

Agriculture, Food and Rural Living

The acknowledgements for *Agriculture* are an integral part of the Introduction in the Agriculture Sector Study. There are no separate acknowledgements.

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Chapter I—Introduction

STUDY OF PUERTO RICO'S ECONOMY

The U.S. Department of Agriculture (USDA) was one of several Federal Agencies¹ participating in the Interagency Study Group on the Puerto Rican Economy. The study was requested by President Jimmy Carter, with the concurrence of Carlos Romero-Barcelo, Governor of Puerto Rico. Federal-Commonwealth coordination was provided by Juanita Kreps, Secretary of the U.S. Department of Commerce, and Miguel Rivera-Rios, Chairman of Puerto Rico's Planning Board.

USDA Role—Agricultural, Food, and Rural Living Analysis

USDA was assigned the lead role for the analysis of the status and performance of agriculture, food consumption, and rural living, including evaluation of alternative strategies for improving these sectors of Puerto Rico's economy.

Secretary of Agriculture Bob Bergland delegated the study direction and policy guidance to Howard Hjort, Director of Economics, Policy Analysis and Budget, and Maynard Dolloff, Acting Deputy Director for Intergovernmental Affairs. Ted Moriak, Office of Budget, Planning, and Evaluation, was appointed project leader and chaired the Study Task Force. Analysts from 13 USDA agencies and 2 of the Secretary's staff offices² participated in developing the data and conducting the analysis.

Heriberto Martinez-Torres, Secretary of Agriculture for Puerto Rico, and his staff provided data and analytical information and helped prepare the agricultural production and marketing section of this study. The Puerto Rican Department of Social Services contributed to the analysis of the consumption

and nutrition aspects of food programs. The Puerto Rican Department of Housing assisted in the analysis of rural living conditions. The Governor's Office, the Planning Board, and numerous other public and private institutions of Puerto Rico provided helpful cooperation in preparing data, providing analytical viewpoints and issues, and developing an appropriate perspective for the study.

One of the requests directed to USDA was that the food stamp program and programs of the Farmers Home Administration be included in the study. Thus, the "agricultural" sector analysis includes not only the traditional agriculture or farming activities but, also, the consumption of food commodities and rural living conditions.

Purposes of the USDA Study

The study was fact-finding and analytical. The study team was specifically requested not to develop recommendations for action. With these guidelines, the objectives of the study were to:

- Analyze trends in production, distribution, and consumption of agricultural commodities in Puerto Rico and housing conditions in rural areas of the Commonwealth.
- Assess the Commonwealth's future food and fiber needs and supplies.
- Evaluate the Commonwealth's agricultural production capability.
- Assess future housing needs in rural areas.
- Identify and analyze the impacts of alternative strategies or opportunities for meeting food and fiber needs in Puerto Rico and housing in its rural areas.
- Present the findings on the agricultural and rural living sectors consistent with the overall interagency study of the Puerto Rican economy.

NEED FOR FEASIBILITY STUDIES AND IMPLEMENTATION PLAN

Following the selection of a policy strategy or program redirection by public policy officials, the

¹ The Cabinet-level agencies are: Agriculture; Housing and Urban Development; Treasury; Commerce; Energy; Transportation; Health, Education, and Welfare; Interior; Labor; Office of Management and Budget; White House; and Environmental Protection.

² The USDA agencies are: Office of Budget, Planning, and Evaluation; Office of Governmental and Public Affairs; Economic Research Service; Food and Nutrition Service; Farmers Home Administration; Animal and Plant Health Service; Soil Conservation Service; Extension Service; Forest Service; Agricultural Stabilization and Conservation Service; Extension Service; Food Safety and Quality Service; Rural Development Service; Agricultural Research Service; Cooperative State Research Service; and Rural Electrification Administration. Some of these agencies were recently reorganized.

Puerto Rican and Federal Agencies need to conduct economic cost/benefit project analyses and prepare an implementation plan. The economic studies of specific projects would assist in determining their relative priority in competing for limited funds. Both economic and social considerations need to be evaluated. The implementation plan would show an orderly transition of manpower, and budgets from current marketing achievements in agricultural resource development, food production, and rural living conditions would assist the subsequent program evaluation efforts. Some of this work may already be done, especially if the Government-directed action plan for agricultural production and marketing is chosen. It was based largely on a detailed study in Spanish prepared by the Puerto Rican Department of Agriculture.

PUERTO RICAN DIRECTIONS FOR THE FUTURE

Goals for Puerto Rican agriculture, food, and rural living conditions were discussed by the USDA study task force with Puerto Rican officials during mid-1977. Puerto Rico's goals, which follow in greater detail, provide basic guidelines for evaluating strategies for improving the economic and social development of Puerto Rico.

Goals for Agricultural Production and Productivity

The Puerto Rican Secretary of Agriculture has a plan to develop an efficient commercial-oriented agriculture on family farms. The plan will aggressively develop programs to better utilize agricultural land for increasing the domestic contribution to the island's food and fiber supplies and export earnings. Frequently, the rhetoric indicates self-sufficiency targets, but such vocabulary is intended to convey the concept that the island has the resources to produce substantially greater quantities of food and fiber at competitive prices than are currently produced. The challenge is to identify, produce, and market those commodities which have the greatest economic comparative advantage for mainland and export markets and domestic consumption.

Government assistance will be needed to facilitate restructuring the emerging modern commercial production system. The entrepreneurial capacity, technical knowledge, capital investment, and input requirements for commercial beef, dairy, rice, vegetable, fruit, and other commodity production is significantly different from traditional sugar, coffee, tobacco, and pineapple operations or subsistence farming. The goal for farm input requirements is to

provide fertilizer, seeds or plant materials, machinery services, operating supplies, and technical assistance consistent with efficient production patterns for the commodities mentioned above.

Before 1950, Puerto Rico was largely an agricultural producer of sugarcane, coffee, tobacco, pineapples, and other traditional tropical food crops. Since 1970, goals have been broadened beyond tropical agriculture to focus on diversifying and commercializing agricultural production of milk, poultry, eggs, beef, pork, and other fruits and vegetables.

The agricultural production sector has a dual organizational structure. Subsistence-oriented family farms outnumber the commercial operations. Roughly 80 percent of all farmers earn less than \$5,000 net annual income. While 70 percent of mainland farmers earned less than \$5,000 from farming, the inclusion of off-farm revenues raised average farm family income to over \$12,000 for any sales class.

Goals for Agricultural Marketing Efficiency and Product Quality

The goal for marketing efficiency and product quality is to develop handling, processing, and storage facilities and systems for consistent high-quality products produced by Puerto Rican farmers. The lack of consistent high-quality products is a characteristic of the subsistence production system and a major constraint to efficient large volume production and distribution. Since seasonal production could not be eliminated, there is a need to develop export markets to distribute the periodic excess supplies.

As agriculture shifts from the three traditional cash crops—sugar, coffee, and tobacco—to a diversified commercial agriculture, it requires a more sophisticated agricultural marketing system involving restructuring the organizational systems for performing each of the marketing functions. The movement of people from subsistence farms into metropolitan areas also expands the need for an efficient food-marketing system. One-third of the Puerto Rican population is in the San Juan area. Most of the other metropolitan areas are located on the flat coastal areas and linked by a relatively efficient highway system.

Goals for Food Prices and Nutrition

Food and nutrition goals for Puerto Rico are similar to those for the United States for eliminating hunger and malnutrition. Their attainment, however, may be more difficult in Puerto Rico because of lower incomes.

The demand for food is relatively stable and does not fluctuate as widely as the seasonal supplies of traditional food crops. Thus, merchants looked for and found stable sources of food supply on the mainland. The advantages of consistent quality and quantities often more than offset the economic gain derived from seasonal purchases of surplus interior island production. Retail prices are high most of the time, but the costs of getting in and out of the interior island producer areas for short-term gains are barriers to long-term development of agricultural production.

Plantains, yams, and other starchy commodities have been traditional staples in the family diet. They are the commodities most subject to seasonal fluctuations. The introduction of the food stamp program to Puerto Rico in July 1974 expanded food programs to over \$600 million per year. This expansion has enabled consumers to diversify their diets, improve their nutrition, and stabilize their food consumption patterns.

Puerto Rican food prices have been rising, sometimes more rapidly than U.S. mainland food prices. The economic conditions which contribute to this situation are high shipping costs for imports, lack of interior central markets, relatively few suppliers in wholesale markets, and strong food demand. Improving island food production and marketing efficiency could competitively provide cheaper and more nutritious diets.

Goals for Rural Living

Improvements in rural living conditions are integrated with the objectives for raising agriculture's contribution to the island's food supplies. Large tract subdivisions are being developed with roads, electricity, water, sewer, homes, and agricultural production facilities, e.g., broiler houses. The projects are coordinated with facilities to deliver farm production inputs and marketing services. Technical assistance is provided on a "live in" basis by agronomists, home economists, and other professionals. Their current objective is to construct 200 homes on a self-help basis at about \$5,000 per unit and a total housing investment of \$1 million. The eventual goal is for 2,000 homes in farm tract subdivisions.

In mountainous areas where land-based agricultural incomes are difficult to obtain, off-the-farm income projects are supported for an entire community. However, the costs of transferring supplies, moving finished products, providing education, recreation, and health services inhibit development of mountain communities. In 1978, the Puerto Rican Department of Agriculture is requesting \$8.7 million for development of craft-type projects in mountain communities in the Commonwealth budget. By 1980, the program may increase to \$19 million. With Federal assistance, these projects could be expanded quickly to include housing, roads, community services, and longer term employment opportunities. Some feel this program could develop into a program similar to the Appalachian Regional Commission.

Chapter II—Agricultural Production and Marketing

DECLINING IMPORTANCE OF AGRICULTURE TO THE PUERTO RICAN ECONOMY

In the span of less than 40 years, the Puerto Rican economy has been transformed from a traditional agricultural economy into an industrial-oriented economy based on manufacturing, commerce, construction, tourism, government, and other services. During this period, per capita income rose, in current dollars, from \$296 in 1950 to \$587 in 1960, \$1,398 in 1970, and \$2,422 in 1976. Increased incomes over this period had a pronounced effect on the quantity, quality, and the mix of commodities demanded by Puerto Rican consumers.

Agriculture, the predominant sector in 1950, employed about 216,000 people (36 percent of total employment) and contributed \$149 million (25 percent) of the island's total income (table 1).

Table 1.—Changes in the Importance by Puerto Rican Economic Sectors 1940, 1950, and 1976

Sectors	[In percentages]					
	Net income			Employment		
	1940	1950	1976	1940	1950	1976
Agriculture	31	24	5	43	36	7
Manufacturing	12	14	31	10	9	19
Commerce	12	17	18	10	15	20
Construction	1	4	6	3	5	7
Government	8	11	22	2	8	22
Services	9	7	13	14	13	17

Source: Puerto Rico Planning Board.

By 1976, agriculture was the smallest of the major economic sectors, providing employment for only 6 percent of the work force and received only 5 percent of the total net income. The transformation of the Puerto Rican economy does not differ greatly from that which took place over the same period in many of the predominantly cotton-producing mainland States such as South Carolina, Georgia, Alabama, Mississippi, and Arkansas.

Table 2.—Puerto Rican Agricultural Production by Major Commodities 1960, 1970, and 1976

	Unit	1960	1970	1976
Dairy	Thou. qts.	289,219	383,668	417,416
Fresh fruit	Cwt.	5,126	3,699	2,843
Starchy vegetables	Cwt.	855	1,720	4,376
Eggs	Thou. doz.	14,558	21,800	29,045
Garden vegetables	Cwt.	7,547	7,221	7,026
Pork	Thou. lbs.	24,314	29,500	46,231
Beef	Thou. lbs.	29,331	44,500	46,417
Poultry	Thou. lbs.	20,564	30,000	37,884
Legumes-pulses	Cwt.	110,000	75,000	85,000

Source: Puerto Rico Department of Agriculture.

Increasing Reliance on Food Imports

Even though the levels of Puerto Rican pork, dairy, poultry, and egg production have shown rapid increases over the last 10–15 years (table 2), their share of the island's markets has been constant or declining (figure 1). Island dairy products make up a large share of Puerto Rico's total dairy product consumption, about 90 percent. Island egg production has been regaining 50 percent of the total island market during the last few years.

Puerto Rican crop production has shown mixed performance; starchy vegetables up sharply; legumes, pulses, and garden vegetables stagnating and fresh fruit production declining.

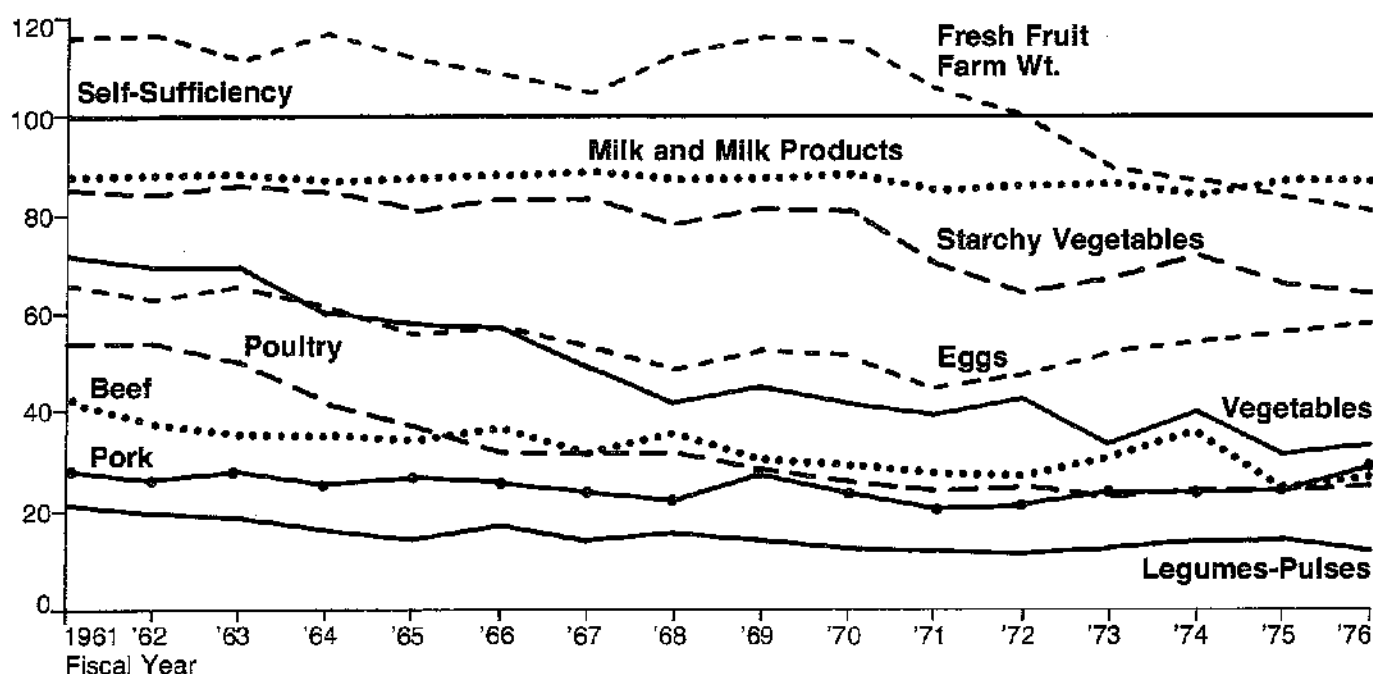
Fresh fruit production shifted sharply from an export position prior to 1970 to providing only about 80 percent of consumption in 1976. Starchy vegetables (such as bananas, plantains, sweet potatoes, and yams) are being imported at nearly a rate of 35 percent of consumption. Island garden vegetables have shown a precipitous decline from about 70 percent of consumption in 1961 to less than 40 percent in 1976.

BACKGROUND ON PUERTO RICAN AGRICULTURAL PROBLEMS AND ISSUES

Puerto Rican agriculture has a culture surrounding the traditional sugarcane, tobacco, pineapple, and

Figure 1

Local Puerto Rican Production As Percent of Total Consumption, 1961-1976



Source: Puerto Rico Department of Agriculture.

coffee operations. Heavy erosion on the hillside put tobacco in serious economic trouble and trimmed sugar operations. The sugarcane industry and pineapple operations combined with the wage-supplement program have been used for social employment objectives and have been detrimental to increasing labor productivity. Lack of adopting high-yielding farm management practices has stunted performance in coffee and food crops. Livestock production shows low rates of feed efficiency and high costs of imported feeds. Thus, dairy, hogs, poultry, and eggs are more expensive to produce than on the mainland. Production of rice to meet island consumption would likely meet stiff competition from the major mainland supplier. These problems are examined more completely below.

Subsidization of Sugar

The Government subsidized 2,480 sugarcane growers at the cost of \$8.5 million during the 1976 season. In addition, the Puerto Rico Sugar Corporation has registered an accumulated deficit of \$213 million since 1974. Annual operating losses have been between \$45 million and \$69 million for the last 2 fiscal years. The Sugar Corporation is expected to sustain heavy losses again in 1977. In

addition, consumers are paying retail sugar prices that are 7¢ per pound above New York's price. This higher price was estimated to cost Puerto Rican consumers about \$100 million in 1977.

Puerto Rican estimates indicate costs of producing sugar are about 26¢ a pound—19¢ at the farm stage and 7¢ for processing. The decline of the sugar industry is attributed to low-yielding varieties, deficient irrigation and drainage systems, insect attacks, use of inadequate farm equipment, the burning of cane before harvest, too long a period between harvesting and crushing, and excess milling and refinery capacity that results in low labor productivity. Studies show that man-hour requirements per ton in Puerto Rico are four times those of Hawaii, 2.6 times those of Florida, and twice those of Louisiana.

Inefficiency in Coffee

Coffee production in Puerto Rico has averaged about 265,000 cwt. annually over the past 3 years. Coffee is grown on 110-130 thousand cuerdas¹ in the highlands, down from about 160,000 cuerdas in 1960-65. Consumption is approximately 400,000 cwt. per year, 35 percent in excess of local produc-

¹ One cuerda is approximately 0.98 acre.

tion. Local consumers pay higher prices than mainland consumers in spite of the Commonwealth subsidy. Traditional coffee production is characterized by yields of about 200 pounds per cuerda. New production methods, using prescribed sets of technological practices developed by the Agricultural Experiment Station, show sustained yields as high as 2,000 pounds per cuerda.

Pineapple Operations

From the early 1950's, Government and private pineapple production from a harvested area of about 2,200 cuerdas rose from about 25,000 tons to a peak of 80,000 tons in 1965 from a harvested area of 5,000 cuerdas. Pineapple production and processing is now totally a program of the Puerto Rican Land Authority, with production about 42,000 tons from a harvested area little less than 3,000 cuerdas. The Land Authority had a loss of over \$1 million in the past 3 years. Projected operations in 1978 and 1979 anticipate profits of \$158,000 and \$482,000, respectively. The cooperation of the local labor unions in raising productivity is crucial to the profitability and future expansion of the pineapple enterprise.

Collapse of Tobacco

Tobacco acreage declined from 37,000 cuerdas in 1950-51 to less than 5,000 annually in the 1970's. To slow this decline, the Government offered special incentives to growers in recent years of about 23¢ per pound and to processors of about 8¢ per pound. Traditionally, tobacco has been grown on mountainous land with serious erosion problems and requiring high rates of fertilization. Despite incentives and subsidies, the tobacco industry has not been profitable. It is expected to be phased out within a few years.

Seasonal Production and Lack of Modern Technology in Food Crops

The principal food crops grown in Puerto Rico include the starchy vegetables (root crops and plantains) and legumes (pigeon peas, lentils, etc.), with horticultural products (tomatoes, peppers, etc.), and fruits (mangoes, citrus, avocados) also being produced to a lesser degree. Most of the food products have been grown on small farms in the hilly or mountainous regions. These farms are usually less than 50 acres in total size, with 6 to 7 acres in crops such as bananas, plantains, root crops, and legumes. Few managed orchards have been developed.

The Land Authority operated only about 450 acres of irrigated land on the southern coast in

1976 and 1977 in an effort to learn about the production of vegetable (horticultural) crops. Net operating losses amounted to \$900,000 in 1975 and \$306,000 in 1976. The Land Authority has leased this land to private entrepreneurs. Even though yields have varied widely and are low relative to other commercial producing areas, practices for obtaining high yields have been developed.

High Feed Costs and Livestock

In contrast to the general decline of the traditional export crops and food crops, the livestock subsector has shown considerable growth over the past 15 years. Total meat production, which includes beef, pork, and chickens, has increased from slightly less than 700,000 cwt. in 1961 to 1,250,000 cwt. in 1976. While all meat production has increased by 78 percent over this 15-year period, all meat and poultry consumption increased over 150 percent, from 1.8 million cwt. to over 4.55 million cwt. As a consequence, imports increased 200 percent, from 1.1 million cwt. in 1961 to 3.3 million cwt. in 1976.

The expansion of livestock production was due to the increased local demand for meats, eggs, and fluid milk. Most of the dairy and beef production took place in the coastal flat lands, relatively close to the population centers. Improved pastures assisted increased beef and dairy production. The land requirements for pork and poultry enterprises were quite small.

Poultry and swine production is largely dependent upon imported feed which costs \$35 to \$47 per ton more than on the mainland, because of transportation costs. Island feed conversion rates are lower than on the mainland, too. Consequently, its economic viability is contingent on the size of the fresh product market or on the consumers' willingness to pay premium prices for a fresh product.

Major California Cooperative Supplies Rice

The U.S. Department of Commerce reported approximately 440 million pounds of rice being shipped to the island from the mainland in 1976 at a cost of \$88 million, or 20¢ per pound. This estimate is 18 percent higher than their estimate for shipments in 1975 and is nearly twice the 7-10 percent annual growth since 1973. Estimates by DACO in Puerto Rico show 391 million pounds being imported from July 1976 to June 1977. This estimate is consistent with the rate of growth since 1973 and is supported by the USDA survey of shipments from U.S. rice millers. The Task Force was unable to ascertain why the DOC data show such a sharp departure from trend in 1976. In any case, Puerto Rican rice sales show strong growth.

The California Rice Growers Cooperative is the major supplier of the short grain rice. If rice were to be grown and milled on the island, it is unlikely that the California Coop would relinquish their market share easily. However, benefit-cost studies show that rice grown in Puerto Rico can compete favorably with California rice in retail outlets.

FAILURE OF TECHNOLOGY TRANSFER

The research and education functions of Puerto Rico have operated as autonomous agencies, each developing their own policies and program. Approximately 8.5 percent of Experiment Station funds are used in administration. Also, the transformation of the Puerto Rican economy from a basically agricultural to an urban and industrial economy has contributed to a stagnant philosophy regarding agricultural research.

The Puerto Rican Extension Service is staffed with administrators and a cadre of agronomists well acquainted with Puerto Rican agriculture. The administrative costs of the Extension Service are abnormally high, amounting to 24 percent of total funding. Since State Extension Service offices are to design programs relevant to their needs, they receive little unsolicited direction from the Federal Extension Service in USDA. Only perfunctory program reviews to determine legal qualification for the use of funds (Bankhead-Jones, etc.) have been made. There is little follow-through from USDA, other than documentations and audit reviews, as to how funds are actually used.

There are problems in the commitment of the island's extension personnel to do more work with farmers. There is little contact between the Commonwealth Extension headquarters and the local extension agents. With little central direction, information is both slow and lacking. There has been inadequate teamwork between research and extension personnel—and little coordination between the production and farm management staffs. In Puerto Rico, little or no use has been made of advisory committees at the Commonwealth or metropolitan levels.

As a result, Puerto Rican agriculture has not kept pace with the technological advance required to compete for productive resources with either mainland agriculture or the rapidly developing urban-industrializing sector of the island's economy. Other factors contributing to the Puerto Rican farmers being unable to adopt a high level of technology are their inadequate education, high average age, and low capital resources.

Old Age and Low Education of Operators

The average age of Puerto Rican farm operators is about 55 years old, whereas the average age on the mainland is 51 years. The low income operators tend to be older with an average age of 60 years. Educational levels on the island are lower than the U.S. mainland and rural dwellers are particularly disadvantaged—having less than a 5th-grade education compared to a 10th-grade education on the mainland. Only 10 percent of the farm operators have any vocational training. This combination of low education and older age makes it difficult to replace obsolete and traditional agricultural techniques. (See table 3.)

Table 3.—Age and Education of Farm Operators, Puerto Rico and Mainland, Selected Years

	Puerto Rico			Mainland
	1950	1960	1970	1970
Farm operators				
Average age	55	55	55	51.2
Median school years completed	3.0	3.6	4.3	10.4
Percentage having any vocational training	NA	NA	10.5	20.2

NA—not available.

Source: Census of Agriculture.

Decline in Fertilizer Use

Fertilizer use increased in Puerto Rico from 1950 to the mid-1960's, after which both total and per acre applications declined.² After the mid-1960's, trends in fertilizer use in sugarcane declined while other crops increased. Sugarcane represents more than 50 percent of the fertilizer use. Slight increases in fertilizer use have occurred for coffee and vegetables. Pasture shows measurable use of fertilizers only after 1967. (See table 4.)

*Table 4.—Fertilizer Use Per Acre in Puerto Rico, Selected Years
[In pounds]*

Crop	1950	1959	1964	1969	1974
Sugarcane	1,000	1,020	1,020	700	840
Coffee	140	190	190	240	240
Vegetables	1,000	1,280	1,340	1,760	1,550
Pasture	0	0	0	70	50
All crops	580	630	680	350	480

Source: Puerto Rico Department of Agriculture.

Plant Disease and Animal Health

Sugarcane yields have declined recently partially due to infestation by the West Indian sugarcane root stock borer, commonly referred to as the "white grub," a larval insect which damages root structure.

² The data are crude because they are based on total volume and do not reflect possible changes in active ingredients for nitrogen, phosphorus, and potash.

The only effective treatment for the "white grub" is the pesticide Aldrin. It is banned by the Environmental Protection Agency. Without chemical treatment, there is no known recourse because there are few uninfested fields. Barring development and use of an alternative pesticide, the "white grub" infestation will intensify and further inhibit production. This pest will attack most plant roots.

The Bont tick, which carries anaplasmosis, is seen in both beef and dairy cattle. Infestation is spread by movement of herds to new locations or to market places. The tick carries human as well as animal diseases. Survey funds to determine the extent of Bont tick infestation have been granted by the Office of Management and Budget, but no funds are allocated for a treatment program.

Dairy herds in increasing numbers have been experiencing outbreaks of mastitis and some brucellosis. Control of mastitis, brucellosis, and Bont tick will require implementation of rigorous identification and control programs using currently available methods and treatments. Delay in such programs will permit wider spread infection and increased cost of production.

Inadequacies of Local Market Infrastructure

The poor organization of Puerto Rico's local marketing infrastructure is, to a great degree, associated with the nature and characteristics of its agricultural food production patterns. Scattered low-income producers, poor roads in remote areas, and the lack of an effective distribution system for the principal local food crops lead to high costs of marketing. Itinerant hucksters make periodic trips into the remote areas. The Agricultural Market Services Branch of the P.R. Department of Agriculture now operates 22 local buying centers, 5 central warehouses, and 1 central warehouse in San Juan, making sales to wholesalers, retailers, and direct retail sales. Although there are more assembly points, this function encounters difficulties with providing marketing services such as grading and packaging for the seasonal production.

The budget for carrying out marketing improvements averaged only about \$500,000 annually from 1970-72. It was increased to over \$1 million in 1973, then to about \$2.5 million annually between 1974 and 1976. The current budget now exceeds \$3 million, but projected budget costs show increases by 25 to 50 percent to bring the marketing system within an acceptable level of serviceability.

Cooperatives have been established in several areas. Their objectives are to contribute to the socio-economic development by solving fundamental social problems associated with high unemployment, lack of training and education, inadequate housing, high

cost of living, and poor social planning. Of the 17 agricultural coops in Puerto Rico, only 5 have significant size. They provide farm input and commodity marketing service at 33 locations, often in direct competition with the P.R. Department of Agriculture.

COMPETITION FOR LAND RESOURCES

In Puerto Rico, some 270,000 fully mechanizable acres are suitable for tillable land.² These lands are located almost entirely in the coastal plains. An additional 600,000 acres (27 percent of the island) are in the uplands and are partially mechanizable. Urban, industrial, and other permanent uses are encroaching on agricultural land at an average rate of 4,000 acres per year. Nearly 50 percent of the island is too steep or composed of such fragile soils as to be best suited for permanent vegetative cover.

Industrial and residential encroachment on highly productive agricultural lands is controlled by the Puerto Rican Planning Board. Sales of the coastal agricultural properties are also subject to approval from the Puerto Rican Secretary of Agriculture. Experience at zoning lands for prime agricultural use by other States shows that the process of urban encroachment is slowed and may be better planned, but not halted. Inevitably, the economic factors will bid lands into higher use values, and provide more employment per acre than would agricultural production.

Deforestation and Abandoned Hillsides

Early in its 500-year history, Puerto Rico cut the forests and tilled up to 90 percent of the plains and mountains, largely for sugar and tobacco. By 1830, the island was no longer self-sufficient in wood and paper products. About 280,000 acres are best suited and available for commercial forests. This acreage of well-managed forest lands could provide 90 percent of Puerto Rico's needs for wood and paper. As the low value hillside tobacco and sugar land was abandoned, it returned to scrub brush and trees with no commercial value. There are currently 600,000 acres of woodland and brush.

Erosion and Sedimentation

The early farming practices of the fragile soils caused serious erosion problems. The runoff silted water supply facilities and resulted in a loss of soil productivity. Seven major reservoirs have lost a total of 32,500 acre-feet of storage capacity. The Comerio

² Greater detail is available upon request in an unpublished report entitled "Puerto Rico Agricultural Production Resource, Management and Technology Base."

and Coamo Reservoirs are totally silted. Some of the reservoir area has actually become a grazing meadow. (See table 5.)

Table 5.—Major Puerto Rican Reservoirs, Date of Construction, Size, and Loss to Siltation

[In acre-feet]

	Construction date	Storage capacity	Acre-feet lost by 1977
Comerio	1913	4,918	4,000
Guayabal ¹	1913	15,100	9,000
Coamo	1914	2,827	2,800
Patillas	1914	15,000	900
Cidra	1946	5,300	600
Caonillas	1948	49,000	6,900
Loiza	1953	21,674	6,500
Total		113,819	32,500

¹ Capacity was expanded to present size in 1950.
Source: USDA—Soil Conservation Service.

Changes in land use have reduced the problems of erosion and sedimentation. Farmland has declined from 90 percent of the island in 1950 to less than 60 percent in 1976. Erosion was largely associated with the tilled acreage.

The adoption of conservation practices over the last 25 years has contributed substantially to reducing damage to both land and water resources. Farmers' practices include irrigation water management, conservation strip and contour cropping, drainage, proper grazing, brush management, fencing, and spring development. A measurable benefit has been a reduction of reservoir sedimentation rates.

SCARCITY OF WATER RESOURCES AND LACK OF MANAGEMENT

Rainfall of up to 70 to 90 inches occurs annually on the north coast and mountain slopes of the island. A few mountain areas receive well over 100 inches per year. In contrast, the south coast is droughty and requires irrigation most of the time. Currently, the need for drinking water, industrial uses, and agricultural irrigation exhaust existing quantities of controlled surface and ground water supplies. There is plenty of water on the island, if it were controlled. Uncontrolled runoff to the ocean amounts to about 3 million acre-feet annually, or 80 percent of the precipitation. Additional impoundment sites have a potential aggregate storage capacity of 1.8 million acre-feet (table 6).

Water use projections for 1990, assuming trend increases in use and current rates of efficiency, will probably require development of 350,000 acre-feet additional storage capacity. Most uses could be met without adding storage capacity by improving the delivery efficiency rates in the three irrigation sys-

Table 6.—Puerto Rican Precipitation Areas, Water Storage Potentials, and Projected Use

[In thousands of acre-feet]

Area	Uncontrolled runoff	Reservoir storage		1970	1990 projection
		1917	Potential		
South coast	355	58.2	141	178	362
East coast	581	0	100	8	17
West coast	870	19.9	656	86	50
North coast and upland	2,010	234.5	978	166	380
Total	3,816	312.7	1,875	437	809

Source: USDA—Soil Conservation Service.

tems. These systems are operating only at a 30-percent efficiency rate, whereas a highly managed rate of 50 percent is achievable.

ROLE OF COMMONWEALTH PROGRAMS

Agricultural Support and Development Administration (ASDA)

The Puerto Rican Department of Agriculture is a centralized Commonwealth agency charged with policy formulation and implementation for the agricultural sector, including the administrative aspects of budgeting, planning, statistics, and evaluation (fig. 2). ASDA is the major action-oriented coordinating agency within the department that is engaged in comprehensive commercial activities extending to every facet of Puerto Rican agriculture.

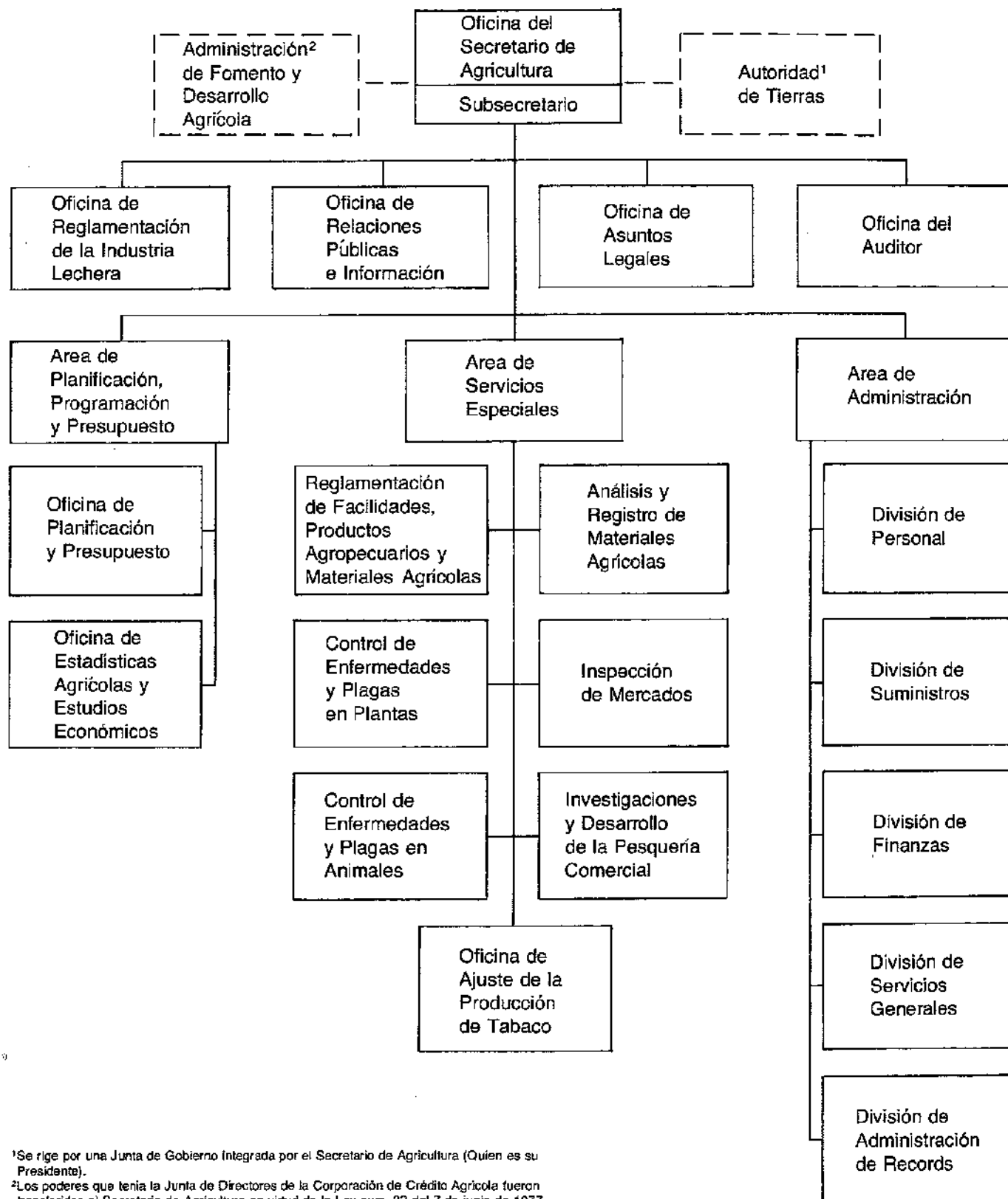
The four major direct operating programs under the central direction of the Executive Administrator of ASDA are: (a) Agricultural Development Assistance, (b) Economic Assistance and Auxiliary Services, (c) Marketing of Agricultural Products, and (d) Wage Supplements and Security. The estimated budget for the agency for 1977-78, including public funds of the ACC and RDC, is projected at \$88.4 million.

The department is the island's largest landowner, conducts the largest farming operations, and disburses subsidies and producer incentives to practically every major farm enterprise. It also furnishes a wide array of agricultural production and marketing services to individual landholders through ASDA, and oversees the Commonwealth's agricultural credit and rural development programs through the Agricultural Credit Corporation (ACC) and the Rural Development Administration (RDA). The Department of Agriculture, in cooperation with Federal agencies, also carries out research, extension, regulatory inspections of plants and animals, and insect and disease control programs.

Figure 2

Departamento de Agricultura de Puerto Rico

Diagrama de Organización



¹Se rige por una Junta de Gobierno Integrada por el Secretario de Agricultura (Quién es su Presidente).

²Los poderes que tenía la Junta de Directores de la Corporación de Crédito Agrícola fueron transferidos al Secretario de Agricultura en virtud de la Ley num. 33 del 7 de junio de 1977.

Agricultural Credit Corporation (ACC)

The Agricultural Credit Corporation was created to integrate all public farm credit programs within the Department of Agriculture. It provides credit facilities in the form of direct loans and equity loans, as well as guaranteeing private bank loans for the development of farm enterprises and other related agricultural trades. A major aspect of the ACC is to make loans to provide the equity capital needed by farmers and agri-business firms to enable them to borrow from the Federal Land Bank and private lending institutions. In effect, it serves credit demands not met by other sources. The estimated budget for the ACC activities in ASDA for 1978 is projected at \$5.9 million.

The interest charge on ACC loans is 5 percent, which makes it the cheapest source of credit in Puerto Rico. An interest subsidy is provided for guaranteed loans. The subsidy covers the difference between the ACC rate of 5 percent and the usual commercial rate of 8.5 to 9 percent. Fifty-two percent of loans have been made without security. Of the loan portfolio of \$27 million, about \$7 million or 25 percent is considered delinquent. Unsecured loans are made to small- and medium-sized farmers. Machinery loans are secured by chattel mortgage.

Wage Supplements

The agricultural wage subsidy program was started in 1969. From 1969-76, about \$150 million were disbursed with 40-50,000 farm workers benefiting. This program has raised the minimum agricultural wage rates 50-80 percent since its inception. Under the program, farm operators are reimbursed any minimum wage increases over what they were paying in 1968-69.

It is now recognized that the program needs to be restructured in order that the farmers pay a larger portion of the minimum wage to keep program costs from reaching exorbitant levels and to encourage farm operators to adopt new production practices that will raise labor productivity.

Land Authority of Puerto Rico

Land Authority of Puerto Rico was created in 1941 to support agricultural development on the island and to improve rural living conditions. The original purpose of the land law was to put an end to the then existing corporative latifundia in Puerto Rico, and to prevent its reappearance in the future. To achieve this objective, landholdings were limited to 500 acres for any partnership or corporation.

In conjunction with its responsibility to help in agricultural policy implementation of the Department of Agriculture, the Land Authority was given the

following tasks: (1) to assist in the creation of new farms and by renting land to small farmers; (2) to facilitate the best land use for public benefit under efficient and economic production programs, including the industrial processing of agricultural products; (3) to ensure the conservation of land; and (4) to take actions leading to scientific, economic, and efficient use of the land by the people of Puerto Rico.

Four agricultural and industrial programs are supervised by the Land Authority. They are: (1) the pineapple program, (2) the livestock program, (3) the food crops program (in the process of transfer to ASDA), and (4) the real estate program. The Land Authority owns a total of 94,943 acres of land which are used in the different farming programs. The operating budget of the Land Authority for 1977-78 is \$25.8 million, most of which is self-financing. Its public budgetary support is not included in ASDA budget projections. In January 1973, the Sugar Corporation was created as a subsidiary of the Puerto Rico Land Authority to administer the sugar program. As an independent subsidiary of the Land Authority, its function is to consolidate efforts and manage the human, land capital resources in order to develop farming as well as industrial phases of the sugarcane industry. Estimated public budgetary costs and losses for 1977-78 are projected at about \$57.3 million, not including interest on previous debts. These figures are not included in ASDA budget projections.

Department of Natural Resources

The prime responsibility for operating the Commonwealth forestry programs is held by the Department of Natural Resources. However, these efforts need to be coordinated with the Puerto Rican Department of Agriculture. Both agencies have nurseries and both provide technical assistance to rural residents.

ROLE OF SELECTED MAJOR USDA PROGRAMS—NATIONAL PRIORITIES

Research and Extension

The Agricultural Experiment Station research activities are integrated within the College of Agricultural Sciences of the University of Puerto Rico at Mayaguez. The Experiment Station has no direct administrative link to the Puerto Rican Department of Agriculture. However, it is important for Experiment Station research programs to take into consideration the plans and programs of the Puerto Rico Department of Agriculture. The basic objective of the Agricultural Experiment Station is to provide

the technological and scientific frameworks necessary for the development of an efficient agriculture. Emphasis is placed on applied research to develop improved technology. Approximately 31 percent of the total funding of the Agricultural Experiment Station has been coming from Federal sources on a regular basis.

The Agricultural Research Service cooperative project at the Rio Piedras Experiment Station has an applications research effort. These projects concentrate on the development of simplified packages of improved farmer practices in coffee, plantains, bananas, root crops, and rice, and the establishment and maintenance of pasture. The scope of this program should include all food crops that can be grown competitively in Puerto Rico. The Mayaguez Institute of Tropical Agriculture is largely an Agricultural Research Service (ARS) supported institution working on problems related to the United States needs in the temperate zone and in the tropics with opportunities for spinoff to Puerto Rican agriculture. Some funds are received from the United States Agency for International Development and minor amounts from other sources.

The Agricultural Extension Service's education and teaching activities are integrated within the College of Agricultural Sciences of the University of Puerto Rico. The purpose of the Agricultural Extension Service is to educate farmers, housewives, 4-H Club youths, and other people in the use of knowledge, practices, and techniques to improve agricultural development family life and the development of community resources. It reports to the Dean of Agricultural Science, the College of Agriculture, as does the Experiment Station and is totally independent of the action-oriented programs of the Puerto Rico Department of Agriculture. The Puerto Ricans would prefer that coordination of the Extension Service and the Experiment Station programs be under the leadership of the Puerto Rican Department of Agriculture.

Approximately 62 percent of total funding at the Extension Service comes from Federal sources on a regular basis. In other States, their level of funding is higher so that the Federal contribution is 40 percent or lower of the total cooperator budget. Administrative costs use approximately 15 percent of appropriated funds and the rest is divided about evenly between the two major program areas—agricultural education and home economics.

The Forest Service has two research and extension-type programs in Puerto Rico. Research on regeneration of forests and their management costs about \$580,000 per year. Another \$160,000 is used to provide technical assistance to farm foresters with \$70,000 being matched by the Commonwealth.

Agricultural Stabilization and Conservation Service (ASCS)

Nationally, this agency has responsibility for developing regulations and administering a price-support program for sugar, rice, and other crops authorized and mandated by the Food and Agriculture Act of 1977. The programs are administered through loans and purchases with respect to the processed products.

Anyone can produce rice in 1979, but target price and price support loan eligibility is restricted by the Food and Agriculture Act of 1977 to historical allotment holders. The national rice acreage allotment is also fixed by that act at 1.8 million acres. The 1979-crop rice program has been announced with a target price of \$9.05 per hundredweight, and a loan and purchase rate of \$6.79 per hundredweight.

Legislation would have to be amended in order to authorize the rice program in Puerto Rico. The difficulty of achieving such authorization is evidenced by the strong opposition of traditional U.S. rice allotment holders to provide any program benefits to nonallotment rice producers, which culminated in the 1977 act restricting program benefits to allotment holders.

USDA has proposed to implement by June 1, 1979, a CCC loan program for 1979 crop sugar. The loan program is intended to provide interim support to the industry until new sugar legislation becomes effective. Should legislation not be enacted, the loan program would cover the entire 1979 crop. The timing of this proposed action reflects an intention to help meet Puerto Rico's needs for price-support protection and interim financing. The effective basic loan rate for raw cane sugar in Puerto Rico is being proposed in the range of 12.37-13.62 cents per pound.

Food Inspection

Prior to June 5, 1977, the meat and poultry inspection program was part of Animal and Plant Health Inspection Service, and the other commodity services programs were under Agricultural Marketing Service. In 1976, there were 77 Federal and Commonwealth employees engaged in the various programs now administered by the Food Safety and Quality Service (FSQS) in Puerto Rico. The activities in Puerto Rico cover the meat and poultry inspection program, the Poultry and Dairy Quality Division, the Meat Quality Division, and the Fruit and Vegetable Quality Division. Meat and poultry inspection accounts for over 60 percent of \$1.8 million in these programs.

ALTERNATIVE STRATEGIES FOR AGRICULTURAL DEVELOPMENT

Three development strategies for agricultural production and the use of Puerto Rican land, labor, water, and capital resources are analyzed to 1988. A continuation of past policies and an alternative free-market approach were estimated during the fall of 1977 by the task force. They evaluated trends, producer and processor behavior, and commodity budget analyses for Puerto Rican situations in order to develop estimates of land use, crop and livestock production, farm income, and taxpayer costs to the Commonwealth and the Federal Government. A third alternative, a government-directed action plan, was based largely on a Spanish study developed by the Puerto Rican Secretary of Agriculture. The estimates in the Puerto Rican study were thoroughly evaluated for farm budgets, economic development and the longer term world commodity outlook.

This evaluation of the Action Plan led the Task Force to use less optimistic commodity price projections, allowed more time to achieve high degrees of managerial performance and top entrepreneurial levels of yields. The estimates were adjusted to reflect world agricultural production potential and variability, rising energy price impacts on the costs of agricultural inputs, and a longer learning period for the farmers to achieve high yields and cost-efficient operations. Even though this analysis uses substantially more conservative estimates of profitability, both the task force and Spanish analyses point in the same general direction.

Each strategy has Commonwealth and USDA components that must be coordinated to achieve their respective estimated production employment use and farm income. A brief description of each strategy is given below.

Continuation of Past Policies

This strategy would continue past Commonwealth programs which mixed the social objectives of reducing urban crime and housing pressures arising from off-the-farm migration and unemployment with economic objectives for higher wage earnings and greater agricultural production.

Commonwealth wage supplements would be used to pay the difference between the minimum farm wage level established by the Minimum Wage Board and the prevailing agricultural wage rates being paid by farmers in 1968-69.³ Price subsidies and development incentives would be provided to producers of sugar, tobacco, coffee, vegetable, dairy, and pork

³ Technically, it is the wage rates established by law No. 141 and 142 of 1969, as amended. This difference in recent years has ranged from 20 to 50 percent.

producers. Incentives to expand productive capacity would be given to many food crops, dairy, pork, poultry, and egg producers. Losses on sugar and pineapple operations would be curtailed even though other programs remained. Little emphasis would be given to the role of technology in raising labor productivity and crop yields.

Free Market-Type Approach

Opening Puerto Rican agriculture to a semi-free market could significantly affect smaller Commonwealth expenditures for wage supplements, subsidies, incentive payments, or operating losses. Under this strategy the production estimates and land, labor, and capital requirements can be used to examine the feasibility of reducing the role of government. The Commonwealth and USDA would need to substantially increase their programs in research, technology transfer, credit, and marketing services in order to complement the private production adjustment process from traditional low-productivity food-crop enterprises to new technologies and new crops that have a potential comparative advantage in Puerto Rico and export markets.

Government Directed Action Plan

The comprehensive action-packed plan for turning agriculture around involves a two-pronged approach. One effort would be directed toward the older traditional low-income farmers in terms of continued subsidies until retirement or other forms of attrition, moderate development incentives, and more aggressive government action in the improvement of the marketing infrastructure. The other effort would be directed toward younger, more educated, technically aggressive farmers to improve methods of operation, to adopt modern production technologies, and to shift out of perennial farm income losses to more profitable commodities and enterprise combinations. These farmers would receive cash incentive payments, subsidized input supplies, and intensive technical assistance to improve land, labor, and capital productivity. Through the use of model farms, modern technology, and entrepreneurial practices are expected to be spread throughout the island.

It is a transition program for phasing down the continuation of subsidies to numerous low-income farmers and developing a smaller number of viable family farms in a sustained free market.

COMPARISON AND EVALUATION OF ALTERNATIVE STRATEGIES

The foregoing three strategies are compared and evaluated as to how they might affect commodity

production, resource use, employment, credit needs, and returns to agriculture. Each of the strategies calls for a different mix of Commonwealth and USDA programs and a different level of funding to achieve their objectives.

Shifts in Land Use and Commodity Production

Under all three strategies, urbanization, industrialization, and other permanent uses are expected to continue at present growth rates to encompass about 200,000 acres by 1988. In 1976, these uses were estimated by the Soil and Conservation Service to occupy 150,000 acres.

Tobacco production is expected to cease under all three strategies. Puerto Rico Department of Agri-

culture data show that it has had a long-term decline from 35,000 acres in 1950 to about 3,000 acres in 1976. The different development strategies suggest different timeframes; 2-3 years for free market, 8-10 years for action plan, and 10-12 years for the continuation strategy.

The *Continuation* of past programs would lead to decreases in tilled and cover cropland from 340,000 to 169,000 to 279,000 acres (table 7). Sugar, coffee, and tobacco are the big losers; by 57,000, 30,000 to 115,000 and 3,000 acres, respectively. Rice may be developed on 0 to 25,000 acres as now planned. Coffee production may rise to 15,000 acres in intensive sunlight production. Livestock and dairy production would continue increasing—beef at about 1 percent per year, pork only 6 million pounds above the current excessive supply peak of 46 million

Table 7.—Puerto Rican Land Use, Crop Acreages and Production by Commodity, 1976, and Alternative Strategies for Development to 1988

[In thousands]

Commodity	Units	1976 ¹	1988 ²		
			Continuation	Free market	Action
LAND USE					
Cropland cultivated and tree crops	Acre	339	169-279	88-239	222-311
Pasture:					
Managed	Acre	160	160	160	400
Native and brush	Acre	690	840	840	600
Forest:					
Native scrub	Acre	538	370	465	303
Commercial	Acre	0	0	0	97
Reserves and parks	Acre	89	89	89	89
Other land	Acre	109	139-249	58-209	108-197
Federal land	Acre	97	97	97	97
Small water areas	Acre	17	17	17	17
Urban and developed	Acre	150	198	198	198
Total	Acre	2,189	2,189	2,189	2,189
LAND IN CROPS					
Sugar	Acre	127	70	0-50	70
Tobacco	Acre	3			
Coffee	Acre	130	15-100	5-90	30-105
Rice	Acre		0-25	25	50
Pineapple	Acre	3.5	4	4-6	4-8
Fruits	Acre	21	25	20	20
Pigeon peas	Acre	14	14	4-8	8
Vegetables	Acre	11	11	10	15
Starchy vegetables	Acre	30	30	20-30	25-35
Total	Acre	340	169-279	88-239	222-311
PRODUCTION					
Sugar	Ton	300	250	0-125	200
Tobacco	Cwt.	46.5			
Coffee	Cwt.	252	170-440	150-310	450-600
Rice	Cwt. milled		0-1,750	1,750	3,500
Pineapple	Tons	42	64	64-96	64-128
Fruits	Cwt.	2,843	3,200	3,500	3,500
Pigeon peas	Cwt.	88	100	75-153	153
Vegetables	Cwt.	7,000	7,000	7,000	10,000
Starchy vegetables	Cwt.	4,376	4,400	4,000-6,000	5,000-8,000
[In millions]					
Beef	Lbs.	45.4	52.0	40.0	68.0
Pork	Lbs.	46.2	52.0	35.00	62.0
Poultry	Lbs.	37.9	47.0	42.0	50.0
Eggs	Doz.	29.0	43.0	43.0	42.5
Dairy products	Qts.	417.6	450.0	431.0	431.0

¹ Source: Puerto Rico Department of Agriculture.

² The estimates for the three alternative strategies were developed by the study task force.

pounds, poultry up about 25 percent, eggs up 40 percent, and dairy output would rise slowly.

Under the *Free Market*, about half the current tilled and cover cropland would go out of production, leaving only 88 to 239,000 acres. Sugar would go bankrupt. After that, however, there may be opportunity to reorganize the industry on an economic basis comparable to that in Louisiana and Florida. Commercially hand-harvested pigeon peas as well as tobacco would no longer be produced, but subsistence production would continue at 30 to 60 percent of current levels. Coffee production would shift only about 5,000 acres to full-sunlight production in response to promotion of the high-yielding farming practices. Rice could be gradually brought into production on the 25,000 acres of irrigable lands, primarily on the North Coast.

Pineapple acreages could be increased by about 50 percent in adjacent areas to existing pineapple left by sugar, if private enterprises could obtain suitable farm lands near the existing canning plant, and if labor cooperates and productivity is improved, and if aggressive production management practices are followed. However, there are significant economic constraints to expanding production such as the cost of suitable land, the high cost of labor compared with foreign competitor pineapple production areas.

Pork, dairy products, and beef could face declines of 25, 12, and 3 percent, respectively from 1976 levels due to high local production costs largely attributable to imported feeds, elimination of wage supplements, and elimination of the \$75 import subsidy on cattle. Consumers have the alternative of buying imported beef products from the Dominican Republic, Central America, and the mainland. Eggs would increase by 40 percent, same as the continuation option. Poultry would be up only by half as much as under continuation strategy because of the lack of incentive payments and price guarantees. Dairy production would be off 4 percent from the excess supply level in 1976 and would probably be limited to the increased demands for fresh milk consumption.

The *Action Plan* calls for a total cropland area of 222,000 to 311,000 acres, 32,000 to 53,000 acres above the continuation option. A substantially changed cropland mix and higher productivity levels restrain the upward pressure on prices. Sugar acreage would be dropped gradually by about 50 percent from current levels and productivity increased in order for the industry to achieve a no-loss position. The new technology of full-sunlight coffee production is estimated by the Puerto Rican Department of Agriculture to be harvested on 30,000 acres by 1988 and average yields for the island are projected by the Experiment Station to increase eight- to tenfold. Ap-

plications have already been received to develop 5,000 acres. Traditional, low yield shaded production is expected to cease on the 130,000 acres. This projection may be somewhat excessive, as much of the existing coffee land may remain in coffee if prices warrant harvesting costs. Even though 75,000 acres remained in traditional production, there would be little lost since alternative uses of the steep highlands are very limited except in commercial forests. Rice production is projected to expand by about 4,000 acres per year for 10 years and 5,000 acres for each of the following 2 years on the acreage shifted out of sugar production. Rice could reach 50,000 acres in 12 years—a level sufficient to meet island consumption. Pineapples might be expanded to about double the present acreage, but there are serious constraints.

Fruit and vegetable production and productivity as projected would undergo radical and dramatic change. Tropical fruits such as mangoes and avocados could be economically expanded to over 5,000 acres with the use of drip irrigation in the southwest. This would require substantial long-term investment capital. Local and export markets on the mainland and in Europe could be developed. Native and essentially wild varieties of citrus and bananas could be replaced by intensive commercial production as producers take advantage of development-incentive options provided by the Department of Agriculture. The 1988 Action Plan also calls for 15,000 acres of irrigated and intensively grown vegetables which could replace sugar on the semiarid south coast. Some of the traditional oranges and bananas on coffee plantations (130,000 acres) will continue production, as it is doubtful they would be totally abandoned in 10 to 12 years.

Starchy vegetables—yucca, yams, taniens, name, and sweet potatoes—would be established under modern farming practices in 7,500 acres. Production yields of plantains would also be doubled—largely through more effective spacing, fertilization, harvesting, and marketing.

Forage production for livestock would be emphasized. Another 240,000 acres would be brought into the managed pasture category. The greatest impact would be on beef production due to growing out dairy bull calves—up 50 percent over 1975—within 13 years. Dairy production would recede to the Free Market levels. Pork production is projected to increase by 30 percent under the 1988 plan. Pork expansion prospects, however, are highly unlikely without substantial subsidies given the present situation of excess production in Puerto Rico.

Commercial forest production would begin developing under the Government-directed Action Plan. By 1988, Honduras pine would be planted on 97,000 acres. Another 113,000 acres would be planted in

succeeding years. Projected products are fence posts, poles, and softwood lumber.

Such plantings would require immediate low-skilled employment, conserve water and soils, provide esthetic values, and develop a domestic source of softwood timber supply. Currently, 90 percent of Puerto Rico's wood and paper needs are supplied by imports. Commercial timber production would not be undertaken as part of the other two strategies.

Costs to the Commonwealth

Continuation of present programs implies a high level of incentive payments, wage supplements, commodity subsidies, and a decline of operating losses on Commonwealth agricultural activities—down from about \$138 million in 1976 to about \$80 million in 1988 (table 8).⁴ It also implies a continuing low level of about \$8.4 million per year on research and extension. Puerto Rico only contributes about 40 percent of Cooperator funding for extension

⁴ Numbers without parentheses represent the 1988 budget needs. Ten-year totals for 1979–88 are shown in parentheses.

programs whereas other States contribute 60 percent or more. The lack of technology adoption has been attributed to the low rate of Commonwealth funding, but the mixing of social and economic goals also had a negative effect on the use of improved technologies and management's efforts to increase productivity of labor. The accumulated undiscounted cost of the pattern of Commonwealth budgets (fig. 3) to achieve the action plan over the next 10 years could be about \$1.3 billion.

The *Free Market* implies an immediate and continuing increase in research and extension funding to about \$13 million per year. Costs for marketing services would need to rise sharply to \$10 million per year. Subsidies and losses could be reduced gradually to about \$20 billion per year. It is highly unlikely that they would be eliminated in the short run because of the extent of Commonwealth publicly owned real estate facilities, and operations as well as special interest group pressures to maintain specialized government support. The accumulated undiscounted cost over the next 10 years could be about

Table 8.—Commonwealth and Federal Costs, Farm Income, Agricultural Employment and Credit Needs, 1976 and Alternative Strategies for 1988. (Constant 1976 Dollars)

[In millions of dollars]

Item	1976 ¹	Alternative strategies ² to 1988					
		Continuation		Free market		Action	
Commonwealth costs:							
Research	5.5	5.5	(55)	6.5	(65)	6.5	(65)
Extension	2.9	2.9	(29)	6.5	(65)	6.5	(65)
Traditional subsidies	25.0	25.0	(250)	3.0	(90)	5.0	(180)
Losses on operations	69.5	20.0	(435)	16.0	(357)	9.0	(370)
Wage supplement	28.0	22.0	(220)	0	(150)	0	(100)
Production services	12.5	12.5	(125)	0	(100)	10.0	(250)
Marketing services	3.2	4.0	(40)	10.0	(100)	7.2	(72)
Total	146.6	91.9	(1,154)	42.0	(927)	44.2	(1,102)
Federal costs:							
Research	3.0	3.0	(30)	4.0	(35)	4.0	(35)
Extension	5.0	5.0	(50)	5.3	(51)	5.3	(51)
Forest improvement	0	0	(0)	0	(0)	1.2	(12)
Forest protection	1.0	1.0	(10)	1.0	(10)	3.0	(20)
Food inspection	2.0	2.0	(20)	3.0	(25)	3.0	(25)
Plant and animal disease	2.0	2.0	(20)	3.0	(25)	3.0	(25)
Soil and water conservation	1.0	1.0	(10)	3.0	(30)	3.0	(60)
Sugar act	3.0	0	(0)	0	(0)	0	(0)
Total costs	17.0	14.0	(140)	19.3	(176)	22.5	(228)
Total government costs	163.6	105.9	(1,294)	61.3	(1,103)	66.7	(1,330)
FmHA farm production loans	7.0	7.0	(70)	50.0	(500)	50.0	(500)
Farm income:							
Gross	410.7	549.3		461.4		625.5	
Agricultural labor	98.4	90.4		100.0		165.5	
Island produced inputs	122.3	248.3		195.7		225.7	
Imported inputs	107.9	118.0		121.0		170.0	
Total costs	328.6	456.7		416.7		561.2	
Net income	82.1	92.6		44.7		64.3	
Island returns to government cost (ratio)	1.85	4.07		5.55		6.83	
Employment (thousand)	46.0	42.0		34.0		45.0	
Credit needs (millions of dollars)	200.0	200.0		240.0		300.0	

¹ Sources: Puerto Rico Department of Agriculture and the U.S. Department of Agriculture.

² The estimates for the three alternative strategies were developed by the study task force.

\$900 million in a declining pattern as shown in figure 3.

The *Action Plan* calls for the same research and extension funding as the *Free Market* strategy. Subsidies to traditional producers would decline from \$25 million to \$5 million per year. Losses on operations would decline from \$65 million in 1976 to \$9 million in 1988 as farmers are accelerated into profitable operations. Another \$250 million over 10 years is deemed necessary for long-term capital adjustment projects in rice, vegetables, fruits, and other commodities including forest plantings; most of these costs coming in the first 5 years. Projected development projects in marketing infrastructure and export market development during excess production periods may cost over \$7 million per year—up from the current level of \$3.2 million. This estimate may be too conservative, given the lack of marketing infrastructure linking the interior island production with coastal consumption centers. Overall costs for a decade of the *Action Plan* are expected to be about the same as that of *Continuation* of past policies, i.e., \$1.3 billion. However, the 1988 budget for the *Action Plan* is expected to be only half the \$90 million attributed to *Continuation* because of the drastic reduction in operating losses on sugar and the elimination of wage supplements.

Impact on USDA Budget

Under the *Continuation* option, there would be only one change in USDA program mix. Sugar payments would be eliminated as a result of the International Sugar Agreement. The level of funding for the other programs associated with Puerto Rican agricultural production and marketing and in the \$7 million of loan assistance for real estate and farm production loans would remain unchanged (table 8).

Under the *Free Market*, about \$1.3 million more funding would be needed to be increased gradually above current levels for directed research and extension. Another \$3 million would be gradually increased for plant and animal health, food inspection, and water resource services—particularly irrigation. The big increase in USDA assistance would come in an immediate and continuing sevenfold increase in FmHA farm and production loans to farmers—up to about \$50 million per year.

Under the *Action Plan*, an increase of funding of \$1 to \$3 million would be necessary for establishing and protecting the commercial forest plantations. The need for efficient irrigation systems for rice, fruits, and vegetables would call for an immediate sharp increase in planning and technical assistance for the water resource development up to about \$8 million and then down to \$3 million per year by 1988. The action plan would require about \$60

million over the 12-year period, about six times the current rate of funding (table 8).

Puerto Rican rice production could generate indirect pressures for increased mainland program costs for CCC nonrecourse commodity marketing loans to farmers, deficiency payments if market prices fall below target levels, and Public Law 480 rice export assistance. The difficulty of including Puerto Rico in the rice program was discussed in the section on the Agricultural Stabilization and Conservation Service. In the absence of island production, these costs are projected for the United States to be over \$200 million per year in the early 1980's. Puerto Ricans consume short grain rice. Even though the 1978 rice prices have strengthened, it is largely the result of demands from higher income countries for the long grain varieties.

The Commonwealth production incentives and price guarantees would provide substantial assurance to increase farm real estate and production loans from private banks. It is expected that banks would provide \$60 million in additional capital to undertake the vast transition in agricultural production and marketing. FmHA would need to supplement farmer production loan activity at about the \$50 million level—the same level as estimated for the *Free Market*, but probably different types of projects.

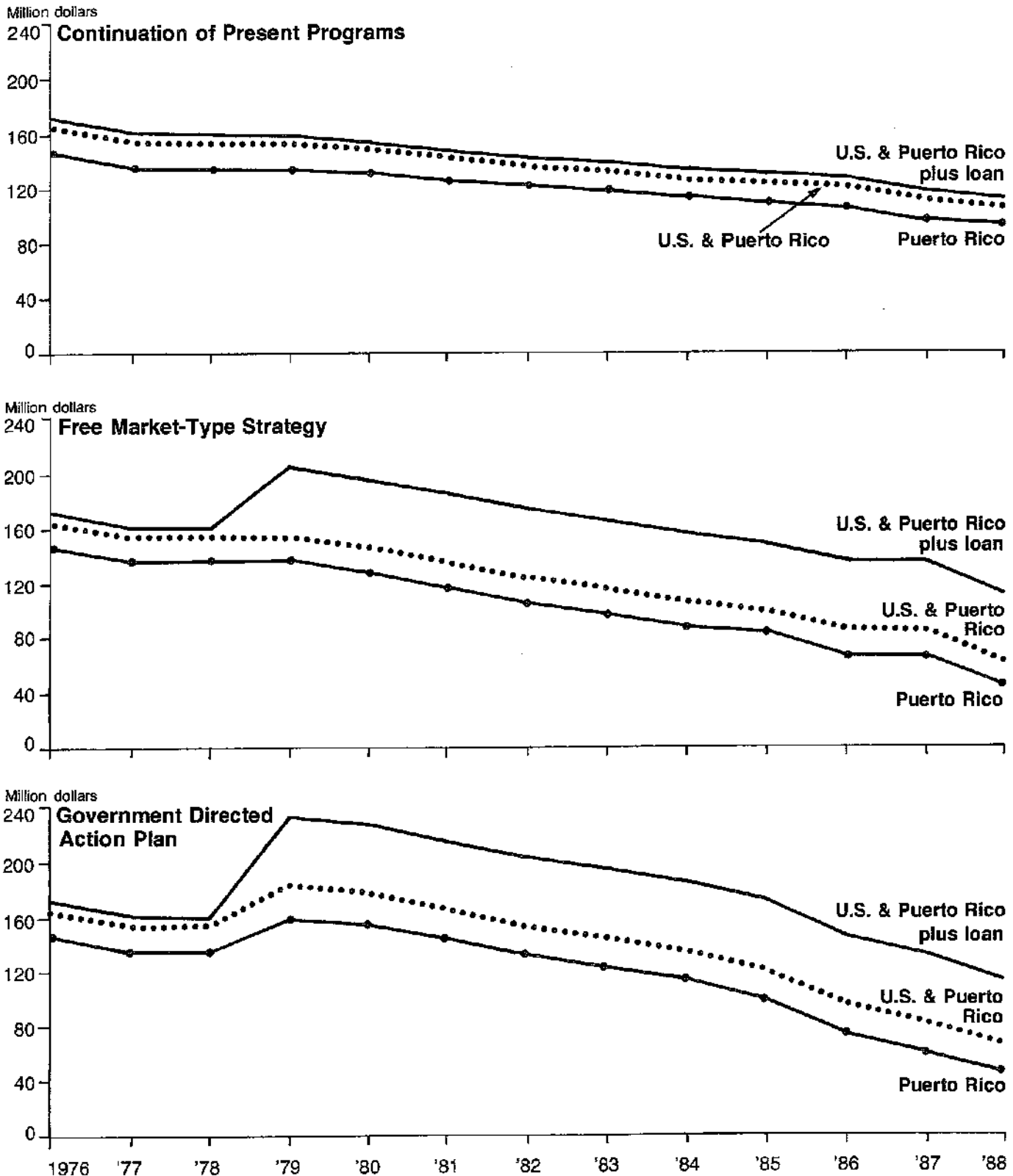
Returns to Agriculture

Gross returns to agricultural production would be nearly \$90 million per year less under the *Free Market* than the \$550 million for *Continuation* by 1988 (table 8). Gross return to farmers of about \$625 million under the *Action Plan* in 1988 would be nearly 50 percent above that of *Continuation*. The *Action Plan* estimates imply that production costs may rise to 90 percent of gross receipts by 1988; whereas farm production expenses are currently running about 80 percent of revenues for the mainland as well as the island. If that happens, then net farm income of \$64 million would be 30 percent less under the *Action Plan* than it is under a *Continuation* option.

Most of the reasons, for the rise in production costs can be attributed to the elimination of the wage supplement program and transferring the \$2-per-hour cost of agricultural labor to farm operators. Another reason for the lower net farm income is the decline in subsidies. The ratio of island value added in terms of agricultural labor, other island farm inputs, and net farm income to the costs of Commonwealth and USDA programs shows nearly a \$7 return for every taxpayer dollar expended under the *Action Plan*, whereas the current situation shows

Figure 3

Commonwealth and USDA Cost and Loan Outlay Budget Patterns under Alternative Strategies for Agricultural Development, 1976-88



only a \$1.85 return, the Continuation option has a \$4 return, and the Free Market shows a \$5.50 return.

Employment Impacts

The *Continuation* option shows reduction in employment to about 42,000 by 1988 at a wage supplement cost of about \$22 million per year (table 8). This gradual decline in employment is consistent with past performance of agriculture. The programs provided a job holding action to meet the social employment objectives.

A move to the *Free Market* would displace significant number of workers—9 to 13,000 out of sugar alone. Some of these workers would move into rice, pineapple and fruits, starchy foods, and vegetables, forests, ornamentals, and aquaculture. Other displaced workers would swell the unemployment rolls which already are at 20 percent of the work force. The social costs of displacing these workers may be as high as \$4,200 per employee lost per year.

The net result of the *Action Plan* is to achieve year-round jobs for about 45,000 agricultural and forestry laborers in 1988 without wage supplements. This employment should result as labor productivity increases along with those for land and capital.

Credit Needs

With a *Continuation* of present programs, several agricultural industries are expected to gradually decrease their total capital assets as machinery, equipment, and facilities wear out. These are sugar, tobacco, and coffee. Other commodities such as livestock, pineapple and fruits, and vegetables would

invest new funds in production facilities. The net impact is to continue credit demands at about \$200 million per year (table 8).

Under the *Free Market* option, vast disinvestment will occur in sugar and pork. The shifts to rice, pineapples, full-sunlight coffee, and other capital improvements will have a net impact of increasing credit demands to \$240 million per year. Lack of guarantees and poor historical performance to induce private bank financing probably puts the burden of about \$50 million on FmHA. The lower Commonwealth budget suggests that they may have the ability to develop farm production loan programs of their own.

Under *Action Plan*, credit demands will increase to about \$300 million per year as more facilities, equipment, and machinery are needed for producing and marketing the irrigated fruits and vegetables, rice, full-sunlight coffee; ornamentals, and aquaculture products. The government price guarantees and development payments would provide the incentive for private banking interests in Puerto Rico and the United States to expand their agricultural financing about \$60 million above current levels. The Bank of America, which has a long and profitable agricultural financing record, is currently conferring with Puerto Rican officials and firms regarding investment opportunities on the island. Other banks are analyzing reentry into the Puerto Rico agricultural lending market. Even with this renewed interest of the private banking sector, there appears to be a need for FmHA financing at about \$50 million per year. Some of the need for FmHA loans would be for joint funding of agricultural production facilities.

Chapter III.—Consumption and Nutrition

Puerto Rican diets have changed significantly in the last 10 to 20 years. There has been increased per capita consumption in all livestock categories between 1960-73—90 percent in beef, 44 percent in pork, 200 percent in poultry, 70 percent in eggs, and 13 percent in dairy products (table 1). Per capita

Table 1.—Per Capita Food Consumption in Puerto Rico, Farm Equivalent 1960-76¹

	[In pounds]			
	1960	1970	1973	1976
Beef and veal	20.5	38.1	38.8	43.7
Pork	34.3	41.0	49.1	35.2
Poultry	14.9	37.5	43.7	53.3
Fish	11.1	14.0	15.1	13.8
Eggs	12.9	21.0	21.3	22.5
Dairy products	272.0	316.0	307.0	^a 460.7
Starchy vegetables	235.6	191.7	209.7	219.5
Cereals	229.7	236.1	248.2	217.0
Fruits	116.4	101.2	118.3	166.8
Fats and oils	36.8	42.4	49.6	^a 44.6
Coffee, tea, chocolate, etc.	11.3	14.7	16.3	16.8
Legumes	33.3	25.0	24.4	18.9
Soups and spices	8.1	10.6	10.3	6.5
Total	1,036.9	1,089.3	1,151.8	1,319.3

¹ These trends should not be extrapolated due to the rapid expansion of food stamps since 1973. New survey data will be available in mid-1978.

^a Includes butter equivalent as fresh milk.

^b Excludes butter.

Source: Commonwealth of Puerto Rico Planning Board, Department of Agriculture and Commerce.

consumption of starchy vegetables declined by 10 percent. The total amount of food consumed per capita has increased. Rice consumption, as measured by Commonwealth import data, declined from 3.5 million cwt. in 1968 to 3.1 million cwt. in 1974. However, since 1974, imports have risen by 800,000 cwt.

In 1974, Puerto Rico began participation in the U.S. food stamp program. Due to an unemployment rate which reached 20 percent on the island in 1976, participation in the program grew quickly. Since per capita aftertax income in Puerto Rico averaged only 40 percent of that on the mainland in 1976, nearly 70 percent of the Puerto Rican population was eligible to participate in the food stamp program, and about 50 percent of their population received stamps. In 1976, food stamp benefits in Puerto Rico represented \$540 million. Other food

programs—School Lunch; Food Distribution; Women, Infants, and Children (WIC); and Summer Food Service—added another \$90 million of USDA expenditures.¹

Food stamp expenditures in Puerto Rico are higher than they would be on the mainland because of the substantially lower per capita income, and the gap left by other income-maintenance programs. Whereas, the USDA program operates by the same criteria in Puerto Rico as it does in the United States, many of the other Federal cash assistance programs (SSI, AFDC, etc.) have special procedures for the island that provide lower aid than for comparable situations on the mainland. These transfer payments are used in calculating the need for bonus food stamps. Puerto Rico suggests that the Federal cash assistance programs be revised so as to operate on the island with the same criteria as on the mainland.

The following sections examine the impacts of the USDA food program. It evaluates the impacts of rescinding the purchase requirement and making other changes in the food stamp program that will occur as the 1977 Food and Agricultural Act is implemented. There are problems with wage minimums, lack of local agricultural labor, the competitive stance of large-scale mainland and foreign farm producers vis-a-vis local farmers, and inaccessible redemption centers for local production. Selected opportunities are identified for using food programs to aid agricultural development.

IMPACTS OF USDA FOOD PROGRAMS ON PUERTO RICAN GENERAL WELFARE AND ECONOMY

Several detailed studies have been made of the food stamp program and its economic contribution to the island. These studies have been done cooperatively between the Puerto Rico Department of Social Services and the Food and Nutrition Service of the USDA. A brief description of the important impacts on Puerto Rican consumers and producers,

¹ An unpublished paper entitled "Food Programs in Puerto Rico" is available upon request.

mainland producers, and taxpayers in the Commonwealth and the United States are given below.

Expanded Consumption of Food

Comparison of food sales and consumption from immediately before, and 12 months after, the implementation of the food stamp program showed a 20 percent increase in sales of the same food items after allowing for increases in food prices, according to a Puerto Rico Department of Social Services survey of three areas of the island. Since there was no significant increase in income of the participating households, this increase in food demand can be attributed to the food stamp program.

Impact on Nonfood Consumption

The same study estimated that food stamp participants used bonus dollars to purchase additional food items equivalent to at least 40 percent of the value of the bonus. The other 60 percent of the bonus substituted for food purchases made with participants' own funds and thus had the effect of increasing purchases of nonfood goods and services, including an increase of savings or a decline of borrowing. In addition, there are indirect impacts on the island's economic activity due to this infusion of spending, about 9 percent of Puerto Rican net income.

Benefits to Mainland Farmers

About one-half of the food tonnage consumed in Puerto Rico is imported, primarily from the U.S. mainland. The increased demand for imported meats, cereals, fruits, and vegetables benefited mainland farmers. About the only product not being imported is fresh milk. The island produced beef, pork, poultry, eggs, and dairy products but required increased imports of mainland feed grains. The benefit to mainland farmers is reduced by the income tax contribution of about \$3 million used to fund the food stamp program.

Benefits to Puerto Rican Farmers

Consumption rose dramatically for local-type food products such as plantains, cassava, and taniens due to the food stamp program. However, the supplies came largely from other Caribbean islands. The lack of an effective marketing system prevented the local traditional crop producers from expanding production and capturing the expanded markets. Thus, production remained nearly constant while the share of island consumption fell from 75 percent down to 65 percent. Island dairy producers captured the entire effect of increased consumption for fresh milk. Beef, pork, and poultry producers shared the increased demand for their products with importers.

Costs to USDA and the Commonwealth

Total food program costs to USDA have expanded rapidly from about \$33 million in 1969 to nearly \$90 million in 1974, and from \$330 million in 1975 to over \$600 million in 1976 (table 2). The big shift came in 1975 when the food stamp program was implemented islandwide and the school lunch, school breakfast, and WIC programs were expanded. The food distribution program has been phased out.

The costs to the Commonwealth of participating in the programs were increased because of the cost sharing associated with the operation of the food stamp program. The cost of the bonus stamps was borne entirely by the Federal Government, but the costs of administering the programs were shared about equally between the Federal Government and the Commonwealth.

IMPACTS OF THE FOOD AND AGRICULTURE ACT OF 1977

Eligibility

As of July 1, 1977, the maximum permissible net annual income for a family of four members

Table 2.—Food Program Costs in Puerto Rico, FY 1969 through FY 1976

[In millions of dollars]

Fiscal year	Food distribution	Food stamp	National school lunch	School breakfast	Summer food service	Nonfood assistance	WIC	Total dollars
1969	27.37	—	5.19	0.26	0.11	0.32	—	33.25
1970	32.37	—	7.28	.30	.15	.56	—	40.66
1971	38.00	—	14.92	.22	.24	.79	—	54.17
1972	42.63	—	21.48	.28	.37	.26	—	65.02
1973	55.04	—	21.29	.33	.17	.14	—	76.97
1974	58.78	—	27.16	1.32	.25	.28	0.31	88.10
1975	32.44	261.01	33.06	3.88	.65	.26	2.21	333.51
1976	29.88	540.89	46.20	4.99	1.44	.41	5.63	629.44

Source: Program Reporting Staff, FNS, USDA.

for food stamp program eligibility was \$6,876. This income criteria will be reduced to \$5,860 according to the new poverty guidelines established by the Office of Management and Budget (OMB) as required by the Food and Agriculture Act of 1977. Thus, households at the upper end of the income scale will be eliminated from the food stamp program. This will have the effect of reducing eligibility in Puerto Rico from about 75 percent to about 60 percent of the population. However, by eliminating the purchase requirement, more families are expected to participate.

Participation

According to a preliminary estimate prepared by the Department of Social Services of the Commonwealth of Puerto Rico, about 75 percent of all households which were eligible to participate in the food stamp program during the last few years actually participated. Nonparticipation by 25 percent of all households can be attributed to several factors, including (1) marginal net benefit to those at the upper income levels of program eligibility, making them indifferent to the program; (2) financial resources may have been lacking to meet the purchase requirements, making it difficult to participate regularly in spite of a willingness to do so; and (3) physical handicaps and old age, making it difficult to travel to the food stamp office.

Since the new act eliminates the purchase requirement, the households with financial resource restraints are expected to participate. New participants will likely offset those households that become ineligible for the program because of lower income eligibility criteria.

Net Benefit

The new act changes the net benefit in two ways: (1) eliminating higher income households from being eligible and (2) adjusting the deduction calculations. Rather than a complex set of documented itemized deductions, more simple standardized deductions will be used. These changes in procedures are an attempt to reduce administrative costs, eliminate errors, and shift the bonus to those in need. For particular Puerto Rican families, the new bonus can be higher, lower, or the same as before, depending on how they earn and spend their money in comparison to the new guidelines.

An analysis of the U.S. mainland food stamp participant profile shows that 8.6 percent of the households will become ineligible, less than one-half percent will drop out of the program voluntarily, about 20 percent will lose some bonus, nearly 50 percent will be relatively unaffected and about 25 percent

will receive increased bonus stamps. Furthermore, over 20 percent of the current caseload will become new participants—twice the amount dropping off the rolls. In contrast, the total Puerto Rican enrollment is expected to be relatively unchanged from the present 350,000 households. A further analysis of the Puerto Rican families who will gain and lose is not available.

ALTERNATIVE OPPORTUNITIES FOR FOOD PROGRAMS TO AID PUERTO RICAN DEVELOPMENT

Although Puerto Rico already realizes substantial economic benefits from the food stamp program, the Federal Government could provide further assistance in marketing of farm products to consumers, extending the knowledge of foods and nutrition to homemakers, and improving program management. More effective use of food stamp bonus dollars increases the impact of spending for food, creates new jobs, and indirectly aids the Puerto Rican economy. The food stamp program requires participants who are able to work to register for jobs when they apply for the stamps. Through this mechanism, unemployed persons can be referred to available jobs.

The following section examines alternative actions that could be taken regarding food assistance programs and the likely results of each action.

Expansion of WIC Program

The Special Supplemental Food Program for Women, Infants, and Children (WIC) provides supplemental diets to pregnant and nursing women, their infants, and children who are a nutritional risk. Incomes in Puerto Rico are less than half of those on the mainland.

The WIC Program in Puerto Rico has expanded by two-thirds over the past year. In December 1976, participation totaled 21,000 women, infants, and children per month. By the end of 1977, participation had climbed to 35,000; but the need is even greater. Seventy thousand infants are born annually and large numbers of eligible pregnant women and young children are not participating. The WIC Program, through an orderly expansion in future years, can be used to meet the special nutritional needs of this group, and prevent health problems later in their lives.

Improving Food Stamp Program Management

The food stamp program in Puerto Rico has suffered management problems, some of which have

seriously affected the operation of the program. Problems have occurred mainly with management of the program at the local level, and with the operation of the central computer system.

FNS is now providing technical assistance to Puerto Rico in both these areas. A management consulting firm has been hired to develop standard operating methods for the program, including procedures for local food stamp office operations. In addition, FNS is providing assistance in eliminating problems in the computer system. The Commonwealth now feels that some of these management problems to a large extent have been solved. However, recruitment of local level managers remains a problem due to local wage structure.

Study of Dietary Status

As part of the 1977-78 nationwide food consumption survey, a special sample is being taken in Puerto Rico. This sample will produce measures of the nutritional adequacy of Puerto Rican diets. Within this sample, those persons participating in the food stamp program can also be identified.

The information gained through this survey will provide a data base for decisions on the future of the feeding programs in Puerto Rico. In addition, it can highlight areas of special needs, such as lack of nutritional information. Thus, FNS will be in a better position to initiate new activities which will benefit Puerto Rico.

Farmers Markets and Food Stamps

Recent hearings regarding operation of the food stamp program indicated a need for widening redemption accessibility to farmers markets and wholesale-type outlets in the United States. This need is particularly acute in rural areas.

In response to these observations, the Food and Nutrition Service will be proposing regulations to encourage the use of food stamps at such food outlets. It is unlikely that this change will have a major aggregate impact, but it should offer increased opportunity for local market participation by both producers and consumers. In some areas, the local impacts could be significant. This encouragement would also apply to Puerto Rico.

Nutrition Education and Extension

Specific guidance is given in the Food and Agricultural Act of 1977, for expanding the food and nutrition education program, to the greatest extent

possible in order to reach all eligible food stamp participants. The Food and Nutrition Service is looking into the costs and effectiveness of preparing bilingual posters and literature which list:

- (a) Foods that contain substantial amounts of recommended daily allowance of vitamins, minerals, and protein for children and adults;
- (b) Menus that combine such foods into meals;
- (c) Details on eligibility for other programs administered by USDA that provide nutrition benefits; and
- (d) General information on the relationship between health and diet.

Cashing Out Food Stamps as Part of Welfare Reform

If, as the Federal Administration has proposed, the food stamp program were cashed out as part of a general reform of the welfare system, Puerto Rico would receive further economic benefits. Instead of food stamps and small cash payments, the Administration plan emphasizes the creation of public service jobs for those who are able to work.

The plan calls for the creation of 35,000 to 50,000 new jobs in Puerto Rico, subsidized with approximately \$200 million in Federal money. This option doubles the number of subsidized jobs that presently exist under the CETA program in Puerto Rico. These public sector jobs could be created in areas which would aid in the economic development of the island.

In addition, the welfare reform proposal would alter the presently existing imbalance between public assistance payments and food stamps on the island. Because Federal law sets a limit on the amount of Federal reimbursement provided to Puerto Rico for cash assistance payments, benefits levels are very low. As a result, a family of four with no other income now receiving public assistance and food stamps receives three-quarters of their total benefits in food stamps, and only one-quarter in cash. Under the reform plan, families in which no one was able to work would receive their total benefit in cash.

These benefits would not come easily. Since the number of jobs needed in Puerto Rico is about 10 times those able to be supported by welfare reform, the selection criteria will be important. Puerto Rico suggests that these jobs be oriented toward public works, repair of roads and highways, and maintenance of public parks and beaches.

Chapter IV.—Rural Living Conditions

PUERTO RICAN RURAL LIVING CONDITIONS AND PROBLEMS

Puerto Rico has 78 municipalities of which 66 are outside the Standard Metropolitan Statistical Areas (SMSA) and can be served by FmHA. Some of the outlying areas of the remaining 12 major municipalities can also be served by FmHA (Aguadilla, Arecibo, Bayamon, Cayuas, Carolina, Catano, Cayey, Guayama, Guaynabo, Mayaguez, Ponce, and San Juan).¹

The definition of "rural area" varies from agency to agency and program to program. Commonwealth urban housing programs are active in some areas also serviced by FmHA. This overlap causes some confusion in the field as to whether an FmHA program is applicable. The Task Force did not attempt to reconcile geographical differences in definitions of rural areas because all sets of data tend to show substantial need for improving living conditions. An implementation plan or study of program operations would need to examine data for specific and uniform geographical areas.

Population Shifts to the Cities

Between 1950 and 1970, the Puerto Rican population increased 23 percent to 2.7 million people. During that period, rural population declined 14 percent while urban population increased 76 percent. The change in designation of a municipality from rural to urban may have occurred as a result of only localized population growth. Thus, the statistics could possibly overstate the actual physical movement of people. In 1950, 60 percent of the population was classified as rural. By 1970, the rural population represented only 42 percent of the island's population and by 1975 it had declined further to 38 percent.²

¹ Municipalities of 50,000 population or less are eligible for the Business and Industry Program; municipalities of 20,000 population or less are eligible for the Housing Program; municipalities of 10,000 population or less are eligible for the Community Program; and the Farmer Program is available in all of these areas.

² "Housing and Development in the Rural Areas of Puerto Rico," Commonwealth of Puerto Rico, Department of Housing, United Nations Expert Group Meeting on Rural Housing, New York, May 1976.

General Housing Situation

During the last 25 years, Puerto Rico gave a high priority to housing activities over the entire island. Public policy made it a Commonwealth goal to provide home ownership and adequate housing for all families. The number of occupied dwelling units increased from 429,000 in 1950 to 807,414 in 1976. This increase has not coincided with adequate housing goals due partially to an expanding population.

Number of Inadequate Rural Units

Puerto Rico's Planning Board data were used by the Task Force to estimate that 209,000 units (54 percent of the rural municipalities) were inadequate in 1976 according to census definitions of homes lacking plumbing facilities and being overcrowded. If the FmHA definition is used, then the rural area is seen as having 202,201 inadequate units. These compare to 37 percent for the entire island. On the mainland, the 1970 Census shows an average of 20 percent of the rural housing units as being inadequate. Seven States had rates of inadequate housing that were as high as 30 to 37 percent.

Small Housing Size

Many family units which were financed by the Commonwealth have less than 600 square feet of living area and are placed on 3,000-square foot lots. The individual programs are discussed in a section on the Commonwealth rural living programs. Many of the units are not constructed to meet the U.S. minimum property standards. Single family homes financed by FmHA must have a living area of at least 950 square feet for the three-bedroom apartment while rental units must have at least 700 square feet of space for a three-bedroom apartment. These units meet Department of Housing and Urban Development (HUD) minimum property standards which satisfy FHA and VA requirements.

Concrete Construction and Increasing Costs

In Puerto Rico, a dramatic change in the type of housing construction materials has occurred. Prior

to 1950, 78 percent of the Puerto Rican homes were of wood construction. By 1970, 52 percent of the units had concrete walls and roofs and helped combat the termite problems of wooden structures. On the mainland, wood construction is generally less expensive than concrete, masonry, or brick. If construction lumber were to be used, it would have to be imported due to the lack of commercial forests on the island.

Construction costs for land, labor, materials, and other services were estimated by the Task Force from Puerto Rican data to have increased by 2.6 to 11.2 percent over the last 3 years.³ Since 1973, the island has been affected by a combination of recession and inflation. Growth and nature of construction is discussed in a chapter entitled "Housing and Construction" prepared by the Department of Housing and Urban Development. The lack of interim financing and lagging increases in family income have brought housing construction to a complete standstill. If these costs continue to increase, housing costs could nearly double within the next 10 years.

Projected Rural Housing Needs

By 1980, the rural housing shortage was estimated by the Task Force from Puerto Rican Planning Board data to be over 30,000 units, in municipalities defined as rural by FmHA. Over 120,000 homes are likely to be inadequate in terms of structural condition and plumbing facilities through 1985 even though overcrowding is not considered in the definition of inadequate. If trends continue, the growth in rural population and lack of housing construction could triple the shortage of new units between 1980 and 1985.

Water and Waste Situation

The water supply and sewage treatment for both urban and rural areas is the responsibility of the Puerto Rico Aqueduct and Sewer Authority (PRASA). Sewage treatment systems are not provided in the central highlands and in many of the rural small lot developments.⁴ Residents rely on septic systems or latrines in these relatively confined rural communities. Both the surface and underground water supplies which feed the reservoirs used for drinking water in the coastal cities can become contaminated.

³ For more detail on public and private construction and recession-inflation trends see "The Cost of Providing Housing in Puerto Rico—A Planning Approach," a preliminary draft on the Puerto Rico Planning Board Study.

⁴ Based on discussions with Puerto Rican housing staff and reports, especially "Land Use Element of Comprehensive Development Plan, Summary Statement" Commonwealth of Puerto Rico, June 1977 and "Housing and Development in the Rural Areas of Puerto Rico, Commonwealth of Puerto Rico Department of Housing." United Nations Expert Group Meeting on Rural Housing, New York, May 1976.

The Puerto Rico Environmental Quality Board, as the official planning agency for water pollution control, includes every region of the island in its water-quality plan. This system has been difficult to implement as EPA is insisting on assigning priority (and funds) to the problems of coastal areas.

In 1977, 24 percent of the rural families had sewers as compared to 71 percent of the urban families. Data are not available to determine number of families with septic systems or latrines.⁵

Drinking water can be provided in urban and rural communities either within homes or by community public faucets. By 1977, nearly 80 percent of the rural families had an in-house water supply. Another 9 percent had access to a community faucet.⁶

The remaining rural residents relied on private wells, springs, or streams. Such sources of water, often contaminated by bilharzia and other organic or inorganic pollutants, are not considered safe for drinking purposes in Puerto Rico. A detailed review of possible remedial actions which could be taken should give full consideration to these problems in conjunction with EPA's involvement under Public Law 92-500.

Electric and Telephone Situation

As of 1970, electric power was provided by a single supplier, the Puerto Rico Water Resource Authority, to 93 percent of the population. Of the 7 percent lacking electricity, over 59 percent were in rural areas. Telephones were available to only 22 percent of the island's homes. Only 3 percent of telephones were located in rural areas.⁷

Income Distribution and Family Size

In 1975, 40 percent of the rural families, those living outside the larger SMSA's, had an income of less than \$4,000. Only 3 percent of the rural families had an income over \$15,000. Figure 1 shows the income distribution of the island population in \$1,000 class intervals up to \$15,000 or more. Family sizes of four persons or less represent 60 percent of all rural families. Those families with eight or more members represent about 10 percent of all rural families.⁸ Figure 2 shows the distribution of family size throughout the island for two to eight or more members.

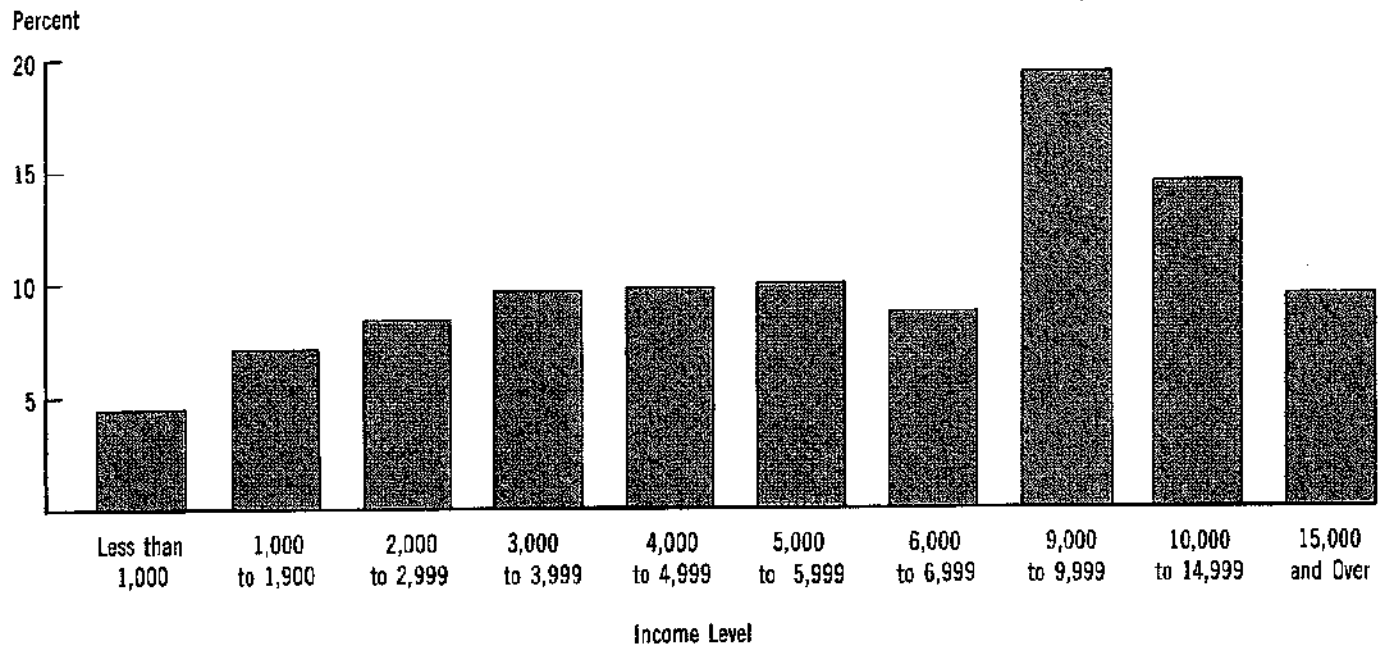
⁵ Municipality detail can be found in "Banco De Information Services De Aguay Alcantarillado, Part VII, Años 1970-77," Commonwealth of Puerto Rico, Puerto Rico Aqueduct and Sewer Authority.

⁶ Municipality detail can be found in "Banco De Information Services De Aguay Alcantarillado, Part VII, Años 1970-77," Commonwealth of Puerto Rico, Puerto Rico Aqueduct and Sewer Authority.

⁷ U.S. Bureau of the Census of Housing: 1970 Detailed Housing Characteristics. Final Report HC(1)-B53, Puerto Rico. U.S. Government Printing Office, Washington, D.C. 1977.

⁸ Puerto Rico Planning Board working papers "Distribution De Las Familias Por Niveles Ingreso, PR 1975."

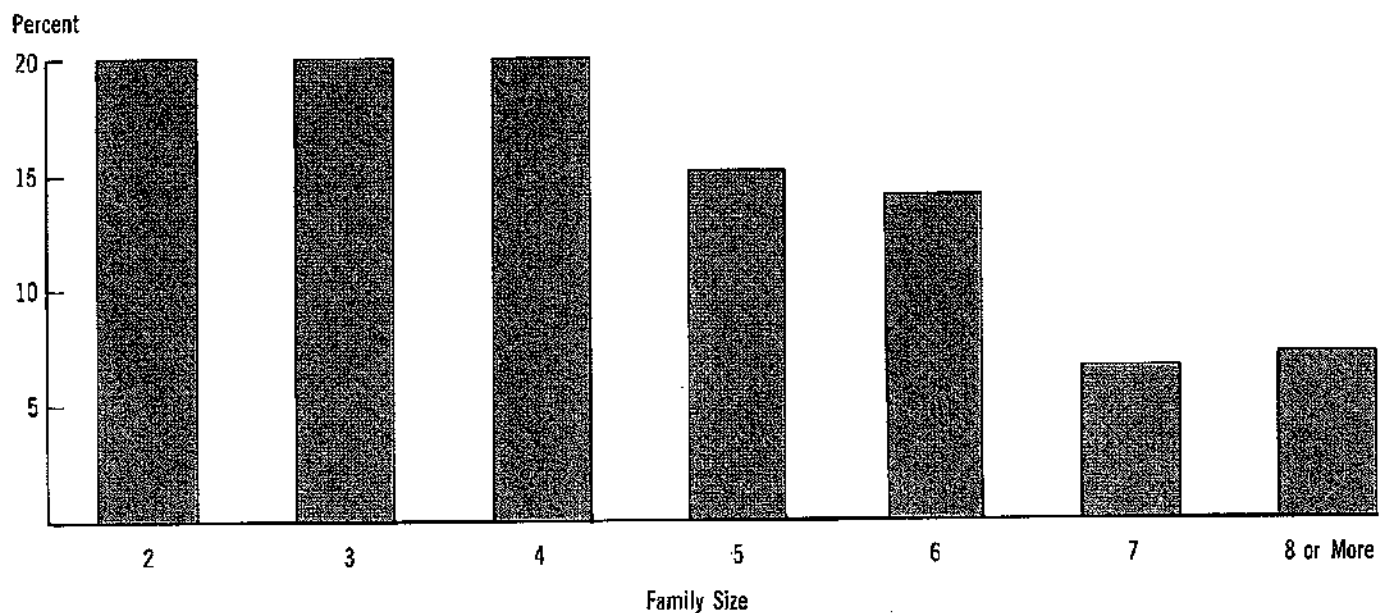
Figure 1.
Percent Distribution of Population by Income Level, Puerto Rico, 1975^u



^u Preliminary

Source: Puerto Rico Planning Board

Figure 2.
Percent Distribution of Population by Family Size, Puerto Rico, 1975^u



^u Preliminary

Source: Puerto Rico Planning Board

FEDERAL AND COMMONWEALTH RURAL HOUSING AND LIVING CONDITION PROGRAMS

Federal Rural Living Programs

USDA Rural Living Programs.—Rural development is a major mission for USDA. It has programs for rural housing, community facilities, business and industry, electric and telephone, and technical assistance. Each of these areas is described and evaluated below. A chapter on "Housing and Construction" also discusses housing goals and issues in Puerto Rico.

FmHA Programs.—FmHA housing programs are directed to both home owners and renters. Loans are provided for purchasing new or existing modest units (table 1). Repair grants are available to senior citizens. All loans carry an interest credit subsidy, if the applicant is eligible. Subsidies on interest can reduce interest rates to as low as 1 percent.

Homeownership loans currently reach families with incomes above \$6,000. Repair loans are available to families with very low income (\$1,000–\$3,000). Repair grants are available to senior citizens. Loans and grants for rental housing construction are available through both the Rural and Rental Housing Program and the Farm Labor Housing Loan and Grant Program. Subsidies on interest can be granted to rental-unit developers. FmHA rental

assistance and HUD's Section 8 rental assistance are available to ease the rent burden of low-income families in the appropriate geographical areas who are paying more than 25 percent of their adjusted incomes for rental housing. Self-help technical assistance grants and loans can aid low-income families in building their own homes.

Community facilities loans and grants assist municipalities in establishing sewer and water facilities, health services, parks, and other community projects.

Business and industrial guaranteed loans assist in establishing agricultural and other related businesses in rural communities.

FmHA's program has increased tenfold between 1970 and 1976, reaching a level of \$100 million. This expenditure represents 1.8 percent of the FmHA loan and grant levels for these activities. The expenditure level is projected to increase to \$224 million in 1978, representing 2.6 percent of the FmHA budget for these activities.

REA Electric and Telephone.—REA has made loans to the electric and telephone authorities of Puerto Rico to provide service to persons in rural areas. To date the Puerto Rico Water Resources Authority has received \$122 million in REA loans to construct electric facilities. This represents about 1.3 percent of all electric loans made by REA during the period 1952–77. In 1976, REA made its first loan for construction of telephone facilities in Puerto Rico; this loan made to the Puerto

Table 1.—FmHA Outstanding Caseload, Program Funding Levels in Puerto Rico and as a Percentage of U.S. Total, 1970, 1976, and 1978

Program type	Outstanding caseload (number)		FmHA obligations (millions of dollars)			Percentage of total FmHA loan dollars		
	1970	1976	1970	1976	1978 projected	1970	1976	1978 projected
Housing:								
Homeownership 502 loans (guaranteed)					31.0			3.4
Homeownership 502 loans (insured)	4,758	12,196	8.4	50.8	84.0	1.1	2.2	3.1
Home repair 504 loans and grants	(²)	1,528	.3	.5	1.0	5.8	7.6	4.8
Rental housing 515 loans	3	2		8.1	21.3		2.0	3.1
Site loans 523-4 loans		2						
Farm labor housing grants and loans Sections 514 and 516 ³	(²)	(²)	(²)	(²)		(²)	(²)	
Subtotal	4,761	13,728	8.7	59.4	137.3	1.1	2.2	3.8
Community Services:								
Water and waste loans	19	45	1.4	15.9	25.0	1.0	3.4	3.3
Water and waste grants .....			.6	2.6	6.0	1.4	1.5	2.4
Industrial development grants .....				.3	.3		2.5	3.4
Community facility loans		1		2.7	8.3		1.4	3.3
EO association loans	16	4						
Recreation loans	1		(²)	(²)	(²)	(²)	(²)	(²)
Subtotal	35	50	2.0	21.5	39.6	1.0	2.0	3.1
Farmer programs	7,184	4,731	2.7	8.6	12.4	0.4	0.4	0.8
Business and industry loans	(²)		(²)	12.0	35.0	(²)	3.4	3.6
All FmHA loans and grants	11,981	18,149	13.4	101.5	224.3	.7	1.8	2.7

¹ Program not in existence.

² Amount is less than \$50,000.

³ Authorizes grants up to 90 percent of development cost available to Puerto Rico under Housing and Community Development Act of 1977.

Sources: FmHA, MIS Staff.

Rico Communications Authority in the amount of \$25 million represented 9.1 percent of all REA telephone loans made in 1976. It is projected that during the period 1978-81, loan programs administered by REA could provide as much as \$515 million for construction of telephone facilities in rural areas of Puerto Rico. Included in this projected amount are funds for expanded telephone service in rural areas served by the Puerto Rico Telephone Authority, which to date has never received an REA loan.

Rural Development Service.—The Puerto Rico Rural Development Committee should work with Federal agencies, coordinate information and programs, and locate and channel Federal and State resources. The Puerto Rican Committee has low visibility and exhibits a lack of direction.

Commonwealth Rural Living Programs

The Commonwealth housing programs are administered through the Puerto Rican Department of Housing and its subsidiaries—(1) Puerto Rican Urban Renewal Housing Corporation (CRUV), responsible for housing in urban areas; (2) Social Programs Administration (SPA), responsible for housing in rural areas; (3) the Housing Bank, responsible for providing financing to CRUV, provides spot loans directly to low- and moderate-income families, guarantees interim financing, and offers mortgage insurance; and (4) the recently established Corporation for the Financing of Rental

Housing. The Housing Element Project of the Puerto Rican Planning Board coordinates, integrates, and sets forth housing policy and construction strategies. It also prepares statistics and works closely with the Puerto Rican Department of Housing and the municipalities in integrating their programs.

Puerto Rico has developed 19 programs for urban and rural development since 1941 (table 2). Some projects address housing, while others improve rural living conditions by offering other services. These programs are grouped into five major areas.

Renewal.—The Commonwealth urban-renewal programs are active in some areas that are also served by FmHA. These programs are directed toward (1) on-site renovation of poorly developed housing where physical and social conditions make improvement and conservation feasible, and (2) elimination of slums in accordance with master plans for development of the area, for the elimination of overcrowding, or to alleviate unsuitable street patterns.

Families who are displaced may choose from a variety of housing units and lots, according to their financial situations. Every effort is made to provide relocation opportunities in order to preserve neighborhoods. This program area provides for land acquisition, relocation, and demolition of structures. The Core Housing Program provides new structures.

Core Housing.—This program was implemented in 1972 to assist the transfer of families currently

Table 2.—Commonwealth Programs and Funding for Urban and Rural Development

Program	Purpose	Funding ¹	
		Commonwealth (percentage)	Federal (percentage)
Renewal:			
1. Renewal with Federal funding	Eliminate slums, relocate families	25	75
2. Renewal with local funding	Eliminate slums, acquire land	X	
Environmental improvements:			
1. Environmental improvement	Provide slums with facilities	X	X
2. Lot improvement	Provide sewer, water, and roads	X	
3. Physical improvement to rural isolated community	Improve facilities	X	X
Public housing:			
1. Development of public housing	Provide adequate housing		X
2. Section 8	Rent assistance to low income	X	X
3. Improvement of existing public housing	Rehabilitation of existing units	X	X
Core housing:			
1. Modest housing	Adequate housing for low income	X	
2. Floodable areas	Relocate families	X	
3. Small lot	Provide sites for housing	X	
4. Semiconstructed housing	Provide basic structure	X	
5. Mutual aid and self-help housing	Provide basic adequate housing	X	X
6. Homeownership	Provide adequate housing to moderate income	X	
7. Law 10-subsidized housing	Provide adequate housing through interest subsidy	X	
8. Rehabilitation	Improve existing units	X	X
9. Low cost housing	Provide self-help adequate housing	X	
10. Physical development of parcels	Provide lot	X	
11. Title to land	Permit ownership under usufruct	X	
Isolated areas:			
1. Isolated community	Provide community and agricultural facilities	X	X

¹ Percentage breakdown of funding for the programs is given where available. Other areas only indicate source of funding.

living in flood-prone areas. It complements the Small Lot Program by providing core house construction loans from the Housing Bank. Families are encouraged to form voluntary groups for mutual assistance. CRUV provides technical assistance in building and completing their own homes at the lowest possible cost.

Many core houses consist of a floor, roof, three or four load-bearing walls, and bathroom. Sanitary systems are provided, but many homes do not have other amenities such as electricity and running water. As the family resources permit, the homes are completed by their own efforts, with technical assistance from CRUV and further loans, if available, from the Housing Bank.

The Commonwealth's small lot and semifinished housing program has resulted in the construction of many inadequate homes. During the last few years, 34,000 lots have been developed and 8,000 housing units constructed. Some of these units are prefabricated asbestos homes with less than 600 square feet of living space, thus making them inadequate by the overcrowding criteria.

Environmental Improvement.—These programs are directed toward problems of slums and deteriorating neighborhoods, where 80 percent of inadequate housing units are located. It is only a temporary ameliorating program. While the slum conditions and inadequate units are not eliminated, the facilities and improvements provided by the program make family living more tolerable; such as sanitary facilities and improved streets.

Public Housing.—Almost all units are rental apartments in rural areas to provide adequate housing for low-income families. The HUD Section 8 and FmHA rental assistance programs ensure not more than 25 percent of adjusted family income is spent on housing.

Isolated Communities.—The Rural Development Corporation of the Puerto Rican Department of Agriculture provides for the development of isolated communities. The isolated community program has concluded work in 36 communities serving 8,050 families and is developing other remote communities. A total of 2,100 individual farms have been established. Land development includes clearing and grading the site, providing roads, water, sewer, electrical systems, and community facilities. These costs normally account for 5 to 20 percent of total project costs.

Commonwealth Projected Housing Programs

During the next 4 years, the Commonwealth would like to construct and rehabilitate housing, and

provide sites and services to over 150,000 housing units. However, lack of funds will probably restrict attainment to one-third of the desired goal, or 13,000 units a year (table 3). The small-lot program

Table 3.—Puerto Rico 4-Year Goals Expressed in Housing Units by Program Type

Program type	4-year desired goal	Annual expected objective
Homeownership:		
Low income:		
Semifinish	2,792	¹ 0
Mixed and modest	5,749	² 0
Middle income:		
Homeownership conventional ..	0	0
Turn key	0	0
Low 10	8,278	3,701
FmHA Section 502	NA	2,900
Rental housing:		
Section 8	5,103	³ 1,622
Urban public housing	3,106	309
FmHA Section 515	NA	⁴ (1,000)
Lot program urban	28,971	² 0
Urban renewal	7,370	² 0
	(rehab.)	
	4,813	
	(destroy)	
Site rehabilitation	6,000	² 0
Land invasion lot improvement	14,651	² 0
Lot programs—rural	19,463	² 0
Low cost housing—rural	11,696	3,000
Improve existing rural communities	32,212	² 0
Self-help program FmHA Section 523 ..	NA	1,396
Total	150,209	12,928

¹ Lack of housing bank funds.

² Lack of funds.

³ FmHA construction financing included.

⁴ Included in Section B.

NA—not available.

Source: Housing Element Study, Puerto Rico Planning Board, chapter II.

will be the primary instrument used in rural areas and be supplemented with existing lot improvement.

Rural housing goals to assist the low-income families for 1978 include 10,848 additional lots to be completely developed and construction to begin on 5,500 housing units. The community development objectives include installation of water service to 16,629 developed lots, 120 kms. of streets, supplemented with other minor projects. Total cost to the Commonwealth is estimated to be \$7 million, with \$6 million being financed through the sale of securities and \$1 million from Puerto Rican tax revenues. An EDA grant of \$15.2 million will augment the total public investment.⁹ Since previous performance of these Commonwealth programs has resulted in the establishment of many inadequate units, it would seem that the monetary and manpower assistance is being spread too thin in order to adequately improve these units and the communities in which they are located.

Financing the housing construction in rural areas will depend heavily on FmHA funding. Puerto Rico's

⁹ Working papers of the Governor's 1978 Commonwealth of Puerto Rico Budget.

Housing Bank is unable to loan funds. CRUV has \$220 million in outstanding loans that are not covered by bond issues. This agency has a practice of issuing no more than \$50 million in bonds yearly. Thus, new money for housing is not likely for 4 to 5 years. The inability to finance additional housing improvements has halted Commonwealth housing construction. Budgetary constraints exist for most other rural and urban housing programs.

ALTERNATIVE OPPORTUNITIES FOR IMPROVING PUERTO RICAN RURAL LIVING CONDITIONS

The Housing and Community Development Act of 1977 has expanded the number of loan and grant programs available in Puerto Rico. Some opportunities exist for using present programs more effectively. Other opportunities may require changes in regulations and removal of legislative barriers in order to widen program delivery. Coordination is needed for effective delivery of community services by the administering agencies of the Commonwealth and Federal programs affecting rural living. Frequently, such coordination comes too late for useful long-term planning.

The greatest constraint to improving rural living conditions is the lack of family incomes. Housing loans, community facility loans, and more consumable services are of little use to families without jobs. To achieve expanded economic opportunities in rural areas would require a substantial commitment by several agencies in both the Commonwealth and Federal Government. A few alternative strategies for contributing to rural development are outlined below.

Loans for Agricultural Business and Industry

FmHA's business and industry loan program could provide opportunities for growth of business and industry in rural areas. The Small Business Administration is another Federal Agency which can provide loans and guarantees for private business. In 1977, Puerto Rico used about \$40 million of FmHA loans for rural business. The *Government Directed Action Plan* for improving production and marketing of Puerto Rico's agricultural commodities will require many supporting private or cooperative businesses for farm input supplies and commodity assembly, storage, processing, and funding would require increased appropriations which recently rose from \$350 million up to \$1 billion.

Rural businesses, whether to serve agricultural production or merely to provide employment, are

constrained by the lack of communications facilities, sewer and water facilities, a highly trained work force, and credit services. While over 90 percent of the island population has electricity, only 22 percent has telephones, and only 3 percent are located in rural areas. A coordinated rural development effort would be needed to provide the environment conducive to locating businesses in rural areas. The Commonwealth would have to commit itself to provide islandwide communications, improved sewer and water facilities, strengthened education, and dispersed credit services.

Loans To Improve Inadequate Housing and Complete Existing Units

One of the greatest housing needs is to provide the basic facilities for eating, sleeping, bathing, and waste treatment. Increasing the size of existing units for bedrooms, adding bathrooms, or improving kitchens can act as an interim carryover until better designed housing can be constructed. Completing the existing semifinished units is another way of increasing the supply of adequate housing. FmHA's 502 homeownership and rehabilitation loan program and 504 home repair loan and grant program can be used to meet this need. Puerto Rico's share of FmHA funding in this area is projected to be 4.8 percent for 1978. An additional \$10 million of 504 repair loans are available because \$15 million are appropriated and only \$5 million are used on the mainland.

Puerto Rico's share of subsidized 502 homeownership loans is expected to increase to 3.3 percent of total FmHA 502 funding by 1981. If the present weighted formula determining fund allocations remains unchanged, the 1981 unsubsidized 502 funds could increase \$40 million over the projected 1978 funding. (The present formula assigns appropriate weights to population, income, number of inadequate units, and delinquency record.)

Alter Minimum Property Standards (MPS)

Federal funds to improve inadequate units are restrained by the failure of many semiconstructed units to meet Federal specifications. More uniform codes are needed and the Federal standards could be reviewed in order to ascertain adaptations that are more amenable to the Puerto Rican situation. "Local acceptable standard" modifications in MPS's have occurred for Guam and some of the American Indian areas. Small lot developments need standards, construction time tables, and closer Commonwealth guidance. This increased guidance and management will require financial support from the Federal and private sectors.

Modify PRASA's Accounting Procedures

PRASA's past accounting system did not differentiate between rural and urban receipts and expenditures. Thus, FmHA grant funds could not be dispersed because grant funds can only be used in rural areas (cities of 10,000 or less) and to establish "reasonable user rates." A total of 17 million dollars in grant funds was returned during 1976 and 1977. PRASA completed a study in December 1978 to implement an accounting system which would separate urban and rural receipts. The acceptance of this system by FmHA allows full utilization of Agency funds allocated to Puerto Rico.

Loans and Grants for Rural Community Facilities

FmHA and Federal Government funds for roads, bridges, health clinics, sewers, water, etc., contribute directly to improving rural living conditions and provide an opportunity to stimulate employment in rural areas. Puerto Rico's Department of Agriculture isolated community projects could make more use of services available from the Federal Government. Central sewer systems are needed in small-lot developments. FmHA's authority for water and waste loans/grants can be used for rural areas with a stable or increasing population. Department of Transportation has excess grant funds available for the construction of high-priority rural roads. Economic Development Administration provides grants for public works projects that assist community development. The Commonwealth needs to conduct the planning feasibility analysis and prepare the project proposals in order to take advantage of these funds as they become available.

Expand Regional Sewer and Water System Plans

The Central Highland region is excluded in the current plans for sewer development since EPA's

priorities (and fundings) are coastal area orientated. Lack of sewer treatment systems for malfunctioning septic and latrine systems can lead to contamination of the headwaters of the rivers that feed the drinking water reservoirs of the coastal cities. Puerto Rico could apply for FmHA loan and grant funds for the construction of waste-water treatment facilities in the highlands. Watershed protection loans are also available to improve reservoirs or expand the capacity of existing structures. In recent years, FmHA has been loaning about \$17 million less than appropriated for these purposes.

Future Decline of FmHA Service Areas

Population growth between 1970 and 1980 may expand municipal populations beyond the 10,000 population eligibility limit for FmHA assistance. To overcome lack of assistance and to ensure continued rural growth, changes in legislation regarding Puerto Rican eligibility for FmHA loans could be considered.

Potentials for Rural Development Outreach

Improving inadequate housing units, constructing community facilities, and developing local businesses require considerable manpower for technical guidance in financing and construction. An effective outreach team approach probably would require five members to locate recipients, package loans, and be responsible for a limited number of projects. If such teams could be financed with Federal and Commonwealth funds, each team, located in municipality offices, could be expected to improve 400 to 500 housing units a year using FmHA loan funds. Other teams could be devoted to agricultural input, marketing, and service sectors. The Agricultural Support and Development Administration of the P.R. Department of Agriculture would likely have a strong role to play in coordinating the infrastructure development with the improvements in agricultural production.

Tourism

Acknowledgements

Many individuals and Organizations contributed to the preparation of the Tourism Sector Report of the Interagency Economic Study of Puerto Rico.

The principal analysis, coordination, and preparation of the Report were the responsibility of George Beuschold of the Office of Policy and Research, United States Travel Service, Department of Commerce.

Valuable direction, advice, and consultation were provided by David Edgell, Director of the Office of Policy and Research.

Jeanne Westphal, Acting Assistant Secretary of Commerce for Tourism, provided policy guidance and review.

The Puerto Rico Study Staff in the Commerce Department was outstanding in working with the study authors. Other Federal organizations with which contact was established included the Office of Economic Adjustment in the Defense Department, the Economic Development Administration in the Commerce Department, the Department of Transportation, and the Civil Aeronautics Board.

The cooperation of the Government of the Commonwealth of Puerto Rico, particularly the Puerto Rico Tourism Development Company, was also instrumental in assembling much of the basic information for the project.

Tourism

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Chapter I.—Introduction

A theoretical blueprint for an outstanding tourism destination might include some of the following items:

- physical beauty and geographic diversity
- an inviting climate and enjoyable weather
- a broad range of entertainment and recreational opportunities
- a variety of good accommodations and facilities
- friendly people with an interesting heritage
- cultural interest within a familiar context
- proximity to an affluent, populous market
- the infrastructure to permit convenient, economical access.

The Commonwealth of Puerto Rico possesses all these attributes. It is no wonder, then, that tourism has become an important and growing sector of the Puerto Rican economy.

This development has not been without problems, nor, as will be seen, has it been without corresponding rewards and opportunities.

Puerto Rico is a lush tropical island with white sandy beaches, plains, forests, and a mountainous interior. It is sunny and warm year-round and the coastal areas experience sea breezes which moderate the heat. In short, Puerto Rico has the natural physical advantages to make it a major tourism destination, particularly during the cold North American winters. In addition, Puerto Rico has a rich and ancient Spanish heritage mixed with other heritages which make visiting the island a rewarding cultural experience.

Tourism to Puerto Rico has grown into an important sector of the Puerto Rican economy. The vitality of Puerto Rican tourism, however, moderated somewhat in 1975-76. During this difficult

period many problems arose, and many seemed insurmountable.

Yet, in the past year, tourism has experienced a resurgence. The Executive Director of the Commonwealth of Puerto Rico Tourism Company notes that "there has been a complete turnaround in our tourism industry" such that the recent "winter season has been comparable to the boom days of 1968. . . ." ¹ Some of the problems of the earlier 1970's remain, but tourism in Puerto Rico has emerged this year as a healthy and leading sector of the Commonwealth's economy.

In this report we will examine the background of tourism in Puerto Rico, analyze the demand for tourism to this destination along with the tourism facilities in Puerto Rico, and identify major issues and policies relevant to the issue.

BACKGROUND

Tourism in Puerto Rico had a modest beginning, yet has grown to assume considerable importance. Table 1 summarizes some broad measures of the growth and significance of tourism in Puerto Rico.

For example, from a level of only 65,000 tourists in 1950, with expenditures of \$7 million, Puerto Rican tourism expanded to over 1.3 million visitors in 1977 with expenditures exceeding \$400 million. The number of tourist hotel rooms has also expanded greatly from 1950 to 1977, from less than 800 to over 6,600, respectively.

Of particular significance is the role tourism has achieved in the economy of Puerto Rico. By 1977 tourism expenditures represented 5.4 percent of the

¹ Doel R. García, Speech to the Caribbean Tourism Association, Feb. 13, 1978.

Table 1.—Basic Tourism Data for Puerto Rico Selected Years, 1950-77

	1950	1960	1970	1974	1975	1976	1977
Visitor expenditures _____ (millions of dollars) _____	7	58	235	360	375	392	424
Visitors _____ (thousands) _____	65	347	1,088	1,441	1,339	1,299	1,376
Tourist hotel rooms _____	791	2,309	7,116	7,732	7,222	7,463	6,628
GNP _____ (millions of dollars) _____	755	1,676	4,687	6,798	7,136	7,439	7,914
Visitor expenditures divided by GNP _____ (percentage) _____	0.9	3.5	5.0	5.3	5.3	5.3	5.4

Note: All data refer to fiscal years.

Source: Government Development Bank for Puerto Rico, Economic Research Department.

Chart 1.
Number of Visitors to Puerto Rico

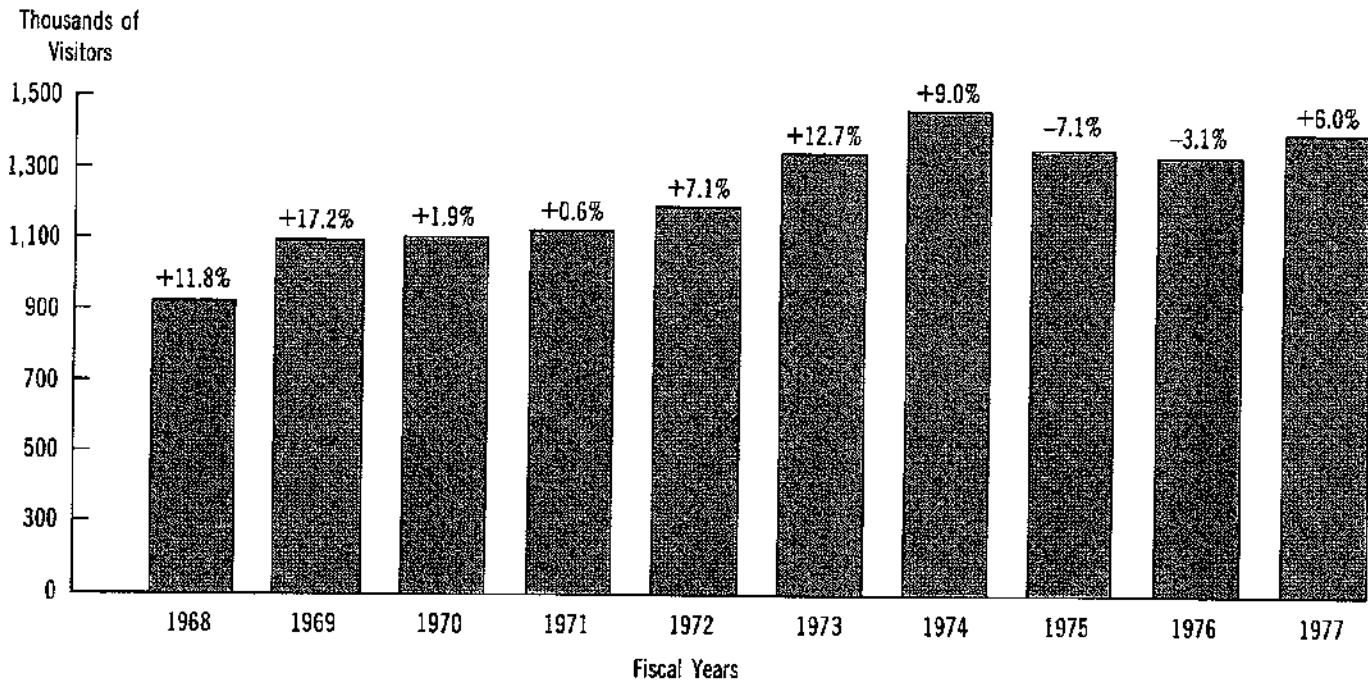
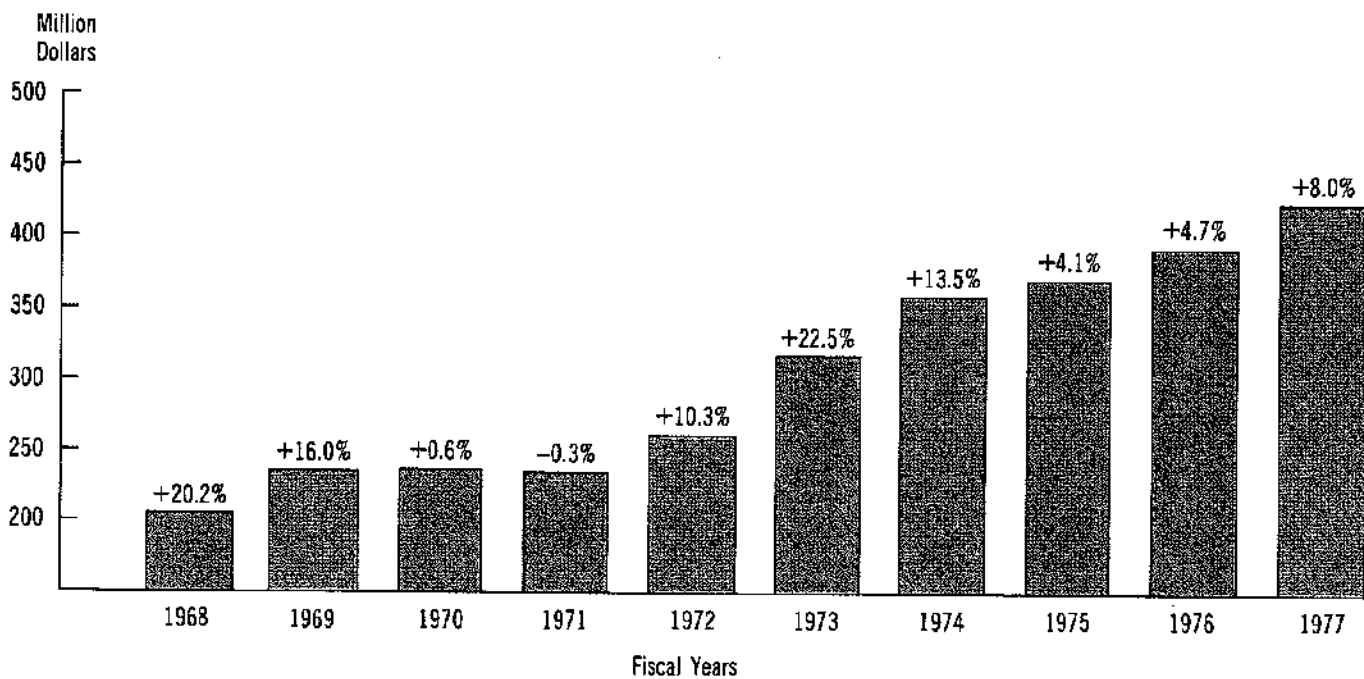


Chart 2.
Total Expenditures of Visitors in Puerto Rico



Puerto Rican GNP, compared to less than 1 percent in 1950.

Tourism is the third largest sector of the Puerto Rican economy, behind manufacturing, which provides over a quarter of Puerto Rico's income, and behind government, but ahead of agriculture and construction.

Tourism is a labor intensive sector of the Puerto Rican economy. This is indicated by the fact that tourism generates a larger proportion of jobs in the Puerto Rican labor force than the proportion of income which it provides to the Puerto Rican economy. Tourism expenditures in Puerto Rico generate about 80,000 of the 700,000 total jobs, or about 11 percent of total employment. Tourism expenditure as a percent of GNP has remained at about 5 percent throughout the 1970's. (See table 2.)

Table 2.—Contribution of Tourism to GNP and Employment in Puerto Rico, Fiscal Years 1970-77

Year	GNP (millions of dollars)	Visitor expendi- tures (millions of dollars)	Percent age of GNP	Total employ- ment (thou- sands)	Employ- ment generat- ed by visitor expendi- tures ¹ (thou- sands)	Percent- age
1970	4,687	235.4	5.0	686	44.7	6.5
1971	5,253	234.7	4.6	700	44.6	6.4
1972	5,726	258.9	4.6	737	49.2	6.7
1973	6,270	317.3	5.1	757	60.3	8.0
1974	6,797	360.3	5.3	775	68.5	8.8
1975	7,136	375.0	5.3	738	71.3	9.7
1976	7,439	392.5	5.3	718	74.6	10.4
1977	7,914	423.9	5.4	739	80.5	10.9

¹ Based on a mathematical model prepared by the Puerto Rico Planning Board which states that 190 direct and indirect jobs are generated for every million dollars spent by visitors.

Source: Puerto Rico Planning Board.

According to the Puerto Rico Planning Board, the employment multiplier of tourism expenditures is 190 jobs per million dollars expended, while the general economic multiplier of expenditures is 1.5.²

Recent trends in the number of tourists to Puerto Rico, and their expenditures, are illustrated graphically on charts 1 and 2.

² "Agenda for a Socio-Economic Study of Puerto Rico," pp. 182, 203. Office of the Governor, Commonwealth of Puerto Rico, June 1977.

The rate of growth in visitors has varied, as large early increases were followed by smaller and briefly negative rates. The number of visitors to Puerto Rico increased at an average annual rate of just over 3 percent from 1972 to 1977, declined in 1975 and 1976, and resumed its growth in 1977. The 1975 peak was surpassed in 1978.

A dissimilar situation has prevailed in the recent period for visitor expenditures: An average annual growth in visitor expenditures of more than 10 percent was maintained between 1972 and 1977. Moreover, expenditures continued to increase even while the numbers of visitors and hotel rooms declined.

As tourism growth slowed in the 1970's and the number of visitors actually declined in 1975 and 1976, problems of long standing emerged to demand attention. Detailed later, they can be highlighted here:

- Deterioration of some hotel facilities and closing of some unprofitable hotels;
- Pollution of coastal waters and of beaches;
- Fear for security and safety by tourists because of terrorist activities;
- Decline of courteous service by tourism employees;
- High prices, especially of hotel rooms.

These problems, however, have not deterred recent growth in the tourism sector as has been shown by the extraordinarily strong demand by North Americans to travel to Puerto Rico during the 1978 winter season. The success of this season can be attributed to five principal demand factors: (1) a recovered and strong U.S. economy providing Americans with considerable disposable income; (2) an unusually cold North American winter; (3) improvements in tourism facilities in Puerto Rico; and (4) increases in tourism advertising by the Commonwealth of Puerto Rico Tourism Company; and (5) developments in travel marketing such as package rates.

The following sections will explore the factors bearing upon the demand for tourism to Puerto Rico, the supply of tourism facilities, and ways to address the problems which may exist.



Chapter II.—Demand for Tourism in Puerto Rico

Tourism demand is often a complex manifestation of not only economic, but social and other factors. Tourism markets are a product of demographic, geographic, and institutional forces, in addition to economic and social influences.

This section will attempt to identify the components of the demand for tourism in Puerto Rico and the factors affecting it.

The Puerto Rican economy has exhibited slowing rates of growth throughout the 1970's. The tourism sector has shown a strong cyclical pattern of growth. Tourism development appears to be related not only to the Puerto Rican economy, but also to the economic vitality of the countries which provide visitors, particularly the mainland United States.

The growth trend of total visitors has generally followed the U.S. business cycle pattern, demonstrating fluctuations not unlike those in the general U.S. economic cycle. (See table 1.)

The trend of U.S. visitors—who make up the great bulk of total visitors—has demonstrated a similar cyclical relationship.

Foreign visitor growth demonstrated no similar

pattern. It began from a very small base in 1959–60 and has grown rapidly but erratically. This rate slowed and became negative during the period 1974–75 and 1975–76.

The relative distribution of visitors shows a shifting cross sectional pattern. The great bulk of visitors are from the mainland of the United States, accounting for around 75 percent of the total. A relatively small proportion of visitors, from the United States Virgin Islands, at a fairly constant 2 percent of the total, is not shown. Foreign visitors comprise around 25 percent of the total.

The mainland share of Puerto Rican visitors has declined somewhat over the years, while the foreign share has demonstrated an increase (table 2).

The preceding information is based on statistics relating to arrivals. A different overall perspective on tourism in Puerto Rico can be gained by looking at hotel registrations by origin (table 3).

The overall importance of the U.S. market, and its slightly diminished role in recent years, is again evident. The mainland still accounts for a substantial proportion of tourists in Puerto Rico—around

Table 1.—Number of Visitors to Puerto Rico by Origin, Fiscal Years 1960–77¹

Fiscal Year	Total		United States		Foreign	
	Number	Percentage change	Number	Percentage change	Number	Percentage change
1959–60	347,425	—	319,115	—	17,392	—
1960–61	354,963	2.2	323,343	1.3	16,427	–5.9
1961–62	396,675	11.8	358,855	11.1	19,384	18.0
1962–63	461,857	16.4	379,222	5.7	53,184	274.4
1963–64	526,641	14.0	429,930	13.4	66,787	25.6
1964–65	606,093	15.1	529,201	23.1	46,766	–42.8
1965–66	723,543	19.4	613,641	16.0	75,134	60.7
1966–67	815,505	12.7	714,629	16.5	77,606	3.3
1967–68	910,903	11.7	798,795	11.8	87,365	12.6
1968–69	1,067,511	17.2	928,032	16.2	113,446	29.9
1969–70	1,088,379	2.0	879,635	–5.5	188,267	66.0
1970–71	1,095,119	0.6	860,754	–2.2	212,456	12.8
1971–72	1,172,885	7.1	888,706	3.2	260,246	22.5
1972–73	1,322,258	12.7	1,011,485	13.8	287,128	10.3
1973–74	1,441,002	9.0	1,116,890	10.4	300,077	4.5
1974–75	1,339,137	–7.1	1,018,632	–9.6	294,308	–2.0
1975–76	1,298,738	–3.0	980,724	–3.7	291,623	–0.9
1976–77	1,376,466	6.0	1,010,587	3.0	337,195	15.6

¹ Total number of visitors consists of U.S. visitors, foreign visitors, and visitors from the Virgin Islands. Visitors from the Virgin Islands are not included in this table, nor are special military and cruise visitors.

Source: Tourism Company of Puerto Rico, *The Tourism Industry of Puerto Rico: Selected Statistics*, pp. 15–16.

Table 2.—Numbers of Visitors and Their Expenditures in Puerto Rico, by Origin; Selected Fiscal Years, Based on Visitor Arrivals Converted to Rounded Percentage Shares of Total Visitors

Origin	1977	1976	1975	1974	1973	1972	1967	1960
United States	73.4	75.5	76.0	77.5	76.5	75.8	87.6	95.0
Foreign	24.5	22.5	21.2	20.8	21.7	22.2	9.5	5.0

Source: Table 2, United States Travel Service, Department of Commerce.

60 percent as measured in this way.¹ Moreover, the dominant U.S. market is concentrated in relatively few areas of origin—principally the New York-New Jersey-Pennsylvania region, which was the only area of the United States with reasonably frequent air service.

An additional factor is discovered by analyzing hotel registrations rather than arriving visitors. It is the substantial and growing share of registrations accounted for by the Puerto Ricans themselves.² Using this definition of "tourist," Puerto Ricans account for around a quarter of the total.

Finally, the significance of foreign visitors, highlighted earlier, can be seen. Since this measurement is by registration, rather than arrival, it permits closer identification of foreign origin, and, it is clear that Canadians, South Americans, and Europeans are increasing in importance as tourists to Puerto Rico.

Elimination of "domestic" Puerto Rican registrations, on the "bottom" half of table 3, reveals the same trends identified above, but also highlights the dominance of the mainland United States as an origin of "outside" tourists.

This brief overview highlights some elements of Puerto Rican tourism. The balance of this section will expand upon the market segments identified above, their characteristics, and other factors bearing upon the demand for tourism in Puerto Rico.

SOURCES OF TOURISTS—UNITED STATES

The vast majority of tourists coming to Puerto Rico come from the U.S. mainland. Around 87 percent of total hotel registrations are either by visitors from the U.S. mainland or from Puerto Rico. The relative proportions, however, indicate a steady gain in Puerto Rican registrations, and a corresponding drop in the U.S. share.

Foreign tourists are of growing importance to Puerto Rican tourism, but the U.S. will continue to

¹ Surveys of air travelers to Puerto Rico, detailed later, indicate that some 17 percent may stay with friends and relatives, thus would not be represented in this distribution based on hotel registration.

² For obvious reasons, Puerto Ricans traveling within the Commonwealth are not accounted for in figures based on arrivals, but do appear as hotel registrations.

Table 3.—Hotel Registrations, by State and Country of Origin, Fiscal Years 1972–77

	1972	1973	1974	1975	1976	1977
Selected origins converted to percentages of total						
U.S. mainland	76.6	75.6	74.7	68.8	65.5	60.2
Puerto Rico	13.8	14.9	14.9	19.7	21.6	26.9
West Indies	3.3	4.9	4.9	4.7	4.7	5.0
Canada	0.8	0.9	1.1	1.3	2.0	2.6
South America	1.5	1.5	1.6	2.4	2.4	2.4
Europe	1.0	1.3	1.5	1.5	1.8	1.6
Selected origins converted to percentages of total minus Puerto Rico						
U.S. mainland of which	88.9	88.8	87.8	85.7	83.4	82.4
New York	41.3	38.9	39.2	34.3	32.2	30.2
New Jersey	12.0	12.0	12.0	11.2	11.3	10.9
Florida	5.2	5.5	5.3	5.9	6.4	6.8
Pennsylvania	4.9	5.4	5.2	5.7	6.2	5.9
California	2.9	2.9	3.2	3.8	4.0	4.2
West Indies	6.1	5.7	5.8	5.8	6.0	6.9
Canada	1.0	1.1	1.4	1.6	2.6	3.5
South America	1.8	1.8	1.9	3.0	3.2	3.4
Europe	1.2	1.5	1.8	1.8	2.3	2.1

Note: Totals may not add due to rounding and elimination of very small origins.

Source: Puerto Rico Planning Board, United States Travel Service.

account for the major portion of the Puerto Rican tourist market in the foreseeable future.

Tourists from the United States originate in a limited number of regions in which direct air service has been available. As direct connections to other cities have become available, that pattern has been modified. Just 5 of the 50 States accounted for over half the registrations in 1977, and New York itself represents close to one-third. However, the New York-New Jersey combination has shown a relative decline in share—accounting for over 53 percent of mainland registrations in 1972, but only 41 percent in 1977. (See table 3.)

Puerto Rico would find tourism on a firmer footing if it could increase the proportion of tourists from the rest of the United States. To lure Americans from elsewhere in the United States, however, may require new directions in Puerto Rico's tourism promotion coupled with additional direct air service to other areas of the country.

SOURCES OF TOURISTS—FOREIGN

Foreign tourists have increased rapidly in importance to Puerto Rico. The foreign share of total tourist arrivals has climbed from 5 percent in 1960 to nearly 25 percent in 1977. The foreign share of total tourism expenditures has also increased by an almost identical proportion during the same period. Per capita expenditures by foreign tourists are about the same as for visitors from the United States.

The most important source of foreign tourists is Canada, followed by countries in the Caribbean basin, including the Dominican Republic, Vene-

zuela, and Mexico. Fifth is Spain, indicating that language and cultural heritage may be a factor in attracting tourists to Puerto Rico. (See table 4).

Table 4.—Top 10 Foreign Visitor Generating Countries for Puerto Rico, Fiscal Year 1977

Source country	Hotel registrations
1. Canada	17,067
2. Dominican Republic	9,847
3. Venezuela	8,145
4. Mexico	4,172
5. Spain	2,545
6. Italy	1,758
7. France	1,168
8. Argentina	1,140
9. Germany	1,109
10. United Kingdom	839

Source: Tourism Company of Puerto Rico, San Juan, *The Tourism Industry of Puerto Rico Selected Statistics, 1976-77*. Table 14, pp. 56-57.

The recent growth in Canadian tourism reflects the success of a special package program involving chartered flights to Borinquen Airport and the use of the former dependent housing facilities of the former Ramey Air Force Base.

SOURCES OF TOURISTS: MOVEMENT OF PUERTO RICANS TO AND FROM MAINLAND

A considerable amount of the travel between the U.S. mainland and Puerto Rico is by Puerto Ricans themselves. There are approximately 1.7 million Puerto Ricans living in the mainland United States, compared to the island's population of 3.1 million. Puerto Ricans are in all 50 States but they are heavily concentrated in a close proximity to the New York metropolitan area. New York City's share of the mainland's Puerto Rican population declined from 82 percent in 1950 to 59 percent in 1970 and is about 50 percent today. The dominant though moderating importance of New York as a source of visitors to Puerto Rico, seen above, may partially reflect this development.

Available data fail to show whether visitors from the mainland are Puerto Rican. A large number of mainland tourists, however, stay with friends and relatives—around 17 percent according to air surveys. A large portion of these visitors are likely to be Puerto Rican. (See chapter III.)

CRUISE SHIPS

A most dynamic feature in tourism to Puerto Rico has been the growth in cruise-ship visitors. In the 20-year period ending in 1975, cruise-ship visitors

increased by an average annual rate of 23 percent. This growth started from a very small base, but even in the second half of this 20-year period, it has continued at an impressive 17 percent, which is double the 8-percent growth rate of total visitors. (See table 5.)

Table 5.—Cruise-Ship Visitors to Puerto Rico, Fiscal Years 1950-51 through 1975-76

Year	Cruise ships (number)	Visitors (number)
1950-51	6	NA
1951-52	17	NA
1952-53	12	NA
1953-54	21	NA
1954-55	16	7,086
1955-56	12	8,034
1956-57	20	10,681
1957-58	44	15,155
1958-59	58	24,251
1959-60	105	41,337
1960-61	109	42,322
1961-62	113	50,634
1962-63	139	57,632
1963-64	187	79,204
1964-65	221	97,162
1965-66	226	95,970
1966-67	251	103,569
1967-68	278	119,937
1968-69	271	122,451
1969-70	301	136,604
1970-71	323	163,771
1971-72	534	261,159
1972-73	734	344,341
1973-74	739	411,086
1974-75	698	415,627
1975-76	639	412,276
1976-77	685	445,083

NA—not available.

Source: Tourism Company of Puerto Rico.

The proportion of cruise-ship visitors to total visitors has grown accordingly. Cruise-ship visitors have increased from 16 percent of total visitors in 1965 to 31 percent in 1975.

However, even this rapidly growing portion of the tourism market was hit by the recent U.S. recession, and between 1975 and 1976, cruise-ship visitors declined for only the second time since 1955.

Compared to tourists actually staying in island facilities, the contribution of transient cruise visitors to income and employment in Puerto Rico is not proportional to their numbers, since they use ship-board facilities and stay a relatively short time. However, a number of cruise-ship operators are now using San Juan as their point of departure and return, with passengers arriving from and departing to the mainland by air charter and scheduled carriers. These ships are likely to make a larger contribution to the local economy because they take on food and other supplies and require other local services. In addition, their passengers have a double exposure to Puerto Rico.

Proposed legislation in the U.S. Congress could also impact on Puerto Rican cruise travel, as a bill has been introduced which could permit temporarily

the transportation on foreign-flag vessels of passengers between ports in the Continental United States and ports in Puerto Rico.

CONVENTIONS

Conventions are a promising part of tourism to Puerto Rico. The number of conventions and the number of convention attendees peaked in 1969 and again in 1973. Puerto Rican convention activity appears to have been strongly affected by, among other things, the 1974-75 U.S. recession which influenced business spending plans for such activities. (See table 6.) Actual convention activity declined sharply between 1975 and 1977, but has rebounded recently, to 81,000 visitors in 1978.

Table 6.—Convention Statistics Selected Fiscal Years 1960-61 through 1976-77

Fiscal year	Conventions (number)	Attendance
1960-61	98	11,962
1962-63	127	12,784
1963-64	209	20,512
1964-65	381	42,943
1966-67	389	67,723
1967-68	460	75,973
1968-69	701	84,650
1969-70	722	82,397
1970-71	650	73,026
1971-72	779	85,258
1972-73	1,040	99,122
1973-74	882	97,077
1974-75	897	98,710
1975-76	603	65,257
1976-77	375	62,000

Source: *The Tourism Industry of Puerto Rico, Selected Statistics*, Tourism Company of Puerto Rico, 1976-77.

In fact, projections by the Puerto Rican Government estimate that some 591,000 visitors will be generated by groups and conventions during the next 5-year period, fiscal years 1978-82. This compares to 422,000 during the 1972-77 period. Future growth expectations are based on the improvement in the U.S. economy and convention treatment in the U.S. tax law.

In 1976, section 602 of the Tax Reform Act established that Americans could deduct expenses for no more than two foreign conventions per year. As a domestic convention destination, Puerto Rico has benefited from this legislative change. Arnold Orenstein, the 1976-77 president of the San Juan-Puerto Rico Convention Center Bureau, stated:

Associations and companies are switching their meetings to Puerto Rico as more and more of them learn of the new tax law. . . . We're hoping for a steamroller effect after we start advertising and publicizing this new law, and the tax benefit

to be had by organizations in meeting . . . in Puerto Rico.³

Puerto Rico has, in fact, advertised this tax advantage in the *Wall Street Journal* and other U.S. publications in early 1978.

There have been numerous protests by foreign governments about section 602 of the Tax Reform Act of 1976. Convention booking in Puerto Rico has increased with passage of this provision as conventions have been canceled in other countries.

However, legislation pending in the 96th Congress could alter the existing situation. Several bills modifying the current tax treatment have been introduced.

Also, Puerto Rico opened a convention center in San Juan in 1976, which should improve its prospects of attracting future business. The San Juan Convention Bureau has helped to promote this center. The convention center has excellent facilities, and is in the process of building an inventory of convention bookings, which typically have a leadtime of from 3 to 10 years.

PUERTO RICAN TOURISTS IN PUERTO RICO

Earlier it was noted that hotel registrations in Puerto Rico by Puerto Ricans themselves amounted to about 27 percent of the total in 1977. Some of Puerto Rican travel may be due to businessmen traveling about the island, but its impact on spending at tourist facilities would be beneficial nevertheless. Considering that this "domestic" travel may also involve some day trips or visits with friends and relatives, its magnitude may well exceed the 177,000 persons recorded in 1977 hotel registrations.

Moreover, this market has exhibited consistent growth, shown below. (See table 7.)

Table 7.—Hotel Registrations, by Origin, Puerto Rican Percentage of Total, Selected Fiscal Years

1972	1973	1974	1975	1976	1977
13.8	14.9	14.9	19.7	21.6	26.9

Source: Puerto Rico Planning Board, United States Travel Service.

Clearly, domestic tourism is an important element of Puerto Rican tourism. As travelers from an identifiable single origin, Puerto Ricans themselves account for a volume of registrations second only to visitors from the mainland United States. Puerto Rico, with about 177,000 persons registered in 1977, provided more tourists than the two leading mainland States combined—New York at 120,000 and New Jersey with 43,000.

³ San Juan-Puerto Rico Convention Bureau, *Convention News*, January 1977, p. 3.

Of additional significance is the countercyclical timing of this domestic tourism vis-a-vis that from the mainland, described later.

TOURISM DEMAND STABILITY

As noted earlier in this section, tourism to and within Puerto Rico is subject to fluctuation and is comprised of several market segments with presumably varying characteristics. This will be briefly recapitulated and analyzed. Later, in section IV, the issues associated with any findings will be discussed.

First we consider "external" visitors over a recent 5-year period, both in total and by origin (table 8).

Table 8.—"External" Visitors by Origin, Selected Fiscal Years

[Figures in thousands]

	1972	1973	1974	1975	1976	1977
Total	1,173	1,322	1,441	1,339	1,299	1,376
Percentage change	7.1	12.7	9.0	(7.1)	(3.0)	6.0
United States:	889	1,011	1,117	1,019	981	1,011
Percentage change	3.2	13.8	10.4	(9.6)	(3.7)	3.0
Percentage share	75.8	76.5	77.5	76.0	75.5	73.4
Virgin Islands:	24	24	24	26	26	29
Percentage change	9.2	(1.3)	1.6	2.7	0.7	8.7
Percentage share	2.0	1.8	1.7	1.8	2.0	2.1
Foreign:	260	287	300	294	292	337
Percentage change	22.5	10.3	4.5	(2.0)	(0.9)	15.6
Percentage share	22.2	21.7	20.8	21.2	22.5	24.5

Note: Parentheses indicate negative number; percentages may not add due to rounding.

Source: The Tourism Company of Puerto Rico, *The Tourism Industry of Puerto Rico, Selected Statistics, 1976-77*, table 3, p. 16.

The total number of visitors increased to a peak in 1974, declined in 1975 and 1976, then increased in 1977 to a level close to the peak.

Tourism from the United States followed a similar trend, but to a more pronounced degree. The number of U.S. visitors, which had been increasing faster than the total, during 1972-74, declined more sharply than the total in 1975-76, and recovered more slowly than the total in 1977. The U.S. share of the total underwent a corresponding change, expanding to 77 percent at the peak and contracting to a still very substantial 73 percent in 1977.

Puerto Rican tourism is also active, and countercyclical as noted later. This is the result of two factors. One is the use of tourist hotels as centers of local social activity. The other is the fact that many Puerto Ricans have invested in or visit the new out-island resorts, such as Rio Mar and Palmas del Mar. The Dorado Beach Hotel for many years has promoted the use of its facilities by island residents during the summer months, with special rates.

The Virgin Islands is the origin of a relatively small number of visitors to Puerto Rico which maintains a fairly constant proportion of the total.

Foreign visitor arrivals, on the other hand, reflected the general pattern, but in a different way. The decline from peak was considerably more moderate than that of U.S.-origin visitors, and the recovery stronger. Consequently, the foreign visitor share of the market expanded to nearly one-fourth, partially compensating for the shrinking mainland market.

Tourism has not been a focal point for rigorous analysis of economic relationships, so it is difficult to ascribe the foregoing changes to any definite development. However, most of the visitors being considered here are from the mainland United States, which experienced an economic slowdown during the period when less travel to Puerto Rico occurred.⁴ Moreover, external visitors of this sort are likely to be engaging in longer distance vacation travel which can be postponed during a downturn. Some such possible relationships are suggested by table 9. Cruise and convention travel may also be influenced by economic downturns and adverse business conditions, since personal income and corporate profits are affected by recessions.

Table 9.—Percentage Change in Selected Statistics

	1972	1973	1974	1975	1976	1977
U.S. visitors ¹	3.2	13.8	10.4	(9.6)	(3.7)	3.0
Foreign visitors ¹	22.5	10.3	4.5	(2.0)	(0.9)	15.6
Cruise visitors ¹	59.4	31.8	19.3	1.1	(0.8)	7.9
Convention visitors ¹	16.7	16.3	(2.1)	1.6	(44.0)	(5.0)
Air travel ^{2,3}	7.4	8.0	—	(6.4)	(8.0)	4.3
U.S. GNP ^{2,4}	3.0	5.7	5.4	(1.4)	(1.3)	6.0

¹ Visitors to Puerto Rico, *Fiscal Years*, Source: Tourism Company of Puerto Rico.

² Calendar year data recorded under the heading for succeeding fiscal year giving implicit 6-month lag. For example, data for 12 months ending December 1976 is recorded under column which contains travel data for 12 months ending June 1977.

³ U.S. International/Territorial Airline Passenger Enplanements, Source: Air Transport Association of America.

⁴ Constant 1972 dollars, Source: U.S. Department of Commerce.

Note: Figure in parentheses indicate minus percentages for year-over-year comparisons.

DISTRIBUTION AND SEASONALITY OF TOURISM

A question related to the stability of tourism demand, but with a different focus, is the seasonality and distribution of the demand. This has strong implications for the efficient use of Puerto Rican tourism capacity and wide significance for the stability of tourism employment, as seasonal and distributional patterns occur.

The "tourist" season in Puerto Rico is generally conceded to occur during the winter when visitors come from cold regions, primarily the northern United States and Canada, seeking obvious attrac-

⁴ The U.S. economy, measured by constant dollar GNP, fell from a November 1973 peak to a trough in March 1975, and did not return to its previous level until early 1976.

tions. However, there is also a comparable summer season, but a low period in the fall and spring.

Unfortunately, most of the monthly data on Puerto Rican tourism is recorded in fiscal years ending in June, interrupting the summer data. Therefore, in this paper, the data has been rearranged to constitute a "tourism" year as follows:

Winter: December, January, February
 Spring: March, April, May
 Summer: June, July, August
 Fall: September, October, November

On this revised basis, let us examine Puerto Rican tourism.

First addressed is the passenger movement from "external sources. (See table 10.)

Table 10.—Passenger Movement by Origin, Tourism Year 1976-77, Quarterly Percentage Distribution

	Seasonal total	Origin		
		United States	Virgin Islands	Foreign countries
Summer	28.7	29.3	21.3	29.0
Fall	18.8	18.2	16.8	19.8
Winter	29.5	30.8	39.6	29.6
Spring	22.3	21.6	22.3	24.6

Source: Tourism Company of Puerto Rico, United States Travel Service (totals may not add due to rounding).

There is a definite peak season of tourist movements to Puerto Rico during the winter, as visitors seek to escape cold northern weather, and possibly visit Puerto Rican relatives during the holidays. There is also a peak season evident during the summer. The fall and spring are definite slack periods.

The winter movement is heaviest among those coming from the United States and the Virgin Islands. However, many of the latter may be visitors to Puerto Rico on 1-day shopping trips to the free port shops on those islands. Foreign travel to Puerto Rico reaches a peak in the summer, even though Canadian travel is basically a winter peak.⁵

Passenger movements do not by any means account for the entire impact within Puerto Rico. The issue can also be analyzed on the basis of hotel registrations. This permits inclusion of "internal" Puerto Rican travel, not recorded otherwise. The tourism seasons analyzed are the same as in table 10, and statistics covering various types of accommodations are included (table 11).

This type of analysis reveals two peak registration periods for nonresidents: winter, particularly at island hotels; and spring, particularly at San Juan hotels. The spring peak may be due to the countercyclical

⁵ The United States, comprising about 66 percent of the total, has obviously strong influence. Foreign countries and the Virgin Islands comprise virtually equal shares of the remainder.

Table 11.—Registrations, by Residents, Tourism Year 1976-77, Quarterly Percentages

	Summer	Fall	Winter	Spring
Registrations:				
By residents of Puerto Rico:				
Total	31.4	24.9	20.9	22.7
San Juan hotels	29.9	26.5	21.3	22.2
Guest houses	30.7	19.2	21.4	28.7
Island hotels	33.1	23.0	20.6	23.3
By nonresidents:				
Total	20.7	19.8	31.7	27.7
San Juan hotels	20.7	20.1	31.1	27.9
Guest houses	22.7	16.1	34.6	26.5
Island hotels	20.1	17.5	35.9	26.3
All registrants:				
Total	23.9	21.3	28.5	26.2
San Juan hotels	22.7	21.4	29.0	26.7
Guest houses	23.2	16.2	33.8	26.7
Island hotels	28.2	20.9	26.3	24.5

Note: Of total registrations, Puerto Ricans comprise about 30 percent, or 229,000 against 761,000 nonresidents in his 12-month period ending May 1977.

Source: Tourism Company of Puerto Rico, USTS.

foreign travel peak noted earlier, most likely from South America and Europe.

Also evident is a summer peak by residents of Puerto Rico concentrated on island hotels.

For all registrants there is only a mild seasonality, which tends to mask problems in efficient use of facilities. The winter peak by U.S. visitors is somewhat offset by balancing summer and spring peaks by "foreign" and "domestic" tourists.

Nevertheless, there are clear distributional problems as the focus of hotel usage shifts, with implications for tourist accommodations and employment in the various areas and seasons. These will be addressed in chapter IV.

SUMMARY

This concludes the exploration of the markets which generate the demand for tourism in Puerto Rico.

To recapitulate this section:

- The mainland U.S. market dominates tourism to Puerto Rico, is heavily concentrated in the northeast United States, is primarily a winter recreation market with some additional indications of family ties.
- The growth and dominance of the U.S. market has moderated recently, as has the northeast concentration.
- There is an appreciable and growing foreign market, primarily in Canada, South America, and Europe.
- "Internal" tourism by Puerto Ricans is growing.
- "Specialized" markets for cruise ship and convention travel are small but noteworthy.

• Economic conditions in major originating countries may influence the long-term trend of Puerto Rican tourism.

• The seasonality of Puerto Rican tourism is

moderated by countercyclical developments but distributional problems remain.

The supply of tourism facilities, and some difficulties associated with them, are the next topic.

Chapter III.—Tourism Facilities in Puerto Rico

When inventories and evaluations were made of the tourism facilities in Puerto Rico in recent years, problems were apparent which detract from the advantages or favorable features of the island.

Many factors observed and commented on in the Commonwealth, and generally conceded to be problems, are associated with the concentrated urban character of the majority of tourism destination facilities in Puerto Rico. Conditions which may go without notice in a tourist's home environment, yet are more apparent in the context of a resort experience, include such things as traffic, noise, litter, and pollution. High prices, unsightly areas, and indifferent service might be added as characteristic metropolitan afflictions.

In contrast to these problems, some basic advantages of Puerto Rico as a tourism destination can be noted:

- (1) natural beauty
- (2) consistently good climate
- (3) recreational, cultural, entertainment and accommodation facilities
- (4) U.S. currency and customs standards.

Puerto Rico clearly has considerable natural resources and facilities which will continue to make it a major tourist attraction, particularly for North Americans during the winter season. At the same time, problems exist which may act as a hindrance to future growth of the tourism sector. Some of these problems have been corrected recently. Others can be corrected by private economic activity and through public policy.

HOTELS

Hotels represent a major tourism investment in Puerto Rico. Hotels are large fixed structures whose quality and quantity determine much of the character of a tourism destination.

Most hotels in Puerto Rico were built in the 1960's and reflect the character of anticipated demand for hotel facilities during that period. Over

5,000 tourist hotel rooms were built in the 1960's representing more than two-thirds of the tourist hotel rooms available in 1970 (table 1). The num-

*Table 1.—Tourist Hotel Rooms in Puerto Rico
Selected Years, 1950-76*

	1950	1960	1970	1974	1975	1976	1977
Tourist hotel rooms —	791	2,309	7,116	7,732	7,222	7,463	6,628

Source: Puerto Rico Planning Board.

ber of tourist hotel rooms tripled in the 1950's and did so again in the 1960's. However, the decline in tourists to Puerto Rico, and the U.S. 1974-75 recession, contributed to a shakeout in the hotel industry. Several hotels closed, including the 240-room Flamboyant and the 450-room Americana in San Juan, and the 222-room outisland (outside San Juan) Dorado del Mar. Other closings included the Miramar, Petite Miramar, and Normandie hotels. More recently, the Flamboyant reopened as a part of the Condado Holiday Inn, the El Conquistador reopened, and the Americana is expected to be opened for the 1978-79 winter season. This process of refurbishing and reopening of closed hotels has been accelerated by the strength of demand during the 1977-78 winter season.

Weakness of tourism demand in 1974-76 resulted in a push for greater efficiency in the operation of hotels. Wages, benefits, and hotel rates have continued to rise in the hotel industry, while employment has fluctuated with the U.S. business cycle (table 2). The use of labor in this highly labor-intensive industry has been a focal point for hotels seeking operational improvements. While in the 1960's the ratio of total employment to hotel and guest house rooms had generally been close to or greater than 1.0, in the 1970's this ratio has generally been 1.0 or less. (See table 3.) The decline in this ratio reflects the closing of smaller hotels and increased productivity in the use of labor. Efficient utilization of labor is an important factor for Puerto Rican hotels, since a considerable num-

Table 2.—Payroll in Hotels, Fiscal Years 1970 Through 1977

[In thousands of dollars]

	1970	1971	1972	1973	1974	1975	1976	1977
Payroll	60,702	61,413	64,505	73,327	82,366	76,921	72,277	76,422
Supplements	4,549	4,729	5,116	5,725	6,733	6,330	5,790	5,983
Total	65,251	66,142	69,621	79,052	89,099	83,251	78,067	82,405

Source: Puerto Rico Planning Board, Bureau of Economic Planning.

Table 3.—Employment, Earnings, and Accommodations in the Puerto Rico Hotel Industry, 1961-77 (Fiscal Years)

	1962	1967	1972	1973	1974	1975	1976	1977
Hotel and guest house rooms	4,106	7,987	9,121	9,043	9,208	9,010	9,355	8,582
Total employment	4,671	7,887	9,268	9,343	8,950	8,808	7,514	8,081
Ratio of employment to rooms	1.14	0.99	1.02	1.03	0.97	0.98	0.80	0.94
Nonsupervisory employees:								
Employment	4,293	7,205	8,496	8,490	8,170	8,040	6,798	7,241
Hourly earnings (dollars)	1.01	1.51	2.25	2.39	2.54	2.66	2.83	3.02
Weekly hours	39.6	38.2	37.7	39.2	38.7	38.0	39.1	38.8
Weekly earnings (dollars)	40.00	57.83	84.82	93.69	98.30	101.23	110.50	117.37

Sources: Commonwealth of Puerto Rico, Department of Labor, Bureau of Labor Statistics and Puerto Rico Planning Board.

ber of them have been operating at a loss in recent years.

Hotel rooms are very heavily concentrated in the San Juan area. San Juan contains three-quarters of the tourist hotel rooms and 70 percent of all the rooms in tourist and commercial hotels and guest houses on the entire island. (See table 4.) As a result, tourism in Puerto Rico is mostly located in San Juan, and in San Juan, hotels are heavily concentrated along two beach front strips—the Condado and Isla Verde areas. Tourism in Puerto Rico, then, has an overwhelmingly urban character. Tourism has both the advantages and disadvantages of location in large urban areas. Among the advantages are proximity to: (1) the venerable heritage of old San Juan, (2) numerous restaurants, (3) a wide variety of shopping, recreational, and entertainment facilities, (4) commercial attractions such as the

rum distilleries, and (5) relative ease of transportation.

The result of supply and demand factors determining the matching of room availability and tourist arrivals to fill them is stated by an average occupancy rate of San Juan hotels which has been as high as 82 percent in 1960 and as low as 57 percent in 1976. Average occupancy rates rose to 60 percent in 1977 and reached 85 percent during January through March 1978. (See table 5.) Occupancy rates have varied cyclically and have had a downward trend until the strong recovery in 1978. There has been concern that aging hotels might not be viable commercially and that lack of profitability would prevent refurbishing. The current strength of demand, however, has greatly improved the economic position of hotels in Puerto Rico. The fears of the Tourism Company of Puerto Rico of the “ex-

Table 4.—Number of Rooms in Tourist Hotels, Commercial Hotels, and Guest Houses As of June of Each Year

	1969	1970	1971	1972	1973	1974	1975	1976	1977
Tourist hotels	6,763	7,116	6,943	7,599	7,621	7,732	7,222	7,463	6,628
San Juan	5,256	5,609	5,383	5,510	5,613	5,626	5,099	5,548	—
Island	1,507	1,507	1,560	2,089	2,008	2,106	2,123	1,915	1,533
Commercial hotels	1,055	1,055	1,126	1,126	1,061	1,115	1,087	1,002	1,064
San Juan	757	757	768	768	743	781	753	713	—
Island	298	298	358	358	318	334	334	289	289
Guest houses	378	384	441	396	354	346	350	345	345
San Juan	330	336	393	366	318	310	306	291	—
Island	48	48	48	30	36	36	44	54	54
Tourist villas on the island	—	—	—	—	7	15	253	390	390
Paradores Puertorriqueños	—	—	—	—	—	—	98	155	155
Total	8,196	8,555	8,510	9,121	9,043	9,208	9,010	9,355	8,582

Source: Tourism Company of Puerto Rico.

Table 5.—Hotel Registrations in San Juan, Percentage of Available Rooms Rented, and Daily Average Number of Guests (Fiscal Years 1959-60 through 1976-77)

Fiscal year	Percentage of rooms rented	Daily average of guests
1959-60	81.6	2,683
1960-61	76.7	2,763
1961-62	73.9	3,184
1962-63	69.3	3,484
1963-64	63.7	4,641
1964-65	74.3	5,786
1965-66	77.4	6,480
1966-67	73.6	6,860
1967-68	77.5	8,257
1968-69	77.6	8,318
1969-70	67.8	7,873
1970-71	67.7	7,383
1971-72	67.4	7,440
1972-73	68.7	8,440
1973-74	68.8	8,929
1974-75	59.0	7,335
1975-76	56.8	6,632
1976-77	60.2	6,439

Source: Tourism Company, Commonwealth of Puerto Rico, *The Tourism Industry of Puerto Rico, Selected Statistics*, pp. 51-56.

tremely serious financial reverses" of hotels resulting in "a major deterioration of the physical hotel plant" which becomes "a major contributor to the negative impact of the price/value relationship" have been overcome by the recent improvements in the tourism market in Puerto Rico.¹ Doel Garcia, Executive Director of the Commonwealth of Puerto Rico Tourism Company, has recently spoken of the "success" of "our hotel industry," citing virtually full hotels, reopening of closed hotels, "renovations and refurbishments of most of our hotels on the entire island" and "close to 800 rooms under construction."²

The one market segment which doesn't affect the hotel sector is comprised of those Puerto Ricans returning from the U.S. mainland to visit friends or relatives. Table 6 indicates that 17 percent stay with friends or relatives.

Outisland Development

In the short run, Puerto Rico has no choice but to rely on San Juan as its preeminent tourism destination. It would take time and substantial capital investment to move many tourists from San Juan to outisland locations. Yet there is strong sentiment for development of tourism in outisland areas. A president of the San Juan Hotel Association has supported outisland tourism development "diversifying in Dorado or Borinquen, with large ports, unpolluted areas, and a service-conscious labor segment and overall community."³

The Commonwealth has put considerable emphasis

¹ Tourism Company of Puerto Rico, *Marketing Plan, Puerto Rico, 1977/78*, page 7.

² Doel R. Garcia, Speech to Caribbean Tourism Association, Feb. 13, 1978.

³ Juan Santoni, President's Annual Report to the Puerto Rico Hotel Association, Sept. 17, 1977, mimeo, p. 5.

Table 6.—Type of Accommodations of Airline Passenger Visitors

	Respondents	Percentage distribution ¹	Percentage distribution
No answer	66	—	7.2
Hotel	583	74.5	63.6
Guest house	24	3.1	2.6
Friends and relatives	132	16.9	14.4
Condominium	30	3.8	3.3
Rent house/cottage	14	1.8	1.5
Other	68	—	7.4
Total	917	100.0	100.0

¹ Percentage distribution removing "No Answer" and "Other," (Totals may not add due to rounding.)

Note: "Respondents who did not answer the question on type of accommodations (7.2 percent) and those who reported 'Other' (7.4 percent) are those passengers in transit who did not stay overnight. This adds up to more or less the passengers who answered 'Changing planes' as their purpose of trip (12.8 percent)."

Source: Tourism Company of Puerto Rico, Office of Statistics and Economic Studies, *A Continuing Survey of Visitors to Puerto Rico* (mimeograph), April 1977, p. 7.

sis on development of tourism outside of San Juan. The private sector has developed Rio Mar and Palmas del Mar. In the public sector are the moderate-cost facilities at Punta Borinquen (the former Ramey Air Force Base) and three of the *paradores*, and the low-cost vacation centers at Boqueron, Punta Santiago, and Monte del Estado. Negotiations with international hotel chains to further develop Punta Borinquen may be affected by success in concluding negotiations with the Federal Government, which still holds title to the land on which tourism development is to occur.

The Commonwealth has stated three goals for the tourism sector:⁴

- (1) To accelerate the development of tourism in Puerto Rico,
- (2) To increase the proportion of moderate income and family tourism, and
- (3) To ensure that every region of Puerto Rico shares equitably in the benefits of tourism.

Paradores

A number of small hotels, or *paradores*, have been constructed around the island. These are small guest hotels located throughout the country and known for their scenic beauty and unique personal hospitality.

In Puerto Rico, *Paradores Puertorriquenos* have been chosen or are being constructed in sites unique for their island beauty and for their own special charm. None of the *paradores* are luxury resorts, but *paradores* are an alternative for those travelers who are interested in something more rustic than a fancy resort hotel. Although they were originally intended

⁴ Puerto Rico Planning Board, Development Plan for the Southwest Region of Puerto Rico: Preliminary Statement of Goals and Objectives (Draft), Santurce: mimeograph, September 1969 (Revised October 1969), p. 10.

to serve island residents, knowledge of their existence has been spread by some of the visitors who have visited them.

The Government built and operates three of the *paradores*, while the others have been developed by private investors. The new Industrial Incentives Act provides for limited tax exemption as an additional incentive for such private development.

These *paradores* are systematically examined by the Tourism Development Company and conform to specific standards of operation and quality; and at each, the owner or manager must be in residence. In this way, the tourist can be assured of receiving hospitality and accommodation in a variety of out-island locations.

Condado-Isla Verde Area

Concentration of tourist facilities in the Condado and Isla Verde coastal strips in San Juan has resulted in numerous problems. A study by the Puerto Rico Planning Board described the problem of the San Juan hotel districts and proposed measures—which were and remain frequently unobserved—designed to correct this problem.

The increasing ugliness of some hotel areas, a matter of widespread public complaint in recent years, has given rise to a number of special regulatory measures in the hotel districts:

- (1) Bonuses for design features . . .
- (2) Architectural approval. Development in hotel districts is subject to discretionary review of its exterior appearance . . .
- (3) Ashford Avenue Arcade. To increase pedestrian amenity, new commercial uses along Ashford Avenue [in the Condado district] will be required to provide pedestrian arcades.
- (4) Nonconformities terminated. Some existing conditions in hotel districts must be terminated by July 1, 1971. As a result:

- Nonconforming activities located outside enclosed buildings will have to be terminated.
- Most neon and other directly illuminated signs will have to be removed.
- Required front yards will have to be landscaped and not used for parking.⁶

A law was enacted in 1972 to enable the Tourism Company and the Planning Board to identify zones of tourist interest, and to prepare and adopt plans and regulations to guide their development. A general regulation that will apply to all such zones has been drafted, but it has not yet been adopted.

The Tourism Company recommends a broad

range of activities to improve the Condado Beach and Isla Verde areas. These measures include: ⁶

- (1) litter cleanup
- (2) landscaping
- (3) further development of miniparks
- (4) upgrading storefronts and displays
- (5) elimination of unsightly signs
- (6) modified traffic access in the Condado section
- (7) improved parking facilities.

The San Juan municipal government recently created a municipal police force oriented toward service to tourists; the Tourism Company cleans the beaches every day with special mechanical equipment.

Another problem, especially along the Condado and Isla Verde strip, is that of limited access to the beach and limited visual contact with beach and ocean, due to the proliferation of high-rise hotels and apartment buildings along the beach front. As a result, there have been numerous proposals for paths ("paseos"), parks, marinas, and expansion of beaches to give greater access by both tourists and residents to the beaches and ocean. One recommendation is for a "Paseo del Atlantico" which would deal with the problem that: "[t]he 6-mile-long beachfront, from the San Geronimo opening at the beginning of the Condado Area to Boca de Congrejos . . . is not easily accessible in many places and is used by nearby residents only." The paseo would "link the entire line with a pathway for pedestrians and bicyclists."⁷ The bicycle path proposal is still highly controversial, because it would require considerable construction but would not improve the beaches as such. Still, given the narrowness of the sidewalks and streets in the Condado and Isla Verde areas, such a paseo could be an important infrastructure addition as well as a pleasant means of traversing the tourist areas along the beaches.

Arterial Roads and the Airport

Tourists' first view of Puerto Rico is at the San Juan Airport and along the arterial roads to the hotel districts. The Tourism Company notes that the "existing airport terminal has inherent limitations to cope with the flow and movement of passengers at high density traffic periods."⁸ It notes two specific problems of the "current location of the agricultural inspection station" posing "a major bottleneck for departing passengers" and the "taxi flow and dispatching control."⁹

The airport road to downtown San Juan is being improved and made into a limited access road along

⁶ Tourism Company, *Marketing Plan, Puerto Rico, 1977/78*, p. 8.

⁷ Puerto Rico Planning Board, *the San Juan Edges Project: Technical Report*, July 1976, pp. 27, 42-55.

⁸ Tourism Company, *Marketing Plan, Puerto Rico 1977/78*, p. 8.

⁹ *Ibid.*, p. 8.

⁵ Puerto Rico Planning Board, *Land Use Policies: A Draft for Discussion*, 1970, pp. 59-60.

some sections. It traverses some poor and crowded neighborhoods. One recommendation of the Tourism Company is a "regularized schedule of litter cleanup and lawn mowing on highway approaches to tourism centers" and "beautification of these approaches through proper landscaping."¹⁰

In more general terms, the Puerto Rico Planning Board has recommended that for the benefit of the traveler and highway neighbor, arterials and their environs should be insulated from each other; and that more expressways are needed. The improvement of the airport road is a step in this direction. A grade-separated interchange is planned at the entrance to the international airport. This will eliminate traffic signals to permit a continuous flow of vehicles.

Water Pollution

Pollution of the waters along San Juan seashore remains a continuing problem. Signs prohibit swimming and warn that the water is temporarily polluted. These signs, however, have been in place for several years. The source of pollution is largely from storm sewers into which some houses and apartment buildings discharge their sewage. Most of these connections to the storm sewers have been cut, and the water and sewage authority has been working on this problem.

A number of steps have been taken to improve the beaches and waters of the San Juan area. The Condado lagoon was cleaned in 1977 and now is being used for boating and water skiing. Beach cleaning machines are being used to clean seaweed and other debris. Cleaning brigades supplement the use of machinery.

Hospitality and Security

A sense of hospitality and security is essential to attract tourists to given tourist destinations. Unfriendly activity can spoil a tourist's lasting impression of an important vacation experience.

Instances of violence, however rare, are apt to be perceived as threatening to a potential tourist contemplating travel into a perhaps unfamiliar milieu, particularly if only superficial knowledge of any isolated event is gained through the media.

Likewise, a tourist's vacation is a valued personal experience, and discourtesies otherwise endured as commonplace in everyday life can take on an enlarged character in the context of a holiday event.

Airport surveys by the Tourism Company of Puerto Rico have identified some of the following complaints about Puerto Rico:¹¹

- high prices;

- hotel, airline telephone service;
- hotel employees and taxi drivers;
- city not clean enough;
- attitude of people toward tourists;
- insecurity, lack of police protection.

Measures are needed to deal with these problems which may inhibit tourism. Among those which have been undertaken are:

- training programs for hotel employees, known as "Training in Guest Employee Relations";
- an effort to upgrade standards of service under "Operation Amigo";
- a beach clean-up program;
- utilization of tourist police.

Continuing efforts along these lines should produce dividends in tourism.

Air Transportation to Puerto Rico

Aviation facilities and prices are always important to an island tourist destination. The transportation sector of this study will address this issue, but some tourism information can be summarized here.

Transportation tends to be the largest single expenditure for tourists, and the price—as well as the quality and quantity—of transportation services can play a key role in determining the attraction of a tourism destination. The levels of air service and fares on an absolute basis affect Puerto Rico, as do the relative service and fare levels available to competitive tourist destinations.

Puerto Rican tourism officials have been continuously concerned with air transportation, especially with the quality and quantity of service, and the levels of fares, which have risen considerably over the years.

In line with current aviation policy, additional services and increased competition should provide the economic incentive necessary to spur promotion of travel to Puerto Rico and provide innovations in fares and service.

In fact, the air transportation scenario has been rapidly changing and is still evolving. Some developments which have a beneficial impact on Puerto Rico include new awards of additional service.

For example Delta, Northwest, and National Airlines were approved for service from Chicago, Boston, Newark, Miami, and Philadelphia to San Juan. American Airlines was given permission to service San Juan from Chicago, Philadelphia, and Miami. Trans-Carib Airlines was granted approval to fly from New York to San Juan. North Central Airlines

¹⁰ *Ibid.*, p.7.

¹¹ Airport Survey covering January to December 1977, Tourism Company of Puerto Rico.

received permission to fly to San Juan from Baltimore, and Evergreen Airlines was approved from Boston, Philadelphia, Baltimore, and Washington. Allegheny was approved from Boston, Philadelphia, and Baltimore to San Juan.

Additional service grants are AeroAmerica to San Juan from Boston and New York, Ozark to San Juan from St. Louis, World Airways in the Miami-San Juan corridor and, awaiting approval, Aeronautes de Puerto Rico to Borinquen from Newark.

Moreover, Southeast Airlines, a Florida-based concern, was permitted to fly to Borinquen from the Miami gateway. This service was inaugurated May 1, 1979, bringing daily scheduled 707 service to the western part of Puerto Rico. Service from New York to Borinquen is being requested.

Further modifications in service to Puerto Rico may be forthcoming in the future as various proceedings concerning such matters evolve. Clearly, with tourism so important to Puerto Rico, and air service and fares so critical to tourism, liberal service and fare policies could prove very beneficial.

Prices and Competitive Destinations

In addition to transportation costs, one of the primary cost considerations for the tourist is accommodations. The airport survey, noted earlier in this section, indicated that high prices were one of the complaints visitors made about Puerto Rico. An indication as to why this is so can be seen by comparing costs in Puerto Rico with those in some competing destinations (table 7).

*Table 7.—Average Daily Rate Per Occupied Room
Years 1975-76*

	1975 dollars	1976 dollars	Average percentage increase
International hotels ¹	29.39	31.40	6.8
PUERTO RICO	44.93	47.88	6.5
Bahamas	35.00	41.64	18.9
Bermuda	50.04	54.83	9.5
Jamaica	31.18	36.32	16.5
Canada	27.85	29.49	5.6
Mexico	29.08	29.31	0.8
Europe	28.90	30.03	3.9
Brazil	28.00	31.05	8.9
Colombia	17.73	20.81	17.3
Venezuela	26.61	30.85	15.9
United States	25.83	27.92	8.1

¹ Does not include the United States.

Source: *Trends in the Hotel Business*, 1976, 1977, Harris, Kerr Forster & Company.

An additional measure of Puerto Rico's competitive posture and an indication of a problem can be

*Table 8.—Caribbean Competitors in Terms of Visitors,
Length of Stay, and Occupancy, Calendar 1977*

	Visitors	Length of stay	Occupancy
Bahamas	965,420	7.0	NA
Jamaica	386,514	8.7	28.9
Bermuda	441,025	9.1	70.0
Puerto Rico	1,390,000	4.0	60.3

Source: Puerto Rico Tourism Company, from data provided by Government tourism offices to Caribbean Travel Research.

seen in table 8. While Puerto Rico enjoys a large margin in tourism volume, vis-a-vis the other noted destinations, its hotels are not fully utilized, and the average length of stay of visitors to the island is well below the average for visitors to the Caribbean as a whole.

The further exploration of these issues, and possible remedial measures, will be discussed in the following section.

Summary

The "supply" side of Puerto Rico's tourism picture—the amount, type, and quality of facilities available—includes elements of transportation, accommodations, attractions, and social infrastructure.

Like the "demand" side addressed in chapter II, to which it is inescapably related, the tourism facility situation manifests subtle characteristics and trends.

The problems identified earlier, and measures to deal with these issues, are the topic of section IV. Here, the immediately foregoing section can be briefly recapitulated:

- Puerto Rico has a number of problems in physical appearance associated with the urban concentration of its tourism facilities.
- The stability of the accommodations industry appears to reflect the general tourism demand.
- A problem of sufficient value at the prevailing prices seems to be evident.
- Hospitality, security, cleanliness measures can still improve.
- A wider range of hotel options and locations appears promising.
- Urban and architectural improvements merit continuation.
- Additional innovative transportation alternatives may be needed.

The succeeding section deals with these issues.

Chapter IV.—Major Issues and Policies

Below is a discussion of (1) major problems facing the tourism sector of Puerto Rico; (2) Federal programs and program policies which impact on these problems; and (3) program and policy options facing both the Federal Government and the Commonwealth of Puerto Rico.

MAJOR PROBLEMS

Fluctuating Demand.—Puerto Rico devoted considerable resources to developing tourism in the 1960's. Tourism was developing rapidly until the 1969-70 recession which brought decline to the sector. Tourism fell far below its earlier strong upward growth path in the early 1970's.

The decline in tourism growth was due in part to increased competition from other tourism destinations and to changed tastes, but it also appeared responsive to the decline in the U.S. economy. The rate of tourism growth in Puerto Rico seems to move up and down with swings in the U.S. economic cycle.

Puerto Rico tourism has improved sharply in the past year accompanying the upturn in the U.S. economy. In 1978 the number of visitors to the island increased by 7.1 percent over 1977. The future of tourism depends heavily on the U.S. economic outlook.

However, the prevailing concentration of earlier periods may be mitigating as growth in secondary U.S. market areas, foreign origins, and internal Puerto Rican tourism provide enhanced opportunities for tourism growth and diversification.

Urban Concentration of Tourism.—Tourism in Puerto Rico is highly concentrated in metropolitan San Juan and has developed with minimal urban planning. As a result, tourism faces close proximity to urban blight, traffic congestion, instances of ramshackle urban development, and polluted beaches. These urban developments have had an adverse impact on tourism and have resulted in less tourism in the San Juan area than if these problems were ameliorated.

At present 77 percent of the tourist hotel rooms are in the San Juan metropolitan area. However,

some of the finest hotel facilities are outisland. The majority of these were built during the last 10 years, and demonstrate new private sector interest in outisland facilities.

The outlook for this problem is brightened by the improvement in tourism demand during the winter of 1977, and by the increasing use of outisland facilities. Increased demand has facilitated private refurbishing of many tourism facilities and the opening of closed retail establishments and hotels.

Air Transportation.—Despite the recent expansion of air service, noted earlier, the Commonwealth of Puerto Rico feels that it needs increased scheduled air transportation to encourage expansion of tourism. Puerto Rico wants further new gateways to the U.S. mainland providing additional nonstop service between San Juan and its major U.S. markets.

Cases pending before the CAB are considering these matters, and are discussed in the transportation section report.

The Commonwealth of Puerto Rico argues that increased service and increased competition will improve the quality of air transportation and increase tourism demand.

The Commonwealth also requests that authority be awarded to serve Puerto Rico through Borinquen Airport for international scheduled service. Scheduled service from Miami to Borinquen was inaugurated recently, and Canadian charters service the airport.

Borinquen Airport is the former Ramey Air Force Base located in the northwest corner of Puerto Rico and it can accommodate the largest jet aircraft. Puerto Rico is beginning to develop a new tourism center in the Borinquen area. The western part of Puerto Rico has been selected as a growth area for outisland tourism development in Puerto Rico. Tourism development of this poor section of Puerto Rico would reduce its high levels of unemployment and increase per capita income.

Hotels.—Through the 1970's very few new hotels were built and some existing hotels have closed or not been kept in good repair. Hotel construction

which flourished in the 1950's and 1960's slowed markedly in the first half of the 1970's.

By the end of the 1960's San Juan had a large stock of relatively new hotels. With the downturn in tourism after 1968, there was little incentive to build new hotels. The doldrums of the 1970's in fact led to a shakeout in the hotel industry resulting in unprofitable hotels frequently closing or becoming run-down due to reduced maintenance and replacement investment.

The outlook for hotels is bright. Many hotels are in the process of refurbishing and most of the closed hotels were scheduled to reopen by the winter of 1978-79. The Hotel Montemar in Aguadilla has been refurbished and reopened for business. The public vacation centers at Monte del Estado in Maricao and Boqueron Beach in Cabo Rojo are also available for low-cost vacation travel. Continuance of strong demand for tourism should permit the continued recovery of the hotel industry through private initiative.

Reliance on Northeastern United States as a Source of Tourists.—Puerto Rico has relied heavily on New York and contiguous States as its major source of tourists. Around half of all U.S. mainland tourists come from this single region, which has always had the best air service to the island. The policy of the Puerto Rican Government is to place greater emphasis on developing sources of tourists elsewhere inside and outside the United States.

The Tourism Company of Puerto Rico has been placing increased emphasis on promoting tourism outside of the traditional regions. The prospects are fairly good for diversifying the sources of tourism, and Puerto Rico has been particularly successful in developing Canada as a market. A regional sales and promotion office for Europe has been opened in Madrid, Spain.

High Prices and High Wages.—Puerto Rico has the problem of high prices for tourism, particularly with respect to hotel prices. Major sources of those high hotel costs have been: (1) high cost of hotel construction, (2) high wage and employment levels. This problem was partially ameliorated by the earlier drop in tourism. The slowing of growth of tourism in the 1970's caused management to increase productivity. The utilization of labor has been reduced as the ratio of employment to hotel rooms has generally declined from greater than 1.0 in the 1960's to less than 1.0 in most of the 1970's.

Puerto Rico is likely to remain a relatively expensive tourism destination relative to most other Caribbean areas, partly because the island has prevailing wage levels that are above the average for the region. In the case of hotels, union activity is accountable, in part, for the higher wage scales, but Common-

wealth and Federal labor legislation also play a role in the matter.

Another reason for the higher cost of tourism in Puerto Rico is the original emphasis on luxury urban hotels. However, with the new orientation to other markets, it is anticipated that there will be a change in the price structure.

Tourist Distribution and Seasonality.—Tourism is seasonal in Puerto Rico. Tourists coming to the island come principally during the winter and summer season, while arrivals are relatively lower in the fall and spring. Moreover, the peaks occur among different tourist groups and at different destinations. Income and employment stability and distribution are less desirable under the circumstances. Tourism from outside the island could be increased mainly by lengthening the season. Domestic tourism by Puerto Ricans themselves occurs mostly during the summer. Increasing domestic tourism improves the utilization of tourist facilities and provides greater continuity and stability in employment. The prospects for domestic tourism are enhanced by increased development of outisland tourism facilities. Such an effort is now in its second year.

FEDERAL PROGRAMS AND POLICIES

Air Transportation Policy.—The preexisting Federal Government air transportation policy had limited the number of gateways from the U.S. mainland to San Juan. It also restricted the certification of airlines on existing routes. The Commonwealth has requested increased gateways and increased competition on existing routes, and has already received some additional service and routes. A continuation of this policy would likely increase tourism to Puerto Rico.

Present policy also authorizes only San Juan's airport as an internationally scheduled airport. The Commonwealth is requesting adding Borinquen Airport as an additional scheduled international airport. Borinquen now receives some scheduled flights from the mainland and some charter flights from Canada.

Conventions.—Present U.S. policy on foreign convention is beneficial to Puerto Rico tourism. Section 602 of the Tax Reform Act of 1976 restricts the number of income tax deductible foreign conventions to two per year. This policy has had the impact of substituting domestic conventions for foreign conventions. The San Juan-Puerto Rico Convention Bureau believes this policy has had a beneficial impact on Puerto Rico tourism. Puerto Rico has, in fact, been advertising this tax advantage in the *Wall Street Journal* and other U.S. publications

in early 1978. However, bills presently pending in the 96th Congress could alter this situation.

Another tax-related matter possibly affecting development of hotels in Puerto Rico by American-based multinational companies is the provision for transfer back to the mainland of excess funds without full taxation. This provision, under section 936 of the Tax Code, is discussed in the Industrial Development Sector Study.

Ramey Air Force Base.—The U.S. Air Force several years ago phased out its operations at Ramey Air Force Base in Aguadilla. Subsequently, the entire base was leased to the Government of Puerto Rico, except for some facilities that were retained for Federal purposes. Under the prevailing Federal policy for the disposal of surplus property, certain kinds of facilities may be transferred to other levels of government free of charge. This does not apply to housing, however, and additional development of the former dependent housing units as a tourism facility is dependent on the achievement of an agreement for the terms of sale.

The process of disposal of such military property is monitored by the President's Economic Adjustment Committee, and involves agencies such as the Economic Adjustment Office of the Secretary of Defense, in cooperation with the Economic Development Administration's Title IX program, and where applicable, the Departments of Interior and Housing and Urban Development, the Civil Aeronautics Board, and Federal Aviation Administration.

A reuse plan has been prepared by the Puerto Rico Planning Board as a basis for the orderly transfer of the various parcels of Ramey property from the United States to the Commonwealth. The airport portion was transferred in March 1973. Decisions concerning educational facilities are pending. Until an agreement has been reached on the price for the Punta Borinquen housing units, Puerto Rico's program for tourist development of the area cannot be put into effect.

Wage and Labor Standards.—Federal minimum wage and labor standards apply in Puerto Rico but not, naturally, in some competing Caribbean tourism destinations. Puerto Rico also has local labor laws and standards. Most of the hotels are strongly unionized and collective bargaining activity is at least partly responsible for the prevailing higher wage levels. These factors, among others, contribute to making Puerto Rico a high-cost Caribbean tourism destination.

Ocean Policy.—A report was issued by the Commerce Department late in 1978—"U.S. Ocean Policy in the 1970's: Status and Issues." Some of the

issues involved, such as coastal resource development policy may have implications for a jurisdiction such as Puerto Rico, and could merit future consideration concerning Puerto Rican tourism.

PROGRAM AND POLICY OPTIONS

Federal Government Options

Outisland Development.—Federal Government policy could aid outisland tourism development—and thus reduce tourism concentration in San Juan—in two ways. The first is to facilitate the conversion of the former Ramey Air Force Base to tourism uses by the Commonwealth of Puerto Rico. Tourist development of Punta Borinquen has potential through the implementation of the Ramey Re-Use Master Plan, including detailed plans for improving and expanding the facilities, and a carefully coordinated promotion effort. The airport element, which has been transferred to Puerto Rico and is being operated by the Puerto Rico Ports Authority, has significance through recent decisions of the Civil Aeronautics Board to permit additional commercial air service to Puerto Rico. A hangar on the north side of the runway has been converted to a passenger terminal, releasing the entire south side of the airport for development to produce airport-related revenues.

A second Federal program could be to assist in the planning or development of other outisland tourism areas.

These options should be considered also in conjunction with the 5-year tourism master plan being undertaken in Puerto Rico under the auspices of the Organization of American States with support from USTS. Cooperative planning for long-term development is important to identify priorities and marshal resources for a comprehensive approach to problems.

A comprehensive marketing plan should include an evaluation process, and can be responsive to historical, cultural, and recreational programs and coordination mechanisms within the Federal Government.

Air Transportation.—Federal Government policy with respect to air transportation could increase tourism to Puerto Rico. One policy could be the authorization of additional gateways with direct routes to San Juan from the U.S. mainland, as well as continue to increase frequency on presently served routes. This policy appears to be consistent with CAB's increased commitment to permissive rather than mandatory designation of routes as a method of increasing air-transport competition. Im-

proving scheduled airline service to Puerto Rico is likely to have some favorable impact on tourism.

Also important is the encouragement of the development of innovative types of flights which provide for reduced fares for travel within the United States. Tourism officials in Puerto Rico have noted increased travel from the West Coast this season which they attribute to new reduced charter fares.

Finally, authority could be awarded to serve Puerto Rico through Borinquen Airport for international scheduled service.

Conventions.—The present convention provisions in section 602 of the Tax Reform Act of 1976 appear to have had a favorable impact on Puerto Rico's convention business and are likely to have similar future impact. Limitations on the deductibility of expenses associated with foreign convention attendance have encouraged a shifting of U.S. association conventions from foreign tourism destinations to Puerto Rico.

This is a current issue as the 96th Congress is presently considering proposed legislation which would change the existing treatment for foreign conventions. A change could undoubtedly alter the relative competitive posture of Puerto Rico in attracting conventions.

Encouraging New Sources of Tourism.—The Federal Government could encourage the development of new sources of Puerto Rican tourism.

Assistance is given to Puerto Rico by the U.S. Travel Service (USTS) through promotional efforts carried out by its overseas offices located in Canada, Mexico, Japan, the United Kingdom, Germany, and France, as well as through its special markets program in a number of other countries.

For example, there has been prior assistance from field offices, help on travel missions abroad, familiarization tours, provision of information to commercial offices overseas, as well as matching grants.

The USTS will continue to work closely with the Commonwealth, given resource availability.

For example, the 5-year tourism master plan study being conducted in Puerto Rico under the auspices of the Organization of American States is with the support of USTS.

Distribution and Seasonality.—This is a problem in which the Federal Government can give guidance, but the solution is local. Seasonality and distributional imbalance cause disruptions in economic activity and dislocations in the labor market. The Federal Government could provide funds to conduct research or provide technical assistance with respect to problems of distribution and dislocation. A potential source of these funds might be Economic Development Administration grants.

Of course, Federal agencies in their own prerogatives must determine priorities among various proposals competing for resources. The new tourism master plan project for Puerto Rico may suggest avenues within which to pursue such issues.

Direct Assistance.—The Federal Government could provide assistance on a number of specific projects which would enhance tourism. Some potential historic, cultural, recreational, and tourist attractions which could be assisted are: a sugar museum, the Camuy Caves, the Old Caisson Building in San Juan, and the Art Deco Normandie Hotel.

Federal policies and programs which could be considered relevant to such projects might include competitive grant programs, Economic Development Administration assistance, various programs under the youth employment demonstration projects program using funds of the Comprehensive Employment Training Act, and possibly various programs administered by the Interior Department, HEW, HUD, and some miscellaneous agencies concerned with historical or architectural renovation, such as the Heritage Conservation and Recreation Service.

Commonwealth Government Options

Tourism Promotion.—The Commonwealth of Puerto Rico could further increase the resources of the Tourism Company to promote tourism. An increase in funding from \$6 million to \$7 million has been requested in the budget petition for the next fiscal year. Promotion could be directed to present markets, but it could also be directed toward developing new markets, especially outside the New York-contiguous States. Promotion could also be aimed at decreasing tourism seasonality by promoting tourism outside the high season.

How and where the Commonwealth can proceed with additional tourism promotion will depend on the effectiveness and additional impact experienced as expanded resources are devoted to this activity.

Urban Policy.—There have been studies of San Juan tourism which have recommended improvements in the Condado and Isla Verde tourism areas. Recommended improvements include: (1) improved architecture, (2) ending zoning nonconformities, (3) constructing pedestrian arcades, (4) improved traffic flows and restrictions on parking. The Commonwealth could improve the Condado-Isla Verde area. Some efforts could have an impact in the short run; others such as improving architecture on newly constructed buildings would take much longer to have a substantial effect. Given the slowing of construction, Commonwealth policy modifying existing tourism facilities would have a greater impact than policies which depend on new tourism development.

There is a program to designate zones of tourist interest in areas where special development policies would be applied. This program is being developed by the Planning Board in cooperation with the Tourism Company.

Outisland Development.—In the long run tourism growth in Puerto Rico is likely to require more diversified tourism facilities including outisland development. The Commonwealth has been promoting such development by developing an outisland system of *paradores* and the Punta Borinquen area. Such continued outisland development will aid the seasonal and geographical spread of tourism. Outisland development has the advantage of being attractive to local Puerto Rico tourists as well as U.S. mainland and foreign tourism. There does remain the question of how effective the Commonwealth can be unless it enlists the strong support of the private sector in outisland tourism development. (Investment in *paradores* has been covered in the new Tax Incentives Act.)

Tax Policy.—In a recent revision of the Industrial Incentives Act (IIA), Puerto Rico has not provided tax exemption for any new hotel facilities. The new law generally excludes hotels from tax exemption, except for tourist hotels that were closed prior to January 1, 1978, and renewed their operations or that were under construction on January 1, 1978. The "Paradores Puertorriqueños" or Puerto Rico Inns also qualify for tax exemption. Income, property, and municipal license-tax exemptions are the same as those provided for manufacturing entities. However, the extension of the tax exemption for an additional 10-year period is not offered for any of these new facilities in the new law. There is, however, an extension for the property-tax exemption for those hotels exempted under the Industrial Incentives Act of 1963 and whose grants expire between January 1, 1978 and December 31, 1982. The new law provides a partial exemption from property taxes of 75 percent for a period of 5 years, at the expiration of the original tax-exemption period.

This is an internal issue which will have to await future local study and legislative action.

Training and Education for Tourism.—The Commonwealth should consider educational programs to provide skilled labor for tourism-related industries as well as a visitor education program for residents.

PRIDCO recently closed a hotel school for cooks and waiters in Barranquitas which it had been operating for the benefit of the tourism industry.

The Tourism Company owns and operates a hotel management school at the Carib Inn with guidance and faculty from the School of Hotel Administration

at Cornell University. The latter school was built with an EDA public works grant.

Additional tourism training resources exist within the Organization of American States through CICATUR, the program of tourism development of the OAS General Secretariat, and through CUEST, an international center for studies in tourism opening soon in Mexico City in conjunction with the World Tourism Organization.

Other institutions providing tourism industry education are the George Washington University, New School for Social Research, and University of Hawaii.

Ground Transportation.—Essentially a local concern, the Commonwealth may find it appropriate, in conjunction with planning for broader tourism development, to consider the ground transportation needs of tourists. This is under the jurisdiction of the Public Service Commission and Airport Authority.

Presently, limousines are available from the airport to hotels but only taxis are available from San Juan back to the airport.

There are some 2,000 seats available for tourist transportation, excluding taxis.

A broad-based tourism initiative may compel consideration of various options mixing taxis, limousines, sightseeing and tour buses, and the like.

Hotel Classification.—There is the possibility as a local option of consideration of classifying hotels as part of the promotion effort. This can be administratively burdensome, and may be unfamiliar to the mainland tourist. However, foreign tourists may find it more familiar.

Tourism and Recreation.—The Commonwealth has earmarked the hotel tax to the Recreation Company, thus it may want to explore internally the relationship between tourism and recreation. This could be done in the master plan project and could use as a reference point some Federal policies in the area.

Consideration should be given to how other countries and areas use such resources for tourism promotion.

Travel Outside San Juan.—The local authorities could consider ways and means of encouraging tourists to travel outside the metropolitan San Juan area. The ways and means are largely internal, but the master plan may be a working point and the aim is in accord with the views of this report.

CONCLUSION

Puerto Rico possess many attributes which make the island an attractive center for tourism. Indeed,

Puerto Rico's tourism assets have already contributed to making the tourism industry a significant one in the Commonwealth's economic structure.

This report has reviewed the various aspects bearing on the demand for tourism to Puerto Rico as well as the facilities for tourism in Puerto Rico.

While identifying problems and issues relevant to

the vitality of this important industry in the island, the opportunities for an increased contribution of tourism to the area have also been made apparent.

It is to the constructive opportunities for capitalizing upon the present and potential contribution of tourism to Puerto Rico that this report is essentially directed.

Housing and Construction

Acknowledgements

The following acknowledgements are made with regard to the preparation of the Housing and the Construction Sectors of the Interagency Economic Study of Puerto Rico.

Assistant Secretary for Policy Development and Research (PD&R) Donna Shalala represented HUD on the Interagency Study Group. She, in turn, assigned responsibility for the study to Katharine Lyall, Deputy Assistant Secretary for the Office of Economic Affairs within PD&R. The Economic Market Analysis Division (EMAD) within the Office of Economic Affairs had responsibility for coordinating and carrying out the two study sectors.

The former head of EMAD, Bernard Horn, prepared the reports. In so doing, he called upon staff within EMAD for selected data collection and analytical tasks. Among the staff who assisted him were Sigmund Shapiro, Bernard Stark, and Ray Kahn. Secretarial assistance was provided by Hattie Goings, Sylvia Matthews, Cecelia McConnell of EMAD and Jan McKnight of Housing's Office of Policy and Program Development.

Invaluable assistance in arranging field interviews and obtaining data from Puerto Rican Government sources was supplied by the HUD Caribbean Area Office. The Area Office Manager, Jose Febres-Silva, and the Area Economist, Julio Wiscovitch, deserve special mention for their cooperation and responsiveness. Additional Area Office members who helped in the study were David Berrocal and Felipe Gorbea-Fernandez, as well as selected members of their respective staffs.

Mr. Alexander Neclario, then of the New York HUD Regional Office, provided special guidance with regard to identifying unique aspects and characteristics of the Puerto Rican housing industry.

The preparation of the Construction sector of the study required collection and interpretation of Puerto Rican construction activities supported by various Federal loan and grant programs. A number of representatives from the Economic Development Administration; Environmental Protection Agency; Department of Transportation; Corps of Engineers; Department of Health, Education, and Welfare; and Department of Agriculture extended excellent and concerned cooperation in providing HUD with appropriate program data on Puerto Rican construction activity supported by their programs.

Housing/Construction

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Housing

HISTORICAL PERSPECTIVE

Until World War II, the level of housing development and the quality of the housing inventory in Puerto Rico reflected the island's lack of economic development. The effective demand for quality, modern housing had been restricted to a proportionately and numerically small upper-income class. The lack of liberal long-term mortgage financing from local lenders additionally inhibited the production of quality housing. Mortgage terms were restrictive, characteristic of poorer economies with limited thrift resources.

The emergence of a substantial quality housing inventory in Puerto Rico began during the post-World War II years, when the economy of the Commonwealth was brought into the mainstream of U.S. economic activity and the island's home-building industry entered into the building and mortgage financing infrastructure of the U.S. mainland. It was not merely that the rapid growth of the island's economy began to create a substantial middle class, anxious to spend its income on modern, quality housing. Equally important, these middle-class families found that they were able to purchase houses on the same liberal home financing terms as middle-class families on the mainland. The long term, lower interest, fixed monthly payment terms of mortgages insured by the Federal Housing Administration (FHA), or guaranteed by the Veterans' Administration (VA), became universally available in Puerto Rico, as well as a result of the development of an appropriate mortgage origination infrastructure in Puerto Rico.

Housing production both for the private and subsidized markets paralleled general economic activity on the island. Although Puerto Rico entered into the U.S. low-income public housing program later than mainland counterpart communities, it participated very vigorously, and today the public housing share of the total island inventory is four times greater than the proportion in the rest of the United States. Puerto Rico created a centralized public housing agency, Corporacion de Renovacion Urbana y Vivienda de Puerto Rico (better identified by its acronym CRUV) which developed nearly 52,000 units of public housing and undertook ancillary sub-

sidized housing programs for the island. (The largest of these, Law 10 projects, is discussed later.)

The FHA, VA, and low-income public housing programs have a common characteristic, i.e., the use of Federal support to reduce or eliminate lender risk. Only by comparatively risk-free participation could mainland lenders and investors be attracted to housing investment in a developing economy, one thousand miles away from the nearest part of the U.S. mainland, characterized by distinct cultural and language differences.

In the case of FHA programs, the mortgage lender is protected against financial loss by a mortgage insurance fund into which the mortgagor-borrower pays mortgage insurance premiums. (In selected programs, the FHA, itself, sustains the insurance fund.) In the VA loan guaranty program, the mortgage lender is guaranteed repayment of a substantial part of the total mortgage indebtedness, a portion typically large enough to offset normal risk exposures caused by default, foreclosure, and resale of the property. In the public housing program, the Federal Government pledges its full faith and credit to payment of principal and (income tax-free) interest to purchasers of housing authority bonds. The Federal housing subsidy can amount to the entire debt service for the project (principal and interest on the bonds), and in recent years the subsidy has been increased to absorb, as required, certain portions of operating costs (utilities, maintenance, etc.). (Note: the Farmers Home Administration (FmHA) of the Department of Agriculture, by end of 1977, had accounted for some 15,500 home ownership loans on the island, virtually all in new construction. This program, section 502, is discussed later in greater detail.)

THE HOUSING MARKET GAP, LOW PURCHASING POWER, AND HIGH HOUSING COSTS

The relationship of effective housing demand in Puerto Rico to the price of new housing is not unlike the relationship encountered in other lower income areas of the United States, such as in the

Appalachian States. Despite lower construction wages, the prices required for producing "quality" housing in Puerto Rico (i.e., meeting Federal Housing Administration or Veterans' Administration minimum property standards) are not significantly cheaper than those in other subtropical areas of the U.S. mainland.

Housing built on the island does not require expensive heating systems, and few, if any, houses are built with basements. These economies, however, do not effect large-scale price reductions. The subtropical climate of the island and the termite problem make less-expensive frame construction impractical; masonry construction also reflects Hispanic cultural preferences. Although Puerto Rican enterprises manufacture sufficient cement for local use, and some steel reinforcing bars are produced locally from scrap metal, the major requirements for steel reinforcing bars and mesh have to be imported. Virtually all lumber and millwork, plumbing, electrical and air-conditioning equipment must be brought in from outside. The prices of these items are increased by local excise taxes as well as transportation costs. All goods brought from the United States are required to be shipped on American-flag vessels at higher rates than for comparable distances from other countries. Land costs are high in major urban centers, particularly the San Juan Metropolitan area. Despite the efforts of the Planning Board to influence the design of subdivisions, large scale developers in the past made little effort to fit their development to existing topography, but frequently engaged in extensive "cut and fill" operations to provide level building sites. The level coastal plains, which are most inviting for such development, are largely floodable, while the interior of the island features very rugged topography.

Puerto Rican construction labor is cheaper than labor on the mainland, and in terms of the one-story masonry single family homes which are typically built, is probably quite efficient. On the other hand, construction wages must be competitive within the framework of the island's minimum wages, and skilled artisans such as electricians and plumbers command high pay, just as on the mainland.

Housing standards and prices in the San Juan area are generally higher than elsewhere on the island. According to the Puerto Rico Planning Board, the area of a standard house without carport is about 1,150 square feet within the San Juan Standard Metropolitan Statistical Area (SMSA); elsewhere on the island the average house area is 1,000 square feet. The Board also indicates that condominium units average 985 square feet. Average price of houses in the San Juan area was \$34,500; in the Ponce and Mayaguez SMSA's it was \$39,500; and in smaller municipalities average price

was \$32,000. Average cost of condominium units in SJMA was \$48,800, reflecting, in part, the comparatively higher incidence of luxury structures near the beach areas.

HUD Area Office representatives provided nearly comparable cost estimates. They indicate that new detached single family housing produced for sale in Puerto Rico with 3 bedrooms and 1½ baths costs about \$38,000 for the island as a whole. Contrary to the Puerto Rican Planning Board estimate, however, the HUD Area Office estimates equivalent costs for such a house in the San Juan SMSA to be \$43,000.

What is the extent of the housing market gap? It is estimated by the Department of Housing and Urban Development (HUD) that the 1977 family incomes in Puerto Rico are 133 percent higher than the (1969) incomes reported in the 1970 Census. The HUD-estimated 1977 family income distribution is shown as follows:

1977 Family Income Distribution, Puerto Rico

Decile	Income
1	\$700
2	2,100
3	3,700
4	5,375
5 (median)	7,150
6	9,220
7	12,220
8	16,000
9	23,900

The median family income in Puerto Rico in 1977 was only about *one-half* of the median income for the entire United States, approximately \$15,000. In fact, only about one-fifth of the Puerto Rican families had incomes at or above the level enjoyed by one-half of all other Americans.

Only about 15 percent of the families in Puerto Rico can afford the cost of these new "minimum" single-family homes. It should be noted that under current liberal conventional mortgage terms, an annual income of approximately \$19,000 would be needed to acquire a home valued at between \$38,000 and \$47,500 (2 or 2.5 times gross income).

The housing market gap would be somewhat narrowed when the income/housing cost relationship is viewed in terms of Puerto Rican urban family incomes. The 1977 median family income for urban families is estimated by HUD at \$9,430, and somewhat over 20 percent of the urban families are estimated to have the \$19,000 annual incomes required to purchase a \$38,000 house.

For the United States as a whole, the 1977 Statistical Yearbook of the Department of Housing and Urban Development shows that the percentage of

American families able to purchase a median-price new house has ranged from 44.3 percent in 1963 to 31.5 percent in 1975. The percentage has been steadily declining; even so, the income/price relationship is only half as great in Puerto Rico (15 percent eligible to buy lowest priced housing) as in the entire United States (31.5 percent able to buy a median-price new house). Actually, this disparity would be larger, since the Puerto Rican comparison is made on the basis of a lowest priced house, rather than with a median-price house. (A similar comparison cannot be made for the total United States in light of the wide disparities in lowest cost housing from one geographical section of the country to the other.)

It is unlikely that the income/price gap can be closed significantly without the intervention of subsidy assistance. Lowering housing costs by reducing physical and quality standards appears to be an avenue with limited potential. It does not seem appropriate to adopt lower FHA or VA standards for Commonwealth residents than for other American citizens, particularly in those design areas affecting health and safety of the occupants, such as provision of operable and appropriately placed windows for emergency fire egress. Rehabilitation of existing structures appears to have limited potential, as well, since so many of the substandard units on the island (very many located in squatter enclaves) were built to inadequate standards and from makeshift, non-permanent materials. Puerto Rico has achieved substantial progress in the removal of these enclaves and in the provision of sanitary facilities and water to those portions which remain.

Certain housing cost reductions could be obtained from Commonwealth measures to provide cheaper sites. Land obtained with HUD's block grant assistance could be sold below its true market value and at a price consistent with the modestly priced housing to be built on it. The Commonwealth might undertake selected draining and landfill operations to provide low-cost housing sites in urban areas. Also, site preparation costs for builders might be reduced by having the Commonwealth extend water and sewer lines to subdivision boundaries, where extensive trunk connections might, otherwise, have to be borne by the builder. Such site economies, however, would be fairly modest, when related to the total cost of new housing construction and would not significantly diminish the need for housing subsidies.

THE AVAILABILITY OF PRIVATE MORTGAGE FINANCING

The large-scale private housing development which occurred in Puerto Rico after World War II

predominantly depended upon mainland private mortgage sources. Such mortgage funds are derived almost entirely from personal savings. Major sources for such funds are typically savings and loan associations, savings banks, insurance companies, and pension funds. In areas of very low personal and family income, such as Puerto Rico, the indigenous development of mortgage funds has been necessarily very limited because personal savings capacity is very low.

Availability of mortgage funds for the Puerto Rican housing industry is inextricably tied into the availability of such funds for the Nation as a whole. These funds become available through the workings of the secondary mortgage market.¹ So effective and pervasive have the workings of the secondary mortgage market become that Puerto Rico's access to mortgage funds is no different than that of virtually any other part of the United States where indigenous saving cannot support the proposed levels of new housing construction.

The pricing mechanism of the marketplace tends to offset mortgage money supply shortages, either through payment of higher mortgage interest rates or through the "point discount" mechanism, or a combination of both. Mortgagor borrowers in money-short areas will pay a higher cost to borrow, say at 9½ percent interest instead of at 9 percent. Or, the developer or seller will pay the same rate of interest, but accept less than the face value of the mortgage. In this latter case, the mortgage amount will be "discounted" by one or more "points," with

¹ *Secondary Mortgage Market:* This is the market for buying and selling of home and rental project mortgages after their origination by lenders. Commercial savings banks, insurance companies, and savings and loan associations, for example, have made large investments in long term mortgage loans, and often are buyers in the secondary market. Mortgage companies in particular, and commercial banks, to some extent, are interested in the resale of mortgages which they have originated. Many investors both originate mortgages and buy them in the secondary market. The ability of this secondary market to absorb mortgage loans into investment portfolios has a direct relationship to the amount of new mortgages made. Since this is so, there have developed several government-sponsored instrumentalities in the secondary market.

In the United States there are three public or quasipublic institutions which facilitate the workings of the secondary market. These are the Federal National Mortgage Association (FNMA), the Government National Mortgage Association (GNMA), and the Federal Home Loan Mortgage Corporation (FHLMC). The Federal National Mortgage Association, a Government agency created in 1939, has operated since 1968 on a self-sustaining, profit motivated basis as a privately owned, federally chartered and regulated corporation. The Government National Mortgage Association, a Government corporation within the Department of Housing and Urban Development, was created in 1968 to manage and liquidate FNMA's mortgage portfolio, to purchase Government underwritten mortgages having an unconventional risk or below market interest rates, and to guarantee securities based on pools of Government mortgages. The Federal Home Loan Mortgage Corporation, another privately owned, federally chartered corporation, was established in 1970 to guarantee or trade in insured and uninsured mortgages or participations issued by financial institutions having deposits or accounts insured by the Federal Government.

The Federal Reserve Board supports its member banks in their ability to make additional loans, including mortgage loans. Similar, but proportionately larger mortgage support is provided by the Federal Home Loan Bank System which consists of private regional banks which provide a credit reservoir for member home financing institutions through advances to meet withdrawal requirements and loan commitments.

each point approximating one-eighth of a percent difference in mortgage interest yield. For example, a \$1 million mortgage at 9 percent, discounted at 4 points, would provide only \$960,000 to the borrower. The prepayment of \$40,000 to the lender has the effect of raising the yield of the mortgage loan to about 9½ percent.

As suggested earlier, Puerto Rico has tended to fare, in terms of mortgage fund availability, about as well as other parts of the United States where demand for mortgage funds is greater than indigenous sources can supply. When there is an ample nationwide supply of mortgage money, its availability and price in the Commonwealth tend to match national patterns. When the national supply of mortgage money becomes reduced, the shortages are manifested in several different manners. Rates of interest go up; the point discounts increase; downpayment requirements might increase; lenders become more selective in their loans; and/or demand for mortgage insurance protection rises.

Response mechanisms to these market adjustments are varied. In a strong housing market, builder-developers readily absorb point discounts and, in turn, pass these costs on to the consumers in the form of higher prices or rents. Greater utilization of HUD's "Tandem" program (to be explained later in greater detail), where front-end Federal payment to the lender reduces mortgage interest rates to "acceptable" levels, may also be more aggressively sought by island mortgagees.

While it is true that at the present time, Puerto Rico's mortgage supply situation is considered to be satisfactory, with sufficient funds to cope with ongoing and prospective levels of unsubsidized housing production, there is no assurance the condition will continue. The preponderant private housing activity on the island is production of sales housing, and the great bulk is financed with conventional mortgages (non-FHA and non-VA). Varied mortgage financing procedures are employed. One of the most prevalent is reported to be the "participation" mortgage, where local mortgage service companies in the Commonwealth initiate loans with preagreement to have mainland mortgage sources accept 90 percent of the mortgage liability. That same mortgage service company initiator may either retain the remaining 10 percent or, more likely, sell it to another lender, either on the island or on the mainland. Low downpayment loans, in virtually all cases at the present time, are required to secure private mortgage insurance to protect the lenders.

The interest rates for such participation mortgages are reported at 9½ percent for 10 percent downpayment, 30-year terms, and with requirement for private mortgage insurance for such minimum downpayment. This 9½ percent rate is less than one-

half percent higher than the average U.S. rate. Purchasers with larger downpayments and/or shorter terms can bargain for somewhat lower interest rates and avoidance of private mortgage insurance.

Local savings and loans associations are reportedly active in mortgage initiation, with a significant proportion utilizing secondary market resources (e.g., the Federal Home Loan Mortgage Corporation).

An additional source of mortgage money is cited as supporting the current, relative adequacy of mortgage financing on the island. This is the tax law provision under which "possession corporations" on the island (owned by mainland firms) are authorized to reinvest their profits in FHA and VA mortgages, the interest income from which is tax-exempt. The Commonwealth has identified two policy options it might subsequently consider with regard to these funds. The first is its possible authorization of such funds for conventional mortgages, and the second is the waiver of the "tollgate tax" on mortgage interest earnings. As indicated, initiative for these options rests with the Commonwealth.

On the other hand, the comparatively small share of total island housing activity attributable to FHA and VA mortgage financing (to be discussed later in greater detail) suggests that the above described mainland sources of mortgage money continue to dominate mortgage financing activity in the Commonwealth.

There has been national apprehension expressed concerning the prospective adequacy of mortgage funds for the rest of 1978 and for 1979. Reportedly, competing demands for thrift funds to finance U.S. industrial expansion, municipal and State borrowings, consumer financing, and Federal deficit borrowing may result in rising interest rates, with prospective "disintermediation," i.e., saver-investors may prefer to invest their money in these alternative sources, rather than in mortgages.

There is no offsetting Federal program of direct mortgage lending to replace or buttress the private mortgage financing resources for the island. The historical role of the Federal Government as a mortgage lender for privately owned housing has been comparatively very modest. Only two housing programs of national significance have access to Federal mortgage sources; these are the programs of the Farmers Home Administration (FmHA), which are discussed separately in this chapter, and the section 202 program of direct loans for development of housing for the elderly, whose modest program scope has not significantly impacted the Puerto Rican housing inventory or housing construction activity.

It is highly unlikely that the foregoing Federal mortgage functions will change. Traditionally, Con-

gress has shunned a direct Federal mortgage lending role in urban areas. The budgetary impact to finance even modest numbers of houses can be massive. The Federal role, instead, has emphasized provisions of various incentives and stimuli to help channel private mortgage funds to mortgage-money shortage areas such as Puerto Rico. There are no indications that the attitude of this Administration will shift in this regard, since any direct mortgage lending role for the Federal Government will require extensive Treasury borrowings.

The Commonwealth, in order to assure long term adequacy of mortgage funds, has suggested consideration of mandatory allocation of Puerto Rican thrift funds to predetermined socially desired objectives. The initiative for such action necessarily rests with the Commonwealth.

HUD'S HOUSING PRODUCTION ROLE

The FHA Mortgage Insurance Program, Its Growth and Importance

The FHA mortgage insurance program in Puerto Rico has probably been more responsible than any other Federal activity for the development of Puerto Rico's current privately owned, quality housing inventory.

The FHA home mortgage insurance program was introduced into Puerto Rico shortly before the end of the 1930-40 decade. In early years after the introduction of the mortgage insurance program, FHA insuring activity amounted to fewer than 100 units a year. This reflected not only the novelty of the program and relative scarcity of broad-based middle income market, but also the lack of indigenous mortgage funds. Even with the stimulus of war-time activity and post war economic adjustment, there were only 5,800 FHA-insured housing units on the island at the end of 1948.

Concomitant with the greatly accelerated growth of the Puerto Rican economy during the 1950's and 1960's, there occurred a massive increase in the volume of FHA mortgage insurance activity. The same economic factors which attracted mainland capital for industrial and commercial expansion also brought volume housing subdivision development from the mainland and access to mainland sources of mortgage funds. Puerto Rican mortgages with FHA mortgage insurance became readily accepted in America's secondary mortgage market. Major mortgage service companies established themselves in Puerto Rico, and they initiated thousands of mortgages for sale on the mainland.

By 1962, a total of 54,000 home mortgages had been insured in Puerto Rico under the FHA pro-

gram, an average annual increase of 3,450 mortgages a year since 1948. A decade later, in 1972, however, the total of FHA-insured home mortgages in Puerto Rico reached the very impressive total of 155,900; the gain in the prior 10 years averaged over 10,000 mortgages a year, a threefold annual increase over the 1950's experience. Additionally, by 1972, a total of 127 mortgages on FHA-insured multifamily projects, with a total of nearly 22,000 units, had been provided in Puerto Rico.

The combined FHA home mortgage and multifamily mortgage program averaged about 12,000 units a year during the decade, at a time when (see table 1) nonpublic housing production amounted to approximately 16,000 units a year. In effect, the FHA mortgage insurance program covered about 75 percent of all nonpublic housing starts during the period.

Table 1.—Construction of New Housing Units, Fiscal Years 1950 to 1976

Fiscal year	Total new housing units	Private	Public
1960	14,273	9,932	4,341
1961	15,701	9,081	6,620
1962	19,925	13,185	6,740
1963	14,995	11,366	3,629
1964	16,247	12,693	3,554
1965	22,094	16,294	5,800
1966	22,354	17,596	4,758
1967	18,629	14,851	3,778
1968	20,558	17,400	3,158
1969	19,925	17,495	2,430
1970	22,499	16,609	5,890
1971	20,977	16,826	4,151
1972	25,817	20,328	4,589
1973	24,955	20,562	4,393
1974	28,994	18,779	10,215
1975	18,632	10,575	8,057
1976	14,909	8,413	6,496

Source: Puerto Rico Planning Board, Bureau of Permits.

By the end of 1977, the FHA insured home mortgage total had increased to about 174,000 units, and the number of multifamily units in insured projects to 26,100 or a total of about 200,000 (source: 1977 HUD Statistical Yearbook). This amounted to about 23 percent of the island's estimated 1977 year-round inventory. This proportion is compared to a ratio of approximately 20 percent for the entire United States. Having started its FHA program about a decade after mainland activity, Puerto Rico not only caught up in a hurry, but in fact, even surpassed the rest of the United States in use of FHA.

There were two basic reasons for heavy utilization of the FHA program in Puerto Rico.

First, mainland mortgage lenders, who have provided the bulk of mortgage investment funds for Puerto Rico, initially sought the risk protection of FHA's mortgage insurance or VA's loan guaranty. Second, the major institutional catalyst in the sec-

ondary mortgage market, the Federal National Mortgage Association (FNMA), was legislatively restricted until 1972 to the purchase of FHA and VA mortgages. In effect, FHA/VA and FNMA were the "only game in town."

Accordingly, a network of subdivision builders and mortgage service companies emerged on the island, patterned on mainland counterparts, and these large-volume operators used FHA and VA vehicles to enter into the U.S. mortgage finance mainstream.

FHA Decline in Recent Years

The proportion of FHA activity, however, has begun to decline precipitously during recent years. Data from the Puerto Rican Planning Board (table 2) show minuscule FHA-insured activity in new construction in FY 1976, only 581 units, about 7 percent of the total of 8,413. (In FY 1977, there were only 383 mortgages for new construction, according to the Planning Commission.) In FY 1975, the approximately 1,500 units of FHA-insured new construction contrasted with total new private housing starts of 10,573, about 14 percent of the total. In FY 1974, the percentage was 21 percent, and in FY 1973, about 34 percent, as compared to the approximately three-fourths of the total during the 1960's. A reversal to this trend may be evidencing itself. During calendar 1978, there were nearly 1,100 new single family mortgages insured by FHA in Puerto Rico.

Some recent FHA decline was offset by gains in VA loan guaranty activity. In 1975 and 1976, VA activity, for the first time, actually exceeded FHA unit activity on the island, and in 1974, it amounted to 60 percent of the FHA unit volume. (See table 2.) This is compared to 1970 FHA/VA relationships, when VA activity was only about 20 percent of FHA unit volume.

During the last several years, conventional loans have accounted for the majority of financing of new housing starts in Puerto Rico. FHA's declining impact on new housing in Puerto Rico has tended to parallel the mainland experience, as well. Several reasons probably account for this. FHA's former \$45,000 statutory single family home maximum mortgage ceiling (since increased by new legislation) undoubtedly fell short of the sales prices required for detached sales units at the "upgrading" upper end of the market, i.e., targeted at second-time buyers where houses, for example, would be priced in the \$50,000 and over range.

Also, there has been an increasing acceptance of conventional mortgages in the secondary mortgage market. There are several reasons for this. Private mortgage insurance for conventional loans has tended to diminish lender risk. The savings and loans associations have created their own secondary market organization, the Federal Home Loan Mortgage Corporation, which operates similarly to FNMA in providing a clearinghouse for the merchandising of savings and loan mortgages in the secondary market. Perhaps most importantly, the inflationary spiral of housing values of the past several years has tended to diminish lender risk for "good" properties. The 80-percent mortgage loan of today, in the face of recent inflation of home prices of 10 percent a year, becomes 40- and 50-percent exposure in a few short years, and lender risk becomes very substantially diminished.

Another reason had been previous willingness of lenders to accept houses with lower than FHA standards. The HUD Area Office indicates, however, that such lender interest has diminished very greatly since 1973. Among other factors, such mortgages are more difficult to sell in the secondary mortgage market.

The previous protection of FHA and VA may no longer be considered essential for Puerto Rico's

Table 2.—Number and Value of Housing Loans Guaranteed by Federal Agencies in Puerto Rico, Fiscal Years 1970 to 1977

Guaranteed by—	1970	1971	1972	1973	1974	1975	1976	1977
Federal Housing Administration:								
Number, total	9,234	9,286	9,364	8,500	5,085	2,880	1,906	NA
New construction	7,618	7,728	7,766	6,962	4,013	1,518	581	NA
Existing construction	1,616	1,558	1,598	1,538	1,072	1,362	1,325	NA
Value, total (in millions of dollars)	181.1	184.6	194.0	184.3	109.5	66.3	53.5	NA
New construction	147.7	154.6	161.9	151.1	86.5	31.8	16.7	NA
Existing construction	33.4	30.0	32.1	33.2	23.0	34.5	36.8	NA
Veterans' Administration:								
Number	1,896	1,500	1,137	1,862	3,310	3,620	2,766	2,470
Value (in millions of dollars)	38.8	32.8	26.8	48.2	101.6	121.9	98.5	88.7
Farmers Home Administration:								
Number	1,144	1,250	1,340	2,181	1,305	1,154	NA	NA
Value (in millions of dollars)	8.7	16.4	19.2	39.3	22.7	22.6	NA	NA

NA—Not available.

Source: Bureau of Economic Planning, Puerto Rico Planning Board.

access to mainland secondary mortgage markets. This transition, however, is accomplished at a social cost, i.e., the "good" conventional loans acceptable to secondary market buyers are probably linked to higher priced sales units, targeted at the uppermost segment of the market.

FHA's Future Activities

As will be indicated later, a high level of non-subsidized housing development will be an essential part of Puerto Rico's housing recovery program. Whether FHA can contribute substantially to this effort and regain its former importance on the island is conjectural. Recent legislation increased the FHA home mortgage ceiling to \$60,000 compared to the previous \$45,000 limit. This may allow FHA to participate in certain sales housing developments, hitherto precluded because of their higher prices. However, higher cost housing requires higher income buyers, and this will tend to offset the advantages of increased mortgage ceilings.

The fundamental institutional changes which have taken place and which have tended to diminish the former advantages of FHA participation in the unsubsidized housing market will continue. As indicated, continuing housing price inflation has tended to reduce lender need for the protection of mortgage insurance. The use of private mortgage insurance and the increased acceptability of conventional mortgages in the secondary mortgage market will continue. Also, there may continue to be builder unhappiness with the length of FHA processing time, which has increased for new single family housing subdivision construction due to Federal environmental clearance requirements, according to Commonwealth representatives.

Low-Income Public Housing

Growth of the federally subsidized low-income public housing inventory in Puerto Rico has also been comparatively very great. By the end of 1977, there was a total of over 52,000 occupied low-income public housing units on the island, equal to about 6 percent of the island's year-round inventory. In the entire United States, the public housing inventory of somewhat over 1 million units represents about 1.5 percent of the total housing inventory of about 70 million units.

There are several reasons for the proportionately very large low-income public housing program in Puerto Rico. First, there is the profound absolute need for housing to serve low-income families. Second, there was the intense desire of the Commonwealth Government to obtain as much of this housing as possible and its creation of a central consolidated agency, Corporacion de Renovacion

Urbana y Vivienda de Puerto Rico (CRUV), for effective production and delivery. Third, there were fortuitous periodic end-of-fiscal-year "gluts" of such housing, as mainland communities became embroiled in site selection quarrels or, otherwise, could not effect contracts with HUD to produce their allocated units. Consequently, there were occasions when mainland-forfeited, surplus public housing units materialized at the end of selected fiscal years, and were offered to Puerto Rico. (Note: The absence of racial discrimination on the island, coupled with the centralized government's positive attitude toward project site selection and program implementation, allowed expeditious development of such public housing projects.)

FARMERS HOME ADMINISTRATION (FmHA) PROGRAMS, DEPARTMENT OF AGRICULTURE

The FmHA program in Puerto Rico had developed, as of end of 1976, a historical, cumulative portfolio of nearly 14,000 housing units, of which some 12,200 were homeownership section 502 loans and about 1,500 were section 504 home repair loans and grants. By end of 1977, the section 502 portfolio had increased by nearly 3,500 additional units, and by the end of 1978, by over 4,000 more. Activity in 1977 and 1978 provided over 50 percent of the total section 502 portfolio.

Mortgage loans are made directly by FmHA, so there is no problem with regard to private mortgage capital availability. Loans are initiated and serviced by the Federal agency itself. Interest rates are flexible, based on need of purchasers, and range from a minimum of 1 percent to a current maximum of $8\frac{1}{4}$ percent. The maximum rate, which is established by the Secretary of Agriculture, currently lags behind the FHA maximum interest rate (increased on May 22, 1978, from $8\frac{3}{4}$ percent to 9 percent), but as a matter of Department policy, has historically tended to match the latter.

FmHA mortgage loans are initiated and serviced by individual FmHA field offices, usually one to each county. FmHA obtains funds for this sales housing program from a revolving fund pool that has been authorized by Congress. Depending upon the strength and condition of the pool and the authorization entitlement, FmHA periodically supplements its mortgage lending capacity by selling Certificates of Beneficial Ownership, the great bulk of which have most recently been sold to the Federal Financing Bank, an arm of the Treasury.

The great bulk of section 502 loans in Puerto Rico, as might be expected, are made at interest rates which are below the maximum permitted and,

therefore, are classified as subsidized loans. Commonwealth officials estimate that 80 to 85 percent of such loans in Puerto Rico are being made at rates of 1 and 2 percent. (They indicate that in 1978, 92 percent of section 502 loans were made with some degree of interest subsidy benefit.)

Administratively, the FmHA is limited to operating in localities of under 10,000 population, but it can operate in localities of up to 20,000 on the basis of agreement between FmHA and HUD. The FmHA activity can also extend into peripheral, outlying localities of SMSA's, so long as the population of the community(ies) is under 10,000 and it is geographically separated from other builtup portions of the SMSA.

COMMONWEALTH HOUSING PROGRAMS

The Commonwealth has undertaken numerous programs, supported entirely by its own funds, to serve the needs of families requiring housing assistance. These programs have concentrated upon ownership housing, rather than rental. Also, the programs show wide diversity, ranging from development of building lots, provision of semifinished core houses, and use of new prefabrication technology.

The following information is obtained from the June 1978 publication of the Department of Housing, Commonwealth of Puerto Rico.

Rental Housing

There are two rental programs funded by the Commonwealth. The first, Apartments for Single Persons, is intended to serve single person elderly who want to maintain independent housekeeping. A total of 714 of these units has been completed. The second program, Moderate Rent Housing, is intended to serve families who are eligible at income limits somewhat higher than federally subsidized low income public housing. A total of 846 units has been completed under this latter program.

Ownership Housing

The largest of these programs is the Commonwealth's Law 10 program, and this program is described in footnote ² to this chapter. As indicated, it is a program which offers condominium units at an

initial subsidized interest rate (1 to 3 percent) to moderate income purchasers. The units are built with scaled-down amenity features intended to reduce costs and make home purchase opportunities as broad as possible. Subsidy benefits will be phased out over a 14-year period. The initial Law 10 program called for 13,500 units; a second program quota of 12,500 units has been recently authorized.

There are two Commonwealth "Low Cost" homeownership programs which are administered without Federal subsidies. The Regular Low-Cost Housing program provides housing for moderate income families, with advantageous financing obtained through sale of bonds by CRUV, guaranteed by the Commonwealth Government. The second, which is designated Low Cost Housing, Other Projects, includes five separate programs. These programs are self-help, provision of a core house that will be completed by the occupant, cooperatives, condominiums financed with municipal funds, and semi-rural public housing units which are sold to their occupants. Under the first program, about 9,400 units have been completed, with 1,100 still in planning. Under the second, some 6,000 units have been completed.

A comparatively small program, the Asbestos Cement Housing program, sought to obtain economies with prefabricated modular elements made of asbestos cement. About 1,500 units have been completed under this program, and about 340 remain to be finished.

There is also a "Modest Housing" program intended to serve low-income purchasers. Initially, the houses were built of chemically treated wood; most recently, construction has shifted to asbestos cement. Some 2,100 units have been completed under this program; no others are in planning or construction.

There is a program of Regular Semifinished Housing, limited to areas which are susceptible to flooding. The Commonwealth investment is intended to be minimal; the principal financing load is borne by the occupant-owner. The owners pay according to their means, and financing had been provided through the Commonwealth Housing Bank. Some 2,000 units have been finished under this program.

² Law 10 Program, Puerto Rico: Law 10, enacted by the Legislature of Puerto Rico, was an attempt to offset the former President's 1973 "freeze" on new subsidized housing construction. The intended original scope of the program was to supply 13,500 units of housing for sale or rent, and it authorized the Secretary of the Housing Department to incur obligations up to \$9,220,000 for start of the program. The program was subsequently expanded to provide an additional 12,500 units, or a total of approximately 26,000. (This can be compared with the approximately 52,000 units built under the low income public housing program.)

Its intended market was "moderate income" families, defined as

those whose incomes exceeded the low income public housing eligibility level, but whose incomes did not, alternatively, allow them to buy unsubsidized privately built new housing. The maximum price for a unit to be built under the program was limited to \$25,000. Units built at under \$20,000 would receive the benefit of rents determined at a 1-percent interest rate; units priced between \$20,000-\$25,000 would receive benefits based upon either a 2- or 3-percent interest rate, as determined by the Commonwealth Secretary of Housing. The subsidy will be proportionately readjusted every 2 years and will be decreased, so that at the end of the 14th year the interest subsidy benefits would be entirely eliminated, and the occupant would be paying the interest rate necessary to support repayment of the obligations which were sold to finance the project.

The Commonwealth has sought to keep housing costs down by reduced space and amenity standards, i.e., reduced room sizes, higher land coverage, etc.

It is indicated that lack of Commonwealth resources has caused financial shift of this program to the aegis of the Farmers Home Administration.

A third major category of Commonwealth housing assistance has been in supporting the purchase and development of improved building lots. There are three major programs under this category. The first provides developed lots to families in flood-prone areas, and the program was initiated in response to October 1970 floods. The second site program was intended to serve families who must be relocated because of governmental actions; families pay for these lots according to their means. The third provides cost-free developed lots to eligible low income families. In all, about 24,000 lots have already been provided, with an additional 2,400 in planning and improvement status.

The Commonwealth housing and site programs, which do not depend upon Federal financial support, will have provided, as of June 1978, 1,560 rental units; 35,178 sales units, including the most recently authorized additional 12,500 Law 10 units; and 26,284 sites.

It should be additionally noted that the Commonwealth administers a rent control program which, it is alleged, has inhibited development of a quality rental housing inventory in Puerto Rico. This allegation is questionable; other constraints appear much more decisive. As indicated in the discussions of FHA program activity and also of the character of the housing industry in Puerto Rico, island families have historically demonstrated a strong preference for ownership. Also, the local housing economy has not yet generated a sufficient number of private sponsor-investors who wish to or have the financial capacity to operate rental housing on a long term basis. Local multifamily builders have operated principally in a contractor capacity, typically building for housing authority (CRUV) ownership and operation.

FHA-insured rental properties are exempt from Commonwealth rent control provisions, and FHA has virtually preempted subsidized and unsubsidized rental housing production on the island. With such FHA dominance of new rental housing production on the island and with exemption of FHA-insured projects from local rent control, the alleged inhibiting effects of island rent controls upon new rental housing production have been more academic than real.

UNIQUE ASPECTS OF PUERTO RICAN HOUSING INDUSTRY

Following are some unique aspects of the Puerto Rican housing construction, briefly described:

1. The industry has predominantly served home-

ownership, as illustrated by FHA activity, which in 1976 reflected cumulative program activity of 87 percent sales housing and only 13 percent rental housing. The Farmers Home Administration and Veterans' Administration programs would enlarge the homeownership percentage even more. Also, recognizing that most of the rental construction on the island took place under FHA programs, the conventional sales housing sector input would probably reduce rental construction (exclusive of low-income public housing) to less than 5 percent.

This nearly exclusive emphasis upon production of sales housing responded to several forces. Endogenously, there is a strong cultural preference in Puerto Rico for "casa propia," owning one's own house. Ownership designates security, status, and freedom, and it provides a family legacy for children. A prospering economy develops a home ownership pattern, as contrasted to the "landlord" housing inventory pattern of poorer and developing countries.

Furthermore, single family mortgages initially provided a more readily saleable investment commodity on the mainland secondary mortgage market. Homeowners will struggle to retain their properties, even in the face of economic adversity. Mortgage investment risk is spread among many units in many neighborhoods, rather than in a single project.

It has been easier to generate an indigenous Puerto Rican infrastructure of craftsmen and contractors for production of single family sales housing. Capital requirements are not high, and single family construction does not require massive investments for building equipment. Such an environment can also attract mainland builders who readily adapt to Puerto Rican production and marketing requirements.

2. Conversely, the development of a rental housing industry has lagged. Most of the larger scale contractors on the island have not developed the investment perspective or the resources to stay with a project and extract operating profits, even during the periods when rental housing development provided extremely attractive sources for accelerated property depreciation for income tax purposes, and net annual yields of 20 to 25 percent could be realized.

3. Because of the lack of interest in private rental property investment, the island has also not developed property management expertise for private rental housing. In the event that private rental housing were to expand very greatly, there would not be sufficient professional management capabilities on the island to serve these needs, particularly where the prospective tenant bodies might require careful

screening and selection, monitoring, and effective rent collection programs.

4. The predominant rental construction and project operation on the island has historically been public in nature, i.e., the low income public housing program of 52,000 units, as operated by CRUV. The homebuilding and construction industry has adapted itself to this arrangement by serving essentially as contractors who build to order for CRUV, but leave operation and management to the agency. Unfortunately, CRUV's management competence has diminished during the last several years, allegedly as a result of too frequent changes in leadership and loss of supervisory continuity. The centralized agency is currently working hard to regain its previous management excellence.

5. Condominium development has recently assumed a significant role in the Puerto Rican housing market. Earlier condominium production had been targeted at the upper-income end of the market, where choice locations supported market acceptance of such production. Island builders, during the early 1970's, undertook substantially larger condominium production, targeted at both the upper and middle levels of market. The recent recession, however, adversely affected condominium sales at all price levels, and large numbers of unsold units accumulated in the inventory. The majority of unsold condominium units were situated in the San Juan area, but they were encountered in other urban centers of the island, as well. The average price for condominium units in the San Juan area, according to the Puerto Rican Planning Commission, rose from \$37,500 in 1973 to \$48,900 in 1976, roughly following the pattern of housing production cost increases during that same period.

6. Of unknown prospective duration is the current problem of securing performance bonding for completion of rental housing. Only 2 of 15 firms on the island which offer such bonding (typically on the basis of reinsurance with mainland carriers) are Treasury listed, and, therefore, are acceptable to HUD. This is shown, as follows:

Bonding Companies Operating in Puerto Rico

1. West Indies Insurance Company
2. Trans World Assurance Company
3. Puerto Rico American Insurance Company¹
4. Aseguradora Patria
5. National Insurance Company
6. American International Insurance Company
7. Home Insurance Company¹

¹ Treasury listed.

Source: Puerto Rican Planning Commission.

8. Seaboard Surety Company
9. Federal Insurance Company
10. General Accident Fire and Life Assurance Corporation
11. Continental Casualty Company
12. U.S. Fidelity Guaranty Company
13. C.N.A. Casualty Company
14. Hartford Accident and Indemnity Company
15. Builders Insurance Company

Availability of such performance bonding is essential, particularly in light of the smaller and modestly capitalized character of island developers, and also in light of the atmosphere of caution created by a softened housing market. (Note: The problem of securing adequate performance bonding reportedly exists nationwide, but it is reportedly severe in Puerto Rico.)

PUERTO RICO'S HOUSING NEEDS

The socioeconomic study of the Commonwealth estimated Puerto Rican housing needs for FY 1977 at 204,000 units. This is a relatively static assessment in that its major component consists of a requirement to replace 183,000 units of substandard housing, and to "undouble" almost 20,000 families who are occupying standard private housing and public housing. There is a minor dynamic element of need in this estimate, i.e., the need to replace 1,500 housing units which will be lost through public action or through fires, disasters, etc.

The above estimate of 204,000 units is considered to be conservative, although it is equal to about one-fourth of the island's inventory. The Commonwealth apparently utilized published 1970 Housing Census data to arrive at this estimate. These census data for Puerto Rico described housing conditions in SMSA's in terms of "sound," "deteriorating," "dilapidated," and "original construction inadequate" categories. Similar descriptive categories were not available in published form for housing located in non-SMSA's. It is assumed, therefore, that the Commonwealth utilized alternative published data such as availability of plumbing facilities and presence of private-cooking facilities, together with appropriate statistical relationships, to arrive at estimates of substandard housing in such non-SMSA localities. The separate estimates were then aggregated to arrive at the island total. Coincidentally, the estimated total of 183,000 units of substandard housing would also be comprised of all occupied units which lacked complete plumbing and which were also overcrowded, vacant units available for rent or sale which lacked complete plumbing, and "other" vacant units (not offered

for rent or sale) to which plumbing deficiency was attributed in the same proportion as it occurred in vacant units which were available for rent or sale.

The Commonwealth did not take into account the need-dynamics of prospective increased population and household growth; the total estimate could have been accordingly increased by another 20,000 units a year (assuming continuation of most recent demographic trends). Also, if it had taken into account dynamics of housing deterioration, i.e., the non-substandard units which would become substandard as a result of age, misuse, etc., the Commonwealth could have increased the total even more.

Despite its static and conservative nature, the need-estimate of 204,000 represents a reasonable starting benchmark against which prospective programs and resources can be directed.

The Department of Agriculture's analysis of rural living conditions describes Puerto Rican housing deficiencies in rural areas, in terms of shortages, deficiencies, and adequacy of water and sewer.

COMMONWEALTH HOUSING GOALS

To provide all Puerto Rican households with housing of standard quality would require a multi-year effort. In its socioeconomic report, the Puerto Rican Planning Commission asserts that nearly 60,000 units ought to be produced over the next 3 years, or an average of almost 20,000 units a year. These are housing production levels which were, in fact, exceeded during the 1972-74 peak years, and almost reached during 1975 (table 1).

It is noted, however, that the 1972-74 high levels of housing production had depended, in substantial part, upon production of HUD-subsidized housing (tables 1 and 3). The subsidized housing programs which accounted for such production were placed under a moratorium by the President in 1973. These

Table 3.—Construction of New Private Housing Units

Fiscal year	Total units	With sections 235 and 236 subsidy	Percentage subsidized
1969	17,495	938	5.4
1970	16,609	4,670	28.1
1971	16,826	6,022	35.8
1972	20,328	6,230	30.6
1973	20,562	3,853	18.7
1974	18,779	—	—
1975	10,575	—	—
1976	8,413	—	—

Source: Puerto Rico Planning Board.

were sections 235,³ 236,⁴ and public housing. Since then, alternative programs have emerged that, instead, will principally have to serve the Commonwealth's subsidized housing goals.

The annual program of the planning commission includes 8,750 units of private and unsubsidized housing and 2,825 units of owner-built housing (self-built or built to individual contract) as well as 8,325 units of subsidized housing.

Unsubsidized Housing Goals

The Commonwealth's annual goal of 8,750 units of unsubsidized housing appears conservative, no doubt influenced by the lagging recovery of the housing market and the continuing slow pace of absorption of surplus, unsold condominium units. The recovery of the Puerto Rican economy, which began in mid-FY 1976, suggests, however, that this conservative goal will be achieved and probably surpassed. While the 8,750-unit goal nearly corresponds to private housing starts during FY 1976, it amounts to less than one-half of such starts during the 1972-73 period (table 1).

The economic slump during calendar year 1975 and early 1976 impacted major sectors of the Puerto Rican economy, causing unemployment and a slowdown in the growth of real family incomes. However, between mid-FY 1976 and FY 1978, the growth in family incomes resumed. The impact of the recession upon family incomes is shown in the following comparison, obtained from Department of Commerce calculations.

³ *Section 235:* The section 235 mortgage insurance program of FHA is designed to enable eligible families (incomes below 95 percent of median) to afford new or rehabilitated homes that meet HUD standards.

The Federal Housing Administration (FHA) insures mortgages and makes monthly payments to lenders to reduce interest to as low as 4 percent. The homeowner must contribute 20 percent of adjusted income to monthly mortgage payments and must make a downpayment of 3 percent plus closing costs and prepaid items. There are dollar limits on loans and sales prices. Mortgage limits are \$32,000 (\$38,000 for homes for 5 or more persons), and in high cost areas, \$38,000 (\$44,000 for homes for 5 or more persons).

The section 235 homeownership subsidy program was reactivated in 1975 in order to stimulate increased activity in the residential construction industry by enabling families priced out of the market to buy a new or substantially rehabilitated home. The reactivated program provides a limited interest subsidy to qualified homebuyers, but is significantly different from the program as implemented previously. Under the prior program, subsidies could be paid to reduce the interest rate to as low as 1 percent. The revised program also requires a larger downpayment. Existing home purchases, allowed under the original programs, are excluded now.

⁴ *Section 236:* Under the section 236 mortgage insurance program, HUD/FHA originally insured multifamily mortgages and paid interest subsidies to lenders which allowed the mortgage to be paid off by the project owner at an interest rate as low as 1 percent. The reduction this made possible in monthly rents was designed to produce new or substantially rehabilitated rental or cooperative units for lower income households. Tenants contribute no more than 25 percent of adjusted income to rent. Beginning in 1974, HUD paid additional subsidies to cover the difference between the tenants' contribution and the actual costs of operating the project. Sponsors may be nonprofit, limited dividend, or cooperative organizations. Both tenants who can afford fair market rents and those who cannot may occupy these projects; only the latter will be subsidized.

The section 236 program is currently inactive. It was suspended by the housing subsidy moratorium of Jan. 5, 1973. Current activity consists mainly of funding bonafide commitments issued before the moratorium.

	Average rate of growth in real family income
FY 1970-FY 1978	1.8 percent
FY 1970-FY 1975	1.6 percent
FY 1976-FY 1978	2.1 percent

During the total 8-year period of FY 1970-FY 1978, the average family income increased by an average of 1.8 percent a year. In the FY 1970-FY 1975 period, the average rate dropped to 1.6 percent, reflecting the severe impact of the recession months of first half of calendar 1975. The economic recovery appears to have been so substantial that, even with accommodating approximately one full year of recession, the gain during the last 2 years of the 3-year period was so great as to yield a 3-year average of 2.1 percent for FY 1976-FY 1978.

Continued population and household growth, as well as employment recovery, should strengthen island housing demand for unsubsidized housing. The General Economic Assessment asserts that structural obstacles to Puerto Rican growth should not be significant for the near term period, and this implies that mainland economic activity will directly impact and effect continued economic growth of the island. With the island's recession "bottoming out" in FY 1976, coupled with the island's ability to build 8,400 unsubsidized units, during that same time, the unsubsidized target of 8,750 units should be substantially reached or exceeded. Liberalization of FHA mortgage ceilings and terms should abet this achievement.

The achievement of 2,825 units of owner-built and self-built housing also appears reasonable. With a population of over 3 million, the island can surely support that level of nonproject, nonsubdivision development.

Subsidized Housing Goals

How realistic is the subsidized annual housing goal of 8,325 units? There are four principal subsidized housing programs which the Federal Government can make available to the island. Three are administered by HUD and one by the Farmers Home Administration of the Department of Agriculture. HUD's programs are the section 8 Housing Assistance Payments Program,⁵ a "deep subsidy"

⁵ *Section 8 Program:* Under the section 8 program, HUD makes up the difference between what a lower income household can afford and the gross rent (including all utilities) for an adequate housing unit. No eligible tenant has to pay more than 25 percent of adjusted income toward rent. Housing thus subsidized by HUD must meet certain standards of safety and sanitation, and rents for these units must fall below the Fair Market Rent (FMR) ceiling determined by HUD. This rental assistance may be used in existing housing, in new construction, or in substantially rehabilitated units. Different procedures apply in each case.

Local public housing agencies (PHA's) administer the existing housing program, certifying eligible tenants, inspecting the units proposed for subsidy, and contracting with approved landlords for payment.

program to serve occupants of rental housing; the section 235 homeownership program, a "shallow subsidy" program to facilitate purchase of new sales housing; and the low-income public housing program, also a "deep subsidy" rental program. The Farmers Home Administration program is the section 502 "shallow subsidy" homeownership program.

Section 8 Housing.—During FY 1976 and transitional quarter, HUD provided Puerto Rico with section 8 subsidy funds to support 3,672 units of new construction and 4,000 existing rental units. In FY 1977 it provided funds for 4,024 units of new construction and 3,734 units of existing housing. These figures show that HUD is providing nearly 7,000 to 7,500 units of section 8 housing a year, with the most recent new construction quota of 4,000 units amounting to 52 percent of the total. (Note: Approved and anticipated section 8 funding levels in 1978 and 1979 will provide approximately the same or increased levels of new construction section 8 program activity for Puerto Rico.)

Approximately 5,000 existing units have already been placed under section 8 lease in Puerto Rico, attesting to the urgent need for the existing housing program. Participating families are using program benefits predominantly "in place," i.e., income-qualifying families can ask their landlords to participate in the program, and after the landlord enters into an agreement with the local public housing agency, the tenant will pay one-fourth of his income for gross rent (contract rent paid to the landlord, plus all utilities expenses borne by the tenant), and HUD will pay the remainder. Landlords may, in fact, take the initiative in seeking such benefits for their tenants, especially those anxious to retain a good tenant and simultaneously help him to ease his rent burden.

Another major source of "in place" use is HUD's Loan Management program, wherein owners of FHA-insured rental properties may seek section 8 assistance for their tenants to avoid possible operating hardships that might be caused by rent delinquencies. Section 8 aid can also be sought to ease the burdens of the occupants, even if the project is not in imminent financial danger.

An additional source of leasing is moving from one unit to another. The shortage of vacancies in standard, acceptable units has impeded more extensive use of this program by renter movers.

(Tenants execute separate leases with landlords to pay their share of the rent.)

Nonprofit and profit-motivated developers, along or together with PHA's, submit proposals for substantial rehabilitation or new construction in response to invitations from HUD, or they may apply to their State Housing Finance Agency(ies). On approval of the proposals, HUD contracts to subsidize the units to be occupied by eligible families.

Tenants must be lower income households with incomes amounting to 80 percent of the area median income or less. Project sponsors may be private owners, profit-motivated, and nonprofit or cooperative organizations, public housing agencies, and State housing finance agencies.

A remaining source for the use of existing section 8 housing is the utilization of "recently completed" housing. After overcoming certain legal and administrative constraints, CRUV has started to utilize section 8 benefits to assist in the absorption of its Law 10² inventory, condominium units built for sale and financed with CRUV bonds. The sales program for these units has progressed irregularly, partly because the initial and temporary interest rate differential provided through Commonwealth financing, while substantial, does not effect large enough reductions in monthly carrying costs, and the prices of these units cannot reach into the broad mass of low-income island families.

As of November 1978, there were 3,977 Law 10 units completed and available for sale, according to Puerto Rican officials. An additional 586 will become available soon. Units in high rise structures without balconies, with excessive land coverage, or other design deficiencies have moved slowly.

Until recently, the coidentity of CRUV as public housing agency and landlord did not permit recently completed Law 10 units to be leased under the section 8 program. This problem has been resolved, and a first group of 700 Law 10 units (all 3 high-rise buildings in a single project) have been leased under section 8. (Note: There are 6,000 more Law 10 units to be completed; of the total of 26,000 Law 10 units, an indeterminate and probably substantial number will probably be leased as recently completed housing under section 8.)

As of mid-April 1978, approximately 1,400 units of new construction section 8 housing had either been started or completed in Puerto Rico, and these units were situated in seven different projects. Mortgage financing for these projects, it is reported, has been accomplished under HUD's Tandem program. This is a program whereby the Government National Mortgage Association (GNMA), an arm of HUD, will purchase from the initiating private mortgagee the mortgage of a subsidized rental housing project insured by FHA. GNMA will then absorb the cost of reducing the mortgage interest rate to 7½ percent, and sell the mortgage on the secondary mortgage market. (Note: The prevailing FHA interest rate for multifamily housing of 9 percent, if adjusted to 7½ percent, would probably require at least 12 points discount, meaning that a \$1 million mortgage at 7½ percent interest would sell for no more than approximately \$880,000.)

The Federal National Mortgage Association (FNMA), a stockholder-owned secondary mortgage market organization, acts as the agent for mortgage resale. The availability and flow of Tandem funds for HUD projects has been irregular, and while there is reportedly adequate current availability of Tan-

dem funds for that portion of Puerto Rico's section 8 new construction program ready for immediate start, there is no assurance that this condition of Tandem adequacy will prevail for the next 3 years.

Section 235 Housing.—An additional major source for new construction is the section 235 homeownership program. This, however, is *not* the same section 235 program described in the Commonwealth's socioeconomic study. The previous section 235 program provided 1-percent financing on a 30-year basis, with no mortgage insurance premium and only \$200 downpayment. Carrying charges amounted to only \$3.22 per \$1,000 of mortgage indebtedness. The section 235 program participant could carry a \$25,000 mortgage for about \$80 a month, as compared to the over \$200 he would have to pay with current 30-year FHA financing at 9 percent, and ½ percent mortgage insurance premium.

The practical effect of this earlier subsidy, stated roughly, was to reduce by one-half the cost of the house to the prospective purchaser. The \$30,000 house which might require a \$15,000 annual income by its purchaser was transformed, in terms of monthly debt service charges, to a \$15,000 home, for which the purchaser needed only a \$7,500 annual income. The enthusiasm of the Commonwealth report for this program is readily understood. Approximately 12,500 section 235 units were insured in the Commonwealth under that former section 235 program.

The section 235 program was placed in moratorium status in 1973. It was legislatively reactivated 2 years ago, and it has emerged as a 4-percent interest program with 3-percent downpayment, plus closing costs and prepaid expenses. It has become, therefore, a comparatively much shallower subsidy program, with benefits virtually halved. The reduced debt service charges at 4-percent interest still require an annual income of about \$12,000 for purchase of a \$38,000 house.

HUD has provided somewhat over \$3 million in new program section 235 contract authority for Puerto Rico in two separate fund allocations. It is estimated that this could provide subsidy for as many as 27,000 units of section 235 housing. In point of fact, only some 1,250 have been utilized thus far under the new legislation.

Several factors account for the lack of current section 235 program success. As indicated, the subsidy has become much shallower. Also, inflationary increases in housing costs have made it difficult to produce single family homes in major urban centers, even at the more liberal mortgage ceilings. The new and substantially higher equity requirements caused diminished effective demand. Although downpay-

ments are low, only 3 percent, or \$900 for a \$30,000 home, the closing costs and prepaid items (such as taxes, selected fees, etc.) can impose a significant initial cash outlay, perhaps as much as \$1,500 as compared to the \$200 required under the former section 235 program.

Also, builders are limited to developing no more than 40 percent of total production in a single subdivision under the section 235 program. In order to sell two section 235 units, the developer has to sell three nonsection 235 units. As seen earlier, total FHA single family homebuilder activity has been very low in the island; so this has, practically, limited section 235 activity. Lastly, the potential section 235 market begins to thin out rapidly at required annual incomes of \$12,000 and more to support new section 235 sales housing.

Low-Income Public Housing.—The low-income public housing program has also been reactivated. Puerto Rico's first-year allocation permitted a single additional project of only 200 units on the entire island. FY 1978 will permit development of 1,400 units. An additional 600 units were "unfrozen" from previous moratorium status and allowed to go forward. Future low income public housing program levels will probably be less than 1,400 units, inasmuch as estimated 1979 budget levels for HUD show a 15-percent reduction in public housing levels, but the loss will be offset by higher section 8 program levels.

Farmers Home Administration Section 502 Program.—As described earlier, this program provides for a sliding scale of interest rates to qualified homebuyers, and the mortgage loans are made directly by the Federal agency. Interest rates can be as low as the "old" section 235 program, i.e., at 1 percent. Accordingly, it provides a somewhat deeper level of subsidy than HUD's reactivated section 235 program.

More economical housing construction can be achieved in rural areas, largely as a result of cheaper land and ability to employ private wells and individual ground disposal systems (septic tanks, etc.). Other building cost economies can be achieved by omitting curbs and gutters, storm sewers, and heavy-grade access roads.

It is indicated by Commonwealth officials that model sales prices of \$28,000 and \$29,000 are currently achieved for section 502 housing; they also indicate that about four-fifths of all purchasers, because of their lower incomes, qualify for 1- and 2-percent mortgage interest rates. Difficulty, nevertheless, is encountered in qualifying prospective buyers because of prevailing extremely low family incomes in rural areas and small towns. Selected Puerto Rican builders have frequently complained of slow

processing by FmHA, attributed mostly to insufficient staff with know-how in housing.

ACHIEVABILITY OF SUBSIDIZED HOUSING GOALS

The attainment of an annual production goal of 8,235 units of newly constructed subsidized housing appears achievable if certain institutional constraints, private and governmental, can be overcome. The following indicates the several inputs to this subsidized housing goal:

	Units
Section 8 new construction	4,000
Low income public housing	1,200
Section 235	1,500
Farmers Home Section 502	2,000
Total	8,700

(Note: The completion of the Commonwealth's Law 10 construction program will supply an additional 3,000 units per year, for the next 2 years, of modestly priced, interest-rate subsidized units. This represents the completion of the 26,000 unit law 10 program.)

The 4,000 units of new section 8 construction will be consistent with the current level of program funding for the island. FY 1979 nationwide levels of section 8 funding will exceed 1978's, and Puerto Rico's share should, accordingly, increase.

Previous introductory materials described certain institutional and governmental constraints upon achievement of the annual 4,000 unit goal of section 8 new construction. These included (1) lack of performance bonding capacity for island construction, (2) shortage of builder-investors on the island who are willing or able to undertake long term operation of subsidized rental housing projects, (3) absence of a professional rental property management capacity which could operate subsidized rental housing on a fee basis on behalf of builder-investors, and (4) current uncertainty over long term availability of permanent financing for these projects.

While difficult, these problems appear capable of resolution, some more readily than others.

Arrangements are currently being made whereby HUD will strengthen the market for housing finance bonds to be sold by the Commonwealth by providing FHA mortgage insurance for the projects to be financed with such bonds. Such FHA mortgage insurance will protect prospective bond purchasers against potential loss. Additionally, there is currently ample Tandem financing, although the 3-year availability of such funding is not assured. Previous Tandem financing availability has fluctuated, and

the Office of Management and Budget perennially raises questions concerning the desirability and levels of Tandem outlay.

There appears to be no serious problem with regard to development of this year's 1,200 units of low income public housing. Sale of long term bonds for such housing is very readily accomplished, because the income tax free securities have their repayment guaranteed by HUD. Accordingly, these housing authority bonds have found very ready sale in the nationwide bond market. The centralized Puerto Rican housing authority, CRUV, has demonstrated a consistent production capacity, and the Commonwealth building industry is capable of responding in the role of low-bid contractor or Turnkey developer. (Note: The Turnkey public housing developer reaches a prior agreement with the housing authority to erect a project according to the latter's standards; upon completion, he sells the project to the authority, literally "turning the key" over to the authority.)

The Farmers Home Administration program has no long term financing problems, inasmuch as the same agency provides direct mortgage loans to its section 502 home purchasers. The 2,000 unit indicated level of section 502 activity has, in fact, been substantially exceeded. Calendar 1977 activity has amounted to nearly 3,500 units, and calendar 1978 activity to 4,000 units. This greatly increased program level has reportedly created processing delays due to insufficient, trained manpower. In this regard, CRUV is providing \$260,000 to FmHA to retain the services of personnel, aimed at improving the capacity of the Federal agency to process the applications filed by prospective owners interested in units produced by CRUV.

Indicated section 235 usage will be significantly greater than previously, perhaps by an additional 700 or 800 units a year, but this attainment appears realistic. Recently increased mortgage ceilings for section 235 housing will now be largely within the reach of the island's homebuilding capacity, whereas previous mortgage limits had been significantly lower than modal prices required for new sales housing produced in urban areas.

The development of section 235 housing is administratively linked by HUD to development of unsubsidized sales housing, i.e., no more than 40 percent of a subdivision can be sold to section 235 purchasers. This restriction is intended to preclude undue concentration of lower income families in one location. In the past, this quota has limited section 235 development because previous FHA mortgage ceilings for nonsection 235 housing did not entirely cover typical detached, single family home development in Puerto Rico. Recent legislation, however, has raised FHA mortgage ceilings

to levels where they now are high enough to blanket virtually all new subdivision housing built on the island. No particular difficulty is anticipated in obtaining long term mortgage financing for the section 235 units on the secondary mortgage market.

Development of new section 8 rental housing must still overcome the difficulties associated with obtaining adequate performance bonding. The HUD Assistant Secretary of Housing has indicated his willingness to accept an irrevocable letter of credit from the mortgagee (or alternative mortgagee) in lieu of performance bonding, but the attractiveness of this alternative to mortgage lenders is uncertain.

There remain, additionally, the thorny institutional problems of the "immaturity" of the rental housing industry on the island and the related lack of expertise in housing management to serve such development. As described earlier, island rental housing industry competence resides principally with fulfillment of a general contractor function. Lack of capital and need for fast money turnover have not allowed island multifamily builders to develop an investor posture with regard to rental housing development.

The island has at least one locally based firm which operates in a builder-investor capacity, but, clearly, this is not enough. Aside from the undesirability of assigning all section 8 construction activity to a single firm, there is a basic necessity to stimulate and support indigenous private rental housing production capacity. This objective cannot be achieved overnight.

Immediate rental production achievements could be obtained, say, by calling upon mainland resources to participate in a partnership role. However, there is the danger of local enterprise being swallowed in the process or being relegated to the permanent role of junior partner. HUD, working with the Commonwealth and with local industry groups, can help to develop this resident island industry capacity.

A corollary institutional development has to be the creation of an indigenous professional rental housing management capacity to serve the above builder-developers. Such a capacity might also be required to serve as a "yardstick" against which the management competence of CRUV can be measured.

There will continue to be heavy long term reliance upon CRUV as a producer and operator of subsidized rental housing. Heretofore, CRUV has served these dual functions only in the area of low-income public housing. Such a dual role is additionally available to them under the section 8 program, where a substantial part of the new construction program can, in fact, be carried out by State housing finance agencies (which would be applicable

to CRUV) and also by a public housing agency, itself (which, of course, CRUV is).

Unfortunately, CRUV's capacity for effective housing management has diminished during recent years, due in large part, it is alleged, to the frequent discontinuities in middle-level professional leadership resulting from changes in island administration. HUD is aggressively urging CRUV to redevelop its former management competence, and to this end is currently reluctant to place additional management responsibilities on CRUV, directing them instead to available private rental housing management firms on the island.

As a corollary to the development of a private rental housing management competence, efforts are being made to effect a restoration of CRUV's former

excellence in this area. HUD can usefully serve the Commonwealth in this regard, by making available additional training and manpower supervision from the regional and headquarters offices.

There is an additional administrative constraint upon attainment of new subsidized rental housing production goals, and this is the requirement for additional technical processing staff in the Caribbean HUD Area Office. It may be possible to detail or temporarily assign skilled underwriting personnel from the regional or headquarters office. Continuation of larger new construction programs under section 8, in turn, would support increased professional staffing for the Caribbean Office when annual Regional Operating Plans (which establish appropriate staffing levels among various HUD offices) are approved.

Construction

CONSTRUCTION'S PLACE IN THE PUERTO RICAN ECONOMY

The Commonwealth's socioeconomic study placed strong emphasis on the construction sector's importance to the vigor of the Puerto Rican economy. During the past two decades the economic health of the island, according to the study, has rested upon three major elements: tourism, manufacturing, and construction. These three sectors, of course, are interrelated. Development of new manufacturing plants requires new buildings, warehouses, roads, and utility extensions. The tourism industry generates construction in the development of new hotels and resorts, ancillary shops, restaurants, laundries, etc. The construction industry, itself, generates development of cement plants, warehouses, and facilities for maintenance of heavy equipment.

The Commonwealth socioeconomic study also emphasizes that the housing component has been a major element of total construction activity, and that the current depressed state of construction can

be largely attributed to the substantial falloff in new housing starts.

Both of these contentions are verified in the attached tables 1 and 2. Table 1 shows the relationship of construction to the total gross national product (GNP) for both Puerto Rico and for the United States. In Puerto Rico, the share of construction in GNP has ranged from about 13 to 23 percent, whereas in the United States as a whole, the range has been substantially narrower, between 8.7 and 11 percent. During the 1960's, when the Puerto Rican economy was experiencing its most rapid growth, the comment was heard on the island that "Puerto Rican concrete is always wet," i.e., that it was always just being poured for new construction. There is, indeed, a direct relationship between the current depression on the island and the falloff in construction activity. In current dollars (table 1) Puerto Rican construction activity declined by 6.6 percent between 1972-76; adjusted for inflation, this decline (in constant dollars) reflected a drop of one-third.

Table 1.—Investment in Total Construction as a Percentage of the Gross National Product, Puerto Rico and United States Total, Annual Totals, 1960-76

[In billions of dollars]

Year	Puerto Rico			United States, total		
	Gross product		Construction— percentage of total	Gross national product		Construction— percentage of total
	Total ¹	Construction		Total ²	Construction	
1960	1.676	0.227	13.5	506.0	55.6	11.0
1961	1.834	.253	13.8	523.3	57.5	11.0
1962	2.047	.307	15.0	563.8	59.7	10.6
1963	2.271	.323	14.2	594.7	63.4	10.7
1964	2.488	.381	15.3	635.7	67.4	10.6
1965	2.764	.501	18.1	688.1	73.4	10.7
1966	3.019	.505	16.7	753.0	76.0	10.1
1967	3.328	.630	18.9	796.3	77.5	9.7
1968	3.680	.705	19.2	868.5	86.6	10.0
1969	4.132	.760	18.4	935.5	93.4	10.0
1970	4.622	.994	21.5	982.4	94.2	9.6
1971	5.141	1.148	22.3	1,063.4	109.2	10.3
1972	5.675	1.288	22.7	1,171.1	123.8	10.6
1973	6.206	1.111	17.9	1,306.6	137.9	10.6
1974	6.706	1.275	19.0	1,413.2	138.5	9.8
1975	7.147	1.489	20.8	1,516.3	134.3	8.9
1976	7.493	1.203	16.1	1,692.4	147.5	8.7

¹ Fiscal year.

² Calendar year.

Sources: Puerto Rico Planning Board and U.S. Department of Commerce, Bureau of Economic Analysis.

Table 2.—Value of Housing Construction as a Percentage of Total Construction Activity, Puerto Rico and United States Total, Annual Totals, 1960–76

[In millions of dollars]

Year	Puerto Rico			United States		
	Value of Construction Activity		Housing—percentage of total	Value of Construction Activity		Housing—percentage of total
	Total	Housing		Total	Housing	
1960	227	88	38.8	55,556	16,422	29.6
1961	253	102	40.3	57,492	16,241	28.3
1962	307	125	40.7	59,667	18,638	31.2
1963	323	133	41.2	63,423	20,385	32.1
1964	381	158	41.5	67,413	21,786	32.3
1965	501	212	42.3	73,412	21,712	29.6
1966	505	245	48.5	76,002	19,352	25.5
1967	630	286	45.4	77,503	18,985	24.5
1968	705	316	44.8	86,626	24,030	27.7
1969	760	348	45.8	93,368	25,941	27.8
1970	994	337	33.9	94,167	24,272	25.8
1971	1,148	392	34.1	109,238	35,066	32.1
1972	1,288	451	35.0	123,836	44,736	36.1
1973	1,111	434	39.1	137,917	50,087	36.3
1974	1,275	450	35.3	138,501	40,644	29.3
1975	1,489	411	27.6	134,293	34,408	25.6
1976	1,203	345	28.7	147,481	47,277	32.1

Sources: Puerto Rico Planning Board and U.S. Department of Commerce, Construction Reports C-30.

Equally significant is the fact that construction's share of the total GNP in Puerto Rico declined by about 30 percent, from nearly 23 percent in 1972 to only 16 percent in 1976. In the United States as a whole (which also experienced substantial homebuilding losses during 1974–75), the corresponding decline was somewhat less than 18 percent, from 10.6 percent to 8.7 percent.

Housing's share of the total construction dollar has been more volatile in Puerto Rico than in the rest of the United States (see table 2). During the 1960's, when levels of housing production were at their peak in Puerto Rico, housing represented about 43 percent of the total construction dollar activity. In the United States as a whole, the peak proportions ranged from one-fourth to one-third.

During more recent years, the housing/construction ratios for Puerto Rico and for the United States as a whole have tended to match each other. Here, as in the foregoing construction/GNP comparison, the significance lies in the contrasts. In Puerto Rico, housing's share of the total construction activity declined from 48.5 percent in 1966 to 28.7 percent in 1976, a drop of 41 percent. In the United States as a whole, the movement, in fact, has been in the opposite direction, a 26-percent increase, from 25.5 percent to 32.1 percent. It should be noted that housing production in the United States showed a strong turnaround recovery in 1976, approximating 1.8 million units as compared to barely over 1 million units in the previous year. Puerto Rico's housing industry has still not followed the mainland homebuilding industry into recovery.

NATURE OF CONSTRUCTION ACTIVITY

Puerto Rico's construction activity has depended more heavily, in most recent years, upon nonhousing activities. Table 3 shows that highway and public works activities have registered a steady growth pattern, and that this persisted until 1975. For the first time since 1960, highway and public works dollar volume declined in 1976, but only by 5.4 percent.

Table 3.—Value of Construction Activity, Fiscal Years 1960 to 1976, Puerto Rico

[In millions of dollars—at current prices]

Fiscal year	Total estimates	Housing, private and public	Industrial and commercial buildings and installations	Highway and public works
1960	227	88	95	44
1961	253	102	107	44
1962	307	125	133	49
1963	323	133	132	58
1964	381	158	151	72
1965	501	212	214	75
1966	505	245	197	62
1967	630	286	266	77
1968	705	316	300	89
1969	760	348	297	115
1970	994	337	500	157
1971	1,148	392	585	171
1972	1,288	451	599	238
1973	1,111	434	430	247
1974	1,275	450	573	251
1975	1,489	411	798	280
1976	1,203	345	593	265

Source: Puerto Rico Planning Board, Area of Economic Research and Evaluation.

Industrial and commercial construction has been volatile, and the levels of construction activity in these sectors have been irregular. This is not unexpected. The leadtime for private office building, for example, is very extended. Such developments tend to be automatic once set in motion, moving ahead despite economic fluctuations. Two factors tend to account for this momentum. First, new office buildings are often of the "single user" type. Where commercial users construct their own new replacement or enlargement office space, there is no problem of marketing. Second, competitive office space offered for rent typically obtains substantial long term tenancy as a precondition to long term mortgage financing. Such tenancy is frequently obtained from mainland national firms.

The foregoing is illustrated in table 3. While housing in 1975 showed its first sharp decline in dollar levels, commercial and industrial building reached its highest dollar level since 1960. In FY 1976, commercial and industrial building dropped substantially, but it was still above 1974 levels.

Government ability to control or modify the development of private commercial and industrial construction on a short term basis is necessarily limited. Therefore, the potential utilization of enhanced construction activity for use as a countercyclical economic measure will probably depend, in large part, upon public works construction, paralleled by possible stimulation of the homebuilding industry. In this regard, Puerto Rico enjoys the advantage of centralized administration of most public construction, as contrasted to highly decentralized authorities in the 50 States.

FEDERAL PROGRAMS SUPPORTING CONSTRUCTION ACTIVITY

The following briefly identifies selected Federal agency activities which support construction in Puerto Rico. Levels of such activity are identified principally for illustrative and analytical purposes. The following descriptions are not intended to serve as a complete inventory of federally supported construction activity; other sector studies will supply the precision and comprehensiveness that, necessarily, cannot be supplied in this broad overview.

Economic Development Administration (EDA)

During the last year, this Agency (EDA) has been a major contributor to the island's construction activity. This is due predominantly to the countercyclical local public works legislation which provided 100 percent Federal grant funding for

public works. These public works have been principally for urban infrastructure, as shown in the following:

EDA/LPW PROJECTS IN PUERTO RICO By Category and Grantee Level Aggregate of Rounds I and II

Category	Grantee level			
	Municipal	State	Total	Percentage
1. Community facilities (including streets, waterlines, sidewalks)...	128	50	178	39
2. Recreation	56	7	63	14
3. Government buildings	36	16	52	11
4. Community buildings	35	2	37	8
5. Water supply	11	23	34	7
6. Education and culture	18	14	32	7
7. Economic development	17	8	25	6
8. Sewage systems	12	11	23	5
9. Health	10	4	14	3
Aggregate	323	135	458	100

Source: Puerto Rico Planning Board, Division of Economic Development Programs.

It must be remembered that the Commonwealth not only started with an inadequate community facility infrastructure prior to its rapid economic development in the 1950's and 1960's, but that this condition was made even more severe by the rapid, large-scale increases in need caused by the precipitous urbanization of the island. To illustrate, urban population leaped from 30 percent in 1940 to 62 percent in 1976, and of the urban population, 89 percent is located within the Commonwealth's four SMSA's. Industrial and commercial development within the urban areas additionally aggravated street, water, and sewer deficiencies.

As part of the countercyclical effort, EDA authorized about \$292 million in 100-percent grant funds to Puerto Rico during FY 1977 under special Federal legislation. Because of the centralized nature of most public services at the State level, Puerto Rico's government agencies were allocated 40 percent of the EDA/LPW funds, as compared to only an 8-percent share for other State governments. After deducting for administrative transfers and deobligations because of cost underruns, etc., the net grant amount approved for Puerto Rico was about \$284 million instead of \$292 million.

The formula for fund allocation is legislatively prescribed. Allocations to the separate States are based upon number of unemployed (65 percent) and the percentage of unemployed (35 percent). These are the only factors considered; there is no consideration for rural/urban or population differentials. There is no funds allocation to civil divisions smaller than a State, although "planning targets" were established at the EDA regional level as a basis for reviewing projects.

These funds for FY 1977 were distributed in two separate allocation rounds; discrepancies between the first- and second-round allocations were caused by minor mathematical changes in the formula, i.e., the first-round formula utilized logarithms for deriving the impact of numerical employment; the second-round formula used a more direct procedure. (These differentials are shown in exhibit A.)

Exhibit A
Local Public Works Allocations

[In thousands of dollars]

State	Round I	Round II	Total
Alabama	18,439	30,626	49,065
Alaska	¹ 10,000	¹ 30,000	40,000
Arizona	13,214	49,195	62,409
Arkansas	¹ 10,000	¹ 30,000	40,000
California	² 250,000	467,804	717,804
Colorado	¹ 12,612	¹ 30,000	42,612
Connecticut	48,422	76,306	124,728
Delaware	¹ 10,000	¹ 30,000	40,000
District of Columbia	¹ 10,000	¹ 30,000	40,000
Florida	130,683	154,234	290,917
Georgia	24,836	76,029	100,865
Hawaii	¹ 10,000	¹ 30,000	40,000
Idaho	¹ 10,000	¹ 30,000	40,000
Illinois	64,110	89,767	153,877
Indiana	22,803	39,895	62,698
Iowa	11,890	¹ 30,000	41,890
Kansas	¹ 10,000	¹ 30,000	40,000
Kentucky	15,228	¹ 30,000	45,228
Louisiana	25,468	34,665	60,133
Maine	¹ 10,000	¹ 30,000	40,000
Maryland	20,167	39,282	59,449
Massachusetts	52,323	132,385	184,708
Michigan	158,311	197,659	355,970
Minnesota	16,831	30,272	47,103
Mississippi	¹ 10,000	¹ 30,000	40,000
Missouri	19,497	36,591	56,088
Montana	¹ 10,000	¹ 30,000	40,000
Nebraska	¹ 10,000	¹ 30,000	40,000
Nevada	¹ 10,000	¹ 30,000	40,000
New Hampshire	¹ 10,000	¹ 30,000	40,000
New Jersey	100,038	217,063	317,101
New Mexico	¹ 10,000	¹ 30,000	40,000
New York	232,910	488,172	721,082
North Carolina	28,039	43,866	71,905
North Dakota	¹ 10,000	¹ 30,000	40,000
Ohio	59,578	151,101	210,679
Oklahoma	16,493	¹ 30,700	46,493
Oregon	29,491	55,729	85,220
Pennsylvania	83,385	182,078	265,463
Rhode Island	16,452	31,533	47,985
South Carolina	13,454	¹ 30,000	43,454
South Dakota	¹ 10,000	¹ 30,000	40,000
Tennessee	22,509	30,167	52,676
Texas	55,592	88,025	143,617
Utah	¹ 10,000	¹ 30,000	40,000
Vermont	¹ 10,000	¹ 30,000	40,000
Virginia	21,847	38,018	59,865
Washington	40,156	66,801	106,957
West Virginia	¹ 10,000	¹ 30,000	40,000
Wisconsin	21,741	33,085	54,826
Wyoming	¹ 10,000	¹ 30,000	40,000
Puerto Rico	127,481	164,652	292,133
Guam, Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands	¹ 10,000	20,000	30,000
Totals	³ 1,990,000	⁴ 3,815,000	5,805,000

¹ Statutory minimum allocation.

² Statutory maximum allocation.

³ \$10,000,000 reserved for administrative purposes.

⁴ \$100,000,000 reserved for Indian tribes, \$70,000,000 reserved to fund projects which would have been funded under Round I except for procedural errors and which would not otherwise be eligible for funding under Round II, and \$15,000,000 reserved for administrative purposes.

Despite a 1970 population of only some 2.7 million, the Commonwealth ranked fifth highest in first-round allocations and sixth in the second round for the entire Nation. Its funds compared very favorably with the \$265 million of Pennsylvania, with a 1970 population of nearly 12 million, and \$290 million for Florida, with a 1975 population of nearly 7 million. This resulted, as indicated, from the allocation criteria of unemployment rate and unemployment count, and Puerto Rico ranked high on both.

EDA notes there was an additional FY 1976 public works allocation, estimated to be over \$15 million, from the Title X Public Works Program funds, also intended to serve as a countercyclical effort.

It should be noted, however, that these are reportedly "one-time" programs, and their recurrence in future years is not certain, nor likely. Congressional action is required to renew the programs as to purpose and scope.

The significance of this public works program cannot be overlooked. Table 3, from data supplied by the Puerto Rico Planning Board shows that highway and public works programs in FY 1976 accounted for \$265 million, and in the previous year to \$280 million. The EDA countercyclical input in FY 1977, by itself, matched the entire previous roads and public works sector of construction activity on the island in FY 1976.

The "bread and butter" public works program of EDA, which provides an 80-percent Federal grant, is substantially more modest in scope. In FY 1972-75, activity in Puerto Rico ranged from a low of about \$1.5 million to a high of nearly \$5 million. Previous peak years in 1968-71 ranged from nearly \$9 million to over \$12 million. This program is primarily intended to serve industrial development, e.g., provision of roads, and water and sewer for industrial parks. Additional types of assistance include business development, technical assistance, etc. Fund allocation is on a need and first-come-first-served basis.

Puerto Rico's benefits under this public works program also have been comparatively very substantial. From the inception of the program in 1965 through September 30, 1976, Puerto Rico, with only 10 percent of Federal Region II (Department of Commerce definition) population, received 39 percent of the obligated funds. With little more than 4 percent of the population of the 13-State area which comprises Commerce's Atlantic Regional Office, Puerto Rico received 12 percent of the obligated funds in that larger region. These comparisons are shown in exhibit B.

As of September 30, 1976, there was a total of 143 projects in Puerto Rico under this program.

Exhibit B
Summary of EDA Obligated Projects, by State, by Public Works and All Programs,
Cumulative to September 30, 1976

	1 Population estimate 1976 (hundreds)	2 Public works (thousands of dollars)	3 Percentage public works within Federal regions	4 Percentage public works divided by total in Federal regions I, II, and III	5 All programs (thousands of dollars)	6 Percentage all pro- grams within Federal regions	7 Percentage all pro- grams divid- ed by total in Federal regions I, II, and III
FEDERAL REGION I							
Connecticut	3,117	16,846	17.1	4.0	24,183	14.3	3.6
Maine	1,070	12,282	12.5	2.9	39,341	23.3	5.8
Massachusetts	5,809	37,580	38.2	9.0	59,088	35.0	8.8
New Hampshire	822	8,010	8.2	1.9	9,873	5.9	1.5
Rhode Island	927	17,920	18.2	4.3	29,023	17.2	4.3
Vermont	476	5,709	5.8	1.4	7,145	4.2	1.1
Subtotal Federal Region I	12,221	98,347	100.0	23.5	168,653	99.9	25.0
FEDERAL REGION II							
New Jersey	7,336	23,149	16.8	5.5	65,337	26.7	9.7
New York	18,084	59,262	43.1	14.1	102,779	41.9	15.2
Puerto Rico	3,214	53,795	39.1	12.8	75,580	30.8	11.2
Virgin Islands	95	1,251	1.0	.3	1,469	.6	.2
Subtotal Federal Region II	28,729	137,457	100.0	32.8	245,165	100.0	36.4
FEDERAL REGION III							
Delaware	582	5,196	2.8	1.2	6,355	2.4	.9
District of Columbia	702	15,314	8.4	3.7	20,295	7.8	3.0
Maryland	4,144	11,468	6.3	2.7	31,414	12.1	4.7
Pennsylvania	11,862	63,424	34.6	15.1	94,784	36.4	14.1
Virginia	5,032	18,120	9.9	4.3	24,685	9.2	3.6
West Virginia	1,821	69,756	38.1	16.6	83,632	32.1	12.4
Subtotal Federal Region III	24,143	183,218	100.1	43.7	260,565	100.0	38.6
Total Federal regions I, II, and III	65,093	419,082	—	100.0	674,383	—	100.0
United States	214,659	1,953,970	—	—	2,704,021	—	—
ARO percentage of United States	30.3	21.4	—	—	24.9	—	—

Sources: 1976 Annual Report, Economic Development Administration and Population Estimates and Projections, Bureau of the Census, Series P-25, No. 646, February 1977.

Almost one-half, or 69, were public works, accounting for about two-thirds of the obligated funds. About 22 percent of the funds went to business development loans and working capital loans. The remainder of the funds went into such broad categories as technical assistance, planning, and economic adjustment.

The Commonwealth points out that there is a potential for increased Federal assistance to Puerto Rico from prospective creation of an EDA Title V Regional Action Planning Commission, comprised of Puerto Rico and the Virgin Islands, which was authorized by Congress in 1975. A formal application for the creation of the "Antillean Regional Commission" was submitted by the two Governors in March, 1976. Approval and establishment of such a commission would increase the Federal contribution in selected construction grant programs to 80 percent. This Commission is identified and described in pages II, 49-53 of Federal Programs and Policies, Volume 1, which is part of the Interagency Study.

Environmental Protection Agency (EPA)

The major EPA program in the Commonwealth is its Wastewater Treatment Construction Grants

program, authorized under the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500). The Federal legislation provided for a 3-year \$18 billion program, which was passed into law in October 1972. EPA obligated approximately \$170 million of these funds to Puerto Rico. Prior similar legislation provided an additional \$85 million to Puerto Rico before 1972.

Federal assistance under the 1972 Act is limited to planning, design, and construction of wastewater treatment facilities, which include collection systems, combined sewers, pumping, and wastewater treatment plants. (Note: Approximately 84 percent of obligated funds are used for actual construction.) Such projects are eligible to receive 75-percent Federal funding. These funds are allocated on a fiscal year basis with an obligation deadline. Any funds not utilized by a State by the obligation deadline are subject to reallocation to States capable of using the funds.

Funds are distributed to States based upon a formula keyed to population and to needs. A wastewater facility needs survey is conducted every 2 years, and each State's share is adjusted accordingly. The need criteria include such items as unsewered and sewer population, pollution loads, effects of

Exhibit C
Summary of EDA Obligated Projects, by State, by Program,
Cumulative to September 30, 1976¹

[Amounts in thousands of dollars]

State	Public works		Business development		Technical assistance		Planning grants		Economic adjustment		State total	
	Number of projects	Amount	Number of projects	Loans	Working capital	Number of projects	Amount	Number of projects	Amount	Number of projects	Amount	Number of projects
Alabama	108	41,657	16	18,137	3,438	49	1,706	21	1,156	2	68	196
Alaska	75	42,583	3	87	1,035	58	2,177	28	1,601	3	760	167
Arizona	90	40,125	4	2,612	—	62	1,509	30	3,015	3	1,278	189
Arkansas	177	67,039	8	3,064	720	51	1,142	76	4,269	3	2,285	315
California	236	131,439	39	21,376	39,065	298	14,584	32	2,555	9	4,932	614
Colorado	32	11,307	—	—	—	38	1,376	18	1,229	3	2,087	91
Connecticut	21	16,846	2	2,819	—	27	1,805	3	426	3	2,289	56
Delaware	9	5,196	1	738	—	4	103	2	318	—	—	16
District of Columbia	8	15,314	5	809	641	55	3,996	2	175	—	—	70
Florida	38	14,918	10	3,119	765	44	1,564	19	1,361	3	5,206	114
Georgia	110	53,054	13	22,419	—	69	3,475	119	5,871	5	7,548	316
Hawaii	3	1,197	1	66	—	2	23	4	196	—	—	10
Idaho	60	16,662	6	4,451	360	21	906	25	1,207	1	60	113
Illinois	77	60,694	10	13,394	—	99	3,930	34	1,655	—	—	220
Indiana	34	16,875	6	2,187	180	38	1,060	17	1,040	3	5,125	98
Iowa	19	9,861	1	—	5,400	8	160	8	382	1	75	37
Kansas	26	12,918	—	—	—	14	780	11	705	—	—	51
Kentucky	189	91,850	22	13,583	1,535	59	2,227	28	2,164	1	38	299
Louisiana	104	49,467	9	4,613	2,180	36	1,187	44	2,735	1	160	194
Maine	51	12,282	20	19,732	6,075	44	1,001	29	1,251	2	5,075	146
Maryland	13	11,468	5	5,052	180	30	2,816	11	997	2	11,081	61
Massachusetts	41	37,580	12	6,808	2,475	114	6,597	27	1,691	1	6,411	195
Michigan	139	63,500	10	8,623	1,485	63	2,383	66	4,073	5	3,941	283
Minnesota	137	58,592	30	7,937	2,138	94	1,267	25	2,153	—	—	286
Mississippi	202	91,134	17	15,510	3,504	58	2,343	68	3,776	2	3,045	347
Missouri	87	28,253	4	2,772	—	71	1,778	50	2,296	—	—	212
Montana	66	27,374	9	2,714	684	69	1,290	56	2,679	1	200	201
Nebraska	23	14,862	—	—	—	15	542	7	365	—	—	45
Nevada	27	4,125	1	299	—	7	161	9	550	—	—	44
New Hampshire	18	8,010	4	1,550	270	13	203	2	110	—	—	37
New Jersey	28	23,149	23	26,845	1,634	49	1,899	3	445	1	13,000	104

New Mexico	127	56,462	11	3,948	999	63	1,170	53	2,215	1	211	255	64,007
New York	106	59,262	33	22,415	79,118	178	7,948	50	3,034	2	10,120	369	102,779
North Carolina	113	60,462	15	9,420	293	45	1,385	46	2,112	4	161	223	73,541
North Dakota	50	19,499	1	750	—	24	990	25	1,422	2	536	102	23,197
Ohio	81	47,676	9	5,722	—	83	5,208	19	1,406	3	1,778	195	61,790
Oklahoma	170	55,488	15	13,069	315	90	1,617	79	4,189	6	1,677	360	78,040
Oregon	48	27,958	2	7,500	—	42	782	23	1,168	—	—	115	37,408
Pennsylvania	117	63,424	18	12,406	5,403	182	10,083	43	2,623	2	6,249	362	94,784
Rhode Island	17	17,920	1	1,113	—	14	1,309	3	180	2	8,500	37	29,023
South Carolina	101	43,083	16	14,314	1,121	18	697	43	2,160	—	—	178	20,254
South Dakota	57	13,868	—	—	—	29	465	33	2,330	—	25	142	16,687
Tennessee	135	65,746	14	19,404	540	43	2,015	55	1,893	1	—	235	91,043
Texas	223	78,669	25	13,203	7,429	99	3,839	84	3,891	4	4,867	437	104,469
Utah	47	17,226	2	2,250	—	14	795	20	1,148	2	1,050	85	22,469
Vermont	14	5,709	3	1,000	974	9	125	4	310	—	—	30	7,145
Virginia	35	18,120	6	2,640	2,698	25	1,479	35	1,847	—	—	101	24,085
Washington	124	65,796	15	18,266	945	88	4,339	42	2,199	2	3,580	271	94,180
West Virginia	123	69,756	13	5,667	8,135	54	835	24	991	2	3,382	216	83,632
Wisconsin	79	25,551	3	2,919	—	52	1,711	22	1,158	1	6,000	157	37,339
Wyoming	14	3,325	1	781	—	7	48	4	243	1	149	27	4,545
American Samoa	2	1,510	3	1,010	135	6	192	5	349	—	—	16	3,051
Guam	3	2,488	—	—	—	1	25	1	203	—	—	5	2,716
Puerto Rico	69	53,795	22	15,310	1,350	41	2,665	9	626	2	3,185	143	75,580
Virgin Islands	2	1,251	—	—	—	5	113	2	105	—	—	9	1,469
United States, General	1	596	—	—	—	385	20,938	29	1,949	1	3,550	417	27,033
Totals	4,106	1,953,970	519	386,424	2,183,237	3,257	136,765	1,633	92,194	99	134,668	9,614	2,704,021

¹ Does not include projects funded under Title III, Section 304, of the Public Works and Economic Development Act.

² Agency exposure for guarantee of 90 percent of unpaid balance of loans.

³ Represents current obligations which include deobligations of prior year funds.

Note: Detail may not add to totals due to rounding.

wastewater discharges upon water supplies, etc. Within each State, the obligation of funds is derived from a State-developed, EPA-approved priority list. In Puerto Rico, the priority system and list for sewer projects is prepared by the Environmental Quality Board (EQB). The Aqueduct and Sewer Authority is responsible for the implementation of the plan-design, construction and operation of the systems.

Exhibit D shows Public Law 92-500 program implementation progress in Puerto Rico and also in EPA's Region II. The levels of Puerto Rican program activity have shown strong fluctuation. However, the impact upon the construction economy is probably more stable, because many of the wastewater improvements take several years to carry out.

The peak year of program activity in Puerto Rico occurred (as shown in exhibit D) in FY 1976,

nearly \$85 million, or one-half of the total funds allocated and obligated from FY 1973 to FY 1977. There was a precipitous drop from FY 1976 to FY 1977, as shown in exhibit D. This drop was caused by expiration of funds under the 1972 Act.

Puerto Rico has about 10 percent of the population of Region II; however, its share of the program funds amounts to only 5 percent for the same region. The relationship between obligated funds from FY 1973 to FY 1977 is approximately the same. On a nationwide level, Puerto Rico's allocation of approximately \$185 million represents about 1 percent of the \$18 billion program appropriation, which is somewhat less than the Commonwealth's share of the total U.S. population.

Despite the profound need for water and sewer facilities on the island, it would appear that Puerto Rico has not pursued this program of assistance

Exhibit D

SUBJECT: Status of Construction Grants Applications and Funds
For the Month Ended April 30, 1978

Herbert Barrack
Director, Management Division

TO: Eckardt C. Beck
Regional Administrator

1. Construction Grants—Status of Funds Available

State	Allocated	Obligated	Balances available	Percentage obligated
NEW JERSEY				
FY-1973	\$154,080,000	\$154,080,000		100.0
FY-1974	231,120,000	231,120,000		100.0
FY-1975	254,656,200	251,974,667	\$2,681,533	100.0
FY-1976	660,830,500	657,442,823	\$3,387,677	100.0
FY-1977	47,591,000	6,226,051	41,364,949	13.8
FY-1978	160,717,500		160,717,500	0.0
Total	1,508,995,200	1,300,843,541	208,151,659	86.2
NEW YORK				
FY-1973	221,156,000	221,156,000		100.0
FY-1974	331,734,000	328,573,385	\$3,160,615	100.0
FY-1975	490,654,200	472,486,557	\$18,167,643	100.0
FY-1976	1,046,103,500	1,045,882,002	\$221,498	100.0
FY-1977	105,294,000	78,790,578	26,503,422	74.8
FY-1978	477,940,500		477,940,500	0.0
Total	2,672,882,200	2,146,888,522	525,993,678	80.3
PUERTO RICO				
FY-1973	17,690,000	17,690,000		100.0
FY-1974	26,535,000	26,535,000		100.0
FY-1975	40,832,900	40,801,153	\$31,747	100.0
FY-1976	84,910,500	84,846,145	\$64,355	100.0
FY-1977	8,923,000	6,355,188	2,567,812	71.2
FY-1977 ²	5,856,000		5,856,000	0.0
FY-1978	52,803,000		52,803,000	0.0
Total	237,550,400	176,227,486	61,322,914	74.2
VIRGIN ISLANDS				
FY-1973	1,786,000	1,786,000		100.0
FY-1974	2,679,000	2,679,000		100.0
FY-1975	3,130,900	3,130,900		100.0
FY-1976	7,794,800	7,794,800		100.0
FY-1977	496,000	496,000		100.0
FY-1978	1,701,000		1,701,000	0.0
Total	17,587,700	15,886,700	1,701,000	90.3
Grand total	4,437,015,500	3,639,846,249	797,169,251	82.0

¹ Decreases of previously obligated funds.

² Under the Public Works Employment Act.

as aggressively as it might in order to obtain its "share." Additional funds were provided under the Talmadge-Nunn amendment to the Public Works Employment Act of 1976, and Puerto Rico received about an additional \$6 million. Puerto Rico received nearly \$9 million in additional authorized funds as part of a congressional effort to keep the program moving while supplementary legislation was being considered. The additional \$15 million (\$6 million plus \$9 million) represents about an 8-percent increase over the previous funding of nearly \$185 million.

On December 28, 1977, the President signed the Clean Water Act which provides for \$4.5 billion for FY 1978 and \$5.0 billion for each of FY 1979, 1980, and 1981. Puerto Rico's share is calculated to be approximately \$52.8 million for FY 1978 and \$58.7 for each of the three additional fiscal years. This consistent level of funding will "even out" the allocation progress on a nationwide basis. In so doing, it may also facilitate Puerto Rico's financial planning, so that it can more effectively provide its share of the total cost, one of the problems reportedly contributing to its irregular record of program implementation.

As indicated earlier, public works programs are irregular in the ebb and flow of their implementation. Planning, hearings, land acquisition, etc., frequently impose long lead time preconstruction periods before actual construction can start. EPA has anticipated that bidding and actual construction for nearly \$100 million in EPA-financed projects can start during the next 12 to 18 months.

(Note: It should be pointed out EPA's responsibilities directly affect the construction programs of other Federal agencies. EPA has responsibility for issuing a "Certification as to Adequacy of Treatment." Other Federal agencies (such as the Economic Development Administration), which intend to issue a grant resulting in the construction of facilities discharging domestic, commercial, or industrial wastewaters, must insure that the applicant has received certification from EPA that there are wastewater treatment facilities available to treat adequately the wastes generated by the proposed project. The failure to obtain such a certification from EPA can prevent the Federal agency from issuing a grant to the applicant.)

Exhibit E is a fact sheet of EPA activity, showing status and nature of Public Law 92-500 program activity in FY 1977. The text of this exhibit suggests the kinds of projects supported by EPA, i.e., related to collection and disposal of wastewater. These can include such projects as treatment plants, collection systems, pumping stations, etc. No attempt is made herein to tabulate the comparative costs of each of these separate items, since they all relate to

the single category of treatment of wastewater. (Page 378.)

Department of Transportation (DOT), Federal Highway Administration

Because of the Federal relationship, Puerto Rico was not included in the interstate commerce and defense highway system, under which States received 90-percent Federal highway grants. (Note: About half of the U.S. apportionment to highway assistance is allocated to the interstate program.) Instead, it qualifies for the 70-percent grant assistance provided under the intrastate road and highway development program. The bases for fund allocation consist of several factors, applied uniformly throughout the United States. These are land area, rural population, urban population, and mail delivery route mileage.

Public road apportionments to the Commonwealth have progressively increased from \$10 million in FY 1972 to \$24.5 million in FY 1976 and an additional \$16.5 million for the transitional quarter. FY 1978 will amount to about \$27.4 million, somewhat less than the FY 1977 amount. (See exhibit F, p. 380.)

Actual obligations, however, have not matched apportionments. In part, this has been attributed to the Commonwealth's inability to provide its 30-percent matching funds; in other parts, to delays in planning. Obligations have, as in the case of allocations, showed steady increase, from about \$6 million in FY 1971 to a high of nearly \$26 million in FY 1975. There was a drop to about \$15 million for FY 1976 and transitional quarter, and only about \$6.5 million for 1977. The 1975 Federal Highway Administration obligation of almost \$26 million amounted to 10 percent of the total highway and public works activity for the entire Commonwealth, as reported by the Puerto Rico Planning Board. In FY 1976 and transitional quarter, the \$14.7 million obligation amounted to 5.5 percent of total highway and public workers activity.

Exhibit F shows that Puerto Rico's share of the total highway fund program has ranged from nearly 0.2 percent to 0.4 percent, with the highest share reached in the transitional quarter of FY 1977, almost 1 percent, somewhat below Puerto Rico's share of total U.S. population, about 1.2 percent.

On the other hand, it must be kept in mind that Puerto Rico participates only in the intrastate highway program, which, according to DOT, accounts for only about one-half of total highway funding. On this basis, the above percentages could be "doubled," and the resultant relationships are not so out-of-kilter—although they show that Puerto Rico has not been receiving a proportional share of intrastate highway funds.

FACT SHEET COMMONWEALTH OF PUERTO RICO

By William J. Muszynski, Chief
Caribbean Construction Grants Branch

A. Funds allocated

Commonwealth's share of	
Public Law 92-500	\$169,968,400
FY 77 allotment	8,923,000
Talmadge-Nunn funds	5,856,000

B. Funds obligated as of
September 30, 1977

Commonwealth's share of	
\$18 billion	169,968,400
FY 77 allotment	932,000
Talmadge-Nunn funds	

C. Funds remaining to the
Commonwealth

Commonwealth's share of	
\$18 billion ¹	477,512
FY 77 allotment ²	7,991,000
Talmadge-Nunn funds ³	5,856,000

D. Awards with Public Law 92-500 and FY 77
funds through September 30, 1977

	Number	Dollars
Step 1	37	10,520,488
Step 2	29	16,749,803
Step 3	136	143,530,109

E. Significant projects awarded with Public Law
92-500 funds

Step 1's—Twenty-nine Step 1 facility planning grants have been made which cover almost all areas of the Commonwealth including the island of Culebra. Twelve of these grants have been completed with the majority of the others about 80 to 90 percent complete. The facility planning documents developed by these grants form the backbone of the Commonwealth's water pollution control program. Plans covering areas such as Bayamon and Carolina were completed in May 1976 and resulted in design grants awarded in June 1976. These design grants then resulted in Step 3 construction grants being awarded this September 30. Other notable Step 1 grants are currently being completed for the San Juan, Fajardo, Dorado, Guyanilla, and Humacao regions.

Step 2's—Twenty-nine Step 2 grants have been made providing for the design of projects ranging from collection systems for small communities

to the design of a 40-million gallon per day (MGD) wastewater treatment plant for Bayamon. While initial Step 2 awards were made for collection systems, most recent awards have been for regional treatment plants and interceptor systems. In June 1976, for instance, several Step 2's were awarded for the design of regional wastewater facilities for areas such as Santa Isabel, Camuy-Hatillo, Carolina, and Bayamon. The eventual construction of these facilities will eliminate overloaded, inefficient treatment facilities and provide for the adequate treatment of over a 100 MGD of wastewater. On September 30, 1977, a grant for design of secondary facilities for the Ponce area was awarded. This grant also provided for the study of effluent reuse options which could alleviate water supply problems.

Step 3's—Thirty-six Step 3 grants have been awarded providing for the construction of wastewater treatment facilities. Projects range in size from small collection sewers to the proposed construction of a 40-MGD wastewater treatment plant. In many cases, the construction of the large treatment facilities along the ocean have been phased to provide primary treatment initially while the secondary treatment designs are completed. This phasing concept has the effect of allowing funds to be utilized on smaller island facilities while at the same time, the larger ocean discharging facilities are constructed. A notable project is the construction of the San Juan Sludge Incinerator which will incinerate the sludge produced at the San Juan, Carolina, and Bayamon wastewater treatment plants. Construction started on this facility in May 1977 and should be completed in 1979. On September 30, 1977, over \$82 million was awarded for projects such as the Bayamon wastewater treatment plant, ocean outfall and interceptors, the Carolina wastewater treatment plant and interceptors, and the Santa Isabel and Camuy-Hatillo wastewater treatment plants and interceptors. These regional facilities will serve over a million people in their design year. As regional facilities they should provide for less costly more efficient operation than the numerous smaller plants they will eliminate. They are also significant because they mark the first projects that are being placed under construction after undergoing the rigorous Step 1 and Step 2 process established under Public Law 92-500.

¹ Remaining FY 75 funds (result of decrease in grant).

² Must be obligated by May 3, 1980.

³ No expiration date.

Future—Congress is currently working on amendments to Public Law 92-500 which should also provide additional funds to keep the water pollution control program going. Until passage of new legislation, the Commonwealth still has some \$13 million to use to prevent any program stoppages. Current plans indicate that about \$40 million additional will be available for this fiscal year depending upon when Congress acts. The Commonwealth water pollution control program has undergone the formative Step 1 planning

stage and is now moving into the design and construction stages where the real benefits to the environment lie.

- Attachment 1—Bayamon Fact Sheet Project C-72-103-03 and C-72-103-04.
- Attachment 2—Copies of the Grant award document of the Bayamon Project C-72-103-03 and C-72-103-04.
- Attachment 3—Active Projects GICS report dated Oct. 17, 1977.

Highway funds are spent on specific projects which are classified under specific program categories. These funds are not mingled with general funds, except on an isolated basis.

During the most recent years, major categories of expenditure for highways in Puerto Rico have been primary roads, rural primary and secondary roads, and roads for the urban system. In FY 1976 and FY 1977, these three categories accounted for three-fourths of apportionments.

Department of Transportation (DOT), Federal Aviation Agency (FAA)

The FAA, under the Airport and Airway Development Act of 1970 (P.L. 92-258), is authorized to allocate funds to Puerto Rico for airport improvement, both for air carriers and for general aviation. There are two program categories of assistance, the Planning Grant Program (PGP) and the Airport Development Aid Program (ADAP). The latter is the major source of construction dollars; its funds are allocated principally on a 50-50 share basis. The current formula for obtaining air carrier funds is based predominantly upon number of emplane-ments, with a sliding scale, so that smaller airports can receive proportionately more per flight than larger airports.

The great bulk of airport funds have been allocated to air carrier requirements. Since 1970, the Commonwealth would have been entitled to somewhat over \$20 million in Federal dollars, for which its comparable contribution would have been nearly \$13 million. It has, however, received only about \$8 million, for which it provided matching funds of \$7 million. The reasons for this lack of complete utilization are expressed by the Commonwealth, as follows: FAA construction grants for airports applied initially only to aviation-related elements such as runways, taxiways, and navigation aids, plus land acquisition. They are now available for groundside facilities, but with certain limitations as to funding.

The Ports Authority had a long range plan for Puerto Rico International Airport that provided for a second runway. The construction of the second runway, as justified by increasing air traffic, accounted for the peak in FAA grants in 1971 (as noted in the following paragraph). The Ports Authority has invested upwards of \$25 million of its own resources in cargo and passenger facilities, and it is now using FAA funds, as available, for ground-side purposes for which local matching must be at a higher rate (50 percent versus 25 percent for aviation facilities).

The peak airport expenditure year was in FY 1971, in which Federal contributions amounted to \$4.8 million. There was very limited activity in 1972-74, but in 1975 and 1976 Federal contributions were \$1.4 million and \$1.2 million, respectively. As such, airport improvement programs have relatively small impact upon total construction activity on the island.

Between 1971 and 1976, ADAP funds have been spent in three airports, Vieques (for general aviation) and in Ponce and San Juan (for air carrier purposes). Most recently, FAA funding has been obtained for a new general airport in Fajardo to serve the Northeast region of Puerto Rico. Of the almost \$15 million spent, all but about \$350,000 were spent in San Juan.

The San Juan expenditures were absorbed in five separate projects, which covered the gamut from expansion of terminal aprons, installation of security fencing, purchase of fire crash vehicles, removal of light and telephone poles in proximity to a runway, improvement of runways and taxiways.

Department of Defense, Corps of Engineers

Corps of Engineers activity on the island, until FY 1975, was concerned principally with harbor maintenance in San Juan, Mayaguez, and Ponce. The sums were relatively modest, ranging from a low of \$65,000 in 1970 to \$1.7 million in 1975.

Exhibit F
Puerto Rico Apportionments
[Dollars]

	1972	1973	1974	1975	1976	1977	TQ	1978
Primary	2,425,500	2,425,500						
Secondary	2,390,806	2,403,430						
Consolidated primary		368,786		5,346,443		10,750,098		10,787,434
Rural primary	367,500	366,031	5,140,691	3,055,110	6,033,008			
Rural secondary	364,108	971,761	2,948,337		3,393,567	3,056,490		3,073,688
Topics	2,672,343	2,672,343	2,775,405	2,900,707	2,871,108			
Urban extension	888,806	888,806	7,192,018	7,356,940	7,376,429	7,433,463		7,433,463
Metropolitan planning			201,121	226,704	230,692	236,544		245,727
Transition quarter							16,343,224	
Rail-highway crossings					561,000	1,074,706		1,077,407
High hazard locations					738,541			
Eliminate roadside obstacles					738,541			
High hazard/eliminate roadside obstacles						1,228,277		1,228,779
Safer roads demonstration					954,996	644,824	164,917	646,444
Rail-highway off system						9,307	2,327	9,307
Forest highway		9,307	9,307	9,307	1,501,178			
Off system								
Safer off system								
Bridge replacement						1,673,816		1,670,086
Economic growth			1,422,240	1,022,679	1,259,314	1,787,602		432,892
Emergency relief			924,000	2819,000	712,381	387,930		391,956
Pavement marking								
Section 402, highway safety			27,297	82,736	62,944	176,065		179,844
Beautification						238,041		245,053
Puerto Rican total	10,080,824	10,105,964	19,640,416	120,819,626	26,463,096	28,697,153	16,510,468	27,422,080
United States total	5,360,561,000	5,393,560,800	4,856,663,585	5,546,275,983	6,355,714,758	6,414,387,500	1,664,390,000	6,725,829,199
Puerto Rican total/United States total (percentage)	.188	.187	.404	.375	.416	.447	.992	.408

¹ Note that \$3,543,908 of Bridge Replacement Funds in 1974 were held in reserve (of the total).

² Note that \$30,500,000 of Economic Growth Funds for 1975 were held in reserve (of the total).

A massive flood control undertaking, however, was started in FY 1975. This is the Portuguese-Bucana Rivers Flood Control project located in the south of the island. In 1976 and the transitional quarter, appropriations for this flood control project totaled nearly \$8.2 million; FY 1977 and FY 1978 outlays will be \$6.25 and \$6.3 millions, respectively. Here, as well, the impact is relatively small, only about 2.3 percent of total FY 1976 highway and public works expenditures.

Flood control projects are proposed by local governments to the Corps of Engineers which evaluates them on a cost-benefit basis, and annual appropriations are sought from Congress for their start and continuation.

Department of Agriculture, Farmers Home Administration (FmHA)

FmHA's comprehensive program for rural areas includes loans and grants for water and sewer facilities. Through FY 1974 FmHA water and sewer programs were relatively modest, ranging from virtually no activity in FY 1974 to peaks of \$1.8 to \$1.9 million in 1970 and 1973. In 1975, the levels of loans and grants for water and sewer reached \$2.2 million.

Most remarkably, the level increased to \$23 million in FY 1976 and the transitional quarter. Of this \$23 million amount, nearly \$20 million was in loans involving 22 separate projects. The FY 1976 activity of \$23 million in Puerto Rico for water and sewer loans and grants by FmHA is expected to rise to \$31 million by FY 1978, according to the Department of Agriculture. This massive change, according to Agriculture, is attributable to a revision in the allocation formula for these programs. The previous allocation of funds to Puerto Rico was based upon historical use trends; the FY 1976 funding represents allocations based upon need. A 5-year transition schedule is being established by Agriculture for changeover to the new funding procedures.

The Commonwealth study identified several alleged shortcomings in the administration of the FmHA housing programs on the island. (Levels of housing activity are discussed in the Housing sector study.) Criticisms were made in connection with FmHA participation in the section 8 Housing Assistance Payments program (see Housing sector chapter), but the Commonwealth study asserted these same criticisms would apply generally to the entire FmHA operation. The Department of Agriculture has responded to each, and these are set forth briefly, as follows:

1. *Criticism.*—FmHA site and property standards are based upon mainland standards, and they

do not respond to the unique characteristics of Puerto Rico.

Response.—FmHA has undertaken a modification of its minimum property standards, and FmHA/HUD agreement is expected by April 1978.

2. *Criticism.*—The Puerto Rican FmHA office is inadequately staffed, and it cannot respond to large-scale housing programs.

Response.—The FmHA staff will be expanded in FY 1978 with Comprehensive Employment Training Act (CETA) employees and also with Commonwealth assistance.

3. *Criticism.*—FmHA procedures are too complicated, standards are too high, and local office directors of FmHA can impose additional and arbitrary restrictions.

Response.—FmHA local office directors do not impose additional qualification and processing restrictions; they do, however, exercise personal judgment in making individual decisions. Applicants who are dissatisfied with a local office decision have the opportunity to appeal to the State Director. A major review consideration in all cases is the ability of the applicant family to repay the FmHA loan. The reduced interest rate of FmHA does not eliminate the need for the borrower's credit-worthiness.

4. *Criticism.*—There is a lack of local organizations to make monthly collections under the FmHA section 504 rehabilitation loan program.

Response.—FmHA does not provide private sector collection of monthly payments. Some section 504 loans are available to rural residents where the Commonwealth becomes a cosigner.

5. *Criticism.*—FmHA insists upon sanitary sewer hookups, and frequently this is not possible, or it is achievable only with excessive cost.

Response.—FmHA will accept ground disposal systems if the ground is found suitable, i.e., passes a suitable percolation test.

6. *Criticism.*—FmHA has insisted upon clear title to the building site, even though most rural applicants claim their sites on the basis of "usufruct," which constitutes valid title in Puerto Rico.

Response.—Most recent legislation in Puerto Rico, according to FmHA, allows land to be used as security, even though the mortgagor may not have clear title.

7. *Criticism.*—FmHA imposes its own housing quality standards, despite the fact that the applicant family is in a better position to know its housing needs.

Response.—FmHA's decisions are controlled by need to meet minimum property standards; also, the property must be completely safe and sanitary.

8. *Criticism.*—A financial credit check is demanded by FmHA, the \$75 cost of which must be borne by the applicant, many of whom cannot afford such fee.

Response.—FmHA states that its credit check is carried out at no cost to the applicant.

Department of Health, Education, and Welfare (HEW)

HEW grant awards for the construction of health and education facilities in Puerto Rico have been comparatively modest. There are six categories of construction for which HEW grant awards have been made. These are library, school construction in federally impacted areas, subsidized construction loans for higher education, community health centers; health facilities construction, and nursing school construction.

In FY's 1973 through 1976, HEW outlays have ranged from \$1.8 million to \$6.7 million, with the FY 1976 level at \$5.9 million. A peak activity of \$6.7 million amounts to about 2.5 percent of total roads and public works activity in FY 1976.

The levels of HEW construction outlays are shown in exhibit G.

Exhibit G
HEW Construction Funding in Puerto Rico

[In thousands of dollars]

Program	Fiscal year			
	1973	1974	1975	1976
1. Public library construction	24	—	228	—
2. School assistance in federally affected areas—construction	39	—	—	—
3. Higher education—subsidized construction loans	485	—	—	—
4. Community mental health center construction	249	324	227	227
5. Health facilities construction	5,940	1,449	794	5,710
6. Nursing school construction	—	—	791	—
Total	6,737	1,773	2,040	5,937

Department of Housing and Urban Development (HUD)

HUD's contributions to and impacts upon housing production activity are discussed separately in this report. The Department also has significant impact upon nonhousing construction through its Community Development Block Grant program. The

Housing and Community Development Act of 1974 established a "block grant" basis for allocation of HUD funds to urban communities; this replaced previous categorical programs such as urban renewal, model cities, public facility loans, etc. (Note: The Commonwealth study suggests housing construction activity under the urban renewal program, but this is not a relevant consideration under the new 1974 legislation, which, as noted above, abolished that program's separate identity.)

The block grant program was able to increase very substantially the levels of community development funding for the island. The total aggregate of urban renewal funding in Puerto Rico from 1949 through 1974 amounted to about \$95 million, or an average of less than \$4 million a year. Levels of funding immediately prior to enactment of the Housing and Community Development Act of 1974 amounted to about \$12 to \$13 million a year; to this could be added about \$7 million for Model City activities (restricted to San Juan). HUD's other community development programs would have increased this estimated combined urban renewal/model city funding only moderately. The new legislation, in contrast, raised Puerto Rico's HUD community development funding to \$38 million in FY 1975 and to \$48 million in FY 1976. FY 1977 funding may amount to, perhaps, as much as \$60 million.

The massive increases in community development funding (two to three times greater than under the previous categorical programs) can be credited very largely to the "fair share" formula for fund distribution prescribed by the Housing and Community Development Act of 1974. The law established certain criteria for block grant fund allocation. These are population, substandard housing, overcrowding, vacancies, and poverty. Puerto Rico's fair share, as a result, amounted to 1.8 percent of total U.S. block grant funds of \$2.8 billion in FY 1975. (This is compared to its 1.2 percent of total U.S. population.)

A substantial part of these community development block grant funds is expended on construction activities. Applicant communities under the block grant program are required to classify their proposed eligible expenditures by 16 separate categories. The category of "public works, facilities, and site improvements" in Puerto Rico accounted for 85 percent of FY 1975 funds and for 57 percent of FY 1976 funds. Data available for the large-size entitlement cities, which claim about 80 percent of block grant funds, show about 43 percent of funds used for these purposes. The last 2 years, therefore, show a pattern of roughly half of Puerto Rico's block grant funds being used for construction activities.

OUTLOOK AND STRATEGY

The Commonwealth's socioeconomic study has suggested that the strategy for recovery of the economy's construction sector ought to emphasize augmented housing production. It suggested a housing program which would provide, for the first 3 years, a roughly equal division of subsidized and nonsubsidized housing (also permitting a modest effort in custom-built or self-built housing).

It is believed that corollary emphasis might also be placed upon enhanced public works construction activities, including roads.

The Commonwealth study questioned the priorities for environmental protection imposed by Federal legislation and regulations, and it has criticized the EPA for an unrealistically high standard with regard to sewage disposal. It has urged that EPA reexamine its criteria with regard to: (1) secondary treatment for all sewage disposal plants and (2) use of deepwater discharge of effluent of primary treatment sewage.

In response to those proposals, EPA advises that secondary treatment is mandated by law, the Federal Water Pollution Control Act of 1972. Regarding discharge of nonsecondary treatment effluent in marine deepwater outfalls, the 1977 amendments to the above-mentioned 1972 act (also described as the Clean Water Act), allow for a potential waiver of secondary treatment requirements by the EPA Administrator after the applicant has demonstrated compliance with eight specific requirements, prescribed by section 301(h) of the act. The Commonwealth has not yet demonstrated such compliance. In part, this may be attributed to nonpublication of regulations for section 301(h), according to EPA. These, however, will be shortly published. Thereafter, the burden of proof will rest with the Commonwealth.

These recent amendments to the water pollution control statutes, which authorize waivers for secondary treatment of effluent discharge in ocean outfalls, appear to be restricted to existing plants treating domestic wastes. Since most of Puerto Rico's regional collection and treatment systems accept industrial wastes, they seem to be precluded from consideration. However, the Puerto Rico Aqueduct and Sewer Authority is undertaking a special study of the cost and feasibility of providing pretreatment of industrial wastes, so that the wastes received for treatment at the authority's regional plants will be the equivalent of domestic wastes, and the plants will be qualified to obtain the waiver.

The need to catch up with required community

facility infrastructure for a newly urbanized society has imposed a tremendous environmental burden upon the island. The United States, over 60 years ago, first became an urban nation, i.e., more people lived in communities of 2,500 or more than on the farm or in smaller communities. The mainland has been coping with urban and metropolitan area growth problems for more than 60 years. As indicated earlier, Puerto Rico became an urban environment in a far shorter period. The Commonwealth has had to cope with problems of priorities, as well, e.g., community facilities for factories and jobs, or for homes, instead.

The Commonwealth socioeconomic report pointed out that the federally imposed priorities for providing secondary sewer treatment facilities for existing population, in addition to impeding provision of collection services to thousands of families, have also restricted the ability of the island to provide new industrial sites with adequate water and waste collection and disposal facilities.

An immediately visible avenue for nonhousing stimulation of the construction sector would be continuation of EDA's antirecession 100-percent grant program for local public works. The 100-percent grant program, however, requires reenactment of expired Federal legislation, and this appears unlikely, according to EDA.

A more realistic alternative strategy for accelerating construction activity would be to "push" for complete utilization of all available Federal program funds. There is a substantial lag between Federal authorizations and appropriations and actual obligations and payouts in selected programs. In this regard, Federal agencies could augment their technical advice, assistance, and cooperation to the Commonwealth. They could more readily accommodate the unique centralized administration of public construction in Puerto Rico. The cooperation and flexibility of EDA, under the 100-percent grant Local Public Works program, can serve as a model to other Federal agencies, according to Commonwealth officials.

One of the HUD officials in the Commonwealth office informally indicated that there is not a single urban community in Puerto Rico which is not seriously deficient in water, sewer, and streets. Provision of adequate water and sewer facilities can provide a modern utilities infrastructure for today and also for 21st century population and economic growth needs in Puerto Rico, while also helping the Commonwealth to recover completely from the recent economic recession.

Transportation

Acknowledgements

Many individuals contributed to the preparation of the report on the Transportation Sector of the Puerto Rican economy. Stephen Sheffer, Deputy Assistant Secretary for Policy and International Affairs, was the DOT representative on the Interagency Study Group on Puerto Rico. Richard Walsh, Director of the Office of Transportation Economic Analysis, provided overall guidance for conducting the study. Ed Case and Wayne Stevens served as Study Coordinators. The DOT Working Group consisted of Phil Barbato, Milt Brooks, Bruce Cannon, Bill Dick, Barbara Ducoff, Charles Elder, Laura Ericson, Phil Franklin, Doug Leister, Lou Manoliades, Bill Riedel, Gil Sherburne, Bob Stearns, and Tom Weeks. Advice and material for the report were also provided by Keith Adams, Army Corps of Engineers; Bob Christi, Maritime Administration; Bob Ellsworth, Federal Maritime Commission; and Jim Murley, Office of Coastal Zone Management (NOAA). Additional material, review, and field liaison were provided by Norm Huff of the DOT Regional Office in New York. Clerical support was provided by Norma S. Black, Diane Rhodes, Rosemarie Selak, and Sue Tew. Many other individuals were called on by those named above for advice, information, and material needed for the report.

Transportation

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Transportation

INTRODUCTION: TRANSPORTATION AND ECONOMIC GROWTH

The basic approach of this sector study is to identify problems in the transportation sector of the Puerto Rican economy and the Federal programs which relate to these problems. The designation of a phenomenon as a "problem" is necessarily a subjective and somewhat arbitrary process. In this respect, the transportation problems identified by the Commonwealth in *A Socio-Economic Study of Puerto Rico* serve as a point of departure. They can be grouped into three categories:

Difficulties in providing transportation facilities, including highways, mass transit, seaports, airports, and safety and environmental improvements;

Barriers to passenger service to Puerto Rico, by air and sea, which may constrain the important tourism sector;

Rising ocean freight rates which, due to the dependency on ocean commerce, aggravate costs of consumer goods and reduce the viability of Puerto Rican industries.

The transportation sector is analyzed both as a supplier of services and as a user of resources.

Transportation serves other sectors by linking resources, production centers, markets, and residential area. The demand for transportation is derived from the activities of the other sectors, but the efficiency of transportation systems can limit the viability of other economic activities. The price of transportation is added to the delivery cost of the goods carried. Bottlenecks, which occur as traffic growth approaches the capacity of transportation systems, are reflected as transportation cost increases. However, these cost increases may occur as social costs external to the transportation sector, so there is an additional consideration that transportation systems be safe and environmentally responsible. Avoiding bottlenecks can be particularly difficult when increments of system expansion involved large projects with long lead times and optimal timing must be considered. This calls for additional emphasis on integrated planning which incorporates social, economic, and land use goals.

As a user of resources, the transportation sector affects resource markets. It is useful to distinguish the differences in resource use patterns for the construction, maintenance, and operation of transportation systems. New transportation activities may spawn new industrial development to provide its materials. Accelerated expansion of transportation systems can absorb idle resources, but the impact on the market for scarce resources may also be relevant.

Institutional arrangements have special significance in the transportation sector. Transportation activities are carried out by both the public and the private sectors, with the latter generally operating under governmental regulation. Within the public sector, decisions about the same or related elements of the transportation system are made at different levels of government, sometimes without clear and explicit agreement on goals and priorities. Cooperative financing is a special consideration, especially when objectives include noneconomic social goals.

A special effort was made to analyze the transportation sector in the context of the unique characteristics of Puerto Rico. There is, otherwise, a tendency to make customary implicit assumptions or apply comfortable rules-of-thumb which are not appropriate. Special considerations include the insular economy, Commonwealth status, climatic and cultural differences, demographic changes, and the stage of industrial development.

TRANSPORTATION AND LAND USE PLANNING

Comprehensive Planning

In planning for economic development, consideration must not only be given to desirable economic activities, but also to land use in terms of the location of the activities, their potential adverse effects on nearby land uses, the loss of land for competing uses, and the intensity of the land use. Consideration must also be given to transportation with respect to the amount of traffic expected to be generated by the economic activities, the suitability of

the existing transportation system, and the adequacy of its capacity to provide the needed mobility and the need for new services and facilities.

The Puerto Rico Planning Board (PRPB) was established in 1942 to coordinate the planning activities of all functional agencies to achieve the desired types, amount, and location of social economic, and physical development. The Board, an adjunct to the Governor's office, consists of three members and one alternate who are appointed by the Governor. The PRPB is also the Commonwealth agency designated for meeting Federal requirements for areawide planning and coordination of Federal programs as required by OMB Circular A-95.

The Puerto Rico Planning Board Organic Act of 1975 (Law No. 75) requires the PRPB to adopt:

1. The Integral Development Plan of Puerto Rico.
2. Land use plans.
3. The Four-Year Investment Program.

Adopted plans are transmitted to the Governor for approval. All projects, including those that would result in the improvement, acquisition, sale, or change in the use of public or private property, which are proposed or initiated after the land use plans are approved, must be consistent with the plan recommendations and contained in the Four-Year Investment Program or receive the Governor's investment authorization. The Investment Program consists of proposed programs for each functional area and it is prepared, coordinated, and adopted by the Planning Board; it is the principal mechanism for ensuring comprehensive planning.

The Organic Act of 1975 (Law No. 76) of the Regulations and Permits Administration (RPA) shifted responsibilities pertaining to granting building permits from the Planning Board to the RPA. Although the RPA is empowered to promulgate regulations for simple subdivisions, the preponderance of standards and regulations which the RPA applies to construction, alteration, improvement, and development were established by the Planning Board. Furthermore, the Planning Board must approve the regulations established by the RPA.

Land Use Planning

The Land Use Plan for Puerto Rico, which is required by the Puerto Rico Planning Board Act of 1975 and is pending adoption by the Planning Board, identifies the following general objectives:

1. Maximize the efficient use of cultural and natural resources, especially land;
2. Produce a more equitable distribution of development benefits based on need, both within urban areas and between urban and rural areas;

3. Attain rapport with nature to maximize environmental benefits while minimizing environmental degradation;

4. Involve all population subgroups in the planning process.

To ensure consistency with these objectives, policies have been established for urban development, industrial development, agriculture development, flood damage control, infrastructure placement, and natural areas protection.

Urban development policies promote intense land use and the containment of development to urban areas to reduce sprawl, improve the efficiency of public services, and encourage urban revitalization. A subpolicy notes the importance of transportation infrastructure location decisions for controlling growth and development.

Policies concerning industrial location reflect two concerns: large-scale industrial development should be concentrated in areas where pollution and competition for land for other purposes are minimized, and decentralization of some industries is needed to provide employment and to distribute benefits equitably. Subpolicies: large industries should be situated near major transportation facilities such as highways, ports, and airports and in proximity to the labor supply. Besides decentralizing light industry to the regions, some industries, including agriculture-related industries, should be allowed to locate in rural areas.

Agricultural development policies stipulate that agricultural activity must be confined to areas which are not suitable or designated for other purposes. Increased agricultural development is desirable to lessen the dependency on imports. To ensure the longevity of farming operations, preservation of soil productivity and minimization of land parceling are important considerations.

Policies to minimize flood damage include restricting the use of potential flood areas and constructing appropriate countermeasures where the existing uses could not be easily relocated or where agricultural development is desirable.

The policies dealing with infrastructure stress the importance of coordination between public agencies to ensure that infrastructure is available at the time and places when development of certain land uses is planned.

Natural resources and natural areas are to be assessed and protected, according to the environmental policies. Land uses permitted in natural areas are to be selected so as not to interfere with future use of natural resources.

Transportation Planning

The Puerto Rico Department of Transportation

and Public Works (DTPW) is responsible for the planning, development, and coordination of all transportation activities for the Commonwealth. Specific functional responsibilities rest with the Highway Authority, Port Authority, and the Metropolitan Bus Authority including the preparation of 5-year priority programs, with overall coordination by the DTPW. A formal agreement between the DTPW and the Planning Board (PRPB) provides the mechanism for coordination of matters related to land use and transportation planning to ensure that economic development activities are complemented by suitable transportation services. The Commonwealth of Puerto Rico is given the status of a "State" for most Federal programs. Consequently, Puerto Rico is entitled to receive Federal assistance and is required to assume attendant responsibilities for both statewide and local programs.

The Highway Authority.—The Highway Authority of the Department of Transportation and Public Works is responsible for the design, construction, and substantial reconstruction of highways and bridges. The Authority no longer undertakes basic planning or acquisition of rights-of-way, which are responsibilities of the Department of Transportation and Public Works. The Authority performs maintenance functions only for toll highways. Some of the major goals for the Highway Authority are: guiding development locations, providing adequate levels of service to alleviate congestion, providing access to all parts of the island, and improving the efficiency of transportation to reduce costs and travel times.

The Department of Transportation and Public Works plans transportation systems, with management strategies, aimed at providing efficient transportation at the lowest cost.

Pursuant to joint regulations issued in 1975 by the Federal Highway Administration and the Urban Mass Transportation Administration, program and project funding in urbanized areas is contingent on certified urban transportation systems management strategies and a transportation improvement program. The DTPW was designated by former Governor Hernandez-Colon as the Metropolitan Planning Organization (MPO) responsible for urban transportation planning in the four urbanized areas in the Commonwealth. The Highway Authority provides the staff support for the required comprehensive land use and transportation studies are directed by a policy board in each urbanized area consisting of the mayor of each municipality and the top executive of several Commonwealth agencies, including the Secretary of Transportation and Public Works and the Chairman of the Planning Board. The Highway Authority, the Metropolitan Bus Authority, and the Ports Authority are also represented in a nonvoting

capacity. Comprehensive transportation plans have been developed for the San Juan, Ponce, Caguas, and Mayaguez urbanized areas. These plans serve as the basis for project implementation decisions by the local and State officials acting through the policy boards.

The Metropolitan Bus Authority.—The Metropolitan Bus Authority was established in 1959 and brought into the Department of Transportation and Public Works in 1973. The Bus Authority operates the public transit system in San Juan. The MBA is also responsible for planning support for the proposed development of a San Juan rapid rail system.

The Ports Authority.—The Ports Authority has as its major goals: provide adequate facilities for goods movement between the Commonwealth and other areas; improve passenger facilities at air and sea-ports to promote tourism; facilitate export industry development by linking with external markets; create new job opportunities; provide interchange facilities for local and international freight and passenger movements; provide for national defense; and improve ferry service between islands as well as service in the metropolitan area of San Juan.

Coastal Zone Management

The Coastal Zone Management Act of 1972 states that the key to more effective protection and use of the land and water resources of the coastal zone is to encourage the States to exercise their full authority over the lands and waters in the coastal zone by assisting the States, in cooperation with Federal and local governments and other vitally affected interests, in developing land and water use programs for the coastal zone, including unified policies, criteria, standards, methods, and processes for dealing with land and water use decisions of more than local significance.

In order to achieve these goals of effective protection, effective use, and State encouragement, three major elements were placed in the Act:

1. Grants for management program development;
2. Grants for program administration; and
3. Provisions for intergovernmental coordination and cooperation.

The Coastal Zone Management Program development process includes submission of the management program to the Office of Coastal Zone Management, preparation and circulation of a Draft Environmental Impact Statement, comment on the draft EIS, and preparation of a Final Environmental Impact Statement.

Puerto Rico is currently engaged in activities provided for in the CZMA. Puerto Rico has submitted a

management program for approval by the Secretary of Commerce under the procedures outlined in section 306 of the Act. This is the first step in achieving program approval and for qualifying for grants for program administration.

The four principal agencies involved in Coastal Zone management are:

1. The Puerto Rico Planning Board,
2. The Regulation and Permits Administration,
3. The Environmental Quality Board, and
4. The Department of Natural Resources.

Planning for transportation, land use, and economic development in the coastal zone, as elsewhere, should be synchronized to ensure that appropriate transportation services are available in sufficient quantity in the proper locations and at the right times. Mobility between various sites should be cost-effective and efficient to minimize resource waste. The development of land for one use may preclude other uses. Therefore, the value of the particular use must be weighted against alternative land uses in terms of social, economic, and environmental costs. In selecting the location of an activity, consideration should be given to available transportation capacity and services constraints.

MARITIME TRANSPORTATION

A detailed description and analysis of Maritime Transportation may be found in the maritime supplement to this report.

Ocean Commerce

The quality and cost of both domestic and foreign ocean transportation service are significant influences on the Puerto Rican economy. Puerto Rico depends upon ocean transportation for the external movement of most of what it consumes and produces. The preponderance of all the goods and materials, both finished and inputs to finished products, are moved to the Commonwealth via ocean carrier, and most of the commodities produced within Puerto Rico for consumption elsewhere exit by sea.

Foreign Trade.—The oceanborne foreign trade of Puerto Rico is heavily imbalanced, with imports being approximately 10.5 times the volume of exports. Much of this trade imbalance stems from the lack of raw materials and the absence of sufficient manufacturing facilities to produce many of the finished goods needed.

There is a growing imbalance in the foreign trade of Puerto Rico and an increasing reliance upon the outside world for most types of goods despite ex-

pansion of the domestic industrial sector in Puerto Rico.

Puerto Rico's reliance on the petrochemical industry as an integral part of its economic base is readily apparent from analysis of its foreign trade statistics. Massive petroleum imports from Venezuela, the Netherlands Antilles, and other oil producing nations and the export of organic chemicals and other petroleum products dominate the Commonwealth's oceanborne trade statistics.

Foreign Trade—Imports.—Petroleum and crude oil accounted for 68.5 percent of the imports to Puerto Rico in 1976. By comparison, all other imported commodities seem insignificant. Therefore, Puerto Rico is heavily dependent, economically, upon the smooth flow of world oil. A large part of the economic base of Puerto Rico's heavy industry is composed of firms which process oil or oil-based products as part of the petrochemical industry. In addition to refining oil into gasoline, the existing plants in Puerto Rico's petrochemical industry currently produce for export significant amounts of organic chemicals, benzene, xylene, and polyvinyl chloride. Without a dependable supply of feeder stock, these plants cannot function effectively, and the Arab oil embargo in 1973 proved highly disruptive of these industries.

Puerto Rico is also dependent upon foreign oil supplies for almost all of its energy supply for both private consumption and manufacturing use. It is not difficult to see why fluctuations in the price and supply of oil would be important to Puerto Rico.

The next two largest imports to Puerto Rico are fish products and passenger vehicles. Puerto Rico also imports large quantities of foodstuffs despite a favorable climate and some rich, arable soil.

Foreign Trade—Exports.—Organic chemicals were the leading export of Puerto Rico in 1976 and comprised 41.3 percent by value and 40.6 percent by weight of all exports. Other oil and coal derivatives and food preparations constituted the next three categories of exports.

The 19th leading export, clothing—textile, fabrics, is especially important because of the impact of the textile industry on employment (especially female) in Puerto Rico. The textile industry of Puerto Rico is able to compete in world markets partially because of the relatively low economies of scale for textile plants. Beyond a certain basic plant size, it has been estimated that the doubling of a textile mill will result in less than a 10-percent economy of scale. Thus, the small plants of Puerto Rico, staffed with relatively inexpensive labor, are able to produce textile products at competitive prices.

Domestic Trade.—Domestic Trade—Dry Car-

go.—Dry cargo domestic trade is heavily imbalanced also, with U.S. mainland to Puerto Rico volume being almost three times that in the other direction. Puerto Rico's total dry cargo trade moving between the Commonwealth and U.S. mainland ports totaled 5.5 million short tons in 1975. Mainland to Puerto Rico traffic amounted to 4.1 million short tons. Outbound (from mainland) traffic exceeded inbound (to mainland) in a ratio of 2.9 to 1. The four U.S. mainland regions serving Puerto Rico include North Atlantic, South Atlantic, Gulf, and West Coast. The North Atlantic region extending from Eastport, Maine, to the boundary of Virginia/North Carolina is the major trade area with respect to U.S. mainland-Puerto Rico dry cargo traffic, accounting for 56 percent of the total. The imbalance ratio in this trade is only 1.6 to 1.

Trade with the South Atlantic region amounts to 16 percent of the total with an imbalance ratio of 4.1 to 1. Gulf region cargo represented 22 percent of the U.S.-Puerto Rico dry cargo trade with an imbalance ratio of 11 to 1. Dry cargo traffic between west coast ports and Puerto Rico in 1975 accounted for only 5.8 percent of the total U.S.-Puerto Rico traffic flow. The imbalance ratio in west coast trade is approximately 12 to 1.

Because of its unusual commonwealth status with the United States, Puerto Rico is in a position to offer certain relatively unique economic incentives to investors. Industries located in Puerto Rico are exempt from Federal and Commonwealth taxes for from 10 to 30 years (depending on where the plants are located). The result of these favorable circumstances coupled with the fact that goods manufactured in Puerto Rico can enter the U.S. mainland duty free makes Puerto Rico a viable location for manufacturing operations.

Goods which are labor intensive are especially suited to manufacture in Puerto Rico because of the presence of a relatively skilled labor force, and wage scales which are generally lower than in the United States. As a result of these lower labor costs, Puerto Rico has attracted labor-intensive industries such as scientific instruments and apparel.

In recent years, Puerto Rico has been attracting a larger proportion of high technology activities that make use of newly available skilled manpower. Electronics is one example of this kind of industry.

Domestic Trade—Bulk Liquid Cargo.—In 1975 Puerto Rico's total bulk liquid cargo trade moving between the Commonwealth and U.S. mainland ports totaled 6.6 million tons, of which 6.2 million tons moved from Puerto Rico to the United States. Nearly 89 percent of the total tonnage consisted of refined petroleum products and petrochemicals.

While not labor intensive (in fact, it is one of the

most capital-intensive industries), the oil refining industry has grown significantly during the past decade in Puerto Rico. The oil refining industry (including the Commonwealth Refining Company, CORCO) produces feedstocks for the many petrochemical plants located in Puerto Rico. The petrochemical industry located in Puerto Rico includes some of the largest petrochemical companies in the world such as W. R. Grace and Mitsubishi.

Forecast of Domestic Trade.—The Maritime Administration does not yet have an operational domestic trade forecasting system capable of using historical data and other inputs to predict long term behavior of Puerto Rican domestic ocean commerce.

Even the use of such standard statistical techniques as correlation and regression analysis for near term forecasting is not considered feasible due to the severe economic dislocations recently experienced by the Commonwealth which have drastically altered prior shipping patterns.

Lack of a satisfactory domestic trade forecasting system, coupled with the severe economic recession undergone by the Commonwealth in recent years, has led to the reluctant conclusion that a valid mid-range or long-range forecast for her domestic trade is probably not attainable at the moment.

Oceanborne Freight Rates

Since ocean transportation costs, like all costs, must eventually be recovered in the final sales price of the items shipped, these transportation charges ultimately increase the cost of living in Puerto Rico.

Domestic Freight Rates.—The majority of the Commonwealth's external commerce in terms of value is carried on with the U.S. mainland. Data available for the period 1963 until the present indicate that in terms of dollar value the United States has purchased, on the average, 88 percent of Puerto Rico's exports annually. The United States has received as much as 95 percent of the island's exports in some years. The majority of the Commonwealth's imports also come from the mainland. In 1976, goods valued at \$2.8 billion were shipped from Puerto Rico to the United States. On the import side, \$3.4 billion worth of goods moved from the United States to the island in 1976.

The 1970 *FMC Puerto Rican-Virgin Islands Trade Study* indicated that 99 percent of Puerto Rico's domestic imports were transported by water and a review of more recent data indicates that this relationship has not changed significantly. Unquestionably then, the costs associated with ocean transportation, especially in the domestic trades, impact on the entire economy of the Commonwealth of Puerto Rico. FY 1975 data indicate that inbound freight costs

amounted to \$519 million. Comparison of this figure to the value of total imports for FY 1975 indicates that freight costs, the majority of which are ocean shipping costs, amounted to 10.5 percent of the value of the imports. Outbound freight costs in FY 1975 were \$261 million. By making a similar calculation as above, it can be determined that the export freight costs amounted to 8.3 percent of the value of the exports from Puerto Rico.

The June 1977 Puerto Rican Department of Labor and Human Resources report entitled *Relative Importance of the Consumer Goods and Services in the Consumer Price Index for Wage Earners' Families in Puerto Rico* indicates that in excess of 49 percent of the money spent by Commonwealth families went for the purchase of food items. The Puerto Rican-Virgin Islands Trade Study contained a section which measured the relationship between the wholesale price of various commodities and the freight rates charged to transport these items from the United States to Puerto Rico. This study found that ocean transportation costs amounted to approximately 11 percent of the wholesale price of food in Puerto Rico.

For the present study percentage changes in ocean freight rates for the 10-year period, January 1, 1967, to January 1, 1977, were calculated and increases in the Puerto Rican CPI for six freight classifications: vehicles, self-propelled (cars); freight, all kinds (FAK); poultry, frozen; soap and related articles; paper or paper articles; and furniture. The rate increases on these products ranged from 57 percent on vehicles to 109 percent on paper articles while the CPI during the same period rose 68 percent. Soap and FAK rates increased 68 to 69 percent respectively, almost exactly the same increase as recorded by the CPI. Furniture and poultry products experienced freight charge advances of 74 and 77 percent respectively, reflecting a somewhat higher increase than that reported for consumer prices generally. It should be noted that the smallest increase in rates was experienced by vehicles, which in FY 1976 produced the greatest revenue and accounted for the most tonnage carried by the Puerto Rican Maritime Shipping Authority (PRMSA). On the other hand, paper articles whose rates increased more than 100 percent over 10 years produced only one-fourth the revenue generated by vehicles in FY 1976 and one-sixth the tons transported. Thus the predominant cargo in the trade experienced the smallest increase of all southbound items while commodities moving in lesser amounts saw their rates rise more than vehicles rates.

Over a 9-year period, January 1968 to January 1977, beverage rates increased 90 percent and fruit and vegetable rates 73 percent. From 1969 to 1977, canned or bottled foodstuffs experienced rate in-

creases of 81 percent while southbound dry good rates were increased 56 percent.

Up to this point, only the rates of those commodities moving southbound to Puerto Rico were analyzed. The southbound portion of the trade is the predominant part; however, a substantial amount of certain cargoes move northbound. Two of the top 15 moving commodities (dry goods and canned fish) carried by PRMSA during FY 1976 moved northbound. In contrast to the rate increases on southbound goods, canned fish experienced rate increases of only 39 percent from 1968 to 1977. This small rate adjustment, in comparison to the southbound increases can be explained because the northbound (backhaul) leg of the trade has excess capacity available. Thus, as long as the cargo is covering variable costs, the carriage of the cargo at lower rates may be justified.

In conclusion, it appears that ocean freight rates have risen faster than the CPI over the past decade. However, the CPI bears no direct relation to ocean shipping costs and any comparison with consumer prices should be viewed cautiously. The CPI provides a benchmark but is not determinative of whether ocean freight rates are too high or too low. Therefore, it is impossible to draw a conclusion as to the reasonableness of rates in the trade from these statistics.

Recent History of Freight Rates in the Puerto Rican Trade.—In March of 1971 Transamerican Trailer Transport (TTT), Sea-Land, and Seatrain filed new rates with the Federal Maritime Commission (FMC) to become effective April 25, 1971, which would have increased rates across-the-board by 18 percent for trailerload shipments and 28 percent for less-than-trailerload shipments. These rate increases included a 3-percent bunker fuel surcharge, which became effective February 1, 1971.

These rate increases, excluding the 3-percent fuel surcharge, were suspended by the FMC until August 25, 1971, and further suspended by the price commission. They finally became effective in March of 1972.

In 1973, the carriers serving the trade put into effect a 17.2-percent southbound and a 5.2-percent northbound, so-called "ILA" (International Longshoremen's Association) surcharge. A bunker fuel surcharge of 11 percent was put into effect in 1974. Finally, TTT proposed a 12.8 percent general rate increase in April 1974 but withdrew it shortly thereafter.

Partly in response to these rate increases, the Commonwealth decided to purchase the assets of these companies and form PRMSA (Puerto Rico Maritime Shipping Authority).

Commonwealth officials were hopeful that a ra-

tionalization of the service would lead to cost reductions and operational efficiencies which would stem the tide of general rate increases.

The Puerto Rico Maritime Shipping Authority consolidated the service offered by the three previous carriers. Costs continued to escalate, however, for a combination of reasons, including the recession and increased competition. PRMSA experienced financial difficulties in the 1975 to 1976 period. PRMSA's remedy for this revenue deficiency was to institute a 15-percent general rate increase.

The rate increase was required to overcome an \$11 million deficit that PRMSA incurred during its first year of operation. Furthermore, revenue forecasts done by PRMSA's staff showed that the company could expect to experience a loss of over \$17 million during the September 1975 to September 1976 period if no rate relief was granted. PRMSA's revenue deficiency was exacerbated by the unique financial status of the company.

PRMSA was created by Public Law 62 of the Commonwealth of Puerto Rico. Public Law 62 states that PRMSA was to be a nonstock corporation. As a consequence, with no equity funds invested in the company, PRMSA was forced to finance its entire operation from the debt markets. The raising of debt capital was facilitated by the fact that the company's obligations were exempt from taxation.

In December of 1975, PRMSA obtained a \$60-million loan from Manufacturers Hanover Trust Company, which was guaranteed by the Government Development Bank of Puerto Rico. In addition to this source of financing, PRMSA acquired its equipment and vessels from the original owners through purchase money notes payable in 6 years. These latter acquisitions amounted to some \$150 million.

The financial result of all these short-term loans was that PRMSA was required to make huge annual interest and principal payments. In addition to these fixed charges, PRMSA had large lease commitments which it assumed when it took over the lease agreements that TTT, the original owners of the roll on/roll off vessels, had incurred from Sun Shipbuilding and Dry Dock Company. The total amount of annual fixed charges amounted to over \$40 million as shown below.

PRMSA's Annual Fixed Charges—1976

Interest on bank loan	\$4,215,000
Other debt repayment	23,175,585
Lease payments	12,850,943
Total	40,241,528

Clearly the company was in a precarious financial situation due to its huge amount of fixed charges,

which had to be met regardless of the level of income being generated from its operations. The rate increase (15 percent) put into effect helped the company meet its contractual agreements, but by 1977 PRMSA needed additional revenue.

Conditions did not improve significantly in 1977 and another general rate increase (10.4 percent) was put into effect on June 19, 1977. Implementation of the increase was conditionally approved pending a formal rate investigation by FMC.

This rate increase was required, according to PRMSA's officials, because the company was sustaining an operating loss of \$504,000 as of March 27, 1977. Adding to the problems of PRMSA were the large nonoperating outlays that were required to service the company's huge debt.

Projections for the July 1977 to June 1978 period showed that the company would experience an \$18 million cash deficit unless the rate increase was approved. The rate increase was projected to increase revenues by \$20 million.

Management said that the reasons for PRMSA's poor financial picture were chiefly the rising cost of bunker fuel; payroll increases for seamen, longshoremen and management; and the required upgrading of container and trailer equipment.

PRMSA is not alone in having financial problems with the Puerto Rican trade; on September 1, 1977, Sea-Land Service announced the filing with FMC of a proposed 24-percent rate increase on its U.S. West Coast/Puerto Rico service, to become effective September 29, 1977. This increase follows a 10-percent rate increase in that trade effected earlier that year.

Sea-Land claimed that, because the existing rate levels allegedly would not justify continuation of direct water service between the west coast and Puerto Rico, it was considering reemploying its three vessels presently in this service in alternate trades. Cited as contributory factors to nonprofitability, in addition to the current rate level, were long voyages and a severe cargo imbalance (nearly 6 to 1 east-bound). The carrier may also have been anticipating a further increase in Panama Canal tolls following ratification of the pending treaty.

In mid-December of 1977, Sea-Land announced its all-water service would be discontinued approximately January 10, 1978. The carrier subsequently filed joint rail/water tariffs at both the Federal Maritime Commission and the Interstate Commerce Commission. Both northbound and southbound tariffs were filed with an initial set scheduled to become effective on January 15, 1978. This set never went into effect but a subsequent set correcting certain provisions found to be unacceptable by the ICC became effective January 22, 1978. The rates pub-

lished in these minibridge tariffs are equivalent to the former all-water rates plus the suspended 24-percent general rate increase. The tariffs contain single factor joint-through rates from origin points to destination.

Sea-Land plans to devote four vessels to its intermodal services. Service will originate at rail terminals in Los Angeles and Oakland and continue via rail to Houston and New Orleans where rail/water interchange will occur. Sea-Land will handle the water movement between the Gulf ports and the ports in Puerto Rico and the U.S. Virgin Islands. Participating with Sea-Land in the intermodal service are the Atchison, Topeka, and Santa Fe Railway Company and the Missouri Pacific Railroad Company.

As a direct result of a change in governmental policy, the Commonwealth Government has announced its intention to sell PRMSA's assets back to the private sector. The Commonwealth of Puerto Rico began accepting bids on July 31, 1977, for the purchase of PRMSA's assets which were estimated to be worth around \$300 million.

PRMSA officials have stated that the reasons for their revenue deficiency and resultant rate increases were, among other things: (1) rising expenses, (2) the need to upgrade equipment, and (3) low utilization factors. Whether the private carriers that replace PRMSA will have much more success than PRMSA is doubtful. In short, an immediate solution to increasing freight rates between the U.S. mainland and Puerto Rico is not in sight.

As of August 3, 1977, PRMSA has received bids from Seatrain Lines, Inc.; Puerto Rico Marine Management Inc. (PRMMI—the management team, largely composed of ex-Sea-Land employees, who have been running PRMSA); and John J. McMullen Associates. A fourth bidder, Sea-Land, has tendered a bid to repurchase the five former Sea-Land vessels in PRMSA's fleet.

Regardless of when the actual sale takes place, PRMSA is already experiencing increased competition from Sea-Land, Seatrain, and Trailer Marine Transport (TMT). Industry sources estimate that this increase in competition has already reduced PRMSA's share of the trade from around 90 percent to an estimated 70 percent and further inroads seem likely.

Escalating Expenses and Increasing Freight Rates.—If we believe that PRMSA did in fact create a more efficient and therefore less costly transportation service, then we must also conclude that rates would have been increased by even larger amounts had the privately owned carriers remained in the trade and offered at least the same level of service.

The most serious difficulty that carriers have encountered in this trade has been their inability to generate and sustain a profitable operation. Data on file with the FMC shows that, in the aggregate, operators in this trade have incurred losses in that portion of the U.S. Gulf and East Coast/Puerto Rican trade which is subject to FMC regulation. In 1975, carriers devoted assets (rate base) of over \$200 million to the trade and realized operating revenues in excess of \$160 million. Total operating expenses, however, exceeded \$165 million, resulting in an aggregate loss position for the operators. Although PRMSA did report an overall profit in its fiscal year ending June 27, 1976, by the first quarter of 1977 it was again losing money and requesting rate relief.

As pointed out previously, PRMSA officials believe their difficulties are attributable to three basic sources: (1) rising expenses, (2) the need to upgrade and replace operating equipment, and (3) low utilization factors. The increasing level of wages in the maritime industry, increases in bunker fuel oil, and escalating costs of purchasing new vessels are well established facts and not at all unique to PRMSA.

Considering the fact that eight of PRMSA's vessels are now more than 30 years old (although they were refurbished and converted to containerships in the 1960's), it is not hard to believe that the assets devoted to the Puerto Rican trade will have to be replaced in the near future. One representative of PRMMI, the management organization that runs PRMSA, has estimated that the cost of purchasing new vessels and equipment for PRMSA's fleet over the next 10 to 15 years could amount to \$500 million.

In addition to the escalation in vessel costs, equipment required to complement these vessels has also increased in price in the last few years. PRMSA officials, in fact, have stated that the cost of a refrigerated trailer had increased 46 percent from 1974 to 1976, and the fuel to run these units had increased 82 percent during the same period.

The problem of low utilization predates the formation of PRMSA. Statistics available for Seatrain's operation in the 1971-72 period show southbound utilization rates fluctuating between 70 and 90 percent. Although Sea-Land and TTT experienced fairly high utilization rates, in the 90- and 80-percent range, respectively, utilization rates overall appear to have been lower than required for all operators in the trade to be profitable. Attributing its low utilization to the recession, PRMSA reported vessel utilization rates of 74 percent for the third quarter of 1975 and 80 percent for the fourth quarter. Although utilization improved in 1976, by early 1977 PRMSA officials again attributed lower revenues to

utilization rates averaging between 75 and 80 percent.

Utilization rates are of critical importance to industries such as the containerized ocean freight industry which are capital intensive and, therefore, have a large portion of their costs which are fixed. The presence of, proportionately, a large amount of fixed costs requires the meeting of expenses which do not vary proportionately with fluctuations in output (utilization). As a consequence, prolonged periods of low utilization will lead to a larger percentage reduction in revenue than expenses and leave the company in a situation where it may not be able to meet its debt service requirements, leasing commitments, or other contractual obligations. These types of obligations remain, even if the firm decides to reduce the number of sailings in order to save vessel operating expenses. Nevertheless, low utilization rates, while not desirable to any firm, are especially destructive to capital-intensive firms. Clearly, the low utilization rates that carriers have experienced in the southbound vessel movements during the 1970's in the Puerto Rican trade have contributed to the financial difficulties of the various operators.

One attempt to solve the underutilization problems was PRMSA's reduction of the number of vessels used in the trade from 14 to 11. PRMSA's lack of success in accomplishing this goal can be attributed to two factors: (1) the reduction in cargo demand due to the 1974-75 economic recession and (2) the reintroduction of competition in 1975 when Seatrain, Sea-Land, and others either entered the trade or upgraded their service in the U.S.-Puerto Rican trade. PRMSA's market share has been further reduced by increased competition in 1977. A current solution to the utilization problem is, therefore, nowhere in sight.

The solution to the problem of escalating expenses is likewise elusive. Present conditions in the maritime industry offer little hope that wage demands, the price of fuel, or the costs involved in the construction of new vessels and equipment will be abated in the near future. The continual rise in the cost of providing ocean freight service has affected all U.S. carriers operating in the many foreign and domestic trades served by U.S. operators and are not unique to the Puerto Rican trade.

Perhaps the success that Matson Navigation Company has enjoyed in the Hawaiian trade during the past few years offers some insight into the type of operation that may be required in the Puerto Rican trade to ensure a successful operation.

Through the acquisition of new vessels, Matson has introduced some of the most technologically advanced methods of transporting cargo in the maritime industry. At the same time this new equipment

was being purchased, Matson was able to control a sizable share of the dry cargo moving between the mainland and Hawaii. In fact, Matson also carries large quantities of bulk fuel oil to the islands and much of the sugar, molasses, and pineapple which constitute the majority of the tonnage that moves eastbound from Hawaii. Control over this eastbound tonnage is critical because the Hawaiian trade, like the Puerto Rican trade, is imbalanced. The key, then, to Matson's success appears to be based on adopting modern, space-efficient technology in the trade and simultaneously maintaining a sizable share of the market. These two factors, in fact, go hand in hand since the introduction of new expensive equipment, and the fixed charges this entails, require that the operation be run at a high rate of utilization.

One solution, then, to the success of an operator in the Puerto Rican trade may be to follow Matson's example and introduce more efficient equipment into the trade and at the same time strive to gain a large share of the market. Obviously, this is easier said than done and much depends on the reaction of other competitors to one firm's attempt to dominate the market. Nevertheless, it seems apparent that to be successful in the Puerto Rican trade, a carrier must: (1) adopt the most efficient maritime technology, and (2) gain and retain a large share of the market.

Rate Regulation.—Section 18a of the Shipping Act, 1916, and sections 3 and 4 of the Intercoastal Act, 1933, give the Federal Maritime Commission authority to prescribe just and reasonable maximum and minimum rates and charges. Moreover, the Commission may prescribe just and reasonable classifications, tariffs, regulations, and practices.

Two types of carriers serving the Puerto Rican trades are governed by these provisions: (1) common carriers operating vessels, and (2) nonvessel operating common carriers (NVOCC's) who offer transportation to the public but utilize the services of vessel operators for the physical movement of the cargo. Their rates to the shipper are largely dependent upon the rates charged them by the vessel operators for the movement of the cargo. The sections of the shipping acts dealing with the levels of ocean freight rates could potentially have a greater effect on the people of Puerto Rico than any other legislative provision administered by the Federal Maritime Commission.

Although the Commission has been successful in regulating the levels of ocean freight rates in some proceedings, sometimes the rates under investigation are superseded before the proceeding can be completed. Often this leads to discontinuance of the proceeding. A review of Commission instituted proceedings involving vessel operating common carriers

serving Puerto Rico indicates that a majority of the cases instituted in the last 10 years were discontinued prior to final Commission decision.

Currently, Congress is considering a bill (H.R. 6503) which was designed to alleviate these problems. Among other provisions, the bill would authorize refunds to shippers upon a finding that rates were unreasonably high. The bill would also place strict deadlines for Commission decisions. Although the Commission has expressed reservations regarding certain provisions in the bill, it believes that, with some modification, the bill could result in more effective regulation in the domestic offshore trades.

Rate Parity.—Although there was competition, prior to the establishment of PRMSA, in terms of service offered, advertising, or other forms of non-price competition, all three carriers in the trade had established rate parity in the trade. The Federal Maritime Commission (FMC) ordered that the parity issue be examined in a docketed proceeding (Docket Nos. 71-30, 71-42, and 71-43 consolidated). In 1973, after an extensive investigation, of which the parity question was only one part, the Administrative Law Judge concluded that:

In this instance, rate parity is not a matter of choice by the Commission or the carriers. It is a fact of life in the Puerto Rico trade. Because of the similarity of the services offered, no carrier can hope to participate in the traffic at rates higher than those of its competitors. The carrier who published lower rates effectively sets the level for competing carriers. Stability is based primarily on parity. That is why these carriers have maintained and must continue to maintain rates at substantially uniform levels.

Implications of Cabotage.—*Ocean Cargo Freight Rates.*—To some degree, the operation of the cabotage laws affects all the areas of the United States which conduct, or which could conduct, domestic commerce by water. Obviously, not all areas are affected equally. Those areas which are exclusively or largely reliant upon the water mode are more sensitive to the effects than are those with a fuller choice of modal options. Thus, Alaska, Hawaii, and Puerto Rico—which are characterized by a heavy dependence upon external trade and by a limited choice of transport modes—have understandably wished to explore alternatives to the existing arrangement.

Because cabotage affects not only the nationality of shipping service but also such factors as choice of carrier, rate, levels, and stability and level of service, it does not necessarily follow that exemption from cabotage would prove an unqualified boon to economies of the noncontiguous areas.

The introduction of foreign ships into the Puerto

Rican trade might or might not lead to reduced transportation cost in the long run. Even allowing for initially lower freight rates, which would in time rise and become stable due to the probable introduction of the conference system, the long-range structure would be predicated upon the amount of shipping capacity available. In this context, excess shipping capacity can lead to higher costs or, at any rate, to the elimination of those savings originating from the lower costs associated with foreign-flag operators. This would come about because, with a low vessel utilization factor based upon excess capacity, each ton of cargo must bear a relatively high portion of the operator's cost structure. As long as the revenues thus derived offer a better contribution to meeting his fixed or his capital costs than any alternative kind of vessel employment, he is likely to keep the ship in the Puerto Rican service even though it does not represent efficient use of resources. Thus, a high level of service—characterized by a considerable choice of carrier, loading port, and sailing frequency—will be sustained at a price. Such may well have been the situation with the three private U.S. carriers which were bought out by PRMSA.

It is probable that foreign-flag operators would initially enter the Puerto Rican trade with older class break/bulkers. However, over the long term, the foreign-flag operators would also have to make inroads into the container, tug/barge, and RO/RO traffic if they are to obtain any substantial returns from entry into the Puerto Rican trade. In time, with the establishment of liner conferences, those carriers engaged in the Puerto Rican trade will be likely to adjust to the "agreed upon" rate regardless of average cost curves. In the final analysis, the competition factor could be all but nonexistent.

Cabotage and Passenger Service.—There is presently no U.S.-flag passenger service between the mainland and Puerto Rico on either a liner or a cruise basis. Under current U.S. Customs Service policy, foreign-flag cruise ships may call at Puerto Rican ports while carrying passengers embarked at another U.S. port. However, the vessels may not remain in a Puerto Rican port for more than 24 hours.

There are two distinct aspects to passenger service—point-to-point or liner service and cruises. They would be affected differently by a relaxation of the restrictions on foreign-flag carriage. Point-to-point service is now strictly by air carrier with its features of speed and convenience. It is questionable whether a carrier by water offering service from a single mainland port to a single Commonwealth port could consistently attract adequate patronage, given the 4 to 6 days of sea time required for a round trip voyage and limited choice of embarkation points. A

passenger/vehicle ferry service might be more popular although it could pose traffic volume problems for Puerto Rico's road network.

A cruise service involving other Caribbean ports in addition to those in Puerto Rico might well benefit from being allowed to remain at Puerto Rico longer than 24 hours, although with the ship functioning as hotel and restaurant, the revenue accruing to Puerto Rican service industries would be less than that derived from visitors using a point-to-point service and living ashore.

Federal Maritime Programs

Ship Financing Guarantee Program and Capital Construction Fund.—Briefly, the ship financing guarantee program places the credit of the Government behind debt instructions issued by a shipowner in acquiring borrowed funds to finance ship construction. This guarantee can result in a lower rate of interest on the borrowed capital than the shipowner might normally command. The capital construction fund is a means of accumulating funds for vessel construction by placing in a corporate income tax-deferred account certain proceeds from the operation, sale, or insurance claim settlement of one or more existing vessels of the same owner.

Detailed explanations of the workings of title XI ship financing guarantee and capital construction fund programs appear in the Marine Transportation Supplement to this Sector Study.

As of March 31, 1977, the Title XI Ship Financing Guarantee program, covering approved applications and contracts in force, had total obligations of loans/mortgages outstanding of \$4.1 billion. There are pending title XI applications in the amount of \$2.5 billion. For the 50 vessel operators in the U.S.-Puerto Rican trade in 1975, only one company had four of its vessels covered by title XI contracts by force. These four vessels had guaranteed mortgages of \$97 million. Two other carriers that serve Puerto Rico on an intermittent basis had \$39 million in guaranteed mortgages. These amounts represent 2.4 percent and 1 percent respectively of the approved loan/mortgage outstanding. There are no pending title XI applications on file from operators engaged in the Puerto Rican trade. Moreover, there are no vessel operators in the Puerto Rican trade presently participating in the Capital Construction Fund program.

We can only speculate as to why they choose not to participate. Either they do not intend to construct new vessels, perhaps until uncertainty about the future structure of the Puerto Rican trade is reduced, or they do not need this method of raising capital badly enough to accept the admittedly complicated rules governing its use.

It appears, therefore, that while these two key programs of financial assistance are available to shipping companies in the Puerto Rican trade, they are not being utilized by the vessel owners.

In the case of PRMSA, there are legal or fiscal barriers to participation in these programs, stemming chiefly from its character as a tax exempt Puerto Rico Corporation. For example, in establishing PRMSA eligibility for title XI guarantees, it was held by MarAd that the combination of the guarantees and the tax exempt status of the Authority might give it unfair advantage over the private operators in the same trade. Had PRMSA been willing to forgo its tax exempt status, it could likely have taken advantage of the title XI guarantees. Since it was unwilling to relinquish that status, however, it had to forgo participation.

As for the Capital Construction Fund program, while PRMSA would theoretically be eligible to establish a fund, there would be no financial incentive to do so since the tax deferment feature of the fund would have no value for a firm which is already exempt from Federal income taxes.

Use of Construction and Operating Differential Subsidy in the Domestic Trade of Puerto Rico.—In the past, the Commonwealth of Puerto Rico has asked for consideration to participate in MarAd's direct subsidy programs, in particular the Construction Differential Subsidy program. The purpose of the CDS and Operating Differential Subsidy (ODS) programs is to produce a parity between U.S.-flag operators and their foreign competition in U.S. foreign commerce with respect to vessel acquisition and vessel operation. Detailed explanations of these programs appear in the Maritime Transportation Supplement to this Sector Study. To extend these programs to the trade between Puerto Rico and the U.S. mainland would require a change in not only the terms of the Merchant Marine Act of 1936 but to the basic avowed purpose of these programs themselves.

The purpose of the programs under the Merchant Marine Act of 1936 is defined in the Preamble, Section 101, which states that it shall be a national policy to maintain a U.S.-flag merchant fleet adequate to carry out domestic trade and a substantial portion of our foreign trade and to serve as a naval auxiliary in time of war or national emergency. The programs in subsequent titles of the Act support that policy by providing certain kinds of direct and indirect economic aid to U.S. vessel owners and operators, particularly those in the foreign trades. A U.S. shipper of goods can choose from among competing carriers, both United States and foreign, on the basis of freight rates and service quality. If U.S. carriers, with the higher costs of vessel construction and oper-

ation which result from building, crewing, storing, and repairing their ships domestically, are to compete for business with foreign carriers, their freight rates must be roughly comparable to those of the competition. The construction and operation differential subsidy programs attempt to equalize freight rates by equalizing operator cost structures. This is done not to benefit the shipper or consignee of the goods but to benefit the U.S. ship operator and thereby promote the strength and well-being of the U.S. merchant fleet.

The viewpoint of Puerto Rico is fundamentally that of a consumer of ocean transport services who is, quite properly, concerned with minimizing the delivered cost of its imports and exports. As long as there is cargo to be lifted, one or more U.S. carriers will undertake to lift it, at rates fully reflecting both his cost structure and the absence of lower cost foreign competition. Our domestic trade will be carried so long as that carriage is profitable over the long term to the carriers.

Expressed simply, the underlying purpose of the Act is to sustain a U.S.-flag merchant fleet having certain capabilities with respect to carriage of our domestic and foreign commerce and our national defense. The underlying purpose of Puerto Rico in seeking subsidy participation for operators in the noncontiguous domestic trades is to protect itself against what it considers to be unacceptable ocean freight charges. These purposes are visibly distinct; they are not necessarily mutually exclusive, however. The link between them is the effect of freight rates upon the number and quality of ships engaged in our domestic commerce. Where a rate level is so high that it persuades a shipper to switch to air cargo or to seek an alternative market to Puerto Rico, the water carrier suffers a loss of business and domestic trade by water is not well served. Alternatively, where a rate level is so low that it does not enable a carrier to renew his fleet in a timely way, overall U.S. fleet quality is affected. To the extent that the subsidy program might facilitate a prosperous trade between the U.S. mainland and noncontiguous areas *carried by a more modern and capable* U.S. fleet than at present, a case could perhaps be made for its extension to at least part of the domestic trades.

While availability of these programs could encourage and facilitate introduction of additional or improved vessels to the Puerto Rican trade, there would be both a number of procedural problems to be overcome and a probable detriment to the effectiveness of the programs for foreign trade.

Approval of the President and Congress would be necessary to effect the conceptual and statutory changes to the Merchant Marine Act of 1936. It would be unacceptable to propose extension of the

programs only to Puerto Rico while continuing to deny them to operators in the other noncontiguous trades involving areas such as Alaska and Hawaii which could assert many of the same claims to need as does Puerto Rico.

In the Puerto Rican trade, selective awards of subsidy to only certain operators in the trade could introduce competitive inequities with the other operators and would generate strong pressures for an "across-the-board" availability, the alternative being a massive intervention during consideration of any particular application.

Unless CDS and ODS were made retroactive, operators with the newer vessels or recently reconstructed vessels already in operation which had been financed entirely with private capital would seek some alternative form of compensation in order to remain cost-competitive with the subsidized units.

While none of these procedural problems is insurmountable, taken together they represent a formidable deterrent to near term action. The most critical limiting factor, however, is that budget ceilings are finite things. Unless the Congress is ultimately willing not only to approve but also to fund subsidies for the noncontiguous domestic trades above and beyond those already deemed necessary to maintain a viable presence in our foreign trade, then that trade is going to have its support diluted—possibly to an injurious point.

Shipbuilding and Repair.—Title XI of the Merchant Marine Act of 1936 established the Federal Ship Financing program. Its primary purpose is to promote growth and modernization of the U.S. Merchant Marine. Vessels financed under this program must be constructed, reconstructed, or reconditioned in shipyards within the continental limits of the United States. However, since the continental limits requirement may be waived, it is possible for vessels to be built or converted with title XI financial assistance in Puerto Rican shipyards. Shipyards in Puerto Rico also are eligible to participate in cooperative MarAd-industry research and development programs directed toward improving shipbuilding efficiency.

At Puerto Rico Drydock and Marine Terminals, Inc., business is only fair. Most of the work consists of emergency repairs, and the yard's facilities are usually underutilized. Because of a lack of capital and lack of sufficient land area, the company has no plans to enter the boatbuilding or shipbuilding market. However, the shipyard management is optimistic with regard to future ship repair and overhaul prospects. To increase repair capability, a new concrete floating drydock, with a lifting capacity of 2,500–3,000 tons, was recently ordered from a Louisiana company, at a cost of about a million dollars.

At San Juan Shipyard, Inc., business is good. Most of the work consists of repair work on barges, tugs, and fishing vessels, but the yard management is interested in expanding the repair facilities by acquisition of a 300-foot floating drydock. In regard to new building, the company would like to enlarge its bargebuilding facilities. Additional pier space is also badly needed. Sufficient land area is available for additional berthing and other expansion. The company considers prospects for the yard's future as excellent, but lack of capital for expansion remains a major problem. Obtaining skilled shipyard labor is also considered a serious problem.

Ocean & Inland Waterways Corporation plans to build a shipyard at Guanica Bay on the south coast of Puerto Rico. Feasibility studies have been completed. The Farmers Home Administration, U.S. Department of Agriculture, has conditionally approved a \$9 million loan guarantee, and long term financing is now being negotiated. Present plans call for the new shipyard to initially build tugboats, barges, and supply-type boats. The site has characteristics which would allow the possibility of constructing ships up to 130,000 deadweight tons in the future. Initial employment would be approximately 200 people, rising to an estimated 800, at which time the shipyard would represent an investment of about \$15 million and have an annual payroll of \$12 to \$15 million. A necessary preliminary step would be an intensive program to be carried out in a training center to be established near the shipyard.

In connection with the new shipyard to be established at Guanica Bay, A&P Appledore (London) Limited, in 1975, prepared a feasibility study. The following are some of the study's conclusions with regard to development of a new shipyard in Puerto Rico:

- The best market for a new shipyard lies in the production of vessels for operation under U.S. flag. The market sector for a small shipyard would be the U.S. coastal fleet which totals between 5,000 and 6,000 vessels. The U.S. east coast is the most significant center of operation for coastal boats and barges.
- The opportunity exists for a yard to build simple vessels such as tugs and small oceangoing barges in a minimal facility initially, and to systematically increase the size and complexity of the vessels produced. Alternatively, the opportunity exists for a yard to develop a specialist capability, to serve growth in the U.S. coastal fleet, in the form of minibulker/products tanker type vessels.
- A potential also exists at the Guanica Bay facil-

ity for vessel repairs—primarily fishing boats, tugs, barges, and other small craft operating out of Puerto Rican ports.

- The study concluded that this new shipyard would be a viable operation from a financial standpoint.

The Maritime Administration's Office of Ship Construction, in August 1975, prepared an evaluation of the foregoing feasibility study. It considered the conclusion in this study to be overly optimistic.

Development of an adequate market for the products of the shipyard would be difficult due to fierce competition from mainland U.S. shipyards, and to additional construction costs resulting from procurement of nearly all materials in the continental United States.

Notwithstanding the many obstacles and risks involved, it appears reasonable that some potential exists for the establishment of a shipyard capable of construction and repair of small ships and barges. Such a facility would be of benefit to the Puerto Rican economy. Invaluable in such a project are the many financial assistance programs offered to new business by the Commonwealth of Puerto Rico, such as: tax exemption, location incentive grants, payroll subsidy, training programs, on-the-job training, land purchase assistance, and infrastructure assistance.

Port Systems and Navigation

Ports and Terminals.—Ports constitute a vital interface between ocean shipping and the inland transportation network. Dependence on seagoing trade has brought mounting pressure on the existing port facilities with the result that expansion and modernization projects are being undertaken or planned at existing harbors.

Public port facilities throughout Puerto Rico come under the jurisdiction of the Puerto Rico Ports Authority (PRPA). Established as an instrumentality of the Commonwealth of Puerto Rico, the PRPA is responsible for managing the development and operation of the Aerial and Maritime Transportation Facilities in Puerto Rico and to promoting transportation services from and to Puerto Rico.

The Ports Authority administers its wharves in the port areas of San Juan, Mayaguez, Arecibo, Fajardo, Vieques, Culebra, Guayama (Las Mareas), Guayanilla, Guanica, and Yabucoa. In accordance with lease agreements with the naval and military authorities, it also operates the Army Terminal, the Navy Pier (Frontier Base Pier) and the Isla Grande Pier. In addition, the Ports Authority operates ferryboat services for passenger transportation between San Juan and Catano, and passenger and cargo transportation between Fajardo and the islands of Vieques

and Culebra. The facilities at the port of Ponce are owned and operated by the municipality.

Inventory of Facilities and Equipment.—San Juan, Ponce, and Mayaguez are the major seaports in Puerto Rico. These ports have been designated as major Federal navigation projects by the Corps of Engineers. In 1975, total commerce moving through these ports was 10,522,000, 566,000, and 293,000 tons respectively. The percentage and tonnage moving in containers are growing rapidly; container cranes exist at San Juan and are planned for Ponce. Container facilities also exist at Mayaguez. There are large private oil and petrochemical ports on the south coast of Puerto Rico.

Other ports of interest include Jobos Harbor, Guanica, Guayanilla, Yabucoa (Guayanes Harbor), Guayama (Las Mareas), Fajardo Harbor, Arecibo Harbor, Aguadilla Harbor, Humacao, Arroyo, and Ensenada Honda Harbor. These ports handle a variety of commodities including bulk sugar, fertilizers, fuel oils, liquid chemicals, grains, and general cargo. Table 1 is a brief inventory of port facilities. More detailed information on the port system of Puerto Rico is contained in appendix B.

Port Development and Expansion.—Local investments in harbor terminal facilities alone represent a much greater amount than is invested in the existing Federal navigation projects. For example, in San Juan Harbor, the total Federal investment in the harbor through FY 1976 has been \$19 million. Current local development plans call for a 15-berth container terminal estimated at \$70 million.

An analysis of capacity and demand is a logical prerequisite to port development. Before attempting such an analysis, it should be recognized that no universally accepted measure of a port's capacity currently exists, and that there is even disagreement among persons knowledgeable in these matters on just what measures constitute capacity.

In general, capacity of a seaport is the measure of its ability to move cargo from and to vessels calling at the port as well as its ability to move cargo from, to, and through the port and out into the tributary area. Accordingly, an evaluation of port capacity must give careful consideration to shoreside facilities and interconnecting land modes of transportation. This hinterland accessibility by rail, truck, pipeline, or barge, however, is difficult to assess.

Because of the problems in developing a realistic or practical method for determining the capacity of ports, capacity analysis can be based on actual cargo handling experience, using data which has been reported by those directly involved with cargo handling at ports. This was done in a recent U.S. coastal region survey by the four regional offices of the

Maritime Administration. Accordingly, based on the marine terminal capacity data collected from the above survey, some "first cut" rough estimates of Puerto Rican port capacities can be developed. By comparing these estimates with the existing and projected movements of commerce through Puerto Rican ports, it will be possible to assess their adequacy, and, in turn, the need for facilities and port expansion programs.

There is a potential for refining estimates of Puerto Rican port capacities for the future; but this would exceed the scope of the current study. As part of a National Port Assessment being conducted by the Maritime Administration, data is being collected nationwide on port facility capacities and commodity trends. This assessment is scheduled for completion by the end of 1978. This output will be an aggregated regional facility supply and demand analysis through 1985. This can subsequently be updated. Since the report of the assessment will have data for Puerto Rican ports aggregated with that for other "South Atlantic" ports, it would be of only limited value to Puerto Rico. However, since raw data for Puerto Rican ports was originally collected for aggregation, it would be technically feasible to break this out as a separate project, agency resources and priorities permitting. An alternative approach would be for the Commonwealth to take part in a regional port planning project on a 50 to 50 cost sharing basis with the Maritime Administration. Several such projects involving both individual States and groups of States are underway. Further information on this program may be obtained from either MarAd's Eastern Region Office in New York (ATTN: Regional Port and Intermodal Development Officer) or from the Office of Port and Intermodal Development at MarAd's Washington headquarters.

As a first rough approximation of port and terminal capacities, a practical capacity estimation for each of the Puerto Rican ports has been developed. The estimates are based on total number and types of terminals and berths and are listed for the respective Puerto Rican ports in table 2.

Despite incomplete 1975 waterborne commerce statistics for several of the smaller ports noted above, the estimated port capacities of the major ports when matched against actual 1975 cargo tonnage indicate that the total capacity of the major ports of Puerto Rico exceeded the total demands. Therefore, it initially appears that the present major port terminal facilities of Puerto Rico are more than adequate to handle existing movements of commerce.

For undertaking a more complete demand and capacity analysis, it will be necessary to examine forecasts of commodity data movements through the

Table 1.—Inventory of Facilities and Equipment (Selected Puerto Rican Ports)

Port ¹	General cargo facilities					Specialized facilities			Remarks
	Total berths	General cargo	Container	RO/RO	Lash	Dry bulk	Liquid bulk	Pas-senger	
San Juan	41	18	11	4		1	2	5	5 container 27½ tons 2" 45" 1 GC/container 25 tons
Ponce ²	7	5							Two 600 ft. containership berths have been completed but the support area is still under development.
Mayaguez	2	2							Expansion of wharf and marshaling area for cargo vans under construction.
Jobos Harbor ³ (Central Aguirre)	1						1		
Guanica	1	1							
Guayanilla ⁴	3	2					1		
Yabucoa (Guayanes Harbor)	1						1		
Guayama (Las Mareas)	2						2		

¹ Coast Guard information includes ports of the Greater Antilles: Christiansted, Line Tree Bay, Fredriksted, and Charlotte Amalie. Corps of Engineers include other harbors: Pajardo, Arecibo, Aguadilla, Humacao, Arroyo, and Ensenada Honda.

² Not a part of the Ports Authority System.

³ Not listed by Coast Guard.

⁴ Coast Guard and Corps of Engineers include under Ponce.

Table 2.—Estimated Annual Throughput Capacities of Cargo Terminals—1975 (Selected Puerto Rican Ports)

[In millions of long tons]

Port	Breakbulk	Container	RO/RO	Liquid bulk	Dry bulk	Estimated port capacity	Tonnage handled
San Juan	3.3	2.5	2.8	8.0	(1)	16.6	10.5
Ponce	1.5	(1)	.8	(1)	(1)	2.3	.6
Mayaguez	.6	(1)	(1)	(1)	(1)	.6	.3
Jobos Harbor (Central Aguirre)	(1)	(1)	(1)	1.5	(1)	1.5	NA
Guanica	(1)	(1)	(1)	.2	1.0	1.2	NA
Guayanilla	.6	(1)	(1)	.2	(1)	.8	NA
Yabucoa	(1)	(1)	(1)	1.5	(1)	1.5	.2
Guayama (Las Mareas)	(1)	(1)	(1)	1.5	(1)	1.5	NA
Total	6.0	2.5	3.6	12.9	1.0	26.0	*11.6

NA indicates data not available at the time this report was prepared.

* No terminal facility in this category.

* Incomplete total because 1975 tonnage data for ports of Jobos, Guanica, Guayanilla, and Guayama were not available at time of report preparation.

ports of the study region in order to determine whether present facilities are sufficient to handle the cargo volumes forecast for the future. From this, it can be determined what degree of development of port facilities will be necessary to meet the future needs of Puerto Rico's oceanborne trade and commerce.

The capacity of port systems can also be constrained by the dimensions of harbors and channels and by aids-to-navigation configurations. A necessary adjunct of terminal expansion plans, based on capacity and demand analysis, is the coordination with the Federal programs which affect the development of ports and harbors. The harbor maintenance and improvement programs of the Corps of Engineers require advance planning input. Coast Guard plans for aids-to-navigation, vessel traffic services, and regulations for marine safety and environmental protection also interact with local port development plans.

Other Federal organizations which may impact on port development and expansion are:

Policy Formulation

Water Resources Council
Department of Transportation
Council on Environmental Quality
Federal Energy Administration

Regulations and Operations

Federal Maritime Commission
Interstate Commerce Commission
Environmental Protection Agency
Office of Management and Budget
Office of Coastal Zone Management

At present, the only direct Federal aid available for port development and expansion is the community development programs such as those of the Economic Development Administration. While EDA, Farmers Home Administration, and HUD Community Development Block Grant programs may fund

individual projects, depending on the circumstances, they are not oriented specifically to port development. Funds are limited, and any port projects must compete with other development proposals for the available resources. For instance, only one port project was funded under the Public Works Employment Act of 1976, although six were submitted. Currently, a bill has been introduced in the House to amend the Merchant Marine Act of 1920, which, if passed, would make available to Puerto Rico Federal grant funds for seaport development. This bill, H.R. 7948, "Domestic Offshore Communities Seaport Development Act of 1977," recognizes the dependence of Puerto Rico on water transportation including ports.

Port Labor.—Longshoring is one of the highest paying bluecollar occupations found within Puerto Rico. The vast majority of longshoring jobs are covered by contract agreements with the International Longshoremen's Association (ILA). Based on recent reports from ILA, there are approximately 2,300 native Puerto Ricans on the island who are employed by the industry and members of the ILA. These longshoremen are currently receiving an average hourly base wage of \$8.00. Longshoring employment in Puerto Rico is relatively stable unless there is either a national or worldwide recession. In general, the hiring practices, work rules, and other employment practices are governed by the master ILA contract for Gulf and Atlantic ports. As with ILA agreements in other ports, local issues are negotiated separately. However, these locally negotiated differences have relatively little impact on wages, fringe benefits, work rules, hiring practices, and other items which affect the stability of the work force.

Impacts of a strike illustrate Puerto Rico's dependence on ocean transportation. Importing 65 percent of its basic food needs, stocks were depleted to the point that public health would have been en-

dangered had the strike not ended when it did. Stocks of raw materials and intermediate goods, upon which industrial employment depends, were nearing exhaustion, and massive layoffs were imminent. Diversion of cargo to TMT and the air carriers occurred, but their capacity was saturated without materially offsetting the cargo deficiency.

The new master contract finally accepted provides for hourly wages to increase from \$8 to \$10.40 over 3 years, a strong job security package, and large increases in pension and welfare contributions by employers. The added cost may be expected to appear in the form of higher freight rates.

When a work stoppage does occur, the Federal Government may be able to afford some relief through the mechanisms of a temporary restraining order or a Taft-Hartley injunction provided that certain requirements are met as to the scope or severity of the stoppage. Additionally, the services of the Federal Mediation and Conciliation Service are available to assist in negotiations of a settlement. Beyond these resources, however, the Government does not possess the means to compel restoration of commercial shipping service to Puerto Rico or to any other offshore State or entity.

Furthermore, review of our strike information data reveals that the Puerto Rican locals follow the same general strike patterns as the mainland ILA locals. The number of days lost to strike activities is relatively low, which also adds, to some degree, stability to the work force. Dependent as it is upon ocean transportation, Puerto Rico is sensitive to any interruption to that service occasioned by work stoppages of seafaring, longshore, or teamster personnel. While stoppages have obviously not been eliminated, their frequency and duration have moderated since the start of the current decade.

Prior to the ILA strike of 1977, of those stoppages, which by virtue of the carriers or ports affected have had an effect on Puerto Rico's trade, 12—4 by seafaring personnel, 6 by longshore personnel, and 2 by teamsters—have exceeded 5 days duration since 1970. The average duration of stoppage had been 29 days, with a low of 9 days and a high of 100 days. No stoppages in excess of 5 days had been recorded for seafaring personnel since October 1975, for longshore personnel since December 1974, or for teamsters since January 1975.

On October 1, 1977, members of the ILA went on strike in Puerto Rico. Within 4 days, eight U.S.-flag vessels were strikebound. Many of these vessels were awaiting the discharge of perishable food items. On October 4, the U.S. District Court of San Juan issued a Temporary Restraining Order (Docket 771473) against the ILA locals involved in the strike. Subsequently, all containerships which were in port or enroute to Puerto Rico were worked by

ILA and cargo on the docks was delivered. This temporary restraining order remained in effect and there was actually no extended ILA strike within Puerto Rico. The strike on the mainland, as it affected Puerto Rico, ended November 29, 1977, having run for 60 days.

Approximately 85 percent of the value of ocean-borne general cargo discharged in Puerto Rico is domestically shipped from the continental United States. The vast majority of this cargo originates from Atlantic and Gulf ports. During the strike little containerized cargo left the mainland except through Jacksonville via Trailer Marine Transport, whose dock facilities are manned by non-ILA labor. The remaining 15 percent of trade which enters Puerto Rico comes aboard foreign-flag vessels. Although these ships were not hampered by the strike situation from their points of origin as U.S.-flag vessels were they still faced the possibility of being strikebound in Puerto Rico if the temporary restraining order was removed and an injunction did not follow. Due to this situation, many foreign-flag operators tried to avoid Puerto Rico as a point of destination.

While the Commonwealth Government could attempt to obtain from the union leaders a commitment to exempt Puerto Rico from future stoppages on humanitarian grounds, it should recognize that such a commitment would represent a significant dilution of labor's bargaining leverage with management and is not likely to be readily granted for that reason.

Harbor Safety and Navigation.—Fifteen groundings have occurred on the south and east coast of Puerto Rico since January 1, 1974. A summary of these casualties is included as appendix B. Although no analysis of the economic impact of these groundings on Puerto Rico has been attempted, the number of casualties alone leads to the conclusion that the impact has been significant.

A major navigational problem in the Greater Antilles area involves those vessels approaching the south coast of Puerto Rico, where the terrain is characterized by lowlying mangrove swamps. These mangrove swamps provide poor radar targets for navigational purposes. In addition, the channels entering the harbors of Guayanilla and Tallaboa, where the bulk of Puerto Rico's petroleum imports is received, are narrow and contain numerous, poorly delineated bends, with shallow water on both sides of the channels. Repeatedly, vessels have grounded on the south coast of Puerto Rico due to not having an effective navigational method for the channels involved.

Another problem area in the Greater Antilles region is the Mona Passage, which has only one major navigational aid. This aid is on top of Mona

Island, and is obscured to vessels which approach within 12 miles of the light from certain directions.

The entrance to San Juan Harbor has been the site of several groundings, also. Due to the configuration of the harbor entrance, Masters who are not familiar with the approach to the harbor have been disoriented, and have attempted to pass to the west of Isla de Cabras. In March 1976, the Dutch tugboat *Gelderland* grounded west of Isla de Cabras after approaching the harbor without a pilot. As a result of the grounding, approximately 1,000 barrels of fuel oil were lost into the ocean adjacent to the shoreline, and the vessel was declared to be a total loss. In 1968, the *Ocean Eagle* grounded in the same area causing a major oil spill which severely affected the ecology of the north coast of Puerto Rico.

At present, the only electronic navigation system for the Greater Antilles region is LORAN A (Long Range Radio Aid to Navigation), which is marginal, at best. LORAN A is scheduled to be phased out in the near future as part of the National Navigation Plan. LORAN C is an improved electronic system replacing LORAN A nationally, but there are no provisions for LORAN C coverage for the Greater Antilles area. The need for electronic navigation in this area has been recognized by the Coast Guard, and they currently are evaluating possible alternatives.

AVIATION SYSTEMS

Air Service

Puerto Rico (PR) would like to expand the air service available to it in three directions:

New routes between Puerto Rico and the U.S. mainland and more U.S. carriers to fly the current routes;

Expanded air cargo service between the Puerto Rican and the U.S. mainland and intra-Caribbean points; and

Expanded air service to Europe and South America.

There are three current route investigation cases before the Civil Aeronautics Board (CAB) which will affect Puerto Rico. In addition, the United States-United Kingdom air services agreement and the recently concluded CAB Transatlantic Route Proceeding also contain provisions relating to Puerto Rican air service.

Background.—Puerto Rico currently receives direct service from 38 North American cities, including 23 United States points. Nonstop service is provided from 14 of the 23 U.S. cities. The major U.S. carrier serving Puerto Rico is Eastern Airlines. It provides combined passenger and cargo service to Puerto Rico. American Airlines and Delta are the

other principal U.S. airlines serving Puerto Rico, but their service together would not equal the total number of weekly Eastern Airlines flights. (Table 1, appendix A.)

San Juan is called the gateway to the Caribbean and there is extensive intra-Caribbean service out of San Juan. The largest commuter¹ carrier in the United States, Puerto Rican International Airlines (Prinair) maintains its own terminal facilities at the San Juan Airport and in 1976 carried 823,073 passengers. (The second largest U.S. commuter airline, Golden West Airlines, flew 398,170 passengers.)

Puerto Rico has direct international service from approximately 15 non-Caribbean cities. The intra-Caribbean network includes 11 foreign points. The two major foreign carriers serving San Juan are Colombia's Avianca and Iberia of Spain. San Juan is used as an intermediate stop between European-South American routes, with Madrid being the primary point. (Table 2, appendix A).

Domestic Passenger Service.—As can be seen from the preceding data, San Juan, the principal Puerto Rican city, receives substantial service from the U.S. mainland. However, the Puerto Rican government is asking the Civil Aeronautics Board (CAB) to certificate more U.S. carriers to operate on the existing routes. Puerto Rico's major complaint is that Eastern Airlines has, in effect, a monopoly on most of the routes it flies between Puerto Rico and the mainland, and service has suffered as a consequence. Puerto Rico also contends that, on routes where Eastern and American Airlines both operate (New York-San Juan and Miami-San Juan), the volume of traffic would support the entry of a third carrier.

Eastern and American claim that both carriers are not covering their costs on their Mainland-San Juan routes, and the entry of a third carrier would force one of them out of the Puerto Rican air market. Formal arguments have not yet been filed by the Federal agencies, but the current emphasis on low fares may make the Puerto Rican market more attractive for expanded service, if the low fares can be combined with flexible and innovative service options.

Eastern's arguments that a third carrier would be uneconomical on the New York and Miami-San Juan routes have been disputed by the Commonwealth and the various carriers applying for authorization to operate on those and other routes. (Table 4, appendix A lists the cities for which new or expanded Puerto Rican authority has been requested and the carriers who have applied for the routes.)

¹ The CAB defines a commuter carrier as one which performs pursuant to published schedules, at least 5 round trips per week between 2 or more points, or carries mail and is not a certificated scheduled airline.

A carrier with heavy costs and a high breakeven point would not be a viable choice for the San Juan market due to the fare structure unique to that market. Pan Am was forced out of the San Juan route for that reason, even though today, it is a much more cost-effective carrier than at that time.

The CAB initiated the Caribbean Area Service Investigation (Docket 30697) April 6, 1977, to evaluate the service changes that have taken place since the 1968 CAB decision. This is a complex case involving much more than U.S. mainland-Puerto Rican service. The Caribbean Area Service investigation can be expected to realign the Caribbean route structures of the current U.S. carriers, but whether the changes will be major is difficult to predict. An initial decision on this investigation by the Administrative Law Judge is expected in August 1979.

In addition, the recently enacted Airline Deregulation Act of 1978 opens the door for expanded domestic air passenger service for Puerto Rico if the demand for such service is warranted.

Cargo.—Puerto Rico would also like to see expanded cargo service to the U.S. mainland and Latin America. Eastern provides the bulk of the mainland-Puerto Rico cargo service. Puerto Rico believes that additional cargo authority would strengthen the weak island economy. Better utilization of Borinquen Airport (a former U.S. Air Force base) would provide jobs and spur development of the western half of the island, as well as reduce congestion at the cargo facilities at the San Juan International Airport.

A recent case before the CAB (United States-Latin America All-cargo Service Investigation—Docket 29295) included an examination of the cargo situation between Puerto Rico and Latin America. American Airlines and Airlift International, Inc. (Airlift) had applied for all-cargo authority between Puerto Rico and South America. Airlift would have included more South American cities in its schedule and would have served Borinquen Airport, but the initial decision by the CAB Administrative Law Judge (ALJ) ruled in favor of American due to that carrier's stronger financial structure. However, on October 3, 1977, Airlift filed a petition for discretionary review by the Board and was supported by civil parties from several U.S. points.

The Board reversed the ALJ recommendation with respect to Airlift and granted authority to Airlift to serve the markets in question for a period of 7 years with certain conditions. The CAB recommendation is expected to receive Presidential approval.

International Service.—Puerto Rico is particularly interested in obtaining direct service to Europe since

the local government feels this will boost their tourism trade. San Juan's only European access is through Madrid via connecting service on Pan Am and Iberian Airlines, the Spanish national carrier. Puerto Rico would like to exploit its position as a major gateway to the Caribbean by expanding its international service. The Puerto Rican government wants a nonstop route to London and Frankfurt, and claims sufficient traffic could be generated from South and North American points to justify the route. They have established a tourism office in Frankfurt and plan to carry on active promotion.

The Transatlantic Route Proceeding is a major route proceeding which was recently concluded by the CAB after years of investigation. This case establishes new U.S. gateway cities for service to Europe and awards new or expanded route authority to U.S. carriers. Pan Am was given authority to offer nonstop service directly to Madrid from Miami, eliminating an intermediate stop at San Juan, which has become a cogateway point with Miami. Puerto Rico will still have access to Europe via connecting service to Miami or South America, but the CAB recognized that this arrangement probably did not satisfy their service needs.

The United States-United Kingdom Air Services Agreement (Bermuda 2) designates Puerto Rico as a U.S. Caribbean point which both U.S. and British carriers may serve on passenger and cargo routes within the Caribbean and U.S.-Caribbean area. Puerto Rico is a major Caribbean traffic generator for both passengers and cargo.

Summary.—Puerto Rico's domestic and international air service needs are being studied by the Civil Aeronautics Board and other interested Federal agencies. While there is extensive U.S.-Puerto Rican service already available, it is expected that the CAB will encourage the use of innovative fare and service plans to strengthen the traditionally low-yield Puerto Rican air service market.

With Airlift's entry into the cargo market at Borinquen, a major Puerto Rican concern should be substantially reduced. Airlift will provide cargo service to Houston, Miami, and seven Latin American points, and its operations at Borinquen should reduce the congestion at the main San Juan airport and encourage economic development in the western end of the island.

The CAB's United States-Benelux Low Fare Route investigation may open up new routes to Europe from Puerto Rico if such service is demonstrated to be economically viable for the air carriers and in the public interest. The CAB's decisions on this case, and all others dealing with Puerto Rican air service, are subject to Presidential review, pursuant to section 801 of the Federal Aviation Act.

The Airport and Airway System in Puerto Rico

The Airport and Airway Development Act of 1970 (P.L. 91-258) established an expanded program of Federal matching grants to sponsors of airports serving commercial and general aviation. The Act also established a system of user taxes paid into a trust fund to provide an assured, long term source of funding. Subsequent amendments to the Act made several major changes affecting project eligibility, overall funding levels, distribution of funds, the project approval process, and the percentage of the Federal contribution for most projects.

Pursuant to this Act, the Federal Aviation Administration (FAA) administers the Planning Grant Program (PGP) and the Airport Development Aid Program (ADAP), as well as the acquisition, establishment, improvement, and maintenance of air navigation facilities.

Under the PGP, the Secretary of Transportation may make grants of funds to planning agencies for airport system planning and to public agencies for airport master planning in order to promote the effective location and development of airports and the development of an adequate national airport system plan. Under the ADAP, the Secretary is authorized to make grants for airport development by grant agreements with sponsors.

The National Airport System Plan (NASP) includes 10 existing and 2 proposed airports in Puerto Rico. The 10 existing airports consist of 2 air carrier airports (Puerto Rico International and Mercedita), 7 commuter service airports (Borinquen, Fajardo Harbor Seaplane Base, Humacao, Culebra, Vieques, Mayaguez, and Isla Grande), and the general aviation airport at Arecibo. The proposed new airports are a commuter service airport at Fajardo and a reliever airport at San Juan. Since all of these airports (except the Fajardo Harbor Seaplane Base) are operated by the Puerto Rico

Ports Authority (PRPA), the PRPA is the sponsor with which the FAA deals in processing and executing PGP and ADAP grants in Puerto Rico.

Since the inception of the ADAP through FY 78, Puerto Rico has been entitled, on the basis of territorial and enplanement apportionments, to receive Federal grants totaling \$20,070,424, of which \$19,230,424 was for air carrier airport development and \$840,000 was for general aviation airport development. Puerto Rico has also been eligible to receive additional ADAP funds obligated at the discretion of the Secretary. Full utilization of their \$20 million entitlement would have required the PRPA to provide matching funds for about the same amount, in which case a total of about \$40 million could have been spent on airport development in Puerto Rico since the ADAP was instituted in 1970.

As it was, however, a total of only \$10,127,642 in ADAP grants has been made to PRPA for 14 different airport development projects, meeting all of the PRPA's requests for aid. Of this total \$2,787,366 was obligated from discretionary funds for air carrier airport development in 1971, the only year in which obligations to the PRPA exceeded their apportionment. Only \$91,208 was requested and obligated for general aviation airport development until \$600,000 of territorial discretionary funds were requested and obligated in 1978. Thus, the PRPA has requested and received only about one-third of the Federal air carrier airport development funding available to them and only 11 percent of their general aviation airport development apportionment (plus the territorial discretionary funds requested and obligated in 1978). These grants of \$10 million were matched by \$8 million in sponsor funds from the PRPA, meaning that a total of \$18 million has been expended for airport development in Puerto Rico under the ADAP.

Puerto Rico's entitlements and obligations are summarized in the following table for air carrier ADAP funds.

Air Carrier ADAP Apportionments and Obligations to Puerto Rico

Fiscal year	Apportionments			Obligations ²	Percentage of apportionment obligated
	Territorial ¹	Enplanement	Total		
1971	\$875,000	\$1,153,847	\$2,028,847	\$4,816,213	100
1972	875,000	975,963	1,850,963	333,600	18
1973	875,000	1,388,029	2,263,029	0	0
1974	962,500	1,422,091	2,384,591	39,076	2
1975	962,500	1,337,908	2,300,408	1,482,116	64
1976		2,877,795	2,877,795	1,193,067	41
1977		2,857,775	2,857,775	0	0
1978		2,667,016	2,667,016	1,572,362	59
Total	4,550,000	14,680,424	18,230,424	9,436,434	335

¹ Territorial apportionments for air carrier ADAP funds were terminated after 1975.

² Entirely from enplanement entitlement except in 1971 when the

total entitlement plus \$2,787,366 in discretionary funds were obligated. ² Does not include the \$2,787,366 in discretionary funds obligated in 1971.

If the PRPA had applied for the additional \$13 million to which they were entitled and provided the necessary matching sponsor's share of about \$6 million, an additional \$19 million could have been spent on airport development in Puerto Rico during the 1971-77 period (assuming that all project applications were approved). This would have meant expenditures totaling about \$37 million, \$23 million in Federal grants and \$14 million in matching funds from the sponsor, more than double the \$18 million that was actually spent. Clearly this increased level of government expenditures would have had a most favorable impact on employment.

There are three plausible explanations why these airport development expenditures were not made: the PRPA was unable to provide the required matching funds, this amount of airport development was not needed in Puerto Rico, or the necessary airport development was not adequately perceived or sufficiently well planned.

The 1972 NASP indicated that necessary airport development in Puerto Rico would require expenditures of about \$35 million during the 1972-77 period, or \$7 million per year. Thus, the need for more extensive airport development clearly appears to exist. Though the PRPA may have encountered some difficulty in providing the additional \$6 million in matching funds necessary to fully utilize their ADAP apportionment, indications are that this was not the major obstacle. Thus, it is suggested that more effective airport system planning could have resulted in significantly greater airport development expenditures in Puerto Rico over the past several years, with its consequent beneficial effects upon the transportation system and the economy. It also appears that the PRPA is taking steps to solve this problem.

Since the inception of the Planning Grant Program, a total of \$456,209 in PGP grants has been made to the PRPA, as follows:

	Date	Federal share	Sponsor share	Total
Commonwealth System Plan	7/1973	\$139,124	\$69,562	\$208,686
Ramey AFB Master Plan	6/1974	73,000	37,000	110,000
Puerto Rico International Master Plan	8/1977	126,850	42,283	169,133
Puerto Rico International Master Plan	1/1978	117,235	39,129	156,364
Total		456,209	187,974	644,183

The Puerto Rico Airport System Plan has now been published. The Airport Master Plan segment of the Ramey Air Force Base Re-Use Master Plan has been completed. The Master Plan for Puerto Rico International Airport will be completed shortly. Completion of these plans should greatly improve the PRPA planning process and enable them to utilize airport development funds available to them.

Looking ahead, Puerto Rico's annual ADAP apportionment will probably be about \$3 million. If the PRPA provides the currently required matching amount of about \$1 million per year for necessary airport development projects, a total of approximately \$4 million annually may be spent in Puerto Rico to develop air carrier and general aviation airports in the Commonwealth. The FAA's official forecast of aviation activity, the Terminal Area Forecast (TAF), projects a growth in aircraft operations and enplaned passengers in Puerto Rico roughly paralleling that in the continental United States. The current NASP estimates that the cost of airport development projects needed in Puerto Rico over the next 10 years will total about \$37 million: \$24 million at Puerto Rico International Airport, \$8 million at other air carrier and commuter service

airports, and \$5 million at reliever and other general aviation airports. Many of these projects were originally included in the 1972 NASP, but were not accomplished during the 1972-77 period when it was estimated that they would be needed. The need to complete these airport development projects is, therefore, even greater now. Given these airport development needs and the probable availability of Federal ADAP funds, it appears that adequate and comprehensive airport system planning by the PRPA can ensure a significant input to the Puerto Rican economy over the years ahead.

The FAA currently employs over 300 people in Puerto Rico with an annual payroll in excess of \$7.5 million and spends about \$425,000 a year for rent and utilities. The percentage of local personnel employed was only 18 percent in 1972 when the FAA undertook a concerted program to hire local personnel. As a result of this program, about one-half of the FAA employment in Puerto Rico is now Puerto Rican, ranging in grade level from GS-5 or GS-7 entry levels to GS-13 supervisory positions. Further benefits to the Puerto Rican economy may be achieved through similar efforts to employ and upgrade local personnel.

INTERCITY AND RURAL GROUND TRANSPORTATION

Description

General.—The intercity and rural ground transportation system consists mainly of highways. There are relatively few bus transit systems operating in the island. The largest is the Metropolitan Bus Authority (MBA), a Government-owned transit company which serves San Juan and various other cities within the metropolitan area. There is a private bus company which provides service between San Juan-Mayaguez and San Juan-Ponce. This company has been operating with financial difficulties and is in danger of going out of business. There are several small bus companies in operation throughout the island serving intertown transportation. These are usually small fleets using very old equipment.

The predominant public transportation service in Puerto Rico is provided by the "publico" system. This system consists of privately owned jitney-type vehicles carrying passengers between fixed destinations. The system does not operate on a scheduled basis, being rather demand-responsive. In many rural areas and small towns "publicos" are the only form of public transportation available. In general terms it is a *very efficient, low-cost form of transportation* providing a needed service.

The offshore municipalities of Vieques and Culebra are served by ferry service from the main island. The ferry system provides a vital passenger and cargo transportation link between the islands.

Railroads play a very minor role in Puerto Rico's rural transportation system. The only railroads in operation on the island are narrow-gage railroads which are used to haul sugarcane to the mills during the approximately 6-month harvesting season. The number of active sugarmills has been decreasing steadily. Goods movement throughout the island is accomplished almost exclusively by trucks.

Highway System.—Puerto Rico has no interstate system. A total of 1,769 miles of highway have been designated as Federal Aid Primary, Secondary, and Urban Systems. These system miles represent about one-quarter of the total paved highway mileage on the island. The Federal-aid system rural miles total 1,233 and are made up of 483 FAP rural miles and 750 FAS miles. As reported in the National Highway Inventory and Performance Study (NHIPS), highways in 1975 totaled 7,636 miles in Puerto Rico. Of this total 4,846 miles were rural miles. A comparison of the condition of nonlocal miles in 1970 with 1975 indicates that the miles in good condition in 1970 for all systems have been deteriorating into a fair condition. Maintenance is satisfactory although

it appears that increased effort is necessary to keep systems in their existing condition.

The number of vehicles in Puerto Rico has been increasing at a faster rate than the population. Between 1970 and 1975, the number of vehicles increased by 67 percent—from 470,094 to 769,258. This rate of increase is three times the national average. These vehicles account for 8,857,000 daily vehicle miles of rural highway travel, for a population of 1.3 million rural inhabitants.

Highway Funding

Background.—To understand the relationship of Federal money and local money in highway construction, a brief discussion of the Commonwealth's Department of Transportation is required.

In July of 1937, the Federal Highway Act was extended to include Puerto Rico. The Act provided that Puerto Rico share in the appropriations on the same terms and conditions as the mainland States. Federal-Aid apportionments to Puerto Rico began in 1938, and at that time, the island had approximately 1,439 miles of paved roads. The highway program at this time came under the Puerto Rico Department of Interior, which also was responsible for all bridges and public works.

In 1952, the Department of Interior became the Department of Public Works. In 1965, the Puerto Rico Highway Authority was established as a public corporation with authority for all highway-related construction. In January of 1973, the Department of Public Works was reorganized and renamed the Department of Transportation and Public Works. It is headed by a Secretary of Transportation and Public Works. The DTPW unites under one department the previous Department of Public Works, the Highway Authority, the Ports Authority, and the Metropolitan Bus Authority.

In February of 1976, the Secretary implemented a major administrative reorganization of the Department; the reorganization affected the organizational structure of the public works area and Highway Authority. The other modal agencies—Port Authority and Metropolitan Bus Authority—were not affected.

After the 1976 reorganization, all highway construction related functions were transferred to the Department of Transportation and Public Works proper, and the Highway Authority remained as a financing body only. However, the Authority continued in charge of the administration and operation of toll roads. The Department would be directly responsible for carrying out all operational aspects of the highway program, including the Federal-aid program. From 1965 until recently, the Highway Authority was recognized as the Commonwealth agency to receive and administer Federal highway

funds, meeting the requirements of law (23 U.S.C. 302) for that purpose. On December 27, 1976, the Federal Highway Administration approved the Department's request to be recognized as the agency meeting those requirements in lieu of the Highway Authority. Recently, some functions that had previously been taken away from the Highway Authority in February of 1976 were restored. That agency is again responsible for all design and construction activities for new highway facilities in addition to its financial responsibilities. The Department retains overall responsibility for the Federal-aid highway program but the Highway Authority will act in behalf of the Department in carrying out certain assigned functions. The 1976 reorganization adversely affected the Commonwealth's ability to address highway needs. Additional efforts remain to be made to recapture the ability to utilize Federal funds promptly and effectively.

Revenues.—The current gasoline tax rate in Puerto Rico is 16¢ per gallon, and the Highway Authority receives the full amount of that tax for its highway program. It also receives four (4) cents of the gas and diesel oil taxes. For FY 1977, revenues from those sources amounted to almost \$103 million. Right-of-way costs are met out of this fund and out of Federal grants as no legislative appropriations have been approved for right-of-way since FY 1973. Since the gasoline tax revenues are not sufficient to maintain the program level desired by the Commonwealth, there are periodic issuances of bonds. Between its establishment in 1965 and October 1978, the Highway Authority has sold \$668 million in bonds. Most of the bond revenues have been used to finance toll roads under construction between San Juan and Ponce and San Juan and Arecibo. Emphasis was given to the San Juan-Ponce toll road (PR-52) and it is now open to traffic for its entire 64-mile length. Only short sections of the San Juan to Arecibo toll road are open; however, construction is ongoing. At the Arecibo end, two projects with a 57-mile length and a \$16 million cost are underway. At the San Juan end, two segments are expected to be under construction during 1979 with a length of 4.7 miles and a \$19 million cost. It will be quite some time before the entire toll road is completed due to financial limitations, however, upon completion of this effort, the de Diego Expressway will have 23.9 miles of highway in use, all constructed without Federal funds.

Except for toll collections, gasoline taxes and half of the diesel and gas oil taxes, all other highway user revenues go into the general fund where appropriations are made to cover all State government functions including those of maintenance of highways and all motor vehicle and driver related administration functions.

Federal-Aid.—Federal-aid funds for highways on the Federal-aid primary, secondary, and urban systems are distributed to Puerto Rico on the same basis as these funds are apportioned to the States, i.e., on a formula giving equal weight to area, population, and post road mileages. Matching ratios for the different program categories are the same as for any of the States.

Up until about 1975, available Federal-aid highway funds were only a small part of Puerto Rico's overall highway program (less than 10 percent). However, because of a tight money situation, the Commonwealth's overall program has been greatly curtailed. This austerity situation coupled with the present availability of all unobligated apportionments and allocations will make the Federal-aid program the major portion of new project activity this year. In 1976, the Puerto Rican legislature approved a special bond issue that made \$30 million available to the Department primarily to match currently available Federal-aid funds. The Highway Authority's Five Year Priority Program includes projects whose right-of-way and construction costs total \$630 million. The total of Federal funds estimated to be available during that period is \$212 million or about one-third of the total cost.

Allocations, Obligations, and Expenditures.—Approximately 349 miles of primary, secondary, and urban projects have been completed since July 1, 1956, at a total cost of \$322 million of which \$165 million were Federal funds. About 36 construction projects were underway in 1977 involving about \$25 million of Federal funds.

Puerto Rico program progress is somewhat slow. Only about 78 percent of the FY 1976 noninterstate categories of funds have been obligated as of October 1, 1978. Most other States in the Nation have obligated 100 percent of their funds. Project development proceeds at an extremely slow pace. Reasons for this are varied and have included such factors as: the lack of a clearly defined Federal-aid program of projects, changing priorities, the lack of a well-established monitoring and project control system to assure timely initiation and completion of required actions, and the complexities of such Federal requirements as environmental impact statements and compliance with the Uniform Relocation Act, both of which are not routinely encountered on other than federally aided projects. During the 1973-74 period, when the Federal highway program was operating under restricted obligation levels as a matter of fiscal policy, the Commonwealth was concentrating on a large nonfederally aided program and was developing only a sufficient number of Federal-aid projects to utilize the limited Federal funds available. In 1975, when the restricted obli-

gational controls were lifted, the Department did not have any backlog of projects ready to use the large amount of money suddenly made available. This situation was followed by a tight Commonwealth financial situation and local matching funds were not available. In the absence of matching money to advance projects to construction, project development continued at a slow pace. That overall financial situation coupled with possible side effects caused by departmental reorganizations during a portion of that same time period may well have had a delaying effect on project development.

As reported in the NHIPS study, Puerto Rico's rural highway expenditures in 1975 dollars, for the period 1970-75 amounted to \$467,731,000 including Federal-aid obligations. This is about \$78 million a year for the 6-year period. Most of these funds were used for the toll road construction. Puerto Rico's apportionments and allocations for FY 1977 totaled about \$45 million which amount included about \$18 million for the transition quarter. As of September 30, 1977, Puerto Rico had an unobligated balance of Federal-aid funds of about \$46 million. An additional \$26 million in FY 1978 funds was made available for obligation October 1, 1977; as of October 1, 1978, the amount still available for obligation was \$54 million.

While the project development process has been lengthy, there are several large right-of-way and construction projects which are very close to being ready for authorization. These projects are estimated to involve approximately \$24 million in both urban and rural categories of Federal-aid funds. This activity should be helpful in stimulating the economy.

Other Federal Programs

Ferries.—The offshore municipalities of Vieques and Culebra are served by air and ferry service from the main island. The ferry system provides a vital passenger and cargo transportation link between the islands. Puerto Rico has taken advantage of the provision of 23 U.S.C. 129 and used about \$700,000 of rural secondary funds to purchase two vehicular/cargo ferries to be used between Fajardo on mainland Puerto Rico and the two offshore municipalities of Vieques and Culebra. The first of the two ferries was put into service on October 10, 1976, and the second was put into service on February 23, 1977. The Puerto Rico Ports Authority, part of the Puerto Rico Department of Transportation and Public Works, operates the ferries. Since a part of the desirable ferry routes lies within international waters, 23 U.S.C. 129 was amended by the Federal-Aid Highway Act of 1976 to permit these ferries to operate within international waters.

The two ferries purchased with Federal highway

funds replaced the two outmoded ferries previously in use. Since the new ferries have been in operation less than a year, it is not possible to ascertain the economic benefits accrued. It is known, however, that a faster, more reliable service has resulted with the new ferries in service.

Emergency Relief.—Heavy rains and flooding during 1970 resulted in Puerto Rico being declared a disaster area. That was the first time that Puerto Rico participated in FHWA's emergency relief program. Since that time, the island has suffered additional disasters. Damages due to excessive rains during October and November 1974 resulted in a disaster declaration which included 52 of Puerto Rico's 78 municipalities. Highway damage amounted to about \$1 million on the Federal-aid system and about \$10 million off the system. For all practical purposes, the offsystem repairs authorized under the Federal Disaster Assistance Administration's program have been completed, and the FHWA on-system emergency relief program has been authorized. Funding is with 100-percent Federal funds.

In September 1975, Puerto Rico was again subjected to extensive heavy rains from tropical storm Eloise. Flooding and highway damage was encountered throughout the island, especially in the southern and western zones. Puerto Rico was again declared a disaster area and the entire island was included in the declaration. Damage survey estimates indicated the amount of offsystem highway damage at about \$16 million and on-system highway damage at about \$7.3 million. Fifty bridges were destroyed or damaged to some extent. The regular deadline for completion of the offsystem repairs under the FDAA program was September 1977; however, FDAA granted some special extensions to December 1977. As for the ER program, about 50 percent of the anticipated projects have been finalized. All projects have been authorized except the bridge on Highway PR-102 which had to be redesigned and was therefore granted an extension of time by FHWA. Funding is with 100-percent Federal funds.

On June 30, 1977, bridge number 187 on Route PR-189 between Caguas and Gurabo collapsed. This was a major through-structure over the Rio Grande de Loiza. A temporary ford has been constructed. A new bridge is being designed as an ER project. Construction has been scheduled to commence in September 1979.

Traffic Safety.—Puerto Rico has an accident rate about twice the mainland average. In the period 1972-76, Puerto Rico's motor vehicle fatality rate (deaths per 100 million vehicle miles) lead the Nation, with the rate in 1976 standing at 6.41 compared with a national average of 3.30. (See table 1, appendix C.) However, Puerto Rico has made steady

progress in reducing fatalities utilizing the technologies and funding made available through the Highway Safety Act of 1966 and subsequent amendments. During the 1972-76 period, Puerto Rico has experienced a 28-percent decrease in fatalities (rate of 8.9 in 1972 to 6.41 in 1976). Although fatal accidents decreased in Puerto Rico between 1974-75 by 5.0 percent, nonfatal and property damage accidents increased by 6.0 and 6.4 percent, respectively.

The Highway Safety Standards under which Puerto Rico has built a coordinated highway safety program are described in table 2, appendix C. The safety construction programs established by the Highway Safety Act of 1973 also contributed to a significant degree to the reduction in fatalities. The status quo of these two programs is discussed below.

The Highway Safety Act of 1966 (sec. 402) provides Federal grants-in-aid to all States, Puerto Rico, and the District of Columbia which must be utilized in the development of highway safety programs through the Department of Transportation Safety Standards. The Standards, which offer a fairly wide latitude in the use of these funds, are currently under review. The proposed revision will offer the States and territories even more latitude in the use of these funds. Section 402 funds are apportioned to Puerto Rico by apportionment formula. Funds available to Puerto Rico under Sec. 402 are projected (in thousands of dollars):

1977	1978	1979	1980	1981	1982
1,107	1,540	1,817	1,967	2,067	2,317

Initially, Puerto Rico took good advantage of the safety construction programs established by the 1973 Highway Act; however, more recently project development has been quite slow. As of September 30, 1978, \$7.4 million in safety-category funds were available for obligation in the several safety related construction categories.

Safety construction projects can generally be developed with a minimum of project development time since many of the more time consuming activities, such as environmental impact statements and public hearings, are not required for these projects. Abbreviated plans and performance of the work by Commonwealth forces are also permitted. Safety improvement projects are quite often labor-intensive which would have a positive effect on the economy as well as the potential for reducing accidents, injuries, and fatalities.

The Puerto Rico Department of Transportation and Public Works has developed priority listings which support the need for safety construction and enable the Department to select those projects which have the greatest potential for accident reduction. What is needed is an organized approach to develop-

ing and implementing needed improvements; however, as of October 1, 1978, Puerto Rico had achieved 76 percent of its 1978 goals for safety obligations (\$4.6 million out of a total of \$6.04 million). Much of the money available in the safety construction categories is available at a 90 (Federal) to 10 (Commonwealth) matching ratio thereby requiring only a small investment of Commonwealth funds.

Economic Growth Center Development Highway Program.—Puerto Rico is utilizing the Economic Growth Center Development Highway (EGCDH) Program to balance the growth on the island. Previous growth has almost exclusively centered around San Juan. The growth centers that Puerto Rico has chosen to develop under the EGCDH Program are Aguadilla, San German, and Guayama. Aguadilla and San German are having sections of Route PR 2 widened with growth center funds; the San German project also involves construction (to expressway standards) of a new segment of PR 2. In both Aguadilla and San German, the highway will provide better commuter access to the central city and will provide better access to and from the local airport (aiding tourism). Improvement of Route PR 3, near Guayama, under the EGCDH Program, will help Guayama by improving connections with San Juan and Ponce. The Guayama project has not yet begun. The Aguadilla and San German projects are under construction. The Aguadilla Project has spent \$549,495.53 in Federal funds and completed 2.64 miles of reconstructed highway. The San German project has spent \$491,000 in Federal funds on resurfacing and widening. As of October 1, 1978, Puerto Rico has obligated its entire \$3,334,311 allocation. Use of the growth center funds should provide good impetus to economic growth in Puerto Rico.

Discussion and Conclusion

The absence of highway dollars is not the immediate problem, since there are over \$72 million of Federal-aid funds available for obligation. Of more immediate concern is the Commonwealth's ability to expend all of its available Federal-aid dollars in a timely manner so as to have the greatest impact on the island's economy. *To accomplish such a task will require stepped-up pace of project development.* While the project development process is a mix of both Federal and local actions, much can be done at the Commonwealth level to overcome the several causes of delay enumerated previously.

The Puerto Rican report cites Federal agencies' regulations and requirements as some of the reasons for the delay in the development of projects, and recommends that authority be given to the FHWA

division office for the processing of the Federal-aid highway program. The delegation of authority to FHWA's division office is quite broad and the Division Administrator already has approval authority for most aspects of the Federal-aid highway program. One significant area in which the Division Administrator does not have the delegated authority to take final action is concerned with environmental impact statements. The Division Administrator has authority to approve nonmajor action determinations and negative impact statements; however, environmental impact statements must be sent to FHWA's Regional office and sometimes to the Washington office for review and approval. This is consistent with operating procedures throughout FHWA. While this requirement for review and approval of EIS's at a higher level does add to the project processing time, not all projects require processing of an EIS. Many projects require only a nonmajor action determination or a negative impact statement. During the past 2 years, the Division office has been involved in approximately 166 environmental determinations. Only 13 of those actions involved environmental impact statements which require action at a higher level. Of the balance, 143 were nonmajor action determinations and the remaining 10 actions involved negative impact statements. Processing of environmental action does add to project processing time; however, *delays associated with such activities can be minimized or at least reduced* by more timely initiation and processing by the Commonwealth. Federal agencies should similarly strive to minimize review and approval time periods.

Coordination by the different Federal agencies at times can be a problem and there is something to be said for decentralization. However, this cannot always be achieved. The Puerto Rican report indicates that some modification is needed to expedite actions by the U.S. Coast Guard and the Corps of Engineers. To date, the permit requirements of these agencies have not been particularly burdensome to Puerto Rico nor have any significant delays been encountered. Of some 73 candidate projects in Puerto Rico submitted to the U.S. Coast Guard for review during the past 2 years, 61 were found not to require permits, 6 will require permits, and a final determination has not been made in the remaining 6 cases. To date, Puerto Rico has submitted applications on two of the six structures requiring permits. Both permits have been issued; however, the projects are still being developed.

Similarly, the Corps of Engineers permit process has not been a significant delaying factor. In the past 2 years only one project has required a permit from the Corps. That permit has recently been issued; however, the project is not yet ready to be advertised. While these permit requirements have not been

a significant delaying factor up until now, the potential for delay does exist. The possibility of such delays can be reduced by initiation of coordination early in the project development process. Federal agencies should continue to streamline permit procedures to minimize processing time.

Based on the above, we conclude that putting the already available Federal-aid highway dollars to use would help to alleviate the dismal unemployment picture. As pointed out previously, the obligation of these dollars would have an effective impact not only on the employment picture but on the total island's economy as well. Almost all contractors, subcontractors, and material suppliers operating in Puerto Rico are local firms. On occasion, a mainland contractor comes to Puerto Rico for a specific project, but by and large, the highway program is carried out by the island's contracting industry. The labor force, both skilled and unskilled, of the local industry is almost all Puerto Rican. Increased highway construction activities would, therefore, impact individuals well-being as well as the overall economy of the island.

URBAN TRANSPORTATION

Introduction

This chapter deals with Puerto Rico's urban transportation system, the demands placed on it, its performance, and local plans for improvement. The chapter will define the status of Puerto Rico and its urban areas in the current Federal programs for urban transportation assistance, summarize available data concerning the use and effectiveness of existing urban transportation infrastructure and services, and report local plans for system improvements.

Status of Puerto Rico Under Federal Urban Transportation Assistance Programs

For both the highway programs of the Federal Highway Administration (FHWA), under Title 23 U.S.C., and the transit programs of the Urban Mass Transportation Administration (UMTA), under 49 U.S.C. 1601 *et seq.*, the term, "State," is defined to include Puerto Rico. Given this status, assistance is available to Puerto Rico under the following programs:

Highway Programs

Interstate System.—Puerto Rico has no mileage designated for the Interstate system.

Primary System.—Puerto Rico has 181 miles of arterial routes designated as urban extensions of the primary system and receives an apportionment of

funds under the formula based on land area, rural population, rural and intercity mail routes, and urban area population.

Urban System (FAUS).—Puerto Rico has designated 355 miles of arterial and collector routes; funds are apportioned on the basis of urban area population (over 5,000) and do not need to be spent on the designated system.

Metropolitan Planning (PL).—One-half of one percent of highway fund apportionments under 23 U.S.C. 104 is distributed to the States on the basis of urbanized area population (areas with population over 50,000) for performing urban transportation planning in such areas.

Highway Planning and Research (HPR).—One and one-half percent of funds apportioned to a State under 23 U.S.C. 104 is available only for planning or research activities including planning of future highway programs and public transportation and appropriate research or demonstration projects. An additional ½ percent is available for the same purposes upon request of the state.

Mass Transportation Programs

Section 3 Capital Assistance.—This is a discretionary program limited to capital investments under which applications from Puerto Rico are considered along with those of other applicants.

Section 5 Formula Assistance.—Each urbanized area (over 50,000 population) receives an apportionment based on a formula that considers population and population density. Each of Puerto Rico's four urbanized areas receives an annual section 5 apportionment that remains available for 2 additional years. Because of the population density weighting factor in this formula, Puerto Rico areas receive the highest per capita allocations under this program. Funds under this program can be used for either capital investments or operating costs, and are the only Federal funds which can be used for regular transit operations.

Section 9 Planning Assistance.—Although this is a discretionary program, UMTA informally allocates the funds among States and urbanized areas, including Puerto Rico, on a formula considering population, number of transit dependents, and special planning study needs.

Section 10 Grants for Training Programs.—Authorizes the Secretary to make grants to States, local public bodies, and agencies thereof to provide fellowships for training of personnel employed in managerial, technical, and professional positions in the public transportation field.

Section 16 Planning and Design of Mass Transportation Facilities To Meet Special Needs of the Elderly and the Handicapped.—Provides that special efforts shall be made in the planning and design

of mass transportation facilities and services so as to make these facilities available to the elderly and handicapped. In addition to grants and loans otherwise provided under the UMT Act, section 16(b)(2) authorizes the Secretary to make grants and loans to private nonprofit corporations and associations for the specific purpose of assisting them in providing transportation services that meet the special needs of elderly and handicapped persons. Section 16 also provides that 2 percent of the amount authorized to be appropriated for section 3 capital grants and section 8 planning and technical studies, may be set aside for transportation programs and activities to serve the elderly and handicapped. In addition, 1½ percent may be set aside to finance research, development, and demonstration projects.

The Federal-aid highway funds available to Puerto Rico for construction require a 30-percent State/local share of project cost while transit funds used for planning or capital projects require a 20-percent local share. Section 5 funds used for operating costs of transit must be matched at least on a 50 to 50 basis and are subject to a maintenance-of-effort requirement. The Primary and Urban System funds can be used to finance highway related public transportation improvements such as fringe parking, bus shelters, exclusive lanes or facilities for preferential access, pedestrian and bicycle facilities, and traffic operations improvements on, or serving, one of the designated Federal-aid routes. In addition, Urban System funds can be used for improvements without regard to a designated system, including purchase of buses or rail rolling stock or construction of new transit facilities.

Table 1 summarizes the status of funds available to Puerto Rico under the various assistance categories described above. During the years 1973-76, the Commonwealth was slow in making use of its highway funds and had not placed much demand on the transit capital assistance program. It has made full use of the section 5 formula grant funds available to San Juan, but until recently it had not used any of the formula funds available to the other three urbanized areas. This overall pattern of fund use probably results from the severe resources constraints faced by the Commonwealth and local priorities as to the use of the available local funds. This is an understandable dilemma frequently faced by other States and cities, especially during periods of economic hardship. It might be worth considering developing a mechanism which would allow a reduction in the local matching share, or its suspension entirely, when local conditions meet some criteria. Such a mechanism would require statutory changes to current program requirements. The Commonwealth study suggested that its slow use of funds is the result of FHWA's and UMTA's organizational

Table 1.—Status of Federal Urban Transportation Funds Available to Puerto Rico, FY 1976–78

[In thousands of dollars]

Program category	Obligated during FY 1976	FY 1977 apportionment	Total available for OB. 10/1/1976	Obligated during FY 1977	FY 1978 apportionment	Total available for OB. 10/1/1977
Highways:						
Consolidated primary (urban and rural) _____	496	10,589	10,093	2,456	10,787	18,424
Urban extension _____	262	—	2,694	1,079	—	1,615
Urban system _____	618	7,322	26,319	15,460	7,433	18,284
½ percent planning _____	263	246	199	199	246	246
1½ percent planning and research _____	304	319	327	327	319	319
Transit:						
Section 3, capital _____	918	NA	NA	0	NA	NA
Section 5, formula _____	4,952	8,468	11,729	7,427	10,097	14,399
Section 9, planning _____	460	NA	NA	455	NA	NA

and review structure. While in some particular cases this structure may result in added procedural steps and some delay, the same requirements apply to all other States and therefore could not account for any special problems in Puerto Rico.

Urban Areas and Population Growth

Until the mid-1940's Puerto Rico was an agricultural economy. It then began the change to an industrial economy, stimulated by, among other things, aggressive public policies to encourage growth and industrial development. These policies have resulted in substantial increases in gross product and annual family income and have been accompanied by rapid urbanization of the island's population. Between 1940 and 1950, the proportion of population that was urban (using the 5,000 cutoff of the highway program instead of Bureau of the Census' cutoff of 2,500) leaped from 26 percent to 36 percent, and by 1970 it had grown to 53 percent.

In the 30 years between 1940 and 1970, the population of Puerto Rico grew at a slightly lower annual rate than the United States as a whole (1.25 percent vs. 1.45 percent), reaching 2.7 million. Since 1970, however, it has been growing at a faster rate than the United States, and reached 3.2 million in 1976. Based on the 1970 census, Puerto Rico has four urbanized areas (over 50,000) with 40 percent of the island's population: San Juan, Ponce, Mayaguez, and Caguas. There are also 32 other urban areas that meet the highway program threshold of 5,000, accounting for 13 percent of total island population. Table 2 summarizes the size and growth of these areas and the accompanying map shows their distribution on the island.

Governmental Responsibilities for Transportation

Within the governmental and administrative structure of Puerto Rico, nearly all the planning development and operational functions relating to urban transportation are the responsibility of the Common-

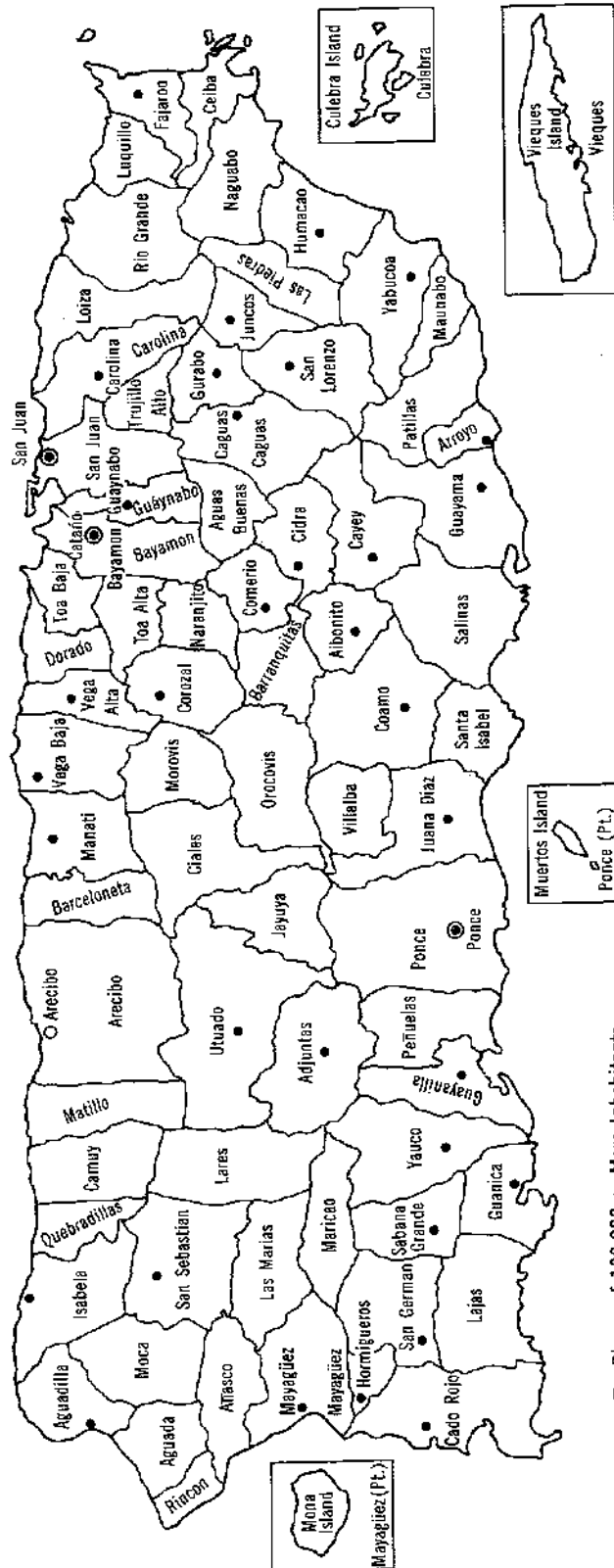
Table 2.—Population and Urbanization Trends in Puerto Rico

	1960	1970	Percentage change
United States:			
Total population (in millions) _____	179	203	13
Urban population (over 5,000 in millions) _____		143	
Puerto Rico:			
Total population (in thousands) _____	2,350	2,712	15
Urban population (over 5,000 in thousands) _____	929	1,430	54
San Juan _____	542	820	51
Ponce _____	114	128	12
Mayaguez _____	59	70	19
Caguas _____	not a UZA	66	NA
Places (number of places):			
25,000–50,000 _____	61 (2)	35 (1)	
10,000–25,000 _____	79 (5)	172 (11)	
5,000–10,000 _____	79 (11)	138 (20)	

wealth Government. The entire Commonwealth is divided into a total of 78 municipalities, "municipios," each of which has one town or city which is its seat of government. The municipality is governed by an elected mayor and council. These local governments have general responsibility to regulate street and curb space, control traffic, enforce parking, and safety. Primary responsibility for transportation planning, programing, and development is held by the Puerto Rico Department of Transportation and Public Works (DTPW). This department is also responsible for maintenance and traffic control of most of the highway system. It is formally designated by the Governor as the agency responsible for "continuous, cooperative and coordinated urban transportation planning" for each of the four urbanized areas of Puerto Rico. In order to meet its responsibilities as the designated Metropolitan Planning Organization (MPO), the DTPW has established a Policy Committee for each urbanized area consisting of the heads of all Commonwealth agencies with transportation responsibilities and the mayors of all municipalities comprising the urbanized area. The DTPW Office of Transportation serves as the technical staff for the MPO.

Puerto Rico has three transportation operating

Municipalities in Puerto Rico



- Places of 100,000 or More Inhabitants
- Places of 50,000 to 100,000 Inhabitants
- Places of 25,000 to 50,000 Inhabitants Outside SMSA's

agencies which are organized as public corporations, but contained within the structure of the DTPW. They are the Metropolitan Bus Authority (MBA), which operates bus transit service within San Juan; the Ports Authority, which operates and develops the port and provides a ferry service across San Juan; and the Highway Authority, which plans and develops the island's highway system. Traffic control on State highways is the responsibility of the Department. Urban streets are under municipal control. The Public Service Commission is an executive department which regulates all privately owned public passenger carriers throughout the island, including publicos, taxis, and private bus lines. Its regulatory responsibility covers entry into service, equipment and safety standards, insurance, fares, schedules, routes, and, for buses, accounting practices and service supervision. It is also responsible for enforcement of its regulations.

The Puerto Rico Planning Board (PRPB), part of the Office of the Governor, is a planning agency for the entire island, with responsibility for coordinating all public investment in infrastructure through annual preparation of a 4-year capital improvement plan. In addition to this tool for coordination, zoning regulations are being drafted to give the PRPB additional effectiveness in enforcing its land use plans. The PRPB has been designated as the area-wide clearinghouse and review agency for all federally assisted projects in accordance with OMB Circular A-95.

Regional Development Policies

For some time the PRPB has been pursuing policies calling for islandwide decentralization of industrial employment, preservation of existing agricultural land uses, and accommodation of population growth within the present urban areas through high density development of vacant or underutilized land. These policies formed the guidelines and criteria for extensive transportation and land use studies in 1964-67. The 1971-73 update study found, however, that these objectives were not being met to the extent that had been assumed in the earlier study.

San Juan Urbanized Area

San Juan, the capital city of Puerto Rico, is the business, trade, cultural, and educational center of the island, the government seat, as well as a major tourist center. An increasing portion of the island's economic growth, employment, and population are concentrated in the San Juan area.

Geographic Development.—The ocean, bay, and lagoon on the north, and the mountain range on the south have concentrated development into well de-

fined corridors and produced four major activity centers along a central spine of about 9 miles length rather than a single concentrated central business district. These centers contain about 30 percent of the area's jobs. Two other centers have developed about 6 miles to the east and west of the bottom of this spine. Most retail and office activities are located in these six centers or along the road connecting them. They contain only 15 percent of the area's population, since residential development has occurred primarily as relatively dense multiple units on previously undeveloped land in outlying portions of the area. Industrial and wholesale activities are scattered throughout the area.

Demography.—The San Juan urbanized area has an aggregate average population density of 8,004 persons per square mile, highest of all the 279 urbanized areas. (New York is next with 6,683.) But this number obscures the real difference between San Juan and the mainland cities: San Juan has a central city density comparable to, but lower than, some of the large mainland cities, while its suburban densities are much higher than in mainland cities where the vast areas and lower densities dilute the aggregate average density for the entire urbanized area. In effect, San Juan is a relatively compact area with much greater uniformity of density than in mainland cities. For example:

Urbanized area	Central city density	Aggregate density
San Juan	12,138	8,004
New York	26,343	6,683
Chicago	15,126	5,227
Philadelphia	15,164	5,349
San Francisco	15,764	4,387
Boston	13,936	3,992
Washington, D.C.	12,321	3,983
Detroit	10,953	4,553

Although its densities are higher, the pattern of new residential development occurring on the fringes of the current urban area—often called sprawl—is the same in San Juan as in typical mainland cities. Between 1960 and 1970 San Juan's urbanized land area increased at a greater rate than its population (60 percent vs. 51 percent), resulting in a decline in average density from 9,236 to 8,004. In the 1973 transportation study update it was pointed out that this pattern of development represented a departure from the planning policies that had been used in developing the 1967 plans and the 1971 master plan, but the consultants responded to this by simply updating the base data to reflect the actual trends and then reapplied the same policy assumption for pro-

jecting future development. There is currently no evidence that these policies have been more effective since 1970 than they were before 1970.

In 1969, median family income in San Juan was \$6,750 (in 1975 dollars) compared with \$15,000 for all U.S. urbanized areas, leaving over 40 percent of the Puerto Rican families below the official poverty level compared with 8.5 percent in the United States. However, between 1959 and 1969, real income grew significantly faster in Puerto Rico (4.5 percent per year) than on the mainland (2.8 percent), indicating progress in catching up with the mainland.

Auto ownership has been increasing rapidly over the past 15 years in step with general economic conditions and growing real income. Nevertheless, the measure of persons-per-vehicle is still higher in Puerto Rico than the U.S. average and the proportion of households with no auto availability (43 percent) is higher than any mainland city (New York = 38 percent, Philadelphia = 26 percent, Chicago = 26 percent, Boston = 25 percent, Washington, D.C. = 20 percent, Atlanta = 16 percent).

Travel Analysis.—As would be expected from the income and auto ownership growth, the average number of daily trips per capita has been increasing as well. When combined with the additional travel resulting from population growth and sprawl, San Juan's total travel demand has increased dramatically:

	1964 study	1970 study
Total daily internal person trips....	1,128,000	1,531,000
Population	695,000	890,000
Trips per capita	1.62	1.72

This represents a lower level of travel per person than in similar-sized mainland cities, although it is not surprising given the relative levels of real income. The estimated modal split of average daily trips (1976) shows:

	Travel per person	
	Daily	Percentage
Private auto	1,586,800	82
Public bus	157,000	8
Publico	150,000	8
Ferry	6,200	—
Taxi	40,000	2
Total	1,940,000	100

Road Network.—The major road network of San Juan has evolved to link the major activity centers as they have developed. The 1975 highway mileage consisted of 91 miles of principal arterials, 89 miles of minor arterials, 115 miles of collector roads, and 899 miles of local streets. Between 1964 and 1970, there was a 20-percent increase in the number of auto driver trips within the 1964 study area, but it is not clear whether this additional demand was accommodated through excess capacity, new capacity, or a deterioration of the level of service for all highway users. The 1967 Transportation Study calculated volume/capacity relationships for five major traffic corridors. This measure defined capacity as the flow that could occur when traffic averages 50 mi/h and produced an overall ratio for all corridors of approximately 1.5 (more pronounced for north-south travel than for east-west). When similar calculations were made for 1970 it was determined to be more realistic to define capacity at a lower level of service—25 mi/h—but ratios exceeding 1.0 were found at nearly every measuring point. Since this is actual data and the traffic was actually carried on the highway, the significance of the ratios is that the performance of the highway system i.e., average speed and smoothness of flow is less than might be desired. These measures can be taken as evidence of congestion on the highways, even though it would be preferable to have a more direct and comparable measure of how bad this congestion is and whether it is getting worse.

Public Transportation.—Public transportation service in San Juan consists of:

- Metropolitan Bus Authority scheduled bus service on 52 fixed routes covering 843 route miles with a fleet of 410, 45-passenger buses;
- approximately 2,000 publicos, privately owned and operated vans and passenger cars, operated on semifixed routes and variable schedules for a fixed fare;
- a small number of private bus companies;
- passenger ferry service across San Juan between Catano and Old San Juan; and
- about 4,000 vehicles providing conventional taxi service.

These public transportation services accommodate a substantially higher proportion of total travel in San Juan than in mainland cities; the role of publicos in carrying as many passengers as the regular bus system is especially significant. Despite a relatively constant level of service in total bus miles and the extension of service to cover one of the fastest

growing centers MBA ridership has declined substantially from its 1966 peak:

Fiscal year	Total bus miles	Passenger trips	Trips per bus mile
1960	11,248,000	60,342,000	5.4
1963	12,885,000	65,871,000	5.1
1966	13,471,000	65,602,000	4.9
1969	14,341,000	64,752,000	4.5
1972	13,665,000	47,109,000	3.4
1973	13,860,000	45,094,000	3.3
1974	13,533,000	45,000,000	3.3
1975	13,248,000	42,864,000	3.2
1976 ¹	11,544,242	38,300,407	3.3
1977 ²	11,694,460	34,662,184	3.0

¹ 10-day strike.

² 49-day strike.

Most of the bus routes wander around residential neighborhoods and then feed into the corridor of the spine, in which a system of exclusive bus lanes has been established to facilitate bus operations and increase their speed. Systemwide average bus frequency was 23 minutes and average bus speed was around 12 mi/h in 1974. There is some indication this has fallen to 10 mi/h more recently. Bus frequencies and schedules are often irregular because driver absenteeism or bus maintenance problems keep at least 25 percent of the fleet out of service, sometimes rising to 35 or 40 percent. Climate, poor performance of maintenance and driver personnel, and lack of a preventive maintenance program have limited the average service life of a bus to 10 years. UMTA Section 3 Capital Grant funds have been used to purchase new buses and to construct a new \$11 million maintenance facility, now nearing completion.

Non-MBA buses generally serve trips entering or leaving the San Juan area, although there is one bus line operating between Bayamon and Santurce. In 1964, about 45,000 passengers per day were using private buses; the 1976 data shows this has fallen to fewer than 10,000 passengers per day.

The Catano ferry has a running time of 12 minutes and a frequency of 15 minutes for its passenger service across San Juan Bay. Daily passengers totaled approximately 6,200 in both 1964 and 1976. UMTA Section 3 Capital Grant funds have been used to purchase new ferryboats and to improve the terminals. This service connects with MBA buses at both terminals.

Publicos are licensed by the Public Service Commission to carry passengers for set fares on a specific route and are not authorized to travel other routes. Approximately 9,500 publico vehicles are registered and active on the island; about 2,000 operate only within San Juan and an additional 800 serve trips going into and out of the area. These

vehicles provide nearly all of the intercity public transportation available on the island, as well as extensive service within the San Juan area. Between 1964 and 1976 publico passenger trips within the respective study areas increased more than 25 percent, perhaps accounting for some of the decline in MBA passengers:

	Daily publico passenger volumes	
	1964	1976
Internal	87,100	112,000
External	40,400	38,000

The primary destination points for publico service are the three retail or industrial centers forming the east-west corridor at the bottom of the spine. Except for some intercity routes, publicos are not allowed to operate along the major north-south spine in competition with MBA service. The east leg of the corridor has heavy bus usage as well as heavy publico usage. In practice publicos tend to operate on semifixed routes, deviating slightly from their approved route to drop off or pick up passengers by prearrangement. They have no fixed schedule and predominately pick up and discharge passengers at established terminals located in the major centers. The vehicle—as large as a 12-passenger van—normally waits at a terminal until it is filled or nearly so, but because of the extensive usage waiting times (except in late evenings) are rarely more than 10 or 15 minutes—not dissimilar to MBA bus service and probably just as reliable.

Publico fares are about the same as bus fares, but since they operate entirely from the fare box they tend not to operate during periods of light demand. Freedom from public subsidy makes publicos an attractive urban transportation option; the major drawback is an inability to compel the provision of service during periods of light demand or to areas of light demand. Publicos also represent a major source of employment and income.

Urban Transportation System Analysis.—San Juan and Commonwealth officials have been continuously assessing opportunities to improve the performance of the highway system and transit services and to anticipate future travel requirements. A major transportation and land use study in 1967 recommended 27 miles of rail rapid transit routes and a “super grid” of new freeways (75 miles) and expressways (50 miles), for a total investment of \$638 million for highways and \$281 million for transit (in 1966 dollars). The 1973 report updating the 1967 study took the 1967 transit recommendation as given, took account of actual trends between 1964 and 1970, applied some revised criteria, and

recommended a revised highway improvement program totaling \$2.7 billion (1972 dollars). The cost estimate for the transit investment had increased to about \$900 million.

In October 1976, a report was submitted to UMTA detailing additional studies that had been done concerning the rail transit proposal in response to UMTA's requirement for alternatives analysis in support of major new transit investment proposals. This report recommends implementation of an initial set of transit improvements consisting of a 14.9-mile rapid transit line, 7.2 miles of new exclusive busway, restructured and upgraded bus service, parking controls and pricing to encourage system usage, and restructured land use policies. Its total cost would be \$584 million (in 1975 dollars).

In addition to these planning activities, San Juan has actively implemented transportation system management actions to increase the capacity and efficiency of existing transportation facilities. Its network of exclusive bus lanes represented an early demonstration of this concept and proved its potential for improving bus system performance and the total people-moving capacity of the system. MBA has recently been implementing internal management actions to improve equipment maintenance and scheduling, although it is still plagued by absenteeism and other personnel difficulties.

A number of other possible actions have been identified in various studies but have not been fully implemented. For example, street congestion could be substantially dispersed if existing enforcement of parking restrictions were stepped-up or if additional restrictions were imposed to improve street traffic flow. Local officials have argued that it is not feasible to attack parking problems unless substantial transit service improvements are made at the same time. In addition, several years ago conversion of the old structure of transit routes into a system of trunk and feeder lines was proposed to eliminate route duplication and reduce excess trip lengths. This has not been implemented, although it continues to be under study and further development. In addition, further action is needed to improve MBA's equipment maintenance, service reliability, and overall productivity.

Financial constraints apparently hamper the Commonwealth's ability to make urban transportation investments of the magnitude proposed in the various studies cited above. Recent submissions have suggested that the highway plans have been scaled back and high priority is put on an initial increment of rail transit. Although transit planning has progressed steadily, there is still a substantial amount of additional data to be developed and preliminary engineering that would be necessary to bring these plans to the decision point with respect to Federal funding

under section 3. Local decisions would also be required concerning the source of local matching funds for the initial investment and for the prospective operating deficits under the proposal. Additional evidence may also be needed of local ability to coordinate and manage such an undertaking, including tangible action to implement and enforce the supporting policy actions that are an integral part of the package.

Other Urban Areas

Ponce is Puerto Rico's second largest urbanized area, with a population of 128,233 in 1970. It is located on the southern coast of the island, 64 miles from San Juan. It has 21 miles of principal arterial highways, 22 miles of minor arterials, 14 miles of collector, and 151 miles of local roads. The only public transit service consists of a fleet of 1,350 publicos and taxis. Of these vehicles, 495 provide local service on 15 routes, 155 provide rural service on 27 routes, and 701 provides intercity service on 24 routes. The transportation planning study completed in 1973 recommended establishment of a fixed-route bus system and \$153 million in highway improvement. A feasibility study for a Ponce Metropolitan Area Bus Transportation System, prepared with funds from UMTA and FHWA, recommended that a public transportation system be implemented in three phases over a period of 13 years, with bus service to be introduced by 1985. Based on UMTA-assisted planning studies, the local Transportation Improvement Program (TIP) provides for specially equipped vehicles for the elderly and handicapped, bus shelters, and the construction of a terminal for publicos and taxis.

Mayaguez is an urbanized area of 69,558 population located on the coast at the extreme western end of the island. It has 17 miles of principal arterials, 15 miles of minor arterials, 19 miles of collectors, and 139 miles of local roads. A fleet of 725 publicos provides the only public transportation service. Its 1973 planning study recommended establishment of a fixed-route bus system and \$104 million in highway improvements. The area's TIP includes transit project only for shelters, a special vehicle for elderly and handicapped, and construction of a terminal for publicos and taxis.

Caguas, with an urbanized area population of 65,844, is located 22 miles south of San Juan. It has 18 miles of principal arterials, 13 miles of minor arterials, 17 miles of collectors, and 110 miles of local roads. Public transportation service is provided by 9 private bus lines operating 111 vehicles on 26 routes and 530 publico vehicles serving 25 routes. UMTA recently approved the use of section 5 funds for the construction of a terminal for publicos and

taxis and purchase of special vans for provision of service to the elderly and handicapped.

UMTA section 9 planning funds are being used by the Commonwealth to assess transportation requirements in the other urban areas of Puerto Rico, especially the needs of the elderly and handicapped.

TRANSPORTATION—SUMMARY AND CONCLUSIONS

Methodology and Format

As enumerated in chapter I, the transportation problems identified by the Commonwealth were grouped into three categories, of which two involved multiple transportation modes and functions. The Federal Transportation Sector study team consisted of individuals who were experts in certain modes or programs. For purposes of analysis, subgroups of the study team examined the initial problems and related issues along modal or program lines. Their indepth findings resulted in the structure of the text in chapters II through VI. In this chapter we synthesize the highlights of the previous chapters to correspond to the initial problem definition.

Transportation Problems Identified by the Commonwealth

Providing Transportation Facilities.—We found that during the period 1973–76 there was a persistent lag in expenditures of available Federal assistance grants for construction of airports, highways, and urban transportation systems. Plausible reasons for these lags were examined in detail in the preceding chapters. Some of the past causes of failure to use available grants no longer apply, and recently there has been an increase in the rate of obligations, but it is not certain that this will be sustained. The critical elements needed for using these grants are timely project development and the availability of matching funds.

In view of the sometimes complex requirements for Federal assistance projects, systematic planning and controls must be employed to meet project development schedules. However, we did not find that Federal requirements were an inordinate burden. Project development also requires stability of plans, which can be disrupted by organizational changes and policy changes. Facilities and employment foregone when changes are contemplated should be recognized as a cost. We did not find that resources for project development, including planning grants, were inadequate. However, one possible Federal option for accelerating the use of the construction grants would be the temporary infusion of additional resources for project development.

The availability of matching funds has been a problem, but it does not fully account for spending lags. It is significant that lags also occurred in the disaster relief program which is 100-percent federally funded. A case can be made that economically depressed regions, as defined by some objective criteria, should obtain relief from matching fund requirements. This could be implemented either by a statutory waiver or by allowing the use of economic development program funds for meeting the statutory matching requirements. In considering this possible option, the complex issues of equity must not be oversimplified. For instance, the limited availability of revenues for matching shares may result, in part, from tax policies designed to induce industrial development.

We found that there is a substantial potential for accelerating the initiation of constructing transportation facilities. In addition to enhancing transportation service and improving traffic safety, accelerated spending would stimulate employment in the construction sector, and aggregate demand through a multiplier effect. A more thorough discussion of the magnitude of this potential is found in the Housing and Construction Sector report.

Passenger Service for Tourism.—The Commonwealth is seeking additional air service to the U.S. mainland and Europe in support of its tourism sector. There appear to be air carriers who are willing to provide additional service, at least on a trial basis. The Civil Aeronautics Board has opened investigations of the adequacy of air service to Puerto Rico. This process is rather protracted and may take some time. The only option may be an appeal to the CAB to accelerate the investigation.

The Commonwealth also recommended that the cabotage laws be waived so that foreign passenger ships could serve the U.S. mainland–Puerto Rico route. We found no evidence that this would have any substantial beneficial effect on Puerto Rican tourism.

Ocean Freight Rates.—Ocean freight rates are a significant component of the Puerto Rican cost of living and of the delivered cost of Puerto Rican exports. In spite of an experiment with a Commonwealth-owned shipping monopoly, PRMSA, freight rates have risen alarmingly. The basic cause of the rate increases was rising cost of input resources, especially fuel. PRMSA was unable to achieve potential reductions in the unit cost of shipping. Low utilization rates with high fixed costs are a feature of the structure of Puerto Rican trade. Institutional limitations on capital investment funds prevented PRMSA from achieving economies embodied in the best available technology of shipping. Even with the disestablishment of PRMSA, an immediate solution to

increasing freight rates is not in sight. Exemption from cabotage laws and eligibility for subsidy and mortgage guarantee and tax deferral programs were considered for their potential impact on freight rates.

Our analysis agrees with that of the Commonwealth regarding exemption from cabotage laws. The entry of foreign ships in the trade would not provide a lasting remedy. Mortgage guarantees and tax deferrals, although not appropriate for PRMSA, have not induced private new ship construction embodying up-to-date technology.

The only option would be to make Puerto Rico, and possibly other noncontiguous areas, eligible for subsidized vessel participation. Participating vessels would not be eligible for other domestic trade, but they would have the flexibility of engaging in foreign trade. We can only speculate about the private sector's response to such a policy change.

Additional Transportation Problems Identified in This Study

Port and Navigation Systems.—The adequacy of port and navigation systems is related to the issue of freight rates because it affects the cost of delivery. The value of delays or losses must be absorbed. Physical constraints on the size of vessels limit the ability to obtain the significant economies available to larger ships. The elements of port and navigation systems are discussed, since a deficiency in any element can limit the capacity of the system. Because of the impracticability of forecasting oceanborne commerce, the adequacy of Puerto Rico's ports was not determined. It would be appropriate for the Port Authority to develop a port and navigation system plan, using the analytic framework of this study and the ancilliary data provided. Inputs from the private port sector would be available through the island's overall planning process. This study identifies Federal programs for planning grants, improvement grants, and direct agency participation.

One specific problem did emerge. The vessel casualties in the approaches to the private ports of the southern coast indicate that tank vessels are operating at the margin of safety for the given physical

configuration and aids to navigation. This is a complex subject and one in which national policies are in a state of flux.

Trade Disruption Due to Labor Dispute.—During the course of this study, the Nation experienced a major strike of dock workers. This demonstrated the vulnerability of Puerto Rico to this kind of disruption. Although dockworkers in Puerto Rico returned to work under a Temporary Restraining Order, cargoes for Puerto Rico were not loaded at mainland ports. No effective legal remedy was found. Our recommendation is that the Commonwealth seek a voluntary commitment from the unions, on humanitarian grounds, to limit the stoppage of its vital trade in any future strikes.

Shipbuilding and Repair.—The Sector Study team examined the potential for expanding this industry as an element of transportation systems and as part of the general industrialization of the Puerto Rican economy. The prospects of increasing employment in shipbuilding and repair were analyzed and found to be marginal. The potential is somewhat diminished by the need to rely on imported materials, but success would depend on the identification of a reliable market segment. The cyclical nature of general market demand for this industry would make a large capital investment a risky venture.

Air Cargo Service.—At the outset of this study, the need for additional air cargo service between Puerto Rico and Latin America was identified as a problem. A recent Civil Aeronautics Board ruling approved expanded service, using Boringuen Airport, for a 7-year trial. This situation should be monitored during the trial period.

Marine Aids-to-Navigation.—All weather electronic aids-to-navigation are currently only marginally adequate in the Greater Antilles. Marine traffic, including oil tankers, is increasing through the area. Present plans do not include coverage by the system (LORAN C) which is being mandated for other U.S. coastal waters. The Coast Guard is reviewing the need for additional electronic aids in this region.

Appendix A.—Aviation Service

Table 1, Appendix A
San Juan Service from Major U.S. Cities—April 1977

	Weekly direct nonstops		Weekly direct one-stops	
	Number	Carrier(s)	Number	Carrier(s)
Atlanta, Ga.	14	EA	—	—
Baltimore, Md.	7	EA	—	—
Boston, Mass.	7	EA	7	EA
			1	AA
Chicago, Ill.	7	EA	7	EA
Cleveland, Ohio	—	—	7	EA
Dallas, Tex.	—	—	—	—
Denver, Colo.	—	—	—	—
Detroit, Mich.	—	—	7	EA
Hartford, Conn.	—	—	7	EA
Houston, Tex.	—	—	—	—
Los Angeles, Calif.	—	—	9	DL
Miami, Fla.	35	EA	—	—
	2	PA ¹	—	—
Minneapolis, Minn.	—	—	—	—
New Orleans, La.	9	DL	7	EA*
New York, N.Y.	38	EA	—	—
	39	AA	—	—
Orlando, Fla.	—	EA	—	—
Philadelphia, Pa.	14	EA	7	EA
			6	AA*
Phoenix, Ariz.	—	—	—	—
Saint Louis, Mo.	—	—	—	—
San Francisco, Calif.	—	—	—	—
Seattle, Wash.	—	—	—	—
Washington, D.C.	7	AA	—	—

¹ PA will provide 4 weekly flights effective May 20, 1977. OAG, April 1, 1977.

² Effective May 1, 1977, OAG, April 1, 1977.

³ AA will provide 7 weekly one-stop flights effective June 9, 1977.

Source: Government of Puerto Rico, Carib. Area Service Investigation, Docket 30697.

Table 2, Appendix A

Direct service—(North American)	
Antigua, W.I.	New York
Atlanta, Ga.	Philadelphia
Baltimore, Md.	Guadeloupe
Barbados (BA)	Haiti
Boston	Trinidad and Tobago
Chicago	St. Croix
Cleveland	St. Martin, Neth. Ant.
Curacao, Neth. Ant.	Virgin Islands (St. Thomas)
Detroit	San Francisco
Martinique	Santo Domingo, Dom. Rep.
Hartford, Conn.	Toronto, Ontario
Los Angeles	Tortola, BVI
Mexico City	Virgin Gorda
Miami	Washington, D.C.
New Orleans	
Direct service to San Juan (other international service)	
Barranquilla, Colombia	Madrid
Bogota, Colombia	Paris
Caracas	San Jose, C.R.
Frankfurt	San Salvador, E.S.
Guayaquil, Ecuador	Santiago, Chile
Lima	Zurich
Lisbon, Port.	
Connections—North America	
Acapulco	Memphis
Akron	Milwaukee
Albany	Minneapolis/St. Paul
Allentown	Montreal
Birmingham	Nashville
Charleston, S.C.	New London, Conn.
Charleston, W.Va.	Norfolk, Va.
Charlotte, N.C.	Omaha
Cincinnati	Ottawa
Columbia, S.C.	Phoenix
Columbus, Ohio	Portland, Ore.
Dallas/Fort Worth	Providence, R.I.
Dayton, Ohio	Puerto Vallarta
Denver	Raleigh, Durham
Des Moines	Richmond
Evansville, Ind.	Roanoke
Ft. Wayne	Rochester
Greensboro, N.C.	St. Louis, Mo.
Guadalajara	Salt Lake City
Houston	San Antonio
Huntington, W.Va.	San Diego
Indianapolis	Seattle
Jacksonville	Syracuse
Kansas City	Tampa
Las Vegas	Toledo
Louisville, Ky.	Tucson
Macon	
Other international	
Amman, Jordan	London
Amsterdam	Manila
Athens	Medellin
Barcelona	Milan
Berlin	Nice
Buenos Aires	Oslo
Cochabamba, Bol.	Panama City
Cologne, F.R.G.	Quito, E.
Copenhagen	Rio de Janeiro
Dusseldorf	Rome
Geneva	Santa Cruz, Bol.
Hamburg	Sao Paulo, B.
Helsinki	Tel Aviv
La Paz	Vienna
Lisbon	

Source: Official Airline Guide, Worldwide and North Atlantic Ed., July 1977.

Table 3, Appendix A
Present Air Service in the 20 Largest San Juan Markets

Rank	Market	Passenger miles (1975)	Passengers (1976) ¹	Carriers providing nonstop service	Carriers providing onestop service
1	New York	1,981,419,140	1,251,460	2	0
2	Chicago	210,757,750	104,500	1	1
3	Philadelphia	186,534,800	121,320	1	2
4	Miami	161,776,430	156,270	2	0
5	Boston	118,456,800	71,420	1	2
6	Los Angeles	99,460,200	31,970	0	1
7	San Francisco	61,659,000	17,860	0	0
8	Washington, D.C.	55,177,920	37,970	1	0
9	Hartford	54,686,450	31,560	0	1
10	Orlando	50,484,940	41,500	1	0
11	Baltimore	49,125,390	28,240	1	0
12	Cleveland	37,645,920	20,010	0	1
13	Atlanta	30,577,260	20,500	1	0
14	Detroit	29,358,120	14,970	0	1
15	Dallas	26,037,540	12,000	0	0
16	New Orleans	24,410,250	15,030	1	1
17	Houston	23,040,000	11,960	0	0
18	St. Louis	17,748,090	NA	0	0
19	Minneapolis	13,875,840	NA	0	0
20	Seattle	10,798,000	NA	0	0

¹ Year Ended March 31, 1976.

Source: C.A.B. O&D Surveys; Government of Puerto Rico, Carib. Area Service Invest., Docket 30697.

Table 4, Appendix A
Applications Filed Pursuant to Order 77-4-28 Seeking All or Part of the Mainland-Puerto Rico Nonstop Route Authority Sought To Be Placed in Issue by Puerto Rico

	Between Puerto Rico and—	Number of carriers applying for the authority	Carriers
Baltimore	_____	6	Allegheny Airlines, Caribbean International Airlines, Evergreen International Airways, North Central Airlines, Northwest Airlines, Trans International Airlines.
Boston	_____	6	Allegheny Airlines, American Airlines, Caribbean International Airlines, Evergreen International Airways, Northwest Airlines, Trans International Airlines.
Chicago	_____	7	American Airlines, Conner Air Lines, Delta Air Lines, Evergreen International Airways, North Central Airlines, Northwest Airlines, Trans International Airlines.
Cleveland	_____	5	Conner Air Lines, Evergreen International Airways, North Central Airlines, Northwest Airlines, Trans International Airlines.
Detroit	_____	6	Conner Air Lines, Delta Air Lines, Evergreen International Airways, North Central Airlines, Northwest Airlines, Trans International Airlines.
Houston	_____	4	Conner Air Lines, Continental Air Lines, Evergreen International Airways, Trans International Airlines.
Miami	_____	8	Conner Air Lines, Delta Air Lines, Evergreen International Airways, National Airlines, Northwest Airlines, Southern Airways, Trans International Airlines, Western Air Lines. ¹
New York	_____	8	American Airlines, Caribbean International Airlines, Conner Air Lines, Evergreen International Airways, North Central Airlines, Northwest Airlines, Southern Airways, Trans International Airlines.
Orlando	_____	4	Delta Air Lines, Evergreen International Airways, Southern Airways, Trans International Airlines.
Philadelphia	_____	6	Allegheny Airlines, American Airlines, Caribbean International Airlines, Evergreen International Airways, Northwest Airlines, Trans International Airlines.

¹ Although Western Air Lines has not formally applied for Miami-San Juan authority, Western's comments indicated that it would do so if such authority was placed in issue in the proceeding. In addition to the eight carriers listed for Miami, Rich International Airways has applied for broad all-cargo Mainland-Caribbean authority that includes Miami-Puerto Rico.

Source: Answer of the Commonwealth of Puerto Rico Carib. Area Service Invest. Docket 30697.

Appendix B.—Port and Navigation Systems Data

Table 1, Appendix B
Corps of Engineers Port Information
San Juan Harbor, Puerto Rico

a. *Location.*—San Juan Harbor is located on the north coast of Puerto Rico, about 35 miles from the island's east end. It is the only harbor on the north coast affording protection in all types of weather. The harbor is about 3 miles long, and varies in width from 0.6 to 1.6 miles.

b. *Existing channel dimensions.*—The existing Federal project consists of an entrance channel 38 feet deep by 800 feet wide across the outer bar to the intersection with Anegado Channel with a 45-foot-deep and 500-foot-wide section within this channel, thence 36 feet deep and 1,200-1,000 feet wide in Anegado Channel to the intersection of Graving Dock and Army Terminal Channels; an approach channel 35 feet deep and 600 feet wide to San Antonio Channel and an area 35 feet deep, thence 30 feet deep, 300 to 1,100 feet wide, and 2,800 feet long in San Antonio Channel; a cruise ship basin 30 feet deep with varying widths north of San Antonio Channel; a channel 36 feet deep and 300 feet wide in Army Terminal Channel with a turning basin on its end; Puerto Nuevo Channel connecting Army Terminal and Graving Dock Channels and having a depth of 32 feet and a width of 300 feet; Graving Dock Channel connecting Puerto Nuevo Channel and Anegado Channel and having a depth of 30 feet and a width of 400 feet; a 30-foot-deep anchorage area southwest of Anegado Channel; and a 36-foot-deep anchorage area off Isla Grande.

c. *Authorized navigation improvements.*—The authorized Federal project calls for:

(1) Widening the Bar Channel to a maximum width of 800 feet and deepening it to a depth of 48 feet, shifting the centerline 350 feet west, with appropriate widening at the intersection with Anegado Channel to provide a 1,300-foot width;

(2) Deepening Anegado Channel in steps from 46 to 40 feet, reducing its width to 800 feet and eas-

ing the bend at the junction with Army Terminal Channel;

(3) Deepening Army Terminal Channel and turning basin to 40 feet, widening the channel to 450 feet, and easing the bend at the junction of Army Terminal and Puerto Nuevo Channels;

(4) Deepening Puerto Nuevo Channel to 40 feet and widening it to 400 feet, easing the bend at the intersection of Puerto Nuevo and Graving Dock Channels, and providing 4 feet of overdepth at the mouth of Cano de Martin Pena for advanced maintenance in that fast shoaling area;

(5) Deepening Graving Dock Channel to 40 feet at its existing 400-foot width and easing the bend at the junction with Anegado Channel;

(6) Deepening San Antonio Channel to 38 feet at varying widths, with a minimum of 500 feet;

(7) Deepening the Cruise Ship Basin to 36 feet over irregular widths between San Antonio Channel and the cruise ship piers on the south side of Old San Juan;

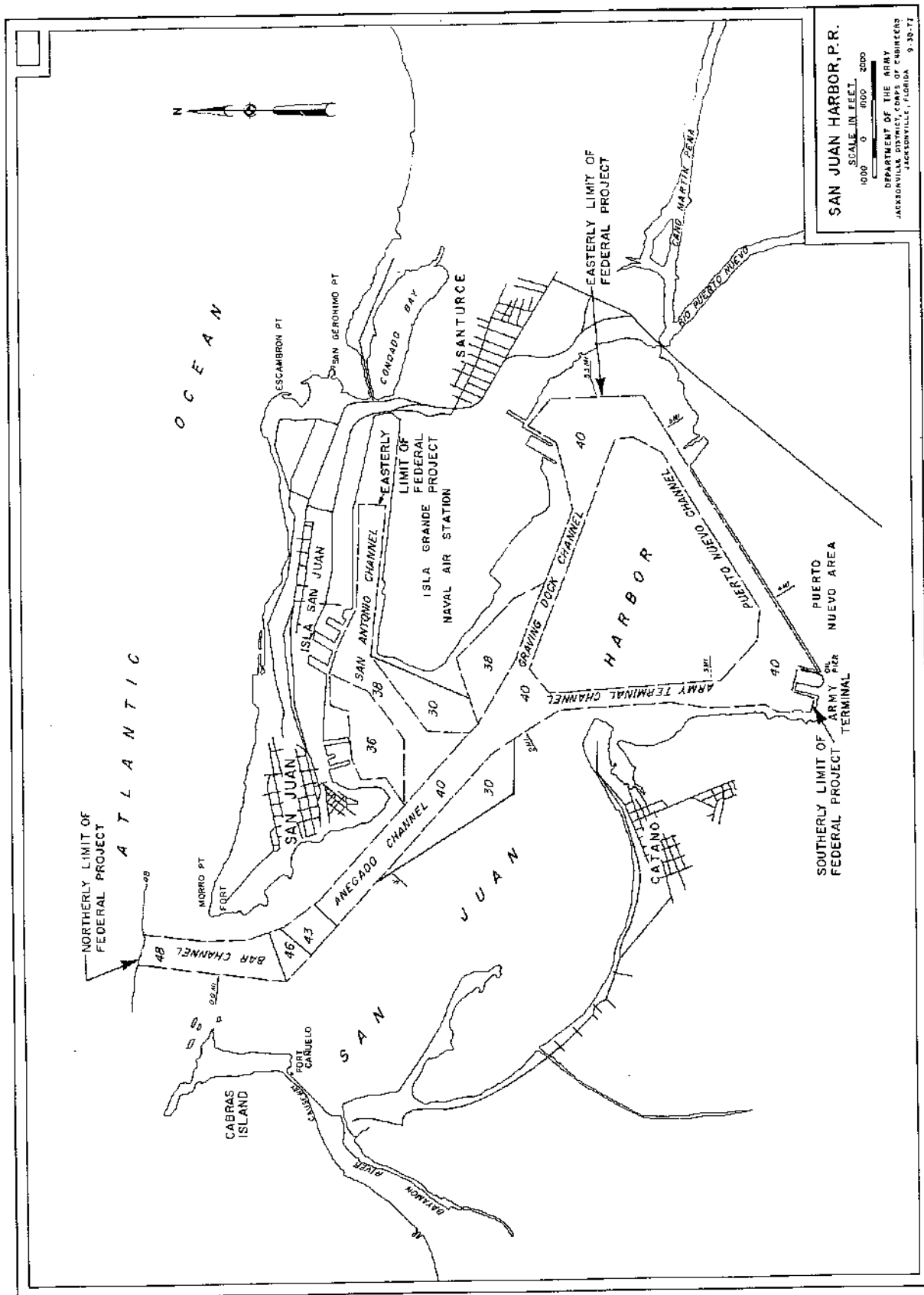
(8) Maintaining Sabana Approach Channel at a depth of 30 feet and a width of 250 feet, and

(9) Deepening existing Anchorage Area E to 38 feet and providing mooring dolphins for ships using the area.

d. *Commodity flows*—

Year	Tons
1940	1,279,000
1950	2,451,000
1960	4,676,000
1970	8,962,000
1971	9,354,000
1972	9,528,000
1973	10,773,000
1974	11,805,000
1975	10,522,000

Major commodities in 1975 were crude petroleum, petroleum products, miscellaneous food products, alcoholic beverages, lumber and wood products, cement, metal products, meat, and frozen vegetables.



e. Vessel traffic—

Year	Type of vessel	DWT up to—	Draft (feet) up to—	Number of trips	
				inbound	outbound
1970	Passenger and dry cargo	32,000	36	4,501	4,506
	Tanker	37,000	36	479	481
1971	Passenger and dry cargo	32,000	36	3,617	3,580
	Tanker	37,000	34	583	585
1972	Passenger and dry cargo	32,000	36	4,229	4,215
	Tanker	37,000	35	343	320
1973	Passenger and dry cargo	32,000	35	4,658	4,640
	Tanker	37,000	35	384	365
1974	Passenger and dry cargo	32,000	33	4,304	4,294
	Tanker	37,000	36	379	398
1975	Passenger and dry cargo	32,000	33	3,631	3,497
	Tanker	37,000	36	480	475

f. *Perception of navigation problems.*—Vessel operators have experienced difficulties in several areas of San Juan Harbor. Because of high waves, 8 feet or greater, it is difficult to maintain control of vessels in the Bar Channel. The existing 500-foot width at 45-foot depth is not sufficient to assure safe two-way traffic under these conditions. Furthermore, due to the sharp 56-degree turn from the Bar Channel into Anegado Channel and high cliffs to the east, the sight distance between inbound and outbound vessels is too short for safe operation. Inadequate depths and widths in interior channels prevent many vessels from entering the harbor fully laden, causing higher shipping costs which are passed on to the consumer in the form of higher prices. Because of the short turning radii at several channel intersections, hazardous situations are created when vessels turn from one channel into another. Navigation interests also state that existing anchorage areas are insufficient to meet the growing needs of the port.

Ponce Harbor, P.R.

a. *Location.*—Ponce Harbor is located on the south-central coast of Puerto Rico, about 48 land miles southwest of San Juan. The harbor is a shallow open bay formed by a slight indentation of the coastline near Carenero Point. It is protected from heavy seas by a number of coral reefs which also restrict circulation within the bay.

b. *Existing channel dimensions.*—The existing Federal project is a channel 30 feet deep and about 500-600 feet wide just north of the municipal bulkhead.

c. *Authorized navigation improvements.*—The authorized Federal project is a 600-foot-wide by 36-foot-deep channel from the Caribbean Sea to Ponce Harbor, thence a 400-foot-wide by 36-foot-deep channel into the harbor, and a 36-foot-deep, irregular-shaped basin with a turning diameter of 950 feet.

d. Commodity flows.—

Year	Tons
1940	360,600
1950	672,600
1960	731,600
1970	529,300
1971	353,400
1972	756,700
1973	515,600
1974	960,500
1975	566,400

Major commodities are cement and general cargo.

e. Vessel traffic.—

Year	Type of vessel	Dwt ¹ up to—	Draft (feet) up to—	Number of trips	
				Inbound	Outbound
1970	Dry cargo	18,000	29	408	399
1971	Dry cargo	18,000	29	353	354
1972	Dry cargo	18,000	29	438	407
1973	Dry cargo	18,000	29	380	367
1974	Dry cargo	18,000	29	346	352
1975	Dry cargo	18,000	29	294	296

¹ Ships up to 37,000 dwt have visited Ponce light loaded. Maximum size fully loaded to 29 feet would be about 18,000 dwt.

f. *Perception of navigation problems.*—Existing channel depths are not adequate to serve the prospective traffic, primarily container ships, which are expected to visit Ponce in the future.

Fajardo Harbor, P.R.

a. *Location.*—Fajardo Harbor is located on the northeast coast of Puerto Rico, 30 miles southeast of San Juan Harbor.

b. *Existing channel dimensions.*—There is no existing channel other than the natural water depths. A line of shoals and cays situated 0.8 mile offshore afford protection from the east and form a sheltered anchorage of about 440 acres with depths ranging from 1 to 29 feet below mean low water. A channel 10 to 29 feet deep and generally 500 feet wide passes between the cays and the mainland and lies 0.5 mile offshore. Depths of 8 to 18 feet prevail in the remaining portion of the harbor, except adjacent to the shores, where there are lesser depths.

c. *Authorized navigation improvements.*—The authorized Federal project is a channel 28 feet deep and 200 feet wide to and including a turning basin of the same depth. It was authorized in 1945 but has not been constructed.

d. *Commodity flows.*—

Year	Tons
1940	123,200
1950	129,100
1960	64,100
1970	700
1971	800
1972	5,200
1973	33,300
1974	35,800
1975	174,900

Major commodities in 1975 were crude petroleum and petroleum products.

e. *Vessel traffic.*—

Year	Type of vessel	Dwt ¹ up to—	Draft (feet) up to—	Number of trips	
				Inbound	Outbound
1970	Tanker, barge...	15,000	20	91	89
1971	Tanker, barge...	15,000	20	8	10
1972	Tanker, barge...	15,000	20	123	122
1973	Tanker, barge...	15,000	20	156	150
1974	Tanker, barge...	15,000	20	78	80
1975	Tanker	17,000	28	4	3

¹ Estimated based on drafts.

f. *Perception of navigation problems.*—As a result of Puerto Rican port studies made in 1966, local interests have requested reconsideration of the Fajardo Harbor project. They now desire improvements consisting of an entrance channel and basin generally 14 feet deep, protected by jetties at the entrance; and relocation of the lower reach of the Fajardo River. Local interests are considering provision of a drydock and an adjacent railroad pier. Both would be protected by jetties.

Mayaguez Harbor, P.R.

a. *Location.*—Mayaguez Harbor is on the west coast of Puerto Rico about 110 miles by water from San Juan Harbor.

b. *Existing channel dimensions.*—This Federal project is an approach channel 2,200 feet long and 30 feet deep, 1,000 feet wide at the outer end, decreasing uniformly in width to 500 feet opposite the westerly end of the terminal, thence continuing with the same width to the inshore end of the terminal, a distance of about 1,250 feet.

c. *Authorized or proposed navigation improvements.*—The Federal project was authorized by the River and Harbor Act of 1935 and provides for an approach channel to the deepwater terminal 30 feet deep. Project construction was completed in 1934.

d. *Commodity flows.*—

Year	Tons
1940	299,200
1950	431,500
1960	248,600
1970	286,900
1971	209,600
1972	264,600
1973	344,600
1974	308,200
1975	293,000

Major commodities in 1975 were fish, petroleum products, corn, rice, fertilizers, and food products.

e. *Vessel traffic.*—

Year	Type of vessel	Dwt ¹ up to—	Draft (feet) up to—	Number of trips	
				Inbound	Outbound
1970	Dry cargo, tanker, barge...	17,000	28	245	244
1971	Dry cargo, tanker, barge...	17,000	27	170	168
1972	Dry cargo, tanker, barge...	17,000	28	254	252
1973	Dry cargo, tanker, barge...	17,000	27	225	227
1974	Dry cargo, tanker, barge...	17,000	27	216	234
1975	Dry cargo, tanker, barge...	17,000	27	158	175

¹ Estimated based on drafts.

f. *Perception of navigation problems.*—Examination of the users' needs indicates that maintained projects' depths would be adequate and no further deepening would be needed in the foreseeable future.

Arecibo Harbor, P.R.

a. *Location.*—The harbor is on the north shore of Puerto Rico about 40 miles west of San Juan Harbor.

b. *Existing channel dimensions.*—The existing Federal project is an entrance channel 25 feet deep at mean low water and 400 feet wide, flared to 650 feet wide at the ocean entrance and widened for the inner 650 feet of its length to form a maneuvering area of the same depth and 900 feet wide, fronting the proposed deep water terminal.

c. *Authorized or proposed navigation improvements.*—The existing project was authorized by the River and Harbor Act of 1937 and provides for construction of a stone breakwater 1,200 feet long and dredging of an entrance channel 25 feet deep. The project was completed in 1944.

d. *Commodity flows.*—

Year	Tons
1940	76,800
1950	None reported
1960	None reported
1970	37,600
1971	17,900
1972	32,500
1973	76,000
1974	208,600
1975	189,300

Major commodities in 1975 were waste and scrap and petroleum products.

e. Vessel traffic.—

Year	Type of vessel	Dwt ¹ less than—	Draft (feet)	Number of trips	
				Out- bound	In- bound
1970	Dry cargo, tanker, barge	10,000	18 or less	19	19
1971	Tanker, barge	10,000	18 or less	9	6
1972	Dry cargo, tanker, barge	10,000	18 or less	19	16
1973	Dry cargo, tanker, barge	10,000	18 or less	36	36
1974	Dry cargo, tanker, barge	10,000	18 or less	92	90
1975	Tanker	10,000	18 or less	78	77

¹ Estimated based on drafts.

f. Perception of navigation problems.—Examination of the users' needs indicates that maintained projects' depths would be adequate and no further deepening would be needed in the foreseeable future. Due to the discharge of the Arecibo River in the project area, rapid shoaling of the harbor occurs. Maintenance dredging to project depth is now scheduled for the near future.

Jobos Harbor, P.R.

a. Location.—Jobos Harbor is located about 42 nautical miles east of Ponce. The harbor is within a natural bay area which is protected by Point Pozuelo on the east side and many islands on the south and southwest sides.

b. Existing channel dimensions.—Jobos Harbor is a non-Federal project. The main channel into the harbor has dimensions of 25 feet in depth and 150 feet in width. The channel terminates at a turning basin and facilities for a powerplant. Another minor channel was privately dredged to a depth of 15 feet in 1967. This channel leads to a private basin and barge-receiving wharf of an oil company.

c. Authorized or proposed navigation improvements.—None.

d. Commodity flows.—Not available.

e. Vessel traffic.—Not available.

f. Perception of navigation problems.—No known navigation problems.

Ensenada Honda Harbor, P.R.

a. Location.—Ensenada Honda Harbor is located on the south side of Isla de Culebra between bluff Punta Vaca on the east and Punta del Soldado on the west. It is the most secure anchorage in the area. The harbor is about 1.5 miles long and in some parts 0.5 mile wide, but of irregular shape with several small shallow bays indenting the shore.

b. Existing channel dimensions.—The entrance to Ensenada Honda is obstructed by shoals with depths of 4 to 26 feet, but the entrance channels are marked by buoys and unlighted ranges. The controlling

depth into the harbor is 27 feet. There is no Federal project for Ensenada Honda Harbor.

c. Authorized or proposed navigation improvements.—None.

d. Commodity flows.—Not available.

e. Vessel traffic.—Not available.

f. Perception of navigation problems.—No known navigation problems.

Arroyo, P.R.

a. Location.—Arroyo is located on the easterly end of the south coast of Puerto Rico.

b. Existing channel dimensions.—Puerto Arroyo is an open bay exposed to southerly winds and swells. The harbor is used only by small fishing vessels that anchor near Arroyo in the northeast part of the bay.

c. Authorized or proposed navigation improvements.—None.

d. Commodity flows.—Not available.

e. Vessel traffic.—Not available.

f. Perception of navigation problems.—None that are known.

Guayanes Harbor (Yabucoa), P.R.

a. Location.—Guayanes Harbor is the port for the town of Yabucoa and is located on the southeast coast of Puerto Rico about 75 miles by water from San Juan Harbor.

b. Existing channel dimensions.—A channel 48 feet deep and 500 feet wide and a turning basin generally 2,000 feet long by 1,300 feet wide located on the west side of the bay has been constructed by an oil company and turned over to the Puerto Rico Ports Authority to develop as a commercial port.

c. Authorized or proposed navigation improvements.—An oil company constructed a private deep-draft port to its petroleum chemical plant near Yabucoa in the vicinity of Guayanes Harbor. Guayanes Harbor is an authorized, unconstructed Federal harbor project located nearby. The Federal project, authorized by the River and Harbor Act of 1937, provides for a short approach channel 23 feet deep and an open anchorage area of the same depth. The oil company has turned over its deep-draft channel and harbor to the Puerto Rico Ports Authority to develop as a commercial port. The authority desires that the channel and basin be federally maintained. Congress, by resolution in 1970, requested a study be made of relocating the authorized project and the feasibility of Federal maintenance of the channel provided by local interests.

d. Commodity flows.—Crude petroleum—tonnages not available.

e. Vessel traffic.—Not available. Ships are esti-

mated to be over 50,000 dwt with drafts over 45 feet.

f. *Perception of navigation problems.*—The Puerto Rico Ports Authority and local interests desire that the channel and turning basin provided by locals be maintained by the Federal Government.

Guanica Harbor, P.R.

a. *Location.*—On the south coast of Puerto Rico about 20 miles west on Ponce. It is a natural bay protected by steep, high, and wooded shores on the east and west sides.

b. *Existing channel dimensions.*—Bahia de Guanica is entered through a buoyed approach channel about 0.8 mile southeast of Punta Brea, thence through a privately dredged channel, marked by a lighted range and buoys, which leads to a turning basin on the east side of the bay, and thence to the sugar mill at the west end of the bay. In 1970 the controlling depths in the dredged channel were 26 feet to the turning basin, thence 21 feet in the north half, and 27 feet in the south half of the channel to the west end of the bay. An overhead power cable with a clearance of 150 feet crosses the channel about 0.4 mile inside the entrance. Shoreside facilities include bulk terminal and loaders for sugar and fertilizer.

c. *Authorized or proposed navigation improvements.*—None.

d. *Commodity flows.*—Major commodities are fertilizers, sugar, and molasses. Tonnages are not known.

e. Vessel traffic—

Year	Type of vessel	Dwt ¹ up to—	Draft ² (feet)	Number of trips
1976	Dry cargo	10,000	Up to about 22 feet	65
	Barges			94

f. *Perception of navigation problems.*—None

Humacao, P.R.

a. *Location.*—On the east coast of Puerto Rico about 70 nautical miles east and south of San Juan Harbor, and 60 nautical miles southwest of St. Thomas Harbor, Virgin Islands.

b. *Existing channel dimensions.*—The existing non-Federal project is an area of almost 200 acres, 24 to 27 feet deep. Natural deep water is about 1.5 miles directly offshore.

c. *Authorized or proposed navigation improvements.*—A survey report for provision of a Federal project for Humacao was substantially completed in 1949. A protected deepwater port, but work was suspended at the request of the Insular Government. Funds have not been made available to resume the study. No local interest has been expressed recently.

d. *Commodity flows.*—Major commodity is believed to be sugar. Tonnages are not available.

e. *Vessel traffic.*—Not available.

f. *Perception of navigation problems.*—None known.

Port Las Mareas, P.R.

a. *Location.*—Las Mareas Harbor is located about 1.5 miles southeast of the town of Jobos in the municipality of Guayama, on the southern coast of Puerto Rico.

b. *Existing channel dimensions.*—All existing channels and associated navigation facilities were constructed by the Phillips Puerto Rico Core, Inc., on behalf of the Puerto Rico Ports Authority, under a Department of the Army permit issued 6 December 1966. Construction was to provide a basin and an access channel with a total length of approximately 5,000 feet and widths varying from 250 feet to just above 900 feet. The inner basin depth was to be 38 feet below m.l.w. and the access channel 40 feet below m.l.w.

c. *Authorized or proposed navigation improvements.*—Under Section 11 of the 1974 Water Resources Development Act, the Secretary of the Army was directed to study Port Las Mareas to determine the feasibility and advisability of the Federal Government assuming maintenance of the project.

d. *Commodity flows.*—Major commodity is crude oil. Tonnages are not known.

e. Vessel traffic—

Year	Type of vessel	Dwt	Draft (feet)	Number of trips
1976	Steamers (probably tankers)	¹ 37,000	36	131
	Barges	² 4,800	12	713

¹ Estimated.

² Average.

f. *Perception of navigation problems.*—The project originally served Phillips Puerto Rico, Inc., but the Puerto Rico Ports Authority now states that it intends to have more than a single user for Las Mareas Harbor. The Ports Authority now wishes that the Federal Government participate in the maintenance of the harbor's channel and turning basin. No commerce has been reported.

Aguadilla Harbor, P.R.

a. *Location.*—Aguadilla Harbor is an open roadstead on the northwestern coast of Puerto Rico, about 82 miles west of San Juan. Nearest Federal harbors are the 30-foot-deep Federal project at Mayaguez, 17 highway miles south and the 25-foot-deep project at Arecibo, 32 highway miles east.

b. *Existing channel dimensions.*—At the present time there are no channels for deep-draft navigation.

However, local interests have provided special facilities for bulkloading raw sugar on deep-water ships. These facilities include a conveyor belt to offshore moorings in 40 feet of water. The ships are moored to large dolphins for loading and unloading operations.

c. *Authorized or proposed navigation improvements.*—A study was authorized by a House Public Works Committee Resolution dated 17 February 1950. A survey-review report was completed in April of 1969. The Plan of Improvement included a

channel with interior depths of 32 feet. The economic analysis of this improvement resulted in an unfavorable recommendation.

d. *Commodity flows.*—Sugar, tonnages not available.

e. *Vessel traffic.*—Not available.

f. *Perception of navigation problems.*—Transportation of raw sugar by deep-draft vessels is adequately satisfied by the existing harbor facilities and no future movements at other commodities of significant tonnages are envisioned at this time.

Table 2, Appendix B
Coast Guard Port Statistics

San Juan		
	Number of port calls	
	Annual	One-day maximum
Liquid bulk _____	191	4
Dry cargo _____	3,468	25
Passenger _____	653	10

Range of vessel sizes:

Liquid bulk:

Smallest: 5-foot draft, 287 tons

Largest: 35-foot draft, 42,000 gross tons

Dry cargo:

Smallest: 4-foot draft, 50 gross tons

Largest: 28-foot draft, 15,000 gross tons

Passenger:

Smallest: 19-foot draft, 2,682 gross tons

Largest: 35-foot draft, 58,000 gross tons

Origins and destinations of vessels arriving and departing:

Liquid bulk:

5 percent arrive from Gulf Coast of North America

27 percent arrive from East Coast of South America

68 percent arrive from interisland trade

6 percent depart to East Coast of North America

6 percent depart to Panama

31 percent depart to East Coast of South America

57 percent depart to interisland trade

Dry cargo:

8 percent arrive from East Coast of North America

1 percent arrive from Gulf Coast of North America

8 percent arrive from Panama

8 percent arrive from East Coast of South America

2 percent arrive from Europe or Africa

73 percent arrive from interisland trade

18 percent depart for East Coast of North America

5 percent depart for Gulf Coast of North America

5 percent depart for Panama

9 percent depart for East Coast of South America

1 percent depart for Europe or Africa

62 percent depart for interisland trade

Passenger:

37 percent arrive from East Coast of North America

63 percent arrive from interisland trade

69 percent depart for East Coast of North America

25 percent depart for interisland trade

6 percent depart for East Coast of South America

Ponce (including Guayanilla and Tallaboa)

	Number of port calls	
	Annual	One-day maximum
Liquid bulk _____	559	8
Dry cargo _____	604	17
Passenger _____	0	NA

Range of vessel sizes:

Liquid bulk:

Smallest: 5-foot draft, 300 tons

Largest: 35-foot draft, 42,000 gross tons

Dry cargo:

Smallest: 4-foot draft, 50 gross tons

Largest: 30-foot draft, 15,000 gross tons

Passenger: NA

Origins and destinations of vessels arriving and departing:

Liquid bulk:

37 percent arrive from East Coast of South America

11 percent arrive from West Africa

15 percent arrive from Mediterranean

39 percent arrive from interisland trade

3 percent depart for East Coast of North America

3 percent depart for Gulf Coast of North America

37 percent depart for East Coast of South America

10 percent depart for West Africa

7 percent depart for Mediterranean

37 percent depart for Northern Europe

27 percent depart for intrisland trade

Dry cargo:

6 percent arrive from East Coast of South America

6 percent arrive from Mediterranean

6 percent arrive from Northern Europe

82 percent arrive from interisland trade

Passenger: No arrivals or departures

Mayaguez

	Number of port calls	
	Annual	One-day maximum
Liquid bulk _____	0	NA
Dry cargo _____	568	7
Passenger _____	0	NA

Range of vessel sizes:

Liquid bulk: NA

Dry cargo:

Smallest: 8-foot draft, 300 tons

Largest: 30-foot draft, 8,000 gross tons

Passenger: NA

Origins and destinations of vessels arriving and departing:

Liquid bulk: NA

Dry cargo:

41 percent arrive from Panama

6 percent arrive from East Coast of South America

13 percent arrive from West Africa

6 percent arrive from Northern Europe

34 percent arrive from interisland trade

14 percent depart to East Coast of North America

7 percent depart to Gulf Coast of North America

28 percent depart to Panama

7 percent depart to East Coast of South America

43 percent depart to interisland trade

Passenger: NA

Guanica

	Number of port calls	
	Annual	One-day maximum
Liquid bulk	98	1
Dry cargo	0	NA
Passenger	0	NA

Range of vessel sizes:

Liquid bulk:

Smallest: 9-foot draft, 1,200 tons

Largest: 30-foot draft, 35,000 gross tons

Dry cargo: NA

Passenger: NA

Origins and destinations of vessels arriving and departing
Guanica is predominantly engaged in interisland trade.

Las Mareas

	Number of port calls	
	Annual	One-day maximum
Liquid bulk	439	3
Dry cargo	0	NA
Passenger	0	NA

Range of vessel sizes:

Liquid bulk:

Smallest: 12-foot draft, 2,700 gross tons

Largest: 33-foot draft, 19,500 gross tons

Dry cargo: NA

Passenger: NA

Origins and destinations of vessels arriving and departing:

Liquid bulk:

66 percent arrive from East Coast of South America

34 percent arrive from interisland trade

50 percent depart for East Coast of South America

50 percent depart for interisland trade

Yabucoa

	Number of port calls	
	Annual	One-day maximum
Liquid bulk	384	3
Dry cargo	229	2
Passenger	0	NA

Range of vessel sizes:

Liquid bulk:

Smallest: 22-foot draft, 4,800 gross tons

Largest: 35-foot draft, 18,500 gross tons

Dry cargo:

Smallest: 5-foot draft, 200 gross tons

Largest: 12-foot draft, 750 gross tons

Passenger: NA

Origins and destinations of vessels arriving and departing:

Liquid bulk:

The liquid bulk cargo transiting Yabucoa is predominantly engaged in the interisland trade

Dry cargo:

7 percent arrive from East Coast of South America

7 percent arrive from West Africa

86 percent arrive from interisland trade

6 percent depart for East Coast of South America

94 percent depart for interisland trade

Passenger: NA

Christiansted

	Number of port calls	
	Annual	One-day maximum
Liquid bulk	0	NA
Dry cargo	187	15
Passenger	0	NA

Range of vessel sizes:

Liquid bulk: NA

Dry cargo:

Smallest: 5-foot draft, 237 gross tons

Largest: 20-foot draft, 1,200 gross tons

Passenger: NA

Origins and destinations of vessels arriving and departing:

Liquid bulk: NA

Dry Cargo:

5 percent arrive from East Coast of North America

95 percent arrive from interisland trade

5 percent depart to East Coast of North America

95 percent depart to interisland trade

Passenger: NA

Limetree Bay

	Number of port calls	
	Annual	One-day maximum
Liquid bulk	1,458	14
Dry cargo	91	4
Passenger	0	NA

Range of vessel sizes:

Liquid bulk:

Smallest: 8-foot draft, 1,000 gross tons
Largest: 72-foot draft, 125,000 gross tons

Dry cargo:

Smallest: 5-foot draft, 300 gross tons
Largest: 37-foot draft, 10,000 gross tons

Passenger: NA

Origins and destinations of vessels arriving and departing:

Liquid bulk:

58 percent are engaged in the trade to East Coast of North America
2 percent are engaged in trade to Gulf Coast of North America
2 percent are engaged in trade to Panama and South America
6 percent are engaged in trade to West Africa
6 percent are engaged in trade to Cape of Good Hope
6 percent are engaged in trade to Mediterranean
1 percent are engaged in trade to Northern Europe
19 percent are engaged in the interisland trade
Dry cargo: 100 percent are engaged in interisland trade

Fredriksted

	Number of port calls	
	Annual	One-day maximum
Liquid bulk _____	0	0
Dry cargo _____	0	0
Passenger _____	40	4

Range of vessel sizes:

Liquid bulk: NA

Dry cargo: NA

Passenger:

Smallest: 19-foot draft, 2,682 gross tons
Largest: 31-foot draft, 33,000 gross tons

Origins and destinations of vessels arriving and departing:

Liquid bulk: NA

Dry cargo: NA

Passenger: 100 percent engaged in interisland trade

Charlotte Amalie

	Number of port calls	
	Annual	One-day maximum
Liquid bulk _____	116	3
Dry cargo _____	426	7
Passenger _____	711	11

Range of vessel sizes:

Liquid bulk:

Smallest: 5-foot draft, 287 gross tons
Largest: 15-foot draft, 3,000 gross tons

Dry cargo:

Smallest: 5-foot draft, 60 gross tons
Largest: 20-foot draft, 5,000 gross tons

Passenger:

Smallest: 19-foot draft, 2,682 gross tons
Largest: 35-foot draft, 58,000 gross tons

Origins and destinations of vessels arriving and departing:

Liquid bulk: 100 percent engaged in interisland trade

Dry cargo: 100 percent engaged in interisland trade

Passenger: 100 percent engaged in interisland trade

Note: Interisland trade includes trade to all islands in the Caribbean, including the Greater Antilles, the Lesser Antilles, and the Netherland Antilles, and also includes coastwise trade in Puerto Rico and the Virgin Islands.

Table 3, Appendix B

Tank Vessel Groundings

Since 1 January 1974 fifteen (15) tank vessel groundings have occurred on the south and east coasts of Puerto Rico. A summary of the circumstances surrounding the groundings is as follows: *

9 April 1974—MV *Ventura* grounded in Las Mareas, P.R.

The proximate cause of this casualty was poor judgment on the part of the pilot in that he brought a large tanker into a narrow channel with only one tug made up on the weather side in rough weather. The *Ventura*, a 560-foot Norwegian tanker was carrying 17,500 tons of chemicals at the time of the casualty, and was refloated with no damage, injury, or pollution.

17 April 1974—SS *Marine Hope* (PN) grounds at Guayanilla, P.R.

The proximate cause of the casualty was poor judgment on the part of the Master of the vessel in that he approached the narrow harbor entrance too closely without a pilot. Bahia de Guayanilla Harbor Entrance Lighted Buoy 1 (LLNR 1407.50) was extinguished at the time. The *Marine Hope* is a 556-foot tanker, and was on a voyage from an unknown port at the time of the casualty. There was no damage injury or pollution as a result of the casualty.

26 April 1974—SS *Marine Hope* (PN) grounded at Guayanilla, P.R.

The proximate cause of this casualty was once again poor judgment on the part of the Master of the *Marine Hope* in approaching the Bahia de Guayanilla Harbor entrance too closely without a pilot. All aids to navigation were watching properly at the time of the casualty. Aside from the aids to navigation aspect, all other factors in this casualty were identical to the previous casualty.

16 July 1974—Tug *Puerto Rico Sun* towing barge *Peck Slip* grounded in Bahia de Jobos, P.R.

The proximate cause of this casualty was a failure on the part of the operator of the *Puerto Rico Sun* to properly evaluate the turning radius of the tow while entering Bahia de Jobos. The barge grounded, and the tug was holed while attempting emergency maneuvers. The tug was then intentionally grounded to avoid sinking. The *Puerto Rico Sun* is a 111-foot tug and the *Peck Slip* is a 350-foot tank barge which was carrying 8,000 tons of Bunker C oil at the time of the grounding. The voyage was from Yabucoa, P.R., to Central Aguirre, P.R. The *Puerto Rico Sun* is equipped with LORAN A.

12 November 1974—SS *Daphne* grounded off La Parguera, P.R.

The proximate cause of this casualty was the failure of the Master to properly ascertain his position while operating under adverse weather conditions. The *Daphne* was carrying 45,340 tons of crude oil from La Ralina, Venezuela, to Guayanilla, P.R., at the time of the casualty. The *Daphne* is a 735-foot Liberian tanker. There was no damage, injury, or pollution as a result of this casualty. The *Daphne* is equipped with LORAN A.

8 March 1975—Barge *Chemical No. 1* grounded at Isla Cabeza de Perro, P.R.

The proximate cause of this casualty was failure of the operator of the towing vessel to navigate a narrow channel with due caution, and allowing the barge to take a sheer while making a turn. The *Chemical No. 1*, a 295-foot American tank barge, was carrying 35,500 barrels of gasoline at the time of the casualty. The barge suffered \$30,000 worth of damage as a result of this grounding, but there was no injury or pollution.

9 October 1975—MT *Ogden Wabash* grounded at Las Mareas, P.R.

The proximate cause of this casualty was the presence of an unknown shoal area at the entrance to Las Mareas Harbor. The *Ogden Wabash*, a 660-foot American tanker, was loaded with 35,171 tons of naphtha at the time of the casualty, and was refloated with no damage, injury, or pollution.

30 April 1976—MT *Serra Trader* grounded at Guayanilla, P.R.

The proximate cause of this casualty was an error on the part of the pilot in that he passed Bahia de Guayanilla Buoy 4 (LLPG 128) on the incorrect side while shifting the vessel from Guayanilla to Tallaboa. The *Serra Trader*, a 725-foot Liberian tanker, was carrying 3,000 tons of toluene at the time of the casualty, and was refloated with no damage, injury, or pollution.

6 May 1976—SS *Ogden Wabash* grounded at Las Mareas, P.R.

This casualty was identical to the casualty which occurred to the same vessel on 9 October 1975 except for the fact that the vessel did not strand but only touched lightly and continued making way. The vessel was drawing 1-foot less draft at the time of this casualty.

1 August 1976—SS *Overseas Aleutian* grounded in Guayanilla, P.R.

The proximate cause of this casualty was an error on the part of the pilot in that he directed that the vessel be anchored in close proximity to a shoal area. When the pilot left the vessel the Master checked the

anchor position and noticed the danger. Before he could recall the pilot the vessel swung and touched lightly on the shoal. The *Overseas Aleutian*, a 676-foot American tanker, was in ballast at the time of the casualty, and was refloated with no damage, injury, or pollution.

17 August 1976—SS *Eagle Voyager* grounded at Yabucoa, P.R.

The proximate cause of this casualty was unknown shoaling at the entrance to Bahia de Yabucoa. The *Eagle Voyager* was drawing 18 feet deep draft at the time of the casualty, and grounded in a charted depth of 48 feet. The vessel, a 665-foot American tanker, was in ballast at the time of the casualty, and was refloated with no injury, damage, or pollution.

18 November 1976—Tank barge *Caribe Sun* grounded in Bahia de Jobos, P.R.

The proximate cause of this casualty was unknown shoaling inside and outside the channel limits of Bahia de Jobos Entrance Channel. The *Caribe Sun* swung wide of the channel while making the turn from the outer reach to the middle reach of the channel, and grounded in a charted depth of 28 feet of water. The barge was drawing a deep draft of 18.6 feet at the time of the casualty. The *Caribe Sun*, a 352-foot American tank barge, was carrying 70,000 barrels of Bunker C oil at the time of the casualty, and was refloated with no damage, injury, or pollution.

23 December 1976—SS *Puerto Rican* grounded in Bahia de Tallaboa, P.R.

This investigation has not yet been completed; however, it appears that the proximate cause of the casualty was obstruction of Bahia de Tallaboa

Lighted Buoy 1 (LLNR 1405) by pelican guano. The *Puerto Rican*, a 660-foot American tanker, was shifting from Guayanilla to Tallaboa carrying 16,400 tons of petrochemicals at the time of the grounding, and was refloated with no damage, injury, or pollution. The *Puerto Rican* is equipped with LORAN A.

28 December 1976—SS *Daphne* grounded at Guayanilla, P.R.

This investigation has not yet been completed; however, it appears that the proximate cause of the casualty was disorientation of the Master since Bahia de Guayanilla Lighted Buoy 1 (LLNR 1407.50) was not showing the correct characteristic at the time of the casualty. The *Daphne*, a 735-foot Liberian tanker, was carrying 47,160 tons of crude oil at the time of the casualty, and was refloated with no damage, injury, or pollution. The Master of the *Daphne* was navigating using radar ranges and bearings as he approached Bahia de Guayanilla, and believed that he was outside the seabuoy at the time of the casualty when, in fact, he was approximately 1 mile inside the harbor limits. The *Daphne* is equipped with LORAN A; however, radio navigational aids were not being utilized.

16 February 1977—MT *Rubirose* grounded at Tallaboa, P.R.

The proximate cause of this casualty was an error on the part of the Master of the *Rubirose* in that he failed to correctly ascertain his position while turning in the vicinity of Bahia de Tallaboa Lighted Buoy 6 (LLNR 1406.60). The *Rubirose*, a 300-foot Norwegian tanker, was in ballast at the time of the casualty, and was refloated with no damage, injury, or pollution. There was no pilot aboard the vessel at the time of the casualty.

Appendix C.—Traffic Safety

*Table 1, Appendix C.—Motor Vehicle Traffic Fatality
Rates (deaths per 100 million vehicle-miles)*

State	1972	1973	1974	1975	1976
Alabama	5.49	5.13	4.08	3.93	3.87
Alaska	3.86	4.79	4.25	4.88	3.43
Arizona	5.49	5.96	4.77	4.19	4.38
Arkansas	5.93	5.00	3.91	4.06	3.66
California	3.95	3.78	3.15	3.16	3.16
Colorado	4.64	4.17	3.81	3.56	3.65
Connecticut	2.62	2.81	2.21	2.18	2.22
Delaware	3.85	3.67	3.17	3.45	3.14
District of Columbia	2.48	2.53	2.64	2.40	1.88
Florida	4.59	4.49	3.91	3.31	3.12
Georgia	5.69	5.41	4.40	3.53	3.13
Hawaii	3.89	3.35	3.29	3.52	3.43
Idaho	6.60	6.40	5.76	4.84	4.43
Illinois	3.80	3.90	3.39	3.42	3.22
Indiana	4.23	4.14	3.33	3.03	3.16
Iowa	4.64	4.18	3.60	3.43	3.84
Kansas	4.53	4.04	3.41	3.34	3.51
Kentucky	4.75	4.58	3.33	3.57	3.33
Louisiana	6.22	5.99	4.42	4.62	4.44
Maine	3.85	3.56	3.23	3.27	3.03
Maryland	3.45	3.22	3.07	2.74	2.58
Massachusetts	3.37	3.45	3.40	3.04	2.47
Michigan	3.91	3.78	3.36	3.11	3.16
Minnesota	4.14	4.07	3.47	3.03	3.00
Mississippi	7.03	6.42	4.62	4.23	4.42
Missouri	5.04	4.72	3.52	3.50	3.70
Montana	7.35	5.68	5.13	5.21	4.90
Nebraska	4.49	3.88	3.55	3.35	3.39
Nevada	6.66	6.24	5.15	4.98	4.75
New Hampshire	3.55	2.77	3.27	2.85	2.77
New Jersey	2.79	2.81	2.35	2.23	2.02
New Mexico	6.63	6.74	5.72	5.73	5.23
New York	4.91	4.56	4.03	3.77	3.53
North Carolina	5.83	5.29	4.53	4.17	3.92
North Dakota	5.05	4.84	3.71	3.75	3.82
Ohio	3.86	3.66	3.01	2.82	2.88
Oklahoma	4.21	3.68	3.49	3.35	3.45
Oregon	4.84	3.98	4.41	3.59	3.73
Pennsylvania	3.48	3.61	3.37	3.27	2.92
Puerto Rico	8.90	8.02	7.97	7.49	6.41
Rhode Island	2.25	2.39	1.77	1.98	2.06
South Carolina	5.64	4.73	4.36	3.98	3.73
South Dakota	5.84	5.56	4.50	3.91	4.07
Tennessee	4.80	4.44	4.05	3.52	3.31
Texas	4.82	4.56	3.87	4.05	3.62
Utah	5.48	4.96	3.06	3.45	3.02
Vermont	4.67	4.64	4.10	4.35	3.40
Virginia	3.84	3.52	3.12	2.97	2.78
Washington	3.82	3.31	3.37	3.21	3.21
West Virginia	5.45	4.68	4.44	4.60	4.42
Wisconsin	4.24	4.03	3.26	3.29	3.13
Wyoming	5.85	5.55	5.65	5.78	6.08
U.S. (including P.R.)	4.43	4.21	3.62	3.44	3.30
U.S. (including P.R.)	4.40	4.19	3.59	3.42	3.29

Table 2, Appendix C.—Department of Transportation Safety Standards

Standard	Purpose and content	Administered by—
1. Period motor vehicle inspection	Provides guidelines for implementation of period motor vehicle inspection programs to ensure that vehicles operated on public highways are properly equipped and safely maintained.	NHTSA
2. Motor vehicle registration	Provides guidelines for development of record systems which identify and describe vehicles and owners and which link this data to other highway safety files for purposes of research, accident investigation, enforcement, etc.	NHTSA
3. Motorcycle safety	Provides guidelines regarding motorcycle safety activities to ensure that motorcycles, their operators, and passengers meet standards for safe operation and protection from injury.	NHTSA
4. Driver education	Specifies criteria for developing adequate driver training programs in public and commercial schools for youth and adults.	NHTSA
5. Driver licensing	Provides guidelines for implementing more effective and uniform licensing procedures to improve the quality of driving and thereby reduce accidents.	NHTSA
6. Codes and laws	Provides guidelines for eliminating major variations in traffic laws between political subdivisions in the State, for increasing the compatibility of local ordinances with State policy, and for promoting adoption of appropriate aspects of the Uniform Vehicle Code (UVC).	NHTSA
7. Traffic courts	Provides criteria for review and revision of traffic court procedures to increase promptness and impartialness of adjudication proceedings involving motor vehicle laws.	NHTSA
8. Alcohol in relation to highway safety	Provides guidelines for various activities directed at reducing the incidence of traffic accidents involving persons driving under the influence of alcohol.	NHTSA
9. Identification and surveillance of accident locations	Specifies procedures for identifying high accident highway locations as basis for establishing priorities for improvement, selective enforcement, or other operations which would increase safety at locations so identified.	FHWA
10. Traffic records	Provides specifications for State and local traffic safety record systems which will allow data analysis regarding the motor vehicle transportation system and various motor vehicle-related activities.	NHTSA
11. Emergency medical services	Outlines procedures for quick identification and response to accidents, for prolonging life through proper first-aid methods, and effective coordination, transportation, and communications necessary to save lives of accident victims.	NHTSA
12. Highway design, construction and maintenance	Presents instructions regarding safety factors in road construction and maintenance, and procedures for promoting highway work site safety.	FHWA
13. Traffic engineering services	Provides guidelines for proper use of modern traffic engineering principles and uniform standards for traffic control in road projects, to reduce incidence of traffic accidents.	FHWA
14. Pedestrian safety	Provides guidelines for development of pedestrian safety activities as an important element in each State Highway Safety Program.	NHTSA/FHWA
15. Police traffic services	Provides guidelines for improving police traffic services in all aspects of accident prevention programs to reduce incidence of death and injury by accident.	NHTSA
16. Debris hazard control and cleanup ...	Outlines procedures necessary to ensure recognition, reporting, and prompt correction of debris hazard conditions which might cause traffic accidents.	NHTSA
17. Pupil transportation safety	Specifies requirements for safe pupil transport systems to reduce the danger of death or injury to school children.	NHTSA
18. Accident investigation and reporting	Establishes a uniform, comprehensive investigation program for gathering information on traffic accidents and for entering this information into the traffic records system for use in planning, evaluating, and furthering Highway Safety Program goals.	NHTSA

Table 3, Appendix C.—Puerto Rico, Accident and Fatality Rate Reduction (1976 data)

Type of accident	Total 1976	10-percent reduction	Dollar saving based on societal cost
Fatal (513):			
Passenger car	218	21.8	6,260,415
Motorcycle	14	1.4	402,045
Pedestrian	245	24.5	7,035,787
Pedalcycle	13	1.3	373,327
Other	23	2.3	660,502
Nonfatal	25,265	2,526.5	8,046,920
Property damage	58,339	5,833.9	3,033,628
Total			25,812,624

Table 4, Appendix C.—Puerto Rico, Funds Acquired Through Driver Licensing¹

	FY 1976	FY 1977	FY 1978	Three-year total
New licenses	120,000	(8% up) 130,000	(4% up) 135,000	
(\$10—4 years license)	\$1,200,000	\$1,300,000	\$1,300,000	\$3,850,000
Renewals	112,000	(7% up) 200,000	200,000	
(\$5—4 years)	\$560,000	\$1,000,000	\$1,000,000	\$2,560,000
Vehicle inspection ...	800,000	(9% up) 875,000	(7% up) 940,000	
(\$4.50—12 months) ..	\$3,600,000	\$3,975,500	\$4,230,000	\$11,803,500
Total	\$5,360,000	\$6,273,500	\$6,530,000	\$18,213,500

¹ Figures obtained from Puerto Rican Annual Highway Safety Work Program. Dollar figures computed with costs obtained from FHWA.

Appendix D.—List of Acronyms

List of Acronyms

ADAP	Airport Development Aid Program
ALJ	Administrative Law Judge
CAB	Civil Aeronautics Board
CDS	Construction Differential Subsidy
CORCO	Commonwealth Refining Company
CZMA	Coastal Zone Management Act
DTPW	Puerto Rico Department of Transportation and Public Works
EGCDH	Economic Growth Center Development Highway
EIS	Environmental Impact Statement
ER	Emergency Relief
FAA	Federal Aviation Administration
FAK	Freight, All Kinds
FAUS	Urban System
FDAA	Federal Disaster Assistance Administration
FHWA	Federal Highway Administration
HPR	Highway Planning and Research
ICC	Interstate Commerce Commission
ILA	International Longshoremen's Association
LORAN	Long Range Radio Aid to Navigation
MARAD	Federal Maritime Administration
MBA	Metropolitan Bus Authority
MPO	Metropolitan Planning Organization
NASP	National Airport System Plan
NHIPS	National Highway Inventory and Performance Study
NVOCC	Nonvessel Operating Common Carrier
ODS	Operating Differential Subsidy
PGP	Planning Grant Program
PL	Metropolitan Planning
PR	Puerto Rico
PRMMI	Puerto Rico Marine Management, Inc.
PHMSA	Puerto Rican Maritime Shipping Authority
PRPA	Puerto Rico Ports Authority
PRPB	Puerto Rico Planning Board
RO/RO	Roll-on/Roll-off
RPA	Regulations and Permits Administration
TAF	Terminal Area Forecast
TCA	Trans Caribbean Airways
TMT	Trailer Marine Transport
TTT	Transamerican Trailer Transport
UMTA	Urban Mass Transportation Administration

Supplemental Section on Maritime Transportation

THE CHARACTER OF PUERTO RICAN OCEAN COMMERCE

Introduction

Puerto Rico depends upon ocean transportation for the external movement of most of what it consumes and produces. The preponderance of all the goods and materials, both finished and inputs to finished products, are moved to the Commonwealth via ocean carrier and most of the commodities produced within Puerto Rico for consumption elsewhere exit by sea as well.

Thus the quality and the cost of both domestic and overseas ocean transportation service are significant influences upon the Puerto Rican economy. This section of the study will trace the growth of that service and will examine the current makeup of the trade in terms of carriers, service levels, commodity flows, and rate levels.

Domestic Commerce

Historical Development and Traditional Problem Areas.—The history of the domestic ocean carriers which have served the Puerto Rican trade during the past two decades is one of almost constant change. This can be contrasted with the Hawaiian trade where one carrier, Matson Navigation Company, has been in the trade since the 19th century and has dominated that trade for decades.

Before discussing the current composition of the carriers serving the Puerto Rican trade, a brief historical review of the previous structure of the trade is in order.

During most of the 1950's, two conferences, consisting of five breakbulk carriers, carried most of the dry cargo which moved between the United States and Puerto Rico. These conferences, the U.S. Atlantic and Gulf Conference,¹ and the Pacific Coast-

Puerto Rico Conference,² like their counterparts in the international trades, developed conference agreements among the member lines so that rate competition was restricted.

Not only was competition among member lines limited, but competition between conferences was limited to a few commodities. It has been estimated that these conferences carried 80 percent of the dry cargo moving to Puerto Rico and 99 percent of the dry cargo moving from the island.

The dominant carrier during this period was Bull Insular Line (Bull) which began service to Puerto Rico in 1910. By 1925 Bull had carved out the largest share of the market, including a large share of the market for the northbound transport of Puerto Rican produced raw sugar. The control of a respectable amount of cargo in the northbound direction has always been important because of the imbalance (most cargo moves southbound) in this trade.

The Advent of Containerization.—Old market relationships changed dramatically after Sea-Land introduced containerization in the trade in May 1956. Beginning with a modified T-2 tanker which carried 60 containers, Sea-Land expanded its carriage from 42,000 tons to approximately 1.66 million tons in 1967. The latter total included almost 1.4 million tons of containerized cargo.

The advent of containerization led to a large reduction in handling costs and gave Sea-Land a cost advantage over breakbulk carriers such as Bull Line (which discontinued its operations in 1962). The inroads made by Sea-Land led to the dissolution of the conferences, with the U.S. Atlantic and Gulf Conference becoming inoperative in 1962 and the Pacific Coast-Puerto Rico Conference being terminated in 1963.

By the late 1960's the Puerto Rican domestic trade had gone through a transformation from breakbulk carriers to operators which specialized in the

¹ Members included: Bull Insular Line, Lykes, Waterman Steamship Corp., and Alcoa Steamship Co., Inc.

² This conference had only two members: Waterman Steamship Corp., and the Pope and Talbot Line.

carriage of cargo in container vessels or roll-on/roll-off (RO/RO) vessels. Most of the old carriers, i.e., Bull Line, Alcoa, Waterman, Lykes, and the Pope and Talbot Line, had left the trade by this time.

Domestic Carriers Operating in the Trade in 1973.—By 1973 three carriers, Sea-Land Service, Inc., (Sea-Land), Seatrain Lines, Inc., (Seatrain), and Transamerican Trailer Transport, Inc., (TTT) provided the bulk of the regularly scheduled steamship service between Puerto Rico and the U.S. mainland.³

Sea-Land was by far the largest operator of the three with its 1970 market share placed at 55 percent of the total traffic. Seatrain and TTT controlled approximately 25 percent and 20 percent of the market, respectively.

Sea-Land operated four C-4 vessels and six C-2 containerhips in the trade. These vessels provided three sailings per week between New York and San Juan with a total capacity for 1,080 35-foot containers and weekly service between Boston, Baltimore, Charleston, Jacksonville, Port Everglades, and San Juan with a combined capacity of 904 35-foot containers.

Seatrain entered the trade in 1963. By 1973 its fleet consisted of four jumbo-sized C-4 containerhips with capacity for 481 40-foot containers each and one T-2 type vessel with capacity for 277 40-foot containers. Seatrain vessels provided service between San Juan and New York, Philadelphia, Baltimore, Charleston, and Jacksonville.

The third major operator, TTT, began its operations in April 1968 and offered twice-weekly sailings between New York and San Juan with two brand new RO/RO vessels, each of which had the capability of achieving 26 knots and a capacity for 244 40-foot trailers and 450 vehicles.

Because of the speed and loading convenience of its vessels, TTT attracted a growing share of the higher rated commodities such as automobiles, refrigerated cargo, and NVOCC cargo.⁴

Although there was competition in terms of service offered, advertising, or other forms of nonprice competition, all three carriers in the trade had established rate parity in the trade. The Federal Maritime Commission (FMC) ordered that the parity issue be examined in a docketed proceeding, (Docket Nos. 71-30, 71-42, and 71-43 consolidated). After an extensive investigation, of which the parity question

was only one part, the Administrative Law Judge concluded that

In this instance, rate parity is not a matter of choice by the Commission or the carriers. It is a fact of life in the Puerto Rico Trade. Because of the similarity of the services offered, no carrier can hope to participate in the traffic at rates higher than those of its competitors. The carrier who published lower rates effectively sets the level for competing carriers. Stability is based primarily on parity. That is why these carriers have maintained and must continue to maintain rates at substantially uniform levels.⁵

The issue of parity is important because current operators in the trade have continued the policy of maintaining similar rates.

Financial Position of the Carriers, 1969-72.—

The financial situation of the three major operators in the trade deteriorated rapidly from 1969 to 1972. After experiencing an aggregate of \$11,629,000 beforetax profits in 1969, the three carriers' financial position deteriorated to a beforetax loss of \$14,082,000 in 1972 (see table 1).

Clearly, by 1972 the financial situation of the

⁵ Initial decision of John Marshall, Administrative Law Judge, Docket No. 71-30 *Transamerican Trailer Transport, Inc., Increase in Rates in the U.S. Atlantic/Puerto Rico Trade*, served July 20, 1973, pp. 9-10.

Table 1.—Financial Statements of Major Operators in the U.S. Atlantic/Puerto Rico Trade 1969-72

	1969	1970	1971	1972
Sea-Land:				
Revenue tons	1,864	2,325	2,217	2,295
Revenue	\$47,613	\$55,317	\$54,461	\$58,504
Expense	\$38,579	\$53,187	\$55,100	\$63,859
Profit before tax	\$9,034	\$2,130	(\$639)	(\$5,355)
Seatrain:				
Revenue tons	833	1,061	1,394	1,385
Revenue	\$15,968	\$18,708	\$25,035	\$23,545
Expense	\$13,731	\$18,726	\$30,663	\$34,527
Profit before tax	\$2,237	(\$18)	(\$5,628)	(\$10,982)
Transamerican:				
Revenue tons	829	874	1,420	1,650
Revenue	\$13,780	\$16,463	\$23,205	\$30,820
Expense	\$13,422	\$15,198	\$23,113	\$28,565
Profit before tax	\$358	\$1,265	\$93	\$2,255
Total—three carriers:				
Revenue tons	3,526	4,260	5,031	5,330
Revenue	\$77,361	\$90,488	\$102,701	\$112,869
Expense	\$65,732	\$87,111	\$108,875	\$126,951
Profit before tax	\$11,629	\$3,377	(\$6,174)	(\$14,082)

Note: Figures in parentheses indicate minus amount.

Source: Initial decision of John Marshall, Administrative Law Judge, Docket No. 71-30 *Transamerican Trailer Transport, Inc., Increase in Rates in the U.S. Atlantic/Puerto Rico Trade*, served July 20, 1973.

³ A fourth carrier TMT Trailer Ferry (TMT) also served the trade but only accounted for a small portion of the market in 1971.

⁴ Nonvessel operating common carriers (NVOCC) are similar to freight forwarders. NVOCC's receive shipper lots of less than a container load and consolidate them before tendering them to the carrier and paying a Freight All Kinds (FAK) rate.

operators had deteriorated to such an extent that adjustments had to take place if service to Puerto Rico was to continue.

The Formation of the Puerto Rico Maritime Shipping Authority (PRMSA)—1974.—In 1973 officials of the Puerto Rican Government were informed that Seatrain was planning to shut down its Puerto Rican operations. Commonwealth officials were concerned about the loss of service and began contemplating the purchase of Seatrain's assets by the Puerto Rican Government. Initial investigations by Commonwealth officials recommended that purchase of Seatrain's assets alone would not be economically sound.

As further exploratory investigations continued, a special three-man negotiating committee was formed which consisted of Mr. Juan Albors, the Committee Chairman and President of the Government Development Bank of Puerto Rico; Mr. Francisco De Jesus Schuck, the Secretary of Justice (Attorney General); and Mr. Theodoro Moscoso, Administrator of the Economic Development Administration of the Commonwealth of Puerto Rico (Fomento).

Negotiations continued with the three major operators, Sea-Land, Seatrain, and TTT, which culminated in a December 1973 announcement by the Governor that he had decided to acquire the assets of all three companies.

After months of negotiations, formal closing of the transaction was accomplished in October 1974. In addition to the assets of the three operators previously mentioned, PRMSA also acquired the assets of a fourth carrier in the trade, Gulf-Puerto Rico Lines, Inc., (GPRL).⁶

Recent History of Rate Levels.—One of the factors that led to the Commonwealth's decision to purchase the assets of the privately owned operators serving the trade was a series of rate increases put into effect by these operators in the early 1970's.

In March of 1971, TTT, Sea-Land and Seatrain filed new rates with the FMC to become effective April 25, 1971, which would have increased rates across-the-board by 18 percent for trailerload shipments and 28 percent for less-than-trailerload shipments. These rate increases included a 3-percent bunker fuel surcharge, which became effective February 1, 1971.

These rate increases, excluding the 3-percent fuel surcharge, were suspended by the FMC until August 25, 1971, and further suspended by the Price Commission. They finally became effective in March 1972.

In 1973, the carriers serving the trade put into effect a 17.2-percent southbound and a 5.2-percent

northbound, so-called "ILA" (International Longshoremen's Association) surcharge. A bunker fuel surcharge of 11 percent was put into effect in 1974. Finally, TTT proposed a 12.8-percent general rate increase in April 1974 but withdrew it shortly thereafter.

Partly in response to these rate increases the Commonwealth decided to purchase the assets of these companies and form PRMSA. Commonwealth officials were hopeful that a rationalization of the service would lead to cost reductions and operational efficiencies which would stem the tide of general rate increases.

The Government-owned entity, however, was not immune to cost increases and on August 21, 1975, PRMSA gave notice that it was instituting a 15-percent general rate increase to be effective on September 21, 1975. Although this rate increase is still in effect, it was found unjust and unreasonable by the Administrative Law Judge; the Commission has not as of the time of this writing, August 1977, ruled in this case.

On May 17, 1977, PRMSA issued an additional 10.4-percent general rate increase to be effective on June 19, 1977. This rate increase was permitted to go into effect but the Federal Maritime Commission has ordered an investigation into the reasonableness of the rate increase.

Since 1971 the trade has experienced numerous general rate increases. The reason cited for most of these increases was, naturally, an increase in the underlying expenses incurred by the operators as they attempted to continue their service. With this background it is now time to explore the current situation in the trade and perhaps speculate on what the future holds for the Puerto Rican domestic offshore trade.

History of PRMSA.—PRMSA filed its first tariff effective September 15, 1974. As was previously discussed, PRMSA's equipment consisted of the assets they purchased from Sea-Land, Seatrain, TTT, and GPRL.

As of March 1976, PRMSA's equipment consisted of over 25,000 owned and leased containers, trailers, and chassis. This equipment was used to complement a fleet of 11 vessels which operated from the U.S. Atlantic and Gulf Coast to Puerto Rico. Eight of the vessels in PRMSA's fleet were aged (built in 1944 or 1945) C-4 and "trans" class container vessels. The remaining 3 vessels were, however modern roll-on/roll-off (RO/RO) vessels.⁷

Although initial utilization rates were high, PRMSA was hit severely by the 1974-75 recession.

⁷ A fourth RO/RO vessel, the SS *Puerto Rico*, is chartered out to other trades for most of the year. During peak periods, approximately 12 weeks per year, The SS *Puerto Rico* is used in the U.S./Puerto Rico trade.

⁶ GPRL was a wholly owned subsidiary of Sea-Land Services, Inc.

sion. By the fourth quarter of 1975 vessel utilization had fallen to 80 percent. Since utilization is critical to an industry which has a large portion of its costs that are fixed, low utilization rates are extremely damaging to a company's profits.

Another damper on PRMSA's financial position was the entry of several small competitors into the trade, in 1975. In December 1975, Seatrain re-entered the Puerto Rican trade through a subsidiary. Seatrain-Gitmo carried relayed European cargo that was transported across the Atlantic on other Seatrain vessels and then transferred to Seatrain-Gitmo vessels. This cargo had been transshipped via PRMSA before the formation of Seatrain-Gitmo.

In April 1975 Sea-Land filed a new Joint Rail-Water, Water-Rail, Motor-Water and Water-Motor tariff between San Juan and ports in Canada via Elizabeth, N.J. Thus Sea-Land became a competitor in the Puerto Rican/Canadian market.

Other competition came from Puerto Rico Marine Lines (PRML) serving the Gulf Ports and Trailer Marine Transport (TMT) serving the ports of Miami and Jacksonville, Fla.; both of these companies are owned by Crowley Maritime Corporation.

Thus, for a combination of reasons, including the recession and increased competition, PRMSA experienced financial difficulties in the 1975-76 period. As previously mentioned PRMSA's remedy for this revenue deficiency was to institute a 15-percent general rate increase.

The rate increase was required to overcome an \$11 million deficit that PRMSA incurred during its first year of operation. Furthermore, revenue forecasts done by PRMSA's staff showed that the company could expect to experience a loss of over \$17 million during the September 1975-September 1976 period if no rate relief was granted. PRMSA's revenue deficiency was exacerbated by the unique financial status of the company. The uniqueness of PRMSA was the subject of Docket No. 75-38 which was conducted by the FMC during 1975 and 1976.

PRMSA was created by Public Law 62 of the Legislative Assembly of the Commonwealth of Puerto Rico. Public Law 62 states that PRMSA was to be a nonstock corporation. As a consequence, with no equity funds invested in the company, PRMSA was forced to finance its entire operation from the debt markets. The raising of debt capital was facilitated by the fact that the company's obligations were exempt from taxation. Furthermore, PRMSA paid no Federal income taxes.⁸

In December of 1975, PRMSA obtained a \$60 million loan from Manufacturers Hanover Trust Company which was guaranteed by the Government

Development Bank of Puerto Rico. In addition to this source of financing, PRMSA acquired its equipment and vessels from the original owners through purchase-money notes payable in 6 years. These latter acquisitions amounted to some \$150 million.

The financial result of all these short-term loans was that PRMSA was required to make huge annual interest and principal payments. In addition to these fixed charges, PRMSA had large lease commitments which it assumed when it took over the lease agreements the original owners of the RO/RO vessels (TTT) had incurred from Sun Shipbuilding and Dry Dock Company. The total amount of annual fixed charges amounted to over \$40 million as shown below.

PRMSA's Annual Fixed Charges—1976

Interest on bank loan	\$4,215,000
Other debt repayment	23,175,585
Lease payments	12,850,943
Total	40,241,528

Clearly the company was in a precarious financial situation due to its huge amount of fixed charges which had to be met regardless of the level of income being generated from its operations. The rate increase (15 percent) put into effect helped the company meet its contractual agreements but by 1977 PRMSA needed additional revenue.

Conditions did not improve significantly in 1977 and another general rate increase (10.4 percent) was put into effect on June 19, 1977.

This rate increase was required, according to PRMSA's officials, because the company was sustaining an operating loss of \$504,000 as of March 27, 1977. Adding to the problems of PRMSA were the large nonoperating outlays that were required to service the company's huge debt.

Projections for the July 1977 to June 1978 period showed that the company would experience an \$18 million cash deficit unless the rate increase was approved. The rate increase was projected to increase revenues by \$20 million.

Management said that the reasons for PRMSA's poor financial picture were chiefly the rising cost of bunker fuel, payroll increases for seamen, long-shoremen, and management, and the required upgrading of container and trailer equipment.

PRMSA is not alone in having financial problems with the Puerto Rican trade; on September 1, 1977, Sea-Land Service announced the filing with FMC of a proposed 24-percent rate increase on its U.S. West Coast/Puerto Rico service, to become effective September 29, 1977. This increase follows a 10-percent rate increase in that trade effected earlier this year.

Sea-Land claims that, because the existing rate

⁸ PRMSA was unable to acquire title XI insurance for its obligations, however, unless it was willing to forgo its tax exempt status. Title XI insurance is available to ocean carriers to help ease their cost of borrowing debt capital.

levels allegedly do not justify continuation of direct water service between the West Coast and Puerto Rico, it is considering reemploying its three vessels presently in this service in alternate trades. Cited as contributory factors to nonprofitability in addition to the current rate level were long voyages and a severe cargo imbalance (nearly 6 to 1 eastbound). The carrier may also be anticipating a further increase in Panama Canal tolls following ratification of the pending treaty.

Sea-Land effectively dominates the West Coast/Puerto Rico trade carried by self-propelled dry cargo vessels. In 1975, in fact, it was the only such carrier reporting westbound tonnage in that trade. Either implementation of the rate increase or withdrawal from the trade would be likely to drive cargo to a rail/sea minibridge routing through Atlantic or Gulf Coast ports. While this traffic represents less than 5 percent of Puerto Rico's dry cargo trade with the mainland carried in self-propelled vessels, the eastbound movement has significant levels of foodstuffs.

Carriers in the Trade.—The principal self-propelled dry cargo vessel operator in the U.S. mainland/Puerto Rico trade currently is the Puerto Rico Maritime Shipping Authority (PRMSA). A Board of Directors, appointed by the Governor of Puerto Rico, is responsible for overall policy and direction of the company. However, PRMSA has a contract with Puerto Rico Marine Management, Inc. (PRMMI) for overall conduct of day-to-day operations. PRMMI operates all of PRMSA's ships, controls all the equipment, and manages all the terminals on the mainland as well as in San Juan. PRMSA pays for the management company's costs, in addition to paying it a management fee. Moreover, when PRMSA shows a profit, the management company receives a share.

The composition of the present PRMSA fleet is shown in table 2. The sailing schedule consists of three containership sailings and one trailership sailing weekly between Elizabeth, N.J. and San Juan; one weekly direct trailership sailing between Baltimore and San Juan, and three weekly containership sailings from Baltimore to New Orleans via San Juan outbound and inbound; two weekly containership sailings from Charleston-Jacksonville to San Juan; and one weekly RO/RO sailing from Jacksonville-Miami to San Juan.

For 1975, PRMSA transported 65 percent of the total U.S. mainland/Puerto Rico trade. Excluding U.S. West Coast/Puerto Rico tonnage, a trade in which PRMSA did not participate, PRMSA carried 69 percent of all U.S. mainland/Puerto Rico dry cargo trade. In terms of carriage by self-propelled dry cargo vessels, PRMSA accounted for 87 percent

Table 2.—The PRMSA Fleet

Name	Former name and owner	Year built	DWT tonnage	Carrying capacity
Aguadilla	Transhawaii (Seatrain)	1944	14,500	430 40-ft. units
Carolina	Transidaho (Seatrain)	1944	15,300	430 40-ft. units
Mayaguez	Transoregon (Seatrain)	1944	14,500	430 40-ft. units
Arecibo	Rose City (Sea-Land)	1944	16,000	636 35-ft. units
Borinquen	Trenton (Sea-Land)	1945	17,000	636 35-ft. units
Guayama	New Orleans (Sea-Land)	1944	9,700	360 35-ft. units
Humacao	Brooklyn (Sea-Land)	1945	9,700	360 35-ft. units
San Juan	Chicago (Sea-Land)	1945	17,900	636 35-ft. units
Bayamon	Eric K. Holzer (TTT)	1970	14,200	245 40-ft. slots
Fortaleza	Fortaleza (TTT)	1972	14,000	245 40-ft. slots
Ponce	Ponce de Leon (TTT)	1968	14,500	280 40-ft. slots
Puerto Rico	PRMSA	1975	14,200	280 40-ft. slots

of outbound tonnage and 74 percent of inbound traffic.

A combined total of 11 other self-propelled dry cargo vessel operators were in the U.S. mainland/Puerto Rico trade in 1975. These operators carried only 729,824 tons, or 7 percent, of the total dry cargo and only 9 percent of dry cargo transported by self-propelled vessels. A large portion of this tonnage, 325,210 tons, was carried in the West Coast/Puerto Rico trade, with two carriers accounting for 96 percent of it. A third carrier lifted another 296,328 tons. Therefore, 3 lines accounted for 608,530 tons, or 83 percent, of the 729,824 tons carried by the 11 operators. The remaining 7 operators carried minimal tonnage in small vessels or by space charter.

On January 8, 1977, Seatrain Lines reentered the Puerto Rico trade with a sailing every other week from New York and Norfolk, with the 14,458 dwt containership *Transindiana* which has a carrying capacity of 481 40-foot units. The service is an extension of Seatrain's government contract service to Guantanamo Bay, Cuba.

Sea-Land Service reentered the U.S. mainland/Puerto Rico trade in January 1977 with a weekly sailing from Elizabeth. Subsequently, Sea-Land expanded its service to Puerto Rico in July 1977 with direct service from Baltimore, Charleston, and Jacksonville. The vessels to be employed in this trade include the containerships *Tampa* (13,100 dwt and capacity of 332 containers), *Seattle* (15,400 dwt and capacity of 354 containers) and *Boston* (9,300 dwt and 360 containers).

There were a total of 13 tug/barge lines in the U.S. mainland/Puerto Rico trade in 1975. There were 11 operators outbound and 8 inbound, with 6 lines operating in both directions. Common car-

riage traffic totaled 326,871 tons or 26 percent of the dry barge movement. The remaining tonnage, 901,376 tons, was either contract or dry bulk shipments.

Trailer Marine Transport (TMT), a subsidiary of Crowley Maritime Corporation, was the principal barge operator in the U.S. Atlantic/Puerto Rico trade in 1975. TMT's major trade area is between Jacksonville-Miami and San Juan. The operation is a roll-on/roll-off trailer service of 40-foot trailers which are loaded on doubledeck barges. TMT has 5 doubledeck barges, 400 by 100 feet, with capacity for 180 40-foot trailers. Underdeck storage is available for automobiles and other vehicles. Service is provided from Jacksonville every 2 days and from Miami every 5 days. TMT also recently announced that it has ordered two new 580-foot, triple-deck roll-on/roll-off barges for use in this trade.

Other barge lines between U.S. Atlantic and Puerto Rico ports utilize smaller deck and hopper barges. They do not have fixed schedules and their cargo is usually handled at owners' terminals.

Gulf Caribbean Marine Lines, another Crowley subsidiary, was the major carrier operating in the U.S. Gulf/Puerto Rico trade. This carrier operates large covered deck barges designed for containerized, unitized, and breakbulk cargoes. Eight other barge lines operate in the Gulf/Puerto Rico trade with smaller deck and hopper barges, carrying contract and bulk type cargoes.

Proposed Sale of PRMSA's Assets.—The Commonwealth of Puerto Rico began accepting bids on July 31, 1977, for the purchase of PRMSA's assets which were estimated to be worth around \$300 million.

As of August 3, 1977, PRMSA had received bids from Seatrain Lines, Inc., Puerto Rico Marine Management (PRMMI—the management team, largely composed of ex-Sea-Land employees, that have been running PRMSA) and John J. McMullen Associates. A fourth bidder, Sea-Land, has tendered a bid to repurchase the five former Sea-Land vessels in PRMSA's fleet.

Regardless of when the actual sale takes place, PRMSA is already experiencing increased competition from Sea-Land, Seatrain, and TMT.

Industry sources estimate that this increase in competition has already reduced PRMSA's share of the trade from around 90 percent to an estimated 70 percent, and further inroads seem likely.

Past Problem Areas and Future Prospects for Carriers.—The announcement by the Puerto Rican Government that it intends to liquidate its ownership of PRMSA's assets has renewed interest in how the ocean shipping services serving the island can be improved. One of the major motivations behind the

original creation of PRMSA was to reduce the number of vessels, containers, etc., required to serve the trade and thereby reduce the overall costs of operations.

How much savings was realized from the consolidation of the assets used in the trade remains speculative.⁹ PRMSA officials, however, have been quoted as saying that reductions have been made in the administration staffs, operating crews, and the numbers of vessels since they consolidated the assets of the three previous owners. Regardless of how much savings the rationalization of the assets serving the Commonwealth entailed, the fact remains the PRMSA has increased its rates by over 25 percent from 1975 to 1977.

If we believe that PRMSA did in fact create a more efficient and therefore less costly transportation service, then we must also conclude that rates would have been increased by even larger amounts had the privately owned carriers remained in the trade and offered at least the same level of service.

It is a documented fact that the previous carriers had experienced financial difficulties during the early 1970's just before they sold their assets to PRMSA. Nothing has occurred in this trade since then that would lead us to conclude that if those same carriers reinstituted their service they would not once again face financial difficulties.

With this rather pessimistic background we will present a statement of the problems which carriers have encountered during the last decade as they attempted to serve the U.S. mainland/Puerto Rican trade. Perhaps somewhere in the distilling of problem areas a hint will be found that may offer a suggestion to a solution to the problems which operators in this trade have experienced.

Problems Operators Have Encountered.—The most serious difficulty that carriers have encountered in this trade has been their inability to generate and sustain a profitable operation. Data on file with the FMC shows that, in the aggregate, operators in this trade have incurred losses in that portion of the U.S. Gulf and East Coast/Puerto Rican trade¹⁰ which is subject to FMC regulation.¹¹ In 1975 carriers devoted assets (rate base) of over \$200 million to the trade and realized operating revenues in excess of \$160 million. Total operating expenses, however, exceeded \$165 million, resulting in an aggregate loss position for the operators. Although PRMSA did

⁹ PRMSA introduced an exhibit in Docket No. 75-38 which suggested that had the existing carriers remained in the trade they would have required a 41-percent increase rather than the 15-percent increase PRMSA requested.

¹⁰ Trade between the U.S. West Coast and Puerto Rico is minuscule in comparison with the trade between the other coasts and Puerto Rico.

¹¹ Those items which move under ICC tariffs or on contract rates are not subject to the FMC's jurisdiction. Likewise, cargo movements on tramp and tanker vessels are usually not subject to the FMC's authority.

report an overall profit in its fiscal year ending June 27, 1976, by the first quarter of 1977 it was again losing money and requesting rate relief.

According to PRMSA officials, PRMSA's difficulties are attributable to three basic sources: (1) rising expenses, (2) the need to upgrade and replace operating equipment, and (3) low utilization factors. The increasing level of wages in the maritime industry, increases in bunker fuel oil, and escalating costs of purchasing new vessels are well established facts and not at all unique to PRMSA.

The Maritime Administration has compiled data which show that the total wage bill for a container-ship employing 45 crewmen has increased 45 percent from 1972 to 1976; this is a 10-percent annual increase. In addition, bunker fuel prices have tripled from March 1972 to March 1977. Finally, as an indication of the rise in the price of constructing new containerships, the experience of Matson Navigation Company in the Hawaiian trade is representative. Matson recently acquired a new "071" container-ship (capable of transporting over 1,150 24-foot containers), which cost (including financing, spare parts, containers, etc.) \$65 million. This new vessel, the *Maui*, is the sister ship of the *Hawaiian Enterprise* which entered the Hawaiian service in 1970 and cost \$23 million.

Considering the fact that eight of PRMSA's vessels are now more than 30 years old (although they were refurbished and converted to containerships in the 1960's), it is not hard to believe that the assets devoted to the Puerto Rican trade will have to be replaced in the near future. One representative of PRMMI, the management organization that runs the Puerto Rican merchant marine, has estimated that the cost of purchasing new vessels and equipment for PRMSA's fleet over the next 10 to 15 years could amount to \$500 million.

In addition to the escalation in vessel costs, equipment required to complement these vessels has also increased in price in the last few years. PRMSA officials, in fact, have stated that the cost of a refrigerated trailer had increased 46 percent from 1974 to 1976 and the fuel to run these units had increased 82 percent during the same period.

The problem of low utilization predates the formation of PRMSA. Statistics available for Seatrain's operation in the 1971-72 period show southbound utilization rates fluctuating between 70 and 90 percent.¹²

Although Sea-Land and TTT experienced fairly high utilization rates, in 90- and 80-percent range, respectively, utilization rates overall appear to have

been lower than required for all operators in the trade to be profitable.

Attributing its low utilization to the recession, PRMSA reported vessel utilization rates of 74 percent for the third quarter of 1975 and 80 percent for the fourth quarter. Although utilization improved in 1976, by early 1977 PRMSA officials again attributed lower revenues to utilization rates averaging between 75 and 80 percent.

Utilization rates are of critical importance to industries such as the containerized ocean freight industry which are capital intensive and therefore have a large portion of their costs which are fixed. The presence of, proportionately, a large amount of fixed costs, requires the meeting of expenses which do not vary proportionately with fluctuations in output (utilization). As a consequence, prolonged periods of low utilization will lead to a larger percentage reduction in revenue than expenses and leave the company in a situation where it may not be able to meet its debt service requirements, leasing commitments, or other contractual obligations. These types of obligations remain, even if the firm decides to reduce the number of sailings in order to save vessel operating expenses. All in all, low utilization rates, while not desirable to any firm, are especially destructive to capital-intensive firms. Clearly, the low utilization rates that carriers have experienced in the southbound vessel movements during the 1970's in the Puerto Rican trade have contributed to the financial difficulties of the various operators.

One attempt to solve the underutilization problems, as has already been mentioned, was PRMSA's consolidation of the number of vessels used in the trade.¹³ PRMSA's lack of success in accomplishing this goal can be attributed to two factors: (1) the reduction in cargo demand due to the 1974-75 economic recession and (2) the reintroduction of competition in 1975 when Seatrain, Sea-Land, and others either entered the trade or upgraded their service in the U.S. mainland/Puerto Rican trade. As earlier stated, PRMSA's market share has been further reduced by increased competition in 1977. A current solution to the utilization problem is therefore nowhere in sight.

The solution to the problem of escalating expenses is likewise elusive. Present conditions in the maritime industry offer little hope that wage demands, the price of fuel, or the costs involved in the construction of new vessels and equipment will be abated in the near future. The continual rise in the cost of providing ocean freight service has affected all U.S. carriers operating in the many foreign and domestic trades served by U.S. operators and are not unique to the Puerto Rican trade.

¹² As previously mentioned, the Puerto Rico trade is imbalanced, with approximately 1 full container moving northbound for every 4 containers moving southbound. The imbalance in refrigerated containers is more pronounced, with approximately 15 containers moving southbound for each northbound container.

¹³ Previously, 14 vessels had been used rather than the 11 PRMSA used in the trade.

Perhaps the success that Matson Navigation Company has enjoyed in the Hawaiian trade during the past few years offers some insight into the type of operation that may be required in the Puerto Rican trade to ensure a successful operation.

Matson has been able to achieve a positive, if not excessive, rate of return on its rate base continually since 1953 (see table 3). Although its rate of return fell off from 1969-72 (a period when Seatrain Lines, Calif., offered meaningful competition) the past several years have seen a resumption of a respectable level of earnings.

Table 3.—Matson Navigation Company—Return on Rate Base (1947-75)

[Thousands of dollars]

Year	Gross revenue	Net income after taxes	Return on rate base (percentage)
1947	28,949	(606)	(3.43)
1948	21,301	(1,478)	(6.36)
1949	18,018	(1,561)	(6.52)
1950	28,725	1,129	4.55
1951	33,525	1,655	7.83
1952	27,492	(566)	(2.81)
1953	36,206	1,242	6.46
1954	34,690	361	1.98
1955	44,105	1,235	6.62
1956	47,215	854	4.55
1957	52,290	896	5.00
1958	48,697	449	2.58
1959	50,122	415	2.30
1960	59,505	813	3.27
1961	53,805	481	1.84
1962	53,109	2,580	11.39
1963	60,949	4,226	17.90
1964	63,201	5,633	20.65
1965	64,971	4,780	15.52
1966	67,570	5,116	11.77
1967	63,985	4,375	10.64
1968	73,565	5,443	12.04
1969	73,597	1,130	2.68
1970	73,810	3,293	5.47
1971	57,743	629	.79
1972	63,828	2,211	2.87
1973	92,357	6,301	8.75
1974	124,596	6,564	8.70
1975	180,672	5,887	7.85
1971-75			5.79
1956-75			7.16

Source: Testimony of Zvi Benderly, FMC Docket No. 76-43.

It should be noted, however, that Matson has not achieved this level of earnings without a cost. Since 1971 Matson has increased rates in the Hawaiian trade by approximately 50 percent. In most cases the company was able to document a need for these additional revenues (verified increases in the underlying costs of operations). Many of the cost increases which affected Matson's operation are similar to those facing operators in the Puerto Rican trade.

A large portion of Matson's increased costs, however, were due to its vessel upgrading program. Beginning in 1970 the company has purchased three 071 type vessels capable of carrying over 1,150 24-

foot containers and two RO/RO vessels capable of carrying 430 24-foot trailers.

Through the acquisition of the new vessels Matson has introduced some of the most technologically advanced methods of transporting cargo in the maritime industry. At the same time this new equipment was being purchased, Matson was able to control a sizable share of the dry cargo moving between the mainland and Hawaii. In fact, Matson also carries large quantities of bulk fuel oil to the islands and much of the sugar and molasses, and pineapple which constitutes the majority of the tonnage that moves eastbound from Hawaii. Control over this eastbound tonnage is critical because the Hawaiian trade, like the Puerto Rican trade, is imbalanced.

The key, then, to Matson's success appears to be based on adopting modern, efficient technology in the trade and simultaneously maintaining a sizable share of the market. These two factors, in fact, go hand in hand since the introduction of new expensive equipment, and the fixed charges this entails, require that the operation be run at a high rate of utilization.

One solution, then, to the success of an operator in the Puerto Rican trade may be to follow Matson's example and introduce more efficient equipment into the trade and at the same time strive to gain a large share of the market. Obviously, this is easier said than done and much depends on the reaction of other competitors to one firm's attempt to dominate the market. Nevertheless, it seems apparent that to be successful in the Puerto Rican trade a carrier must (1) adopt the most efficient maritime technology and (2) gain a large share of the market and retain it.

Some speculation may be in order as to the geographic character of future Puerto Rican domestic waterborne commerce and the type of equipment likely to be employed therein.

There could well be a shift in the mainland center of gravity of the trade. The ever-increasing cost of shipping through New York and other northeastern ports may impel more dry cargo to mid-Atlantic and South Atlantic ports. If West Coast service is discontinued or priced out of competition, Gulf Coast ports could gain through minibridge routing.

The design of vessels employed could also undergo a change, moving from the current emphasis on pure containerships and roll-on/roll-off types to greater use of multipurpose designs able to handle a cargo mix of containers, wheeled or tracked vehicles, bulk liquids, and breakbulk material, for example. The lower capital and operating cost structure of tug/barge units—both conventional and integrated—may give them a competitive edge on the shorter routes while the long-hauls may support self-propelled vessels of 20-knot-plus speeds.

Commodity Movements 1972-75.—Comparative dry cargo movements in Puerto Rico's domestic trade are shown in table 4 for the years 1972

through 1975, including the 4-year growth percentage. Details of activity in 1975, the most recent year for which full data is available, follow.

Table 4.—Dry Cargo Between the United States and Puerto Rico, by Regions—1972-75

[In tons of 2,000 pounds]

	1972	1973	1974	1975	Percentage increase (decrease) 1972-75
Outbound total	3,904,528	4,004,057	4,493,362	4,146,507	6.2
Region:					
North Atlantic	2,046,516	2,160,308	2,611,596	2,056,053	.5
South Atlantic	682,602	732,168	691,176	709,153	3.9
Gulf	940,338	826,996	851,364	1,084,865	15.4
West Coast	235,072	284,585	339,226	296,436	26.1
Inbound total	1,083,040	1,338,946	1,835,140	1,401,286	29.4
Region:					
North Atlantic	811,743	985,713	1,297,551	1,066,795	31.8
South Atlantic	171,238	232,967	265,349	173,792	1.5
Gulf	74,957	89,147	202,857	135,833	81.2
West Coast	25,102	31,119	69,383	24,866	(9)
Total dry cargo trade	4,987,568	5,343,003	6,328,502	5,547,793	11.2

Puerto Rico's total dry cargo trade moving between the Commonwealth and U.S. mainland ports totaled 5.5 million short tons in 1975. Outbound (mainland to Puerto Rico) traffic amounted to 4.1 million short tons while inbound (Puerto Rico to mainland) traffic was 1.4 million short tons. Although outbound traffic exceeded inbound in a ratio of 2.9 to 1, there was some improvement over the 1972 imbalance ratio of 3.6 to 1. Self-propelled dry cargo vessels carried 4.3 million tons in 1975, 3.1 million tons southbound and 1.2 million tons northbound. Dry cargo barges carried 1.2 million tons for 1975, 1.0 million tons southbound and 194,617 tons northbound.

The four U.S. mainland regions serving Puerto Rico include North Atlantic, South Atlantic, Gulf, and West Coast. Table 1 shows the movements of dry cargo by these four regions. The North Atlantic region, extending from Eastport, Maine, to the boundary of Virginia/North Carolina is the major trade area with respect to U.S. mainland/Puerto Rico dry cargo traffic. The principal North Atlantic ports by tonnage are New York and Baltimore. In 1975, their traffic amounted to 3.4 million tons, or 56 percent of the total. Outbound shipments accounted for 2.1 million tons while 1.3 million tons moved inbound, for an imbalance ratio of 1.6 to 1. Virtually all this traffic, 3.2 million tons, moved in self-propelled vessels. In 1975, the North Atlantic region total dry cargo represented an increase of 9.2 percent over the 2.9 million tons in 1972. Although the overall tonnage increased by only 9.2 percent over the 4-year period, outbound traffic to Puerto Rico increased by less than 1 percent while inbound grew by 32 percent.

The principal moving commodities of this outbound traffic flow consisted of food staples, machinery, paper and paperboard, textile products, motor vehicles, manufacturing products, and alcoholic beverages. Inbound cargo from Puerto Rico is composed largely of fish products, finished textile products, liquor, plastic materials, and basic chemicals.

The South Atlantic region extends from Cape Hatteras to the Florida Keys. In 1975, South Atlantic dry cargo traffic to Puerto Rico totaled 882,945 tons. This traffic represented approximately 16 percent of the U.S. mainland/Puerto Rico dry cargo trade. The bulk of this trade, or 709,153 tons, moved outbound, with only 173,792 tons moving inbound, for an imbalance ratio of 4.08 to 1. The main South Atlantic ports serving Puerto Rico are Charleston, Jacksonville, and Miami. Self-propelled vessels carried 480,281 tons and barges transported 402,664 tons. For the 4-year period traffic increased by only 29,105 tons, or 3.4 percent. The principal outbound traffic consisted of food staples, paper and paperboard, and textile products. Inbound shipments were mainly fish products, finished textile products, and liquor.

The Gulf region extends from the Florida Keys to Brownsville, Tex. In 1975, Gulf dry cargo traffic to and from Puerto Rico totaled 1.2 million tons, representing approximately 22 percent of the U.S.-Puerto Rico dry cargo trade. Most of this tonnage, 1.1 million tons, was outbound traffic. Inbound traffic accounted for only 11 percent of the Puerto Rico-Gulf trade. Although the North Atlantic and South Atlantic/Puerto Rico trades showed an increase of under 10 percent over the 4 years, the Gulf trade registered an increase of approximately 20 percent

since 1972. While outbound traffic still accounted for approximately 89 percent of the Gulf/Puerto Rico trade, the inbound trade did increase by about 81 percent in the 1972-75 period. The trade is distinguished by the fact that barges carried the predominant amount of dry cargo, 394,263 tons, compared to only 62,213 tons for self-propelled dry cargo vessels. The major moving commodities outbound were farm products, food products, lumber, and iron and steel products. Principal inbound traffic movement consisted of food products, fish products, liquor, and basic chemicals.

Dry cargo traffic between West Coast ports and Puerto Rico totaled 321,320 tons in 1975, accounting for only 5.8 percent of the total U.S.-Puerto Rico traffic flow. The bulk of the traffic, 296,436 tons, was outbound to Puerto Rico. All the cargo was transported in self-propelled dry cargo vessels. The principal commodities in the outbound trade consisted of food products, paper and paperboard. Inbound cargo consisted mainly of farm products and machinery. PRMSA's share of the 1975 dry cargo market is shown in table 5.

Table 5.—Total Dry Cargo Tonnage Carried by PRMSA in Relation to Total Tonnage—1975

[In short tons]

	Total tonnage	PRMSA	Percentage by PRMSA
Outbound	3,850,071	2,729,587	70.9
Region:			
North Atlantic	2,056,053	1,917,832	93.3
South Atlantic	709,153	478,267	67.4
Gulf	1,084,865	333,488	30.7
Inbound	1,376,420	869,862	63.2
Region:			
North Atlantic	1,066,795	744,249	69.8
South Atlantic	173,792	74,886	43.1
Gulf	135,833	50,728	37.3
Total	5,226,491	3,599,449	68.9

Non-self-propelled barge operations are also a major factor in the U.S. mainland/Puerto Rico trade. The 1975 barge tonnage amounted to 1.2 million tons or 22 percent of the total trade. Outbound barge tonnage was 1.0 million tons or 25 percent of the total outbound dry cargo traffic while inbound barge tonnage was only 194,462 tons or 14 percent of the total inbound dry cargo trade. This represents an imbalance ratio of 5.1 to 1. Table 6 shows the division of the outbound/inbound traffic flow.

The principal commodities moving outbound consisted of food products, pulp, paper and paperboard, glass and glass products, iron and steel products, motor vehicles, and metal containers. The bulk of the inbound traffic consisted of food products, plastic materials, basic chemicals, and sorghum grains.

Table 6.—Dry Cargo Barge Movement Between U.S. Mainland and Puerto Rico—1975

[In short tons]

Region	Outbound	Inbound
North Atlantic	124,990	42,380
South Atlantic	215,461	93,691
Gulf	593,334	58,391
Total	1,033,785	194,462

Puerto Rico's total bulk liquid cargo trade moving between the Commonwealth and U.S. mainland ports totaled 6.6 million tons in 1975. The outbound (mainland to Puerto Rico) traffic accounted for 356,225 short tons, while the inbound (Puerto Rico to mainland) traffic amounted to 6.2 million tons. In contrast to the dry cargo trade, a vast majority of the bulk liquid cargoes transported between Puerto Rico and the U.S. mainland occurred on the inbound trade (95 percent). The principal commodities involved in this trade, both for the inbound and for the outbound portions, were gasoline, distillate and residual fuel oils, lubricating oils and greases, alcohols, sodium hydroxide, and basic chemicals and products. Nearly 89 percent of the total tonnage consisted of refined petroleum products and petrochemicals.

Between 1972 and 1975, the outbound trade showed a 24 percent increase, whereas the inbound trade was subjected to a 10 percent reduction. Overall, the Puerto Rico to mainland trade witnessed a 9 percent decrease between the years 1972 and 1975, going from 7.2 to 6.6 million tons. Table 7 presents these overall figures, together with a breakdown by type of vessel used in the trade.

Table 7.—Liquid Bulk Cargo Trade Between the United States and Puerto Rico (1972-75)

[In short tons]

	1972	1973	1974	1975	1972-75 (percentage)
Outbound:					
Tank vessel	208,692	170,817	303,339	234,701	+12
Tank barge	77,626	78,449	63,201	121,524	+56
Subtotal	286,318	249,266	366,540	356,225	+24
Inbound:					
Tank vessel	5,609,781	5,763,320	5,412,646	4,830,551	-14
Tank barge	1,305,892	808,402	1,004,259	1,418,945	+8
Subtotal	6,915,673	6,571,722	6,416,905	6,249,496	-10
Total	7,201,991	6,820,988	6,783,445	6,605,721	-9

Self-propelled tankers represent the great majority of the types of vessels used in the transportation of bulk liquids. Nonetheless, tank/barges have increased their share of total carriage, jumping from 77,626 tons in 1972 to 121,524 tons in 1975 in the outbound trade, for a decrease in the tank/barge ratio from 2.7 to 1 to 1.9 to 1. In the outbound

Table 8.—Liquid Bulk Cargo Carried by Self-Propelled Tankers Between the United States and Puerto Rico, by Region—1975

[In short tons]

	North Atlantic	South Atlantic	Gulf
Inbound	(79%) 3,860,475	353,037	617,039
Outbound	13,920	886	(94%) 219,895

Table 9.—Liquid Bulk Cargo Carried by Non-Self-Propelled Tank/Barges Between the United States and Puerto Rico, by Region—1975

[In short tons]

	North Atlantic	South Atlantic	Gulf
Inbound	356,868	(62%) 891,722	170,355
Outbound	4,506	—	(96%) 121,524

trade there was a similar reduction in the difference between self-propelled and non-self-propelled vessels used from 4 to 1 to 3 to 1. There were a total of 18 tanker operators involved in the transportation of bulk liquids in both the inbound and outbound trades, compared to 9 operators of tank/barges.

In 1975, for the inbound trade, two self-propelled vessel operators carried 61 percent of the bulk liquids, whereas one operator of non-self-propelled vessels carried 77 percent of the products, mostly gasoline.

Table 8 shows that, for the inbound traffic, the North Atlantic region received 3.8 million or 79 percent of the bulk liquids transported via tankers, whereas the Gulf region shipped 94 percent (219,895 tons) of the same type commodities outbound to Puerto Rico. Table 9 shows the traffic breakdown for inbound/outbound non-self-propelled vessels between Puerto Rico and North Atlantic, South Atlantic, and Gulf. For the inbound trade, 62 percent of the traffic was with the South

Atlantic region, while trade with the Gulf region represented 96 percent of the outbound traffic. There was virtually no traffic between Puerto Rico and the West Coast of the United States.

Forecast of Domestic Trade.—The Maritime Administration does not yet have an operational domestic trade forecasting system capable of using historical data and other inputs to predict long-term behavior of Puerto Rican domestic ocean commerce.

Even the use of such standard statistical techniques as correlation and regression analysis for near-term forecasting is not considered feasible due to the severe economic dislocations recently experienced by the Commonwealth which have drastically altered prior shipping patterns.

This dislocation can perhaps be illustrated by a forecast prepared for MARAD several years ago as part of a Domestic Waterborne Shipping Market Analysis performed by A. T. Kearney, Inc. Reproduced here as table 10, this forecast extends from the base year of 1969 through the year 2000 and represents 19 somewhat arbitrary commodity groupings.

Although actual 1975 experience is now available, it cannot be used for a thorough updating of the forecast because some of the commodity groupings do not correspond to those for which 1975 data exists.

More importantly, however, table 10 anticipated that Puerto Rico's economic expansion would continue at somewhere near the healthy pace experienced during the decade preceding its preparation, which saw a 600-percent increase in GNP over 10 years. It also assumed that the character of the economy would follow certain trends visible at the time. These trends included an increasing concentration of

Table 10.—Commodity Flow Forecasts for the Puerto Rican Trade

[In thousands of short tons]

Commodity	Base year	1975	1980	1985	1990	1995	2000	Percentage growth
Cash grains	544.979	612.173	720.514	847.972	997.976	1,174.516	1,382.289	154
Iron ore .....	.391	.421	.480	.546	.621	.706	.803	105
Metal ores .....	.428	.513	.651	.822	1.038	1.312	1.659	287
Coal .....	.227	.250	.266	.282	.300	.319	.339	49
Crude petroleum .....	.005	.006	.005	.005	.004	.004	.004	(-20)
Sugar	222.059	236.692	256.543	278.039	301.337	326.586	353.953	59
Canned fruits and vegetables	190.452	225.378	273.972	325.786	391.689	470.925	566.190	197
Grain mill products	171.110	195.030	227.710	265.849	310.375	362.360	423.053	147
Lumber	73.849	86.224	97.759	110.827	125.643	142.439	161.481	118
Paper	154.523	190.123	234.132	288.307	355.018	437.167	538.324	248
Chemicals	1,312.504	1,592.326	2,160.752	2,931.949	3,978.358	5,398.231	7,324.857	458
Fuels	3,178.269	3,775.147	4,526.488	5,427.255	6,507.277	7,802.222	9,354.811	194
Primary iron and steel	152.034	179.200	208.968	243.675	284.146	331.340	386.372	154
Nonferrous primary metals	32.923	40.681	49.105	59.266	71.531	86.335	104.204	216
Fabricated metal products	171.564	219.204	263.055	315.654	378.794	454.551	545.458	218
Agricultural products	183.717	206.609	240.597	280.175	326.262	379.933	442.433	141
Mining products	50.474	62.993	75.156	90.533	109.056	136.369	158.247	214
Nonurable manufactures	1,054.291	1,231.517	1,473.478	1,762.869	2,108.036	2,522.047	3,017.377	186
Durable manufactures	405.181	493.186	623.694	788.661	997.262	1,261.046	1,594.592	293
Total	7,898.980	9,346.968	11,433.325	14,018.482	17,571.511	21,283.408	26,356.496	234

chemical processing capacity within the Commonwealth, development of additional petroleum refining capacity within Puerto Rico, expansion of manufacturing capacity, and sustained consumer product demand.

The double-barreled effect of the slowdown in capital investment by mainland firms during the recession and of the drastic revisions to the sources, supply levels, price, and extent of Federal regulation of petroleum resulting from the 1973 OPEC embargo considerably impeded continuation of these trends. Particularly hard hit were the first two, relying as they did upon free access to moderately priced crude oil and naphtha for processing.

Although an upturn point may now have been attained, the distorting effect of the experience of the years 1973-76 is considered such that to use data from that period in a forecasting effort would be unlikely to yield results having much planning value.

Domestic Oceanborne Freight Rates.—The United States is the Commonwealth of Puerto Rico's major trading partner even though the two areas are separated by over a thousand miles of ocean. This separation has caused the economy of the Commonwealth to become heavily dependent on ocean shipping for providing transportation services between the mainland and Puerto Rico. Since ocean transportation costs, like all costs, must eventually be recovered in the final sales price of the items shipped, these transportation charges ultimately increase the cost of living in Puerto Rico.

Impact on Cost of Living.—Studies by the United States Civil Service Commission (CSC) suggest that prices in Puerto Rico are higher than on the mainland.¹⁴ In 1976, the CSC determined that prices in the San Juan metropolitan area were 13.4 percent higher than prices in Washington, D.C. Comparison of expenses in areas outside the San Juan region indicate that the cost of living in these outlying areas exceeds living expenses in the Nation's Capital by 5.4 percent. It should be mentioned that the CSC undertook these studies to ascertain whether Federal employees in Puerto Rico needed a pay adjustment to compensate for the higher cost of living on the island. These studies only compared Puerto Rico to Washington, D.C.; however, the U.S. Bureau of Labor Statistics publishes reports which indicate that living costs in Washington, D.C., are fairly representative to the norm for U.S. metropolitan areas. Thus it is possible to conclude generally that living costs in Puerto Rico are higher, on the average, than in the United States.

The Civil Service Commission report tells us that

¹⁴ United States Civil Service Commission, Federal Personnel Manual System, FPM Letter 591-18, Washington, D.C., Aug. 25, 1977.

prices are relatively higher in Puerto Rico, however, it is interesting to compare Puerto Rico's inflation rate over time with the U.S. rate. The Consumer Price Indices (CPI) for the two areas are shown in table 11. For the 10-year period, 1967-76, the Commonwealth has seen its CPI rise by 5.93 percent annually. The United States, on the other hand, has seen the all-item CPI for the 50 States increase by 6.11 percent per year since 1967. Thus, the rate of inflation in Puerto Rico has been slightly less than in the United States for the 10-year period. It is important to note that this fact does not contradict the CSC's findings. A lower inflation rate does not necessarily imply a lower cost of living at any one point in time, because the different rates of inflation are applied to different bases.

Table 11.—All-Items Consumer Price Index for Puerto Rico and the United States, 1967-76

Year	United States	Puerto Rico
1967	100.0	100.0
1968	104.2	102.8
1969	109.8	105.0
1970	115.3	109.6
1971	121.3	114.4
1972	125.3	117.9
1973	133.1	126.6
1974	147.7	151.7
1975	161.2	164.7
1976	170.5	168.0

Source: U.S. Department of Labor, Bureau of Labor Statistics, and Commonwealth of Puerto Rico Department of Labor, Bureau of Labor Statistics.

As was alluded to earlier, the majority of the Commonwealth's external commerce is carried on with the United States. Data available for the period 1963 until the present indicate that, in terms of dollar value, the United States has purchased, on the average, 88 percent of Puerto Rico's exports annually. Table 12 gives a yearly breakdown and shows

Table 12.—Value of Puerto Rican Exports: 1950-76
(In millions of dollars)

Fiscal year	Total Puerto Rico exports	Puerto Rico exports to United States	United States percentage of total
1950	235	210	89
1960	622	594	95
1963	845	803	95
1964	918	865	94
1965	974	911	94
1966	1,155	1,055	91
1967	1,321	1,174	89
1968	1,449	1,256	87
1969	1,606	1,396	87
1970	1,729	1,533	89
1971	1,797	1,578	88
1972	1,974	1,744	88
1973	2,465	2,184	89
1974	3,339	2,842	85
1975	3,138	2,653	85
1976	3,346	2,817	84

Source: Commonwealth of Puerto Rico, Puerto Rico Planning Board, *Socioeconomic Statistics of Puerto Rico*, Fiscal Years 1940, 1950, 1960, 1963-76.

that the United States has received as much as 95 percent of the island's exports in some years. The majority of the Commonwealth's imports also come from the mainland (see table 13). In 1976, goods valued at \$2.8 billion were shipped from Puerto Rico to the United States. On the import side, \$3.4 billion worth of goods moved from the United States to the island in 1976.

Table 13.—Value of Puerto Rican Imports: 1950–76
(In millions of dollars)

Fiscal year	Total Puerto Rico imports	Puerto Rico imports to United States	United States percentage of total
1950	345	318	92
1960	915	761	83
1963	1,160	942	81
1964	1,354	1,119	83
1965	1,515	1,242	82
1966	1,659	1,357	82
1967	1,805	1,463	81
1968	1,969	1,570	80
1969	2,263	1,765	78
1970	2,556	1,964	77
1971	2,879	2,202	76
1972	3,108	2,270	73
1973	3,496	2,537	73
1974	4,261	2,676	63
1975	4,951	3,005	61
1976	5,432	3,389	62

Source: Commonwealth of Puerto Rico, Puerto Rican Planning Board, *Socioeconomic Statistics of Puerto Rico*, Fiscal Years 1940, 1950, 1960, 1963–76.

The 1970 *Puerto Rican-Virgin Island Trade Study*¹⁵ indicated that 99 percent of Puerto Rico's domestic imports were transported by water and a review of more recent data indicates that this relationship has not changed significantly. Unquestionably then, the costs associated with ocean transportation especially in the domestic trades, impact on the entire economy of the Commonwealth of Puerto Rico. FY 1975 data indicate that inbound freight costs amounted to \$519 million. Comparison of this figure to the value of total imports for FY 1975 found in table 13 indicates that freight costs, the majority of which are ocean shipping costs, amounted to 10.5 percent of the value of the imports. Outbound freight costs in FY 1975 were \$261 million. By making a similar calculation as above, it can be determined that the export freight costs amounted to 8.3 percent of the value of the exports from Puerto Rico.

The June 1977 report entitled *Relative Importance of the Consumer Goods and Services in the Consumer Price Index for Wage Earners' Families in Puerto Rico*¹⁶ indicates that in excess of 49 percent of the money spent by Commonwealth families went for the purchase of food items. The *Puerto*

Rican-Virgin Islands Trade Study released in 1970 contained a section which measured the relationship between the wholesale price of various commodities and the freight rates charged to transport these items from the United States to Puerto Rico. This study found that ocean transportation costs amounted to approximately 11 percent of the wholesale price of food in Puerto Rico.

Other relationships found in the 1970 study indicated that ocean transportation charges amounted to 9 percent of the wholesale price of selected household goods (refrigerators, stoves, sewing machines, washing machines, and TV sets); similarly, the rates on automobiles were equal to 9 percent of their wholesale prices. These relationships may be somewhat low in today's market since total inbound freight costs as a percentage of the value of imports have been rising. For example, in 1967, total freight as a percent of total imports was 7.1 percent, while in 1975, this figure had risen to 10.5 percent.

Analysis of Freight Rate Charges in the Puerto Rican Trade.—Ocean freight rates for 12 of the leading commodities moving between the mainland and Puerto Rico are recorded on table 14 for January 1 of each year from 1965 to 1977. In addition, the rates in effect on August 1, 1977, are also listed. These commodities were selected from the top 15 major-moving items listed by the Puerto Rico Maritime Shipping Authority (PRMSA) in reports filed with the Federal Maritime Commission (FMC) in 1976. These 12 categories of products accounted for 29 percent of the revenue tons carried and 31 percent of the revenues earned by PRMSA for the period June 30, 1975, through June 27, 1976.

A review of table 14 indicates that freight rates in the Puerto Rican domestic offshore trade remained very stable for the 5-year period, 1966–71. With the exception of the rates on "Fruits and Vegetables," and "Soap and Related Products" the rates on the other commodities examined remained constant or decreased over the period. The Consumer Price Index (CPI) for Puerto Rico over the same time span, 1966–71, rose by 14.4 percent (see table 11). Thus, during the late 1960's and early 1970's, it must be concluded that ocean freight rates did not contribute to the rising prices experienced throughout the Commonwealth.

For one half of the items listed in table 14, it was possible to calculate meaningful percentage changes in their rates for the 10-year period, January 1, 1967, to January 1, 1977, and compare the changes with increases in the Puerto Rican CPI.¹⁷ The other major-moving commodities did not lend themselves to analysis over this period because of tariff

¹⁵ Federal Maritime Commission, Bureau of Domestic Regulation, *Puerto Rican-Virgin Islands Trade Study*, April 1970.

¹⁶ The Commonwealth of Puerto Rico, Department of Labor and Human Resources, *Relative Importance of the Consumer Goods and Services in the Consumer Price Index for Wage Earners' Families in Puerto Rico*, June 1977.

¹⁷ The rate increases referred to in this section pertain to trailer load (TL) shipments.

Table 14.—Selected Southbound Ocean Freight Rates from New York, N.Y., to San Juan, Puerto Rico, as of January 1 for the Years 1965–77 and for August 1, 1977

[Rates in dollars]

Commodity	1/1/65 ¹	1/1/66 ¹	1/1/67 ¹	1/1/68 ¹	1/1/69 ¹	1/1/70 ¹	1/1/71 ¹
Vehicles, self-propelled passenger cars, N.O.S. _____	.32 ft ³	.37 ft ³	.37 ft ³	.37 ft ³	.37 ft ³	.37 ft ³	.37 ft ³
Dry Goods:							
A.Q. _____	.54 ft ³	.54 ft ³	.54 ft ³	.54 ft ³	—	—	—
LTL _____	—	—	—	—	.54 ft ³	.54 ft ³	.54 ft ³
TL—Minimum 1,650 ft ³ _____	—	—	—	—	.48 ft ³	.48 ft ³	.48 ft ³
Maximum trailer charge _____	—	—	—	—	783.00	783.00	—
Freight, all kinds—per trailer _____	800.00	800.00	800.00	800.00	765.00	765.00	765.00
Canned or bottled foodstuffs:							
LTL:							
Per ft ³ _____	.49	.49	.49	.49	.49	.49	.49
Per cwt _____	1.25	1.25	1.25	1.25	1.55	1.55	1.55
TL—minimum 43,000 lbs. _____	—	—	—	—	1.15 cwt	1.15 cwt	1.15 cwt
TL—minimum 45,000 lbs. _____	—	—	—	—	—	—	—
Minimum weight per shipment 86,000 lbs. _____	—	1.15 cwt	1.15 cwt	1.15 cwt	—	—	—
Minimum weight per shipment 129,000 lbs. _____	—	1.05 cwt	1.05 cwt	1.05 cwt	—	—	1.05 cwt
Beverages, in barrels, glass, bottles, or cans, viz malt:							
A.Q. _____	1.05 cwt	1.05 cwt	1.05 cwt	—	—	—	—
ATL _____	—	—	—	1.45 cwt	1.45 cwt	1.45 cwt	1.45 cwt
TL—minimum 40,000 lbs. _____	—	—	—	1.05 cwt	1.05 cwt	1.05 cwt	1.05 cwt
TL—minimum 42,000 lbs. _____	—	—	—	—	—	—	—
TL—minimum 45,000 lbs. _____	—	—	—	—	—	—	—
Fruits or vegetables, fresh (not frozen), N.O.S. (refrigerated):							
LTL _____	1.09 ft ³	1.09 ft ³	1.09 ft ³	1.09 ft ³	1.09 ft ³	1.09 ft ³	1.09 ft ³
TL—(per trailer) shipper load-consignee unload _____	610.00	610.00	610.00	—	—	—	—
TL—(per trailer) shipper load _____	650.00	650.00	650.00	660.00	688.00	688.00	688.00
TL—(per trailer) carrier load _____	—	—	—	700.00	728.00	728.00	728.00
Poultry, N.O.S., frozen (refrigerated):							
LTL _____	3.61 cwt	3.50 cwt	3.50 cwt	3.50 cwt	3.50 cwt	3.50 cwt	3.50 cwt
TL—minimum 30,000 lbs. _____	3.00 cwt	—	—	—	—	—	—
TL—minimum 36,000 lbs. _____	—	2.50 cwt	2.50 cwt	2.50 cwt	2.50 cwt	2.50 cwt	2.50 cwt
TL—minimum 40,000 lbs. _____	2.50 cwt	—	—	—	—	—	—
Soap and related articles:							
LTL _____	1.54 cwt	1.54 cwt	1.54 cwt	1.54 cwt	1.54 cwt	1.64 cwt	1.64 cwt
TL—minimum 32,000 lbs. _____	1.24 cwt	1.24 cwt	1.24 cwt	1.24 cwt	1.24 cwt	1.24 cwt	1.24 cwt
TL—minimum 36,500 lbs. (shipper load) _____	—	—	—	—	—	—	—
TL—minimum 39,000 lbs. _____	—	—	—	—	—	—	—
TL—minimum 43,000 lbs. _____	—	—	—	—	—	—	—
Paper or paper articles, viz pulpboard, in rolls:							
LTL:							
Per ft ³ _____	—	—	—	—	—	—	—
Per cwt _____	1.35	1.35	1.35	1.35	1.35	1.35	1.35
TL—minimum 38,000 lbs. _____	.95 cwt	.95 cwt	.95 cwt	—	—	—	—
TL—minimum 40,000 lbs. _____	—	—	—	1.00 cwt	1.00 cwt	1.00 cwt	1.00 cwt
TL—minimum 45,000 lbs. _____	—	—	—	—	—	—	—
Furniture, N.O.S.:							
LTL:							
Per ft ³ _____	.53	.53	.53	.53	.53	.53	.53
Per cwt _____	1.29	1.29	1.29	1.29	1.59	1.59	1.59
TL—minimum 1,600 ft ³ _____	.47 ft ³	.47 ft ³	.47 ft ³	.47 ft ³	.47 ft ³	.47 ft ³	.47 ft ³
Maximum trailer charge _____	—	—	—	—	717.00	717.00	717.00
TL—loose, minimum 1,800 ft ³ _____	—	—	.47 ft ³	.47 ft ³	.47 ft ³	.47 ft ³	.47 ft ³
Maximum trailer charge, loose _____	—	—	—	—	739.00	739.00	739.00

Commodity	1/1/72 ¹	1/1/73 ¹	1/1/74 ¹	1/1/75 ²	1/1/76 ²	1/1/77 ²	8/1/77 ²
Vehicles, self-propelled passenger cars, N.O.S. _____	.38 ft ³	.38 ft ³	.46 ft ³	.50 ft ³	.58 ft ³	.58 ft ³	.64 ft ³
Dry goods:							
A.Q. _____	—	—	—	—	—	—	—
LTL _____	.56 ft ³	.69 ft ³	.83 ft ³	.90 ft ³	1.04 ft ³	1.04 ft ³	1.15 ft ³
TL—minimum 1,650 ft ³ _____	.44 ft ³	.50 ft ³	.60 ft ³	.65 ft ³	.75 ft ³	.75 ft ³	.83 ft ³
Maximum trailer charge _____	—	—	—	—	—	—	—
Freight, all kinds—per trailer _____	787.95	902.70	1,089.70	1,174.00	1,350.00	1,350.00	1,490.40
Canned or bottled foodstuffs:							
LTL:							
Per ft ³ _____	.50	.63	.76	.82	.94	.94	1.04
Per cwt _____	1.60	1.98	2.39	2.58	2.97	2.97	3.28
TL—minimum 43,000 lbs. _____	1.18 cwt	1.36 cwt	1.64 cwt	—	—	2.08 cwt	2.30 cwt
TL—minimum 45,000 lbs. _____	—	—	—	1.73 cwt	1.99 cwt	1.99 cwt	2.20 cwt
Minimum weight per shipment 86,000 lbs. _____	—	—	—	—	—	—	—
Minimum weight per shipment 129,000 lbs. _____	1.08 cwt	1.24 cwt	1.50 cwt	—	—	—	—
Beverages, in barrels, glass, bottles, or cans, viz malt:							
A.Q. _____	—	—	—	—	—	—	—
LTL _____	1.49 cwt	1.86 cwt	2.25 cwt	2.42 cwt	2.78 cwt	2.78 cwt	3.07 cwt
TL—minimum 40,000 lbs. _____	1.08 cwt	1.24 cwt	—	—	—	—	—
TL—minimum 42,000 lbs. _____	—	—	1.57 cwt	—	—	—	—
TL—minimum 45,000 lbs. _____	—	—	—	1.73 cwt	1.99 cwt	1.99 cwt	2.20 cwt

Table 14.—Selected Southbound Ocean Freight Rates from New York, N.Y., to San Juan, Puerto Rico, as of January 1 for the Years 1965-77 and for August 1, 1977—Continued

[Rates in dollars]

Commodity	1/1/72 ¹	1/1/73 ¹	1/1/74 ¹	1/1/75 ²	1/1/76 ²	1/1/77 ²	8/1/77 ²
Fruits or vegetables, fresh (not frozen), N.O.S. (refrigerated):							
LTL	1.12 ft ³	1.40 ft ³	1.69 ft ³	1.80 ft ³	2.07 ft ³	2.07 ft ³	2.29 ft ³
TL—(per trailer) shipper load-consignee unload	—	—	—	—	—	—	—
TL—(per trailer) shipper load	708.64	811.84	980.02	1,056.00	—	—	—
TL—(per trailer) carrier load	749.84	859.04	1,037.00	1,118.00	1,214.00	1,214.00	1,340.26
Poultry, N.O.S., frozen (refrigerated):							
LTL	3.61 cwt	4.48 cwt	5.41 cwt	5.85 cwt	6.73 cwt	6.73 cwt	7.43 cwt
TL—minimum 30,000 lbs.	—	—	—	—	—	—	—
TL—minimum 36,000 lbs.	2.58 cwt	2.95 cwt	3.56 cwt	3.84 cwt	4.42 cwt	4.42 cwt	4.88 cwt
TL—minimum 40,000 lbs.	—	—	—	—	—	—	—
Soap and related articles:							
LTL	1.69 cwt	2.10 cwt	2.54 cwt	2.73 cwt	3.14 cwt	3.14 cwt	3.47 cwt
TL—minimum 32,000 lbs.	1.28 cwt	1.46 cwt	1.76 cwt	—	—	—	—
TL—minimum 36,500 lbs. (shipper load)	—	—	1.67 cwt	—	—	—	—
TL—minimum 39,000 lbs.	—	—	—	—	2.08 cwt	2.08 cwt	2.30 cwt
TL—minimum 43,000 lbs.	—	—	—	1.81 cwt	—	—	—
Paper or paper articles, viz pulpboard, in rolls:							
LTL:	—	—	—	—	—	—	—
Per ft ³	—	—	—	—	.92	.92	1.02
Per cwt	1.39	1.73	2.09	2.33	2.68	2.68	2.96
TL—minimum 38,000 lbs.	—	—	—	—	—	—	—
TL—minimum 40,000 lbs.	1.03 cwt	1.18 cwt	1.42 cwt	—	—	—	—
TL—minimum 45,000 lbs.	—	—	—	1.73 cwt	1.99 cwt	1.99 cwt	2.20 cwt
Furniture, N.O.S.:							
LTL:	—	—	—	—	—	—	—
Per ft ³	.55	.68	.82	.89	1.02	1.02	1.13
Per cwt	1.64	1.65	1.99	2.33	2.68	2.68	2.96
TL—minimum 1,600 ft ³	.48 ft ³	.55 ft ³	.66 ft ³	.71 ft ³	.82 ft ³	.82 ft ³	.91 ft ³
Maximum trailer charge	738.51	846.06	808.68	770.00	893.55	894.00	986.98
TL—loose, minimum 1,800 ft ³	.48 ft ³	.55 ft ³	.66 ft ³	.71 ft ³	.82 ft ³	.82 ft ³	.91 ft ³
Maximum trailer charge, loose	761.17	872.02	808.68	777.00	893.55	894.00	986.98

¹ The rates represent charges assessed by Sea-Land Service, Inc.

² The rates represent charges assessed by the Puerto Rico Maritime Shipping Authority.

Abbreviations: A.Q.—Any quantity; ft³—Cubic foot (feet); cwt—Per hundred pounds; LTL—less than trailer load; N.O.S.—Not otherwise specified; TL—Trailer load.

Note: Per trailer or maximum trailer charges are applicable to 35-foot equipment.

Source: Tariffs on file with the Federal Maritime Commission, Bureau of Compliance, Domestic Tariff Branch.

changes.¹⁸ These commodities and their rate histories will be discussed later. The six classifications for which a 10-year comparison was made are: Vehicles, Self-Propelled (cars); Freight, All Kinds (FAK); Poultry, Frozen; Soap and Related Articles; Paper or Paper Articles; and Furniture. The rate increases on these products ranged from 57 percent on vehicles to 109 percent on paper articles while the CPI during the same period rose 68 percent. Soap and FAK rates increased 68 and 69 percent respectively, almost exactly the same increase as recorded by the CPI. Furniture and poultry products experienced freight charge advances of 74 and 77 percent respectively, reflecting a somewhat higher increase than that reported for consumer prices generally. It should be noted that the smallest increase in rates was experienced by vehicles, which in FY 1976, produced the greatest revenue and accounted for the most tonnage carried by PRMSA. On the other hand, paper articles whose rates increased more than 100

percent over 10 years produced only one-fourth the revenue generated by vehicles in FY 1976 and one-sixth the tons transported.

Thus, the predominant cargo in the trade experienced the smallest increase of all southbound items while commodities moving in lesser amounts saw their rates rise in some cases substantially more than vehicle rates.

Over a 9-year period, January 1968 to January 1977, beverage rates increased 90 percent and fruit and vegetable rates 73 percent. From 1969 to 1977, canned or bottled foodstuffs experienced rate increases of 81 percent while southbound dry good rates were increased 56 percent.

Up to this point, only the rates of those commodities moving southbound to Puerto Rico were analyzed. The southbound portion of the trade is the predominant part; however, a substantial amount of certain cargoes move northbound. Two of the top 15 moving commodities (Dry Goods¹⁹ and Canned Fish) carried by PRMSA during FY 1976 moved northbound. In contrast to the rate increases on

¹⁸ Subsequent to 1967, the carrier introduced trailer load (TL) rates on some commodities which resulted in lower rates than under an Any Quantity (AQ) or Less Than Trailer Load (LTL) rating system. Thus rates from earlier periods were not directly related to the TL rates and no meaningful comparison could be made.

¹⁹ Because of data inconsistency, no analysis of Dry Goods was attempted.

Table 15.—Selected Northbound Ocean Freight Rates from San Juan, Puerto Rico, to New York, N.Y., as of January 1 for the Years 1965-77 and for August 1, 1977

[Rates in dollars]

Commodity	1/1/65 ¹	1/1/66 ²	1/1/67 ¹	1/1/68 ¹	1/1/69 ¹	1/1/70 ¹	1/1/71 ¹
Dry goods:							
A.Q. _____	.38 ft ³	.38 ft ³	.38 ft ³	.38 ft ³	.38 ft ³	.38 ft ³	.38 ft ³
LTL _____	—	—	—	—	—	—	—
TL—minimum 700 ft ³ _____	—	—	—	—	—	—	—
TL—minimum 1,000 ft ³ _____	—	—	—	—	—	—	—
TL—minimum 1,600 ft ³ _____	—	—	—	—	—	—	—
TL—minimum 1,750 ft ³ _____	—	—	—	—	—	—	—
Maximum trailer charge _____	—	—	—	—	565.00 ft ³	565.00 ft ³	545.00 ft ³
Fish, tuna, canned:							
A.Q. _____	.96 cwt	.96 cwt	.96 cwt	—	—	—	—
LTL _____	—	—	—	.96 cwt	.96 cwt	.96 cwt	.96 cwt
TL—minimum 44,00 lbs. (on pallets or slip sheets) _____	—	—	—	.92 cwt	.885 cwt	.885 cwt	.885 cwt
TL—minimum 41,000 lbs. (8-oz. cans on pallets) _____	—	—	—	—	.885 cwt	.885 cwt	.885 cwt
TL—minimum 39,000 lbs. _____	—	—	—	—	—	—	—
	1/1/72 ¹	1/1/73 ¹	1/1/74 ¹	1/1/75 ²	1/1/76 ²	1/1/77 ²	8/1/77 ²
Dry goods:							
A.Q. _____	.39 ft ³	.49 ft ³	.53 ft ³	.58 ft ³	.67 ft ³	.67 ft ³	.74 ft ³
LTL _____	.39 ft ³	.45 ft ³	.49 ft ³	—	.60 ft ³	.60 ft ³	.66 ft ³
TL—minimum 700 ft ³ _____	—	—	—	.52 ft ³	.60 ft ³	.60 ft ³	.66 ft ³
TL—minimum 1,000 ft ³ _____	—	—	—	.44 ft ³	.46 ft ³	.46 ft ³	.51 ft ³
TL—minimum 1,600 ft ³ _____	—	—	—	—	—	—	—
TL—minimum 1,750 ft ³ _____	—	—	—	—	—	—	—
Maximum trailer charge _____	561.35	643.10	696.84	750.00	—	—	—
Fish, tuna, canned:							
A.Q. _____	.99 cwt	1.23 cwt	1.33 cwt	1.43 cwt	1.64 cwt	1.64 cwt	1.81 cwt
LTL _____	.91 cwt	1.01 cwt	.96 cwt	1.04 cwt	1.20 cwt	1.20 cwt	1.32 cwt
TL—minimum 44,000 lbs. (on pallets or slip sheets) _____	—	—	—	—	—	—	—
TL—minimum 41,000 lbs. (8-oz. cans on pallets) _____	.91 cwt	1.01 cwt	.96 cwt	1.04 cwt	1.20 cwt	1.20 cwt	1.32 cwt
TL—minimum 39,000 lbs. _____	.91 cwt	1.01 cwt	.96 cwt	1.04 cwt	1.20 cwt	1.20 cwt	1.32 cwt

¹ The rates represent charges assessed by Sea-Land Service, Inc.

² The rates represent charges assessed by the Puerto Rico Maritime Shipping Authority.

Abbreviations: A.Q.—Any quantity; ft³—Cubic foot (feet); cwt—Per hundred pounds; LTL—Less than trailer load; N.O.S.—Not otherwise specified; TL—Trailer load.

Note: Per trailer or maximum trailer charges are applicable to 35-foot equipment.

Source: Tariffs on file with the Federal Maritime Commission, Bureau of Compliance, Domestic Tariff Branch.

southbound goods, Canned Fish experienced rate increases of only 30 percent from 1968 to 1977. This small rate adjustment, in comparison to the southbound increases, can be explained because the northbound (backhaul) leg of the trade has excess capacity available. Thus, as long as the cargo is covering variable costs, the carriage of the cargo at lower rates may be justified. (See table 15.)

In conclusion, it appears that ocean freight rates have risen faster than the CPI over the past decade. However, the CPI bears no direct relation to ocean shipping costs and any comparison with consumer prices should be viewed cautiously. The CPI provides a benchmark but is not determinative of whether ocean freight rates are too high or too low. Therefore, it is impossible to draw a conclusion as to the reasonableness of rates in the trade from these statistics.

Puerto Rico's Foreign Oceanborne Trade

This section deals with the flow of commodities in the foreign segment of the oceanborne commerce of the Commonwealth of Puerto Rico. To better

understand the composition, amounts, and direction of the various commodity flows, it is important to have some understanding of the social, economic, and geographic features of Puerto Rico.

The Commonwealth of Puerto Rico is composed principally of a single island located approximately 1,612 miles from New York City and 525 miles from Caracas. Puerto Rico's population in 1976 was 3,196,000 which makes it more populous than 25 of the States of the United States. This large population provides a significant market for both domestic and foreign manufactured goods. With a gross national product of \$7,493 million and a labor force of 890,000 persons, Puerto Rico imports and exports commodities in significant quantities. Puerto Rico imports finished goods for local consumption and raw materials and semifinished goods for further manufacture and eventual reexportation.

Because of its unusual commonwealth status with the United States, Puerto Rico is in a position to offer certain relatively unique economic incentives to investors. Industries located in Puerto Rico are exempt from Federal and Commonwealth taxes for

from 10 to 30 years (depending on where the plants are located).²⁰ The result of these favorable circumstances coupled with the fact that goods manufactured in Puerto Rico can enter the mainland United States duty free makes Puerto Rico a viable location for manufacturing operations. The cost of transporting raw materials to Puerto Rico and the cost of transporting finished goods back to the mainland can be absorbed, in part, through the savings which accrue from this favorable tax treatment.

Goods which are labor intensive are especially suited to manufacture in Puerto Rico because of the presence of a relatively skilled labor force, and wage scales which are generally lower than in the United States. As a result of these lower labor costs, Puerto Rico has attracted labor-intensive industries such as scientific instruments, pharmaceuticals, and apparel.

Puerto Rico is thought to have significant deposits of certain raw materials such as copper and nickel but few of these resources have been developed to any great extent as of yet, and so the Commonwealth is dependent upon the outside world for most types of raw materials used in its domestic manufactures. While not labor intensive (in fact, it is one of the most capital-intensive industries) the oil refining industry has grown significantly during the past decade in Puerto Rico. The oil refining industry (including the Commonwealth Refining Company, CORCO) produces feedstocks for the many petrochemical plants located in Puerto Rico. The petrochemical industry located in Puerto Rico includes some of the largest petrochemical companies in the world such as W. R. Grace and Mitsubishi.

Aggregate Oceanborne Foreign Trade Statistics—By Vessel Classification.—In 1976, Puerto Rico exported to foreign countries cargo valued at \$277,641,658 (see table 16).²¹ In the same year, Puerto Rico imported from foreign countries oceanborne

cargo valued at over seven times as much as the cargo it exported.²² Much of the reason for this trade imbalance stems from the lack of raw materials in Puerto Rico and the absence of sufficient manufacturing facilities to produce many of the finished goods needed by an expanding economy.

Puerto Rico is heavily dependent, economically, upon the smooth flow of world oil. A large part of the economic base of Puerto Rico's heavy industry is composed of firms which process oil or oil based products as a part of the petrochemical industry. In addition to refining oil into gasoline, the existing plants in Puerto Rico's petrochemical industry currently produce for export significant amounts of organic chemicals, benzene, xylene, and polyvinyl chloride. Without a dependable supply of feeder stock, these plants cannot function effectively, and the Arab oil embargo in 1973 proved highly disruptive of these industries. Puerto Rico is also dependent upon foreign oil supplies for almost all of its energy supply for both private consumption and manufacturing use.

The rapid escalation of oil prices which accompanied the oil embargo affected the prices of all end products of the petrochemical industry. With an investment approaching \$2 billion in the petrochemical industry and with organic chemicals comprising the largest category (41.27 percent) of exports to foreign markets by all types of vessels, it is not difficult to see why fluctuations in the price and supply of oil would be important to Puerto Rico.

The results of the oil embargo were evident upon the economies of most of the countries of the world and the result of the general economic slowdown and the attendant inflation which most countries felt was visible in the decrease of imports worldwide. For Puerto Rico, this decline showed itself most clearly in the decline in the value of liner exports (in current dollars) from a high of \$158 million in 1974 to the level of \$76 million in 1976 (see table

²⁰ The Tax Reform Act of 1976, further liberalized the tax structure (Section 936 of the Internal Revenue Code) by permitting the repatriation of profits, tax free, whenever the firm wishes. Prior to section 936, firms had to wait until their tax-exempt period had terminated before they could repatriate their profits and not pay any taxes.

²¹ The three classifications of cargo movements used in oceanborne trades are liner, tramp, and tanker. Liner movements are usually movements of dry cargo on vessels which sail according to fixed, regular schedules. Tramp cargo is also dry but the vessels upon which the cargo is carried do not sail according to a fixed schedule. Tanker movements usually entail the shipment of liquid cargoes, such as petroleum products.

²² The data contained in this section were derived from the basic U.S. Department of Census data on foreign oceanborne trade. Because of the way in which the data is compiled, only those shipments which were destined for, or originated at foreign ports without being transshipped at U.S. ports are counted as foreign shipments. In other words, European cargo bound for Puerto Rico but being transshipped through the Port of New York, for instance, would not appear as Puerto Rican imports but rather would be classified as in-transit shipments for the United States. This data limitation should be kept in mind when analyzing these data.

Table 16.—Puerto Rico Oceanborne Trade Exports, 1972–76

[In dollars]

Year	Liner		Tanker		Tramp		Overall export total	
	Dollars	Percentage	Dollars	Percentage	Dollars	Percentage	Dollars	Percentage
1972	53,508,448	42.38	37,278,497	29.53	35,471,692	28.09	126,258,637	100.00
1973	109,810,385	51.88	55,085,245	26.02	46,777,618	22.10	211,673,248	100.00
1974	158,068,488	45.28	108,978,507	31.22	82,018,252	23.50	349,065,247	100.00
1975	100,338,614	40.13	68,828,805	27.52	80,892,210	32.35	250,059,629	100.00
1976	76,146,494	25.58	133,641,226	44.81	88,126,938	29.61	277,641,658	100.00

16). This precipitous drop of more than 50 percent in exports, before accounting for the effects of inflation, was further evidenced by the closing of hundreds of factories on a temporary basis and the permanent closing of others.

Liner imports, reflecting Puerto Rico's dependence upon the outside world for the production of many goods and services, fell less than 20 percent from \$249 million to \$210 million during the same time period.

The value of both imports and exports carried by ship in the Puerto Rican trade have increased significantly over the past 5 years. Between 1972 and 1976, the value of Puerto Rican exports increased by 120 percent while the value of imports from foreign countries increased by 133 percent.²³ These changes have caused a shift in the ratio of imports to exports from \$6.74 worth of imports to each dollar's worth of exports in 1972 to a ratio of \$7.11 worth of imports to each dollar's worth of exports in 1976. The figures show a growing imbalance in the foreign trade of Puerto Rico and an increasing reliance upon the outside world for most types of goods despite expansion of the domestic industrial sector in Puerto Rico.

The liner share of both exports and imports has decreased on a percentage basis with liner imports decreasing from 22.13 percent of all oceanborne imports in 1972 to only 10.59 percent in 1976 (see table 17). The liner share of exports decreased from 42.38 percent in 1972, to only 25.58 percent in 1976. Much of the shift in vessel shares is a result of the growth in tanker cargo which now constitutes 70 percent of all Puerto Rican imports and 45 percent of all exports versus 37 percent and 30 percent respectively, in 1972.

Principal Oceanborne Foreign Trading Partners.—Proximity plays an important role in determining the principal trading partners of Puerto Rico. Located, as it is, in the central Caribbean, Puerto Rico conducts a significant foreign trade with the Dominican Republic, which lies immediately to the west, and Venezuela, which is approximately 500 miles to the south. Among the ten most important trading partners of Puerto Rico, in terms of tramp

²³ Much of this increase was due to the increase in the price (value) of oil and oil products

and liner export cargoes, are several other Caribbean countries such as the Netherlands Antilles, Haiti, Jamaica, Barbados, the Leeward and Windward Islands, and the French West Indies (table 18). The non-Caribbean countries which are among the largest importers of liner or tramp cargoes from Puerto Rico in 1976, were Brazil, Belgium, Venezuela, the Netherlands, West Germany, the United Kingdom, and Japan.

Puerto Rico's tanker exports follow a somewhat different pattern with the Netherlands receiving almost half of all of Puerto Rico's 1976 tanker exports. Most of the outbound tanker trade with the Netherlands involves byproducts, such as organic chemicals, of either oil or coal. Organic chemicals also account for a large share of all liner exports from Puerto Rico to the Netherlands.

Major-Moving Commodities—Exports.—Organic chemicals was the leading export of Puerto Rico in 1972 and 1976. Although in 1972 this export category accounted for \$27,104,612 or 21.47 percent of all exports, by 1976 it was valued at \$122,845,107, and comprised 41.27 percent (tables 19 and 20).

Other oil and coal derivatives, and food preparations constituted the next three categories of exports, by value, in 1976. Tobacco, the 5th most important of Puerto Rico's exports was also the 21st most important of her imports with the value of exports exceeding that of imports by only approximately \$1 million.

Other commodities exported from Puerto Rico range from passenger vehicles (used) to cement. The 19th leading export, clothing—textile fabrics, is especially important because of the impact of the textile industry on employment (especially female) in Puerto Rico.

The textile industry of Puerto Rico is able to compete in world markets partially because of the relatively low economies of scale for textile plants. Beyond a certain basic plant size, it has been estimated that doubling the size of a textile mill will result in less than a 10-percent economy of scale. Thus, the small plants of Puerto Rico, staffed with relatively inexpensive labor, are able to produce textile products at competitive prices.

Table 17.—Puerto Rico Oceanborne Trade Imports, 1972–76

[In dollars]

Year	Liner		Tanker		Tramp		Overall import total	
	Dollars	Percentage	Dollars	Percentage	Dollars	Percentage	Dollars	Percentage
1972	188,528,008	22.13	310,991,578	36.50	352,522,642	41.37	852,042,228	100.00
1973	242,494,412	25.75	363,657,245	38.62	335,557,618	35.63	941,709,275	100.00
1974	249,610,699	12.62	1,333,977,073	67.46	393,882,822	19.92	1,977,470,594	100.00
1975	200,742,250	11.80	1,255,985,145	73.85	243,907,376	14.34	1,700,634,771	100.00
1976	210,517,083	10.59	1,387,371,918	69.77	390,625,113	19.64	1,988,514,114	100.00

Table 18.—Puerto Rican Oceanborne Foreign Trade Top 10 Trading Partners by Mode

1976										1972									
Top 10 trading partners by mode					Percentage of total					Top 10 trading partners by mode					Percentage of total				
Rank	Country	Value (dollars)	Percentage of total	Short tons	Percentage of total	Rank	Country	Value (dollars)	Percentage of total	Rank	Country	Value (dollars)	Percentage of total	Short tons	Percentage of total				
EXPORTS—LINER																			
1	Dominican Republic	21,580,857	28.34	16,960.9	23.20	1	Dominican Republic	16,115,042	30.12	1	Dominican Republic	16,115,042	30.12	26,034.9	24.54				
2	Netherlands	8,709,761	11.44	1,661.6	2.27	2	Jamaica	12,589,687	23.53	2	Jamaica	12,589,687	23.53	27,949.6	26.35				
3	Netherlands Antilles	6,674,644	8.88	7,646.1	10.46	3	Trinidad	7,593,575	14.19	3	Trinidad	7,593,575	14.19	13,888.6	13.09				
4	Belgium	5,829,310	7.66	1,082.4	1.48	4	Netherlands Antilles	6,396,232	11.95	4	Netherlands Antilles	6,396,232	11.95	9,927.2	9.36				
5	West Germany	5,720,839	7.51	5,270.5	7.21	5	Haiti	3,299,946	6.17	5	Haiti	3,299,946	6.17	5,412.7	5.10				
6	Trinidad	5,022,590	6.60	6,242.4	8.54	6	Republic of South Africa	3,000,785	5.61	6	Republic of South Africa	3,000,785	5.61	4,716.7	4.45				
7	Haiti	4,024,400	5.29	9,179.0	12.50	7	Venezuela	1,228,724	2.30	7	Venezuela	1,228,724	2.30	6,315.3	5.95				
8	Jamaica	3,771,199	4.95	3,349.6	4.58	8	Nicaragua	809,784	1.51	8	Nicaragua	809,784	1.51	3,164.4	2.98				
9	United Kingdom	2,726,871	3.58	228.1	.31	9	Netherlands	323,812	.61	9	Netherlands	323,812	.61	346.4	.33				
10	Japan	2,017,673	2.65	2,384.4	3.26	10	Sweden	290,886	.54	10	Sweden	290,886	.54	454.9	.43				
Overall liner total					73,103.7	100.00	Overall liner total					106,082.9	100.00						
EXPORTS—TRAMP																			
1	Dominican Republic	22,218,504	25.21	35,214.4	12.90	1	Dominican Republic	11,455,712	32.30	1	Dominican Republic	11,455,712	32.30	22,925.8	16.35				
2	Venezuela	18,826,324	21.36	123,486.2	45.96	2	Netherlands Antilles	3,829,268	10.80	2	Netherlands Antilles	3,829,268	10.80	30,742.6	21.92				
3	Leeward and Windward Islands	9,797,640	11.12	37,678.8	13.80	3	Haiti	2,839,724	8.01	3	Haiti	2,839,724	8.01	6,075.0	4.33				
4	Netherlands Antilles	9,662,512	10.96	15,922.6	5.38	4	Leeward and Windward Islands	2,692,680	7.59	4	Leeward and Windward Islands	2,692,680	7.59	17,576.3	12.53				
5	Netherlands	5,686,140	6.45	1,426.9	.52	5	Venezuela	2,585,620	7.29	5	Venezuela	2,585,620	7.29	29,460.8	21.01				
6	French West Indies	3,800,379	4.31	4,567.6	1.67	6	Belgium	2,371,167	6.68	6	Belgium	2,371,167	6.68	435.1	.31				
7	Brazil	3,382,335	3.84	11,875.2	4.35	7	French West Indies	1,868,810	5.27	7	French West Indies	1,868,810	5.27	8,376.7	5.97				
8	Trinidad	1,580,887	1.79	2,270.4	.83	8	West Germany	1,523,325	4.29	8	West Germany	1,523,325	4.29	2,812.3	2.01				
9	Barbados	1,359,431	1.54	4,527.0	1.66	9	Jamaica	1,329,247	3.75	9	Jamaica	1,329,247	3.75	4,873.4	3.48				
10	Jamaica	1,279,448	1.45	1,827.9	.69	10	Colombia	1,176,041	3.32	10	Colombia	1,176,041	3.32	1,454.0	1.04				
Overall tramp total					273,009.6	100.00	Overall tramp total					140,234.2	100.00						
EXPORTS—TANKER																			
1	Netherlands	72,222,633	54.15	305,065.1	47.92	1	Netherlands	12,220,806	32.78	1	Netherlands	12,220,806	32.78	202,920.4	28.23				
2	Belgium	18,334,519	13.75	72,466.6	11.38	2	Canada	4,707,341	12.63	2	Canada	4,707,341	12.63	126,745.6	17.63				
3	Japan	17,121,874	12.84	62,971.7	9.89	3	Belgium	3,560,209	9.55	3	Belgium	3,560,209	9.55	57,593.2	8.01				
4	Mexico	3,368,230	2.53	11,711.9	1.84	4	Brazil	3,249,337	8.72	4	Brazil	3,249,337	8.72	50,629.5	7.04				
5	Brazil	3,003,636	2.25	18,862.5	2.33	5	Italy	2,423,214	6.50	5	Italy	2,423,214	6.50	44,154.9	6.14				
6	Korea Republic	2,700,536	2.02	16,768.6	2.63	6	United Kingdom	2,356,474	6.32	6	United Kingdom	2,356,474	6.32	35,696.3	4.97				
7	Spain	2,526,527	1.89	9,022.8	1.42	7	Mexico	1,932,285	5.18	7	Mexico	1,932,285	5.18	41,636.4	5.79				
8	Surinam	2,444,026	1.83	40,603.8	6.38	8	Japan	1,599,603	4.29	8	Japan	1,599,603	4.29	13,559.3	1.89				
9	Italy	2,317,131	1.74	11,139.0	1.75	9	Spain	1,482,262	3.98	9	Spain	1,482,262	3.98	12,973.4	1.80				
10	France	2,050,449	1.54	6,640.7	1.36	10	Argentina	645,314	1.73	10	Argentina	645,314	1.73	6,203.1	.86				
Overall tanker total					636,584.1	100.00	Overall tanker total					718,883.0	100.00						

Table 18.—Puerto Rican Oceanborne Foreign Trade Top 10 Trading Partners by Mode—Continued

1976										1977									
Top 10 trading partners by mode					Percentage of total					Top 10 trading partners by mode					Percentage of total				
Rank	Country	Value (dollars)	Percentage of total	Short tons	Percentage of total	Rank	Country	Value (dollars)	Percentage of total	Rank	Country	Value (dollars)	Percentage of total	Short tons	Percentage of total				
IMPORTS—LINER																			
1	Dominican Republic	40,299,272	19.40	44,771.6	15.04	1	Japan	41,204,647	21.86	1	Japan	41,204,647	21.86	48,597.0	14.10				
2	Japan	23,813,941	11.31	31,961.0	10.74	2	Dominican Republic	34,663,642	18.39	2	Dominican Republic	34,663,642	18.39	65,754.0	19.08				
3	Spain	23,810,496	11.31	21,149.7	7.10	3	Spain	22,729,280	12.06	3	Spain	22,729,280	12.06	26,008.3	7.55				
4	Brazil	12,343,245	5.86	33,500.5	11.25	4	West Germany	11,682,348	6.20	4	West Germany	11,682,348	6.20	14,029.1	4.07				
5	Belgium	11,579,419	5.50	32,785.0	11.10	5	Brazil	7,269,208	3.87	5	Brazil	7,269,208	3.87	42,128.7	12.24				
6	West Germany	11,179,979	5.31	11,747.6	3.95	6	Belgium	6,541,794	3.47	6	Belgium	6,541,794	3.47	19,338.0	5.61				
7	Netherlands	10,873,547	5.17	4,238.1	1.42	7	Canada	6,297,405	3.34	7	Canada	6,297,405	3.34	13,394.2	3.89				
8	Trinidad	9,027,627	4.29	9,290.2	3.12	8	Italy	5,770,289	3.06	8	Italy	5,770,289	3.06	10,756.5	3.12				
9	Costa Rica	7,757,779	3.69	7,443.1	2.50	9	Trinidad	5,530,751	2.93	9	Trinidad	5,530,751	2.93	5,785.0	1.68				
10	Italy	7,126,704	3.39	4,532.9	1.52	10	Netherlands	4,613,392	2.45	10	Netherlands	4,613,392	2.45	7,588.0	2.20				
Overall liner total					100.00	Overall liner total					100.00	Overall liner total					100.00		
210,517,083					100.00	297,717.0					100.00	188,528,008					100.00		
IMPORTS—TRAMP																			
1	Japan	102,396,691	26.21	149,173.0	11.59	1	Japan	62,890,116	17.84	1	Japan	62,890,116	17.84	55,238.8	3.96				
2	Dominican Republic	20,852,540	6.87	128,118.0	9.95	2	Canada	34,229,775	9.71	2	Canada	34,229,775	9.71	212,228.8	15.22				
3	Canada	20,955,244	5.37	120,994.7	9.40	3	Belgium	27,379,366	7.71	3	Belgium	27,379,366	7.71	150,959.4	10.83				
4	Spain	19,693,691	5.04	31,442.4	2.44	4	West Germany	24,318,015	6.90	4	West Germany	24,318,015	6.90	31,100.4	2.23				
5	Australia	18,696,594	4.79	26,444.4	2.05	5	Spain	22,023,289	6.25	5	Spain	22,023,289	6.25	39,039.9	2.80				
6	Panama	14,780,938	3.78	30,925.1	2.40	6	Ivory Coast	12,231,157	3.47	6	Ivory Coast	12,231,157	3.47	26,295.5	1.88				
7	Brazil	11,675,912	2.99	49,160.0	3.82	7	Dominican Republic	11,913,682	3.38	7	Dominican Republic	11,913,682	3.38	132,771.9	9.52				
8	Honduras	10,776,786	2.76	34,612.8	2.69	8	United Kingdom	11,900,847	3.38	8	United Kingdom	11,900,847	3.38	12,264.9	.88				
9	Republic of South Africa	10,186,795	2.61	11,125.8	.86	9	Netherlands	10,208,191	2.90	9	Netherlands	10,208,191	2.90	26,742.0	1.92				
10	Denmark	10,131,042	2.59	5,035.2	.39	10	Republic of South Africa	9,763,474	2.77	10	Republic of South Africa	9,763,474	2.77	13,716.0	.98				
Overall tramp total					100.00	Overall tramp total					100.00	Overall tramp total					100.00		
390,625,113					100.00	1,287,203.2					100.00	352,522,642					100.00		
IMPORTS—TANKER																			
1	Venezuela	545,720,382	39.33	6,927,157.3	42.46	1	Venezuela	214,430,009	68.95	1	Venezuela	214,430,009	68.95	13,098,969.8	71.47				
2	Netherlands Antilles	157,642,807	11.36	1,736,113.8	10.64	2	Netherlands Antilles	37,945,667	12.20	2	Netherlands Antilles	37,945,667	12.20	2,027,603.2	11.06				
3	Libya	135,397,546	9.76	1,625,160.0	9.96	3	Bahamas	22,588,036	7.26	3	Bahamas	22,588,036	7.26	1,185,108.2	6.47				
4	Bahamas	119,340,017	8.60	1,215,019.3	7.45	4	Trinidad	9,974,859	3.21	4	Trinidad	9,974,859	3.21	595,262.2	3.25				
5	Angola	112,221,406	8.09	1,426,349.3	8.74	5	Algeria	6,374,300	2.05	5	Algeria	6,374,300	2.05	324,283.5	1.77				
6	Algeria	88,561,254	7.10	953,734.4	5.85	6	Canada	2,164,785	.70	6	Canada	2,164,785	.70	119,823.5	.65				
7	Trinidad	55,418,240	3.99	517,471.8	3.17	7	Italy	2,124,756	.68	7	Italy	2,124,756	.68	109,561.6	.60				
8	Saudi Arabia	26,838,876	1.93	303,018.7	1.86	8	Dominican Republic	1,989,623	.64	8	Dominican Republic	1,989,623	.64	76,592.2	.42				
9	Iran	22,052,341	1.59	283,276.1	1.74	9	Egypt	1,774,264	.57	9	Egypt	1,774,264	.57	128,534.0	.70				
10	Italy	19,951,246	1.44	200,337.6	1.23	10	Indonesia	1,562,008	.50	10	Indonesia	1,562,008	.50	94,334.0	.51				
Overall tanker total					100.00	Overall tanker total					100.00	Overall tanker total					100.00		
1,387,371,918					100.00	16,314,740.2					100.00	310,991,578					100.00		

Source: Office of Data Systems, Federal Maritime Commission.

Table 19.—Puerto Rican Oceanborne Trade—20 Principal Commodities Exported in 1972

Rank	Commodity code	Commodity description	Value (dollars)	Percentage of total	Short tons	Percentage of total
1	5120	Organic chemicals	27,104,612	21.47	393,624.3	40.78
2	5214	Benzene, toluene, and other crude products from coal/petroleum	9,803,295	7.76	200,505.4	20.77
3	7299	Electrical machinery and apparatus, n.e.c. and parts	3,410,814	2.70	5,272.7	.55
4	7195	Powered tools, n.e.c., for wk., min., plas., and pt.	3,260,401	2.58	378.0	.04
5	0991	Food preparations, n.e.c.	2,708,028	2.14	1,444.8	.15
6	7183	Food processing machinery, other than dom. and pr.	2,674,307	2.12	3,532.7	.37
7	7191	Heating and cooling machinery and equipment and pt.	1,945,282	1.54	859.4	.09
8	1210	Tobacco—unmanufactured	1,897,623	1.50	267.9	.03
9	0114	Poultry, including offals, ot. th. liv. sep., fr., c.	1,639,670	1.30	5,625.7	.58
10	6747	Tin plate and tin coated sheets	1,614,063	1.28	5,253.3	.54
11	5417	Medical and pharmaceutical prep., comp., or mix	1,593,076	1.26	746.2	.08
12	6419	Paper and paperboard-coated, impreg., or. proce.	1,571,209	1.24	14,764.9	1.53
13	5812	Polymerization and copolymer. prod.—unfin./sem.	1,435,523	1.14	4,666.4	.48
14	7249	Phone and telegraph equipment, loudspeakers, microphones	1,430,074	1.13	503.9	.05
15	2511	Paper—waste and old paper	1,272,432	1.01	32,235.3	3.34
16	2670	Waste material from textile fabrics including ra.	1,265,806	1.00	2,519.7	.26
17	6922	Casks, drums, box, cans-transport. ir., st., alu.	1,232,006	.98	1,851.2	.19
18	8210	Furniture	1,225,875	.97	730.6	.08
19	7320	Pass cars; trk.; bus.; spec. pur. veh.; all fuel	1,167,813	.92	745.8	.08
20	4212	Soybean oil, except hydrogenated	1,079,045	.85	2,927.5	.30

Table 20.—Puerto Rican Oceanborne Trade—20 Principal Commodities Exported in 1976

Rank	Commodity code	Commodity description	Value (dollars)	Percentage of total	Short tons	Percentage of total
1	5120	Organic chemicals	122,845,107	41.27	398,468.7	40.25
2	5214	Benzene, toluene, and other crude products from coal/petroleum	23,501,527	7.90	133,221.3	13.56
3	5812	Polymerization and copolymer prod.—unfin./sem.	11,338,038	3.81	28,059.3	2.86
4	0991	Food preparations, n.e.c.	7,052,553	2.37	2,416.8	.25
5	1210	Tobacco—unmanufactured	6,443,604	2.16	781.4	.08
6	5136	Ammonia, inorgan. bases, metal oxid., hydro.	4,520,053	1.52	77,839.5	7.92
7	7125	Tract. other than rd. trac. for trac. tral. com.	4,464,269	1.50	2,890.8	.29
8	7320	Pass. cars; trk.; bus.; spec. pur. veh.; all fuel	4,212,198	1.42	2,306.8	.23
9	7249	Phones and telegraph equipment; loudspeakers, microphones	3,976,530	1.34	1,625.2	.17
10	2511	Paper—waste and old paper	3,702,167	1.24	47,147.1	4.80
11	7195	Powered tools, n.e.c., for wk. min., wd., plas. and pt.	3,514,583	1.18	931.0	.09
12	7193	Mechan. handling machinery and equipment and par.	2,629,075	.86	1,745.9	.18
13	7183	Food processing machinery, other than dom. and pr.	2,556,219	.86	2,532.9	.26
14	6612	Cement	2,532,471	.85	95,963.3	9.77
15	0114	Poultry, incl. offals other than liv. sep., fr., c.	2,494,512	.84	2,778.2	.28
16	6419	Paperboard-coated, impreg., or. proce.	2,285,306	.77	23,245.0	2.37
17	8412	Clothing acces.—textile fab., not knit	2,282,800	.77	254.7	.03
18	5530	Perfumery and cosm., dentl., and other toilet prepar.	2,176,826	.73	902.1	.09
19	8411	Clothing—textile fab., not knit or croch.	2,049,038	.69	333.1	.03
20	1222	Cigarettes	2,021,569	.68	387.6	.04

Major-Moving Commodities—Imports.—In both 1972 and 1976, petroleum and crude oil accounted for the largest share of imports into Puerto Rico. In 1976 this category accounted for \$1.36 billion of the \$1.99 billion of the imports (68.51 percent). (See tables 21 and 22.) By comparison, all other imported commodities seem insignificant. The nearly \$90 million of fish products which this island country imported in 1976, while small as an import total, equaled almost one-third of the value of all exports from Puerto Rico for that year.

The third largest import is passenger vehicles which amounted to \$8,561,147 in 1976. Lacking facilities to manufacture automobiles on the island, the Commonwealth is dependent on U.S. manufactured or foreign manufactured automobiles to meet the demands of Puerto Rican consumers.

Despite a favorable climate and some rich, arable soil, Puerto Rico imports large amounts of food-stuffs. Coffee represented over \$32 million in imports for 1976. Prepared vegetables, unmilled corn, meat

and meat products, and cheese are all significant imports. Ironically, Puerto Rico, which produces some 10 percent of the total U.S. sugar supply, imports over \$4 million worth of sugar a year from foreign countries. Molasses, fruits, and shellfish, all are abundant in Puerto Rico but all are imported in significant quantities. In the case of sugar and molasses, the probable explanation is that these products are produced in other nearby countries and shipped to Puerto Rico for further processing. Puerto Rico also imports large quantities of iron and steel, lumber products, tinplate, etc., which are used in the construction and other basic industries.

Major-Moving Commodities—By Vessel Classification.—Major commodity movements by vessel classification are shown in tables 23 and 24. While few new significant facts can be gleaned from these data, a few interesting points can be made.

Exports.—The most noticeable change in the commodities imported from 1972 to 1976 is the

Table 21.—Puerto Rican Oceanborne Trade—20 Principal Commodities Imported in 1972

Rank	Commodity code	Commodity description	Value (dollars)	Percentage of total	Short tons	Percentage of total
1	3310	Petroleum—crude and ptly. ref. for fur. refin.	291,409,877	34.20	17,536,834.8	87.39
2	0311	Fish, except shellfish—fresh, chill., frozen	89,350,120	10.49	173,930.3	.87
3	7321	Motor veh.—passenger excluding motorcycles and buses	75,241,109	8.83	47,523.9	.24
4	8510	Footwear—new, except orthopedic	19,953,685	2.34	5,569.8	.03
5	6732	Iron/stl. br., hol. min. dr. stl. and fl. wr. ov. 0.0	19,029,063	2.23	183,768.1	.92
6	2432	Lumber—softwood, rough-saw or surface-wor.	18,279,327	2.15	207,543.0	1.03
7	0711	Coffee, coffee substitutes, and mixtures	16,964,176	1.99	18,370.5	.09
8	0111	Beef and veal, exc. offals.—fish., chil., fz.	16,913,523	1.99	16,366.2	.08
9	0139	Meat and meat prod.—prep./pres., n.e.s.	11,908,747	1.40	11,518.8	.06
10	0312	Fish, except shellfish—salted, dried, smoked	10,531,140	1.24	12,815.9	.06
11	3322	Jet fuel and kerosene	10,453,902	1.23	382,907.5	1.91
12	7221	Electric power machinery and parts	9,658,602	1.13	2,777.3	.01
13	7116	Eng.—nonpiston type n.e.s. and pts. for nonp. eng.	9,202,524	1.08	430.7	.00
14	0721	Cocoa beans	8,593,359	1.01	19,003.4	.09
15	1210	Tobacco—unmanufactured	7,615,665	.89	8,196.0	.04
16	0555	Vegetables—prepared or preserved, n.e.c.	7,449,705	.87	21,198.6	.11
17	7249	Phone and telegraph equipment, loudspeakers, and microphones	6,877,528	.81	1,543.1	.01
18	6747	Tin plate and tin plated sheets	6,764,275	.79	31,936.5	.16
19	6312	Plywood, including wood veneer panels	6,285,487	.74	25,017.8	.12
20	7242	Radio broadcast, receivrs., whether/nt. comb.	5,663,572	.66	1,323.9	.01

Table 22.—Puerto Rico Oceanborne Trade—20 Principal Commodities Imported in 1976

Rank	Commodity code	Commodity description	Value (dollars)	Percentage of total	Short tons	Percentage of total
1	3310	Petroleum—crude and partly ref. for fur. refin.	1,362,279,707	68.51	15,948,659.4	89.10
2	0311	Fish, except shellfish—fresh, chill., frozen	89,428,857	4.50	162,790.1	.91
3	7321	Motor vehicles—passenger except motorcycles and buses	87,561,147	4.40	38,231.2	.21
4	0111	Beef and veal, except offals.—fresh, chill., frozen	47,817,261	2.40	50,144.4	.28
5	0711	Coffee, coffee substitutes, and mixtures	32,225,005	1.62	14,514.1	.08
6	8510	Footwear—new, except orthopedic	21,881,334	1.10	4,551.0	.03
7	3322	Jet fuel and kerosene	18,974,394	.95	167,879.9	.94
8	6732	Iron/stl. br., hol. min. dr. stl. and fl. wr. ov. 0.0	18,589,787	.93	106,789.3	.60
9	0139	Meat and meat prod.—prep./pres., n.e.s.	16,787,690	.84	11,799.7	.07
10	2432	Lumber—softwood, rough-saw or surface-wor.	11,888,394	.60	123,802.1	.69
11	6748	Iron or steel plates and sheets—coated	11,073,592	.56	37,208.9	.21
12	6411	Standard newsprint paper	9,752,551	.49	31,528.3	.18
13	6312	Plywood, incl. wood veneer panels	8,600,634	.43	23,966.6	.13
14	6747	Tin plate and tin coated sheets	8,540,660	.43	22,762.2	.13
15	3324	Residual fuel oils	8,481,045	.43	129,051.1	.72
16	9311	Spec. transact. not classified accord.—kind	7,644,997	.38	2,183.4	.01
17	5120	Organic chemicals	5,960,010	.30	822.0	.00
18	0555	Vegetables—prepared or preserved, n.e.c.	5,936,602	.30	11,528.4	.06
19	0440	Corn or maize—unmilled	5,635,353	.28	45,325.4	.25
20	8921	Maps, charts, books, pamphlets, and globes	5,454,105	.27	2,298.5	.01

rise of petroleum-based products to the position of being the leading export by all types of vessel movement; liner, tramp, and tanker. Much of this increase in the importance of petroleum products is due to change in the value of these products, since in tonnage terms there was little change during the period.

Excluding these petroleum products, liner exports showed large movements of food products, tobacco, powered tools, electrical equipment, photographic film, clothing, and various other types of machinery and antibiotics.

Tramp exports in 1976, once again excluding petroleum products, were composed of large movements of tractors, tobacco, waste paper, passenger cars, food products, cement, telephone equipment, and paperboard products.

Tanker exports in 1972 and 1976 were dominated by two products, organic chemicals and benzene, which together accounted for over 90 percent of the tanker exports in both years.

Imports.—The largest liner import in both 1972 and 1976 was coffee and coffee substitutes. The top five liner imports were coffee, motor vehicles, beef, footwear, and fish products. Thus, we can generalize that liner imports were dominated by consumer goods.

In addition, tramp vessels carried large quantities of fish and motor vehicles in 1972 and 1976. Other commodities which moved via tramp, however, were more bulky in nature such as iron and steel products, petroleum, lumber, newsprint, etc.

Nevertheless, large amounts of consumer goods such as coffee, beef, and other food products did move via tramp, albeit probably in a raw or bulk form, as compared to liner shipments.

Once again, tanker imports overwhelmingly consisted of petroleum products with crude petroleum accounting for 94 percent of the 1972 tanker imports and 97 percent of the 1976 tanker imports.

Table 23.—Puerto Rico Oceanborne Foreign Trade—Exports, Top 50 Commodities—Liners for Year 1976

Commodity code	Commodity description	Value (dollars)	Percentage of SVC total	Tons (2,000 lbs)	Percentage of SVC total
5120	Organic chemicals	12,595,880	16.54	3,407.1	4.66
5812	Polymerization and copolymer prod—unfin/sem	5,441,900	7.15	13,608.9	18.62
0991	Food preparations, n.e.c.	4,213,198	5.53	1,150.5	1.57
7195	Powered tools, n.e.c., for wk min, wd, plas and pt	3,114,945	4.09	360.6	.49
1210	Tobacco—unmanufactured	2,573,389	3.38	390.0	.53
8412	Clothing access—textl fab, not knit or croch	2,041,890	2.68	228.5	.31
8411	Clothing—textile fab not knit or croch	2,017,777	2.65	329.7	.45
7249	Phone and telegraph equipmt; ldspeak, microph	1,577,327	2.07	482.7	.66
5999	Cent impr comp, act carb and nat min product	1,282,765	1.68	787.5	1.08
5417	Medic and pharm prep, comp or mix of 2 or mo	1,128,857	1.48	368.4	.50
5530	Perfumery and cosm, denti, and oth toilet prepa	1,073,213	1.41	448.1	.61
7193	Mechan handling machinery and equipmt and par	1,061,801	1.39	490.0	.67
5413	Antibiotics—bulk, excl prep of 2 or more	1,008,525	1.32	6.5	.01
7299	Electrical machinery and appar, n.e.c., and part	984,626	1.29	806.1	1.10
7191	Heating and cooling machry and equipmt and pt	889,852	1.17	214.5	.29
0619	Sugars and sirups, n.e.c.	876,324	1.15	213.5	.29
7183	Food processing machinery, oth. than doh and pr	842,410	1.11	973.3	1.33
8624	Photo film, plates and paper—exposed or no	828,723	1.09	50.3	.07
7320	Pass cars; trk; bus; spec pur veh; all fuel	818,304	1.07	328.6	.45
0542	Vegetables, leguminous—dried	811,564	1.07	2,351.7	3.22
0114	Poultry, incl offals ot tn liv sep, fr, c	783,855	1.03	911.7	1.25
6911	Finished struct pts and struct—iron/steel	755,186	.99	1,407.7	1.93
5333	Prep paints, enam, lacq, varn, art, col, drie	638,004	.84	756.0	1.03
0535	Fruit and vegetable juices—unfermented	604,138	.79	1,374.0	1.88
8210	Furniture	514,902	.63	218.8	.30
4214	Peanut oil, except hydrogenated	511,533	.67	628.2	.86
0814	Meat meal, incl tank, and fish meal, unf ho	510,978	.67	1,229.9	1.68
1222	Cigarettes	510,489	.67	97.1	.13
6429	Artic of paper pulp, paper or paperboard	509,513	.67	456.6	.62
5419	Pharmaceutical goods and preparations—bul	493,419	.65	159.0	.22
6747	Tinplate and tin coated sheets	492,694	.65	822.7	1.13
7151	Machine tools for working metals	491,568	.65	121.0	.17
1124	Beverages—distilled alcoholic	470,543	.62	626.4	.86
6419	Paper and paperboard—coated, impreg, or proce	454,055	.60	2,418.2	3.31
7221	Electric power machinery and parts	450,040	.59	96.8	.13
3329	Pitch, asphalt, pet coke and oth bypr coal, li	442,733	.58	1,869.4	2.56
7192	Pumps for lig, gas, blow, and filt and purif mac	435,911	.57	81.9	.11
8921	Maps, charts, books, pamphlets, globes, peri	432,857	.57	107.8	.15
8930	Articles, finis—artif plastic material	429,956	.56	218.0	.30
0222	Milk and cream—dry	412,659	.54	356.0	.49
0488	Malt, ext and prep of flour, starch or mal	402,757	.53	1,075.2	1.47
7184	Constru and mining machinery, n.e.c. and parts	369,473	.49	326.1	.45
6412	Paper—printing and writing, n.e.c. rolls/shee	368,027	.48	511.8	.70
0520	Fruits—dried, incl artificially dehydrat	364,166	.48	494.0	.68
7196	Calendaring and sim rolling mach	360,622	.47	107.3	.15
2925	Seeds, fruit and spores fo plant, excep oils	340,966	.45	90.5	.12
5542	Surf act agts, detergents and washing prepar	333,772	.44	599.6	.82
2663	Cellulosic manmade fibers	333,278	.44	93.0	.13
0536	Fruits—temporarily preserved	330,048	.43	1,030.6	1.41
7112	Steam generat power boiler accessories	304,373	.40	85.8	.12
Overall liners total		76,146,494	100.00	73,103.7	100.00

PUERTO RICO OCEANBORNE FOREIGN TRADE—EXPORTS, TOP 50 COMMODITIES—TRAMPS FOR YEAR 1976

5120	Organic chemicals	7,529,026	8.54	5,455.6	2.00
5812	Polymerization and copolymer prod—unfin/sem	5,896,138	6.69	14,450.4	5.29
7125	Tract oth thn rd trac for trac tral com	4,301,696	4.88	2,819.1	1.03
1210	Tobacco—unmanufactured	3,870,215	4.39	391.4	.14
2511	Paper—waste and old paper	3,569,181	4.05	44,831.4	16.42
7320	Pass cars; trk; bus; spec pur veh; all fuel	3,393,894	3.85	1,978.2	.72
0991	Food preparations, n.e.c.	2,799,594	3.18	1,258.3	.46
6612	Cement	2,425,361	2.75	91,536.6	33.53
7249	Phone and telegraph equipmt; ldspeak, microph	2,399,203	2.72	1,142.5	.42
6419	Paper and paperboard—coated, impreg, or proce	1,831,251	2.08	20,826.8	7.63
2840	Nonferrous metal scrap	1,783,358	2.02	5,761.1	2.11
7183	Food processing machinery, oth than dom and pr	1,713,809	1.94	1,559.6	.57
0114	Poultry, incl offals ot the liv sep, fr, c	1,710,657	1.94	1,866.5	.68
0460	Wheat flour, meal, and groats	1,594,393	1.81	6,321.3	2.32
7193	Mechan handling machinery and equipmt and par	1,567,274	1.78	1,255.9	.46
1222	Cigarettes	1,511,080	1.71	290.5	.11
6911	Finished struct pts and struct—iron/steel	1,206,579	1.37	1,838.8	.67
8210	Furniture	1,154,324	1.31	750.9	.28
7184	Constru and mining machinery, nec. and parts	1,104,564	1.25	857.6	.31
5530	Perfumery and cosm, denti, and oth toilet prepa	1,103,613	1.25	454.0	.17
7191	Heating and cooling machry and equipmt and pt	962,949	1.09	291.9	.11
6840	Alum and alum alloys—unwr and bars, rod, wire	935,987	1.06	827.4	.30
0819	Food waste and prep animal feeds, n.e.c.	850,074	.96	3,705.6	1.36
1124	Beverages—distilled alcoholic	830,766	.94	1,016.3	.37
7241	TV broadcast receivers, whether/not com	741,901	.84	412.7	.15
7328	Motor vehicle and tractor parts and access, ne	733,149	.83	295.3	.11
1110	Beverages, n.e.c.—nonalcoholic	706,563	.80	1,813.8	.66
5136	Ammonia, inorgan bases, metal oxid, hydro	664,963	.75	12,442.7	4.56
0545	Vegetables, n.e.c.—fresh	614,531	.70	1,161.9	.43

**Table 23.—Puerto Rico Oceanborne Foreign Trade—Exports, Top 50
Commodities—Liners for Year 1976—Continued**

Commodity code	Commodity description	Value (dollars)	Percentage of SVC total	Tons (2,000 lbs)	Percentage of SVC total
0619	Sugars and sirups, n.e.c.	596,991	.68	130.5	.05
6747	Tinplate and tin coated sheets	551,233	.63	895.7	.33
0535	Fruit and vegetable juices—unfermented	526,223	.60	1,202.8	.44
7172	Machinery, oth than sewing, for prep sknle	478,228	.54	120.5	.04
5999	Cent impr comp, act carb and nat min product	467,829	.53	550.1	.20
3329	Pitch, asphalt, pet coke and oth bypr coal, li	448,226	.51	2,628.6	.96
7299	Electrical machinery and appar, n.e.c., and part	444,481	.50	281.3	.10
6312	Plywood, veneered and cellular wood panels	438,421	.50	700.0	.26
6732	Iron/steel bars and rods and hollow drill steel	423,495	.48	1,746.1	.64
6922	Casks, drums, box, cans—transpor ir, st, alu	421,404	.48	420.5	.15
2663	Cellulosic manmade fibers	400,630	.45	122.6	.04
7195	Powered tools, n.e.c., for wk min. wd. plas and pt	399,638	.45	570.4	.21
0541	Potatoes—fresh, except sweet potatoes	388,225	.44	1,388.6	.51
7192	Pumps for lig. gas, blow, and flit and purif mac	383,397	.44	101.8	.04
0129	Meat, and ed offals, n.e.c.—dried, salt, smoked	379,738	.43	622.8	.23
6912	Finished struct pts and struct—aluminum	364,656	.41	148.1	.05
7173	Sewing machines and parts	340,207	.39	64.8	.02
9310	Spec transactions not class accord—kind	333,378	.38	243.5	.09
7221	Electric power machinery and parts	326,351	.37	95.0	.03
7158	Machinery and mechanical appliances, n.e.c.	317,548	.36	153.6	.06
5419	Pharmaceutical goods and preparations—bulk	312,181	.35	95.4	.03
Overall tramps total		88,126,938	100.00	273,009.6	100.00

PUERTO RICO OCEANBORNE FOREIGN TRADE—EXPORTS, TOP 50 COMMODITIES—TANKERS FOR YEAR 1976

5120	Organic chemicals	102,720,201	77.02	389,606.0	61.20
5214	Benzene, toluene and oth crud prod fr coal/p	23,485,381	17.61	133,178.8	20.92
5136	Ammonia, inorgan bases, metal oxid, hydro	3,827,595	2.87	65,325.3	10.26
3324	Residual fuel oils	1,864,500	1.40	27,665.1	4.35
0615	Molasses	817,329	.61	13,811.3	2.17
3329	Pitch, asphalt, pet coke and other bypr coal, li	238,022	.18	4,511.9	.71
7192	Pumps for lig. gas, blow, and flit and purif mac	64,500	.05	2.5	.00
3411	Gas—natural	63,465	.05	292.0	.05
2511	Paper—waste and old paper	49,115	.04	847.1	.13
0991	Food preparations, n.e.c.	39,761	.03	8.0	.00
1110	Beverages, nec—nonalcoholic	31,366	.02	232.7	.04
6983	Chain and parts therof—iron or steel	27,500	.02	27.5	.00
6516	Yarns and thread of noncel mmade fib, inc mo	25,300	.02	10.0	.00
6612	Cement	23,400	.02	940.0	.15
5333	Prep paints, enam, lacq, varn, art col, drie	23,202	.02	22.6	.00
7291	Batteries, and parts, n.e.c.	12,227	.01	8.3	.00
2433	Lumber—hardwood, rough-saw or surfac-work	9,921	.01	20.0	.00
6314	Wood, improv or recon, incl particleboard	8,400	.01	26.9	.00
5132	Chemical elements, n.e.c.	7,220	.01	35.0	.01
8624	Photo film, plates and paper—exposed or no	5,497	.00	2.2	.00
7141	Typewriters and check-writing machines	4,249	.00	.4	.00
8623	Prepared photo chemicals	4,236	.00	2.7	.00
6210	Unvulcanized nat or syn rubber, threa and tu	3,450	.00	2.1	.00
0535	Fruit and vegetable juices—unfermented	2,645	.00	3.1	.00
5819	Hard protein, mod nat res, art resins pla	2,483	.00	.5	.00
8615	Cameras, proj, sound rec and soun repr—mo p	1,642	.00	.1	.00
7250	Electric household and electro thermic appl	1,545	.00	.6	.00
6658	Glass arti, n.e.c., incl imitation gem stone	1,400	.00	.3	.00
7328	Motor vehicle and tractor parts and access, ne	1,136	.00	.9	.00
6785	Iron or steel tube and pipe fittings	890	.00	.1	.00
7191	Heating and cooling machry and equipmt and pt	648	.00	.1	.00
Overall tankers total		133,368,226	100.00	636,584.1	100.00
Overall export total		297,641,658	100.00	982,697.4	100.00
Lines total		76,146,494	25.58	73,103.7	7.44
Tanker total		133,368,226	44.81	436,584.1	64.78
Tramps total		88,126,938	29.61	273,009.6	27.78

PUERTO RICO OCEANBORNE FOREIGN TRADE—IMPORTS, TOP 50 COMMODITIES—LINERS FOR YEAR 1976

0711	Coffee, coffee substitutes, and mixtures	20,798,123	9.88	9,852.5	3.31
0111	Beef and veal, exc offals—frsh, chil, fz	15,686,966	7.45	13,170.8	4.42
7321	Motor veh.—passen exc motorcyc and buses	15,230,754	7.23	6,416.2	2.16
8510	Footwear—new, except orthopedic	11,929,266	5.67	2,363.5	.79
0311	Fish, excp shellfish—fresh, chil, frozen	9,088,958	4.32	15,590.1	5.24
0139	Meat and meat prod—prep/pres. n.e.s.	9,055,027	4.30	7,139.7	2.40
9311	Spec transact not classif accord—kind	6,286,777	2.99	1,511.0	.51
6747	Tinplate and tin coated sheets	5,428,569	2.58	14,132.6	4.75
8921	Maps, charts, books, pamphlets, and globes	3,829,717	1.82	1,873.0	.63
6312	Plywood, incl wood veneer panels	3,751,776	1.78	10,394.8	3.49
6732	Iron/stl br, hol min dr stl and fl wr cv o, o	3,740,024	1.78	21,047.8	7.07
0240	Cheese and curd	3,228,871	1.53	1,440.7	.48
0320	Fish—airtght cont, n.e.c.; fish, prep, inc she	2,918,442	1.39	3,963.2	1.33
5120	Organic chemicals	2,893,287	1.37	334.2	.11
6748	Iron or steel plates and sheets—coated ne	2,800,452	1.33	9,727.1	3.27
0555	Vegetables—prepared or preserved, n.e.c.	2,763,829	1.31	5,328.1	1.79

**Table 23.—Puerto Rico Oceanborne Foreign Trade—Exports, Top 50
Commodities—Liners for Year 1976—Continued**

Commodity code	Commodity description	Value (dollars)	Percentage of SVC total	Tons (2,000 lbs)	Percentage of SVC total
7231	Wire and cable—insulated	2,705,834	1.29	1,339.1	.45
1124	Beverages—distilled alcoholic	2,586,347	1.23	2,711.8	.91
0620	Sug conf not cont cocoa and flav/col sug	2,487,687	1.18	3,557.9	1.20
1210	Tobacco—unmanufactured	2,442,263	1.16	1,455.2	.49
0990	Food preparations, n.e.s.	2,261,622	1.07	3,500.0	1.18
0543	Vegetables, n.e.s.—frsh, chl, froz, or dried	2,098,913	1.00	6,709.1	2.25
6770	Iron/steel wire, exc flat wre and insul ele	2,056,044	.98	5,426.8	1.82
5813	Vulcanized fiber and cellulosic plast mat	1,887,228	.90	90.6	.03
2432	Lumber—softwood, rough-saw or surfac-wor	1,832,591	.87	15,448.1	5.19
0313	Shellfish except prepared or canned	1,813,265	.86	410.8	.14
0312	Fish, excp shellfish—salted, dried, smoked	1,781,043	.85	1,123.1	.38
7122	Agri mach and apl for harv cut thr and sort	1,764,972	.84	130.7	.04
6624	Ceramic tile and oth nonrefrac cer constr ma	1,451,107	.69	6,446.5	2.17
0548	Veg prod, roots and tubers, n.e.c.—fresh/dried	1,446,900	.69	4,754.9	1.60
8942	Child's toys, indo game, xmas decor and enter	1,445,291	.69	742.9	.25
7328	Motor vehicle and tractor parts and access, ne	1,407,065	.67	544.7	.18
0533	Fruit jams, jell, marm, past, pulp, pur and bu	1,390,814	.66	4,470.9	1.50
5310	Syn org dyestuf, nat ind, col lks and toner	1,382,764	.66	27.9	.01
7182	Printing and bookbinding machinery, and parts	1,339,007	.64	216.3	.07
0721	Cocoa beans	1,251,555	.59	895.6	.30
1121	Wine, exc prune wine and rice wine	1,188,871	.56	1,989.6	.67
7250	Electric household and electro thermic appl	1,091,342	.52	813.9	.27
0538	Fruits and nuts—prep/pres, n.e.s.	1,044,012	.50	1,806.1	.61
7221	Electric power machinery and parts	989,491	.47	2,244.4	.75
7191	Heating and cooling machry and equipmt and pt	981,966	.47	631.7	.21
6989	Articles of base metals n.e.c.	971,082	.46	1,480.4	.50
1123	Ale, beer, porter and stout	964,890	.46	3,525.2	1.18
6782	Iron or steel tubes and pipes seamless	899,887	.43	1,993.8	.67
0440	Corn or maize—unmilled	859,471	.41	6,803.0	2.29
4215	Olive oil	852,907	.41	689.5	.23
0812	Byprod of cereal grains and leg vegetable	826,104	.39	8,986.5	3.02
8931	Rubber and plastic manufactures, n.e.s.	824,215	.39	597.1	.20
6741	Iron or steel plates—uncoated	790,853	.38	3,807.3	1.28
8411	Clothing—textile fab not knit or croch	781,140	.37	129.3	.04
Overall liners total		210,517,083	100.00	297,717.0	100.00

PUERTO RICO OCEANBORNE FOREIGN TRADE—IMPORTS, TOP 50 COMMODITIES—TRAMPS FOR YEAR 1976

0311	Fish, excp shellfish—fresh, chill, frozen	80,339,899	20.57	147,200.0	11.44
7321	Motor veh.—passen exc motorcyc and buses	70,992,704	18.17	31,248.3	2.43
0111	Beef and veal, exc offals—frsh, chl, fz	32,130,295	8.23	36,973.6	2.87
6732	Iron/stl br, hol min dr stl and fl wr ov o, o	14,849,763	3.80	85,741.5	6.66
3310	Petroleum—crude and ply ref for fur refin	14,100,314	3.61	193,120.6	15.00
0711	Coffee, coffee substitutes, and mixtures	11,426,882	2.93	4,661.6	.36
2432	Lumber—softwood, rough-saw or surfac-wor	10,051,115	2.57	108,325.3	8.42
8510	Footwear—new, except orthopedic	9,952,068	2.55	2,187.5	.17
6411	Standard newsprint paper	9,566,624	2.45	30,938.1	2.40
6748	Iron or steel plates and sheets—coated ne	8,273,140	2.12	27,481.8	2.14
0139	Meat and meat prod—prep/pres, n.e.s.	7,732,663	1.98	4,660.0	.36
6312	Plywood, incl wood veneer panels	4,848,858	1.24	13,571.8	1.05
0440	Corn or maize—unmilled	4,775,882	1.22	38,522.4	2.99
0813	Oilseed cake and meal, n.e.s.	3,443,690	.88	22,375.7	1.74
8911	Phono, tape record and sound record and rep	3,437,729	.88	913.0	.07
0555	Vegetables—prepared or preserved, n.e.c.	3,172,773	.81	6,200.3	.48
6747	Tinplate and tin coated sheets	3,112,091	.80	8,629.6	.67
5120	Organic chemicals	3,066,723	.79	487.8	.04
1210	Tobacco—unmanufactured	2,724,618	.70	2,538.2	.20
0134	Sausages	2,556,399	.65	1,194.2	.09
7221	Electric power machinery and parts	2,409,183	.62	1,219.0	.09
6770	Iron/steel wire, exc flat wre and insul ele	2,328,769	.60	6,286.1	.49
6786	Iron or steel pipes and tubes—welded	2,248,472	.58	7,905.2	.61
6419	Paper and paperbrd in rolls or sheets, n.e.s.	2,182,697	.56	4,039.3	.31
0312	Fish, excp shellfish—salted, dried, smoked	2,135,233	.55	1,643.0	.13
6782	Iron or steel tubes and pipes seamless	2,105,688	.54	5,227.0	.41
6624	Ceramic tile and oth nonrefrac cer constr ma	1,958,786	.50	8,154.4	.63
1121	Wine, exc prune wine and rice wine	1,930,750	.49	2,534.4	.20
7328	Motor vehicle and tractor parts and access, ne	1,893,931	.48	708.7	.06
0620	Sug conf not cont cocoa and flav/col sug	1,823,673	.47	1,860.6	.14
8921	Maps, charts, books, pamphlets, and globes	1,612,776	.41	422.6	.03
5813	Vulcanized fiber and cellulosic plast mat	1,506,727	.39	130.3	.01
7231	Wire and cable—insulated	1,504,885	.39	593.9	.05
2732	Gypsum—plast crude lnstrn—not for pay, bl	1,496,107	.38	79,941.1	6.21
7196	Calendaring and sim rolling mach	1,435,800	.37	89.3	.01
4215	Olive oil	1,401,492	.36	988.9	.08
0313	Shellfish except prepared or canned	1,352,198	.35	329.6	.03
5530	Perfumry and cosm, dentl, and oth toilet prepa	1,350,630	.35	214.3	.02
0615	Molasses	1,335,137	.34	26,416.1	2.05
6734	Iron/steel angles, shapes, and sect—dim. 3 i	1,323,837	.34	6,279.2	.49
9311	Spec. transact not classif accord—kind	1,315,823	.34	665.5	.05
8931	Rubber and plastic manufactures, n.e.s.	1,272,607	.33	1,113.3	.09
0990	Food preparations, n.e.s.	1,255,236	.32	1,452.7	.11
8993	Candles, tapers, matches, and smoker articl	1,240,971	.32	153.9	.01
0240	Cheese and curd	1,225,257	.31	578.9	.04

**Table 23.—Puerto Rico Oceanborne Foreign Trade—Exports, Top 50
Commodities—Liners for Year 1976—Continued**

Commodity code	Commodity description	Value (dollars)	Percentage of SVC total	Tons (2,000 lbs)	Percentage of SVC total
0320	Fish—airtight cont, n.e.c.; fsh prep, inc she	1,127,547	.29	776.4	.06
1124	Beverages—distilled alcoholic	1,088,962	.28	1,035.9	.08
0543	Vegetables, n.e.s.—frsh, chl, froz, or dried	1,076,688	.28	2,524.9	.20
7125	Tract oth thn rd trac for trac tral com	1,059,124	.27	390.0	.03
2763	Sodium chloride (salt)	982,629	.25	245,545.8	19.08
	Overall tramps total	390,625,113	100.00	1,287,209.2	100.00

PUERTO RICO OCEANBORNE FOREIGN TRADE—IMPORTS, TOP 50 COMMODITIES—TANKERS FOR YEAR 1976

3310	Petroleum—crude and pty ref for fur refin	1,348,179,893	97.18	15,765,538.8	96.57
3322	Jet fuel and kerosene	18,575,648	1.34	164,473.9	1.01
3324	Residual fuel oils	8,472,525	.61	128,529.6	.79
3329	Pitch, asphalt, pet coke and oth bypr coal, li	4,574,889	.33	85,863.3	.53
0615	Molasses	3,750,655	.27	70,900.7	.43
7321	Motor veh.—passen exc motoreyc and buses	1,337,689	.10	566.7	.00
3410	Gas—natural and manufactured	883,059	.06	9,929.9	.06
5133	Inorganic acids and oxy comp—nonmet or mett	723,322	.05	25,546.5	.16
5136	Ammon, sodium hydrox, potassium hydrox etc	395,500	.03	2,500.0	.02
2763	Sodium chloride (salt)	278,276	.02	69,605.0	.43
3323	Distillate fuel oils	76,139	.01	757.2	.00
9311	Spec transact not classif accord—kind	42,397	.00	6.9	.00
6522	Cot fab—woven/othwse fin. n nar/sp, ex te	25,544	.00	9.2	.00
6423	Paper stationery, excp correspondence, ne	18,079	.00	16.8	.00
8921	Maps, charts, books, pamphlets, and globes	11,612	.00	2.9	.00
6618	Articles of gypsum and asbestos—cement	10,756	.00	52.7	.00
6324	Flooring, hrdwood (exc strp and plk) and wd door	5,223	.00	5.5	.00
2432	Lumber—softwood, rough-saw or surfac-wor	4,688	.00	28.7	.00
8210	Furniture	3,576	.00	1.9	.00
6328	Articles manufactured of wood, n.e.c.	3,316	.00	3.3	.00
6318	Wood—simply shaped or worked, n.e.c.	371	.00	.4	.00
6327	Manf of wood for domestic/decorative wr	261	.00	.3	.00
	Overall tankers total	1,387,371,918	100.00	16,314,740.2	100.00
	Overall import total	1,988,154,114	100.00	17,899,660.4	100.00
	Lines total	210,517,083	10.59	297,717.0	1.66

Prepared by: Bureau of Economics, Office of Data Systems for Office of Economic Analysis; 08/31/77—JL. TWBCLC.

Table 24.—Puerto Rico Oceanborne Foreign Trade—Exports, Top 50 Commodities—Liners for Year 1972

Commodity code	Commodity description	Value (dollars)	Percentage of SVC total	Tons (2,000 lbs)	Percentage of SVC total
7299	Electrical machinery and appar, n.e.c., and part	3,366,842	6.29	5,236.7	4.94
0114	Poultry, incl offals ot th liv sep, fr, c	1,546,415	2.89	5,216.6	4.92
1210	Tobacco—unmanufactured	1,419,235	2.65	207.2	.20
0991	Food preparations, n.e.c.	1,357,382	2.54	858.2	.82
5120	Organic chemicals	1,174,222	2.19	3,501.6	3.30
7191	Heating and cooling machry and equipmt and pt	1,150,521	2.15	524.5	.49
5417	Medic and pharm prep, comp or mix of 2 or mo	1,034,981	1.93	530.4	.50
6413	Kraft paper/paperboard, rolls or sheets	1,029,089	1.92	8,739.3	8.24
5812	Polymerization and copolymer prod—unfin/sem	967,448	1.81	3,146.8	2.97
6747	Template and tin coated sheets	918,373	1.72	2,990.4	2.82
8412	Clothing access—texti fab, not knit or	908,397	1.70	189.0	.18
7183	Food processing machinery, oth than dom and pr	907,055	1.70	547.5	.89
4212	Soybean oil, except hydrogenated	867,266	1.62	2,231.9	2.10
6922	Casks, drums, box, cans—transpor ir, st, alu	803,470	1.50	1,290.1	1.22
7241	TV broadcast receivers, whether/not com	780,571	1.46	184.7	.17
6569	Make-up articles—textile materials, n.e.c.	701,499	1.31	220.6	.21
6522	Cot fab—woven, blea, or othw fin, n inc na	695,111	1.30	322.9	.30
7250	Electric household and electro thermic appl	673,810	1.26	389.6	.37
2670	Waste mat from textile fabrics, incl ra	660,408	1.23	1,267.9	1.20
5530	Perfumery and cosm, denti, and oth toilet prepa	656,287	1.23	452.3	.43
7192	Pumps for liq, gas, blow, and flt and purif mac	628,900	1.18	172.3	.16
7222	Electrical appar for mak, break, protec ci	614,276	1.15	121.9	.11
6421	Paper bags, paperboard boxes, and oth paper	600,339	1.12	1,200.6	1.13
8930	Articles, flms—artif plastic material	598,828	1.12	473.0	.45
6535	Woven fab of noncellulosi manmade fiber	585,263	1.09	214.1	.20
0113	Pork, excl offals—fresh, chilled or froz	543,551	1.02	764.1	.72
7249	Phone and telegraph equipmt; ldspeak, microph	529,406	.99	217.4	.20
5333	Prep paints, enam, lacq, varn, art col, dried	490,905	.92	912.8	.86
5133	Inorganic acids and oxy comp—nonmet or mett	487,910	.91	342.9	.32
7320	Pass cars; trk; bus; spec pur veh; all fuel	485,724	.91	332.5	.31
0535	Fruit and vegetable juices—unfermented	477,087	.89	1,738.6	1.64
0619	Sugars and sirups, n.e.c.	455,793	.85	1,372.0	1.29
7198	Machinery and mechanical appliances, n.e.c.	452,960	.85	118.3	.11
7195	Powered tools, n.e.c., for wk min, wd, plas and pt	425,517	.80	58.4	.06
6989	Articles of base metals n.e.c.	408,104	.76	300.3	.28
5542	Surf act agts, detergents and washing prepar	406,205	.76	1,005.0	.95
8210	Furniture	397,089	.74	280.6	.26

**Table 24.—Puerto Rico Oceanborne Foreign Trade—Exports, Top 50
Commodities—Liners for Year 1972—Continued**

Commodity code	Commodity description	Value (dollars)	Percentage of SVC total	Tons (2,000 lbs)	Percentage of SVC total
7196	Calendaring and sim rolling mach	394,632	.74	157.7	.15
0539	Fruits and nuts—prepared or preserved—n.e.c.	383,714	.72	1,078.7	1.02
1222	Cigarettes	380,982	.71	94.2	.09
0545	Vegetables, n.e.c.—fresh	359,837	.67	1,867.0	1.76
0819	Food waste and prep animal feeds, n.e.c.	347,234	.65	1,889.2	1.78
0990	Prep must, sauces, seas, soups, nat yea, vi	321,523	.60	927.3	.87
0121	Pork—dried, salted or smoked	315,300	.59	695.5	.66
2625	Anim hair, oth th wool or fine—not card/	302,282	.56	485.6	.46
6415	Paper/paperboard—mach made, simp fin, ro	301,931	.56	1,776.4	1.67
6911	Finished struct pts and struct—iron/steel	293,972	.55	554.5	.52
6988	Chain—cop and flex tub com clos nm pl sol	281,808	.53	321.7	.30
2432	Lumber—softwood, rough-saw or surfac-wor	278,631	.52	1,676.4	1.58
0546	Vegetables—froz or in temp preservative	272,627	.51	689.5	.65
	Overall liners total	53,508,448	100.00	106,082.9	100.00

PUERTO RICO OCEANBORNE FOREIGN TRADE—EXPORTS, TOP 50 COMMODITIES—TRAMPS FOR YEAR 1972

7195	Powered tools, n.e.c., for wk min, wd, plas and pt	2,834,884	7.99	319.6	.23
7183	Food processing machinery, oth than dom and pr	1,767,252	4.98	2,585.2	1.84
0991	Food preparations, n.e.c.	1,350,646	3.81	576.6	.41
6419	Paper and paperboard—coated, impreg, or proce	1,334,884	3.76	12,886.8	9.19
2511	Paper—waste and old paper	1,038,736	2.93	26,582.6	18.96
7249	Phone and telegraph equipmt; ldspeak, microph	900,668	2.54	286.5	.20
8210	Furniture	828,786	2.34	450.0	.32
7191	Heating and cooling machry and equipmt and pt	794,761	2.24	334.9	.24
6785	Iron or steel tube and pipe fittings	769,230	2.17	759.3	.54
6747	Tinplate and tin coated sheets	695,690	1.96	2,262.9	1.61
7320	Pass cars; trk; bus; spec pur veh; all fuel	682,089	1.92	413.3	.29
0460	Wheat flour, meal, and groats	646,095	1.82	5,178.5	3.69
1124	Beverages—distilled alcoholic	618,962	1.74	1,027.0	.73
5120	Organic chemicals	615,332	1.73	3,740.6	2.67
2670	Waste mat from textile fabrics, incl ra	605,398	1.71	1,251.8	.89
7185	Min crush, sort, and sim machinery and prts, and glasw	584,637	1.65	340.0	.24
5417	Medic and pharm prep, comp or mix of 2 or mo	558,095	1.57	215.8	.15
1210	Tobacco—unmanufactured	478,388	1.35	60.7	.04
5812	Polymerization and copolymer prod—unfin/sem	460,173	1.30	1,478.8	1.05
6922	Casks, drums, box, cans—transport ir, st, alu	428,536	1.21	561.1	.40
7196	Calendaring and sim rolling mach	426,904	1.20	150.4	.11
0615	Molasses	425,452	1.20	16,447.6	11.73
1223	Chewing and smoking tobacco and snuff	411,994	1.16	216.4	.15
8617	Med, dent, surg, ophthalm and vet instrument	383,831	1.08	31.7	.02
0619	Sugars and sirups, n.e.c.	375,401	1.06	298.3	.21
7192	Pumps for liq, gas, blow, and flit and purif mac	339,492	.96	77.8	.06
0814	Meat meal, incl tank, and fish meal, unf hu	336,806	.95	2,950.6	2.10
5133	Inorganic acids and oxy comp—nonmet or mett	330,518	.93	245.1	.17
7250	Electric household and electro thermic appl	279,178	.79	200.5	.14
7184	Constru, and mining machery, n.e.c., and parts	270,756	.76	288.2	.21
6840	Alum and alum alloys—unwr and bars, rod, wire	267,385	.75	246.3	.18
5542	Surf act agts, detergents and washing prepar	254,224	.72	706.3	.50
0990	Prep must, sauces, seas, soups, nat yea, vi	251,601	.71	773.0	.55
8930	Articles, finis—artif plastic material	248,236	.70	181.4	.13
0819	Food waste and prep animal feeds, n.e.c.	236,163	.67	1,870.3	1.33
7241	TV broadcast receivers, whether/not com	229,177	.65	64.0	.05
7193	Mechan handling machinery and equipmt and par	224,699	.63	155.5	.11
5333	Prep paints, enam, lacq, varn, art col, dried	221,660	.62	444.3	.32
3329	Pitch, asphalt, pet coke and oth bypr coal, li	214,487	.60	3,188.6	2.27
4212	Soybean oil, except hydrogenated	211,779	.60	695.6	.50
2840	Nonferrous metal scrap	190,952	.54	1,223.9	.87
7333	Trailers and oth vehicle and pt, n.e.c., not motori	180,567	.51	335.5	.24
6989	Articles of base metals n.e.c.	177,889	.50	219.7	.16
6361	Bags and sacks of textile materials	173,791	.49	184.2	.13
6612	Cement	173,710	.49	16,685.6	11.90
6636	Manuf of min materials, n.e.c., oth thn cera	170,301	.48	2,396.6	1.71
6911	Finished struct pts and struct—iron/stee	169,595	.48	333.6	.24
6921	Tanks, vats and reserv for stor/man—i, s, c	168,153	.47	177.1	.13
6421	Paper bags, paperboard boxes, and oth paper	166,417	.47	419.5	.30
7198	Machinery and mechanical appliances, n.e.c.	165,802	.47	77.2	.06
	Overall tramps total	35,471,692	100.00	140,234.2	100.00

PUERTO RICO OCEANBORNE FOREIGN TRADE—EXPORTS, TOP 50 COMMODITIES—TANKERS FOR YEAR 1976

5120	Organic chemicals	25,315,058	67.91	386,382.1	53.75
5214	Benzene, toluene and oth crud prod fr coal/p	9,690,015	25.99	198,189.2	25.57
3324	Residual fuel oils	812,239	2.18	64,473.3	8.97
3323	Distillate fuel oils	664,948	1.78	23,519.5	3.27
5136	Ammonia, inorgan bases, metal oxid, hydro	475,384	1.28	36,857.3	5.13
3329	Pitch, asphalt, pet coke and oth bypr coal, li	133,224	.36	5,197.1	.72
3411	Gas—natural	68,205	.18	1,741.0	.24
0615	Molasses	51,498	.14	2,061.4	.29
7192	Pumps for liq, gas, blow, and flit and purif mac	12,200	.03	.6	.00
1110	Beverages, n.e.c.—nonalcoholic	9,775	.03	72.6	.01
5542	Surf act agts, detergents and washing prepar	9,450	.03	29.9	.00
7291	Batteries, and parts, n.e.c.	9,350	.03	4.4	.00

**Table 24.—Puerto Rico Oceanborne Foreign Trade—Exports, Top 50
Commodities—Liners for Year 1972—Continued**

Commodity code	Commodity description	Value (dollars)	Percentage of SVC total	Tons (2,000 lbs)	Percentage of SVC total
5812	Polymerization and copolymer prod—unfin/sem	7,902	.02	40.8	.01
2433	Lumber—hardwood, rough-saw or surfac-wor	7,790	.02	7.0	.00
6415	Paper/paperboard—mach made, simp fin, ro	7,719	.02	61.7	.01
6612	Cement	2,238	.01	227.5	.03
2633	Cotton waste—not carded or combed	1,012	.00	22.5	.00
7196	Calendaring and sim rolling mach	550	.00	.1	.00
	Overall tankers total	37,278,497	100.00	718,888.0	100.00
	Overall export total	126,258,637	100.00	965,205.1	100.00
	Liner total	53,508,448	42.38	106,082.9	10.99
	Tanker total	37,278,497	29.53	718,888.0	74.48
	Tramps total	35,471,692	28.09	140,234.2	14.53

PUERTO RICO OCEANBORNE FOREIGN TRADE—IMPORTS, TOP 50 COMMODITIES—LINERS FOR YEAR 1976

0711	Coffee, coffee substitutes, and mixtures	14,607,268	7.75	15,720.2	4.56
7321	Motor veh.—passen exc motorcycle and buses	14,331,383	7.60	9,196.6	2.67
0111	Beef and veal, exc. offals—frsh, chill, fz	10,742,176	5.70	10,408.3	3.02
8510	Footwear—new, except orthopedic	8,686,164	4.61	2,460.1	.71
0311	Fish, excp shellfish—fresh, chill, frozen	7,683,511	4.08	12,823.9	3.72
1210	Tobacco—unmanufactured	5,616,007	2.98	5,852.4	1.70
0312	Fish, excp shellfish—salted, dried, smoked	4,499,486	2.39	5,588.1	1.62
7249	Phone and telegraph equipmt; ldspeak, microph	4,403,396	2.34	1,054.1	.31
0139	Meat and meat prod—prep/pres, n.e.s.	4,262,983	2.26	4,072.7	1.18
0555	Vegetables—prepared or preserved, n.e.c.	3,794,573	2.01	10,495.9	3.05
7242	Radio broadcast receivers, whether/nt comb	3,715,508	1.97	855.1	.25
6312	Plywood, incl wood veneer panels	3,495,438	1.85	13,300.7	3.86
0721	Cocoa beans	3,188,460	1.69	7,007.3	2.03
8921	Maps, charts, books, pamphlets, and globes	3,143,539	1.67	1,099.1	.32
6732	Iron/stl br, hol min dr stl and fl wr ov o.o	3,058,457	1.62	30,928.6	8.98
6747	Tinplate and tin coated sheets	3,046,016	1.62	14,328.1	4.16
7221	Electric power machinery and parts	2,986,050	1.58	958.4	.28
1124	Beverages—distilled alcoholic	2,757,623	1.46	3,486.6	1.01
0313	Shellfish except prepared or canned	2,458,314	1.30	897.7	.26
6510	Yarn and thread of cotton and manmade fibers	2,398,064	1.27	849.8	.25
7116	Eng—nonpiston type nes and pts for nonp e	2,376,081	1.26	190.2	.06
6624	Ceramic tile and oth nonrefrac cer constr ma	2,361,371	1.25	13,066.2	3.79
7241	Television receiving sets	2,158,228	1.14	545.2	.16
8911	Phono, tape record and sound record and rep	2,129,290	1.13	525.9	.15
6770	Iron/steel wire, exc flat wre and insul ele	1,636,963	.87	6,484.1	1.88
7250	Electric household and electro thermic appl	1,507,719	.80	1,930.7	.56
2432	Lumber—softwood, rough-saw or surfac-wor	1,467,617	.78	16,299.2	4.73
7328	Motor vehicle and tractor parts and access, ne	1,453,722	.77	891.2	.26
7323	Trucks	1,335,749	.71	991.5	.29
0548	Veg prod, roots and tubers, n.e.c.—fresh/drie	1,329,418	.71	5,826.3	1.69
8210	Furniture	1,301,459	.69	1,770.8	.51
7231	Wire and cable—insulated	1,272,558	.67	807.6	.23
1121	Wine, exc prune wine and rice wine	1,254,973	.67	2,322.6	.67
9311	Spec transact not classif accord—kind	1,244,784	.66	617.4	.18
0320	Fish—airtight cont, n.e.c.; fish prep, inc she	1,226,273	.65	1,676.9	.49
8411	Clothing—textile fab not knit or croch	1,167,182	.62	439.9	.13
0543	Vegetables, n.e.s.—frsh, chl, froz, or dried	1,163,868	.62	5,834.0	1.69
8942	Child's toys, indo game, xmas decor and enter	1,154,214	.61	858.5	.25
7171	Textile machry, prt and acc, inc laun equip	1,145,454	.61	248.2	.07
6291	Rubber tires and tubes for vehicles/aircr	1,079,026	.57	963.5	.28
6782	Iron or steel tubes and pipes seamless	1,015,961	.54	3,162.0	.92
8414	Clothing and access housfurnish and art knit	959,052	.51	181.1	.05
6786	Iron or steel pipes and tubes—welded	919,993	.49	4,941.2	1.43
8931	Rubber and plastic manufactures, n.e.s.	918,234	.49	932.5	.27
0240	Cheese and curd	901,826	.48	795.8	.23
1123	Ale, beer, porter and stout	892,120	.47	4,928.2	1.43
0723	Cocoa butter and cocoa paste	870,159	.46	921.3	.27
6748	Iron or steel plates and sheets—coated ne	854,504	.45	4,637.8	1.35
2433	Lumber—hardwood, rough-saw or surfac-wor	805,329	.43	6,452.5	1.87
0620	Sug conf not cont cocoa and flav/con sug	779,940	.41	1,215.1	.35
	Overall liners total	188,528,008	100.00	344,599.7	100.00

PUERTO RICO OCEANBORNE FOREIGN TRADE—IMPORTS, TOP 50 COMMODITIES—TRAMPS FOR YEAR 1972

0311	Fish, excp shellfish—fresh, chill, frozen	81,666,609	23.17	161,106.4	11.56
7321	Motor veh.—passen exc motorcycle and buses	60,909,726	17.28	38,327.3	2.75
2432	Lumber—softwood, rough-saw or surfac-wor	16,811,710	4.77	191,243.8	13.72
6732	Iron/stl br, hol min dp stl and fl wr ov o.o	15,970,606	4.53	152,839.5	10.96
8510	Footwear—new, except orthopedic	11,267,521	3.20	3,109.7	.22
0139	Meat and meat prod—prep/pres, n.e.s.	7,645,764	2.17	7,446.1	.53
7116	Eng—nonpiston type n.e.s. and pts	6,826,443	1.94	240.5	.02
7221	Electric power machinery and parts	6,672,552	1.89	1,818.9	.13
0111	Beef and veal, exc offals—frsh, chill, fz	6,121,652	1.74	5,909.8	.42
0312	Fish, excp shellfish—salted, dried, smoked	6,011,654	1.71	7,227.8	.52
0721	Cocoa beans	5,404,899	1.53	11,996.1	.86
6411	Standard newsprint paper	4,149,335	1.18	30,150.0	2.16
6747	Tinplate and tin coated sheets	3,718,259	1.05	17,608.4	1.26

**Table 24.—Puerto Rico Oceanborne Foreign Trade—Exports, Top 50
Commodities—Liners for Year 1972—Continued**

Commodity code	Commodity description	Value (dollars)	Percentage of SVC total	Tons (2,000 lbs)	Percentage of SVC total
0555	Vegetables—prepared or preserved, n.e.c.	3,655,132	1.04	10,702.7	.77
6312	Plywood, incl wood veneer panels	2,790,049	.79	11,717.1	.84
7323	Trucks	2,487,977	.71	1,948.7	.14
6770	Iron/steel wire, exc flat wrt and insul ele	2,476,702	.70	13,000.7	.93
7249	Phone and telegraph equipmt; ldspeak, microph	2,474,132	.70	489.0	.04
8911	Phono, tape record and sound record and rep	2,414,961	.69	850.9	.06
6786	Iron or steel pipes and tubes—welded	2,379,884	.68	13,188.0	.95
6748	Iron or steel plates and sheets—coated ne	2,307,723	.65	12,964.5	.93
0711	Coffee, coffee substitutes, and mixtures	2,256,739	.64	2,540.0	.18
6734	Iron/steel angles, shapes, and sect—dia. 3 i	2,233,812	.63	15,404.2	1.11
7328	Motor vehicle and tractor parts and access, ne	2,096,798	.59	898.3	.06
6510	Yarn and thread of cotton and manmade fibers	2,008,550	.57	776.3	.06
1210	Tobacco—unmanufactured	1,999,658	.57	2,343.6	.17
7191	Heating and cooling machry and equipmt and pt	1,950,642	.55	1,610.0	.12
7242	Radio broadcast receivers, whether/nt comb	1,947,781	.55	468.8	.03
0240	Cheese and curd	1,869,599	.53	1,652.9	.12
8942	Child's toys, indo game, xmas decor and enter	1,868,318	.53	1,347.4	.10
0134	Sausages	1,802,734	.51	1,676.0	.12
8414	Clothing and access housfurnish and art knit	1,792,131	.51	316.7	.02
1124	Beverages—distilled alcoholic	1,649,299	.47	2,042.4	.15
8210	Furniture	1,624,531	.46	2,190.2	.16
5614	Nitro fertilizer and fertil mat	1,530,031	.43	43,057.7	3.09
6624	Ceramic tile and oth norefrac cer constr ma	1,505,878	.43	9,499.2	.68
1123	Ale, beer, porter and stout	1,505,571	.43	8,128.4	.58
8921	Maps, charts, books, pamphlets, and globes	1,469,550	.42	646.7	.05
7250	Electric household and electro the-m/c appl	1,434,741	.41	1,781.2	.13
8411	Clothing—textile fab not knit or croch	1,371,797	.39	486.4	.03
4215	Olive oil	1,321,273	.37	1,803.4	.13
0543	Vegetables, n.e.s.—frsh, chl, froz, or dried	1,272,483	.36	3,894.2	.28
6612	Cement and other concrete mixes	1,245,195	.35	58,452.3	4.19
5324	Flooring, hrdwood (exc strp and plk) and wd door	1,223,354	.35	3,124.0	.22
6291	Rubber tires and tubes for vehicles/aircr	1,177,239	.33	823.0	.06
6522	Cot fab—woven/othwse fin, n mar/sp, ex t	1,152,772	.33	928.2	.07
0440	Corn or maize—unmilled	1,116,184	.32	17,790.4	1.28
7171	Textile machry, prt and acc, inc laun equip	1,094,588	.31	259.7	.02
8931	Rubber and plastic manufactures, n.e.s.	1,078,197	.31	1,235.3	.09
6841	Alum and alum alloys—unwrought	1,068,418	.30	2,128.6	.15
Overall tramps total		352,522,642	100.00	1,393,968.3	100.00

PUERTO RICO OCEANBORNE FOREIGN TRADE—IMPORTS, TOP 50 COMMODITIES—TANKERS FOR YEAR 1972

3310	Petroleum—crude and ptly ref for fur refin	291,409,877	93.70	17,536,834.2	95.68
3322	Jet fuel and kerosene	10,453,902	3.36	382,907.5	2.09
0615	Molasses	2,335,544	.75	93,639.2	.51
5120	Organic chemicals	2,050,242	.66	49,941.1	.27
3324	Residual fuel oils	1,795,201	.58	134,180.0	.73
3329	Pitch, asphalt, pet coke and oth bypr coal, li	1,390,784	.45	84,774.8	.46
5133	Inorganic acids and oxy comp—nonmet or mett	474,715	.15	17,979.5	.10
3323	Distillate fuel oils	334,011	.11	12,472.2	.07
3321	Gasoline, excp jet fuel, and gasol blnd agt	205,264	.07	4,197.7	.02
3410	Gas—natural and manufactured	152,076	.05	6,716.2	.04
0711	Coffee, coffee substitutes, and mixtures	100,169	.03	110.3	.00
5614	Nitro fertilizer and fertil mat	90,742	.03	3,076.0	.02
5136	Ammon, sodium hydrox, potassium hydrox etc	88,455	.03	2,138.7	.01
0111	Beef and veal, exc offals—frsh, chl, fz	49,695	.02	48.1	.00
8942	Child's toys, indo game, xmas decor and enter	16,102	.01	9.4	.00
6624	Ceramic tile and oth norefrac cer constr ma	12,835	.00	59.5	.00
6786	Iron or steel pipes and tubes—welded	11,126	.00	58.9	.00
0320	Fish—airtight cont, n.e.c.; fsh prep, inc she	4,352	.00	2.7	.00
8642	Clocks, time recd mach, tim mec, clk mov and p	3,714	.00	1.2	.00
6613	Bldg and monumental stone and slate—wkd; ar th	3,586	.00	26.0	.00
8210	Furniture	2,980	.00	2.1	.00
1121	Wine, exc prune wine and rice wine	2,640	.00	3.8	.00
7192	Pumps for liq, gas, blow, and flt and purif mac	1,813	.00	.6	.00
7294	Elec start and ignit eqpmt inter combust eng	555	.00	.1	.00
7328	Motor vehicle and tractor parts and access, ne	327	.00	.3	.00
7242	Radio broadcast receivers, whether/nt comb	283	.00	.0	.00
6983	Chain and parts thereof—iron or steel	274	.00	.0	.00
5814	Plastic mat and shapes nes	263	.00	.0	.00
6952	Tools, n.e.c. used in hand or in machin	251	.00	.0	.00
Overall tankers total		310,991,578	100.00	18,329,180.7	100.00
Overall import total		852,042,228	100.00	20,067,748.7	100.00
Liner total		188,528,008	22.13	344,599.7	1.72
Tanker total		310,991,578	36.50	18,329,180.7	91.34
Tramps total		352,522,642	41.37	1,393,968.3	6.95

Prepared by: Bureau of Economics, Office of Data Systems for Office of Economic Analysis; 08/31/77—JL, TWBCLC.

LEGAL, REGULATORY, AND PROMOTIONAL ENVIRONMENT

Cabotage

Introduction.—It has long been a fairly common practice among the maritime nations of the world to reserve at least a portion of their domestic waterborne commerce to their own national flag vessels. Presently, at least 22 coastal nations²⁴ observe some form of such cabotage law. While the rationale for maintenance of such reservation systems varies somewhat according to the particular circumstances of each nation, the most frequently cited motives are those of economic stability and growth, national security, and national prestige. The U.S. practice derives basically from two statutes.

Passenger Transport.—Domestic passenger transport is governed by 46 U.S.C. 289, enacted June 19, 1886, which reads, in part: "No foreign vessel shall transport passengers between ports and places in the United States, either directly or by way of a foreign port, under a penalty of \$2 for each passenger so transported and landed" (24 Stat. 81). It was subsequently amended on February 27, 1898, to increase the penalty from \$2 to \$200.

Cargo Transport.—Transport of merchandise is covered by Section 27 of the Merchant Marine Act of 1920 (46 U.S.C. 883). This section is more commonly known as the Jones Act, after Senator Wesley Jones who introduced it as an amendment during congressional consideration of the basic measure. Section 27 reads, in part: "That no merchandise shall be transported by water, or by land and water, on penalty of forfeiture thereof, between points in the United States, including Districts, Territories and possessions thereof, embraced within the coastwise laws, either directly or via a foreign port . . . in any other vessel than a vessel built in and documented under the laws of the United States, and owned by persons who are citizens of the United States."

Applicability.—In practice, the two statutes regulate all domestic coastwise, intercoastal, Great Lakes, and inland waterway traffic, together with that between the U.S. mainland and the noncontiguous States, territories, and entities of Alaska, Hawaii, Guam, and Puerto Rico.²⁵ Trade with the U.S. Virgin Islands and American Samoa, however, is specifically exempted indefinitely by amendments to Section 21 of the Merchant Marine Act of 1920 (46

U.S.C. 877 and 48 U.S.C. 1433). The Virgin Islands exemption, which can be ended by Presidential proclamation, has come under close scrutiny in recent years as a result of the increasingly heavy flow of refined petroleum products to the mainland from a large refinery in St. Croix.

Enforcement.—Along with many other of the navigation laws of the United States, the cabotage laws are administered by the U.S. Customs Service, Department of the Treasury, which cooperates with the Coast Guard and the Maritime Administration in matters of vessel documentation and corporate citizenship.

Waivers.—On December 27, 1950, the Congress enacted a measure which provided a basis for administrative waivers of compliance with the navigation and vessel-inspection laws (including the cabotage laws) under certain circumstances. This measure (64 Stat. 1120) states, in part, that: "The head of each department or agency responsible for the administration of the navigation and vessel-inspection laws is *directed* to waive compliance with such laws upon the request of the Secretary of Defense to the extent deemed necessary in the interest of national defense by the Secretary of Defense. The head of such department or agency is *authorized* to waive compliance with such laws to such extent and in such manner and upon such terms as he may prescribe, either upon his own initiative or upon the written recommendation of the head of any other government agency, whenever he deems that such action is necessary in the interest of national defense." Thus, the Secretary of the Treasury is *required* to waive compliance with the cabotage laws if the Secretary of Defense deems it to be necessary in the interest of national defense and also *may* waive compliance if he (i.e., the Secretary of the Treasury) alone or he and the head of another Government agency deem it to be necessary in the interest of national defense. To date, there have been somewhat over a hundred waivers issued. With the principal exceptions of two—one concerning west coast lumber movements to Puerto Rico and one concerning anhydrous ammonia movements from Alaska to the Pacific Northwest, both of which covered a span of a year or more—nearly all of these have been short term waivers permitting the short term or one-time *ad hoc* use of foreign vessels by the armed services to perform special missions for which suitable U.S.-flag vessels were not available. The need for a showing of national defense essentiality has thus limited the application of the waiver authority and may be expected to continue to do so.

Waivers may also be sought through special legislation. However, the opposition customarily offered by the various maritime interest groups to passage

²⁴ Australia, Brazil, Canada, Chile, Colombia, Finland, France, Federal Republic of Germany, Greece, India, Indonesia, Italy, Republic of Korea, Mexico, Pakistan, Panama, Peru, Philippines, Portugal, Spain, United States, and Venezuela.

²⁵ The several legislative milestones leading to Commonwealth status have not altered the original applicability of these statutes to Puerto Rico's oceanborne commerce with the mainland.

of such legislation has tended to result in a *quid pro quo* solution involving a waiver of limited duration coupled with a commitment to construction or conversion of a suitable vessel in a U.S. shipyard for ultimate U.S.-flag operation.

Implications of Cabotage for Puerto Rico.—To some degree, the operation of the cabotage laws affects all areas of the United States which conduct, or which could conduct, domestic commerce by water. Obviously, not all areas are affected equally. Those areas which are exclusively or largely reliant upon the water mode are more sensitive to the effects than are those with a fuller choice of modal options. Thus, Alaska, Hawaii, and Puerto Rico—which are characterized by a heavy dependence upon external areas as both a market for their own goods and services and a source of staples and consumer goods, and by a limited choice of transport modes—have understandably wished to explore alternatives to the existing arrangement.

Because cabotage affects not only the nationality of shipping service but also such factors as choice of carrier, rate levels, and stability and level of service, it does not necessarily follow that exemption from cabotage would prove an unqualified boon to economies of the noncontiguous areas.

The introduction of foreign ships into the Puerto Rican trade might or might not lead to reduced transportation costs in the long run. Even allowing for initially lower freight rates, which would in time rise and become stable due to the probable introduction of the conference system, the long-range rate structure would be predicated upon the amount of shipping capacity available; in this context, excess shipping capacity can lead to higher costs or, at any rate, to the elimination of those savings originating from the lower costs associated with foreign-flag operators. This would come about because, with a low vessel utilization factor based upon excess capacity, each ton of cargo must bear a relatively high portion of the operator's cost structure. As long as the revenues thus derived offer a better contribution to meeting his fixed or his capital costs than any alternative kind of vessel employment, he is likely to keep the ship in the Puerto Rican service even though it does not represent efficient use of resources. Thus, a high level of service—characterized by a considerable choice of carrier, loading port, and sailing frequency—will be sustained, at a price. Such may well have been the situation with the three private U.S. carriers bought out by PRMSA.

It is probable that foreign-flag operators would initially enter the Puerto Rican trade with older class breakbulk carriers in order to take up the slack in that aspect of the commodities flow and would, expectedly, reduce freight rates in that area, while

American operators continue providing newer technology vessels at higher rates.

However, over the long term, the foreign-flag operators would also have to make inroads into the container, tug/barge, and RO/RO traffic if they are to obtain any substantial returns from entry into the Puerto Rican trade. In time, with the establishment of liner conferences, those carriers engaged in the Puerto Rican trade will be likely to adjust to the "agreed upon" rate, regardless of average cost curves. In the final analysis, the competition factor could be all but nonexistent.

Passenger Service.—There is presently no U.S.-flag passenger service between the mainland and Puerto Rico on either a liner or a cruise basis. Under current U.S. Customs Service policy, foreign-flag cruise ships may call at Puerto Rican ports while carrying passengers embarked at another U.S. port. However, the vessels may not remain in a Puerto Rican port for more than 24 hours.

Actually, there are two distinct aspects to passenger service—point-to-point or liner service and cruises—and they would be affected differently by a relaxation of the restrictions on foreign-flag carriage. Point-to-point service is now strictly by air carrier, with its features of speed and convenience. It is questionable whether a carrier by water offering service from a single mainland port to a single Commonwealth port could consistently attract adequate patronage, given the 4 to 6 days of sea time required for a round trip voyage and limited choice of embarkation points. A passenger/vehicle ferry service might be more popular, although it could pose traffic volume problems for Puerto Rico's road network.

A cruise service involving other Caribbean ports in addition to those in Puerto Rico might well benefit from being allowed to remain at Puerto Rico longer than 24 hours, although, with the ship functioning as hotel and restaurant, the revenue accruing to Puerto Rican service industries would be less than that derived from visitors using a point-to-point service and living ashore.

FMC Administered Law Affecting Puerto Rico

1 Shipping Act, 1916, as amended ("Act").

(a) Agreements.

1. Section 15 of the act requires that every common carrier by water, or other person subject to the act²⁵ must file with the Federal Maritime Commission (Commission) a copy of every agreement with another such carrier or other per-

²⁵ An other person subject to the act is defined as any person, not including a common carrier by water, carrying on the business of forwarding or furnishing wharfage, dock, warehouse, or other terminal facilities in connection with a common carrier by water.

son subject to the act that fixes or regulates transportation rates; gives or receives special rates, accommodations, or other special privileges or advantages; controls, regulates, prevents or destroys competition; pools or apportions earnings, losses, or traffic; allots ports or restricts or otherwise regulates the volume or character of freight or passengers to be carried; or provides for an exclusive, preferential, or cooperative working arrangement.

2. The Commission shall disapprove, cancel, or modify any agreement, or any modification or cancellation of an agreement, whether or not previously approved, that it finds to be unjustly discriminatory or unfair as between carriers, shippers, exporters, importers, or ports or between exporters from the United States and their foreign competitors, detrimental to the commerce of the United States, contrary to the public interest, or in violation of the Shipping Act, 1916. The Commission shall approve all other agreements, modifications, or cancellations.

3. It is unlawful to carry out in whole or in part, directly, or indirectly, any such agreement, modification, or cancellation before Commission approval or after disapproval. Commission approval under section 15 affords antitrust immunity for activities within the scope of the approved agreement.

4. Section 15 agreements the Commission has considered that involve Puerto Rico include:

(a) Agreements relating to terminal arrangements.²⁷

FMC Docket No. 76-46, for example, involves agreements between the Puerto Rico Ports Authority on the one hand and Sea-Land Service, Inc. and the Puerto Rico Maritime Shipping Authority (PRMSA) for the lease or use of berths or land parcels at Puerto Nuevo, San Juan, Puerto Rico. Issues in this proceeding include whether numerous agreements and amendments are subject to section 15, and if so, whether they should be approved, disapproved, or modified, whether the listed agreements represent all of the agreements among the Port, PRMSA, and Sea-Land for PRMSA's and Sea-Land's use of Puerto Nuevo; whether any of those agreements subject to section 15 have been in any manner implemented prior to Commission approval in violation of section 15; and whether there are any other agreements subject to section 15 which permit PRMSA's use of Puerto Nuevo Marine Terminal facilities leased by Sea-Land from the Port. On April 5, 1977, the Presiding Administrative Law

Judge adjourned the proceeding so that the proponents of the agreements could confer with their clients and decide what action to take with respect to a Commission amended order of investigation significantly enlarging the proceeding. On May 19, 1977, the Port petitioned the Commission to vacate the amended order of investigation. On that date PRMSA petitioned the Commission to reconsider its amended order.

(b) Cooperative working arrangements among carriers.

Federal Maritime Commission Agreement No. 10168, among Thos. and Jos. Harrison, Ltd., Campagnie Generale Maritime, Hapag-Lloyd A.G., and Koninklike Nederlandsche Stoomboot Maatschappij B.V., is an example of a cooperative working agreement among carriers. It provides for the parties, known as Caribbean Overseas Lines, to serve the trade between Europe and Puerto Rico and the U.S. Virgin Islands. The parties share in and contribute to revenues and expenses incurred in offering overall service in the trade. They agree upon and establish rates, charges, conditions, and practices for the carriage of cargo. They cross-charter space on each other's containerships and cooperate in other areas of operating a containership service in the trade. The Commission is currently considering the parties' application to enlarge the scope of the agreement to include a cooperative service between foreign points in the Caribbean and Puerto Rico and the U.S. Virgin Islands.

(c) Tariffs

1. Foreign Commerce—Carriers in foreign commerce must file with the Commission and keep open to public inspection tariffs showing all the rates and charges of such a carrier for transportation to and from U.S. ports and foreign ports.

2. Carriers in foreign commerce seeking tariff changes that result in additional costs to shippers must file a new tariff with the Commission showing the changes 30 days before the tariff shall become effective. Tariff changes which result in a decrease in costs to shippers may become effective immediately upon filing with the Commission.

3. It is a violation of Section 18(b)(3) of the Shipping Act, 1916, for a carrier in foreign commerce to charge or collect a greater or less or different compensation for the transportation of property or for any transportation service than the rates and charges specified in the carrier's tariff on file with the Commission.

4. Section 18(b)(5) of the Shipping Act, 1916, requires the Commission to disapprove any rate or charge filed by a carrier in foreign com-

²⁷ The Puerto Rico Ports Authority has argued that the harbor facilities of Puerto Rico are beyond the reach of Federal regulation.

merce which it finds to be so unreasonably high or low as to be detrimental to the commerce of the United States.

5. Domestic Commerce—Carriers in domestic commerce must file with the Commission their rates, fares, and charges in connection with transportation between points on their routes. Services may not deviate from the charges posted in their tariffs. The Commission if it finds any rates, fare, charge, classification, or practice to be unreasonable, may order enforced a just and reasonable maximum rate, fare, charge, classification, or practice.

(d) Other Regulations

1. False Billing

Section 16 of the Shipping Act, 1916, makes it unlawful for any shipper, consignee, forwarder, broker, or other person to knowingly and willfully obtain or attempt to obtain transportation by water for property at less than the rates or charges which would otherwise be applicable.

Section 18(b)(3) of the act forbids a carrier to rebate, refund, or remit any portion of the rates or charges specified in its tariff or extend or deny to any person any privilege or facility, except in accordance with such tariff.

FMC Docket No. 75-8 is an example of an alleged section 16 violation for misrating cargo. In that case, the Presiding Administrative Law Judge found that Puerto Rico Forwarding Company knowingly and willfully obtained transportation at less than the otherwise applicable rate by misrating containers under the freight all kinds rate shipped via the Puerto Rico Maritime Shipping Authority. That case is pending ultimate Commission resolution.

2. Discriminations and Prejudice

Section 16, First, of the Shipping Act, 1916, makes it unlawful for any common carrier or other person subject to the act to make or give any undue or unreasonable preference or advantage to any particular person, locality, or description of tariffs or to subject anyone to any undue or unreasonable prejudice or disadvantage.

Section 17 of the act makes it unlawful for any common carrier in foreign commerce to demand, charge, or collect any rate, fare, or charge which is unjustly discriminatory between shippers or ports, or unjustly prejudicial to exporters of the United States as compared to their foreign competitors.

In FMC Docket No. 76-41, *Berthing of Seatrains Vessels in San Juan, Puerto Rico*, the Presiding Administrative Law Judge found the Puerto

Rico Ports Authority in violation of Section 16, First, for its failure to insure that public areas at the Isla Grande Terminal which have private fixtures and property thereon do not become effectively dedicated to private and exclusive use. The Judge found that this gives the owner of the property an unreasonable advantage over others wishing to use the terminal.

3. Reasonable Regulations

Section 17, second paragraph of the Shipping Act, 1916, requires every carrier and other person subject to the act to establish, observe, and enforce just and reasonable regulations and practices related to or connected with the receiving, handling, storing, or delivery of property.

In *Berthing of Seatrains Vessels in San Juan, Puerto Rico*, noted above, the Judge found the Ports Authority to have violated section 17 of the act by its failure to establish and enforce just and reasonable regulations concerning assignment of berths and utilization of public areas at Isla Grande. The Judge found the Puerto Rico Maritime Shipping Authority in violation of section 17 by its failure to establish just and reasonable regulations concerning secondary utilization of its container cranes and rails located in the public area at Isla Grande. The Judge's decision is being appealed to the Commission.

4. Freight Forwarder

The Maritime Commission issues licenses to qualified independent ocean freight forwarders and prescribes rules and regulations to be observed by freight forwarders.

In FMC Docket No. 71-85, *Independent Ocean Freight Forwarder Application—Air—Mar Shipping, Inc.*, involving a corporation carrying out freight forwarding in the Puerto Rico trade, the Commission investigated whether the respondent was fit, willing, and able to properly carry on the business of forwarding. The Commission also investigated whether the respondent had been carrying out the business of freight forwarding without a license. The Commission found that notwithstanding the fact that the respondent had been conducting freight forwarding activities without a license, the respondent was qualified to receive a license.

5. Rate Regulation

Section 18a of the Shipping Act, 1916, and Sections 3 and 4 of the Intercoastal Act, 1933, give the Commission authority to prescribe just and reasonable maximum and minimum rates and charges. Moreover, the Commission may prescribe just and reasonable classifications, tariffs, regulations, and practices.

Two types of carriers serving the Puerto Rico trades are governed by these provisions: (1) Common carriers operating vessels; and (2) Non-vessel Operation Common Carriers (NVOCC's) who offer transportation to the public but utilize the services of vessel operators for the physical movement of the cargo. Their rates to the shipper are largely dependent upon the rates charged them by the vessel operators for the movement of the cargo. Thus, the rates of vessel operators are of primary importance to the people of Puerto Rico.

The sections of the shipping acts dealing with the levels of ocean freight rates could potentially have a greater effect on the people of Puerto Rico than any other legislative provision administered by this Commission. The economy of Puerto Rico largely depends upon goods which are brought by ocean carriers from the United States. The level of ocean freight rates is a matter of great interest to the people of Puerto Rico.

Although the Commission has been successful in regulating the levels of ocean freight rates in some proceedings, often the rates under investigation are superseded before the proceeding can be completed. Often this leads to discontinuance of the proceeding. A review of Commission instituted proceedings involving vessel operating common carriers serving Puerto Rico indicates that a majority of the cases instituted in the last 10 years were discontinued prior to final Commission decision.

Currently, Congress is considering a bill (H.R. 6503) which was designed to evaluate these problems. Among other provisions, the bill would authorize refunds to shippers upon a finding that rates were unreasonably high. The bill would also place strict deadlines for Commission decisions. Although the Commission has expressed reservations regarding certain provisions in the bill, the Commission believes that, with some modification, the bill could result in more effective regulation in the domestic offshore trades.

Cases Involving Water Carriers Serving Puerto Rico

- Docket No. 67-32 Sea-Land Service Inc. Investigation of Increased Rates on Beans, Lentils, and Peas
Discontinued, Aug. 1, 1967
- Docket No. 67-35 Sea-Land Service Inc. Investigation of Reduced Rates in Jacksonville / Puerto Rico Trade
Discontinued, Oct. 17, 1967
- Docket No. 68-20 Sea-Land Service Inc. Gen-

Docket No. 68-31

Docket No. 69-9

Docket No. 69-12

Docket No. 69-23

Docket No. 69-24

Docket No. 69-25

Docket No. 69-26

Docket No. 70-1

Docket No. 70-1

Docket No. 70-6

Docket No. 70-28

Docket No. 71-30

eral Rate Increase in the West Coast/Puerto Rico Trade
Discontinued, May 6, 1968

Gulf Puerto Rico Lines Inc. Increased Rates on Lard, in Packages from Gulf Coast Ports to Puerto Rico
Discontinued, Feb. 17, 1969 (Rate reduced)

South Atlantic and Caribbean Lines, Inc.
Final Order, Apr. 4, 1969

General Increase in Rates in the U.S. South Atlantic/Puerto Rico Trade (Consolidated with Docket 69-26)
Discontinued, Feb. 19, 1970

General Increase in Rates in the U.S. Gulf/Puerto Rico Trade (Consolidated with Dockets 71-49 and 73-14)
Discontinued, Feb. 3, 1975

Seatrains Lines, Inc. General Increases in Rates in the U.S. North Atlantic/Puerto Rico Trade (Consolidated with Dockets 69-25 and 69-26)
Discontinued, Dec. 15, 1969

Transamerican Trailer Transport Inc. Temporary Strike Surcharge in the U.S. North Atlantic/Puerto Rico Trade
Discontinued, Dec. 15, 1969

Seatrains Service Inc. — General Increases in Rates in the U.S. North Atlantic/Puerto Rico Trade and Investigation of Financial and Operating Relationships
Discontinued, Feb. 19, 1970

Sea-Land Service Inc. Increase in Rates in the U.S. Pacific Coast/Puerto Rico Trade
Final Order, Aug. 3, 1971 (Sub 1) Sea-Land Service Inc. Increases in Rates in the U.S. Pacific Coast/Puerto Rico Trade
Discontinued, Apr. 4, 1975

Rates and Charges in the U.S. Atlantic/Puerto Rico Trade
Discontinued, May 23, 1975

General Investigation of Pickup and Delivery Rates and Practices in Puerto Rico
Final Order, June 6, 1973

Transamerican Trailer Trans-

- port Inc. Increases in Rates in the U.S. Atlantic/Puerto Rico Trade (Consolidated with Dockets 71-42 and 71-43)
Discontinued, Mar. 21, 1974
- Docket No. 71-32 Agreement Nos. DC-38 and DC-38-1 Association Puerto Rico Trades 1968
Final Order, Jan. 24, 1974
- Docket No. 71-42 Sea-Land Service, Inc.—General Increases in Rates in the U.S. Atlantic and Gulf/Puerto Rico Trade (Consolidated with Dockets 71-30, 71-43)
Discontinued, Mar. 21, 1974
- Docket No. 71-43 Seatrain Lines, Inc.—General Increases in Rates in the U.S. Atlantic and Puerto Rico Trade (Consolidated with Dockets 71-30, 71-42)
Discontinued, Mar. 21, 1974
- Docket No. 71-45 Indiana Towing Co., Inc. General Increases in Rates in the U.S. Atlantic, Gulf, and River ports and Puerto Rico, U.S. Virgin Islands Trade
Discontinued, May 27, 1971
- Docket No. 71-49 Gulf Puerto Rico Lines Inc.—General Increases in Rates in the U.S. Gulf/Puerto Rico Trade (Consolidated with Docket 69-23)
Discontinued, Feb. 3, 1975
- Docket No. 71-53 Sea-Land Service Inc. General Increases in Rates in the U.S. Pacific/Puerto Rico Trade
Final Order, Mar. 18, 1975
- Docket No. 72-1 Caribe Hydro-Trailer Inc.'s Substituted Service between Jacksonville and Puerto Rico via the Port of Miami
Discontinued, Apr. 7, 1972
- Docket No. 72-14 Marine and Marketing International Corp. Reduced Rates on Automobiles from Miami and Jacksonville to San Juan, Puerto Rico
Discontinued, Sept. 12, 1972
- Docket No. 72-49 Seatrain Lines, Inc. Intermodal Tariff FMC-F No. 4 between California and Puerto Rico (Tariff withdrawn)
Discontinued, Dec. 15, 1972
- Docket No. 72-52 Seatrain Lines, Inc.—Proposed Annual Volume Contract Rates on Canned Tuna, FMC-F No. 3 Puerto Rico to U.S. Atlantic Ports and Sea-Land Service, Inc. Proposed decreases in Trailerload Rates on Canned Tuna FMC No. 21 Puerto Rico to U.S. Atlantic and Gulf Ports—Order of Investigation and Suspension.
Discontinued, Nov. 14, 1972 (Rates canceled)
- Docket No. 73-12 Sea-Land Service Inc., Seatrain Lines, Inc. and Transamerican Trailer Transport Inc. Proposed ILA Surcharges in the U.S. Atlantic and Gulf/Puerto Rico Trade
Discontinued, July 31, 1975
- Docket No. 73-14 Gulf Puerto Rico Lines, Inc. Proposed ILA Surcharges between U.S. Gulf Ports and Puerto Rico (Consolidated with 69-23 and 71-49)
Discontinued, Feb. 3, 1975
- Docket No. 73-17 Sea-Land Service Inc. and Gulf Puerto Rico Lines, Inc. Proposed Rules on Containers
Discontinued, Aug. 10, 1977
- Docket No. 73-81 Sea-Land Service, Inc. Reduced FAK Rates from Florida to Puerto Rico
Discontinued, Feb. 4, 1975
- Docket No. 74-22 Sea-Land Service, Inc. and Seatrain Lines, Inc. Wharfage Charges in the Puerto Rico Trade
Discontinued, June 6, 1975
- Docket No. 74-30 Sea-Land Service, Inc.—General Increase in Rates in the U.S. West Coast/Puerto Rico Trade
Pending
- Docket No. 74-40 Puerto Rico Maritime Shipping Authority — Proposed ILA Rules on Containers
Discontinued, Aug. 10, 1977
- Docket No. 74-44 Agreement Between Puerto Rico Maritime Shipping Authority and Puerto Rico Marine Management & Inc. Puerto Rico Marine Operating Company, Inc.
Pending
- Docket No. 75-18 Puerto Rico Maritime Shipping Authority — Reduced Rates from Florida to Puerto Rico
Discontinued, May 28, 1976

- Docket No. 75-20 Puerto Rico Maritime Shipping Authority — Rates on Government Cargo
Pending
- Docket No. 75-38 Puerto Rico Maritime Shipping Authority—General Increase in rates
Pending
- Docket No. 77-17 Sea-Land Service Inc. — Amendment to Freight, All Kinds in the U.S. Atlantic/Puerto Rico Trade
Discontinued, Sept. 7, 1977
- Docket No. 77-18 Seatrain Gitmo, Inc. Rates of Government Cargo
Pending
- Docket No. 77-27 Trailer Marine Transport Corporation General Increase in Rates
Pending
- Docket No. 77-28 Gulf Caribbean Marine Lines, Inc. — General Increase in Rates
Pending
- Docket No. 77-30 Puerto Rico Maritime Shipping Authority—General Increase in Rates
Pending
- Docket No. 77-38 Sea-Land Service, Inc.—Rates on Government Cargo
Pending

MarAd Promotional Program

The Maritime Administration has available two financial assistance programs for ship operators who participate in the Puerto Rico/U.S. mainland trade. These programs are the Federal Ship Financing Program and the Capital Construction Fund.

In addition, the Maritime Administration administers two other programs that would only be applicable for Puerto Rico's foreign commerce. These programs provide subsidy for both the construction and operation of vessels and are known as the Construction Differential Subsidy and the Operating Differential Subsidy programs.

A description of these programs is as follows:

Federal Ship Financing Program.—The Federal Ship Financing Program, established pursuant to Title XI of the Merchant Marine Act, 1936, as amended, provides for a full faith and credit guarantee by the U.S. citizen shipowners for the purpose of financing or refinancing U.S.-flag vessels constructed or reconstructed in U.S. shipyards. The program is administered by the Secretary of Commerce acting by and through the Assistant Secretary

for Maritime Affairs (Secretary). The guarantee of the U.S. Government under this program provides for the prompt payment in full of the interest on and the unpaid principal of any guaranteed obligation in the event of default by the shipowner in the payment of any principal and interest on the obligations when due or for other specified defaults. The Federal Ship Financing Fund established pursuant to title XI is used by the Secretary as a revolving fund for the purpose of underwriting the Government's guarantee and to pay the expenses of the program. In addition, the Secretary is authorized to borrow from the U.S. Treasury in the event the fund is insufficient for the purpose of making prompt payments under its guarantee.

The primary purpose of the program is to promote the growth and modernization of the U.S. Merchant Marine by issuing guarantees of obligations to enable the financing and refinancing of vessels constructed in the United States, and owned and operated by citizens of the United States. The program enables owners of eligible vessels to obtain long-term financing on favorable terms and conditions and at interest rates that are comparable to those available to large and financially strong corporations. Such favorable financing terms are usually not available to the average shipowner.

Vessels eligible for title XI assistance generally include vessels designed principally for research or commercial use and over 5 net tons. However, any towboat, barge, scow, lighter, car float, canal boat, or tank vessel, to be eligible, must be more than 25 gross tons and floating drydocks must have a capacity of 35,000 or more lifting tons and a beam of 125 feet or more between the wingwalls.

The design of the vessel must be adequate from an engineering viewpoint for its intended use, and the delivered vessel must be in American Bureau of Shipping class A-1, or meet other standards acceptable to the Secretary. The shipowner must be a U.S. citizen and have sufficient operating experience and the ability to operate the vessel on an economically sound basis. The shipowner must meet certain financial requirements with respect to working capital and net worth, both of which are based on such factors as the amount of the guaranteed obligations, the shipowner's financial strength, intended employment of the vessel, etc. These factors also affect the terms of the guarantee with respect to continuing title XI financial covenants, guarantee fees, reserve fund, etc. No guarantee under this program can be legally entered into unless the project is determined by the Secretary to be economically sound. Approval of the application will be contingent upon the determination by the Secretary as to whether the vessel(s) and the project meet all the applicable requirements of the existing statutes and regulations.

The Secretary is authorized to guarantee an obligation which does not exceed 75 percent of the actual cost of most eligible vessels. However, obligations may be guaranteed in an amount not exceeding 87½ percent of the actual cost of: (1) passenger vessels, designed to be of not less than 1,000 gross tons and capable of a sustained speed of not less than 8 knots, to be used solely on inland rivers and waterways; (2) oceangoing tugs of more than 2,500 horsepower; (3) barges; (4) vessels of more than 2,500 horsepower designed to be capable of a sustained speed of not less than 40 knots; and (5) other vessels of not less than 3,500 gross tons and capable of a sustained speed of 14 knots. Vessels built with construction-differential subsidy or vessels other than barges and passenger vessels in (1) above engaged solely in the transportation of property on inland rivers and canals exclusively are eligible only for a guarantee not exceeding 75 percent of their actual cost.

Since the Federal Ship Financing Program is a guarantee program and not a direct-loan program, funds secured by the guaranteed debt-obligations and used for the financing of the vessel(s) are obtained in the private sector. The main sources for such funds include banks, pension trusts, life insurance companies, and bonds sold to the general public.

The maximum guarantee period is 25 years from the date of delivery; however, if the vessel has been reconstructed or reconditioned, the life may be extended by the Secretary to include the remaining useful years of the vessel as determined by the Secretary. Amortization in equal payments of principal is usually required; however, other amortization methods such as level debt (equal payments of principal and interest) may also be approved if sufficient security is offered such as long-term charters, reduction of the amount of guarantee, and/or length of guarantee period. The interest rate of the obligation guaranteed, for both new and refinanced vessels, must be within the range of interest rates prevailing in the private market for similar loans and risks and must be determined to be fair and reasonable by the Secretary.

Capital Construction Fund.—The CCF program was established pursuant to Section 607 of the Merchant Marine Act of 1936, as amended (Act), for the purpose of providing replacement vessels, additional vessels, or reconstructed vessels, built in the United States and documented under the laws of the United States, for the operation in the U.S. foreign, Great Lakes, or noncontiguous domestic trade, or in the fisheries of the United States.

Section 607 provides for the deferment of Federal income taxes on certain deposits of money or other

property placed into a fund under certain allowable subceilings. These subceilings consist of earnings or gains realized from the operation of an agreement vessel; net proceeds realized from the sale or other disposition of an agreement vessel or from insurance or indemnification from the loss of an agreement vessel; and earnings from the investment or reinvestment of amounts on deposit in the fund. In general, the taxable income of the party is reduced by the extent to which the party deposits moneys into the fund under these subceilings.

Section 607 also permits a party to a CCF agreement to deposit in the fund amounts allowable as depreciation deductions with respect to agreement vessels. Such deposits do not directly reduce taxable income, but the earnings from such funds may be accumulated on a tax-deferred basis.

Each CCF agreement into which the Secretary enters will provide for the deposit in the fund of amounts agreed upon as necessary or appropriate to accomplish the purposes of the fund. Generally, the party may choose the subceilings with respect to which the deposits will be made. Via the mechanism of tax-deferral on deposits, the party is able to accumulate rapidly pretax funds for use in the acquisition, construction, or reconstruction of vessels built in American shipyards and for use in the repayment of mortgages on qualified vessels.

By the investment of assets in the fund, a party may compound the fund benefits and develop an even greater pool of tax-deferred funds. However, the investment of the fund in securities and stocks is subject to certain restrictions which are intended to preserve the integrity of the fund.

Section 607 specifies that an applicant for a CCF must be a citizen of the United States; own or be the lessee of one or more eligible vessels; have a program which furthers the purposes of the Act and provides for the acquisition, construction, or reconstruction of a qualified vessel; and demonstrate the financial capabilities to accomplish the program.

An applicant must provide such facts, documents, and materials as the Secretary may require in considering an agreement. Furthermore, in order to defer taxable income for a given year, an applicant must execute and enter into a CCF agreement on or before the due date, with extensions, for filing the party's tax return for that year.

An "eligible agreement vessel," for deposit purposes, is any vessel constructed in the United States, and if reconstructed, reconstructed in the United States; documented under the laws of the United States; operated in the foreign or domestic commerce of the United States; engaged primarily in the waterborne carriage of men, materials, goods, or wares; and designated in the agreement as an "eligible agreement vessel." For the purpose of generating ceilings

for deposits, the term "eligible agreement vessel" includes any tug, barge, or share interest in a vessel.

A "qualified agreement vessel," which may be acquired, constructed, or reconstructed with the aid of qualified withdrawals, is any vessel constructed in the United States, and if reconstructed, reconstructed in the United States; documented under the laws of the United States; operated in the U.S. foreign, Great Lakes, or noncontiguous domestic trade; engaged primarily in the waterborne carriage of men, materials, goods, or wares; and designated in the agreement as a "qualified agreement vessel." For purposes of making qualified withdrawals, the term "qualified agreement vessel" also includes any cargo handling equipment which the Secretary determines will be used primarily on a qualified agreement vessel and any oceangoing towing vessel or barge which the Secretary determines is suitable for the trade in which the party intends to operate; or comparable towing vessel or barge operated on the Great Lakes.

For purposes of generating ceilings and making qualified withdrawals, the term "agreement vessel" includes containers, trailers, or barges which are part of the complement of the agreement vessel. Such complement is limited to three times the container, trailer, or barge capacity of the vessel.

The fund is maintained in three accounts: The capital account; the capital gain account; and the ordinary income account. The manner in which the funds would be taxed if not deposited is the primary determinant of the account to which a deposit is credited. If a deposit is representative of an amount which would not be taxed, it is credited to the capital account. If a deposit is representative of an amount which would otherwise be taxed at a capital gains rate, it is credited to the capital gains account. If a deposit is representative of an amount which would otherwise be taxed at an ordinary income rate, it is credited to the ordinary income account.

When qualified withdrawals are made from the fund, certain basis adjustments will be made to the assets being acquired depending upon the account from which the monies are withdrawn. Generally, if any portion of the withdrawal is from the ordinary income account, the tax basis of the vessel will be reduced by an amount equal to such portion. If any portion of the withdrawal is from the capital gains account, the tax basis of the vessel will be reduced by an amount equal to (1) five-eighths of such portion in the case of a corporation or (2) one-half of such portion in the case of any other person. If any portion of the withdrawal is from the capital account, the tax basis of the vessel will not be reduced.

Construction Differential Subsidy.—A key pro-

gram created by the Merchant Marine Act of 1936 is the construction-differential subsidy (CDS) program, which provides for the payment of construction subsidies to American shipbuilders by the U.S. Government. CDS itself can be defined as the difference in costs between having a ship constructed in a foreign shipyard and having the same ship constructed in a U.S. shipyard. Due to the cost differential, subsidy is necessary to place the construction costs of ships built in the United States on a parity with foreign construction costs. The subsidy is intended to encourage the growth and maintenance of both the U.S. merchant marine and the U.S. shipbuilding industry and, thereby, to insure a degree of national self-sufficiency in these industries.

CDS may also be paid to aid in the reconstruction and reconditioning of existing ships if it is determined that the project constitutes an exceptional case.

The prospective CDS applicant must meet the requirements defined in title V of the Act. Title V provides that either the purchaser or a U.S. shipyard may apply for CDS, but in either case the ultimate purchaser is subject to the following general eligibility requirements for the award of CDS:

(1) The prospective purchaser must be a citizen of the United States as defined in Section 2 of the Shipping Act, 1916, as amended;

(2) The ship must be built for use in the foreign commerce of the United States;

(3) The shipyard which will construct the ship must be located in one of the 50 States or Puerto Rico;

(4) The prospective purchaser must possess the ability, experience, financial resources, and other qualifications necessary for the acquisition, operation, and maintenance of the proposed new ship; and

(5) The ship to be constructed must meet the requirements of the foreign commerce of the United States, be capable of aiding the promotion and development of such commerce, and be suitable for use by the United States for national defense or military purposes in time of war or national emergency.

The Maritime Administration will also give preferred consideration to applications that will tend to reduce CDS and will result in the construction of ships having high transport capability and productivity.

Ships built with the aid of CDS are also subject to the following requirements included in the Act:

(1) A ship must be documented under the laws of the United States for 25 years (20 years for tankers and other liquid bulk carriers);

(2) All members of the crew must be citizens of the United States;

(3) Except as described under "Foreign-to-Foreign Operation," the ship must be operated in the U.S. foreign commerce. If operated in domestic trades, as described under section 506 of the Act, a portion of the CDS is required to be refunded; and

(4) If the United States purchases or requisitions the vessel, the owner shall be paid the depreciated original construction cost or the scrap value, whichever is greater.

The statutory ceiling on CDS assistance is limited to a maximum rate of 50 percent. Contract prices may be arrived at by either negotiation or competitive bids.

To encourage the construction and operation of bulk carriers, the Merchant Marine Act of 1970 provided that liquid- and dry-bulk cargo ships built with CDS may engage in trade between foreign ports. The extent to which these ships may engage in such trade in accordance with normal commercial practice is detailed in regulations (46 CFR 278, General Order 111) promulgated by the Maritime Subsidy Board.

The Department of the Navy recommends that certain features be incorporated into the construction of a proposed CDS commercial ship to enhance its value to the United States in time of war or national emergency. These items usually affect the survival capability of the ship or its ability to be used for military purposes. If the Maritime Administration determines that these features have no commercial value to the shipowner, they are determined to be national defense features and the entire cost of these items will be paid for by the United States. If national defense features are used by an operator during commercial operations, a payback of a portion of their cost is required.

Operating Differential Subsidy.—This program created by the Merchant Marine Act of 1936 provides for the payment of operating-differential subsidy (ODS) to qualified U.S.-flag shipping companies for the operation of ships in essential services in the foreign commerce of the United States. In general, this program seeks to equalize the disparity in operating costs between those of American ships and their foreign competitors with respect to the wages of officers and crews, insurance, and maintenance and repairs not compensated by insurance.

The Maritime Subsidy Board, as a representative of the Secretary of Commerce, is authorized to enter into ODS contracts for either liner or bulk carrier operations for a term of up to 20 years.

To qualify for aid under the ODS program an operator must, first of all, be a citizen of the United States.

An applicant for operating subsidy must have the ability, experience, and financial resources necessary

to conduct the proposed operations in an efficient and economical manner. The applicant must own or lease, or be willing to purchase or lease, ships of a number and type suitable to maintain competitive service in the proposed essential trade.

The applicant must demonstrate the financial capability to undertake the long-range ship operating commitments of an ODS contract. In this connection the Maritime Administration applies certain minimum working capital and net worth requirements to each application. Generally, the applicant must have, as a minimum, working capital in an amount equal to 50 percent of the average annual voyage expenses for each of the ships covered by the ODS contract. The shipowner must also show net worth in an amount equivalent to 25 percent of the "owner's actual cost" of all ships involved in the subsidized operation.

If the applicant is not an existing operator of U.S.-flag ships in the service for which subsidy is sought and there is another U.S.-flag operator or operators in the service, the application cannot be approved unless, after proper hearing, it is determined that the service being provided by ships of U.S. registry in such service is inadequate and that, in the accomplishment of the purposes and policy of the Act, additional ships should be operated thereon. The Act provides that if there are two or more U.S.-flag operators in the service for which a subsidy is requested, and if it is determined that subsidy would give undue advantage or be unduly prejudicial to an operator or operators competing in this trade, the application may not be approved unless, following public hearing, the Secretary finds that such approval is necessary in order to provide adequate service by ships of U.S. registry.

It is unlawful for any contractor receiving operating-differential subsidy, or any holding company subsidiary, affiliate, or associate of such contractor directly or indirectly to own, charter, act as agent or broker for, or operate any foreign-flag ship which competes with an essential American-flag service. This prohibition also applies to any officers, directors, agents, or executives thereof. However, the Act provides for a waiver from these prohibited activities in certain cases or under special circumstances and for good cause shown.

The Act prohibits the payment of ODS to any person or company engaged either directly or through personal or corporate relationships in domestic trade, unless the Board, after a hearing in those cases where proper interventions are filed, specifically permits domestic operations. An exception is provided if the ODS contractor, or a related person or firm, was in bona fide operation as a common carrier by water in the domestic trade in 1935 and has since continued in such trade, except

for excusable interruptions. But, even in such an event, the permission is limited to the level of domestic activity carried on in 1935.

Ships eligible for the ODS program include all modern types of cargo carrying ships (barge carriers, containerhips, roll-on/roll-off vessels, tankers, ore/bulk/oil carriers, etc.) whose designs are satisfactory to the United States for commercial operation in an essential foreign trade. Such ships must be built in the United States, controlled by citizens of the United States, and manned with U.S. citizen crews.

In return for the payment of subsidy, the ship operator is required to accept and carry out certain contractual duties. Among these obligations are:

1. Maintenance of U.S. citizenship;
2. Operation of the ships in an efficient and economical manner;
3. Replacement of overage ships as required;
4. Payment of annual dividends in conformity with a conservative dividend policy; and
5. Refraining, without special permission, from operating in the domestic trade, engaging in businesses unrelated to shipping, engaging in certain business transactions with related companies, and owning, operating, or acting as agency for foreign-flag ships.

Additionally, there is a required stipulation in every ODS contract that the operator agrees to perform all ship maintenance and repair work for which subsidy is received within the United States or the Commonwealth of Puerto Rico, except in an emergency.

Use of Construction and Operating Differential Subsidy in the Domestic Trade of Puerto Rico.—In the past, the Commonwealth of Puerto Rico has asked for consideration to participate in MarAd's direct subsidy programs, in particular the Construction Differential Subsidy Program. The purpose of the CDS and ODS programs is to produce a parity between U.S.-flag operators and their foreign competition in U.S. foreign commerce with respect to vessel acquisition and vessel operation. To extend these programs to the trade between Puerto Rico and the U.S. mainland would require a change in not only the terms of the Merchant Marine Act of 1936 but to the basic avowed purpose of these programs themselves.

While availability of these programs could encourage and facilitate introduction of additional or improved vessels to the Puerto Rican trade, there would be both a number of procedural problems to be overcome and a probable detriment to the effectiveness of the programs for foreign trade.

Approval of the President and Congress would be necessary to effect the conceptual and statutory

changes to the Merchant Marine Act of 1936. It would be unacceptable to propose extension of the programs only to Puerto Rico while continuing to deny them to operators in the other noncontiguous trades involving areas such as Alaska and Hawaii which could exert many of the same claims to need as does Puerto Rico.

In the Puerto Rican trade, selective awards of subsidy to only certain operators in the trade could introduce competitive inequities with the other operators and would generate strong pressures for an "across-the-board" availability, the alternative being a massive intervention during consideration of any particular application.

Unless CDS and ODS were made retroactive, operators with the newer vessels or recently reconstructed vessels already in operation which had been financed entirely with private capital would seek some alternative form of compensation in order to remain cost-competitive with the subsidized units.

While none of these procedural problems is insurmountable, taken together they represent a formidable deterrent to near-term action. The most critical limiting factor, however, is that budget ceilings are finite things. Unless the Congress is ultimately willing not only to approve but also to fund subsidies for the noncontiguous domestic trades above and beyond those already deemed necessary for us to maintain a viable presence in our foreign trade, then the latter trade is going to have its support diluted—possibly to an injurious point.

As of March 31, 1977, the Title XI Ship Financing Guarantee program, covering approved applications and contracts in force, had total obligations of loans/mortgages outstanding of \$4.1 billion. There are pending title XI applications in the amount of \$2.5 billion. For the 50 vessel operators in the U.S./Puerto Rico trade in 1975, only one company had four of its vessels covered by title XI contracts in force. These four vessels had guaranteed mortgages of \$97 million. Two other carriers that serve Puerto Rico on an intermittent basis had \$39 million in guaranteed mortgages. These amounts represent only 2.4 percent and 1 percent respectively of the approved loan/mortgages outstanding. There are no pending title XI applications on file from operators engaged in the Puerto Rico trade. Moreover, there are no vessel operators in the Puerto Rico trade presently participating in the Capital Construction Fund program.

It appears, therefore, that while these two key programs of financial assistance are available to shipping companies in the Puerto Rico trade, they are not being utilized by the vessel owners.

In the case of PRMSA, there are legal or fiscal barriers to participation in these programs, stemming chiefly from its character as a tax exempt,

Puerto Rico corporation. For example, in establishing PRMSA eligibility for title XI guarantees, it was held by MarAd that the combination of the guarantees and the tax exempt status of the Authority might give it unfair advantage over the private operators in the same trade. Had PRMSA been willing to forgo its tax exempt status, it could likely have taken advantage of the title XI guarantees. Since it was unwilling to relinquish that status, however, it had to forgo participation.

As for the Capital Construction Fund program, while PRMSA would theoretically be eligible to establish a fund, there would be no financial incentive to do so since the tax deferment feature of the fund would have no value for a firm which is already exempt from Federal income taxes.

OTHER MARITIME ASPECTS

Shipbuilding and Repair

Existing Facilities.—There are only two shipyards presently in operation in Puerto Rico. The following is a brief description of each:

Puerto Rico Drydock and Marine Terminals, Inc.—This ship repair facility, located in San Juan, is the largest shipyard on the island. Leased from the U.S. Navy, the yard specializes in hull and engine repairs, and voyage and annual repairs on tankers and cargo ships. It is also capable of performing minor conversion work.

The yard's reinforced concrete graving dock, built during World War II, can accommodate ships as large as 632 feet in length with a beam of 83 feet. Other facilities include a small floating drydock, a 1,000-foot concrete outfitting pier (31 feet of water alongside), 3 heavy-lift mobile cranes, complete shops (machine, fabrication, boiler, pattern, and electrical), and a foundry. There is also a design division. The current work force at this yard totals about 125.

San Juan Shipyard, Inc.—This small yard, which has been in operation for 5 years, is located in San Juan. The facility is primarily a repair yard but can build barges up to 200 feet by 50 feet and tugs up to 125 feet by 35 feet.

Repair and overhaul capabilities include hull modifications, alterations, and repairs; overhaul of diesel or steam engines; propeller and shafting overhaul; electrical installation and repairs; sandblasting and painting; and boiler repairs.

Presently, the yard is engaged in heavy repair work on barges up to about 1,000 tons, and tugs and fishing vessels up to 150 feet in length.

In addition to a small side-launch building way, San Juan Shipyard has two marine railways, the largest of which can accommodate vessels as large as 200 feet by 50 feet.

There are 10 shops, including fabricating, plate, sheet metal, subassembly, carpenter, boat assembly, machine, electrical, pipe, and a propeller shop. One 115-ton and two 20-ton mobile cranes service the entire yard. About 500 feet of usable berthing space is available for outfitting or repairs. The current work force totals 80.

Eligibility for MarAd assisted work.—Title V of the Merchant Marine Act of 1936—a key program created by the Act is the construction-differential subsidy (CDS) program which provides for payment of construction subsidies to American (including Puerto Rican) shipbuilders by the U.S. Government. The subsidy is intended to encourage the growth and maintenance of both the U.S. merchant marine and the U.S. (including Puerto Rican) shipbuilding industry. CDS may also be paid to aid in the reconstruction and reconditioning of existing ships. Title V provides that either the purchaser or a U.S. (or Puerto Rican) shipyard may apply for CDS. Among the eligibility requirements is the requirement that the shipyard which will construct the ship must be located in one of the 50 States or Puerto Rico. To date, no ships have been built or converted in Puerto Rican shipyards under the provisions of title V.

Title XI of the Merchant Marine Act of 1936 established the Federal Ship Financing Program. This program can also be of assistance to shipyards in Puerto Rico. Its primary purpose is to promote the growth and modernization of the U.S. Merchant Marine by issuing guarantees of obligations to enable the financing and refinancing of vessels constructed or reconstructed in U.S. shipyards and owned and operated by citizens of the United States. In accordance with the title XI regulations, CFR 46, part 298.4(h), all construction, reconstruction, and reconditioning of such vessel shall be performed in a shipyard within the continental limits of the United States. However, since the continental limits requirement may be waived, it is possible for vessels to be built or converted with title XI financial assistance in Puerto Rican shipyards.

Shipyards in Puerto Rico are eligible to participate in cooperative MarAd-industry research and development programs directed toward improving shipbuilding efficiency.

Potential for New Development and Expansion.—At Puerto Rico Drydock & Marine Terminals, Inc., business is only fair. Most of the work consists of emergency repairs, and the yard's facilities are usually underutilized. Because of a lack of capital

and lack of sufficient land area, the company has no plans to enter the boatbuilding or shipbuilding market. However, the shipyard management is optimistic with regard to future ship repair and overhaul prospects. To increase repair capability, a new concrete floating drydock, with a lifting capacity of 2,500-3,000 tons, was recently ordered from a Louisiana company, at a cost of about \$1 million.

At San Juan Shipyard, Inc., business is good. Most of the work consists of repair work on barges, tugs, and fishing vessels, but the yard management is interested in expanding the repair facilities by acquisition of a 300-foot floating drydock. In regard to new building, the company would like to enlarge its barge building facilities. Additional pier space is also badly needed. Sufficient land area is available for additional berthing and other expansion. The company considers prospects for the yard's future as excellent, but lack of capital for expansion remains a major problem. Obtaining skilled shipyard labor is also considered a serious problem.

Ocean & Inland Waterways Corporation plans to build a shipyard at Guanica Bay on the south coast of Puerto Rico. Feasibility studies have been completed. The Farmers Home Administration, U.S. Department of Agriculture, has conditionally approved a \$9 million loan guarantee, and long-term financing is now being negotiated. However, start of work on the yard is indeterminate.

Present plans call for the new shipyard to initially build tugboats, barges, and supply-type boats. The site has characteristics which would allow the possibility of constructing ships up to 130,000 dwt in the future. Initial employment would be approximately 200 people, rising to an estimated 800, at which time the shipyard would represent an investment of about \$15 million and have an annual payroll of \$12 to \$15 million. A necessary preliminary step would be an intensive training program to be carried out in a training center to be established near the shipyard.

In connection with the new shipyard to be established at Guanica Bay, A&P Appledore (London) Ltd., in 1975, prepared a feasibility study. The following are some of the study's conclusions with regard to development of a new shipyard in Puerto Rico:

The best market for a new shipyard lies in the production of vessels for operation under U.S. flag. The market sector for a small shipyard would be the U.S. coastal fleet which totals between 5,000 and 6,000 vessels. The U.S. East Coast is the most significant center of operation for coastal boats and barges.

The opportunity exists for a yard to build simple vessels such as tugs and small oceangoing barges in a minimal facility initially and to systematically

increase the size and complexity of the vessels produced. Alternatively, the opportunity exists for a yard to develop a specialist capability, to serve growth in the U.S. coastal fleet, in the form of minibulker/products tanker type vessels.

A potential also exists at the Guanica Bay facility for vessel repairs, primarily fishing boats, tugs, barges, and other small craft operating out of Puerto Rican ports.

The study concluded that this new shipyard would be a viable operation from a financial standpoint.

The Maritime Administration's Office of Ship Construction, in August 1975, prepared an evaluation of the foregoing feasibility study developed by A&P Appledore. In the opinion of MarAd, the conclusions in this study are considered to be overly optimistic. Development of an adequate market for the products of the shipyard would be difficult due to fierce competition from mainland U.S. shipyards and to additional construction costs resulting from procurement of nearly all materials in the continental United States.

Notwithstanding the many obstacles and risks involved, it appears reasonable that some potential exists for the establishment of a shipyard capable of construction and repair of small ships and barges. Such a facility would be of benefit to the Puerto Rican economy. Invaluable in such a project are the many financial assistance programs offered to new business by the Commonwealth of Puerto Rico, such as, tax exemption, location incentive grants, payroll subsidy, training programs, on the job training, land purchase assistance, and infrastructure assistance.

Ports and Terminals

Inventory of Facilities and Equipment.—Public port facilities throughout Puerto Rico come under the jurisdiction of the Puerto Rico Ports Authority (PRPA). Established as an instrumentality of the Commonwealth of Puerto Rico, the PRPA is responsible for managing the development and operation of the Aerial and Maritime Transportation Facilities in Puerto Rico and to promote the rendering of satisfactory transportation services from and to Puerto Rico in the most extensive and economical way.

The Ports Authority administers its wharves in the port areas of San Juan, Ponce, Mayaguez, Arecibo, Fajardo, Vieques, Culebra, Guayama (Las Mareas), Guayanilla, Guanica, and Yabucoa. In accordance with lease agreements with the naval and military authorities, it also operates the Army Terminal, the Navy Pier (Frontier Base Pier) and the Isla Grande Pier. In addition, the Ports Authority operates ferry-boat services for passenger transportation between

San Juan and Catano, and passenger and cargo transportation between Fajardo and the islands of Vieques and Culebra.

Port of San Juan.—The Port of San Juan is the leading commercial port in the Commonwealth of Puerto Rico, San Juan Bay is almost completely landlocked, about 3 miles long and varying in width from 0.6 to 1.3 miles. It is the only harbor in the north coast of Puerto Rico which affords protection in all weather.

Besides the harbor entrance channel (Bar Channel) with depths of 42 feet and 36 feet respectively, there are four other navigable channels with depths ranging from 30 to 35 feet in the channels and 28-30 feet alongside pier facilities.

The port installations in San Juan Harbor aggregate in the neighborhood of 22,700 lineal feet of berthing space; 1,100,000 sq. ft. transit shed area; 1,500,000 sq. ft. open storage area; and about 105 acres of marshaling yards. The berthing facilities consist of 11 breakbulk or general cargo berths, 5 container berths, 7 roll-on/roll-off berths, 5 passenger berths and 2 berths for handling bulk liquids. A variety of shoreside cargo-handling equipment is available including six container cranes of 25 to 27½ ton capacity and one 45-ton container crane. Planned development is expected to add two additional container berths.

Port Ponce.—This is the second largest commer-

cial port in the island and is located in the southwest corner.

The port facilities at Ponce consist of the old municipal finger pier with a concrete and steel transit shed structure. In addition, there is a bulkhead wharf 2,200 feet long with several cargo sheds for conventional breakbulk cargo handling, a roll-on/roll-off ramp, a heavy lift (72 ton) crane and ample adjacent marshaling yards for the handling of vans and containers. Depth alongside is approximately 29 feet.

Port Mayaguez.—This is the third largest commercial seaport in Puerto Rico and is an open roadstead located midpoint in the west coast.

The Puerto Rico Ports Authority operates the terminal facilities which consist of a bulkhead wharf approximately 1,200 feet long with auxiliary facilities. Depth in the inner channel is approximately 30 feet, and close alongside the pier from 28 to 29 feet.

Specialized Ports.—These consist of some eight minor ports: Port Las Mareas, Guayama, Port Guayanilla, Port Yabucoa, Port Aguadilla, Guanica Harbor, Jobos Harbor (Aguirre), Port Fajardo and Port Arecibo. These ports handle a variety of commodities including bulk sugar and fertilizers, fuel oils, liquid chemicals, grains, and general cargo.

The attached summary shows the various facilities available at principal Puerto Rican ports.

Port	General cargo facilities					Specialized facilities					Remarks
	Total berths	General cargo	Container	RO/RO	Lash	Dry bulk	Liquid bulk	Passenger	Transit shed warehouse	Cranes	
San Juan	30	11	5	7	—	—	2	5	1,100,000 square feet	5 container 27½ tons 2" 45" 1 GC/container 25 tons	Two 600-ft. containers berths and improvement of 25 acres near completion.
Ponce	7	5	—	2	—	—	—	—	216,400 square feet	1 72-ton GC/container crane	Expansion of wharf and marshaling area for cargo vans under construction.
Mayaguez	2	2	—	—	—	—	—	—	¼ acre open storage	—	—
Jobos Harbor (Central Aguirre)	1	—	—	—	—	—	1	—	—	—	—
Guanica	1	1	—	—	—	—	—	—	—	—	—
Guayanilla	3	2	—	—	—	—	—	—	—	—	—
Yabucoa	1	—	—	—	—	—	1	—	—	—	—
Guayama	2	—	—	—	—	—	2	—	—	—	—

Adequacy of Existing and Planned Facilities.—Evaluating the adequacy of marine terminal facilities is an extremely complex matter, because of the imprecision inherent in estimating the capability of facilities to accommodate all the various types of ships carrying a great variety of general, dry, and liquid bulk cargoes. The capability of port terminal facilities to accommodate these many types of ships and the movement of variable volumes of commodities through the port is termed throughput capacity

which is affected by many operating conditions involving principally labor productivity, characteristics of commodities handled, type and size of ship being loaded or unloaded, condition and type of cargo handling equipment, and the percentage of berth occupancy. The combined effect of all of these factors has through the years resulted in the development of a great number of methodologies for determining a port's capacity, and thus, at the present time, there is no universally accepted standard ap-

proach to estimating throughput capacity of various types of marine terminals.

Among a number of shortcut approaches to calculating capacity of a breakbulk general cargo terminal, there is a multiplier or factor method derived from a formula which when applied to the length of a ship's berth or to the port's total linear feet of usable berthing space suitable for handling breakbulk cargo. One such rough approximation or "rule of thumb" which has been used is the factor of 1.4 long tons per linear foot of usable berthing length per cargo working day. This factor when applied to a single 750-foot berth yields a cargo handling capacity of approximately 1,000 long tons of breakbulk cargo per day or a theoretical throughput capacity of about 360,000 long tons of cargo annually, assuming a berth occupancy of near 70-percent and two working shifts a day for 360 working days a year. This base figure must be then modified downward to allow for bad weather, national holidays, shifting vessels, and similar factors which reduce productivity.

A similar factor or formula based on a linear foot/ton relationship which is also employed to estimate the annual throughput capacity of a breakbulk general cargo port or terminal uses a standard measure of 1,000 metric tons per year per meter of pier or quay length as being representative of the theoretic capacity of a breakbulk terminal facility and hence when using this factor a single 750-foot berth would have a theoretical or intrinsic capacity of about 260,000 metric tons of cargo annually.

Another approach to estimating annual throughput capacity, assuming a multipurpose terminal handling breakbulk, neobulk, and containers, is based on empirical data gathered on average cargo handling rate or productivity rate per cargo working shift per ship. For example, the average productivity rate may be derived from handling rates that from experience range from 450 to 1,000 tons per shift per ship for breakbulk and neobulk cargoes to 1,500 tons per shift per ship for containerized cargoes or a harmonic mean average of about 800 tons per shift per ship's berth. Thus, the total theoretical annual throughput of a single ship berth at a multipurpose terminal can be calculated by multiplying the number of working days per year (assume 360) times percentage of berth occupancy (assume 67 percent) times number of shifts per day (assume 2) times the average output per shift per ship (assume 800 tons) which is equivalent to about 385,000 tons per year per berth.

Still another approach to determining a port's capacity is described as the "ideal berth" method of measuring port capacity. The "ideal berth" method establishes a series of standard factors corresponding to some 15 components that affect a berth's capacity.

Weighting values are established for each component in relation to other components. Therefore, an ideal berth which was 100-percent effective would score a total of 1,500 points. The ideal berth then becomes the standard against which the existing and new facilities can be measured and evaluated. An ideal berth is defined as the one that is ideal in all components: apron strength, apron width, heavy lift capability, shed size and arrangement, open storage area, backup warehousing, rail and highway access, ease of berthing at pier or wharf, and the like.

In applying the ideal berth system to the port's existing facilities, it can be shown for example, that if there are 11 existing berths of a certain type then they may be equivalent to only 7 ideal berths. Hence, based on projected cargo tonnage, it may be determined that the port needs 9 ideal berths. Taking into consideration facility deterioration and obsolescence and increasing tonnage or demand on the 11 existing berths, the facilities-needs situation could grow progressively more acute.

Whereas, the above discussion and examples are related to estimating general cargo terminal capacities, there are other types of terminal facilities which must be included in terminal throughput analysis such as roll-on/roll-off, barge carrier, grain, coal, ore, oil, and other bulk handling terminal facilities. Common to terminal capacity analyses, whether evaluating capacity of general cargo or bulk cargo handling facilities, is consideration of the whole terminal as a unit and analysis of its operation and capacity must consider all three major elements of terminal operation, namely: (1) the vessel to apron transfer (berth throughput capacity); (2) the cargo storage capacity; and (3) the storage to hinterland movement (hinterland transfer capacity). A practical capacity for each of these components must be calculated for each type of terminal facility being examined, and the selected throughput capacity is the lowest of the calculated capacities.

More intensive analytical approaches, including graphical models, for determining port and terminal capacity also have been developed, but these methodologies involve the collection of extensive terminal operating data over a period of a year or more which are summarized and introduced into a series of component formulas or cargo transfer equations to determine intrinsic or theoretical capacity and by applying various resource and cycle time modifiers to theoretical capacity arrive at a practical or effective handling capacity. The entire analytical and graphical representation process is very complex and laborious to deal with and except for indepth and detailed studies and analyses of individual terminals spread throughout many ports over a long period of time the analytical tool approach is not very practical for quick and responsive evaluations.

Although generally unsatisfactory for quick and practical responses to questions concerning port and terminal capacities, the basic principles upon which the several analytical equation-type of approaches rest are considered sound. Consequently, it is desirable to develop a modified methodology based on a standard procedure which is easily understood and capable of being applied to a wide variety of terminals. At least one recent effort by a recognized port engineering/management consulting organization is aimed at achieving a simplified analytical method of estimating terminal throughput capacity while at the same time retaining reasonable reliability and practicality in the process.

Because of the above factors and problems in developing a realistic or practical method for determining the adequacy of the capacity of Puerto Rico's ports to handle existing and projected movements of commerce, we recommend that the capacity analysis in this study be based on actual cargo handling data which has been experienced and reported by those who are directly involved with cargo handling at

ports such as port operating personnel, stevedoring companies, shippers, and others. Such a recommendation has been partially accomplished through a recent U.S. coastal region survey by the four Regional Offices of the Maritime Administration on four seacoasts—Atlantic, Gulf, Pacific, and Great Lakes. Accordingly, based on the maritime terminal capacity data collected from the above survey, some "first cut" rough estimates of Puerto Rican port capacities can be developed. By comparing port capacity tonnage estimates with the existing and projected movements of commerce through Puerto Rican ports, it will be possible to assess the adequacy and, in turn, the need for facilities and port expansion programs.

As a first rough approximation of port and terminal capacities, a practical capacity estimation for each of the Puerto Rican ports has been developed. The estimates are based on total number and types of terminals and berths and are listed for the respective Puerto Rican ports in the accompanying table.

[Millions of long tons]

Port	Estimated annual throughput capacities of cargo terminals					Total estimated existing port capacity	Total actual 1975 tonnage handled
	Breakbulk	Container	RO/RO	Liquid bulk	Dry bulk		
San Juan	3.3	2.5	2.8	8.0	—	16.6	10.5
Ponce	1.5	—	0.8	—	—	2.3	0.6
Mayaguez	0.6	—	—	—	—	0.6	0.3
Jobos Harbor (Central Aguirre)	—	—	—	1.5	—	1.5	NA
Guanica	—	—	—	0.2	1.0	1.2	NA
Guayanilla	0.6	—	—	0.2	—	0.8	NA
Yabucoa	—	—	—	1.5	—	1.5	0.2
Las Mareas (Guayama)	—	—	—	1.5	—	1.5	NA
Total	6.0	2.5	3.6	12.9	1.0	26.0	11.6

NA Indicates data not available at the time this report was prepared.

— Dash indicates no terminal facility in this category.

¹ Incomplete total, because 1975 tonnage data for Ports of Jobos, Guanica, Guayanilla, and Las Mareas were not available at time of report preparation.

Despite incomplete 1975 waterborne commerce statistics for several of the smaller ports noted above, the estimated port capacities of the major ports when matched against actual 1975 cargo tonnage indicate that the total capacity of the major ports of Puerto Rico exceeded the total demands, and therefore it initially appears that the present major port terminal facilities of Puerto Rico are more than adequate to handle existing movements of commerce.

For undertaking a more complete demand/capacity analysis, it will be necessary to examine forecasts of commodity data movements through the ports of the study region in order to determine whether present facilities are sufficient to handle the cargo volumes forecast for the future. From this it can be determined what degree of development of port facilities will be necessary to meet the future needs of Puerto Rico's oceanborne trade and commerce.

In conclusion, again it should be recognized that no universally accepted measure of a port's capacity currently exists, and that there is even disagreement among persons knowledgeable in these matters on just what capacity should attempt to measure. For example, should it be employed to measure peak or highest cargo volume handling performance or simply to measure average cargo handling performance? The matter of hinterland accessibility by rail, truck, pipeline, or barge is another element difficult to assess, and should be considered carefully in any detailed analysis of port terminal capacity. The latter is clearly an important issue, especially when evaluating a regional or country transportation plan such as is the case in the proposed study of Puerto Rican ocean transportation.

Container Demurrage Problem.—The problem carriers face typically in collecting demurrage on

containers was greatly exacerbated in the Puerto Rican trade in the years before the formation of PRMSA by the intense competitive struggle of the three major lines serving the island from the U.S. Northeast. The principal reasons the amount of demurrage outstanding grew to such proportions, at one point reportedly in excess of \$6 million, were: the tendency of carriers to absorb or waive this expense for purposes of holding or attracting further business, a shortage of sufficient warehousing capability at many consignee locations which consequently delayed the return of the container as it was being used for storage, the customary consignee or trucker reluctance to pay added charges particularly when they saw that these charges were in many cases waived, and a propensity of customers to dispute the correctness of the basic records and/or calculations on which the charges were based.

To cope with this situation, about 1969, the three ocean carriers secured the approval of the F.M.C. for a section 15 agreement to reconcile and standardize their procedures and billings. This ultimately led to the establishment of the Maritime Service Corporation, an entity set up to operate as a private collection agency based on carrier records which were then computerized and billed to facilitate all subsequent collection and followup efforts. Notwithstanding considerable startup problems, the system was reasonably successful in stemming the continuation of the conditions which had prevailed. By the time of the sale of the companies to PRMSA, this approach had generally achieved its intended purpose for the carriers. Apparently, this still remains a lingering problem in the trade with slow paying debtors, individuals who try to avoid payment, and continuing protests that the amounts billed are incorrect. The demurrage outstanding account has been running for the past 6 months at a level of about \$1.9 million (without further figures, it is not possible to assess the significance of this amount). The PRMMI is considering trying to undertake some steps through tariff rules which would restrict the further extension of credit to individuals in arrears on demurrage and is also soliciting the F.M.C. to consider a rulemaking step which might back up the limitation on the further extension of credit to delinquent accounts. With the reemergence of direct competition (Sea-Land and Seatrain) the situation could again get out of hand. The sale or possible breakup of the PRMSA service additionally entails such possibilities.

The carriers have attempted to recoup their demurrage losses through the general level of rates charged which penalizes the economy as a whole for the transgressions of those who are offenders. Notwithstanding this inequity, the problem of collecting receivables, whether freight money or demurrage, is

a longstanding one for carriers of all modes. Despite government's general concern it is not readily apparent what actions might be taken at this level to solve what is essentially a commercial matter between carriers and their customers. The function of government appears to be limited to that of giving sanction to properly filed tariffs (which says in effect the charge for demurrage is legal) rather than involving government with ensuring the actual collection of the money due. Through the F.M.C.'s authority, government can also act by giving approval to groups of carriers to organize joint efforts to deal with the problem (as was the case with the Maritime Service Corporation).

Maritime Labor

Seafaring Personnel.—The majority of the seafaring personnel on board the U.S.-flag self-propelled vessels serving Puerto Rico are covered by the following unions:

- Masters, Mates and Pilots
- Marine Engineers' Beneficial Association
- American Radio Association
- Radio Officers' Union
- National Maritime Union of America
- Seafarers' International Union of North America
- Marine Cooks and Stewards
- Marine Firemen's Union
- Sailors' Union of the Pacific

These unions have a total membership of about 79,000, most of whom sail aboard the U.S.-flag deep sea fleet (1,000 g.r.t. and over). Perhaps 10 percent of this membership is assigned to ships engaged in the Puerto Rican trade. In addition, there are dozens of tugs and barges serving the trade whose crews may be unionized to some extent, although solid data on these persons is not currently available.

Based on conversations with both union and management officials, we found that ethnic composition records (in terms of Puerto Ricans) of the total seafaring work force are not readily accessible. Both groups indicate that these records are not needed, since as long as a person is a U.S. citizen and can meet various Coast Guard and union qualification standards for specific job classifications, he or she will be assigned jobs equally, based on those standards. However, one authoritative source has indicated that from two-thirds to three-quarters of the unlicensed personnel of one major carrier in the trade (not PRMSA) are of either Puerto Rican birth or ancestry.

The wages, fringe benefits, hiring practices, work rules, and stability factors differ among the several

unions. However, there are some similarities in the above areas when comparing either licensed unions with other licensed unions or unlicensed unions with other unlicensed unions. The stability of the work force varies depending upon the size of the fleet, and the size of the work force. Today, as in the recent past, there appears to be a surplus of qualified personnel to operate the U.S.-flag deep sea fleet (1,000 g.r.t. and over). Therefore, the stability of employment in the seafaring workforce may not be as great as employment in other U.S. industries.

Longshore Personnel.—Longshoring is one of the highest paying blue-collar occupations found within Puerto Rico. The vast majority of longshoring jobs are covered by contract agreements with the International Longshoremen's Association (ILA). Based on recent reports from the ILA, there are approximately 2,300 native Puerto Ricans on the island who are employed by the industry and members of the ILA. These 2,300 longshoremen are currently receiving an average hourly base wage of \$8.

Longshoring employment in Puerto Rico is relatively stable since most commodities enter or leave the island by vessel. Stability of the work force is generally the rule unless there is either a national or worldwide recession. If this occurs, employment generally drops to some degree (as it does in most U.S. mainland ports) until an economic recovery begins.

Hiring practices, work rules and other contract items are identical to those negotiated in most Gulf and Atlantic ports if they are negotiated as part of the master ILA agreement. It should be noted that minor contract differences do occur, as in other ILA agreements, since local issues are negotiated separately. However, these minor differences have relatively little impact on wages, fringe benefits, work rules, hiring practices and other items which affect the stability of the work force (at least to no greater

degree than locally negotiated issues affect other ILA agreements).

Furthermore, review of our strike information data reveals that the Puerto Rican locals follow the same general strike patterns as the mainland ILA locals. The number of days lost due to strike activities is relatively low, which also adds, to some degree, stability of the work force.

Work Stoppages.—Dependent as it is upon ocean transportation, Puerto Rico is sensitive to any interruption to that service occasioned by work stoppages of seafaring, longshore or teamster personnel. While stoppages have obviously not been eliminated, their frequency and duration have moderated since the start of the current decade.

With respect to those stoppages which, by virtue of the carriers or ports affected, have had an effect on Puerto Rico's trade, 12—4 by seafaring personnel, 6 by longshore personnel, and 2 by teamsters—have exceeded 5 days duration since 1970. The average duration of stoppage has been 29 days, with a low of 9 days and a high of 100 days. No stoppages in excess of 5 days have been recorded for seafaring personnel since October 1975, for longshore personnel since December 1974, or for teamsters since January 1975.

When a work stoppage does occur, the Federal Government may be able to afford some relief through the mechanisms of a temporary restraining order or a Taft-Hartley injunction, provided that certain requirements are met as to the scope or severity of the stoppage. Additionally, the services of the Federal Mediation and Conciliation Service are available to assist in negotiations of a settlement. Beyond these resources, however, the Government does not possess the means to compel restoration of commercial shipping service to Puerto Rico or to any other offshore state of entity.

Energy

Acknowledgements

Many individuals contributed to the preparation of the DOE report dealing with energy conditions and programs in Puerto Rico. C. William Fischer, Associate Administrator for Policy and Program Evaluation, was the DOE representative on the Interagency Study Group on Puerto Rico. Dr. Peter Antonelli of the Office of Regulatory Policy served as the Study Coordinator. The preparation and writing of the report were done primarily by Dino G. Pappas with assistance from Mrs. Christine Kaplan. Advice and material for the report were provided by the Office of Energy, Office of the Governor of Puerto Rico: Frank Castellon, Director, Rafael Llompart, Juan Davila, and personnel from the Statistical Division and the Information and Analysis Section. Additional material and review were provided by the Puerto Rico Planning Board, Office of Economic Opportunity of Puerto Rico, the Department of Labor of the Commonwealth of Puerto Rico, the Center for Energy and Environment Research, and the Puerto Rico Water Resources Authority. DOE personnel from the Office of Hearings and Appeals, Office of Consumer Affairs, Office of Conservation and Solar Application, and the Office of Fuels Regulation within the Economic Regulatory Administration (ERA) also provided materials for the report. Policy review was provided by Dr. Peter Antonelli, Office of Fuel Regulation, ERA and Mr. Henry Santiago, Office of Policy Analysis, Policy and Evaluation. Clerical support was provided by Mrs. Catharine Donnelly. Finally, appreciation is extended to the many individuals in Puerto Rico and the U.S. Department of Commerce who assisted the DOE study in providing advice, information, and material needed to complete the report.

ENERGY SECTOR

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Energy-Summary

In March 1977, President Carter, pursuant to an agreement with Governor Romero Barcelo of Puerto Rico, requested a comprehensive interagency study of the economy of Puerto Rico. This study was to serve as the basis for considering ways to improve the economic situation in the Commonwealth. The group decided to address Puerto Rican problems principally in a sectoral framework and to focus on the impact of Federal programs and policies as they relate to the major problem areas. The energy sector focuses on the impact of the Federal Energy Administration (now supplanted by the Department of Energy) policies and programs on the economy of Puerto Rico.

Puerto Rico since the 1950's has undergone dramatic industrial and economic changes. This has been the result of the efforts of an economic development program known as "Operation Bootstrap" which has assisted in the establishment of about 2,000 new factories and plants throughout the island.

This accelerated industrialization of the Commonwealth has brought about a marked increase in the demand for energy. Until 1974 Puerto Rico depended totally upon cheap and abundant crude oil and naphtha (for its petrochemical operations) from Venezuela. These raw materials, transformed into petroleum and petrochemical products, provided the island with electric power, energy and materials for its industrial needs, and gasoline for the movement of its population.

Due to the pricing actions of the Organization of Petroleum Exporting Countries (OPEC) in 1974, cheap crude oil was no longer available not only to Puerto Rico but also to all the nations of the world. In the last few years the prices for crude petroleum and their byproducts have tripled and quadrupled. The world economic recession that has followed OPEC's pricing actions has severely impacted Puerto Rico and resulted in a low growth rate, increased unemployment and underemployment, and the closing of numerous industrial plants.

This energy study focuses on three particular areas: (1) the role of energy in the Puerto Rican economy; (2) the impact of FEA/DOE policies and programs; and (3) a future energy strategy for Puerto Rico. Although the Commonwealth's econ-

omy is nearly 100 percent petroleum based, only 60 percent of this energy source is used for internal needs. Nearly all of the remainder is for the mainland U.S. market consisting of various petroleum and petrochemical products. This is not by accident but rather by design. Both the Federal Government of the United States and the Commonwealth Government jointly adopted policies whereby Puerto Rico would supply the mainland United States with these petroleum products. Intrinsic to this decision was the fact that the raw material, oil, would be cheap and readily available. With the dramatic increase in the price of oil this is no longer true and therein lies the energy dilemma which faces Puerto Rico.

The key industries which have been major energy users are: petroleum, primary metals, cement, paper, and chemicals (primarily plastics). Other major energy users on the island are the Puerto Rico Water Resources Authority (the electric utility) and the consumer sector in the form of gasoline. The authority is the major supplier of electric energy for industrial, commercial, and residential use; at the same time it is a major user of energy in the form of residual fuel oil.

The price increases of crude oil and naphtha brought on by OPEC pricing policies have been so great that they, combined with the U.S. decision to control domestic oil prices below the price of imported oil, reversed the formerly competitive position that the island had in such industries as petroleum refining, petrochemicals, electricity, and steam costs. Since 1974 the average prices for many petroleum products have increased by multiples of four to five times those of the 1972 period. This, in turn, initially led to a slowdown in the economic growth rate and increased unemployment. The Puerto Rican petrochemical industry does not appear presently to be cost-competitive with producers on the U.S. Gulf Coast due to the higher feedstock, fuel, and power costs in Puerto Rico.

The United States Government has been involved in Puerto Rican energy matters since 1959, when the Interior Department's Oil Import Administration created a program which established crude oil imports for the mainland and the island. This was later

expanded in late 1965 when a proclamation included special provisions to develop a petrochemical industry in the Commonwealth.

In May 1973 the Department of the Interior converted the formerly established maximum levels of oil imports to a fee system of imports. Some of these were fee exempt and others were fee paid. This program of fees and duties on imported crude oil and petroleum products was delegated to the Federal Energy Office in December 1973 and then transferred to the FEA in June 1974.

In October 1977 the FEA was absorbed into the new Department of Energy and became responsible for the oil import fee program. Because of long-term allocation of fee-free licenses which did not expire until 1978 for some Puerto Rican firms and in 1981 for others, the island's latter firms did not pay any import fees. In late 1978 the DOE granted relief to firms from such import fees expiring during 1978 and this was to continue through April 1979. Due to Presidential Proclamation 4855 in April and Energy Secretary Schlesinger's decision in June 1978, the oil import fees have been suspended until the end of 1979. The Secretary of Energy under the proclamation can continue this suspension for an additional 6-month period until June 30, 1980.

In February 1975 the U.S. Government imposed a supplemental fee of \$1 on imported foreign crude oil; in June this was raised to \$2 per barrel. Puerto Rico also collected such supplemental fees on crude oil imported into the island with certain exceptions and credits for exports. In late December 1975 the United States discontinued this fee by order of the President and on July 1, 1978, the Commonwealth suspended this supplemental oil import fee. Although the legality of the Puerto Rican supplemental fees is being challenged by CORCO, the Federal program of import and license fees per se has had little or no impact on the Puerto Rican firms because of fee-free licenses, various exemptions, presidential proclamations, and relief granted by DOE.

In late November 1974 the FEA adopted a crude oil cost equalization program—the entitlements program—to equalize the cost of crude oil among U.S. refiners. This program was later expanded to include other petroleum products. Maximum entitlement benefits are received by Puerto Rican importers of foreign crude oil and naphtha imports also receive entitlement benefits. CORCO has benefited substantially from this program and depends heavily upon the sale of entitlements to equalize its crude oil and naphtha costs with mainland competitors. CORCO alone has received over \$477 million from the entitlements program.

To a large extent, over the next few years all of these present cost imbalances of crude oil, feedstocks and other petroleum products will be eliminated. As mainland domestic energy prices are allowed to rise to world levels, costs for crude oil will be equalized. This program is underway as President Carter directed the DOE to phase out controls on all domestically produced crude oil by September 30, 1981.

For the future the price of oil will remain high and possibly increase. To reduce its almost total dependence on oil for its energy needs and thereby cushion its economy against further unplanned increases in oil prices, the island must turn to other energy sources for its industrial, commercial, and consumer needs. This is not easily done when the entire system in operation is almost exclusively dependent upon petroleum and there are no easily implementable alternatives.

Under this situation of high-cost crude oil, Puerto Rico's energy strategy should focus on the development of alternative energy sources and on greater conservation of all energy materials.

Solar energy and potential offshore oil or gas fields are two plausible new energy sources that might be available to provide Puerto Rico with its energy needs. The former has long-term application, whereas the latter source would be one of limited means and duration, if it exists at all. Although there are uncertain environmental and other aspects relating to coal and nuclear energy, these sources should not be overlooked if they are otherwise commercial.

During the period of development of the more exotic energy sources, the island has the opportunity to develop OTEC (Ocean Thermal Energy Conversion) in order to provide for its electric needs. The authority has been pursuing the development of ocean thermal energy since 1967 and an OTEC plant to be operated in the grid of an electric utility is under consideration for Puerto Rico. Although OTEC is a promising alternative for the authority as it offers base-load capability for its electric system, it will be a number of years before this alternative is commercially viable and competitive.

The reliance on oil will continue in the years ahead, but the programs are either underway or under consideration for developing the alternative energies that will provide Puerto Rico with an energy mix that will reduce its near total dependency on oil. The several conservation programs that are underway on the island will have an initial impact on lessening oil consumption and, at the same time, provide opportunities for developing more efficient uses of energy in industry and the home.

Chapter I.—Puerto Rican Energy Overview

BACKGROUND

During the past 25 years, Puerto Rico has made impressive industrial and economic gains. The gross national product has risen over 10 times from \$775 million in 1950 to \$7.9 billion in 1977, and personal income per capita has increased over eightfold from \$296 a year to \$2,472 annually. The Government of Puerto Rico, under an economic development program known as "Operation Bootstrap," assisted in the establishment of 2,000 new factories and plants throughout the island. As a result of this economic development, manufacturing and industrial production surpassed that of agriculture after the mid-1950's, which until that time had been the major source of economic activity.

In the early period of industrialization, new firms were engaged in the processing of local products and resources such as sugar, tropical fruits, tobacco, and local minerals. U.S. corporations, stimulated by 10- to 17-year periods of tax exemptions, availability of Government-built factories, and a ready supply of relatively cheap labor, established branch centers for the manufacture of textiles and the production of apparel. These initial industries were followed by assembly plants for the electrical and electronic industries for the production of products such as electron tubes and microphones. In the 1960's industrialization concentrated on the development of capital intensive industries such as petroleum refining and the production of petrochemical byproducts. Three large petroleum refineries were built on the island—one on the north coast and two on the south—to refine the readily available supplies of then cheap oil from nearby Venezuela. The major portion of the petroleum products was shipped to the U.S. mainland as were the basic and intermediate petrochemical byproducts.

Along with this industrialization of the island, there occurred a marked increase in the demand for power. Nearly all of this power was based on electric energy which depended on the importation of foreign crude oil from Venezuela prior to 1974. Since then, the Middle East and areas of Africa provide large amounts of crude oil. Electric power production jumped from over 1 billion kilowatt hours an-

nually in the late 1950's to over 11 billion kilowatt hours in 1977; however, electric power costs have increased several times as a result of the higher cost of crude oil. Those industries which are energy intensive have been particularly affected by the higher prices of electric power.

Concurrent with these increases in industry and electric power, there was a sizable increase in the number of vehicles on the island. There were 2.2 million people in Puerto Rico at the beginning of 1950, and recent estimates disclose that the population has grown to 3.3 million persons. In 1950 there were 34 persons for every motor vehicle registered; by 1977 there was one car for every four persons in Puerto Rico. The car population has risen nearly 14-fold from 60,000 registered vehicles in 1950 to over 830,000 cars by June 1977.

Thus, Puerto Rico had come to depend almost totally upon what was originally abundant and cheap crude oil from Venezuela for its energy needs. The enormous increase in the cost of crude oil, due to the action of the Organization of Petroleum Exporting Countries (OPEC), has had a very severe impact on Puerto Rico. Within a very short time, prices for petroleum products and electric power started to rise so that they tripled and quadrupled within a matter of a year or two. All the advantages of cheap power and fuel were no longer available.

THE ENERGY SITUATION

Of all the factors that have affected the energy situation in Puerto Rico, the foremost is the pricing policies of the OPEC nations. These price hikes on energy raw materials and petrochemical feedstocks, together with the U.S. decision to control domestic oil and gas prices below BTU equivalent price of imported oil as well as higher two-way shipping costs between the United States and Puerto Rico, have reversed the island's competitive position in petroleum refining and petrochemicals so that the advantages previously available have been wiped out.

For example, the average prices of crude petroleum and naphtha have gone from more than \$2 a barrel in 1973 to about \$11.87 per barrel for crude and \$14.18 a barrel for naphtha in 1977. These in-

creased costs in turn have driven up the prices of finished products such as petrochemicals and gasoline. Puerto Ricans have watched the prices of gasoline soar to 66 cents a gallon wholesale, and at the end of January 1978, were paying 77.5 cents per gallon at the pumps for premium gasoline (leaded), and 1 to 2 cents less per gallon for regular gasoline (unleaded).¹

The consumer without a car was affected at home where the electricity he consumes is derived from petroleum. The people require electricity to run basic appliances, and to provide lighting and entertainment via the radio and television set. This aspect of the energy situation had such an impact upon the low-income group of Puerto Rico that the Government, in June of 1974, started to subsidize those households that would use less than 425 kilowatt hours of electricity monthly. By contrast, the average

U.S. family consumed 1,764 kilowatt hours of electricity monthly. This program had two purposes in mind: one was to decrease the consumption of electric power, and the other was to help households in the payment of their electric bills.

Thus, the energy situation has impacted heavily upon the island, because all of its energy needs are almost totally dependent upon imported petroleum. There are no significant alternative energy sources. By the mid-1950's, the development of small hydroelectric dams came to an end. Today this source of energy provides only 1 to 2 percent of the total energy consumed on the island. There are no other natural resources such as coal or gas available, and plans for a possible nuclear plant have been scrapped. Although the energy situation for the immediate future and for a number of years ahead in Puerto Rico is filled with difficulties, in the long run the potential of harnessing alternative energy sources effectively and implementing energy conservation measures should allow for further development of the island and its economy.

¹This pricing situation is reversed in the United States where unleaded gasoline sells for 1 to 2 cents more per gallon. In Puerto Rico, the Energy Office has assigned a higher pricing margin to leaded premium gasoline than to unleaded regular; in addition, the premium has a higher octane rating.

Chapter II.—Energy and the Puerto Rican Economy

INTRODUCTION

In order to understand the impact of energy on the Puerto Rican economy, it is essential to analyze the uses of energy by its various components. For this study, the economy is divided into three sectors: the industrial, the service, and the consumer. Within the industrial sector, the study will focus primarily on the petroleum refining and petrochemical activities as well as review the apparel, pharmaceutical/drug, food processing, and textile industries. The service sector will concern itself mainly with the energy requirements and related costs of the Puerto Rican Water Resources Authority, the public agency responsible for the production and distribution of nearly all the electricity consumed on the island. The third sector will be devoted to the energy aspects used by the consumer of Puerto Rico in his daily life—transportation and the basic living needs of cooking, the use of appliances, bathing and recreational needs.

ENERGY USAGE

The most unique aspect of Puerto Rico's energy usage is that it is nearly 100 percent petroleum based, but only 60 percent of this energy is consumed on the island for its own internal needs. Two out of every five barrels of petroleum and petroleum products that are imported are processed and shipped largely to the United States as middle distillates, residual oil, and gasoline. Of the average 61 million barrels consumed on the island for the last 3 years, the major uses were residual fuel oil, largely for electricity generation, and gasoline used for transportation needs. Table 1 provides additional data on the type of petroleum products imported and exported or shipped to the U.S. mainland by Puerto Rico in the past 2 years.

The sectoral consumption of petroleum in Puerto

Table 1.—Puerto Rico Petroleum Supply and Demand 1975–77

	1975 (millions of barrels)	1976 (millions of barrels)	1977 (millions of barrels)
IMPORTS			
Crude oil	70.3	83.1	77.7
Naphtha ¹	23.5	20.0	(²)
Refinery gas .....	.2	.1	(²)
Residual fuel oil .....	.5	.1	2.1
Motor gasoline	1.3	.8	
Aviation fuel	2.0	1.1	
Other .....	.2	.2	.2
Total imports	98.0	*105.3	*105.8
Stock changes .....	.2	(.7)	2.4
Total supply	98.2	104.6	108.2
INTERNAL CONSUMPTION			
Refinery gas	4.5	5.4	4.9
Middle distillates	5.8	6.7	6.0
Residual fuel oil	26.2	24.2	27.4
Motor gasoline	14.0	15.1	15.8
Aviation fuel	1.9	1.8	2.4
Naphtha	5.6	4.7	(²)
Other ⁴	1.9	4.1	4.6
Total consumption	59.9	*61.9	*61.2
EXPORTS			
Middle distillates	10.8	12.4	13.6
Residual fuel oil	3.6	6.8	3.4
Motor gasoline	16.6	14.0	18.2
Other	7.3	9.6	11.8
Total exports	38.3	*42.7	*47.0
Total demand plus exports	98.2	104.6	108.2

¹ Includes adjustments in naphtha used by refineries as petrochemical feedstocks; excludes naphtha imported by the petrochemical sector.

² Not available.

³ Figures may not add to totals due to independent rounding.

⁴ Includes loss in processing.

Source: Puerto Rico Commonwealth, Office of Petroleum Fuels Affairs, *Synopsis of the Energy Situation of Puerto Rico, 1976*, San Juan, April 1977, and *Lineamientos para la Formulación de una Política Energética de Puerto Rico*, San Juan, December 1976.

Rico is shown in table 2. The data for 1977 (latest data available) indicates the electric generation sector as the major user of the 61 million barrels of petroleum with 34 percent, followed by the transportation and manufacture sectors with 30 and 27 percent, respectively.

Table 2.—Puerto Rico Petroleum Usage 1975–76
(In millions of barrels—Mbbl)

	1975		1976	
	Total (Mbbl)	Total percentage	Total (Mbbl)	Total percentage
Total imports and change on inventories	98.2		104.6	
Crude				
Naphtha				
Others				
Sectorial consumption:				
Electricity generation	18.7	19.0	18.0	17.2
Transportation	17.9	18.2	17.6	16.8
Manufacture	19.7	20.1	22.7	21.7
Others	3.6	3.7	3.6	3.4
Subtotal	59.9	61.0	61.9	59.2
Exports	38.3	39.0	42.7	40.8
Total	98.2	100.0	104.6	100.0

Source: Puerto Rico Commonwealth, Office of Petroleum Fuels Affairs, *Synopsis of The Energy Situation of Puerto Rico*, 1976, San Juan, April 1977 and *Lineamientos para la Formulación una Política Energética de Puerto Rico*, San Juan, December 1976.

In 1976 the industrial sector was the largest consumer with nearly 37 percent, and transportation and electric generation used 29 and 28 percent, respectively. In 1975, the equality of usage was more evident among the three sectors—industrial, service, and consumer—as each one accounted for one-third of the nearly 60 million barrels of petroleum. The data on usage do not include naphtha imports by the petrochemical sector and therefore fall short of the

Table 3.—Crude Petroleum and Naphtha Imports and Costs, 1971–77¹

Year	Crude petroleum/ naphtha imports (barrels)	Crude petroleum/ naphtha costs	Average cost per barrel
1971	84,832,000	\$ 189,962,690	\$ 2.24
1972	109,302,000	262,667,170	2.40
1973	123,868,000	302,567,830	2.44
1974	119,162,000	861,418,460	7.23
1975	104,071,000	1,148,744,150	11.04
1976	107,592,000	1,272,444,620	11.83
1977	96,823,000	1,208,607,260	12.48

¹ Excludes imports from the Virgin Islands and the United States.

Sources: Puerto Rico Economic Development Administration, "The Petroleum Refining, Petrochemical and Allied Products Industries in Puerto Rico," May 1977; Puerto Rico Planning Board, *External Trade Statistics*; and Puerto Rico Office of Energy.

Table 5.—Puerto Rican Imports of Crude and Unfinished Oil, 1971–77¹
(In thousand of barrels)

Year	Crude oil			Unfinished oil (naphtha)			Total
	Venezuela	Other nations	Subtotal	Venezuela	Other nations	Subtotal	
1971	47,666		47,666	15,898	21,268	37,166	84,832
1972	66,823	1,359	68,182	16,463	24,657	41,120	109,302
1973	71,665	6,323	77,988	15,404	30,476	45,880	123,868
1974	34,079	41,011	75,090	13,522	30,550	44,072	119,162
1975	32,353	40,399	72,752	9,661	21,658	31,319	104,071
1976	37,071	35,837	72,908	8,610	26,074	34,684	107,592
1977	32,285	47,951	80,236	6,420	10,167	16,587	96,823

¹ Excludes imports from the Virgin Islands and the United States.

Sources: Puerto Rico Development Administration, "The Petroleum Refining, Petrochemical, and Allied Product Industries in Puerto Rico," May 1977; Puerto Rico Planning Board, *External Trade Statistics*; and Puerto Rico Office of Energy.

data reported by the other Commonwealth agencies on petroleum imports.

Petroleum Imports

Although Puerto Rico's petroleum imports have varied between 85 and 124 million barrels annually since 1971, the overall cost for such petroleum imports has increased nearly sixfold and the average cost of a barrel of petroleum has jumped from \$2.24 to \$12.48. Table 3 indicates the high costs for petroleum products in the past few years and how that price impact has continued since 1974 following the OPEC pricing policies.

Along with the high price increases for petroleum imports there has been a significant change in the source of these imports. Prior to the 1973 oil embargo, nearly three-fourths of all petroleum imports into Puerto Rico were from Venezuela. Since 1973, oil imports from Venezuela have decreased and in 1977 provided only a little over two-fifths of Puerto Rico's needs. Oil imports from the Middle East, Africa, and other nations of the Caribbean are currently supplying the major needs. This is quite evident from the data presented in table 4.

Table 4.—Source of Crude Petroleum/Naphtha Imports, 1971–77¹

Year	Imports from Venezuela	Percentage	Imports from other nations	Percentage	Total
1971	63,564,000	75	21,268,000	25	84,832,000
1972	83,286,000	76	26,016,000	24	109,302,000
1973	87,069,000	70	36,799,000	30	123,868,000
1974	47,601,000	40	71,561,000	60	119,162,000
1975	42,014,000	40	62,057,000	60	104,071,000
1976	45,681,000	42	61,911,000	58	107,592,000
1977	38,705,000	40	58,118,000	60	96,823,000

¹ Excludes imports from the Virgin Islands and the United States.

Sources: Puerto Rico Development Administration, "The Petroleum Refining, Petrochemical and Allied Products Industries in Puerto Rico," May, 1977; Puerto Rico Planning Board, *External Trade Statistics*; and Puerto Rico Office of Energy.

A further look at the type of petroleum and petroleum products imported into Puerto Rico since 1971 also indicates the lessened dependence upon Venezuela as the major source of supply. Table 5 shows

the imports of crude and unfinished oil to the island from Venezuela and other nations for the last 7 years. These petroleum product imports peaked in 1973 and have shown a decline since then due to the poor world economic conditions and the effects of the recession upon the United States.

Petroleum Sales

Over 90 percent of the Puerto Rican exports of petroleum products were shipped to the United States in the last 6 years. During the 1971-73 period, the value of Puerto Rican imports and overseas sales of petroleum and petroleum products were nearly in balance. In 1973, the value of average sales was nearly \$30 million greater than the imports (see table 3). Since the 1973 period, import costs of petroleum have expanded rapidly and during the 1975 and 1976 periods, Puerto Rico has paid over half a billion dollars more for petroleum and petroleum products than it has received from overseas sales. Table 6 provides an account of the Puerto Rican petroleum sales to the United States and other nations for the past few years. The increased sales dollarwise are due largely to the OPEC price increases. The composition of these petroleum sales to the United States is largely gasoline, distillate fuel oils, ethyl alcohol, organic chemicals, and mineral tars and crude chemicals from petroleum. Organic

chemicals and mineral tars and crude chemicals from petroleum make up the bulk of the Puerto Rican exports to other nations as they comprised roughly 80 percent of the value in 1973 and 1976. The organic chemicals were responsible for 60 percent of the exports in both years. Table 7 provides a comparison of the Puerto Rican petroleum product sales to the United States from 1970 through 1977; again, the increases are due to OPEC price hikes and not increased shipments of products.

IMPORTANCE OF ENERGY-INTENSIVE INDUSTRIES TO PUERTO RICO

Indicators of Importance

Several indicators were selected to emphasize the importance of certain industries to the Puerto Rican economy. Among the indicators chosen were net income, exports, payroll, and employment. Since 1971, net income from manufacturing in the industrial sector has risen from one-fourth to more than two-fifths of the total net income generated by the Puerto Rican economy. Other segments of the private economy, the public sector, and the Commonwealth Government account for the remainder of the net income produced by the island's economy. Table 8 indicates the share of the net income produced by the manufacturing segment.

Table 6.—Puerto Rican Petroleum Product Sales, 1971-77¹

Year	United States	Other nations	Total
1971	\$181,630,257	\$46,117,898	\$227,748,155
1972	255,014,597	42,142,146	297,156,743
1973	381,749,166	45,426,800	427,175,966
1974	750,732,793	131,179,306	881,912,099
1975	799,855,831	73,471,654	873,357,485
1976	868,419,217	128,647,045	997,066,262
1977	1,094,325,557	148,749,534	1,243,075,091

¹ Includes the petroleum refining and related industries (SIC 29), the industrial inorganic chemicals (SIC 281), the plastic materials and synthetics industry (SIC 282), and industrial organic chemicals (SIC 286). Excluded are: drugs (SIC 283); soap, detergents, and cleaning preparations, perfumes, cosmetics, and other toilet preparations (SIC 284); paints, varnishes, etc. and allied products (SIC 285); agricultural chemicals (SIC 287); other miscellaneous chemical products (SIC 289).

Sources: Puerto Rico Development Administration, "The Petroleum Refining, Petrochemical and Allied Products Industries in Puerto Rico," May 1977; Puerto Rico Planning Board, *External Trade Statistics*; and Puerto Rico Office of Energy.

Table 8.—Net Income from Manufacturing, 1971-77¹

[In millions of dollars]			
	Total net income	Net income from manufacturing	Manufacturing income as a percentage of the total net income
1971	4,135.1	1,073.7	26.0
1972	4,553.5	1,282.7	28.2
1973	5,067.5	1,542.5	30.4
1974	5,579.7	1,869.1	33.5
1975	5,919.8	1,940.9	32.8
1976	6,206.3	2,383.1	38.4
1977	6,580.7	2,844.9	43.2

¹ As of June 30.

Source: Puerto Rico Energy Office, February 1978.

Table 7.—Puerto Rican Petroleum Product Sales to the United States, 1971-77¹

Petroleum product	1970	1973	1976	1977
Gasoline	\$94,438,553	\$119,033,246	\$131,986,169	\$234,359,876
Distillate fuel oils	19,772,784	72,502,878	194,730,566	202,527,363
Ethyl alcohol	19,130,830	74,073,382	111,591,706	136,808,307
Organic chemicals	16,893,064	58,946,608	221,280,405	339,762,205
Mineral tar and crude chemicals from petroleum	28,206,508	39,665,295	188,091,890	117,567,025
All other products	10,385,223	17,557,757	20,738,481	63,300,781
Total	188,831,962	381,749,166	868,419,217	1,094,325,557

¹ As of June 30.

Source: Puerto Rico Planning Board, *External Trade Statistics*, May 1971, May 1974, and May 1977. Data for 1977 are unpublished.

In assessing the net income produced by the manufacturing sector, selected industries such as apparel, chemicals, food processing, petroleum, and textiles account for nearly 60 percent or more of the in-

come generated. Table 9 shows the importance of these five industrial sectors and the prime importance of the chemicals (primarily the drug industry).

Another indicator selected to show the importance

Table 9.—Net Income from Manufacturing by Industrial Sector, 1971-77¹

[In millions of dollars]

Industry	1971	1972	1973	1974	1975	1976	1977
Apparel	165.4	185.7	199.9	216.0	204.9	245.3	265.8
Chemicals ²	142.7	254.9	343.7	453.8	559.5	797.3	1,170.7
Food processing	175.1	196.4	208.8	244.3	274.5	302.9	314.9
Petroleum products	72.2	58.3	112.2	167.0	79.3	90.0	86.9
Textiles	48.6	41.3	51.7	55.7	48.8	39.4	42.8
Subtotal	604.0	736.6	916.3	1,136.8	1,167.0	1,474.9	1,881.1
All others	469.8	546.2	626.2	732.3	773.9	908.2	931.8
Total	1,073.8	1,282.8	1,542.5	1,869.1	1,940.9	2,383.1	2,812.9

¹ As of June 30.

Source: Puerto Rico Energy Office, February 1978.

² Chemicals including drugs.

of certain selected industries to the Puerto Rican economy is the data on overseas sales. Table 10 shows that apparel and textiles, chemicals, food products, and petroleum contribute the major share of these sales.

Two internal indicators remain to be discussed—employment and payroll. Employment in Puerto Rico since 1971 has ranged from 700,000 to 775,000 workers, with the highest employment occurring in 1974. The manufacturing sector produces roughly 20 percent of the economy's total employment.

Within the five industrial sectors selected, some are very labor-intensive—such as apparel and food

processing—whereas others, such as petroleum and petrochemicals, are capital-intensive industries and thus utilize relatively small labor forces. In spite of these differences, the five selected industrial sectors account for a large segment of the total employment within the manufacturing segment. Table 11 provides a comparison of the employees and production workers employed by the five selected sectors versus those employed by the rest of the manufacturing sector on the island.

Similarly, these five industrial sectors have provided a payroll ranging from over \$300 million in 1971, to nearly \$600 million in 1977. A detailed accounting of payroll data for these years is provided in table 12 along with individual data on the five sectors dealing with total employment, production workers, and sales of the various manufactured products to the United States.

Table 10.—Puerto Rican Sales to the United States (by Selected Industrial Group) 1974-77¹

[In millions of dollars]

Product	1974	1975	1976	1977
Apparel and textiles	555.0	416.9	321.4	425.2
Chemical ²	579.8	619.6	843.6	1,092.1
Food	251.2	273.6	265.5	371.9
Petroleum	450.8	444.7	348.0	510.8
Subtotal	1,836.8	1,754.8	1,778.5	2,400.0
All Others	1,501.9	1,383.6	1,567.7	2,079.9
Total exports	3,338.8	3,138.4	3,346.2	4,479.9

¹ As of June 30.

² Chemicals includes primarily drugs.

Source: Puerto Rico Energy Office, February 1978.

The Industrial Sector

Petroleum and Petrochemicals.¹—Of the five components embracing the industrial sector for this study—apparel, drugs/pharmaceuticals, food processing, petroleum refining and petrochemicals, and textiles—the most important, as far as energy usage and

¹ For additional data see appendix A on petroleum refining and appendix B on petrochemicals.

Table 11.—Puerto Rico Employees in Manufacturing, 1971-77¹

Employment and production workers	1971	1972	1973	1974	1975	1976	1977
Employment in selected industries	73,272	81,288	83,400	82,128	75,386	78,834	81,970
Total employment in manufacturing	138,126	147,247	152,867	149,557	136,617	144,789	148,553
Total employment, all sectors	696,000	732,000	753,000	771,000	734,000	715,000	736,000
Production workers, selected industries	60,499	67,572	69,513	67,562	61,353	63,059	65,400
Total production workers	114,714	122,500	127,667	122,667	111,892	118,625	121,188

¹ All employment and production worker data is as of October for each year, except for the data dealing with total employment which is as of June 30 of each year.

Source: Commonwealth of Puerto Rico, Department of Labor, Bureau of Labor Statistics, *Census of Manufacturing Industries of Puerto Rico*, March 1976, p. 1, and Economic Development Administration, *Industry Profile Series (selected)*.

Table 12.—Selected Economic Data on the Puerto Rican Industrial Sector, 1971–77¹

Year	Industrial sector	Number of plants	Total employment	Production workers	Payroll (millions of dollars)	Sales to United States (millions of dollars)	Exports to others (millions of dollars)	Total expenses (millions of dollars)
1971	Apparel	437	36,218	34,135	116.6	286.3	9.5	295.8
1971	Drugs	44	2,940	2,213	14.1	150.0	9.4	159.4
1971	Food processing	441	21,746	14,495	112.2	191.0	47.0	236.0
1971	Petroleum/petrochemicals	36	5,616	3,282	52.4	181.6	46.1	227.7
1971	Textiles	79	6,752	6,194	30.9	58.2	4.2	62.4
1972	Apparel	466	39,200	37,130	127.3	271.4	10.9	282.3
1972	Drugs	47	3,535	2,433	22.9	205.9	14.1	220.0
1972	Food processing	432	23,530	16,238	129.1	233.0	46.0	279.0
1972	Petroleum/petrochemicals	39	7,330	4,638	61.9	255.0	42.1	297.1
1972	Textiles	77	7,693	7,133	27.4	69.2	4.8	74.0
1973	Apparel	465	40,721	38,442	140.9	320.1	12.1	332.2
1973	Drugs	54	4,965	3,543	30.1	225.0	15.7	240.7
1973	Food processing	422	22,712	15,732	139.8	308.0	58.0	366.0
1973	Petroleum/petrochemicals	41	7,408	4,754	73.7	381.7	45.4	427.1
1973	Textiles	81	7,594	7,042	30.7	145.1	6.2	151.7
1974	Apparel	435	38,027	35,534	151.8	352.9	12.7	365.6
1974	Drugs	58	5,449	3,846	39.7	263.1	18.5	281.6
1974	Food processing	402	23,721	16,600	152.5	351.0	80.0	431.0
1974	Petroleum/petrochemicals	47	7,766	4,993	80.5	750.7	131.2	881.9
1974	Textiles	70	7,165	6,589	31.6	182.5	12.6	195.1
1975	Apparel	405	36,075	33,834	145.7	307.0	13.3	320.3
1975	Drugs	60	5,964	4,146	52.6	235.1	44.8	279.9
1975	Food processing	375	22,950	15,652	164.2	389.0	91.0	480.0
1975	Petroleum/petrochemicals	51	5,499	3,165	87.6	799.9	73.4	873.3
1975	Textiles	54	4,898	4,556	29.1	90.6	9.5	100.1
1976	Apparel	400	37,054	34,743	164.7	305.2	13.8	316.3
1976	Drugs	69	7,315	5,269	65.5	275.3	87.3	362.6
1976	Food processing	364	24,171	16,737	170.5	381.1	85.2	466.3
1976	Petroleum/petrochemicals	47	6,017	2,337	89.4	868.4	128.6	997.0
1976	Textiles	53	4,277	3,973	25.1	NA	NA	NA
1977	Apparel	385	37,197	34,980	173.7	NA	NA	NA
1977	Drugs	72	8,367	5,813	90.8	NA	NA	NA
1977	Food processing	360	23,880	16,156	192.6	NA	NA	NA
1977	Petroleum/petrochemicals	49	7,639	4,830	102.2	NA	NA	NA
1977	Textiles	44	4,885	4,523	24.6	NA	NA	NA

¹ Figure columns 1 through 3 are as of October of each year; columns 4 through 7 are as of the end of June for each year. Data for 1977 are based on preliminary estimates.

Source: Commonwealth of Puerto Rico, Department of Labor, Bureau of Labor Statistics, and Economic Development Administration, Office of Economic Research, San Juan, 1971–78.

value of imports and exports, is the petroleum refining and petrochemical sector. All of the industries have been affected by the increased prices for energy supplies, but none has been as severely affected as the petroleum and petrochemicals, for it is the most energy-intensive of the entire group. Puerto Rico imported about 83 million barrels of crude oil for its energy needs in 1976 and a similar amount during 1977. On a daily basis this would amount to nearly 230,000 barrels of crude oil needed to provide for internal consumption on the island as well as sales to the United States and other markets.

The major petroleum refiner and petrochemical firm on the island, Commonwealth Oil Refining Co. (CORCO), sold 129,675 barrels of petroleum products on a daily basis in 1977, over one-half of the total island's needs. Of this amount, over 89,000 barrels were sold in Puerto Rico, and nearly 38,500 barrels were shipped to external markets, namely the United States. The major recipients of the internal sales were other major oil companies, the Puerto Rico Water Resources Authority and CORCO's petrochemical operations. Table 13 provides a detailed picture of the major energy user and pro-

Table 13.—CORCO Petroleum Product Sales, 1972–77

[In barrels per day]

	1972	1973	1974	1975	1976	1977
Sales in Puerto Rico:						
Major oil companies	45,134	45,704	38,683	35,071	40,798	39,013
PRWRA	15,462	28,006	27,485	25,042	25,895	24,664
Other third-party customers	11,224	12,351	6,896	6,805	6,438	9,044
The company's joint ventures	23,027	20,392	25,101	22,912	22,610	16,390
Total petroleum products sold in Puerto Rico	94,847	106,453	98,165	89,830	95,741	89,111
Sales outside Puerto Rico:						
United States	40,967	32,162	31,156	27,699	35,830	38,435
Foreign	4,063	4,082	6,512	3,671	3,930	2,129
Total petroleum products sold	139,877	142,697	135,833	121,200	135,501	129,675

Source: CORCO, *Annual Report to Shareholders—1978*, April 1979.

ducer on the island and sales of petroleum products manufactured in CORCO's refinery.

Although the CORCO refinery has a rated capacity of 161,000 barrels a day, the effective current working capacity of the refinery in 1977 according to CORCO officials varied from 121,000 to 141,000 barrels per day depending on the product slate. Thus, the other two major refiners on the island, Puerto Rico Sun Oil Co. and the Caribbean Gulf Refining Co. are largely responsible for the remaining 100,000 barrels which are processed in Puerto Rico daily for the basic energy needs.

CORCO is the primary supplier of petroleum products consumed in Puerto Rico: 62 percent of the motor gasoline, 42 percent of the liquefied petroleum gas, 58 percent of the middle distillates, and 50 percent of the residual fuel oil (sold mainly to the Puerto Rico Water Resources Authority for electricity generation). The Puerto Rico Sun Oil Co. refinery, while basically a lubricating oil facility, also produces naphtha, distillate, and residual fuel oils. Essentially, all lubes and about half of the other products from the Sun Oil Co. are shipped to the East Coast of the United States; the other half are consumed on the island. The residual fuel oil is sold to the authority's Aquirre station on the south coast and also as bunker fuel for ships. The product slate of the Gulf Oil refinery is approximately 25 percent gasoline, 25 percent middle distillates, and 50 percent residual fuel oil. All of these products are consumed on the island, except for small amounts of distillates shipped to the East Coast.

Naphtha is the basic feedstock for all petrochemical production on the island. It is either imported (23.5 million barrels in 1975 and 20 million barrels in 1976) or produced in island refineries from imported crude oil. There are no published statistical data on Puerto Rico petrochemical production, consumption, and exports on a weight basis. Such information would reveal individual company operations. The petrochemical products produced are classified as basic or intermediate. They are almost totally shipped to the mainland for further processing into finished consumer goods and many are imported back into Puerto Rico. Figures 1 and 2 diagram the island's refinery and petrochemical industries.

Other Major Industrial Users.—According to the 1972 data,² nearly 94 percent of the total material costs of the manufacturing industry in Puerto Rico were for raw materials, parts, and supplies. The cost of fuels and electricity accounted for 2 percent each of this cost. The costs vary for the different indus-

trial sectors and those of interest for this study are shown in table 14.

Table 14.—Puerto Rican Material Costs and Chief Components by Industry, 1972

[In percentages]

Industry sector	Raw materials	Fuel	Electricity
Apparel	93	<1	1
Chemicals	89	4	4
Drugs	88	1	4
Food products	95	1	1
Petroleum refining	94	3.5	2
Textiles (knitting mills)	93	<1	2

Source: U.S. Department of Commerce, Bureau of the Census, *Manufacturers, Puerto Rico—1972 Economic Censuses of Outlying Areas*, Washington, D.C., pp. 4-23 to 4-33.

The data from table 14 indicates that chemical manufacturers have both relatively high fuel and electric costs compared to the other industrial sectors; drugs require relatively higher electric costs and petroleum refiners have relatively high fuel costs. Raw material costs account for a higher percentage cost among the petroleum refining industry than they do for the manufacture of chemicals and drugs. The other industrial sectors—apparel, food products, and textiles—have high material costs, but significantly lower energy costs than the industries associated with chemicals, drugs, and petroleum refining. Thus, it is not surprising to find that among the groups selected for consideration in the industrial sector of this study, those firms engaged in petroleum refining and petrochemicals would be the ones most affected by increased raw materials costs and the costs of energy to produce their specific manufactured products.

A comparison of material cost data for selected U.S. industries during the same time period shows similar high energy costs for the chemical sector as in Puerto Rico, but generally lower costs for similar categories. Table 15 provides these material cost data for selected U.S. industries during the 1972 period.

Recent studies on the petrochemical industry done in 1974 and 1977 provide data on the rapid

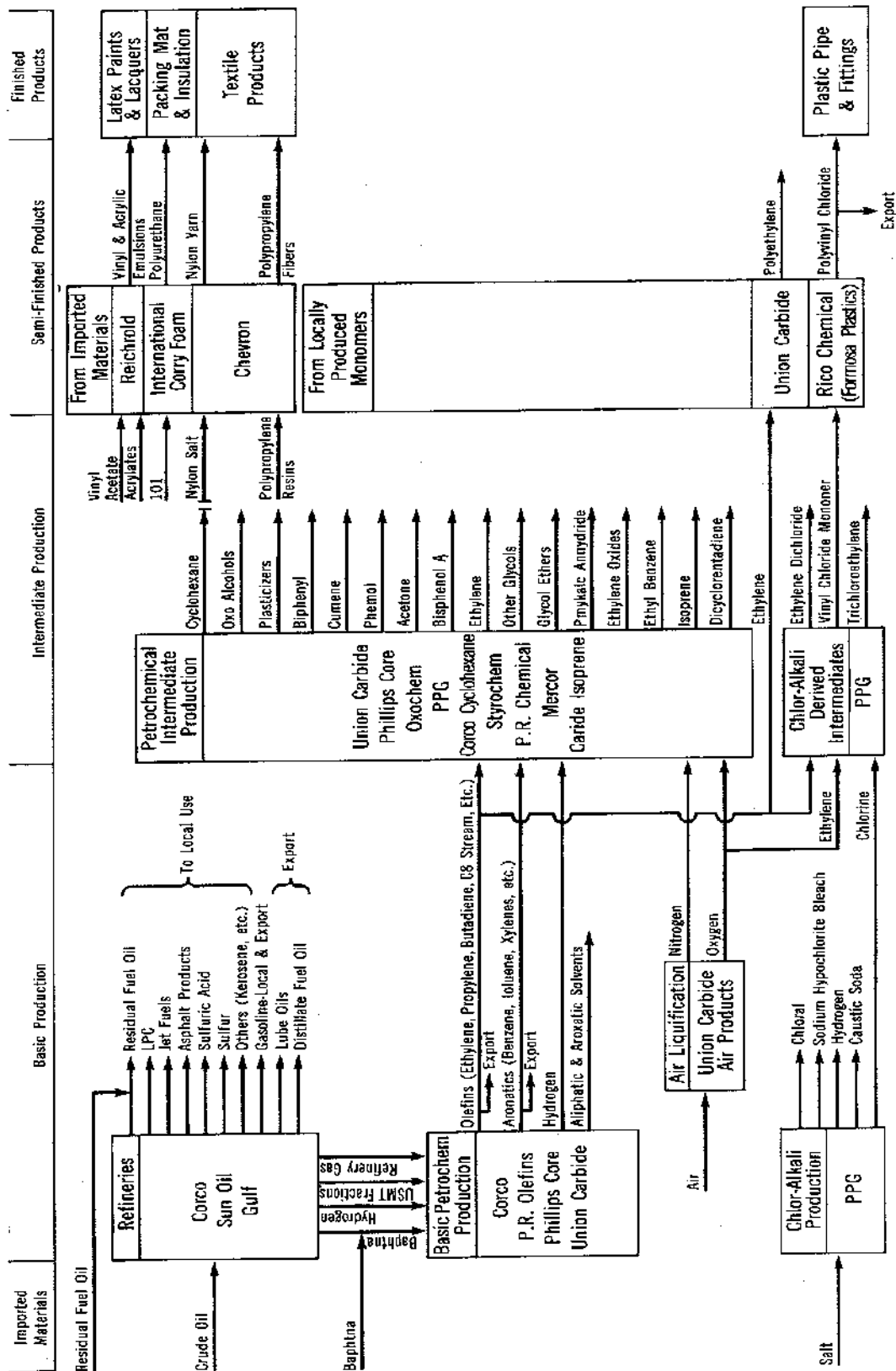
Table 15.—U.S. Material Costs and Chief Components by Industry, 1972

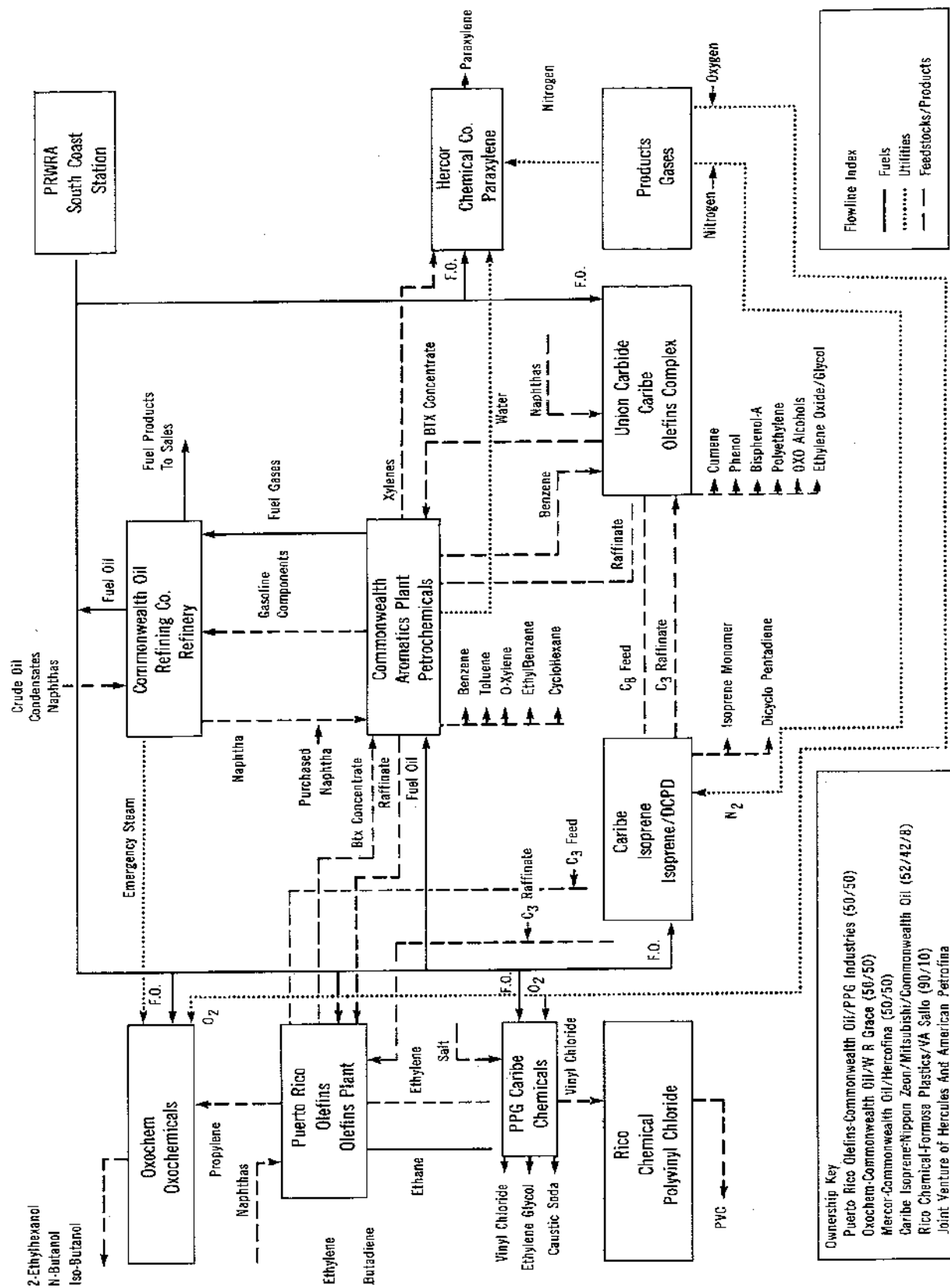
[In percentages]

Industry sector	Raw materials	Fuel	Electricity
Apparel	74	<1	<1
Chemicals	84	4	4
Food products	90	<1	<1
Petroleum refining	92	2	1
Textile products	89	1	2

Source: U.S. Department of Commerce, Bureau of the Census, *Manufacturers, United States—1972 Economic Census*, Washington, D.C.

²For lack of better information, one is forced to use the only readily available data on operating costs for the various industrial groups. This is the 1972 census data supplied by the Department of Commerce. A later data collection is underway, but the results will not be available for this report.





Ownership Key

- Puerto Rico Olefins-Commonwealth Oil/PPG Industries (50/50)
- Oxochem-Commonwealth Oil/W R Grace (50/50)
- Mercor-Commonwealth Oil/Hercofina (50/50)
- Caribbe Isoprene-Nippon Zeon/Mitsubishi/Commonwealth Oil (52/42/8)
- Rico Chemical-Fomosa Plastics/VA Sallo (90/10)
- Joint Venture of Hercules And American Petrofina

escalation in the prices of electricity and fuels. These studies further provide a comparison of such energy costs in operating a petrochemical complex in Puerto Rico and one on the Gulf Coast. The primary feed for both these plants was a 50/50 mixture of naphtha and gas oil and both plants produce the same volume of primary petrochemicals and derivatives. There were some processing differences due to local conditions and the availability of certain energy sources. Table 16 provides the operating cost comparisons of the two petrochemical plants—one located in Puerto Rico and the other on the U.S. Gulf Coast.

**Table 16.—Annual Petrochemical¹
Complex Operating Cost Comparison,² 1974 and 1977**

[In millions of dollars]

Operating cost factors	1974		1977	
	Puerto Rico	U.S. Gulf Coast	Puerto Rico	U.S. Gulf Coast
Production costs:				
Raw materials	160.6	143.5	400.0	374.5
Utilities:				
Power	42.2	13.0	68.5	24.4
Fuel and steam	51.0	27.1	71.9	64.4
Labor and overhead	11.6	11.2	9.4	10.2
Maintenance	12.5	12.2	19.8	19.3
Fixed costs	43.7	46.8	67.8	74.5
Total production costs	331.6	253.8	637.4	567.3
Coproducts credits	(141.3)	(113.8)	(258.7)	(252.2)
Net plant costs	190.3	140.0	378.7	315.1
Transportation difference	7.2	—	20.2	—
Net annual operating costs	197.5	140.0	398.9	315.1

¹ Petrochemical product mix includes (1) basic petrochemicals—ethylene, propylene, benzene (naphtha plants only), and (2) derivatives—low-density polyethylene, ethylene glycol, vinyl chloride monomer, and cement.

² Cost estimates are based on conditions existing during the fourth quarter 1974 and the second quarter of 1977.

Source: Arthur D. Little, Inc., *Competitive Cost Position of the Puerto Rican Petrochemical Industry*, G-78169, April 1975, p. 2 and *Competitive Cost Position of the Puerto Rican Petrochemical Industry in 1977*, C-80863, October 1977, p. 2.

An analysis of the various cost data on electricity and fuel reveals major increases in these categories. The 1974 data indicates that electric costs were more than three times greater in Puerto Rico than in the United States and fuel and steam costs more than double. By 1977 electric costs in Puerto Rico were 2.4 times more than in the United States and fuel and steam costs had nearly equalized for both plants.

Of greater importance for this study has been the dramatic increase in the cost of energy needs in the last few years. In 1972 both U.S. and Puerto Rican chemical plants had 4 percent energy costs for electricity and fuel. By 1974 energy cost for a Puerto Rican petrochemical plant comprised 31 percent of the total production cost—12.7 percent for electricity and 18.3 percent for fuel.

Nearly 2½ years later the total energy costs for a

Puerto Rican petrochemical plant has been reduced somewhat to 21.9 percent (10.7 percent for electricity and 11.2 percent for fuel). For the 1977 period this means nearly tripling (from 8 to nearly 22 percent) the energy costs of producing petrochemicals in Puerto Rico compared to 1972. On the other hand, the U.S. plant had a doubling (from 8 to 16 percent) for similar energy costs with the electricity costs averaging 4 to 5 percent and the fuel costs in the neighborhood of 10 to 11 percent of total production costs.

A recent PACE study completed in January 1979 compared the electric power costs for refineries and petrochemical facilities in Puerto Rico and the Gulf Coast. The supply and cost of electricity are critical elements of a refinery or petrochemical facility. It is especially important in a power operation such as caustic/chlorine production or where a large number of electric motors are involved.

For comparative purposes the study used actual utility company rate schedules and assumed power consumption quantities and use patterns typical of refining and petrochemical facilities in Puerto Rico and the Gulf Coast. The study concluded that the lowest cost power on the island is 30 to 45 percent more expensive than the prevailing rates on the Gulf Coast. The rate which most companies must pay in Puerto Rico is as much as 2½ times the Gulf Coast rates.

As to the future cost of electric power in comparing the two areas, the study indicated a narrowing of these price differences. Currently the relatively low rates on the Gulf Coast result primarily from using low cost natural gas as fuel. However, as these contracts expire they must be replaced with much higher priced fuels (gas or alternates). New gas-fired generating capacity will not be built and existing facilities must be converted to other fuels or replaced by coal-based or nuclear facilities. Both of these fuels are less expensive than oil, but the capital investments are enormous. The point is that power costs on the Gulf Coast will escalate, probably more rapidly than in Puerto Rico, and the gap between the two areas will narrow.

With higher fuel and power costs as well as feedstock and transportation costs in the last few years, the island has been unable to attract the additional investment necessary both to complete the remainder of the petrochemical complex and to construct the downstream industries. This latter group would process the basic and intermediate petrochemicals produced on the island into consumer goods and other end products. The closing of the Puerto Rico Olefins (PRO is a joint venture of CORCO with PPG Industries to manufacture ethylene, propylene, and butadiene) in late November 1978 was largely attributable to the lack of sufficient downstream ca-

capacity to consume its output of ethylene. Oxochem (a CORCO-W. R. Grace & Co. joint venture to produce 2-ethylhexanol and butanol-oxo-alcohols) was also forced to shut down because of its loss of propylene raw material. This shutdown promises to be of extended duration because there are no economically alternative propylene supplies currently available. The Puerto Rico Energy Office estimates that these two shutdowns resulted in the layoff of 1,300 workers directly employed and 1,300 workers indirectly employed plus the loss of \$100 million to the Puerto Rican economy.

The Service Sector

Previously it was noted that Puerto Rico is essentially an all electric island, whose energy needs for industrial, commercial and residential use are provided by the Puerto Rico Water Resources Authority (hereafter call the authority.)³

During 1977 the authority purchased over 22.5 million barrels of petroleum products, of which 21 million barrels were No. 6 fuel oil, 1.5 million barrels of No. 2 fuel oil, 19,000 barrels of propane, and 10,485 barrels of diesel. Other major suppliers of the authority—in addition to CORCO—are Hideca Trading, Inc., Caribbean Gulf Refining Co., and Puerto Rico Sun Oil Co. These are the major residual oil suppliers for the four terminal electric generating stations on the island at San Juan, Palo Seco, Aguirre, and the plant near Ponce.

Since the 1974 OPEC price increases, fuel costs for the authority have nearly tripled. In 1977, fuel costs for the authority were over \$400 million, whereas 4 years earlier they were approximately \$142 million. Some part of this increased cost has resulted from an increased use of fuel oil, but the major portion of the cost for fuel relates directly to the cartel effects of the OPEC nations. This rise in fuel costs is quite noticeable when one checks the

operating cost for the authority. Fuel costs have gone from 45.6 percent of the total operating costs in 1974 to 50.6 percent in 1977.

As a dispenser of electric power, the major customer market for the authority is the residential sector. The industrial and commercial sectors of the economy follow with far fewer customers. Of lesser importance are the retail, wholesale, and other sales made to customers on the island. Table 17 provides data on the number of average customers based on the class of service, and the kilowatt-hours used per average customer.

During the period 1972 through 1977, some 9 to 11 billion kilowatt-hours of power were sold annually by the authority. For the past few years, the industrial sector has been the largest consumer of electric power followed by the residential and commercial customers. The industrial sector consumes over 40 percent of the power generated and the residential and commercial sectors 30 and 20 percent, respectively.

Prior to 1973, the residential sector was the largest user of electric power; since then the industrial sector has taken the lead and retained it. Among the industrial users it is interesting to note the heavy users of electric power by the petroleum refining and petrochemical sectors. Table 18 provides a comparison of these firms' kilowatt usage and the revenues paid for such electric power.

The Consumer Sector⁴

During 1976, the two major internal uses of petroleum products on the island were residual fuel oil and gasoline. These two products accounted for two-thirds of the 60 million barrels of petroleum products consumed internally in 1975 and 1976. In the generation of electricity, 18 million barrels of petroleum products were used in 1976 and this increased to over 22.5 million barrels in 1977. The individ-

³ Appendix C provides numerous details and data on the electric utility sector.

⁴ See appendix D for a more detailed account of consumer uses of energy sources.

Table 17.—Authority Customers and Average Kilowatt Hour (kWh) Usage, 1972-77¹

	1972-73	1973-74	1974-75	1975-76	1976-77
Numbers of average customers:					
Residential	670,064	695,454	716,268	746,982	778,922
Commercial	78,881	81,349	83,696	83,923	86,900
Industrial	4,960	5,011	5,061	4,835	4,712
Others	6,871	6,945	6,997	² 1,429	² 1,434
Total	760,776	788,759	812,022	837,169	871,968
kWh per average customer:					
Residential	4,890	4,788	4,461	4,355	4,445
Commercial	27,403	27,414	27,276	27,823	29,388
Industrial	842,822	879,286	857,340	935,739	1,021,138
Others	67,734	59,107	54,266	271,519	280,544
System	13,255	13,156	12,558	12,539	12,879

¹ Fiscal year—July to June.

² Reflects the elimination of customers who belong to the Dusk to Dawn Lighting Group.

Source: Puerto Rico Water Resources Authority, Distribution and Services Division, *Annual Reports*, 1972-77.

Table 18.—Major Uses of Electric Power, 1972-77

(In millions of kWh and dollars)

User	1972-73		1973-74		1974-75		1975-76		1976-77	
	kWh	Cost dollars	kWh	Cost dollars	kWh	Cost dollars	kWh	Cost dollars	kWh	Cost dollars
Union Carbide (Penuelas)	628.2	2.9	693.1	7.5	702.2	13.5	691.7	14.9	768.6	18.5
PPG Industries	395.6	2.1	437.9	5.6	419.0	8.9	535.0	12.1	518.5	13.1
CORCO	176.3	2.3	168.4	3.8	155.1	4.8	152.6	6.1	162.3	7.1
Yabucoa Sun Oil	138.6	1.7	143.3	3.1	124.1	4.3	118.2	4.8	127.3	5.6
Puerto Rican Cement	135.7	1.7	140.7	3.2	101.1	3.5	109.2	4.9	133.0	5.9
Fibers International	129.6	1.5	138.0	3.0	98.2	2.9	18.0	0.9	84.2	3.5
Phillips Puerto Rico Core	122.3	1.4	120.7	2.7	91.5	3.1	109.8	4.0	105.7	4.6
Air Products and Chemical	156.4	1.2	161.2	2.3	145.3	3.4	163.8	4.1	172.6	4.7
Union Carbide (Yabucoa)	264.3	1.2	265.2	2.9	285.2	5.8	209.5	4.9	269.0	6.6
Commonwealth Petrochemical	73.0	0.9	91.0	2.1	40.8	1.5	56.2	2.3	46.3	2.1

Source: Puerto Rico Water Resources Authority, Planning and Engineering Division, February 1978.

ual consumer (homeowner, apartment dweller, and tenant) used over 30 percent of the total kilowatt-hours generated, and the industrial and commercial sectors the remaining 60 percent.

Over 15 million barrels of motor gasoline were used in 1976 by the population of Puerto Rico. Much of this was consumed in transportation, of which the major user was the private automobile. Puerto Rico now ranks sixth in the world car ownership: there is one automobile for every four persons on the island compared to one automobile for every 1.6 persons in the mainland United States in 1975. Table 19 provides a comparison of U.S. and Puerto Rican vehicle ownership and usage.

Table 19.—Puerto Rican and U.S. Vehicle Ownership and Usage, 1975

	Puerto Rico	United States
Number of passenger cars	638,789	107,174,100
Number of buses and trucks	128,441	25,775,700
Number of all passenger cars	767,320	132,949,800
Average miles passenger cars traveled (per vehicle)	8,655	9,634
Average miles commercial buses traveled (per vehicle)	21,160	28,230
Average miles all passenger vehicles traveled (per vehicle)	8,990	9,413
Average fuel consumption per passenger vehicle (gallons)	692	690
Average fuel consumption for all motor vehicles (gallons)	808	790

Source: United States Department of Transportation, *Selected Highway Statistics—1975* and Puerto Rico Department of Transportation and Public Works, February 1978.

Along with the high percentage of car ownership for Puerto Rico is the usage of these cars on a daily basis. Table 20 provides an accounting of the transportation means used for daily travel in the San Juan area.

Much of this increased ownership of cars and their daily use can be attributed to the economic progress achieved on the island in the past 25 years. This increase in living standards and more disposable income for the Puerto Ricans has resulted in a steady

Table 20.—San Juan Metropolitan Area Daily Trips, 1977

Type of transportation	Number of daily trips	Percentage
Private automobile	2,259,661	85.8
Public bus	99,337	3.8
Publico ¹	227,006	8.6
Ferry	8,283	0.3
Taxi	40,000	1.5
Total	2,643,487	100.0

¹ A "publico" is a privately owned standard passenger car, van, minibus, or station wagon licensed by the Puerto Rico Public Service Commission with set routes for specified fares.

Source: Alan M. Vorhees & Associates, Inc. Puerto Rico Highway Authority, May 1979.

growth in the sales of gasoline. As with mainland U.S. car owners, Puerto Ricans, have become accustomed to their automobiles and are willing to spend large parts of their income to buy and maintain such means of transportation.

With the increased use of the automobile in the last few years, there has also been a decrease in the ridership of public buses. Bus ridership in the last several years has declined over 25 percent, but much of this decline has taken place since the oil embargo and OPEC pricing policies. Table 21 provides data on San Juan bus ridership in the last 6 years.

This reduced ridership of public transportation can be directly related to the poor operating conditions of the buses and the failure of the system to provide efficient and reliable transportation. During 1975, one-fourth of the 390 buses that comprise the

Table 21.—San Juan Bus Ridership,¹ 1972-77²

Year	Number of passenger trips
1972	47,108,252
1973	45,093,820
1974	43,607,743
1975	42,864,326
1976	38,300,407
1977	34,662,184

¹ Metropolitan Bus Authority operates bus transit service within San Juan and some of the metropolitan areas.

² As of June 30.

Source: Metropolitan Bus Authority, February 1978.

system were out of service daily due to mechanical problems or driver absenteeism. The average service life of a bus during this period was less than 10 years due to poor maintenance performance and the lack of an established preventive maintenance program. In addition, bus service had deteriorated to speeds of less than 10 miles per hour. All of these factors assisted the population in preferring the use of the private auto over the public system and, in turn, becoming a major user of petroleum products. Table 22 provides a comparison of several indicators relating to public transportation for the San Juan metropolitan area and the United States.

Table 22.—Puerto Rican and U.S. Public Transportation Indicators, 1975

Indicators	Puerto Rico ¹	United States
Number of buses	390	50,811
Bus ridership	42,864,326	5,643,000,000
Ratio of buses to population ..	1:2,935	1:4,192
Average service life of a bus ..	Less than 10 years	10 to 12 years
Number of route miles	843	107,800
Out of service time	25 percent	10 to 15 percent

¹ Includes only the San Juan Metropolitan area.

Source: Metropolitan Bus Authority, February 1978 and American Public Transit Association, *Transit Facts Book—1975-76*, September 1976.

Table 23.—Gasoline Sales in Puerto Rico, 1970-77
(In thousands of gallons)

Year	Total	Premium	Regular
1970	427,060	274,962	152,098
1971	473,283	306,616	166,666
1972	534,250	344,938	189,312
1973	578,827	298,235	280,592
1974	566,713	330,317	236,396
1975	586,419	480,198	106,221
1976	636,604	503,746	132,858
1977 ¹	600,245	465,415	134,830

¹ From 1974 to 1977 premium gasoline corresponds to leaded gasoline and regular gasoline corresponds to unleaded gasoline.

Source: Puerto Rico Planning Board, Bureau of Statistics, *Statistics on Petroleum Products and Motor Vehicles*, 1978.

Even the increased prices for gasoline since 1974 have not diminished the sales of the product at the pump. Table 23 provides data on the sale of gasoline in Puerto Rico, which has shown a nearly 50 percent increase in the last 8 years and a marked preference for premium gas over regular since 1975. Premium gas in Puerto Rico is leaded gasoline with a higher octane rating than regular gas which is unleaded gasoline. This practice of selling only two types of gasoline in Puerto Rico goes back to 1974 when the Environmental Protection Agency (EPA) required local wholesalers to sell unleaded gas in addition to the two types of leaded gas on the market, in order to cut down exhaust fumes. The local wholesalers refused to sell three types of gas because of the additional investment required for installing pumps.

Thus, they opted for selling premium gas (leaded) with an octane rating of 96 and regular (unleaded) gas with an octane rating of 91.

Further indications of the almost total purchase of gasoline supplies in 1976 and 1977 by the individual consumer on the island are furnished by the data in table 24. In 1976 over 90 percent of the 15.1 million barrels of gasoline were purchased by the retailers, who in turn sold it to the general public for use in their autos, trucks, and other vehicles. The other important users of gasoline supplies were the government sector and an "others" category which were responsible for 2 and 4 percent, respectively. Table 24 provides data on the gasoline consumers for 1976 and the first 9 months of 1977. If the average monthly consumption of gasoline for 1977 continues for the remaining 3 months, 1977 consumption of gasoline will be 500,000 more barrels than the previous year.

Table 24.—Motor Gasoline Consumption, 1976-77

[In thousands of barrels]

Consumer type	1976	1977 ¹
Retailers	13,967.9	10,489.2
Puerto Rico Water Resources Authority	31.7	23.9
Refineries	4.2	3.5
Petrochemicals	7.2	6.9
Other industry	45.6	41.7
Agriculture	66.4	59.9
Emergency services	8.1	8.6
Telecommunications	0.3	0.1
Passenger transport	17.2	45.4
Merchandise transport	73.4	42.7
Government services	256.7	167.6
Construction	68.9	43.3
Others	598.8	817.0
Total	15,146.4	11,749.8

¹ January through September.

Source: Energy Office of Puerto Rico, *Compendio Estadístico sobre la Situación Energética Petrolera de Puerto Rico—1976*, p. 34, and Statistical Analysis Section, February 1978.

ENERGY PRICES

Since Puerto Rico is nearly 100 percent dependent on energy raw material imports, the OPEC pricing policies had a tremendous impact upon the prices of energy and locally produced products. Table 25 provides a list of the prices between the periods of 1973 through 1977 wherein the average prices for many petroleum products increased by multiples of four to five times. The smallest increases during 1973 and 1976 took place in the propane and liquefied petroleum gases which nearly doubled in price; in 1977 propane prices more than doubled and liquefied gases more than tripled in price. Nearly all of the petroleum products listed show an upward pricing trend during those 5 years. The only exceptions are the lubricating oils which peaked in price in 1973.

Table 25.—Average Price¹ of Imported Petroleum and Petroleum Products, 1973–77²

[Average price per barrel]

Description	1973	1974	1975	1976	1977
Crude petroleum under 25 degrees	2.28	5.69	10.34	10.79	11.87
Fuel oil	2.59	7.47	10.53	10.67	10.36
Crude petroleum, 25 degrees API and over	2.80	7.63	10.57	11.59	12.20
Fuel oil n.e.s.	3.94	9.04	13.72	10.91	15.08
Propane	2.26	2.30	3.69	4.04	9.86
Liquefied petroleum gases, n.e.c.	2.29	6.30	14.44	4.08	13.18
Gasoline	5.26	6.56	14.60		
Jet fuel	3.81	6.25	12.10	14.47	15.12
Naphtha to be further refined	2.31	8.01	12.34	12.89	14.18
Naphtha, n.e.s.	3.90	3.17	2.51	17.06	19.06
Lubricating oil	113.00	21.89	39.00	37.95	89.43

¹ Average price is based on a division of value and quantity of imports reported by the United States Department of Commerce.

² As of June 30.

Source: Puerto Rico Planning Board, Bureau of Statistics, *Statistics on Petroleum Products and Motor Vehicles*, June 1977, p. 24. Data for 1977 are unpublished.

Even higher fuel costs than those shown in table 25 were experienced by the authority during the period of February 1976 to February 1977. During that 1-year period costs for fuel oil No. 6 increased nearly 20 percent and for light distillates nearly 30 percent; propane had a very small rise of nearly 5 percent. Table 26 provides a comparison of these price increases.

Table 26.—Authority Fuel Prices, 1976–77

[In dollars per barrel]

Year	Type of Fuel		
	Fuel oil No. 6	Light distillates	Propane
February 1976	11.48	14.66	14.91
August 1976	12.57	15.38	14.91
February 1977	13.65	18.82	15.75

¹ Does not include handling charges.

Source: Commonwealth of Puerto Rico, Office of Petroleum Fuels Affairs, *Synopsis of the Energy Situation of Puerto Rico—1976*, April 1977, p. 4.

A more revealing look at energy price increases and how they affected industry, commerce, and the individual consumer is shown in table 27. The great-

est price increases in cost per kWh occurred in the industrial and other service category where they rose over three times for the former and nearly four times for the latter one. Rates for residential and commercial customers more than doubled in cents for kWh during the 6-year period. Adjusted revenues per average customer were even more startling, especially for the two categories of industrial and others. These revenues jumped from nearly \$2,000 in 1971–72 to almost \$21,000 in the fiscal year just ending for the “others” category; they were not as steep for the average industrial customer where they rose nearly four times during the same period.

In assessing the impact of the OPEC pricing policies upon the Puerto Rican economy one would have to conclude that it significantly affected its economic progress. The average cost per barrel of crude oil jumped nearly five times in value in a 6-year period and presented the island with an import bill over \$1.5 billion whereas during the 1971 to 1973 period such costs for energy raw materials ranged between \$270 and \$400 million. Prices for individual petroleum products showed the same four- and fivefold increases except for the slower rises in propane and liquefied petroleum gases which only doubled for 4 years and then more than redoubled in 1977.

Electric rates on this nearly all-electric island more than doubled for the individual consumer. For the industrial customer they rose more than three times. In the instances of the “others” category electric rates rose nearly four times. Thus the effects of the cartel were extremely hard on the island’s economy which had no readily available alternative energy resource on which to draw.

ENERGY AND PUERTO RICO

In evaluating the role of energy in Puerto Rico, several things are readily apparent. The island, for all intents and purposes, has currently no natural resources upon which to draw for its energy needs; furthermore, nearly all of its energy systems are

Table 27.—Rates and Revenues of the Authority, 1971–77

	1971–72	1972–73	1973–74	1974–75	1975–76	1976–77
Cents per kWh:						
Residential	2.60	2.65	3.68	4.89	5.43	5.79
Commercial	3.18	3.20	4.16	5.32	6.16	6.55
Industrial	1.29	1.35	2.22	3.83	3.80	4.08
Others	2.39	2.52	3.65	4.89	7.65	8.63
System	2.17	2.31	3.16	4.29	4.97	5.33
Adjusted revenue per average customers (dollars):						
Residential	117.20	129.64	176.18	214.21	236.02	252.74
Commercial	790.64	876.71	1,140.31	1,450.17	1,697.79	1,887.28
Industrial	9,805.34	11,611.65	19,689.73	27,713.84	34,899.77	42,194.00
Others	1,977.25	2,270.30	3,003.52	3,827.20	4,090.59	20,952.58
System	269.47	301.28	424.47	540.90	617.54	677.24

Source: Puerto Rico Water Resource Authority, September 1977.

totally dependent upon imported supplies of crude petroleum and naphtha. Such a system is responsible for all the basic necessities of life, such as lighting, cooking, and transportation, as well as the major industrial needs for the production of apparel, food products, drugs, petrochemicals, and petroleum products.

Most drastically affected were the petroleum refiners and the petrochemical industry. In a study done by Arthur D. Little in April 1975, it was found that compared to the U.S. Gulf Coast, Puerto Rico was a higher cost location for producing petrochemicals because the island had higher feedstock, fuel, and power costs. A later October 1977 study completed by the same group concluded that the Puerto Rican petrochemical industry remained non-competitive when compared to producers on the U.S. Gulf Coast. For a comparable petrochemical complex based on naphtha/gas oil feedstock, net operating costs were 27 percent higher in Puerto Rico than on the Gulf Coast before entitlements; after entitlements the difference dropped to a 17-percent advantage for a Gulf Coast plant.

The key differences in costs were as follows: (1) power costs—Puerto Rico power rates were as much as 2.8 times those on the Gulf Coast; (2) fuel and steam costs—Puerto Rico unit costs for fuel and steam were 12 percent above Gulf Coast experience; (3) feedstock costs—before adjustment for transportation, duties, and entitlements, total naphtha/gas oil feedstock costs were estimated to be 7 percent higher in Puerto Rico and (4) transportation costs—the total transportation cost penalty was \$20.2 million per year for Puerto Rican operations; \$14.6 million was attributed to transporting raw materials and \$5.6 million for transporting plant output.

Since 1973 the higher feedstock, fuel, power, and transportation costs of the island's petrochemical industry compared to those of the U.S. Gulf Coast make it difficult for the industry to expand and to remain economically viable. The shutdown of two major petrochemical installations during 1978 is largely due to the above factors as well as the underutilization of capacity. For the closed facilities to become viable it would require new downstream installations. Given the present market conditions it would be difficult to justify such construction with declining growth rates in such markets and the availability of excess production capacity on the U.S. Gulf Coast. In all likelihood, industry supply and demand will not come into balance for the next few years; after this period, the raw materials and other operating cost differentials between the island and the Gulf Coast will narrow.

In the long run as domestic energy prices are allowed to rise to world levels, the current cost imbalances between refiners and petrochemical installa-

tions operating in Puerto Rico and the mainland should be largely eliminated. With the equalization of feedstock, fuel, and power costs for both areas, the only major disadvantage to the Puerto Rican industry would be transportation. In addition, the long term intrinsic value of the existing refineries and petrochemical facilities on Puerto Rico is protected by the higher replacement cost of building new ones.

Similar to the situation that a single firm—CORCO—is responsible for supplying the major petroleum and petrochemical needs of the island, the same situation exists in the matter of electric generation. The Puerto Rico Water Resources Authority finds itself in an even more unique situation, for it is the sole producer of electricity and is totally dependent upon petroleum imports for producing its product. Even more at a disadvantage is the fact that it is an isolated energy system which must at all times depend upon its own capacities for generating power to sell to its customers. The authority, like Puerto Rico, has no readily available alternative systems upon which to rely in order to produce electricity.

This same pattern prevails in the consumer sector where the island has failed to develop alternative systems to moving people easily, cheaply, and effectively. The individual opts for the use of his auto rather than ride a bus system which is inefficient, time consuming, and not very dependable.

Here the island could resort to upgrading the transportation system in order to bring about large savings of petroleum products. Theoretically, 15 million barrels out of 60 million barrels were used internally on the island in 1976. Not all of this 15 million barrels could be saved, but a sizable amount of it could be conserved in order to reduce the increasing import bills for crude oil. Whether this would be a cost-effective trade-off would depend on the funds needed to create a viable public transit system consisting of buses, publicos, and van pools that would move the people on the island in an efficient and effective manner.

As one views the various economic sectors of Puerto Rico and the total dependence upon one energy source for nearly all its needs, it is difficult to find a way out of this highly enclosed and isolated energy system. It seems obvious that the current infrastructure in place cannot be replaced overnight by an alternative energy source. The capital investments have been made and the living styles cannot be changed in a short time. Puerto Rico in the future will have to rely largely on petroleum imports for its energy needs while at the same time world technology undertakes the task to develop energy sources from the sea and the sun. In the meantime, the society will have to make the necessary adjustments to live with high energy costs.

Chapter III.—Impact of Federal Energy Policies and Programs on Puerto Rico

BACKGROUND

The U.S. Government has been involved in matters relating to Puerto Rican energy and economic development for nearly 20 years. Federal energy impact upon Puerto Rico began in 1959 with the establishment of crude oil import quotas for the mainland and the island by the Oil Import Administration of the Interior Department (the mandatory oil import program or MOIP as it is now known). Presidential Proclamation 3693 of December 10, 1965, adopted further special provisions to help develop a petrochemical industry on the island. These provisions provided for the allocation of imports of crude petroleum and unfinished oils into Puerto Rico for use as feedstocks for facilities already established or for the expansion of existing plants.

During the same year Phillips Petroleum and Puerto Rico reached a private agreement whereby for a substantial investment Phillips would be able to import 50,000 barrels of crude oil daily from the Western Hemisphere and ship 24,800 barrels of gasoline daily to the United States. This agreement, along with subsequent amendments to the MOIP, granted additional import rights of crude oil and allocation quotas of imported naphtha to U.S. firms that maintained refining or petrochemical activities in Puerto Rico. Since that time the presidential proclamations, along with the rules and regulations of the Federal Energy Office (FEO), the Federal Energy Administration (FEA), and the Department of Energy (DOE) have continued to control petroleum imports to the island.

Such provisions were originally advantageous to both the island and U.S. industries. They provided the U.S. firms with inexpensive petrochemical feedstocks, tax exemptions, and relatively cheap labor; Puerto Rico gained economic advantages in new industries, increased investments, and earnings and employment opportunities for its population.

FEA REGULATIONS AFFECTING SUPPLY AND DEMAND

One of the major programs administered by the FEA¹ which influenced supply in Puerto Rico was the mandatory oil import program (MOIP), mandated by Presidential Proclamation 3279 (March 10, 1959), and amended in its entirety by Presidential Proclamation 4210, April 18, 1973. Import quota (volume) levels were originally established by these MOIP regulations, but on May 1, 1973, the quotas were converted to a fee system of imports some of which were fee-exempt and others were fee-paid. At this time, crude oil and finished and unfinished products could be imported in the following manner:

1. Under a long-term allocation, usually granted for a period of 10 years, allowing specified volumes of crude or unfinished oils to be imported under a fee-exempt license. (These long-term allocations are recognized by Presidential Proclamation 3279, as amended, and were originally granted in the form of quotas prior to May 1, 1973.)

2. Fee-exempt imports of crude oil and products, also under provisions of proclamation, but gradually declining in volume from the 1973 base (227,221 barrels per day of crude oil and products) to zero beginning May 1, 1980.

3. Fee-paid imports of any quantity of crude, unfinished, or finished products subject only to payment of the fee specified in the proclamation in order to obtain a license. These fees, since February 1, 1975, are currently \$0.21 per barrel for crude oil and \$0.63 per barrel for finished or unfinished products.

Puerto Rican refiners benefitted from the long-term allocation of fee-free licenses but the licenses for CORCO expired on April 1978 (60,000 barrels per day) and for Phillips Puerto Rico on January 1978 (50,000 barrels per day), and will expire for

¹As of October 1, 1977, the FEA was absorbed into the new Department of Energy which is now primarily responsible for all rules and regulations dealing with energy matters.

Union Carbide in October 1981 (33,000 barrels per day) and Puerto Rico Sun Oil Co. in July 1981 (85,000 barrels per day).

In mid-October 1978, the DOE approved an application for exception filed by CORCO to exempt CORCO from the payment of license fees for the 1978-79 allocation period (May 1, 1978 through April 30, 1979). Thus, CORCO did not pay any license fees for product imports to the United States during the period May 1978 through April 1979, although the firm did pay certain amounts as customs duties. The decision granted similar relief to Phillips and Puerto Rico Olefins from May 1978 through April 1979. Sun Oil and CORCO were granted exception relief from the \$0.21 reduction in the value of an entitlement received for foreign crude oil.

Early in April 1979 Presidential Proclamation No. 4655 was signed which temporarily suspended the payment of license fees and duties on imports of crude oil and petroleum products. These license fees and duties will be reimposed on July 1, 1979, unless the Secretary of Energy determines the action would not be in accordance with the proclamation. In that event, the Secretary may defer the license fees and duties until January 1, 1980, or until July 1, 1980, if he makes an additional finding. On June 15, 1979, Secretary of Energy James Schlesinger decided to continue the suspension of fees and duties on imported crude oil and petroleum products through December 31, 1979.

On February 1, 1975, the U.S. Government, in addition to the fee of \$0.21 per barrel on crude oil, imposed a supplemental fee of \$1 per barrel which remained in force until June 1, 1975, when it became \$2 per barrel on imported crude oil. Following the imposition of the \$2 per barrel fee, President Ford authorized the FEA to reduce the \$2 fee on imports to Puerto Rico by an amount equal to an excise tax or other levy imposed or collected by the Commonwealth of Puerto Rico.

In December 1975, the U.S. Government's supplemental import fee on imported crude oil was discontinued by order of the President. However, the Commonwealth continued to impose its own supplemental fee in the amount of \$2 per barrel on imported crude oil and naphtha, with various exceptions, until July 1, 1978. On June 21, 1978, the Commonwealth issued a resolution, effective July 1, 1978, suspending the oil import fee. The supplemental fee can be reinstated at any time by the Commonwealth.

CORCO paid or accrued \$46 million in supplemental oil import fees during 1975, \$35 million during 1976, and \$24 million during 1978, net of certain credits. During 1977, the Puerto Rican Government agreed to defer the time payment of such

fees. However, in March 1978, the government notified CORCO that such deferral had been terminated and that such fees were due and payable on a current basis. CORCO has not paid such fees to date and has challenged the legality of this supplemental oil-import fee in a lawsuit against the Commonwealth. In connection with the lawsuit, CORCO has deposited in an interest-bearing escrow account the amount of the fees due the Commonwealth from March 2, 1978 (the date the chapter XI petitions were filed) until July 1, 1978, the date the fee was suspended.

In essence, the refiners in Puerto Rico have not been at a disadvantage under the license fee program. Furthermore, there has been little or no impact upon the refiners because under the various exemptions, Presidential proclamations and relief granted through the exceptions process, these oil firms have not paid either the license fees or recently, the customs duties.

Allocation of Petroleum Products

Allocation requirements for petroleum products set forth in the Mandatory Petroleum Allocation Regulations did not directly affect Puerto Rico because in 1974 the Administrator of the FEA delegated authority to the Governor of Puerto Rico to establish a separate allocation program for the island. This ensured that the resulting program was designed to meet local needs for gasoline, middle distillates, propane, butane, and residual fuel oil. The Commonwealth allocation regulations are however patterned after the U.S. regulations.

FEA REGULATIONS AFFECTING ENERGY COSTS

The Mandatory Petroleum Price Regulations administered first by the FEA and then DOE include Puerto Rico. These regulations cover crude oil, motor gasoline, and selected other products. Naphtha, the primary feedstock imported by the island for use in its petrochemical facilities, was decontrolled in July 1976, although the price, however, continues to be affected by the entitlements program.²

In April 1976, the FEA conducted public hearings in Puerto Rico for the purpose of obtaining information on the potential impact of possible revisions in the price regulations as they applied to firms operating on the island. Among the issues comment-

² The entitlements program was initiated to bring crude oil costs for all classes of refiners into alignment through a system of monetary transfers. In addition, Puerto Rico petrochemical plants using imported naphtha as a feedstock are also eligible for the program. The benefits for Puerto Rican plants using naphtha feedstock are determined as the difference between an imputed domestic naphtha price and the average Puerto Rican naphtha price. Thus the monetary transfers attempt to equalize full naphtha costs for all users.

ed upon were: (1) the impact of the possible removal of petroleum allocation and price regulations; (2) the impact of FEA regulatory programs upon the competitive position of the island's petrochemical industry and problems caused by the high cost of naphtha feedstock imports and the possibility of a naphtha entitlements program; and (3) the possible amendment of price regulations to treat Puerto Rico marketing subsidiaries of affiliates of mainland U.S. refining firms as resellers, or whether these subsidiaries should continue to be treated as part of their refiner-parents for purposes of price regulations.

Many companies operating in Puerto Rico favored decontrol of products such as middle distillates (subsequently decontrolled in July 1976) and motor gasoline. Although there was some disagreement as to the amount of price increases which might result from the decontrol of motor gasoline, most felt the impact would be minimal and that removal of the regulations pertaining to this product would allow competitive forces to operate more effectively in the market place. Price increases that could occur from decontrol would probably result from the absence of the refiner-parent price regulations which now require some marketers representing mainland refiners to establish average prices which are related to mainland gasoline pricing actions.

There appeared to be no consensus regarding decontrol of crude oil.³ While some firms supported decontrol both for the United States and Puerto Rico, the majority favored the extension of benefits resulting from the crude oil entitlements program, as long as controls remained in existence.

For the most part, Puerto Rican firms did not favor the possibility of a change in the regulations which would consider subsidiaries of affiliates of mainland refiners as resellers instead of as part of their refiner/parents. The primary advantage of the current classification to Puerto Rican consumers results from the averaging of island prices with mainland prices which acts as a subsidy to consumers on the island. The change in this status or removal of price regulations for gasoline mentioned earlier would probably have the effect of raising prices on the island due to a direct pass-through of the island's higher energy-related production costs.

ENTITLEMENT PROGRAM*

Another FEA/DOE program that has had a major

³ The DOE began the phased decontrol program on all domestically produced crude oil on June 1, 1979.

* The FEA and DOE entitlements program is an effort to equalize disparities in crude oil costs for U.S. refiners. Under the program, refiners utilizing more than the national average amount of price-controlled domestic crude are required to buy entitlements for each barrel processed above this average from refiners who use less than average amounts of price-controlled crude. This program essentially functions as an income transfer one between refineries so that their average acquisition costs for crude oil are equivalent.

impact on Puerto Rico has been the crude oil entitlements program. Because of the oil embargo in the fall of 1973, and the resultant sharp increases in the prices of foreign crude oil, the Emergency Petroleum Allocation Act (EPAA) was passed in November 1973. This act, among other things, established ceiling prices on domestic crude oil and petroleum products to prevent domestic producers from increasing their prices to the levels established by foreign producers. It resulted in the average price of domestic crude oil becoming considerably lower than the average price of foreign oil. These circumstances led to the establishment in November 1974, of the crude oil entitlements program under the EPAA.

In December 1975, the Energy Policy and Conservation Act (EPCA)⁴ was enacted which provided significant changes in the entitlements program. The EPCA set the national weighted average price for all domestic crude oil, both old and new, at \$7.66 per barrel, to be effective in February 1976. FEA implemented this by adopting a two-tier ("upper" or new oil and "lower" or old oil) price system for domestic crude oil. This cost differential required the FEA to revise the entitlements program to accommodate the two tier pricing system.

Puerto Rican refiners are included in the entitlements program which was instituted to distribute the benefits of price-controlled domestic crude oil among U.S. refiners. Puerto Rican importers of foreign crude oil receive full entitlement benefits.

In January 1977 CORCO filed an application for exception⁵ in which it requested that the FEA issue it a sufficient number of additional entitlements so as to enable it to achieve the earnings level which it achieved prior to 1974. As an alternative the firm requested that exception relief be granted which would provide CORCO with a feedstock cost advantage of \$1.25 per barrel of crude oil and naphtha as compared with refiners and petrochemical manufacturers in the United States. CORCO further requested that the FEA issue it a number of additional entitlements to eliminate certain inequities experienced as a result of provisions in the entitlements program. The application requested that FEA reassess the \$0.21 bias in favor of domestic production and redefine the basis upon which the naphtha entitlements are calculated so as to assist the company in equalizing the cost of its raw material supplies.

In April 1977 the FEA rejected CORCO's contention that the Government was obligated to provide CORCO with a naphtha cost advantage as compared with domestic petrochemical companies in the

⁴ Public Law 94-163, December 22, 1975, as amended by Public Law 94-385, August 14, 1976, and Public Law 95-70, July 21, 1977.

⁵ Commonwealth Oil Refining Co., Inc., Penuelas, Puerto Rico, Case No. FEE-3573, filed 1-11-77, decided 4-14-77. See Federal Energy Guidelines, vol. 4, 1976-77, Decisions and Orders, Par. 83, 132, June 17, 1977.

United States. The FEA did find substantial merit, however, in CORCO's contention that retroactive exception relief should be approved with respect to entitlement price adjustments and the naphtha entitlements formula. The firm received approximately \$7 million in retroactive relief and approximately \$800,000 per month (\$10 million annually) of additional revenues for 12 months. The October 1978 decision and order also extended the previously granted exception relief permitting CORCO to utilize its own naphtha acquisition costs in calculating the value of naphtha entitlements. This relief is effective until September 30, 1979.

CORCO has benefited substantially from, and depends heavily upon the entitlements program to equalize its crude oil and naphtha costs with mainland competitors. From its sales of entitlements, CORCO received or accrued \$6.5 million in the fourth quarter of 1974, \$96.8 million during 1975, \$128.6 million during 1976, \$140.2 million during 1977 (including naphtha entitlements and special exception relief granted in 1977), and \$105.5 million during 1978 (including naphtha entitlements, special exception relief, and California crude oil exception relief⁶ granted in 1978). The bulk of this money is for normal runs credits which all refiners receive.

Naphtha Entitlements

As a result of the 1976 proceedings and subsequent hearings, a program which provides entitlements for naphtha feedstock imports for use in island petrochemical plants was adopted and became effective in July 1976. The naphtha entitlements program was designed to subsidize refiners in Puerto Rico who had no access to lower priced domestic naphtha and relied on higher priced imported feedstock. Additional benefits have been provided to CORCO as temporary relief through the exceptions and appeals process at FEA. While this program has neither completely remedied the cost problems associated with imported naphtha feedstock nor the competitive position of Puerto Rican firms versus domestic manufacturers, it has assisted in improving the situation experienced by importers on the island prior to implementation of the program. From June 1976 through December 1978, over \$178.7 million have been provided in entitlements for naphtha imported into Puerto Rico under the program. The major share of the naphtha entitlements have accrued to CORCO and Phillips Puerto Rico Core; Union

Carbide has received a smaller amount of the entitlements.

As a result of the discrepancy between the factor set forth in the regulations and the 1977 average naphtha-to-crude price ratio, DOE determined that petrochemical producers located in Puerto Rico were not receiving sufficient entitlements value for the naphtha feedstocks that they imported. This resulted in a relative competitive disadvantage for these petrochemical producers as compared with U.S. mainland firms.

In order to alleviate this situation, DOE held hearings in November 1977 in Washington and San Juan to revise the method used for calculating the imputed cost of domestic naphtha upon which entitlement benefits are based. Following the hearings a final rule on revised entitlement benefits for naphtha imports was issued at the end of November. DOE abandoned the 120-percent value used in the past in favor of a 108-percent value. Under the old naphtha entitlements formula domestic naphtha costs were imputed at 120 percent of the price of a barrel of crude oil. The lower figure allows the Puerto Rican firms a greater per barrel entitlement on the naphtha they import. The entitlement reflects the difference between the imputed cost of domestic naphtha and the higher price of imported naphtha.

Pricing Program

One unresolved issue in the pricing area has been that of the differences in the prices paid for unleaded and leaded gasoline in Puerto Rico. In the United States leaded gasoline sells on the average 4 to 5 cents less than unleaded gasoline; in Puerto Rico the reverse is true and leaded gasoline sells for more than the unleaded product. In the United States it is less costly to produce leaded than unleaded gasoline of comparable octane. CORCO and Caribbean Gulf which produce nearly all the gasoline sold on the island claim that the costs are the same for producing either type. This latter situation may be possible because the leaded gasoline has a higher octane rating of 96 whereas the unleaded has a rating of 91.

It seems that the real reason for the higher price charged for leaded gasoline is due to Federal officials working under the Federal Energy Office. During 1974, these officials assigned to leaded gasoline with an octane rating of 96 the same profit margin previously assigned to leaded gasoline with an octane rating of 98—11.3 cents. Unleaded gas with an octane rating of 91 was assigned the profit margin previously assigned to leaded gasoline with an octane rating of 93—9.8 cents.

Despite the higher prices, Puerto Rican drivers prefer to use the leaded gas, probably because the octane rating is much higher. Efforts are underway

⁶In July and September 1978, the DOE in an effort to provide incentives for the production of heavy crude oil in California issued orders granting CORCO additional entitlements, related to incremental costs of transporting and processing such crude oil. During 1978, CORCO received or accrued approximately \$7,123,000 under these orders. Both orders are being litigated by other refiners affected by DOE's entitlements program.

to reduce the octane rating of the leaded gas in order to meet the Environmental Protection Agency (EPA) emission standards. Thus the pricing and octane structure of Puerto Rican gasoline are directly involved with the EPA lead phase-down program.

Other Regulatory Matters

Although both FEA and the DOE have through the exceptions process, the import fees system, and the entitlements program tried to balance the inherent disadvantages of the refiners on the island with those of the mainland, there are still some unresolved areas in costs and pricing. Among the courses of action suggested by the Commonwealth Government are the following: (1) the additional allocation of old oil to equalize costs; (2) eliminate naphtha entitlements reduction for petrochemical exports; and (3) include Puerto Rico in the East Coast residual fuel oil fractional entitlements program.

It has been suggested that the DOE could accomplish the goal of equalizing the costs of Puerto Rican firms with mainland firms by restoring the feedstock cost advantage of the former. This can be done by allocating additional volumes of lower-cost old oil, without the corresponding entitlement obligation, to Puerto Rican firms through the entitlements program in the same fashion as lower cost foreign oil was allocated under the MOIP quota system. The benefits received by Puerto Rican firms from the additional allocations of old oil should be of a sufficient magnitude to assure a more equitable share of the benefits of domestic price-controlled old oil by Puerto Rico consumers. In determining the appropriate level of entitlements benefits, the Commonwealth suggests that the DOE could refer to the value of the long-term quota allocations at the time such allocations were granted. Such a program would offset the energy (fuel, feedstock, and power) and transportation cost disadvantages of the island firms versus those of the mainland.

Currently mainland firms do not experience a naphtha entitlements deduction for volumes of petrochemicals exported from the United States. Puerto Rican firms, however, experience a naphtha entitlement deduction for exported petrochemicals and thus are limited in their participation in the export market. The DOE recognized this inequity and granted CORCO exception relief from the entitlements reduction for exports in November 1978. The Commonwealth would like to eliminate this inequitable entitlements reduction for exports as applied to all Puerto Rican firms.

The DOE conducted hearings in late March 1979 on several applications requesting exceptions relief which would enable firms in Puerto Rico to earn additional entitlements for the naphtha they imported

into the Commonwealth. Following the hearings DOE indicated in a proposed decision and order issued in mid-May that it intends to grant this exception relief in the form of additional entitlements to Puerto Rican refining and petrochemical firms. The amount of relief to be granted will be determined on a case-by-case basis after consideration of each firm's individual application for exception.

Under the entitlements program East Coast residual fuel oil importers presently receive 50 percent of the per barrel value of a crude oil entitlement for each barrel of imported residual fuel oil. Puerto Rico is not currently included in this entitlement program. The Commonwealth has indicated that Puerto Rico should also be included in the residual fuel oil fractional entitlements program since these subsidized residual oil imports would reduce energy costs on the island, particularly those needed for producing electric power.

To a large extent, over the next few years all of these present cost imbalances of crude oil, feedstocks, and other petroleum products will be eliminated. As domestic energy prices are allowed to rise to world levels, costs for crude oil and the other petroleum products will be equalized. This program is underway as President Carter directed the DOE to complete or undertake administrative actions designed to phase out controls on all domestically produced crude oil by September 30, 1981. The phased decontrol program began on June 1, 1979, by providing special new incentives to those categories of oil where the maximum amount of new exploration and production will result. Thus, these other inequitable aspects of costs faced by the Puerto Rican firms will be overtaken by the series of events resulting from the decontrol programs.

IMPACT ON PUERTO RICO

Although the FEA and DOE regulations and rule-making have not always taken into account the historic relationships between the Puerto Rican refiners and petrochemical firms and the U.S. Government, the regulatory developments have been designed to allow these firms to compete with their mainland counterparts.

The current system of import fees and purchase entitlements have equalized crude oil costs between the island users and those on the mainland. The previous Puerto Rico crude oil cost advantage prior to 1973 of cheaper imports has not been regained. The various waivers and exemptions of the import license fees have not disadvantaged the Puerto Rican firms nor impacted upon them for in essence they have resulted in fee-free licenses.

Unfortunately during periods of shortages and rapidly rising prices, both FEA and DOE have not

been able to fully equalize feedstock costs of the island refiners with those of U.S. refiners who have access to lower cost crude oil or alternative energy supplies. Generally, relief sought for inequities in the entitlements program or as a result of crude oil price controls has been usually granted on a prospective basis and losses and disadvantages incurred prior to the appeal are not implemented on a retro-active basis.

During the next few years as domestic oil decontrol is phased in, the value of entitlements will decline. Moreover, the phased decontrol program to be carried out by the DOE in allowing domestic crude oil prices to rise to world levels should largely eliminate the cost imbalances for the crude oil between the mainland and Puerto Rican refiners and petrochemical firms.

Chapter IV.—Future Energy Strategy for Puerto Rico

INTRODUCTION

Puerto Rico is almost totally dependent upon the importation of crude oil for its energy needs. Thus any changes in worldwide prices or the supply of crude oil are of utmost importance to the economic progress and welfare of the people of this island. Future forecasts indicate that continuing high oil prices and dwindling supplies available worldwide in the years that lie ahead, is a potentially real occurrence.

The basic assumption of both the U.S. Government and Commonwealth officials that cheap and readily available supplies of crude oil could fuel an underdeveloped Puerto Rican economy is no longer valid. The island must turn to other energy sources for its industrial, commercial, and consumer needs; however, how can this be done when the system in operation is dependent upon crude oil and its products solely and there are no easily implemented alternatives which can be substituted for this one energy raw material.

Although one may think that the energy dilemma is unique to Puerto Rico, quite the contrary is true. Much of the underdeveloped world as well as numerous developed nations are trying to maintain economic progress with economies which are largely geared to the use of petroleum. This situation is true as well, in some of the mainland States. For example, the State of Massachusetts has a problem very similar to that of Puerto Rico. Massachusetts depends on residual oil to supply more than 81 percent of its total electric energy generation and pays a high price for that oil.

FUTURE ENERGY STRATEGY

Under this situation of high-cost crude oil, two possible energy strategies are suggested for the future: (1) establish new or alternative energy sources; and (2) develop programs and means for greater conservation of all energy materials.

NEW AND ALTERNATIVE ENERGY SOURCES

Every essential technological ingredient for a commercial solar energy system has existed for more than a decade, although most of these devices have not yet benefited from mass production. Already 200,000 homes in Israel have solar water heaters and over 2 million homes in Japan have similar equipment. More than 1,800 homes in Puerto Rico have solar water heaters as well as numerous industrial and commercial facilities.

In July 1976, the Energy Research and Development Administration (ERDA which became a part of DOE in October 1977) and the University of Puerto Rico created the Center for Energy and Environment Research (CEER) to supersede the Puerto Rico Nuclear Center which had operated under contract with the Atomic Energy Commission. CEER was to focus on ERDA's national energy goals as well as to contribute to Puerto Rico's own efforts to achieve energy independence. Table 1 indicates the funding of energy projects in Puerto Rico from 1967 through 1978.

CEER has been allotted a modest budget of \$2.8 to \$2.9 million for the next few years. Of this amount, the major funding is for education and training as well as an environmental studies program to provide terrain and marine ecological data bases for future environmental assessments. Within the education and training aspects the major part of the

*Table 1.—Funding of Puerto Rico Energy Projects,
1967–78*

[In thousands of dollars]

Energy Project	Federal	State	Private	Total
Solar/wind	2,141	209	—	2,350
OTEC	506	145	25	676
Photovoltaics	499	—	—	499
Biomass	213	—	—	213
Oil exploration	—	310	—	310
Other	—	500	—	500
Total	3,359	1,164	25	4,548

Source: Puerto Rico Energy Office, 1978.

funding is devoted to solar research and technology. Over \$300,000 of the total \$600,000 budget is allotted to research dealing with solar air conditioning, ferro-electric converters, ocean thermal energy conservation (OTEC), and various aspects of solar radiation, fuel cells, and solar materials.

A pilot program funded by the Economic Development Administration (EDA) and the Department of Energy (DOE) involves the development of an industrial air-conditioning system using solar energy. This system will be tested and demonstrated in a factory located in the town of Canovanas (about 20 miles east of San Juan) which is being provided by the Puerto Rican Industrial Development Co. (PRIDCO). Hot water is secured from the rooftop solar collectors and run through an absorption refrigerating machine which generates chilled water necessary for cooling. If the operation of this solar-equipped building proves commercially practical and energy conservative, it will be used as a prototype for a number of other factory buildings to be constructed by PRIDCO in Puerto Rico.

OTEC

Another aspect of solar energy is the idea of drawing power from ocean thermal gradients. Solar energy warms the surface water of the oceans to temperatures considerably higher than those beneath the sea. The difference in temperature is a source of heat energy that can generate electric power and provide a 24-hour-a-day, year-round source.

The authority has been pursuing the development of ocean thermal energy since 1967 when a team of scientists completed a study for an OTEC plant operating a few miles off the east coast of Puerto Rico. The study was ahead of its time but produced the operating parameters and component sizes for a demonstration plant. During the last few years, the authority has been participating with other local agencies in coordinated efforts to bring to Puerto Rico the first demonstration projects. This is being accomplished by gathering the needed scientific site data and by maintaining close communication with the technical community and the U.S. Government agencies interested in this technology.

Two different design approaches are being considered for OTEC: an open cycle system and a closed cycle system. In the open cycle system, warm surface water is introduced into an evaporator, where the pressure is reduced and vapor is produced. The steam generated is passed through an expansion turbine which in turn moves a generator to produce electric energy. The water vapor is then condensed in an open type heat exchanger by using cold sea water from the ocean depths, thus producing the vacuum needed by the system to operate.

This cold water must be brought to the surface through a long hollow tube reaching the depths (2,000 to 4,000 feet) where the water temperature is about 20° C. to 25° C. colder than the surface water. An idea of the size of the cold water pipe can be taken from a conceptual design that the authority presented to DOE in April 1978 for a 5 megawatt (MW) land-based plant to be located in Punta Tuna on the southeast coast. This plant would have a 14-foot diameter cold pipe that would bring water from a point less than 3 miles from the coast at 1,000 meters depth. The temperature differential at this point is about 22° C.

Power is generated in a closed cycle by using a suitable fluid with good heat transfer characteristics and high vapor pressure at ambient temperature. Such fluids may be ammonia or propane. In a typical closed cycle system the working fluid is evaporated in the boiler using warm surface water. The vapor of the fluid is used in an expansion turbine to generate power. After leaving the turbine, the low pressure vapor is condensed in a heat exchanger using cold sea water and then pumped back to the boiler to complete the closed cycle.

Although both systems have their advantages and disadvantages, the main objection to the open cycle system is the use of very large turbines. The major pacing item in the utilization of the closed system OTEC configuration is the scale-up development of equipment and subsystems.

Currently under consideration is the first OTEC plant to be operated in the grid of an electric utility. This plant will probably be a 10 MW closed system module. The cold water pipe must be 58 to 62 feet in diameter and 3,300 feet deep. The total cost of OTEC at the 40 MW capacity with a 10 MW module has been estimated from \$100 to \$150 million. This closed system was selected by DOE for this first demonstration plant and a request for a proposal to start this project is expected to be issued sometime during 1979. Although OTEC is a promising alternative for the authority as it offers base load capability, it will be a number of years before this alternative is commercially available and competitive.

Wind Turbines

From the standpoint of early application, one of the most promising ways to tap the sun's energy is through the Wind Energy Conservation Systems. The main problem in wind energy is one of economics. Within the constraints of technology, it appears that lower energy costs may be achieved by increasing the turbine unit size. In late January 1978, the first federally sponsored wind turbine generator was installed in Clayton, N. Mex. This turbine supplies

200 kilowatts or enough power for the electrical needs of about 60 homes. The second such wind turbine generator became operational in July 1978 on the island of Culebra off the east coast of Puerto Rico. The wind turbine can provide 5 to 10 percent of the local electricity demand or about enough power for 35 homes.

The cost of the wind turbine is a little more than \$1 million including the cost of research and monitoring instrumentation. Significant reductions in cost could be achieved if systems were produced in quantity and research instrumentation eliminated. More advanced and larger systems could be expected to further decrease wind energy costs. Such alternative sources of energy could be viable forms for numerous areas on the island which have wind patterns of great intensity and consistency.

Coal Resources

A more realistic alternative source of energy for providing electric power on the island would be the use of coal. The Exxon Corp. and the Colombian Government are considering the development of a coal field in the Cerrejon Valley of Colombia. Exploration results at the end of 1978 indicated minable resources of 3,100 to 3,300 million tons of high BTU, low ash, and low sulfur coal deposits. If the joint project is undertaken it would require 4 years for developing the coal fields and exports of 4 million tons could be started in 1985. The coal exports could be increased to 7 million tons by 1986 and 12 million tons a year later.

The Exxon firm and the Colombian Government signed a 30-year association contract in late 1976 to develop these coal fields. The coal reserves are substantial in size, high in quality, and well located for export markets. This potential new source of energy could provide a practical alternative for the authority in lessening its total dependence on oil for future additional capacity. A new electric power plant based on coal could provide the additional energy needs of the island in the mid-1980's at a time when an alternative source of energy—coal from Colombia—might be readily available. This potential new energy source is nearby, would be cost competitive, and would not require the costly development of new technology.

Oil Resources

There is also the possibility that offshore as well as onshore oil deposits may exist. Seismic studies carried out as a part of the nuclear plant site selection process by the water authority near Arecibo raised the possibility of the existence of petroleum reserves. Two hydrocarbon prospects were located west of San Juan off the north coast of the island.

Only four wells have been drilled in Puerto Rico to date and only one of these is in the northern portion of the island near the areas of interest. The one well was drilled to a total depth of 6,437 feet and encountered no shows of hydrocarbon. The two prospects are considered high-risk ventures. Prospect A is much larger in area and better defined than Prospect B which also extends inland from the coast. Exploratory drilling has been recommended for the Prospect A area first.

Exploratory drilling could start in these areas sometime in 1979 provided three issues can be resolved. The first problem involves the filing by oil companies of environmental impact statements (EIS) with both the U.S. and Commonwealth Governments. The jurisdictional question as to who owns the natural resources that are offshore must also be resolved. A bill has been introduced into the House of Representatives assigning jurisdiction over these offshore areas to Puerto Rico. The final issue is for the Commonwealth Government to reach agreements with the oil companies before the exploratory drilling starts. If these various aspects can be resolved within the next year, by 1980 Puerto Rico should know whether Areas A and B contain significant oil deposits.

Nuclear Energy

Although there are environmental and safety concerns relating to nuclear energy, this source should not be overlooked. The authority indefinitely postponed the project for a nuclear plant of 600 MW that was to be built at Barrio Islote near Arecibo. There were a number of reasons for this action. There was a drop in energy consumption and authority revenues during the recession and a dim outlook on the issuance of bonds in the capital markets. Although the plant components have been put up for sale, the authority is still in the process of obtaining the required permit for licensing the site in order to initiate a new project when feasible. The construction of a nuclear plant for Puerto Rico could resolve to a large extent the problem of the authority in providing it with a relatively cheap source of supply and one that would not be dependent upon petroleum. Although the costs continue to escalate for such a project and funding would be a major problem in building such a facility, an open mind should be maintained in the event nuclear power is subsequently determined to be cost effective.

ENERGY CONSERVATION

The second part of the strategy opts for conservation and a reduction in the use of petroleum products. There are four basic conservation programs

that are in the process of being implemented by the island's various sectors. The government program is the first one being implemented and consists of three measures—government use of energy, government procurement of energy-efficient products, and conservation by utilities. These have been designed so that expenditures of public funds for energy will be reduced without affecting the quality of the public services that are provided.

Together the 12 measures in the four programs should yield energy savings of 3.29 million to 3.60 million barrels of oil in terms of 1980 consumption, or between 5 and 6 percent of the total expected consumption for that year. This is equivalent to saving approximately \$50 to \$61 million in crude oil import costs.¹ Most of these savings will be achieved by the end of 1980, and all will be achieved before 1985. Table 2 provides a detailed picture of the estimated energy savings in 1980.

Government Conservation Program

The three government measures—use of energy, procurement of energy efficient products, and conservation by utilities—will provide one-half of the total energy savings projected for 1980. This saving of 1.54 million barrels of crude oil occurs largely in the conservation by utilities area. This is an effort to increase energy efficiency in the generation, transmission, and distribution of electricity and to educate the public in conserving electricity. This saving of over 1.2 million barrels of oil will come primarily as a result of improvements in generating efficiency.

¹ These costs do not reflect the latest June 1979 OPEC price increases.

The reduced government use of energy will come from the delamping of government buildings (remove excessive lighting fixtures and ballasts to reduce illumination), the conversion of public street lighting by replacing mercury vapor lamps with either high- or low-pressure sodium lamps, and controlling electricity use in government and public facilities by ensuring that all lights and electrical equipment are turned off when not required. The energy savings from this measure should result in saving nearly 200,000 barrels of oil a year in 1980.

New equipment-purchasing regulations are being developed to ensure that the Government procures energy-efficient products. The new regulations are being applied first to energy-intensive equipment such as automobiles and air conditioners. Later these regulations will be applied to all major energy-consuming equipment. Already the government motor vehicle fleet has been reduced from 6,000 to 4,800 vehicles and energy-efficient vehicles are being bought as replacements. The energy savings for the fleet reduction and the purchases of replacement vehicles is expected to result in savings of 127,000 barrels of oil in 1980.

Solar Program

The solar program consists of solar water heating and provides for a number of solar water heating demonstration projects in new public housing and hospitals. Other actions to encourage a strong solar industry will require legislation in the form of tax credits or deductions for solar water heating units, elimination of excise taxes on solar equipment, and other loan and installation measures. With these

Table 2.—Estimated Energy Savings in 1980¹

Program measure	Savings by measure		Savings by program	
	Low	High	Low	High
Government			1,544.47	
Government use of energy	192.98			
Government procurement of energy-efficient products	126.36			
Conservation by utilities	1,225.13			
Solar			101.87	223.98
Solar water heating	101.87	223.98		
Buildings			580.24	726.14
Lighting efficiency standards	179.43	237.23		
Thermal efficiency standards	4.21			
Energy audits	396.60	484.70		
Transportation			822.34	839.58
Park-and-ride lots	20.88			
Right-turn-on-red	13.01			
Traffic engineering improvements	148.80			
Public transportation system improvements	225.86			
Revision of excise tax and registration fees	413.79	431.03		
Total			3,048.92	3,334.17
With 8-percent adjustment for refinery fuel			3,292.83	3,600.90
As percentage of projected 1980 consumption (61,793,000 barrels)			5.33	5.83
Savings ² (millions of dollars)			49.95	61.14

¹ Subject to periodic adjustments as the conservation plan is implemented.

² Based on an Energy Office forecast of a 1980 crude oil price of between \$15.17 and \$16.98. This price range is based on forecasts of the inflation rate and assessments of the continuing impact of the entitlements program.

Source: Puerto Rico Energy Office, July 1978.

incentives 15,000 to 35,000 solar water heaters could be installed in private homes and up to 10 percent of the new private housing could be using solar water heating by 1980. The savings of this conservation measure vary from 100,000 to 225,000 barrels of oil.

Buildings Program

Three measures comprise the buildings program to reduce the use of energy for lighting and air conditioning: Lighting efficiency standards, thermal efficiency standards, and energy audits. The energy audits measure will provide the major reduction in the category with expected energy savings of nearly 400,000 to 500,000 barrels of oil. This measure will increase the overall energy efficiency in existing buildings pinpointing sources of energy waste and recommending methods or equipment to improve efficiency. The lighting efficiency standards will reduce the use of electricity for lighting in both new and existing buildings. Some legislation will be needed to enforce the standards in privately owned public buildings. The final measure in this category—thermal efficiency standards—will minimize energy consumption for air conditioning.

Transportation Program

This program consists of five conservation measures of which the revision of excise taxes and registration fees will provide the largest savings. This measure, encouraging the purchase of small, energy-efficient autos by taxing vehicles by weight, horsepower, and cost, will result in savings of over 400,000 barrels of oil in 1980. Current and proposed legislation of excise taxes and registration fees should result in a vehicle mix of nearly 70 percent light-weight cars by 1980.

Public transportation system improvements and traffic engineering improvements together will result in expected savings of nearly 400,000 barrels of oil in 1980. To achieve these savings, bus and publico routes will have to be restructured and public transit patronage will have to increase by 15 percent to 121 million passenger miles per year. The traffic engineering improvements will save fuel by reducing travel and idling time and the number of stop-go cycles. This measure is already being implemented and 40 percent of the improvements should be completed by the end of 1980.

The remaining two transportation measures—right-turn-on-red and park-and-ride lots—will result in savings of less than 35,000 barrels of oil. The former has been in effect since August 1977 and the latter measure consists of providing express bus and van service for a limited number of government employees at one employment center in San Juan. These various conservation measures, if fully imple-

mented and if the projections are accurate, would result in reduced oil imports of 5 to 6 percent of the island's total consumption. Such conservation efforts will require little capital investment and will allow additional time for developing alternative energy sources and for making investment decisions on future energy facilities.

AN APPRAISAL

Puerto Rico has no indigenous fossil fuels or other conventional energy resources to provide for its energy needs. The sun and the sea contain the potential for the island to develop adequate sources of energy for its industry, commerce, and population. However, in the next few years there are no quick and easy alternatives to replace the 99 percent dependence on imported oil. This sole dependence on imported oil along with its continuing high prices can adversely impact upon the economic growth and life style of the people of Puerto Rico.

The future energy strategy perceives two avenues to resolve the dilemma of dependence on imported oil and its high cost. First, there is the need to develop and establish new or alternative energy sources which occur on the island; and second, energy conservation measures to reduce the use of oil and produce energy from new technologies or sources of energy.

This section has provided a review of the various new or alternative energy sources that are available to the island. Those such as the sun, wind, and sea are indigenous to the island and thus are secure resources which can be developed and maintained for the well-being of the populace. Although they are inexhaustible sources of energy, they will take time to develop. In addition, the technologies required for their development should be safe, cost effective, and socially acceptable.

During this period of development of the more exotic energy sources, the island has the opportunity to explore, and if found, develop oil resources off its coast as well as the possibility of relying on other fuels such as coal from Colombia or the building of a nuclear plant on the island. These potential new energy sources provide additional breathing space and time until the solar and ocean thermal concepts become practical and cost-effective sources of energy.

The reliance on oil will continue in the years ahead, but the programs are underway or under consideration for developing the alternative energies that will provide Puerto Rico with an energy mix that will lessen its dependence upon oil. In addition the conservation measures by providing opportunities for developing more efficient uses of energy in industry and the home will further lessen oil dependence.

Appendix A.—Petroleum Refining Sector

GENERAL CHARACTERISTICS

Puerto Rico has three petroleum refineries with a total capacity of 266,000 barrels per day. The three refineries are owned by the Commonwealth Oil Refining Co. (CORCO), the Puerto Rico Sun Oil Co. and the Caribbean Gulf Refining Corp.; the latter two refineries are owned by major United States firms, the Sun Oil Co. and the Gulf Oil Corp.

CORCO is a privately owned firm in which Tesoro Petroleum Corporation of San Antonio, Tex., holds 37 percent shareholder interest. In April 1977 negotiations were under way by Ashland Oil, Inc., to purchase 48 percent of CORCO's common stock; in addition, Ashland was given a 5-year option to purchase the 5.5 million CORCO shares owned by Tesoro. The takeover effort ended in failure in November 1977.

In March 1978 CORCO filed for bankruptcy under chapter XI of the Federal Bankruptcy Act. In late July 1978 CORCO signed a management agreement with the Commonwealth Reorganization Co., Inc. (CRC), a Texas corporation, to provide management assistance, analysis, and advice to CORCO. After 5 months of studying CORCO, CRC concluded that it could be maintained as a viable economic entity and would continue to assist in planning CORCO's reorganization.

A major development in 1979 was an agreement in principle between CORCO and Arabian Seaoil Corp., which may form the basis of a plan of arrangement for CORCO's emergence from bankruptcy. Arabian Seaoil would invest \$70 million in a new company formed to carry on CORCO's business and would arrange for the financing of not less than \$60 million for capital improvements. Under the proposal Arabian Seaoil would make crude oil available to CORCO at competitive prices and on normal trade credit terms. Before this plan can be adopted, however, it must be approved by the principal creditors, the bankruptcy court, and CORCO's shareholders. After these and approvals from other interested parties are obtained, a plan of arrangements may be prepared and definitive agreements negotiated.

As of June 1979 it was reported that major CORCO creditors, including a bank consortium headed by Citibank of New York and such suppliers as Gulf Oil and Exxon, had reached agreement on the Arabian Seaoil proposal. Thus the only two financial barriers to finalization of Seaoil's proposed debt settlement plan for CORCO are an alleged CORCO indebtedness of \$81 million for the unpaid \$2 a barrel crude import fees imposed by the Commonwealth Government and a Tesoro petroleum claim involving \$64 million in loans to CORCO.

The CORCO refinery is located on the south coast at Penuelas and contains 57 percent of the total refining capacity (141,000 barrels daily) of the island. The Sun Oil refinery is also located on the south coast and has a daily refining capacity of 85,000 barrels. The Gulf refinery is located on the north coast at Bayamon (San Juan metropolitan area) and has a refining capacity of 40,000 barrels daily. In addition, there is a refinery owned by Phillips Puerto Rico Core, Inc., which is located on the south coast at Guayama and converts naphtha into gasoline and aromatics. Total employment in the petroleum refining and petrochemical industry was 7,500 in 1977, of which the largest number, 1,400, were employed at CORCO's refinery and petrochemical plants.

PRODUCTION CHARACTERISTICS

The petroleum refineries of Puerto Rico use three major processes in refining the crude oil. Of the three the most important is hydroprocessing which accounts for 51 percent of all crude oil processed on the island. The other two processes—catalytic cracking and catalytic reforming—account for some 19 percent and 30 percent of the crude oil capacity, respectively. The catalytic cracking process is necessary in order to produce the large amounts of gasoline which are consumed on the island and exported. Other important refining processes used are vacuum distillation, polymerization, and lube manufacture. Table 1 provides an account of the various refining processes used in Puerto Rico as of January 1, 1978.

Table 1.—Puerto Rico Yields According to Processes

[Barrels per calendar day]

Firm	Hydro processing	Catalytic cracking	Catalytic reforming
Caribbean Gulf Refining Corp.	16,000	7,000	6,000
CORCO	88,000	40,000	70,000
Puerto Rican Sun Oil Company	24,600	—	—
Total	128,600	47,000	76,000

Source: *The Oil and Gas Journal*, December 25, 1978, p. 181.

CORCO Production Characteristics

Although the CORCO refinery has a daily capacity of 141,000 barrels per day, the average throughput for 1977 was 129,675 barrels daily. This was a considerable improvement over 1975 when crude oil runs to the refinery averaged 97,671 barrels per day. Table 2 provides a comparison of the 1975, 1976, and 1978 period on the yields of the CORCO refinery byproducts. The major products produced are distillates, residual oil, gasoline, and naphtha.

Table 2.—CORCO Refined Products, 1975, 1976, and 1978¹

[In barrels per day]

Type of product ¹	1975	1976	1978 ²
Gasoline	26,128	25,005	50,764
Naphtha	5,729	18,273	NA
No. 6 oil	50,027	51,974	40,939
No. 2 oil and distillates	15,465	21,916	14,063
LPG and butane	3,360	5,377	2,983
Other	1,117	1,740	4,758
Total	101,826	124,285	113,507

¹ Includes some products from petrochemical plants.

² January through October 1978.

Source: Commonwealth Oil Refining Co., Inc., *Annual Report—1976*, p. 6, and *First Phase Report*, December 1978, p. 44.

OPERATING COST CHARACTERISTICS

In trying to evaluate the major cost components of the refining industry and particularly those that are related to the energy material requirements, there are some data problems. The most recent data available on the industry in Puerto Rico is the 1972 manufacturers data on *Economic Censuses of Outlying Areas* provided by the U.S. Department of Commerce. This information was updated in 1977 but will not be available for publication until 1979. According to this data, the total cost of materials and supplies for the petroleum refining industry of Puerto Rico in 1972 was \$371,671,000 of which the costs of fuels and electricity were \$13,027,000 and \$6 million, respectively. The fuels and electricity costs correspond to 3.5 and 2 percent, respectively, and thus are a very small part of the total cost picture. Nearly 95 percent of the costs are for materials, parts, containers, and supplies.

Undoubtedly in 1977 the costs of crude oil supplies remain the major factor in the refining process. The percentages of fuel and electric cost categories have also increased with the steep rise in prices for these components. In an effort to measure the energy material cost requirements as related to the use of electric power by the refining industry, the following information is available on CORCO.

In 1973–74 CORCO and its numerous affiliates purchased nearly \$8 million of electricity from the authority. In 1976 the same firm purchased nearly \$19.5 million of electric power from the authority. Much of this increased cost in electricity by CORCO is related to price and not increased usage. In the period from 1973 to 1976 industrial sector electric costs have risen from a penny and a half to nearly 4 cents per kWh. This in large part would account for increased electric costs during the last 4 years for CORCO.

SALES AND DISTRIBUTION

Since CORCO supplies between 70 and 80 percent of all the petroleum product requirements of the island, this section will also focus on the sales and distribution activities of the firm. There is an additional reason for doing this and it is because the United States firms of Gulf, Sun, and Phillips do not break out sales and distribution patterns on a geographical basis.

CORCO sells petroleum products to its joint ventures and to unrelated industrial users principally in the United States and Europe. During 1977 approximately 69 percent of the petroleum products manufactured (excluding petroleum feedstocks) was consumed on the island; 29 percent was shipped to the United States, and the remainder was shipped to other markets. The company's major customer on Puerto Rico is the authority, the Government-owned electric power generating agency. Table 3 provides data indicating the major markets within the island and sales outside Puerto Rico.

CORCO has transported significant amounts of the crude oil and naphtha feedstocks it purchases in oil tankers which it charters. The company also transports significant amounts of its refined petroleum products and petrochemical products it manufactures in ships or barges it owns or charters. The commitments for charter hires and leases of tankers, contracted for principally during the period from September 1972 to March 1974, are for periods ranging generally between 3 and 6 years. Due to a significant decrease in cargo rates resulting from worldwide excess capacity and a reduction in the level of utilization of vessels by the company resulting from a decline in business activity, CORCO has

Table 3.—CORCO Petroleum Product Sales, 1972-77

[In barrels per day]

Sales	1972	1973	1974	1975	1976	1977
In Puerto Rico:						
Major oil companies	45,134	45,704	38,683	35,071	40,798	39,013
Puerto Rico Water Resources Authority	15,462	28,006	27,485	25,042	25,895	24,664
Other third-party customers	11,224	12,351	6,896	6,805	6,438	9,044
Joint ventures	23,027	20,392	25,101	22,912	22,610	16,390
Total in Puerto Rico	94,847	106,453	98,165	89,830	95,741	89,111
Outside Puerto Rico:						
United States	40,967	32,162	31,156	27,699	35,830	38,435
Foreign	4,063	4,082	6,512	3,671	3,390	2,129
Total petroleum products sold	139,877	142,697	135,833	121,200	135,561	129,675

Source: CORCO, *Annual Report—1977*, p. 11, April 1978.

been incurring significant losses from its tanker operation.

The company's geographical location in Puerto Rico has been a disadvantage in competing with other Caribbean-based refiners in the mainland

United States market as a result of the Jones Act. This legislation requires that products shipped from Puerto Rico to the mainland be shipped in U.S. flag vessels whose freight rates are considerably higher than those for foreign-flag vessels.

Appendix B.—Petrochemical Sector

GENERAL CHARACTERISTICS

The petrochemical industry in Puerto Rico was founded upon the basis of the ready availability of low-cost, foreign-origin feedstocks and a system of local incentives with the accent on industrial tax exemption. These incentives and cost advantages enabled the establishment of large, efficient, world-scale petrochemical units. Under normal circumstances these units would have remained cost-competitive with mainland U.S. plants, as well as with the major European and Far Eastern producers. The only real cost disadvantage to Puerto Rico was the cost of shipping the product to the United States, its major market. This cost was more than offset by the other incentives. However, the worldwide upheaval of oil prices during 1974 through 1977 all but destroyed a large portion of the cost advantage to Puerto Rico for producing petrochemicals.

A substantial petrochemical industry representing a fixed capital investment (construction, equipment, machinery) of over \$1.3 billion is now established in Puerto Rico. The heart of this complex consists of four major core facilities producing basic petrochemical and chloro-alkali raw materials.

In addition, a growing number of downstream satellite plants have been built, many of which are located adjacent to the core facilities. These satellite plants produce an increasing variety of petrochemical intermediates. The major petrochemical core facilities are owned by Union Carbide Caribe,

Inc., Commonwealth Oil Refining Co. (CORCO), Phillips Petroleum Co. and PPG Industries.

At present over 50 chemicals and synthetic materials are produced on the island including 38 organics, of which 8 are basic, 21 are intermediate, and 9 are end products. Table 1 shows the 1969-77 value of Puerto Rico's sales of petroleum, petrochemicals, and allied products to the United States and foreign countries. Except for the 1969 and 1970 period, shipments of these Puerto Rican materials to the United States were 80 percent or larger. Ninety percent of the finished petrochemicals are exported to the United States, about 7 percent are shipped to South America and Europe, with the remaining 3 percent consumed within Puerto Rico.

The petrochemical industry is technology intensive and requires large capital investment. These two factors help explain the importance of U.S. concentration in this industry. At present, 82 percent of the 58 petrochemical plants are subsidiaries of U.S. firms. Union Carbide and CORCO own all or in part 27 plants.

Table 2 indicates U.S. concentration in the Puerto Rican petrochemical industry.

EMPLOYMENT

Although this is a capital-intensive industry, employment in the petrochemical and satellite plants has been growing at a steadily increasing rate except for the 1975 and 1976 periods. In October 1977, the

Table 1.—Puerto Rican Sales of Petroleum, Petrochemicals, and Allied Products, 1969-77¹

Fiscal Year	Total	United States	Foreign countries	Percentage to United States	Percentage to foreign countries
1969	\$224,254,788	\$176,089,235	\$48,165,553	79	21
1970	245,788,568	188,876,308	56,912,260	77	23
1971	227,748,155	181,630,257	46,117,898	80	20
1972	297,156,743	255,014,597	42,142,146	86	14
1973	427,175,966	381,749,166	45,426,800	89	11
1974	881,912,099	750,732,793	131,179,306	85	15
1975	873,357,485	799,885,831	73,471,654	91	9
1976	997,066,262	868,419,217	128,647,045	87	13
1977	1,243,075,091	1,094,325,557	148,749,534	88	12

¹ Includes the petroleum refining and related industries (SIC 29), the industrial inorganic chemicals (SIC 281), the plastic materials and synthetics industry (SIC 282), and industrial organic chemicals (SIC 286). Excluded are: drugs (SIC 283), soap, detergents, and

cleaning preparations, perfumes, cosmetics, and other toilet preparations (SIC 284); paints, varnishes, etc. and allied products (SIC 285); agricultural chemicals (SIC 287); other miscellaneous chemical products (SIC 289).

Table 2.—United States Petrochemical Plants in Puerto Rico, 1973

United States firm	Number of petrochemical plants
CORCO	14
Union Carbide Caribe, Inc.	13
PPG Industries	6
Royal Dutch Petroleum Co.	3
Gulf Oil Corp.	3
Occidental Petroleum Corp.	2
Hercules	2
W. R. Grace	2
Total	45

Source: Puerto Rico Planning Board, *External Trade Statistics*, May 1977.

petroleum refining and petrochemical industry employed 7,639 workers directly, which represents about 4.25 percent of the total manufacturing employment. Indirect employment represents approximately 15,000 workers. Table 3 provides data on the number of plants and employment during the last 8 years.

Table 3.—Petroleum Product Plants and Employment, 1970–77

October	Number of establishments	Total employment	Production workers
1970	24	4,442	2,409
1971	36	5,616	3,282
1972	39	7,330	4,638
1973	41	7,408	4,754
1974	47	7,766	4,993
1975	51	5,499	3,165
1976	47	6,017	3,337
1977	49	7,639	4,830

Source: Puerto Rico Department of Labor: *Census of Manufacturing Industries*, 1977.

SUPPLY SOURCES

A unique feature of the Puerto Rican petrochemical industry is its total dependence upon imported petroleum products. In addition, domestic production of naphtha is insufficient for petrochemical requirements. Table 4 shows this heavy Puerto Rican

dependence on imported crude petroleum and naphtha.

Unlike the United States where about two-thirds of the petrochemical feedstocks are obtained from natural-gas operations, Puerto Rico's petrochemical industry depends almost entirely on naphtha and other petroleum derivatives for its raw material. The Puerto Rico petroleum refineries and petrochemical plants are highly interdependent and in a few cases operations are vertically integrated. In general, the refineries provide naphtha, gas oil, process fuels, and residual fuels for the petrochemical units. The latter in turn supply fuel producing operations with aromatics, streams, fuel gases, raffinate, and raw materials for alkylate. Due to the early stages of development of downstream consuming industries (e.g., plastics and synthetic fibers), Puerto Rico exports most of the basic and intermediate products.

PRODUCTION CHARACTERISTICS

Three of the major petrochemical firms in Puerto Rico—CORCO, Union Carbide, and Phillips Puerto Rico Core, Inc.—have been selected as a representative sample of the industry. The information relating to their production aspects are indicative of other petrochemical firms operating in Puerto Rico.

CORCO

CORCO, through its wholly owned and joint venture operations, represents the largest industrial complex in Puerto Rico. The firm has a total investment at cost of nearly \$400 million of which the petrochemical complex accounts for \$250 million.¹ To fully understand the vastness and complexity of CORCO's petrochemical production facilities it is necessary to indicate the facilities and capabilities of its three joint ventures, the Hercor Chemical Corp.,

¹ By the end of 1978, CORCO's total investment at cost was reduced to \$322.5 million and petrochemical investments were down to \$172 million with the shutdown of Puerto Rico Olefins Co., (PRO) and Oxochem Enterprises in late November 1978.

Table 4.—Puerto Rican Crude Petroleum and Naphtha Imports, 1971–77¹

[In millions of barrels]

	1971	1972	1973	1974	1975	1976	1977
Crude oils:							
From Venezuela	47,666	66,823	71,665	34,079	32,353	37,071	32,285
From other areas		1,359	6,323	41,011	40,399	35,837	47,951
Subtotal	47,666	68,182	77,988	75,090	72,752	72,908	80,236
Unfinished oils—naphthas:							
From Venezuela	15,898	16,463	15,404	13,522	9,661	8,610	6,420
From other areas	21,268	24,657	30,476	30,550	21,658	26,074	10,167
Subtotal	37,166	41,120	45,880	44,072	31,319	34,684	16,587
Total	84,832	109,302	123,868	119,162	104,071	107,592	96,823

¹ Excludes imports from the Virgin Islands and the United States.

Sources: Puerto Rico Economic Development Administration, "The Petroleum Refining, Petrochemical and Allied Products Industries in Puerto Rico," May 1977; Puerto Rico Planning Board, *External Trade Statistics*; and Puerto Rico Office of Energy.

the Puerto Rico Olefins Corp., and Oxochem Enterprise.

Hercor Chemical Corp.

This firm is jointly owned by CORCO and Hercolina (a joint venture 75-percent owned by Hercules and 25-percent owned by American Petrofina Inc.) and produces paraxylene, a vital component in the manufacture of polyester fibers and polyester film. The facility purchases a substantial portion of its xylene feedstocks from CORCO's aromatics and ethylbenzene plants and sells all its production of paraxylene to Hercolina.

Hercor is one of the largest producers of paraxylene in the industry. During 1978 Hercor experienced a shortage of xylene feedstocks for paraxylene production. Due to the use of a new, more efficient catalyst, certain plant facilities of Hercor have been shut down since January 1977 and are held as stand-by equipment.

Puerto Rico Olefins Corp. (PRO)

This is a joint venture owned by CORCO and PPG Industries Inc. which produces ethylene, propylene, and butadiene. The ethylene is sold to PPG and Union Carbide for further downstream processing in Puerto Rico. The propylene is sold to Oxochem Enterprise as a feedstock for the manufacture of oxoalcohols for plastic products. The butadiene is sold mainly to Firestone Tire and Rubber as a raw material for the manufacture of synthetic rubber.

PRO purchased all of its feedstocks of naphtha, raffinate, and gas oil from CORCO until November 17, 1978, when the operations of PRO were suspended and PPG terminated all of its petrochemical operations in Puerto Rico. Since its commencement of operations in mid-1972, PRO has had numerous shutdowns and technical difficulties, and has never operated at full capacity due to a lack of sufficient ethylene offtake by its customers. PRO operated at a loss since it began operations.

Oxochem Enterprise

This is a joint venture between CORCO and W. R. Grace & Co., which produces oxoalcohols, the primary one of which is purchased by Grace for its plasticizer lines and for resale to other chemical manufacturers.² The feedstocks of propylene and synthesis gas are obtained from CORCO. A large modification and expansion program completed late in 1976 increased capacity by approximately 70 percent. The principal product produced by Oxo-

chem is 2-ethyl-hexanol, which is purchased in entirety by the Hatco Division of Grace.

CORCO had been selling propylene feedstock to Oxochem under a long-term contract significantly below its cost, and as a result, incurred substantial losses. CORCO was able to recover a portion of these losses through its participation in the joint venture. When PPG terminated operation of PRO in November 1978, Oxochem's primary source of feedstock was eliminated, and Oxochem also suspended operations in early December 1978.

A summary table of CORCO's refining and petrochemical facilities provides investment costs and production capacities through 1977 for the various plants (table 5).

Table 5.—CORCO Investment and Production Capacities, 1977

Facilities	At cost	At cost less accumulated depreciation	Total capacity	Throughput for the year ended Dec. 31, 1977
	Thousands of dollars	Thousands of dollars	Barrels per day	Barrels per day
Wholly owned:				
Refinery	137,500	90,100	141,000	110,026
Aromatics	130,000	104,300	19,700	12,154
Cyclohexane	3,700	2,500	3,600	2,393
Ethylbenzene	9,500	7,400	1,450	—
50 percent owned joint ventures:				
Hercor Chemical Corp.	20,000	16,100	Pounds per day 1,774,000	Pounds per day 828,784
Paraxylene	—	—		
Puerto Rico Olefins Co.	56,300	46,200		
Ethylene	—	—	1,918,000	1,452,140
Propylene	—	—	1,109,000	758,181
Butadiene	—	—	277,000	185,736
Oxochem Enterprise	35,300	30,400		
Oxoalcohols	—	—	1,141,000	712,643
Total	392,300	297,000		

¹ While the capacity of CORCO's refinery as rated by the Federal Energy Administration several years ago approximates 161,000 barrels per day, it is believed that 141,000 barrels per day is maximum capacity practical in a heavy fuel oil operation. The refinery capacity operating in a gasoline mode is 121,000 barrels per day when condensate is available as feedstock or 95,000 barrels per day when no condensate is available.

Source: CORCO, *Annual Report*—1977, April 1978, p. 7.

The numbers of barrels or pounds indicated as capacities represent CORCO's estimate of each facility's capacity under what it believes to be possible operating conditions, assuming such facilities are not shut down for maintenance, repairs, or other reasons, such as lack of demand.

Noteworthy, CORCO produces 12 to 15 percent of the U.S. demand for benzene and is the sixth largest producer in the world with 160 million gallons. The firm is also the biggest single benzene producer in the United States and operates the world's largest benzene plant. Other large amounts

² Grace was in the process of selling its share in the HATCO group (HATCO Puerto Rico) and Oxochem Enterprise to Tenneco Chemicals, a subsidiary of Tenneco, Inc. The negotiations were terminated in October 1977.

of petrochemicals produced are mixed xylenes and orthoxylene. CORCO's petrochemical operations produce more aromatic chemicals than any other facility in the world.

Table 6 indicates the importance of selected petrochemicals produced in Puerto Rico. The output of the Puerto Rican facilities is significant in meeting total U.S. demands for several of the products, namely the aromatics.

Table 6.—Puerto Rico and U.S. Capacities for Selected Petrochemicals, 1978

[In millions of pounds per year]

Product	Puerto Rico capacity	United States capacity	Puerto Rico percentage of United States total
Benzene ¹	355	2,263	15.7
Cyclohexane	137	481	28.4
Paraxylene	1,170	5,735	20.4
Orthoxylene	437	1,355	32.2
Ethylene	1,800	35,015	5.1
Ethylene glycol	1,075	6,825	15.8
Vinyl chloride monomer	500	8,295	6.0

¹ Million gallons per year.

Source: The Pace Company, 1979.

Union Carbide Caribe, Inc.

This company has 13 plants in Puerto Rico with a cumulative investment in construction, machinery, and equipment of \$300 million. In its plants, Union Carbide Caribe has the capacity to produce, on an annual basis, the following selected petrochemicals: butadiene (185 million pounds), ethylene (1 billion pounds), ethylene-glycol (700 million pounds), ethylene oxide (650 million pounds), phenol (200 million pounds), low density polyethylene (310 million pounds) and propylene (500 million pounds).

Phillips Puerto Rico Core, Inc.

This company has a \$175 million investment and total assets amount to approximately \$167 million. Phillips current petrochemical annual capacities are as follows: benzene (126 million gallons), cyclohexane (98 million gallons), toluene (110 million gallons), mixed xylenes (108 million gallons), orthoxylene (250 million pounds) and paraxylene (470 million pounds).

Appendix C.—Electric Utility Sector

GENERAL CHARACTERISTICS

The Puerto Rico Water Resources Authority (PRWRA)¹ produces, transmits, distributes, and sells over 99 percent of the electricity consumed in Puerto Rico; only the town of Cayey remains outside the authority's distribution system. The authority is a public corporation and instrumentality of the commonwealth of Puerto Rico.

As of June 30, 1978, the authority's electric system had an installed capacity of 4,199,225 kW. This system is composed of four thermal electric generating stations (18 units) with 3,058,000 kW, 22 jet and gas turbine emergency startup and peaking units with 442,975 kW, 10 hydroelectric stations (19 units) with 95,400 kW, two combined cycle plants with 600,000 kW, and several diesel units at the Vieques and Culebra islands totaling 2,850 kW. An experimental wind turbine generator of 200 kW was put in service in July 1978. The stations depend almost entirely on oil; only 1 to 2 percent of the energy supply is provided by the hydroelectric facilities.

The San Juan and Palo Seco Steam Plants are located in the San Juan metropolitan area, and fuel is supplied mainly by Hideca Trading Inc. and the Caribbean Gulf Refining Co. The South Coast Steam Plant, located near the city of Ponce, is supplied directly with fuel from the adjoining CORCO refinery. The Aguirre Steam Plant on the south coast is supplied fuel mainly by the Puerto Rico Sun

Oil Co. Eight of the 10 hydroelectric plants have reservoirs which permit some regulation of plant output by collecting and storing water inflows. The remaining two plants operate on run-of-the-river flows.

Due to the energy crisis and the difficult inflation and recession periods that followed, the authority has reduced the number of employees working for the firm. In fiscal year 1974-75, the average total employment numbered 8,540. Total employees at the end of June 1978 numbered 8,370.

FINANCIAL CHARACTERISTICS

The world economic conditions that have affected employment within the authority have also had a similar effect upon the financial condition of the company. The net income, excluding contributions in lieu of taxes, has fallen considerably when compared with those obtained in the early period of the 1970's. Table 1 provides data on the financial aspects of the authority during the last 7 years. Table 2 shows the growth of revenues, kilowatt hours used, number of customers, and payrolls.

SYSTEM CHARACTERISTICS

As of June 30, 1978, the authority had a dependable capacity of 4,187,680 kW to serve a maximum demand of 2,017,400 kW. The authority considers this enough generating capacity to adequately serve the present and near future needs of the island. With

¹ Referred to as the authority in the rest of the report for convenience.

Table 1.—Authority Sales, Net Income, and Profit Margin, 1972-78

[In millions of dollars]

	1972	1973	1974	1975	1976	1977	1978
Sale of energy:							
Residential	75,496	86,870	122,499	156,107	177,979	201,447	226,040
Commercial	60,240	69,156	92,751	121,490	145,017	166,176	185,445
Industrial	48,311	57,582	98,646	141,562	173,304	195,581	212,557
Others	13,192	15,598	20,859	26,909	29,691	33,716	33,696
Other revenues	5,841	6,317	7,519	8,038	13,064	8,866	9,632
Total revenues	203,080	235,524	342,274	454,106	539,055	605,786	667,370
Net revenues	23,345	16,271	18,154	15,718	11,992	5,232	(27,992)
Profit margin (percentage)	11.5	6.9	5.3	3.5	2.2	0.9	(4.2)

Source: The authority, December 1978.

Table 2.—Authority Operating Statistics, 1971–78

Fiscal year	Adjusted revenues	Kilowatt hours	Average customers	Payroll ¹
1971	\$150,269,449	7,268,392,772	705,315	\$84,243,183
1972	197,238,629	8,676,700,000	731,964	91,488,981
1973	229,206,352	10,084,100,000	760,776	114,773,939
1974	334,755,070	10,376,900,000	788,759	126,719,539
1975	446,068,224	10,197,200,000	812,022	146,323,575
1976	525,992,000	10,574,926,551	837,169	151,475,488
1977	596,920,000	11,229,801,364	871,968	156,433,405
1978	657,738,000	11,697,620,108	902,465	128,979,736

¹ Operation and construction and fringe benefits included.

Source: The authority, December 1978.

the slowdown in energy needs during the recent years, the authority has revised its expansion plans.

Annual output of energy has increased nearly two-and-a-half times in the past 10 years. The kilowatt-hours consumed have risen from nearly 4.9 billion in 1968 to over 11.7 billion in 1978. The Palo Seco Steam Plant and the San Juan Steam Plant, both located in the San Juan metropolitan area, have installed capacities of 717,000 kW and 488,000 kW, respectively. The Palo Seco Plant consists of two 83,500 kW units, two 216,000 kW units and six 20,000 kW gas turbine units. The San Juan Plant has four 100,000 kW units and two 44,000 kW units.

The South Coast Steam Plant near Ponce has an installed capacity of 1,113,000 kW in two 410,000 kW units, two 82,000 kW units, two 44,000 kW units, and two 20,000 kW gas turbine generators. The Aguirre Steam Plant, the newest in the island,

Table 3.—Authority's Generating Capacity

Thermoelectric	Location	Installed capacity (kW)	Dependable capacity (kW)
Aguirre steam plant	Aguirre	1,540,000	1,530,000
South Coast steam plant	Peñuelas	1,113,000	1,128,000
Palo Seco steam plant	Toa Baja	717,000	716,000
San Juan steam plant	San Juan	488,000	488,000
Mayaguez gas turbine station	Mayaguez	80,000	76,000
Jobos gas turbine units	Guayama	40,850	38,000
Yabucoa gas turbine units	Yabucoa	40,850	38,000
Vega Baja gas turbine units	Vega Baja	40,850	38,000
Daguao gas turbine units	Ceiba	20,425	19,000
Covaadonga turbojet unit	San Juan	20,000	16,000
Vieques diesel	Vieques	1,000	800
Culebra diesel	Culebra	1,850	1,700
Total thermoelectric		4,103,825	4,089,500
Yauco No. 1	Yauco	20,000	25,000
Yauco No. 2	Adjuntas	8,000	9,000
Caonillas No. 1	Utuado	17,600	18,000
Caonillas No. 2	Utuado	4,000	3,600
Dos Bacas	Arecibo	18,000	15,000
Garzas No. 1	Peñuelas	7,200	7,200
Garzas No. 2	Peñuelas	5,040	5,040
Toro Negro No. 1	Villalba	8,640	8,640
Toro Negro No. 2	Villalba	1,920	1,700
Río Blanco	Naguabo	5,000	5,000
Total hydroelectric		95,400	98,180
Wind turbine		200	200
Total capacity		4,119,425	4,187,880

Source: The authority, December 1978.

has an installed capacity of 1,540,000 kW in two 450,000 kW units, two 20,000 kW gas turbine generators, and two 300,000 kW combined cycle units, each consisting of four 50,000 kW gas turbines and one 100,000 kW steam unit. The Mayaguez plant is equipped with four 20,000 kW gas turbine generators for a total installed capacity of 80,000 kW. Table 3 provides data on the generating capacity of the authority and table 4 provides generating capacity by source of energy. See figure 1 for the authority's service area.

Table 4.—Generating Capacity by Source of Energy, 1978

Energy source	Installed capacity (kW)	Percentage	Dependable capacity	Percentage
Steam	3,660,850	87.2	3,674,500	87.8
Gas	442,975	10.6	415,000	9.9
Hydroelectric	95,400	2.2	98,180	2.3
Other (wind turbine)	200	—	200	—
Total	4,199,425	100.0	4,187,880	100.0

Source: The authority, December 1978.

OPERATING COST CHARACTERISTICS

The major operating cost to the authority has been fuel oil. During the period from 1974 through 1978, the fuel oil costs have increased 2.34 times. At present time, over half of the total expenses of the company are accounted for by fuel oil costs. Other contributing factors to increased costs have been those in salaries, materials, supplies, interest, and services which occurred during the year. Table 5 provides an accounting of the costs and expenses for the period June 1974 through June 1978.

Other major increases during the period were the previously negotiated and granted salary increases, a substantial increase in the authority's contribution

Table 5.—Authority Costs and Expenses, 1974–78

[In millions of dollars]

Operating costs and expenses	1974	1975	1976	1977	1978
Fuel	146,961	202,177	243,646	301,479	344,359
Other production	8,810	34,059	19,348	16,730	15,906
Transmission and distribution	16,483	19,204	26,727	28,539	31,870
Maintenance	37,723	43,658	50,934	56,854	58,982
Customers' accounting and collection	15,466	21,224	24,369	31,052	35,357
Administrative and general	18,510	20,836	32,347	38,444	35,900
Depreciation	26,324	28,640	40,792	47,625	53,065
Interest	40,804	49,563	59,719	64,097	76,357
Other	443	1,385	19,754	4,020	5,745
Total costs and expenses	311,525	420,746	517,636	588,840	657,541

¹ Loss on disposition of nuclear plant slated for Aguirre and other equipment.

Source: The authority, December 1978.

to the retirement system, and higher interest rates on short-term financing.

For the most recent fiscal year, fuel costs alone jumped over 14 percent, from above \$301 million in 1977 to over \$344 million in 1978. Table 6 provides an account of the type of fuels, the amounts purchased, and the value of those purchases along with the major suppliers for 1977.

Since the authority is a government utility, it is required by Commonwealth law to purchase all of its material needs on a competitive basis. As a result, most contracts for fuel purchases are of a short-term nature—1 year or less. Since June 1976, the authority has started to purchase fuel on some 2-year contracts. Fuel inventories are generally kept at a 12- to 15-day level. Fluctuations that do occur are dependent largely on the cash-flow status of the authority and seasonally on the potential impact of the hurricane period. The authority has no neighboring power networks on which to draw for energy supplies and therefore during the hurricane season keeps somewhat higher inventories to provide for self-sufficiency.

ENERGY MATERIALS REQUIREMENTS

The authority is carrying out a program for new facilities, modifications, and improvements in the generating units to make its operations more compatible with environmental requirements. All of the changes required by the regulations of the Puerto Rico Environmental Quality Board and the Environmental Protection Agency (EPA) are being implemented. The investment in this program will amount to more than \$59 million over a 5-year period.

To comply with the regulations on chemical discharges, treatment plants for these effluents were designed and built. Under construction at the present time is a 1.1-mile submerged discharge pipe in the Aguirre Plant to reduce the impact of thermal discharges from the operation of this plant.

Regulations for the controls of atmospheric pollution impose limits on the percentage of sulfur contents in fuel oil to be used at the generating units. The authority is complying with these regulations and is burning fuel oil with a 1.5 percentage sulfur content in San Juan, 2.5 in Palo Seco, 2.5 in Aguirre, and 1.0 in South Coast. These changes required modifications in the fuel handling systems at the San Juan and South Coast plants. To meet the regulations on particulate matter issued by EPA, the authority is modifying the boilers of its generating units by installing high efficiency burners at an approximate cost of \$16.1 million.

GENERATING EFFICIENCY

The conversion of the energy of fuels into electricity is a very inefficient process. It is normal to lose about two-thirds of the energy of the fuel in this process. Unfortunately, the available methods of producing electricity in bulk capacities is still dependent upon those techniques.

The aforementioned losses are strictly those of the generating plant. In moving electric power from the thermal system plants and the generating units, there are additional losses in the transmission and distribution of such a product. These losses have increased by 7 percent from 1972-73 to 1977-78 (from 7.34 percent to 7.91 percent of total generation). The overall-system efficiency averaged 85.5 percent during the 1974-77 years; it was over 85.2 percent in 1977-78. Table 7 provides an account of power generation and the losses occurring within the system.

In 1976-77 the authority consumed 22.6 million barrels of fuel and lost 15.2 million barrels through conversion loss resulting in electricity produced from 7.4 million barrels. In 1977 there was a conversion loss of 16.3 million barrels from 23.9 million barrels consumed, resulting in electric production from the 7.6 million barrels.

Table 6.—Authority Fuel Purchases, Fiscal Year 1977-78

Type of fuel (average price)	Number of barrels	Value of purchase	Major suppliers
No. 6 fuel oil (14.05969 \$/bbl)	20,919,035.24	\$294,115,199.19	Hideca Trading Inc. Puerto Rico Sun Oil Co. Commonwealth Oil Refining. Caribbean Oil Refining.
No. 2 fuel oil (17.03372 \$/bbl)	3,027,944.96	51,577,165.17	Gulf Petroleum S. A. Puerto Rico Sun Oil Co. Commonwealth Oil Refining.
Propane (16.34897 \$/bbl)	22,586.05	369,258.76	Tropigas de Puerto Rico.
Diesel (22.78260 \$/bbl)	4,226.19	96,283.58	Esso Standard Oil.
Total	23,973,792.44	346,157,906.70	

Source: The authority, December 1978.

Table 7.—Power Generation, 1972-78

[In millions of kilowatt-hours]

Type of power	1972-73	1973-74	1975-76	1976-77	1977-78
Thermoelectric	11,166	11,347	11,872	13,197	13,581
Hydroelectric	126	97	140	85	103
Purchased and units under testing	465	826	338	8	0
Total	11,757	12,270	12,350	13,290	13,684
Power used by auxiliaries	578	629	726	808	931
Net generation	11,179	11,641	11,624	12,482	12,753
Transmission losses	670	701	595	642	475
Subtotal	10,509	10,940	11,029	11,840	12,278
Distribution losses	194	371	515	662	607
Subtotal	10,315	10,569	10,514	11,178	11,671
Used by authority	39	34	17	13	17
Power delivered to customers	10,276	10,535	10,497	11,165	11,654

Source: The authority, Planning and Research Division, December 1978.

SALES AND DISTRIBUTION

The authority has increased sales revenues over fivefold in the last 10-year period. The industrial sector has become the largest consumer of electric power, followed by the residential and commercial sectors. For the past few years, the percentages have varied little, as the industrial sector uses over 40 percent of the total energy consumed, the residential over 30 percent, and the commercial sector over 20 percent. Prior to 1972, the residential sector was the largest user of electric power, but since then the industrial sector has taken the lead and accounts for nearly two-fifths of all the electric power used. Table 8 indicates energy sales by the authority and sector consumption for 1969 through 1978.

The world energy crisis resulted in a slowdown of the dramatic growth rate of Puerto Rican electric energy. Prior to 1974, it had a historic compounded annual growth rate of 15 percent. Although kilowatt-hour sales diminished in 1975, revenue from electric sales increased by 33 percent, 18 percent, 13 percent and 10 percent during fiscal years 1975 to 1978.

The increase in revenue was largely due to the increased cost of fuel oil. This cost was recovered from customers through the fuel oil adjustment clause in the rates, and this additional revenue was passed on dollar-for-dollar to the fuel oil suppliers.

CLASS OF SERVICE PRICES

If one uses 1972-73 as a base year for comparing the price of electric power depending on its purchaser, all the economic sectors have seen a doubling or more of the cost of electric energy.

Electric energy sold to the commercial sector has increased from 3 cents per kilowatt-hour in 1973 to over 6 cents per kilowatt-hour in 1976. It reached almost 7 cents in 1978. Similarly, the industrial sector costs for electricity have gone from 1½ cents to 4½ cents per kilowatt-hour cost in the 6-year period. In the "other sector" the energy costs have gone from 3¼ cents to nearly 8 cents per kilowatt-hour.

SPECIAL SELLING AGREEMENTS

Due to the increases in the price of electricity, in June 1974 the legislature of Puerto Rico enacted Law 106, which subsidizes low-income customers consuming 425 kilowatt-hours or less monthly. Over 565,000 families are receiving the benefits of this law. At the end of fiscal year 1978, the authority had a total of 902,465 customers. Of this total, 807,022 were classified as residential customers, 89,111 were commercial, 4,026 were industrial, and 2,306 were customers in the other category. Thus, about 70 percent of the residential customers are

Table 8.—Electric Energy Sales and Distribution, 1968-78

Fiscal year	Sales by class of service [In millions of kWh]					Sales revenues (millions of dollars)
	Total	Residential	Commercial	Industrial	Others	
1968-69	5,707.0	2,089.0	1,418.8	1,749.9	449.3	118.9
1969-70	6,495.4	2,415.3	1,589.0	1,988.2	502.9	132.8
1970-71	7,268.5	2,638.3	1,738.7	2,360.4	531.1	150.3
1971-72	8,676.7	1,898.6	1,892.4	3,471.8	413.9	197.2
1972-73	10,084.1	3,276.7	2,161.6	4,180.4	465.4	229.2
1973-74	10,376.9	3,330.2	2,230.1	4,406.1	410.5	334.8
1974-75	10,197.2	3,195.6	2,282.9	4,339.0	379.7	446.1
1975-76	10,574.9	3,276.5	2,352.4	4,558.0	388.0	526.0
1976-77	11,229.8	3,462.1	2,553.8	4,811.6	402.3	596.9
1977-78	11,697.6	3,708.5	2,680.1	4,865.1	443.9	657.7

Source: The authority, December 1978.

receiving the benefits of the subsidized electric program for low income groups.

Residential customers qualifying for the subsidy are billed for the basic cost of the electric energy consumed and the subsidy is payable to the authority by the Commonwealth. The financing of the subsidy is ultimately from the Commonwealth's General Fund. To date over \$126 million has been paid to the authority under this program. Table 9 shows the subsidies paid in the last 4 years.

Table 9.—Fuel Adjustment Subsidies Paid to the Authority, 1974–78
[In millions of dollars]

Fiscal year	Amount
1974–75	\$26.4
1975–76	32.4
1976–77	40.3
1977–78 ¹	27.2
Total	126.3

¹ Through June 30, 1977 (\$21.0 million due to complete the 1977–78 total cost of \$48.2 millions).

Source: The authority, December 1978.

CHARACTERISTICS UNIQUE TO THE AUTHORITY

The authority's system is an isolated one limited to the island of Puerto Rico. This means that it must provide for all of its reserve requirements, if it is to maintain a comparatively acceptable quality of service. It has been argued that the 1.5-days-in-10-years' planning criterion for loss-of-load may be the best choice for an isolated system such as the authority's, in view of the 1.0 days/10 years reliability of the giant power pools in the United States. Unfortunately these planning guidelines are too demanding economically. For this reason PRWRA is now evaluating other levels of loss-of-load probability along with an intensive plan to restore the reliability of the existing system. An impressive operation reserve margin of about 60 percent should be obtained with these plans. This reserve level is well above the average 20 percent margin found in the mainland.

Puerto Rico finds itself in promotional competition with other areas of the United States for the establishment of different types of industries. The economic operation of industries is intimately related

with the reliability of the electrical energy supply. If Puerto Rico is to attract new industries, it needs to maintain a system of comparable quality of service to mainland utilities. The price it must pay to provide this incentive is high reserve margins.

Determining acceptable levels of generating capacity reserve margins for the authority requires that consideration be given to many unusual features of the system when compared to electric power systems on the mainland. The primary differences are: (1) the warm year-round climate of Puerto Rico which tends to increase system load factor and reduce the variance in monthly peak loads; (2) the lack of transmission interconnections with other electric systems; and (3) the relatively high forced-outage rates of electric generating units on the system.

Temperature-sensitive electrical loads (air-conditioning and space heating), which substantially influence demand on U.S. systems, are of minor importance in Puerto Rico. Indicative of this effect are the monthly peak loads which do not vary by more than about 13 percent during the year.

Electrical energy demand is also relatively constant throughout the year, giving rise to a large annual load factor of about 76 percent. The combination of a large system load factor and relatively constant monthly peak loads does not permit the utility to perform preventive maintenance on electric generating equipment during periods of slack demand as is the common practice on U.S. systems. Consequently, the authority needs a larger installed reserve margin than electric systems which have scheduled maintenance during periods of reduced electrical demand.

A second characteristic is that the authority is not interconnected with other electric systems and must rely entirely on its own resources to supply customers. The lack of interconnections has the effect of increasing the required reserve margin. A third factor is the relatively high forced-outage rates of generating units that are a direct result of the system demand characteristics; this, in turn, also limits periods for preventive maintenance of equipment.

Thus, the uniqueness of the authority's geographic location, as well as the three characteristics inherent in its electric system, demand that it maintain high reserve margins in order to provide reliable electric service.

Appendix D.—Consumer Sector

INTRODUCTION

Following the increase in the price of petroleum and its derivatives, Puerto Rico underwent one of the most dramatic changes in its energy-consumer patterns.¹ This is due to the fact that petroleum is used to generate 99 percent of the electricity produced in the Commonwealth. Petroleum also provides nearly 100 percent of the energy used to move and transport goods and passengers. This exclusive dependence on petroleum accentuated the impact of fuel price level changes on family consumer patterns, particularly those of lower income.

As in many other countries, Puerto Rico used petroleum as its only source of energy until 1973. The basic reason for this absolute dependence was that petroleum prices made it the most economical alternative of all the available substitutes. In spite of the creation of OPEC and an increase in petroleum prices, Puerto Rico must continue to use petroleum as its only source of energy, because there are no alternative energy sources readily available.

ELECTRIC COSTS

As a result of the increase in petroleum prices, those sources of energy available to the poor also increased significantly. Gasoline increased by 100 percent and average kilowatt-hour prices rose from 20 percent to as much as 240 percent in some cases.

Differences in the increase of electricity costs arose from the fact that, prior to 1974, existing tariffs lowered the price as the use of electricity increased; present day ones increase prices with increased consumption. For example, an individual who used 1,527 kWh in 1971 paid 0.0156 cents per kWh; in 1976, he paid 0.0529 per kWh, a 240-percent increase.

An important change took place in June 1974, when people using less than 425 kWh of electricity monthly were given a subsidy by the Puerto Rican Government. This resulted in a drastic change in

¹ This appendix deals solely with lower income groups within the consumer sector. Since they comprise approximately 50 percent of the Puerto Rican population the impact of the energy crisis on them as a group presents a very realistic picture of the consumer sector.

the consumption of electric power at all income levels. In 1971, 8.4 percent of the electric users consumed 1,000 kWh or more monthly and 13.5 percent used between 226 and 400 kWh on a monthly basis. In 1976 although the number of users increased 25 percent over those in 1971, only 6.4 percent of the users consumed 1,000 kWh or more electricity monthly and 22.3 percent used amounts of 226 to 400 kWh on a monthly basis. In essence the larger users of electric power have decreased their usage by 25 percent. There was a 65-percent increase in the number of electric users who lowered their usage to the level of 226 to 400 kWh monthly.

The major uses of electricity on the island are lighting and the use of appliances such as washing machines and irons as well as the use of radios and television sets for entertainment. Table 1 provides data on appliances owned by low-income families. Tables 2 and 3 provide data on the ownership of radio and TV sets in such areas of Puerto Rico as well as the hours such items were used daily. The appliance-ownership table 1 indicates that nearly all the families owned stoves and refrigerators and very few owned air-conditioners or clothes dryers.

Table 1.—Number of Appliances Owned by Low-Income Families¹

Type of appliance	Number of appliances owned by family (percentage)	
	One	More than one
Stove (N=3,153) ²	96.8	3.2
Refrigerator (N=3,081)	98.8	1.2
Electric iron (N=2,659)	99.2	0.8
Clothes washer (N=1,970)	99.3	0.7
Electric fan (N=948)	86.8	13.2
Water heater (N=883)	99.3	0.7
Air-conditioner (N=31)	96.7	3.3
Clothes dryer (N=9)	100.0	—

¹ Data on this and the following tables taken from interviews among 3,252 heads of low-income families who live in slums, near-slums, public housing, and rural areas in Puerto Rico. The interviews were taken between July and November 1976.

² Number in the sampling; for example 96.8 percent of the 3,252 heads of families interviewed owned one stove; 3.2 percent of that number owned more than one stove.

Source: Commonwealth of Puerto Rico, Office of Economic Opportunity, *The Impact of the Energy Crisis on the Low-Income Population of Puerto Rico*, 1977.

Table 2.—Ownership of Radio and Television by Residential Sector ¹

[In percentages]

Ownership	Residential sector				
	Rural	Slum, inland	Slum, metro San Juan	Public housing Inland	Metro San Juan
Radio:					
Yes	80.4	83.8	86.7	80.4	86.0
No	19.6	16.2	13.3	19.6	14.0
Television:					
Yes	83.3	85.5	89.4	89.9	88.6
No	17.0	15.0	10.6	10.1	11.4
	(N=1,460)	(N=567)	(N=570)	(N=306)	(N=342)

¹ Number of the sample of total of 3,252 heads of families.

Source: Puerto Rico Office of Economic Opportunity, 1977.

Table 3.—Daily Hours of Exposure to Radio and Television

[In percentages]

Hours of exposure	Radio	Television
Less than 2 hours	32.5	7.3
Less than 3 hours, but more than 2	22.0	10.2
Less than 4 hours, but more than 3	13.5	16.8
Less than 5 hours, but more than 4	8.8	19.3
Less than 6 hours, but more than 5	5.0	11.4
Six hours or more	17.2	33.2
No information available	1.0	1.8
	¹ (N=2,673)	(N=2,867)

¹ Number in the sample of total of 3,252 heads of families.

Source: Puerto Rico Office of Economic Opportunity, 1977.

Propane Gas and Other Cooking Fuels

Propane gas is used almost exclusively for cooking. In the rural areas charcoal is considered a minor source of fuel for cooking purposes. The majority of the families use propane gas except for those families who live in public housing. The use of charcoal or wood as a source of energy is almost exclusively rural. Two-thirds of those families living in public housing rely on electricity for their cooking needs although there is a relatively large number who rely on propane gas. Table 4 provides data on the type

Table 4.—Fuel Used for Cooking

[In percentages]

Residential Area	Type of fuel used			
	Propane gas	Kerosene	Electricity	Combination
Rural (N=1,416) ¹	91.2	4.4	2.7	1.7
Slum—inland (N=552)	85.0	2.4	10.5	2.1
Slum—metropolitan San Juan (N=525)	84.4	2.9	11.0	1.7
Public housing, inland (N=314)	20.7	0.7	69.1	9.5
Public housing, metropolitan (N=351)	15.9	0.6	79.5	4.0

¹ Number in the sample of total of 3,252 heads of families.

Source: Puerto Rico Office of Economic Opportunity, 1977.

of fuel used for cooking by the various families depending on their location and type of housing.

Electricity for cooking purposes is used by 20 percent of the families sampled who own stoves (653 of 3,190) for an average use of 3 hours, 27 minutes daily. However, nearly one-fifth use their electric stoves for 5 or more hours daily. This indicates that for the low income, cooking is one of the items with high energy consumption. In general, foods are not baked in spite of the fact that the majority of the stoves have an oven.

An important reason that helps to explain the situation is that the ovens did not work in one-third of the cases. When the oven is used, a large number tend to open the oven door to see how the food is doing and they do not use pyroceramic utensils. All of these aspects tend to increase energy consumption.

TRANSPORTATION AND THE USE OF GASOLINE

The rise in the price of energy has changed the consumer patterns of needy families in Puerto Rico fundamentally. This is particularly true in the consumption of electricity with a significant lowering of the use of available appliances. On the other hand, the need for transportation for basic activities such as work, school, trips to the doctor and shopping, and the lack of a trustworthy and efficient public transportation system have kept the lower income group with the necessity of owning old, inefficient automobiles.

In the sampling the majority of those interviewed, 6 out of every 10 persons stated that they use public transportation infrequently or almost never. The other four stated that they almost always use public transportation. The various reasons given for not using public transportation were the discomfort and inefficiency of the buses, the limited bus schedules, and the fact that they owned their own car or used one belonging to a neighbor or family. Table 5 indi-

Table 5.—Transport Used by Working Family Members

[In percentages]

Means of transportation	Family unit		
	Head (N=66) ¹	Others (N=368)	All (N=1,035)
Own car	36.9	20.4	31.0
Public automobile/or station wagon	14.4	31.8	20.6
Walking/or ride bicycle	23.4	17.4	21.3
Bus	8.4	7.3	8.0
Another person's car	16.0	10.6	18.8
Taxi	0.7	11.1	4.4
Other (includes trucks and motorcycles)	5.2	1.4	3.9

¹ Number in the sample of total of 3,252 heads of families.

Source: Puerto Rico Office of Economic Opportunity, 1977.

cates that heads of family primarily use the cars to get to work whereas the rest of the family members depend on publicos. These latter cars are privately owned automobiles, minibuses, or station wagons licensed by the Public Service Commission and have set routes for specified fares. They carry as many passengers as can be squeezed into the vehicle and travel as fast as possible between points of the route.

A further analysis of the data collected for the interviews indicated that the distance to work was less than 4 miles and that most used public cars or minibuses or their own car to get there. The great majority of those who owned a car travel alone. Two-thirds of them take 30 minutes or less to get to work, but think it would take much longer if they used public transportation. Their principal objection is the time it takes and the inconveniences, but many give as the principal reason the fact that they are accustomed to their own car. Users of public transportation generally pay 50 cents or less daily, and the majority get to work in slightly over 30 minutes. They use public facilities because they do not own a car.

About one-fourth of the homes had some car or vehicle. Of the equivalent of 838 motor vehicles one occurred in 660 homes, two were used in 66 homes, and three or more were found in 10 homes. Table 6 indicates the distribution of vehicles by residential sector. One interesting aspect is that more automobiles were owned by low-income residents who lived in the rural areas or slums compared to those living in the public housing areas.

Table 6.—Distribution of Motor Vehicles

[In percentages]

Residential sector	Own a motor vehicle	
	Yes	No
Rural (N=1,333) ¹	28.5	71.5
Slum—inland (N=564)	25.5	74.5
Slum—Metropolitan San Juan (N=525)	27.4	72.6
Public housing—inland (N=307)	16.0	84.0
Public housing—metropolitan San Juan (N=356)	19.1	80.9
Total (N=3,085)	25.4	74.6

¹ Number in the sample of total of 3,252 heads of families.

Source: Puerto Rico Office of Economic Opportunity, 1977.

Another relevant factor on the issue of transportation was that approximately one-third of the vehicles owned by the sampling group had been purchased during the preceding 12 months. Most of the vehicles were automobiles and most were second-hand cars. The vehicles on the average had an age of 7 years, had considerable use, and were mostly eight-cylinder models giving relatively low gas mileage. Nearly two-thirds of the trips taken were short ones and the primary use of the vehicles was for getting to work. Other uses were for recreation, social serv-

ices (trips to school, doctor, and dentist) and for use in business and trade and for shopping.

ENERGY CRISIS IMPACT ON LOW INCOME FAMILIES

From the interviews it was determined that 70 cents out of every dollar was spent by this Puerto Rican group for food. Another 11.1 cents out of every dollar was spent for purchase of energy—electricity, propane, gasoline, and public transportation. Nearly, two-thirds of the money spent for energy uses was for gasoline and public transportation. Thus the increase in the rates for electricity and the price of gasoline have had a considerable impact on the plight of the low income.

The average income of the needy family is extremely low, and depends a great deal on transfer payments from the United States. This dependence on transfers increases from 39 percent to nearly 66 percent if we add the net value of the food stamps received by 79 percent of the families. In other words, two-thirds of the limited income of the needy family depends on U.S. transfers. In spite of these transfers, the main expense of the needy is for food, and they must face continuous deficits which amount to 21 percent of their average yearly income.

Within these circumstances, it is not surprising to find that each person reflects his immediate condition in his priorities to problems: unemployment, price increases, and drugs; energy problems do not appear as primary needs.

In summary, electricity and propane gas are the main sources of energy for the low-income families. With the exception of public housing areas where its use is much more restricted, propane gas is used for cooking. The average Puerto Rican home has the most needed appliances; and, although their general pattern of use is fairly satisfactory, it is limited by the fact that these appliances are relatively old. The area of transportation shows that, because of its alleged deficiencies, only 4 out of every 10 persons use public transportation. Those who use their own cars generally own used ones, large and relatively old, which increases their use of gasoline. The greatest impact fuel price increases have had on the needy family has been to reduce even more the fulfillment of their vital needs; they must set aside part of their limited income to cover these price increases.

To date the only measure to alleviate the high energy costs to the low income has been the subsidy given by the Puerto Rican Government for consumers using less than 425 kWh monthly. In terms of the needy, the subsidy is positive since it eliminates from their real income the impact of the increase in the price of fuel, and also encourages the conservation of energy.

Commercial Banking

Foreword and Acknowledgements

This study was prepared by the author for the U.S. Department of Commerce under contract and is designed to give the reader a general understanding of commercial banking in Puerto Rico: The structure of the system and its role in the local economy. It is not an exhaustive analysis of Puerto Rican banking as an industry, nor does it contain appraisals of individual banks.

The report consists of four chapters. The first three are generally descriptive; the fourth attempts to present some of the major factors in the situation that might be considered for possible action, by either one or both of the two Governments involved (Federal and Commonwealth) or by the banking community itself.

The author has benefited from conversations with Puerto Rican and mainland government officials and bankers, and from previous examinations of the subject. It may be worth noting that, to the best of his knowledge, there have been no broad studies of Puerto Rican banking comparable to those of Di Venuti and deBeers since the appearance of the latter's work in 1960—almost two decades ago. Neither the Federal nor the Puerto Rico Government (so far as I know) devotes any significant amount of resources on a continuing basis to economic studies of the local banking system and its role in the economy. Many of the issues discussed, and probably others that are not raised, would, in the author's judgment, merit more detailed investigation in the future.

The assistance of those who helped in the preparation of this report by providing information and viewpoints is gratefully acknowledged. The basic statistical information came from the Federal Deposit Insurance Corporation and the Puerto Rico Treasury Department, with convenient summaries of the Puerto Rican data provided by the staff of the Puerto Rico Planning Board. Members of the staffs of those agencies, and of the U.S. Comptroller of the Currency, the Board of Governors of the Federal Reserve System, the Federal Reserve Bank of New York, and the Government Development Bank of Puerto Rico, were also generous in giving time for discussion. Senior officials of several banks in Puerto Rico and in New York were also consulted, as were officers of the Puerto Rico Bankers Association. These interviews provided the author with much useful information, and helped him to avoid certain errors.

Commercial Banking Sector

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Chapter I.—Banking Structure and Growth

As of mid-1977, there were 17 commercial banks operating 242 banking offices in Puerto Rico. Their combined total assets were \$7.5 billion; loans and discounts amounted to \$4.7 billion, and deposits were \$5.5 billion (see table 1, and appendix table A).

Thirteen of these banks, hereafter referred to as *Local* or *Puerto Rican* banks, have their headquarters in Puerto Rico. One of these was chartered by the Federal Government as a national bank; the remaining 12 are locally chartered institutions. As discussed later in this chapter, the relative position of these local banks has declined in recent years; as of June 30, 1977, they held 51 percent of the assets of the system, 46 percent of the loans, and 58 percent of the deposits. The three largest local banks held \$2.9 billion of the total of \$3.8 billion of local bank assets. Four of the smaller local banks have come under foreign control in recent years, one while this report was being prepared; the assets of these four totaled \$441 million. Presumably the capital stock of the remaining 9 local banks is owned mainly by residents of Puerto Rico.¹

Together these 13 local banks operate 209 offices scattered throughout the island. Of these, the three largest, Popular, Ponce, and Credito, account for 160 offices; in addition, these three have among them 20 offices in the Mainland—19 in New York and 1 in California.

Two major New York (*mainland*) banks, Citibank and Chase Manhattan, have long-established branches in Puerto Rico.² These two banks held about 40 percent of the assets of the system (\$3.0 billion out of \$7.5 billion) but only 32 percent of the deposits; the two of them combined are presently employing at their branches in Puerto Rico about \$900 million of funds brought in from outside the island. The 23 offices of these two banks are found only in the main population centers.

The combined assets of the two *Canadian* banks with branches in Puerto Rico, Royal and Nova Scotia, amounted to a little over \$600 million in

mid-1977. They operate 10 offices, not including four offices of the Banco Mercantil, which was taken over by the Bank of Nova Scotia in 1975.

While all three groups of banks compete freely in the local loan and deposit markets, the structure of their balance sheets does reflect their institutional differences. Some of these differences are discussed here, beginning with the assets side of the ledger, for the three sets of banks.

ASSETS (USES OF FUNDS)

Relative Importance of Loans

Local banks, both as a matter of prudence and to meet reserve requirements imposed by Puerto Rico law, must keep a significant portion of their assets in liquid form—marketable securities and “cash and due from banks.” Thus “loans and discounts” comprise a smaller part of the total activities of local banks (56 percent of total assets and 67 percent of deposits as of June 30, 1977) than is true of the external banks (68 percent and 108 percent, respectively).³ The external banks, of course, provide for their liquidity on an overall basis for each institution, and their branches in any particular area, such as Puerto Rico, can draw instantly on the home office when funds are needed.

Several local banks have also become very active in the money markets in recent years, as evidenced by the considerable contribution of gain on securities transactions to their net income. (See chapter III.) This activity may also account for part of their holdings of liquid assets, including marketable securities. Another reason offered for the present high ratio of liquid assets is the slack demand for loans in Puerto Rico, because of the severity of the recession.

This ability to concentrate local activity in loans, which are usually considered more profitable than securities investments and certainly more profitable than “cash and due from banks,” would appear to favor the external banks.

However, there is a certain degree of arbitrariness in calculating the earnings of any particular office in

¹ During 1978 and early 1979 two additional banks either shifted to external ownership or closed their doors, this reduces the number of local banks to seven. As a result, local bank holding of total assets decline to less than half.

² The Bank of America has just been authorized to open a local branch.

³ The comparable figures for all insured commercial banks in the Nation on the same date were 58 and 71 percent, respectively.

Table 1.—Principal Assets and Liabilities

[Amounts in millions of dollars]

	Puerto Rican banks					
	All banks	Total	Lo- cally owned	Exter- nally owned	Main- land banks	Can- adian banks
June 30, 1977						
Total assets, amount.....	\$7,473	\$3,803	\$3,432	\$371	\$3,037	\$633
Same, percentage of total	100	51	46	5	41	8
Loans, amount.....	\$4,645	\$2,147	\$1,918	\$229	\$2,078	\$421
Same, percentage of total	100	46	41	5	45	9
Total deposits, amount.....	\$5,513	\$3,198	\$2,910	\$288	\$1,751	\$563
Same, percentage of total	100	58	53	5	32	10
Private deposits, amount.....	\$5,139	\$2,866	\$2,607	\$259	\$1,715	\$558
Same, percentage of total	100	56	51	5	33	11
Loans: percentage of total assets.....	62	56	56	62	68	67
Deposits: percentage of resources.....	74	84	85	78	58	89
June 30, 1976						
Total assets, amount.....	\$6,115	\$3,301	\$3,198	\$103	\$2,369	\$444
Same, percentage of total	100	54	52	2	39	7
Loans, amount.....	\$4,346	\$1,994	\$1,920	\$74	\$2,020	\$331
Same, percentage of total	100	46	44	2	46	8
Total deposits, amount.....	\$4,397	\$2,787	\$2,715	\$72	\$1,286	\$324
Same, percentage of total	100	63	62	1	29	8
Private deposits, amount.....	\$4,040	\$2,497	\$2,436	\$61	\$1,220	\$324
Same, percentage of total	100	62	60	2	30	8
Loans: percentage of total assets.....	71	60	60	72	85	75
Deposits: percentage of resources.....	72	84	85	70	54	73
June 30, 1975						
Total assets, amount.....	\$5,579	\$3,176	\$3,069	\$107	\$2,054	\$349
Same, percentage of total	100	57	55	2	37	6
Loans, amount.....	\$3,939	\$1,901	\$1,828	\$73	\$1,756	\$282
Same, percentage of total	100	48	46	2	45	7
Total deposits, amount.....	\$3,943	\$2,681	\$2,604	\$77	\$993	\$269
Same, percentage of total	100	68	66	2	25	7
Private deposits, amount.....	\$3,571	\$2,368	\$2,312	\$56	\$935	\$268
Same, percentage of total	100	66	65	1	26	8
Loans: percentage of total assets.....	71	60	60	68	86	81
Deposits: percent of resources.....	71	84	85	72	48	77
	All banks		Puerto Rican Banks		Main- land Banks	Can- adian Banks
June 30, 1974						
Total assets, amount.....	\$4,901		\$3,050		\$1,551	\$300
Same, percentage of total	100		62		32	6
Loans, amount.....	\$3,536		\$1,909		\$1,374	\$253
Same, percentage of total	100		54		39	7
Total deposits, amount.....	\$3,875		\$2,523		\$1,126	\$226
Same, percentage of total	100		65		29	6
Private deposits, amount.....	\$3,517		\$2,220		\$1,073	\$224
Same, percentage of total	100		63		31	6
Loans: percentage of total assets.....	72		63		89	84
Deposits: percentage of resources.....	79		83		73	75
June 30, 1970						
Total assets, amount.....	\$2,887		\$1,687		\$1,010	\$190
Same, percentage of total	100		58		35	7
Loans, amount.....	\$1,943		\$1,187		\$588	\$168
Same, percentage of total	100		61		30	9
Total deposits, amount.....	\$2,529		\$1,450		\$947	\$132
Same, percentage of total	100		57		37	6
Private deposits, amount.....	\$2,355		\$1,305		\$919	\$131
Same, percentage of total	100		55		39	6
Loans: percentage of total assets.....	67		70		58	88
Deposits: percentage of resources.....	88		86		94	69
June 30, 1965						
Total assets, amount.....	\$1,324		\$805		\$438	\$81
Same, percentage of total	100		61		33	6
Loans, amount.....	\$963		\$526		\$366	71
Same, percentage of total	100		55		38	7
Total deposits, amount.....	\$1,185		\$698		\$422	\$65
Same, percentage of total	100		59		36	5
Private deposits, amount.....	\$1,055		\$593		\$399	\$63

Table 1.—Principal Assets and Liabilities—Continued

[Amounts in millions of dollars]

	All banks	Puerto Rican Banks	Main- land Banks	Can- adian Banks
June 30, 1965				
Same, percentage of total	100	56	38	6
Loans: percentage of total assets	73	65	84	88
Deposits: percentage of resources	90	87	96	80
June 30, 1960				
Total assets, amount	\$630	\$385	\$210	\$35
Same, percentage of total	100	61	33	6
Loans, amount	\$417	\$217	\$173	\$27
Same, percentage of total	100	52	41	7
Total deposits, amount	\$531	\$330	\$175	\$26
Same, percentage of total	100	62	33	5
Private deposits, amount	\$431	\$270	\$136	\$25
Same, percentage of total	100	63	32	5
Loans: percentage of total assets	66	36	82	77
Deposits: percentage of resources	84	86	83	74

Source: Puerto Rico Treasury Department, *Consolidated Report of Condition of Banks Operating in Puerto Rico*, various issues; years 1974-77 as summarized by staff of Puerto Rico Planning Board. In 1960, 1965, and 1970, data include mainland branches of Puerto Rican banks.

Note: In this and other tables derived from the same source, interest collected but not earned and loan loss reserves are treated as liabilities; in FDIC statistics, both of these accounts are deducted from

loans. As of June 30, 1977, to the total amount of unearned interest for all banks was \$109 million, of which \$66 million was reported by local banks; loan loss reserves were \$80 million, all reported by local banks. External banks apparently do not carry separate loan loss reserves on branch books. In years 1974-76, deposits have been adjusted to exclude "due to foreign banks" reported by Chase Manhattan. Apparently the bulk of this item represents amounts due to non-Puerto Rican branches and affiliates of that bank. In 1977, what appears to be the corresponding item was reported as "due to home office."

a branch-bank system; income reported to the Puerto Rican authorities, shown later on in this report, may not reflect accurately the factors management of an outside bank takes into account in determining the total contribution of its Puerto Rican operations to the overall profitability of the institution.

Thus it would be misleading to assume that a given increase in local deposits would always lead to a larger increase in local loans if placed in external rather than local banks. Except for the complications introduced by the deposits of the so-called section 936 corporations,⁴ and admittedly with some degree of oversimplification, the opposite may be true. It would seem logical, on an *a priori* basis, that the mainland banks (the Canadian banks are a special case) would determine the size of their Puerto Rican loan portfolios on the basis of profitable opportunities in Puerto Rico compared with those elsewhere—drawing on, or repaying, the home offices (or outside affiliates) as needed. Local banks, on the other hand, would presumably tend to expand their local assets more or less in proportion to deposit increases, at least so long as there was an opportunity to do so profitably. From 1972 to 1977, for instance, loans and investments in Puerto Rican securities at local banks grew 62 percent, while their deposits grew 64 percent. Comparable figures for the external banks were 174 and 135 percent, respectively.

⁴ See chapter IV for an explanation and discussion of the deposits of these corporations.

Nature of Loan Portfolio

A thorough analysis of loan portfolios would require a more detailed breakdown by type of borrower than is available in the condition statements filed quarterly with the FDIC or monthly with the Puerto Rico Treasury Department.⁵ As shown in table 2, the major difference in portfolio distribution was the greater concentration in personal loans by the local banks and a somewhat greater concentration in industrial loans by the mainland banks. Neither of these is surprising; the mainland banks for many years devoted major attention to "wholesale" banking, entering actively into the consumer market only in the last decade or so.⁶

Since real estate loans have been the principal source of trouble for most banks in Puerto Rico since the collapse of the construction industry in 1974-75, it is of some interest to note that the ratio of real estate to total loans is not greatly different for the local and mainland banks (around 30 percent; see table 2). However, the following factors must be kept in mind.

1. The data for mainland banks include the very large volume of loans taken over by Chase Manhattan's local branch from a mortgage company

⁵ In fact, a quarterly report to the latter agency does provide more detailed data, but so far apparently no attempt has been made to consolidate the information.

⁶ In 1960, loans to individuals comprised only 14 percent of the loan portfolios of the external banks, compared to 36 percent for local banks. As of June 30, 1977, the ratios were 14 and 29 percent, respectively.

Table 2.—Loan Portfolio Distribution

[In percentages]

	All banks	Puerto Rican banks	Mainland banks	Canadian banks
June 30, 1977				
All loans and discounts	100	100	100	100
Real estate	29	29	34	8
Commercial and industrial	38	38	38	36
Industrial ¹	9	5	12	5
Individuals	21	29	15	10
Agriculture	3	1	(?)	30
Other	9	3	13	16
June 30, 1976				
All loans and discounts	100	100	100	100
Real estate	31	28	38	8
Commercial and industrial	36	41	29	46
Industrial ¹	8	5	10	11
Individuals	19	26	12	13
Agriculture	2	1	(?)	27
Other	12	4	21	6
June 30, 1975				
All loans and discounts	100	100	100	100
Real estate	32	30	37	10
Commercial and industrial	39	44	31	52
Industrial ¹	8	11	10	12
Individuals	16	23	9	12
Agriculture	2	3	(?)	18
Other	11	—	23	8
June 30, 1974				
All loans and discounts	100	100	100	100
Real estate	27	30	23	18
Commercial and industrial	44	41	44	62
Industrial ¹	9	10	12	10
Individuals	19	25	12	15
Agriculture	(?)	(?)	(?)	(?)
Other	10	4	21	5
June 30, 1970				
All loans and discounts	100	100	100	100
Real estate	27	28	29	13
Commercial and industrial	48	46	48	61
Industrial ¹	6	5	7	9
Individuals	19	24	10	15
Agriculture	1	1	1	6
Other	5	1	12	5
June 30, 1965				
All loans and discounts	100	100	100	100
Real estate	26	25	31	4
Commercial and industrial	49	48	45	74
Industrial ¹	6	4	9	5
Individuals	20	24	15	11
Agriculture	3	2	5	7
Other	2	1	4	4

Table 2.—Loan Portfolio Distribution—Continued

[In percentages]

	All banks	Puerto Rican banks	Mainland banks	Canadian banks
June 30, 1960				
All loans and discounts	100	100	100	100
Real estate	17	20	16	3
Commercial and industrial	44	37	47	84
Industrial ¹	9	3	15	26
Individuals	25	36	15	8
Agriculture	7	5	10	1
Other	7	2	12	4

¹ Percentages of industrial loans are included in total percentages of commercial and industrial loans.

² Negligible.

Source: Puerto Rico Treasury Department, *Consolidated Report of Condition of Banks Operating in Puerto Rico*, as summarized by staff of Puerto Rico Planning Board for years 1974-77. Data for 1960, 1965, and 1970 include mainland branches of Puerto Rican banks.

which had been a separate subsidiary of the parent bank; this business did not originate in the branch. If these assets were excluded, the ratio of real estate loans to total for the mainland branches might be as low as 15-20 percent, compared to 29 percent for local banks.

2. The "real estate" category includes only loans so classified in reports to the authorities; mortgages on individuals residences are included, even those insured by the FHA and guaranteed by the VA. However, the category does not include real estate-related loans included in the "commercial and industrial" category, such as loans to construction firms, hotels, real estate firms, and mortgage companies, nor those to certain financial institutions which in turn make real estate loans. Partial information available indicates that all banks together might hold some \$300 to \$400 million in real estate-related loans over and above the total of about \$1.4 billion reflected in the ratios shown in table 2, as of mid-1977.

3. A substantial amount of loans has been written off in the last 3 years; presumably these writeoffs have been more than proportionally concentrated in real estate-related loans, but data regarding the amounts charged off by loan classification are not available.

Investments

Both the local and mainland banks hold significant portfolios of Puerto Rican public sector securities, in each case equal to about 10 percent of total assets. In addition the local banks owned \$436 million in U.S. Treasury issues on June 30, 1977. At the local banks these securities are in part pledged as collateral for public deposits;⁷ in part they serve

⁷ Only \$41 million of a total of \$374 million of public deposits were held in external banks.

to meet the reserve requirements under Puerto Rican law. Since April, 1976, the Puerto Rican authorities, by regulation, have required that at least 75 percent of the securities newly pledged after that date as collateral against public deposits of Puerto Rican agencies consist of Puerto Rican issues. This fact, coupled with the high rates of return available on Puerto Rican securities in recent years, an effort on the part of the banks to help the local government in a difficult time, and, more recently, the advent of section 936 deposits (for the investment of which Puerto Rican securities constitute an eligible asset) have all combined to increase the relative role of local securities in both Puerto Rican and mainland bank portfolios.

Deposits in Outside Banks

As of June 30, 1977, local banks held \$380 million in time deposits with banks on the mainland and foreign countries.

Since 1974, the proportion of local banks' assets held on deposit with banks outside Puerto Rico has been fairly steady at around 10 percent—about twice as high a proportion as in 1972–74. In part this merely reflected a shift in the composition of cash and near-cash assets; claims on external banks rose from 40 percent of total “cash and due from banks” in 1972 to 70 percent in 1977—presumably due to the attractive rates available in mainland and Euro-dollar money markets. As a general matter, Puerto Rican branches of external banks do not usually hold funds with banks outside the island, although there are exceptions from time to time.

LIABILITIES AND CAPITAL (SOURCES OF FUNDS)

Deposits, of course, constitute the principal source of loanable funds for a commercial banking system. For the unit Puerto Rican banks, as shown in table 1, deposits provided 84 percent of total available funds. The ratio for the branches of Canadian banks was even higher at 89 percent; these banks apparently follow a practice of maintaining an approximate balance between their Puerto Rican assets and liabilities.⁸ For the branches of the mainland banks, on the other hand, deposits were equal to only 58 percent of the total assets of their Puerto Rican branches; as already mentioned these two banks combined were employing in Puerto Rico about \$900 million obtained from their home offices or other non-Puerto Rican branches and affiliates.

Not only the relative importance of deposits as a

source of funds is affected by the banking structure, but the composition of deposit liabilities as well. Local banks held 56 percent of total private deposits (including interbank deposits), 80 percent of savings deposits, but only 45 percent of other time deposits (mainly certificates of deposit and time deposits on open account). The dominance of the external banks in this last category is due, at least at present, mainly to their superior ability to attract deposits from the section 936 corporations.

In addition to their relative advantage in obtaining savings deposits, local banks have the preponderant share of public deposits, mainly those of Puerto Rican official agencies. This apparently results from a deliberate attempt on the part of the Puerto Rican Government to favor the local banks, although both local and external banks are presumably equally capable of providing needed banking services and of paying competitive rates on time deposits.

The *capital* accounts of the local banks totaled \$207 million, equal to about 5.4 percent of their Puerto Rican assets (5.2 percent of their total assets, including their mainland branches), down from \$241 million (7.3 percent of total assets) 3 years earlier. The Puerto Rican balance sheets of the external banks do not reflect any capital accounts, although the “due to home office” accounts do, in a sense, reflect a capital contribution to the local activity. Such accounts were equal to about one-third of the total assets on the books of the Puerto Rican branches of the two mainland banks. The two Canadian banks reported “due from home offices” of \$72 million. In view of the special restrictions applicable to their operations, it can be presumed that they had non-Puerto Rican owned deposits of at least that much on the books of their Puerto Rican offices.

In summary, as of mid-1977 local banks accounted for about half of the banking business in Puerto Rico, down from the approximately three-fifths ratio prevailing from around 1950 to the early seventies. Their contribution to bank loans is relatively less, in part because of their need to provide for their own liquidity, and in part because the mainland banks use funds from outside the island. Moreover because of the retail character of their operations, the local banks devote more of their lending capacity to meet consumer needs, and therefore less to business financing.⁹ About 10 percent of the assets of both mainland and Puerto Rican banks consisted of Puerto Rican public sector securities; this was a new development for the mainland banks,¹⁰ and was, in part at least, related to the use of the section 936 deposits.

⁸ Under the Puerto Rican Banking Law, foreign (Canadian) banks must keep assets in Puerto Rico (including cash) equal to their local deposits. Although the law does not prevent them from having local assets in excess of local deposits, they apparently have not chosen to do so.

⁹ It is quite possible that a significant part of loans to individuals actually represents financing of small businesses.

¹⁰ At least so far as reflected on the books of their Puerto Rican branches. Note that these data do not include “loans” to the public sector, which have from time to time been sizable.

BANKING GROWTH

Banking activity in Puerto Rico has expanded far more rapidly than in the United States as a whole in the quarter century since the Puerto Rican industrial development program began. It has also grown much faster than local economic activity, as measured, for instance, by gross national product (GNP)¹¹ in current dollars; the ratio of total bank deposits to GNP more than doubled from 1960 to the early and mid-1970's—from 32 percent in 1960 to 54 percent in 1970 and to 58 percent in 1976. The rise in the ratio of assets to GNP was even more marked, reflecting the substantial use of nonlocal funds by the mainland banks in recent years. Total bank assets rose from \$630 million, equal to 38 percent of GNP in 1960, to \$7.5 billion, about 95 percent, in 1977. By comparison, in the United States, total commercial bank assets as of the end of 1976 were equal to about 53 percent of GNP, lower than the 1950 ratio of 59 percent.

The rate of growth of the three major segments of the banking system over the past three decades is shown in table 3, and the resulting effect on the

Table 3.—Banking Growth, 1950–77

[Percentage change; annual rates]

	1950–60	1960–70	1970–77	1950–77
All banks:				
Assets	8.1	16.6	14.6	12.9
Deposits	8.2	16.9	11.8	12.3
Loans	13.3	16.6	13.3	14.5
Puerto Rican banks:				
Assets	9.0	16.1	12.4	12.5
Deposits	9.4	15.9	12.0	12.4
Loans	14.1	18.5	8.8	14.3
Mainland banks:				
Assets	7.6	17.0	17.0	13.4
Deposits	6.9	18.4	9.2	11.6
Loans	15.2	13.0	19.8	15.5
Canadian banks:				
Assets	3.2	18.5	18.8	12.7
Deposits	4.6	17.6	23.0	13.9
Loans	3.3	20.2	14.0	12.1

Source: Calculated from data in table 1. Growth rates for 1970–77 are slightly understated by exclusion of mainland branches in terminal year. Such branches did not exist in 1950.

share of local banks in the total market is reflected in table 4. As can be seen, the extremely rapid growth of the system was more or less equally shared by the local and external banks, until very recently. As already indicated, the failure of the local banks to maintain their earlier share of the loan market was due mainly to the introduction of outside funds by the two mainland banks.

¹¹ The term "national" product is used to designate the output of the Puerto Rican economy attributable to factors of production provided by Puerto Rico residents, as distinguished from gross "domestic" product, the value of production occurring within the geographic boundaries of the Commonwealth.

Table 4.—Market Share of Local Banks, 1950–77

[In percentages]

Year	Assets	Deposits	Loans
1950	56	56	49
1960	61	62	52
1970	58	57	61
1974	62	65	54
1975	57	68	48
1976	54	63	46
1977	51	58	46

Source: Puerto Rico Treasury Department, *Consolidated Report of Condition of Banks Operating in Puerto Rico*. Data for 1974–77 from Planning Board summaries. Years before 1974 include mainland branches of Puerto Rican banks.

The maintenance over a couple of decades of an approximate three-fifths share of this growing market by local banks was, in part at least, the result of deliberate policy measures pursued by the Commonwealth Government. Local banks were permitted, even encouraged, to open additional branches, especially in the nonmetropolitan areas of the island. Since 1954, the number of offices operated by local banks on the island has risen from 55 to 209; of mainland banks from 9 to 23; and of Canadian banks, from 6 to 10.

This rough balance of market participation prevailed until 1974, when the economy of Puerto Rico suffered the triple shock of the worldwide recession, the sharp rise in oil prices, and the collapse of the local building boom. The result was not only a sharp break in the rate of growth of the banking industry in Puerto Rico, but a very significant change in its structure as well.

First, four of the smaller Puerto Rican banks have passed into external ownership or control—3 into Spanish and one into Canadian hands; in the latter case, the purchaser was the Bank of Nova Scotia, which already had several branches on the island. These four banks, all of which were in financial difficulties owing mainly to large loan losses, held \$431 million in total assets as of mid-1974, 14 percent of the assets of all local banks, and 9 percent of all bank assets. In one case, the takeover was accomplished only because the FDIC took over about \$15 million of assets which the purchasing bank was unwilling to assume.

Secondly, high loan losses, together with such other factors as rising operating expenses (in relation to net interest income)¹² have seriously eroded bank capital, the price of bank stocks, and capital asset ratios to the point where almost no local bank has as high a ratio of capital to deposits, or to total assets, as would ordinarily be considered satisfactory.

Third, as already indicated, the external banks have significantly increased their share of the local

¹² See table 5 of ch. III. The ratio of noninterest expense to net interest income rose continuously over the period, from 88 percent in 1972 to 117 percent in 1976.

market. There are several reasons for this shift in market penetration, only some of which can be satisfactorily quantified.

1. During the fiscal year ending June 30, 1975, the Chase Manhattan Bank transferred to the books of its Puerto Rican branch a large volume of mortgages—in the neighborhood of \$400 million—previously held by a separate subsidiary of the bank and not included on the books of the Puerto Rican branches.

2. The well-publicized difficulties of several local banks undoubtedly have had some effect on the ability of other Puerto Rican banks to attract deposits, to the advantage of the external banks. This seems to have benefited both the mainland and Canadian banks, although deposits at the latter are not covered by Federal deposit insurance.

3. The advent of the special certificates of deposit for section 936 companies had the effect of greatly increasing the flow of "local" deposits to the main-

land and Canadian banks; local banks held only about one-fourth of these deposits as of September 30, 1977, compared to about 80 percent of savings deposits, and 75 percent of "other" time deposits (excluding section 936 funds).

4. As already mentioned, the willingness and ability of external banks, especially the mainland banks, to employ in Puerto Rico funds obtained from offices of the banks in the mainland and elsewhere has enabled these banks to increase their share of the loan market more than proportionately to the increase in their share of bank deposits.

5. The growing number of subsidiaries of large U.S. companies operating in Puerto Rico have probably served to increase relatively the activities of mainland banks; many of the parent companies of these subsidiaries are probably clients of the same banks.

The issues involved in this shift in market shares are discussed later in this report.

Chapter II.—The Economic Role of the Banking System

Commercial banks both affect the level of economic activity and are influenced by it. On the national scene, the total level of bank activity is greatly influenced—indeed can be effectively controlled—by central bank policy. The banking system as a whole will tend to expand its operations if additional reserves are made available by the monetary authorities and vice versa; in the former case, if loan demand is slack, the banks can always invest in already issued securities. Thus commercial bank activity is generally held to be an important factor in determining the level of economic activity.

Individual banks, or banks in a particular region, such as Puerto Rico, are not so directly responsive to national monetary policy. They are, in fact, limited in their capacity to grant credit by the amount of deposits and/or borrowed funds they can attract, regardless of the stance of national monetary policy. Much of their deposit funds are closely related to the financial position of residents of the community served; checking accounts and some volume of pass-book and small-denomination time accounts, although reflecting cyclical influences, are fairly insensitive to interest rates. But larger time deposits, and funds “borrowed,” especially from banks outside the island, are sensitive to interest rates, and banks will bid for such funds only if they can relend them at a profitable spread. This possibility, in turn, depends on the local demand for loans, a demand clearly related to current local economic conditions. Thus, paradoxically, for any particular area within a nation, commercial banks probably tend as much

or more to reflect than to affect the course of local economic developments. There is much to be said for the view—expressed in the Tobin Report—that funds will move freely between Puerto Rico and the mainland (the authors might have added “and between Puerto Rico and other areas as well”) to take advantage of changes in the relative rates of return on “loans of a given type, security, term, and risk.”¹

CREDIT SUPPLIED BY BANKS

Whether or not Puerto Rican banking plays as adequate a role as it could in the economy is largely a matter of opinion and judgment. One can probably always discover some projects, apparently worthwhile, which were not undertaken, or (less likely) having been started failed to succeed, because of a lack of credit. But a broad look at the statistical data fails to support the conclusion that credit extended by the banking system in Puerto Rico has, in an overall sense, been inadequate.

In the first place, bank credit to the private sector as measured in Puerto Rico by “loans and discounts” is relatively much larger in comparison to gross national product than in the U.S. as a whole (see table 1). In part this probably reflects the fact that most Puerto Rican borrowers do not have the ready access to other sources of credit—especially

¹The Committee to Study Puerto Rico's Finances (James Tobin, Chairman), *Report to the Governor*, December 11, 1975, p. 58.

Table 1.—Role of Bank Credit

[Amounts in billions of dollars]

	1950	1960	1970	1974	1975	1976
United States (calendar years):						
Gross national product	\$284.8	\$503.7	\$977.1	\$1,413.2	\$1,516.3	\$1,692.1
Bank loans, December 31	\$52.2	\$117.6	\$313.3	\$539.4	\$546.2	\$595.0
Ratio (percentage)	18.3	23.3	32.0	38.2	36.0	35.2
Puerto Rico (fiscal years):						
Gross national product	\$0.745	\$1.676	\$4.688	\$6.798	\$7.136	\$7.439
Bank loans and discounts, June 30	\$0.120	\$0.417	\$1.943	\$3.536	\$3.939	\$4.346
Ratio (percentage)	15.9	24.9	41.5	52.0	55.2	58.4

the issuance of securities to the general public—that large national corporations have. Put another way, the relative absence of other financial markets in Puerto Rico, or nonbank financial institutions, forces local borrowers to depend more on local banks for their credit needs.

A concomitant of this relationship has been the extremely rapid rate of growth of Puerto Rican banking over the last quarter century. In 1950, bank loans were equal to only 16 percent of gross national product, slightly less than the U.S. ratio. During the ensuing quarter century (1950-76), Puerto Rican banking, as measured by loans outstanding, grew at an average annual rate of 14.8 percent, while gross product, measured in current dollars, grew at only a 9.2-percent rate. In the United States, on the other hand, the comparable rates were 9.8 for bank loans and 7.1 for GNP.

It would also be instructive to compare the net extension of bank credit to actual investment, sector by sector. Unfortunately, this is not possible with existing data; in any event, such comparisons could be only indicative, because of the principle of fungibility. Thus, in table 2 net extension of bank credit (excluding loans to individuals and securities purchased) is compared with total domestic private investment.

As can be seen for the few years included in the sample, there is no consistent relationship between the two series. This is scarcely surprising, given the importance of outside direct investments, and the likelihood that most externally owned enterprises make scant use of local bank credit. Moreover, the industrial character of the borrower does not necessarily indicate the purpose of the loan; a loan to a commercial borrower may be used to

finance construction while an industrial firm may borrow merely to finance inventory or working capital. Commercial firms also borrow from banks to finance consumer accounts receivable, and thus, indirectly, the credit involved is used to finance consumption.

The lack of statistical evidence to support a relationship between bank credit and investment does not mean that a connection does not exist. The movement of net bank loans, for instance, does not necessarily reflect the course of new loans granted, which would be a more appropriate series to relate to actual investment. There are also probably severe timing problems in the data; the disbursement of loan funds often does not coincide with the investment expenditures being financed.

LOAN TERMS AND CONDITIONS

It has been maintained by some observers that the terms on which Puerto Rican bank credit is offered are unfavorable to economic development because interest rates are too high and maturities too short. Indeed, traditionally, Puerto Rican banks have loaned funds mainly on a demand basis (though many demand loans were, in fact, outstanding for long periods of time). Some observers also feel that the growing tendency of banks to make floating rate loans—term loans with the interest rate adjustable periodically, usually with respect to some reference rate, such as prime—also impedes the use of bank credit to meet longer term needs.

A recent expansion in the reports required by the FDIC provides some evidence on the question of maturities and floating rates. And it is possible to compare average rates of return on loans in Puerto

Table 2.—Bank Credit and Investment, 1973-77

[Amounts in millions of dollars]

	1973	1974	1975	1976	1977
Private fixed investment:					
Housing	\$392	\$411	\$373	\$328	\$243
Other private construction	207	246	261	220	133
Total construction	599	657	634	548	376
Machinery and equipment	437	357	374	447	505
Total private fixed investment	1,036	1,014	1,008	995	881
Inventory Change	164	31	90	170	72
Total private investment	1,200	1,045	1,098	1,165	953
Net bank loans, excluding loans to individuals:					
All banks	335	572	43	230	140
External banks	201	360	(1)	231	79
Local banks	134	212	43	-1	60
Ratio, bank loans to investment (percentage):					
All banks	28	55	4	20	15
External banks	17	34	—	20	8
Local banks	11	20	4	—	7

¹ Approximately zero, after adjusting for the assumption by Chase Manhattan of the existing loan portfolio of an affiliate.

Source: Private investment, Puerto Rico Planning Board. Net bank loans: derived from Condition Reports filed with Puerto Rico Treasury Department, as compiled by Planning Board Staff.

Rico with those in the States, also based on FDIC data.

To take up the latter point first: in calendar year 1975, the average yield on loans of all local insured banks (i.e. excluding Citibank and Chase Manhattan) was 10.5 percent; the national average was 8.5 percent.² In 1976, the difference narrowed, to 9.2 and 8.5 percent respectively. The sharp decline in 1976 in Puerto Rico presumably reflects the shift out of real estate loans (in part due to chargeoffs), loans which had been producing relatively high yields.³ Even for earlier years, however, the loan mix—size of loan, degree of security and risk, use of compensating balances, and other factors—affects the comparison, although a previous study⁴ also found that interest rates charged by Puerto Rican banks were somewhat higher than the mainland average. Such a situation would be consistent with Puerto Rico's position as a large net importer of capital.

As to terms and maturities, data from the three largest local banks in Puerto Rico are summarized in table 3. For all 3 banks combined, over 70 per-

**Table 3.—Selected Loans: Term to Maturity
September 30, 1977**

[Percentage of total]

	Up to 1 year	1-5 years	Over 5 years
Banco Popular	85	11	4
Banco Credito	63	11	26
Banco de Ponce	62	31	7
Total: Three banks	72	17	11
United States	60	25	15
Florida	63	26	11

Source: FDIC, *Report of Condition, Large Bank Supplement*. Data exclude loans to individuals and loans secured by 1- to 4-family residential properties.

cent of the loans matured in one year or less; some part of these, of course, had original terms of more than one year, since the data are based on remaining time to maturity. As shown in the table, the proportion of loans with under 1 year to run was higher in Puerto Rico than in the United States as a whole. It was also higher than in Florida, a State in which bank lending patterns might be expected to be more similar to those in Puerto Rico than the national average. In general, these data support the conclusion that, so far as maturities are concerned, lending policy is quite conservative.

Of the total of \$851 million of loans represented

² These figures represent the total interest on loans divided by the average of gross loans outstanding at the beginning and end of the year of all banks combined as reported by the FDIC in *Bank Operating Statistics*.

³ It may also reflect an increase in the proportion of nonproducing loans.

⁴ deBeers, John S., *A Study of Puerto Rico's Banking System*, San Juan, 1960, p. 67. Rates on large business loans (over \$200,000) were about one percentage point higher in Puerto Rico than in 11 southern and western cities; for smaller loans the difference was 1.5 to 2.0 percentage points.

in the reports of these three banks, some \$408 million, or 48 percent, was stated to carry predetermined interest rates and the remainder floating rates. This was significantly above the national average of 30 percent (including loans at foreign offices). The proportions varied among the three banks; however, a substantial percentage of even the loans with a year or less to run carried floating rates.

While floating rate loans may appear to be less attractive to some borrowers than fixed rate loans (particularly if the latter can be prepaid without penalty if interest rates fall), they still provide credit for a fixed term, albeit at a varying price. Some marginal borrowers may be eliminated by their unwillingness to assume the risk of a higher future rate, but there is probably a greater risk of unwillingness of banks to tie up funds for long periods of time at fixed rates given the fact that their liabilities—deposits—are mostly relatively short term, and therefore subject to changes in cost. In short, the choice of the borrower in many cases may be between a long-term loan at floating rates, or no loan at all. In any event, the present system of floating rates seems to give the borrower a greater degree of certainty than the old system of demand loans, under which the banks were legally able to adjust the interest rates at any time—whether they did so or not.

Of course, the economic role of a banking system cannot be measured only by the credit it extends, but by the services it renders to its depositors/clients, particularly in offering them a secure (and hopefully remunerative) asset to serve as a store of value and means of payment. So far as can be observed, the range of services offered by banks in Puerto Rico to their depositor customers compares favorably with those offered in the mainland, particularly since the advent of par clearing with the mainland in the late sixties. Before that, Puerto Rican banks made an exchange charge proportionate to the amount of the item on mainland checks cashed in Puerto Rico and Puerto Rican checks returned from the mainland.

THE SCOPE FOR MONETARY POLICY

It is well established, both in theory and practice, that countercyclical macroeconomic policies—monetary or fiscal—cannot be effectively applied in a single region within a national monetary system. Indeed, as was cogently observed by Tobin and his associates, even independent countries, like Canada and the Netherlands, much larger than Puerto Rico, find it extremely difficult to pursue independent policies. With a common currency, and no controls on the movement of capital or labor, any attempts to stimulate the local economy would lead quickly to

an outflow of funds, or increased imports of goods and services, which would tend almost completely to offset the original policy effects.

However, the question may be raised as to what extent the direction of bank lending, or its terms and conditions, even within a specific area, can be influenced by discrete measures designed to achieve goals that might be considered desirable for the region as a whole. Taxes, subsidies, and special reserve requirements are often mentioned in this connection.

In a sense, Puerto Rico is already employing monetary tools of this kind. By omitting consumer loans (with a few exceptions) from the list of eligible assets in which to invest section 936 deposits, the authorities are in effect discouraging such types of credit. By making only Puerto Rican assets eligible, they are discouraging banks from investing outside the island. The deduction of interest on certain types of housing mortgages in calculating net income for franchise tax purposes ⁵ is another example

⁵Beginning in 1975, the Government of Puerto Rico levied a franchise tax on banks and certain other financial institutions. The tax is assessed on the net income of the institution, including income generally exempt from the local income tax, such as interest on Federal and Commonwealth bonds. Local income tax can be credited against the franchise tax, which means that a bank pays the higher of the two.

of selective credit devices currently in use in Puerto Rico.

In general, however, it is more effective to subsidize directly the desired types of economic activity (or to penalize the nondesired ones), than to operate indirectly through credit allocation measures. (The tax exemption program and high local excise taxes on some consumer goods are well-known examples of these more direct measures.) Selective credit controls, except in periods of emergency, have been generally eschewed in the United States, and, although they have been used extensively elsewhere, their efficacy is still much in debate. Clearly, to be effective at all, they would have to have broad applicability; all institutions extending credit would have to be covered, not just banks.

As discussed later in this report, the preservation of a viable commercial banking system is vitally necessary to the economy of Puerto Rico. Almost by definition, selective credit controls would compel banks to act in other than a profit-maximizing manner. Even if the objectives sought by the selective controls were clear, important, and certain, the costs could easily outweigh the gains.

Chapter III.—Bank Earnings

The crisis which struck the Puerto Rican economy in 1973-74 was due only in part to outside influences. The sharp rise in petroleum prices suddenly destroyed the price advantage of a major sector of Puerto Rican manufacturing. Tightening credit markets in the United States had an adverse effect on the construction industry in Puerto Rico, as they did on the mainland. The ensuing economic recession in the United States and elsewhere severely dampened the market for Puerto Rican exports of manufactured products.

But there were local factors that aggravated the situation, as has been described in the Tobin Committee Report and elsewhere. "The trends of government expenditures, government enterprise deficits, Puerto Rican debt, and costs of production were not sustainable even with favorable economic weather overseas."¹ Also, and very importantly, the economy had become increasingly dependent on a boom in both private and public construction, which proved to be unsustainable. As in many places on the mainland, construction simply outran the market.

The banking system both affected and was affected by this chain of events. While it would take a very detailed investigation to fully document the connection, the large volume of real estate-related loans on the books of the banking system, and particularly the large volume of defaulted loans, is evidence that the ready availability of bank financing had much to do with the expansion of the construction industry.

It may also be that credit standards in general were relaxed during the long expansion period; the rapid growth of bank credit relative to economic activity as a whole, as related in the preceding chapter, seems to provide some evidence of this. The course of events was strikingly reflected in bank earnings.

RECENT DEVELOPMENTS

The net income of all commercial banks operating in Puerto Rico, as reported by the Puerto Rico Treasury Department, declined sharply from a peak of \$52 million (before franchise and income taxes) in 1973 to a net loss of \$86 million in 1976. As

shown in table 1, most of the decline resulted from increases in the provision for loan losses, although the operating income (before provision for loan losses) of the national banks also declined beginning in 1974,² and that of the local banks fell sharply in 1976.

In any event, the course of the net income of the Puerto Rican branches of external banks is not of as much concern to Puerto Rico as that of local banks. Losses of local banks are borne by the shareholders, in the main Puerto Rican residents; losses of external banks can be regarded as a "transfer payment" by nonresidents to the debtors, mainly Puerto Rican residents. The Puerto Rican branches of external banks represent, in general, a very small part of the worldwide operations of those banks; their Puerto Rican activities usually do not significantly affect their overall financial position.³ In the long run, if their Puerto Rican activities were consistently unprofitable, they might at some time consider reducing or even abandoning them. So far, this has not occurred; on the contrary, as already described, the external banks have significantly increased their total business, and share of the market, in recent years.

The remainder of this discussion deals with the local, or Puerto Rican, banks. Since it is based on individual income reports filed with the FDIC, only insured commercial banks are covered, but these include all Puerto Rican commercial banks named in appendix table A except Obrero, Cooperativo, and Metropolitano de Bayamon. (Banco Industrial y Comercial de Caguas is also not included; it began operations only in 1977.) The assets of the omitted banks totaled only about \$150 million in June 1977.

The earnings experience of the 9 insured banks from 1972 to 1977 is summarized in table 2. The banks are divided into two groups: those which have come under new ownership or control in recent years (Mercantil, Economias, First National/San-

² The decline resulted from a more rapid increase in interest paid than in interest received, which could have resulted in part from an increase in nonproducing loans, and in part from variations in the rates charged on funds received from external sources.

³ An exception was the experience of Chase Manhattan in Puerto Rico in 1976. See that Bank's Annual Report for 1976, p. 34, where it was stated that a \$75-million increase in overseas real estate charge-offs was "associated primarily with real estate lending activities in Puerto Rico."

¹ Tobin Committee Report, letter of transmittal, first page.

Table 1.—Bank Income, 1972–76

[Amounts in the thousands of dollars]

	1972	1973	1974	1975	1976
Net income¹:					
All banks	43,971	52,148	31,869	7,909	—85,655
Puerto Rico banks	26,771	26,287	24,270	8,662	—27,008
Non-Puerto Rican banks	17,200	25,861	7,599	—753	—58,647
National banks ²	13,935	22,184	2,002	—5,323	—62,767
Canadian banks	3,265	3,677	5,597	4,570	4,120
Net operating income³:					
All banks	52,960	70,210	56,777	48,050	22,416
Puerto Rican banks	32,700	37,417	42,217	40,475	29,919
Non-Puerto Rican banks	20,260	32,793	14,560	7,575	—7,503
National banks ³	16,432	28,962	8,683	2,847	—12,888
Canadian banks	3,828	3,831	5,877	4,728	5,385
Net charges for losses on loans and securities⁴:					
All banks	—8,989	—18,062	—24,908	—40,141	—108,071
Puerto Rican banks	—5,929	—11,130	—17,947	—31,813	—56,927
Non-Puerto Rican banks	—3,060	—6,932	—6,961	—8,328	—51,144
National banks ³	—2,497	—6,778	—6,681	—8,170	—49,879
Canadian banks	—563	—154	—280	—158	—1,265

¹ Before income and/or franchise tax, dividends on preferred stock, and interest on capital notes.

² Includes First National Bank of Puerto Rico (now Banco de Santander—Puerto Rico N.A.).

³ Before charges for actual or potential loan losses, and losses or gains on securities transactions.

⁴ Reflects charges to current profit and loss accounts only; does not include charges and credits directly to reserve or surplus accounts.

Includes gains on securities transactions and extraordinary income. Derived by deduction: net income minus net operating income.

Source: Puerto Rico Treasury Department. Includes all banks listed in appendix table A.

Note: These data differ from FDIC data in coverage and probably also definitionally. However, there is a rough correspondence between the data for Puerto Rican banks in this table and the FDIC data for all insured (local) banks used in tables 9, 11, and 12.

tander, Comercial de Mayaguez,⁴ Banco de San Juan and the one which according to press reports, seems about to do so as of this writing, Credito) in group B, and the other 4 (Popular, Ponce, Roig, and San Juan) in group A.

Net income, after taxes, is first shown, followed by a restatement of that net income adjusted to reflect actual loan chargeoffs (net of recoveries) rather than the “provision for possible loan losses” used in calculating net income. For information, net income

after taxes but before provision for loan losses is also shown, as well as the contribution to net income of gains on sale or redemption of securities. As can be seen, the net income of banks in group A held up well until 1976; the decline in that year was caused entirely by an increase in the provision for loan losses. However, there was a marked increase in securities gains in 1975 and 1976. For banks in group B, increased provision for loan losses began to reduce their net income as early as 1974, but net income before provision for loan losses also dropped sharply in 1976.

⁴ Recently acquired by the Mutual Savings Bank of Puerto Rico.

Table 2.—Net Income of Local Insured Banks, 1972–77

[Amounts in thousands of dollars]

	1972	1973	1974	1975	1976	1977
Net income after taxes:						
Group A	16,511	16,171	16,548	15,138	11,429	13,595
Group B	8,361	8,321	6,817	—13,390	—28,756	—31,565
All banks	24,872	24,492	23,365	1,748	—17,327	—17,970
Same, adjusted to reflect actual (net) loan chargeoffs:						
Group A	16,530	17,428	18,048	17,381	17,078	15,832
Group B	8,957	9,925	10,640	—12,656	—14,690	—31,974
All banks	25,487	27,353	28,688	4,725	2,388	—16,142
Net income before provision for loan losses:						
Group A	22,239	22,731	24,641	24,210	25,490	34,939
Group B	11,936	13,517	13,959	13,185	5,948	4,235
All banks	34,175	36,248	38,600	37,395	31,438	39,174
Securities gains after taxes thereon:						
Group A	1,275	251	279	1,455	3,490	3,214
Group B	593	—42	65	551	1,306	442
All banks	1,868	209	344	2,006	4,796	3,656

Source: Consolidated Report of Income, filed with FDIC and Comptroller of the Currency. Data for 1975 exclude extraordinary gain of one bank resulting from sale of a subsidiary.

The question naturally arises whether the different experience of the two groups of banks can be linked in any way to the economic characteristics of their respective borrowers—in particular, did the banks in group B have a larger part of their portfolios in real estate loans than those in group A? Unfortunately, it is not possible to identify all real estate-related loans; as already noted, many of them are included under “commercial and industrial” and other headings in the condition statements. For what it is worth, as of June 30, 1974 (before the beginning of major chargeoffs), real estate loans (excluding federally guaranteed or insured mortgages) constituted 17 percent of the loan portfolio of banks in group A and 19 percent of that of group B banks. The ratios for the 3 major banks were: Popular, 6; Ponce, 25; Credito 23. For external banks the combined ratio was 21 percent.

Over this period, the operating results of Puerto Rican banks deteriorated far more than the national average, and even more than those of banks in the State of Florida, which, like banks on the island, may have suffered more than banks in many other places from a sharp decline in the construction industry. Nationally, the ratio of net income to total assets fell from 0.76 percent in 1972 (0.78 percent in 1973) to 0.72 percent in 1976. (See table 3.) In Florida, the ratio dropped from 0.94 percent to 0.68 percent (0.57 percent in 1975). But in Puerto Rico the ratio for all banks in the aggregate became negative in 1976, and even for the banks in group A, fell from 1.09 percent in 1972 to 0.53 percent in 1976.

A very detailed analysis would be necessary to determine why Puerto Rican banking has fared so much worse than mainland banking during the last 3 to 4 years, or why some Puerto Rican banks were hit so much harder than others. Clearly, the local economy suffered more from the 1974-75 recession than the national economy, and its recovery has been slower. It is also clear that overbuilding, especially of relatively expensive multifamily residences (condominiums), was a major element in the cyclical movement, as well as in bank losses. To what extent the overbuilding itself reflected too great a willingness on the part of some banks to finance speculative building cannot easily be determined; even if the

local banks had been more conservative, the builders might have been able to get the needed credit elsewhere, at least in part.

ADDENDUM

Only the confidential examination reports of the FDIC and the Commonwealth Treasury could provide the basis for an authoritative appraisal of the individual weaknesses of the Puerto Rican banks. The fact that some banks have fared better than others—at least judging by the available statistics—makes it tempting to conclude that the principal problems lay with bank management rather than with external factors, although clearly the collapse of the real estate boom (particularly as reflected in the inability of borrowers to sell units after they had been built, and their resulting inability to repay interim financing loans obtained from the banks) seems to have been directly responsible for most of the extraordinary loan losses incurred.

OTHER FACTORS AFFECTING BANK INCOME

Although the recent downturn in bank earnings in Puerto Rico was clearly due to unusually large loan losses, there are other factors affecting the levels of, if not the changes in, bank earnings which deserve mention. If locally owned unit banks are to retain, or to increase, their present market shares, additional capital will be required, either in the form of equity or of long-term subordinated debt or preferred stock. The latter alternatives are not always attractive; the cost may be so high as to leave little margin of profit in relending the funds. Additional equity capital, either from sale of common stock or reinvestment of earnings, can be obtained only if banking is a profitable business. There are some factors other than loan losses which tend to affect bank earnings unfavorably which can be mentioned.

One factor that could adversely affect bank earnings would be what might be called “overbanking”—too many bank offices for the size of the market.

Table 3.—Ratio of Net Income to Total Assets, Selected Banks

[In percentages]

	1972	1973	1974	1975	1976
U.S. banks, assets of \$500 to \$999.9 million	.76	.78	.74	.70	.72
Florida banks, assets of more than \$100 million	.94	.95	.77	.57	.68
Puerto Rico	1.05	.85	.74	.05	—51
Puerto Rico, group A	1.09	.90	.85	.76	.53
Puerto Rico, group B	.97	.77	.55	—1.07	—2.31

Source: U.S. and Florida banks: FDIC, *Bank Operating Statistics*, and *Annual Report*, various issues. Florida data represent arithmetic average of ratios for all banks in group. Puerto Rico banks: Income from table 9. Assets, condition reports to P.R. Treasury Department, June 30 of each year.

At the outset, it must be admitted that Puerto Rico has far fewer banking offices in relation to its population than the national average and less than any individual State—one to every 13,700 people, compared to 4,700 in the United States as a whole and 8,500 in Florida, a State which has had relatively few bank offices in proportion to population.⁵

However, because of much lower per capita incomes in Puerto Rico, the need for banking services would also be lower in relation to population. As of June 30, 1977, for instance, there was one banking office for every \$34 million of personal income, quite comparable to the average mainland ratio of one office for each \$30 million; Florida had only one office for each \$52 million of personal income (1976 data).

Another indicator of the prospective profitability of a banking system would be the volume of activity per office and per employee; other things being equal, it could be expected that a high volume per office or per employee would be a favorable factor,

⁵ See Horton, Joseph J. Jr., *A Comparative Evaluation of the Adequacy of Florida Banking*, FDIC Division of Research, Working Paper 69-11. At the time of writing (1969) Florida had one banking office for each 13,600 inhabitants, the highest ratio of population per banking office of all the States.

Table 4.—Certain Balance Sheet Ratios: United States and Puerto Rican Banks

	Per office		Per employee	
	Assets (millions)	Deposits (millions)	Assets (thousands)	Deposits (thousands)
United States (end 1976) —	\$22.5	\$18.3	\$826	\$672
Florida (end 1976) —	31.1	27.2	743	651
Maryland (end of 1976) —	12.7	10.7	625	530
Puerto Rico, all banks (6-30-77) —	29.0	21.4	716	622
Local banks —	16.9	14.2	581	490
Mainland banks —	132.0	76.1	1,622	935
Canadian banks —	63.3	56.2	1,445	1,283

Source: United States: derived from FDIC, *Annual Reports and Bank Operating Statistics*. Puerto Rico: Derived from appendix table A, and data on number of employees reported to Puerto Rico Treasury Department (as of December 31, 1976).

although it must be remembered that the largest single component of bank expenses—interest paid—is directly related to the total volume of business. However, as shown in table 4, the volume of business per office and per employee at local banks in Puerto Rico is well below the national average, although on a per office basis it compares favorably with Maryland, a State in which, as in Puerto Rico, statewide branching is permitted.

An examination of income and expenses in relation to total assets shown in table 5, also gives some indication of the profitability of Puerto Rican banks compared with the U.S. average. In general, Puerto Rican banks tend to show net interest income and (gross) noninterest income significantly above the mainland average. This advantage, however, has been approximately offset by higher noninterest expense (administrative costs) and, as we have already seen, a very unsatisfactory loan experience—considerably worse than the U.S. average.⁶ Unless the relatively higher noninterest expense ratio is directly related to the correspondingly higher noninterest income, it is difficult to escape the inference of preceding paragraphs—that Puerto Rican banks are not operating as efficiently as their mainland counterparts, on the average in both cases.⁷

INCOME DEVELOPMENTS IN 1977

Income statements for the calendar year 1977, which became available as this report was nearing completion, show considerable improvement in the earnings position of five of the nine banks included in table 2. Three of the banks in group A—Popular,

⁶ These comparisons of Puerto Rico and U.S. banks can be only indicative, in part at least because of the vast differences in banking structure. And the Puerto Rican data are, in effect, determined by the largest banks.

⁷ Incidentally, this higher loan loss experience may be taken as (indirect) evidence of the liberality of loan policy on the part of the Puerto Rican banks, in contrast to the frequently heard criticism that Puerto Rican bankers are too "conservative."

Table 5.—Income and Expenses of Insured Commercial Banks, United States and Puerto Rico

[In percentages of average assets]

	1972		1973		1974		1975		1976	
	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico
Gross interest earned —	4.67	6.54	5.38	7.21	6.19	8.69	5.45	7.53	5.99	6.68
Gross interest expense —	2.08	2.74	2.80	3.74	3.55	4.72	2.85	3.71	3.47	3.48
Net interest margin —	2.59	3.80	2.58	3.48	2.64	3.96	2.60	3.82	2.52	3.20
Noninterest income —	.70	.77	.69	1.07	.70	1.28	.81	1.57	1.11	1.41
Loan-loss provision —	.13	.38	.14	.41	.23	.53	.33	1.11	.32	1.45
Noninterest expense —	2.19	3.34	2.13	3.27	2.17	3.89	2.23	4.18	2.44	3.76
Operating income before tax —	.97	.86	1.00	.86	.94	.82	.85	.11	.88	— .60
Operating income before tax and loan loss provision —	1.10	1.24	1.14	1.27	1.17	1.35	1.18	1.22	1.20	.85

Sources: Puerto Rico: Derived from FDIC *Bank Operating Statistics*. Excludes branches of mainland banks. United States: *Federal Reserve Bulletin*, July 1977, p. 626. Includes foreign operations in 1976 only.

Ponce, and Roig—reported increases in net income after taxes of 12, 66, and 33 percent, respectively; two of the banks in group B, Central-Economias^{*} and Santander, showed much smaller net losses, as loan chargeoffs returned to a more normal level. The

^{*}The income report for this bank covers only the period after the takeover by Banco Central. Presumably most of the problem loans not previously written off were purchased by the FDIC.

remaining four banks reported larger net losses in 1977 than in 1976. (Income data for the branches of external banks were not yet available.)

Clearly, several of the local banks have still to surmount their difficulties, and there is still a danger, absent a better recovery in the real estate field, that additional unusually large loan losses may occur.

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Chapter IV.—Current Issues

This chapter deals with some of the major issues confronting Puerto Rican banking today. It is based on the factual material presented in the preceding chapters, and on discussions with knowledgeable Puerto Rican and mainland bankers and Federal and Commonwealth Government officials. The primary objective is not to propose changes in present arrangements, but to highlight those issues to which both Federal and Commonwealth officials, including legislators, need to give special attention when adopting policies that will affect the banking system in Puerto Rico.

Paramountly it must be kept in mind that a healthy banking structure is an absolute necessity in modern economic systems, not only for its role in providing credit, but, of perhaps greater importance, also its role as a creator of money (deposits) and purveyor of financial services to business firms and households alike. The latter aspect is especially important in the case of a local banking system in a given area like Puerto Rico; credit can often be obtained from other financial institutions, or from external sources, but commercial banks are peculiarly well equipped to meet the needs of the public for an efficient and secure system of effecting monetary transfers, and for providing a repository for cash balances.

Moreover, at least on the American scene, there is a widely held conviction that unit banks, usually locally owned, are superior to a national system of branch banking in meeting the needs of local communities on a continuing basis. This is a major—perhaps the major—current issue in Puerto Rican banking, and the first issue to be discussed in this chapter.

THE ROLE OF EXTERNAL BANKS

As brought out in earlier chapters, the balance between local and external banking has shifted sharply toward the latter in the last few years. In part this has been due to the increased willingness of the mainland banks to bring funds into the island; in part to the greater ability of external banks to attract section 936 deposits (see separate section); and in part to the fact that several local banks, facing severe

financial problems and in the apparent absence of alternatives involving local capital, were taken over by outside banks in rescue operations.¹ In part it may also be due to a reluctance of local banks to expand more rapidly than they have in view of the difficulty, under present circumstances, of increasing their capital base correspondingly.

Sources of Funds

Outside banks can supplement their local deposits with funds obtained from their home offices or other affiliates more readily than purely local institutions. So long as the rate of return on funds employed in Puerto Rico is attractive relative to opportunities elsewhere (considering both risk and rate of return), there are no practical limits on the amount such banks may be willing to employ in Puerto Rico—witness the present position of Chase and Citibank. The obverse of this state of affairs, of course, is that these banks may at any time choose to reduce the use of their funds in Puerto Rico; since their long-range interests are not so intimately tied to the Puerto Rican economy as those of local banks, they may have a tendency to base their decisions more on short- than long-run considerations. However, as already shown, the outside banks have not reacted to the current recession by withdrawing funds—loans at the Puerto Rican branches of external banks in 1977 were 2½ times their 1972 level; loans of local banks rose only about 45 percent during that period.

Outside banks, or local banks owned by outside banks, are probably also in a better position to attract deposits directly from nonresidents, particularly clients of non-Puerto Rican offices of the same banks. This may be an important factor if, as some have proposed, it is decided to try to make Puerto Rico an international financial center. In other words, outside banks may be in a better position than purely local units to engage in “offshore” banking—receiving deposits from external sources and investing them outside the island. Of course, local banks can also bring in funds from outside—mainly

¹ In the statistical tables in this report these banks are still classified as “local,” since they are independent units. However, they are in some respects now in a quite different position than they were before—especially in their ability to obtain additional capital funds from their parent banks.

by borrowing in mainland or international money markets. Such funds, however, may be more costly, and almost certainly less stable, than funds received directly from external nonbank depositors.

A special current factor is the relatively greater ability of the large external banks to attract section 936 deposits. However, this results mainly from the fact that the external banks are already there; if there were no external bank branches in Puerto Rico, but if the institutional arrangements surrounding the use of section 936 funds was the same, obviously local banks would be able to attract more of these deposits.²

Mention is sometimes made of the fact that, unlike the Canadian and Mainland banks, local banks have no access to a "lender of last resort," i.e. to central bank credit. In this respect, however, Puerto Rican banks are no different from State-chartered non-Federal Reserve member banks in the mainland, who also meet their liquidity needs by holding liquid assets or having recourse to the U.S. money markets. Professor Robert S. Holbrook, in an unpublished paper prepared for the Tobin Commission, concluded that lack of direct access to Federal Reserve credit was not a handicap to Puerto Rican banks. The basic issue is cost of funds—and this is usually a function of the size and creditworthiness of the borrower. In any event, Puerto Rican banks are eligible for Federal Reserve membership; so far, they have apparently decided, along with the vast majority of State-chartered banks, that the costs outweigh the benefits.

Uses of Funds

Whether the uses of funds—mainly in loans and investments—by external banks are more favorable to economic growth in Puerto Rico than uses by local banks is a question that probably cannot be answered quantitatively, at least not on the basis of available data. One thing is clear, loans to individuals comprise a higher proportion of the loan portfolios of local than of external banks—as of June 30, 1977, 29 percent and 14 percent respectively. It may be, of course, that this category includes a significant amount of loans to small, unincorporated, businesses. The islandwide branch systems of the three largest banks probably also result in a relatively large volume of consumer-oriented business. However, since loans to individuals serve importantly to finance purchases of imported consumer durables, their contribution to economic development, either directly by financing capital investment or indirectly by enhancing consumer demand for *local* goods and services,

² Local banks, in that case, probably would not be as successful as external banks have been in competing with other potential (nonbank) borrowers of section 936 funds.

is presumably less than that of loans for most other purposes.

Another aspect of portfolio composition: As of June 30, 1977, 14 percent of the "commercial and industrial" loans of local banks consisted of industrial loans; the comparable percentage of all external banks was 30 percent, and for the two mainland banks combined, 33 percent.

The comparable figure for large weekly reporting commercial banks on the mainland at a recent date was 32 percent. Moreover, as a percentage of all loans, both "commercial and industrial" and "industrial" were lower in Puerto Rico than in the mainland. The counterpart was the higher concentration in Puerto Rico on real estate and personal loans.

Whether the lower concentration on commercial and industrial loans in Puerto Rico than on the mainland is due to different asset preferences on the part of Puerto Rican banks, or to a different pattern of loan demand reflecting different economic structures, is hard to say. In any event, the ratio of commercial and industrial to total loans in Puerto Rico was the same for both local and external banks. Since the mainland banks, in particular, might be expected to have more industrial customers (Puerto Rican subsidiaries of mainland clients), and might also be expected to be as disposed as their home offices to favor industrial loans, the similarity of the ratios may be taken as evidence that the portfolio distribution in Puerto Rico probably reflects a pattern of loan demand in Puerto Rico different from that in the mainland.³

Of course, the propensity of the local banks to do a proportionately greater "retail" business, particularly to devote more of their loan portfolio to consumer credit, may be considered a desirable factor from a broader socioeconomic point of view. (Note that a significant part of bank loans to commercial and financial firms may also be used by the latter to extend credit to individuals.) And even within the business loan categories, local unit banks may be more able and willing to meet the credit needs of smaller and medium sized businesses than local branches of large outside banks. However, there are no *a priori* reasons why this should be so; a bank which deals with customers of all kinds and sizes at its principal offices (as all the external banks do) should be able to apply skills learned elsewhere to its Puerto Rican operations.

In the last analysis, the decisions regarding external/local banking in Puerto Rico will undoubtedly be greatly influenced by social and political factors, to the extent permitted by economic considerations. The important thing to remember in this connection,

³ The manufacturing sector in Puerto Rico consists predominantly of subsidiaries of mainland companies, which are largely financed by their parents.

however, is that local unit banks have to stand on their own feet—if a local presence is to be maintained, banking will have to be sufficiently profitable to attract enough capital to support a sound and growing system.

To determine what specific measures the bankers themselves, and the Puerto Rican authorities, could undertake to strengthen local banking would require a thorough study of operating revenues and costs and other aspects of banking practices. But clearly it would not be sufficient simply to bar the entry of new banks, or inhibit the growth of external banks already on the island; more positive steps would need to be taken.

THE DEPOSITS OF SECTION 936 COMPANIES

As described in detail elsewhere in the Task Force report, U.S. corporations operating in Puerto Rico under the provisions of section 936 of the Internal Revenue Code do not pay U.S. income taxes on their Puerto Rican income (including investment income), provided they meet certain conditions. In most cases the corporations involved are also exempt from Puerto Rican taxes on the income arising from their business operations. However, income on the financial investments of such companies in Puerto Rico is exempt from Puerto Rican taxes only if invested in certain eligible assets.⁴ One of such assets consists of certificates of deposit issued by banks operating in Puerto Rico, provided the banks themselves use the funds in prescribed ways; except for a temporary "warehousing" period, during which the funds may be invested outside the island, the banks must in effect increase their eligible assets—essentially any credit extended to a Puerto Rican entity, except for most consumption loans—by an amount equal to the increase in their section 936 deposits.

The accumulated undistributed profits of the section 936 companies is presently estimated at around \$5 billion, of which, as of September 30, 1977, \$1.6 billion was held in the form of time deposits at Puerto Rican banks. Because the interest on these funds is tax free to the depositors, the banks are able to borrow them at relatively low rates of interest—currently in the range of 3 to 4 percent per annum. Much of the benefit of this lower rate so far apparently has accrued to the banks themselves, although it was reported by some bankers that they were making some loans on more favorable terms than before (even below prime) to some borrowers.

⁴ The U.S. companies in question are not required to pay Puerto Rican income tax on their income from sources outside Puerto Rico. A good recent analysis of the whole section 936 question is that of Robert S. Holbrook, *A Study of the Characteristics, Behavior, and Implications of "Possessions" Corporations in Puerto Rico*, U.S. Treasury Department, October 1977, processed.

Section 936 funds have been invested in Puerto Rican public sector bonds and other debt, both by the banks and directly by the section 936 companies themselves. This phenomenon, coupled with greater fiscal austerity in Puerto Rico, has reduced the spread between Puerto Rican bonds and mainland municipals from a peak of nearly 3.5 percentage points in early 1976 to less than 1 percentage point recently.⁵ Most of the section 936 depositors appear to prefer very short-term maturities, although instances of terms up to several years have been reported.

As already indicated, the external banks, particularly the two mainland banks, have been receiving a much larger share of section 936 deposits than other deposits (see table 1).

Table 1.—Deposit Breakdown, June 30, 1977

[In percentages]

Class of bank	Total	Private	Private time ¹	Section 936
All banks	100	100	100	100
Local banks	58	56	45	25
External banks	42	44	55	75
Mainland banks	32	33	41	55
Canadian banks	10	11	14	20

¹ Excluding savings deposits.

The growth of section 936 funds more than accounted for the entire deposit increase at banks in Puerto Rico from June 30, 1976 to June 30, 1977. The rise in section 936 deposits was equal to 111 percent of the increase in all private deposits; for local banks, the ratio was 82 percent; for Canadian banks, 95 percent; and for the mainland banks 140 percent. Private deposits at all banks grew 27 percent during that year; 15 percent at local banks; 72 at Canadian; and 41 percent at mainland branches (these data include interbank deposits).⁶

This concentration of section 936 deposits is a natural result of two major factors:

(a) The parent companies of many of the section 936 companies are clients of the two mainland banks involved.

(b) The treasurers of large U.S. companies often have criteria for depositories of their surplus cash funds which local banks are simply unable to meet; these criteria are often related to size of institution. In some cases the companies may have a minimum deposit size which may be too large for some Puerto Rican banks to handle conveniently.

But no matter what the cause, the Puerto Rican

⁵ Holbrook, op. cit., p. 46. One banker also reported that because of the presence of section 936 funds, the bank was able to offer lower rates on condominium mortgages, thus helping to dispose of the unsold stock.

⁶ Except for \$475 million reported by Chase-Manhattan in 1976 as "due to foreign banks," which is assumed to have been due to foreign affiliates.

banks have so far not been fully able to capitalize on this source of relatively low-cost deposits, the use of which could help them improve their profit position.

This situation has led to the development of some "pass-through" business—the external banks relending some of their section 936 money to other local banks, which in turn invest in eligible assets. Presumably the gain to the originating bank is less on such transactions than it would be if the originating bank itself had invested in the eligible assets.

So far as the banking system is concerned, then, a major question would seem to be the influence of section 936 funds on market shares. This is more than just a question of who gets the section 936 deposits; if the local banks are to continue to grow rapidly enough to maintain or expand their proportion of deposits, they will also have to expand their capital. This, in turn, seems to hinge in part on their profitability, which in turn could be helped, presumably, by access to more section 936 deposits. A strict enforcement of the so-called incremental rule will probably tend to have a restrictive effect on the ability of the external banks to use section 936 funds, thus hopefully channeling more of them to local banks, either directly, via the passthrough mechanism, or as has been suggested,⁷ by the sale of newly issued preferred stock or capital notes of the banks to the section 936 companies.

The local banks reportedly already have on their books a large volume of eligible assets.⁸ Channeling more section 936 funds to them might therefore not result in as great a future expansion of bank holdings of eligible assets as if the funds remained in the external banks. But it could have a salutary effect on the income of local banks by reducing their cost of funds, and perhaps also result in some reduction in their lending rates.

BANK SUPERVISION

All three of the Federal banking supervisory authorities (the FDIC, the Comptroller of the Currency, and the Federal Reserve System), plus the Commonwealth Treasury Department and the Canadian Government, exercise some degree of authority over the Puerto Rican banking system. So far as U.S. banking law is concerned, Puerto Rico is treated in some respects like a foreign country, and in other respects as part of the national banking system. The following brief summary will give some idea of the present complex situation.

⁷ By the Secretary of the Treasury of Puerto Rico, in a press release, December 8, 1977. So far, no such sales have apparently occurred.

⁸ More than \$3 billion, according to a Puerto Rico Treasury official, cited by Holbrook, *op. cit.*, p. 40.

1. Banks chartered under Puerto Rican law, and branches of foreign banks authorized to operate in Puerto Rico (the 2 Canadian banks) are fully subject to Puerto Rican control, including examination by Commonwealth authorities.

2. Banks chartered under the National Bank Act, whether they are headquartered in Puerto Rico (Banco de Santander-Puerto Rico, N.A.) or branches of banks headquartered elsewhere (Citibank, Chase) are not examined by the Puerto Rican authorities. They are, however, subject to general Puerto Rican law, including local taxation, interest rate ceilings, etc.

3. Branches of mainland national banks can be established in Puerto Rico only with the approval of the Federal Reserve Board, since Puerto Rico and other U.S. overseas areas are treated like foreign countries for this purpose. In the mainland, national banks can establish branches with the sole approval of the Comptroller of the Currency—but only in the State where the head office of the bank is located, and then only if State law permits branch banking. In the past, the Federal Reserve Board has not approved the establishment of any new national bank branches in Puerto Rico without the concurrence of the Commonwealth Secretary of the Treasury.

4. On the other hand, Puerto Rico is considered "domestic" for purposes of the Bank Holding Company Act. This means that no corporation, U.S., Puerto Rico, or foreign, can become the controlling shareholder of a Puerto Rican bank (including a nationally chartered bank with headquarters in Puerto Rico) without the approval of the Federal Reserve Board. (Such approval was granted in each of the first three takeovers effected: Nova Scotia/Mercantil; Santander/First National; Central/Economias. In each case, the concurrence of the Puerto Rico authorities was obtained.)

5. Bank examinations are conducted jointly by FDIC and Commonwealth examiners in the case of all Commonwealth-chartered banks whose deposits are insured by the FDIC; by the Puerto Rican Government alone in the case of the two foreign (Canadian) banks and locally chartered noninsured banks; and by the U.S. Comptroller of the Currency alone in the case of the three national banks operating in Puerto Rico (Citibank, Chase, and Santander).

This disparate supervision—which is similar to the situation in the States—has, perhaps, not worked too badly in the past. (There is no clear evidence that the recent problems of Puerto Rican banking can be attributed in any significant degree to the supervisory system as such.) On the other hand, there has been increasing criticism of the mainland system itself and it might well be that Puerto Rican

banking, and the Puerto Rican economy, could benefit from a more unified system of supervision.

For one thing, it would seem to be more in keeping with the autonomous status of the Commonwealth if the local authorities were given a greater degree of control—or at least influence—over local banking. Although Puerto Rico, as part of the U.S. monetary system, has no ability to follow general monetary policies different from those pursued by the national authorities, there may be some room for attuning the local banking system more to local needs. Indeed, this is an argument used in the mainland for maintaining the unit banking system, and for prescribing that national banks must, in general, conform to limitations placed on State-chartered banks, for instance, in the matter of branching.

A full movement in this direction might be to provide that all banks operating in Puerto Rico be examined only by Commonwealth authorities, with the quality of the process being monitored by the insuring agency—the FDIC—or by the Comptroller in the case of national banks. This would help to ensure that banking practices (so far as they are affected by the examination process) would be uniform for all classes of banks. It would also enable the Puerto Rican authorities to have a more detailed knowledge of banking activity and practices, which could improve the planning process, and financial administration in general, on the island.

Presumably such a step would require strengthening the Puerto Rico Bureau of Bank Examinations, possibly—as is being considered by the Commonwealth administration—by establishing it as a separate agency, responsible directly to the Governor, instead of continuing its present status within the Treasury Department.

A lesser step in the same direction, but one that would probably have the same practical effect, would be to arrange for Puerto Rican participation in the examination of national banks in the same manner and degree as now practiced in the case of those banks examined by the FDIC. This might be accomplished by an agreement between the Comptroller of the Currency and the Commonwealth Government, and probably would not require any new Federal legislation.⁹ Of course, in the case of mainland banks, such cooperation would extend only to the examination of the Puerto Rican branches.

The experience of the past few years, both in Puerto Rico and the mainland, is evidence that governmental supervision is no guarantee that some banks will not get into trouble from time to time. However, the fact that a relatively large number of Puerto Rican banks have encountered difficulties seems to indicate a need for them to apply stricter

standards than, with the benefit of hindsight, they apparently applied in the past. The objective of keeping banks in a sound condition may at times appear to conflict with the need to ensure that they are making an appropriate contribution to the financing of economic development. Joint Federal and Commonwealth participation in all phases of bank supervision ought to help in achieving a sound and efficient banking system that will meet all the needs of the Puerto Rican economy.

FINANCIAL DISCLOSURE

During the past half-decade there has been a quantum increase in the amount of financial information that banks regulated by Federal authorities have been compelled to disclose to the general public. The previously widely held view was that the public interest was best served by confidential treatment of much relevant information, mainly in the interest of the stability both of individual banks and of the banking system. This has given way to an almost diametrically opposite view (at least in some quarters) that the interests of bank security holders, creditors, depositors (especially large depositors, not protected by deposit insurance) and the general public are better served by ample disclosure. Thus profit and loss statements of all insured banks, as well as considerable detail about their assets and liabilities, are now a matter of public record.

Securities and Exchange Commission requirements for bank holding companies, and thus indirectly for the banks they own, have gone much further than the requirements imposed by Federal supervisory agencies on banks as such. The SEC, under its Guides 3 and 61, require public disclosure of considerable information regarding past due and other “nonperforming” loans. Chairman Barnett of the FDIC has endorsed¹⁰ the principle of disclosing “information which reveals the earning characteristics of the asset base, its stability and profitability” holding that such disclosure “will be a powerful force in compelling the banks to correct weak asset conditions.”

As already indicated, the bank supervisory agencies have not so far required as much detail in the reports they collect from individual banks, which, in any event, are limited to banks which have securities registered with the SEC—in general, banks with 500 or more shareholders, or which issue securities to the public.

Many banks are beginning on their own to publish more information than formerly, apparently in the belief that such disclosure will, in the long run, re-

⁹ Under Puerto Rican law this authority already exists. (Banking Law of Puerto Rico, section 28.)

¹⁰ In a speech on November 18, 1976. See FDIC, *Annual Report*, 1976, p. 195 ff.

dound to the bank's credit. Most Puerto Rican banks, for instance, in their 1976 reports to their shareholders indicated, for the first time, the amount of "nonaccruing" loans, together with the amount of interest that would have been collected if payments had been current.

So far, the expanded disclosure rules, because of their basic purpose, have been applied to each bank as a unit, and not to individual branches or to branches operating in a given area, say Puerto Rico. However, it appears that the interests of other Puerto Rican banks, and of the public in general, would be well served if all banks operating in Puerto Rico were required to disclose essentially the same amount of information with regard to their Puerto Rican operations. Not only would such disclosure have the disciplinary effect alluded to by Mr. Barnett, it would enable depositors and borrowers to make more rational decisions, and it would permit the authorities and academic communities alike to make more thorough analyses of the banking system.

It must be recognized, of course, that the more a bank is compelled to disclose, the more conservative its lending policies may tend to be—which may not be conducive to a maximum contribution to economic development. But the maintenance of a sound banking system that can provide a stable and dependable financial transfer mechanism, and a repository for cash balances, may, in the long run, be more important to a local economy than achieving ultimate efficiency in the allocation of bank credit. There are many sources of credit other than the banking system, even in Puerto Rico; in no modern economy is there any visible replacement for commercial banks in their purely monetary functions.

STRENGTHENING LOCAL BANKS

Local Taxation

The full effect of the franchise tax on the earnings of local banks has yet to be felt, in part because the losses suffered in recent years have reduced, or eliminated, taxable income. Nevertheless, it appears that this change in taxation has had a greater impact on the tax burden of local than of external banks; the latter presumably continue to pay the same amount of income tax as before (Federal and Commonwealth combined), while local banks have had their tax burden increased. It is understood that other recent changes in local taxation have increased the taxes borne by banks—but presumably have affected local and external banks alike.

The inauguration of the franchise tax followed a detailed study by a special commission on tax reform, which study included a thorough examination of bank taxation. However, the work of this com-

mission was essentially completed before the full effect of the economic crisis on the banking system was evident. In view of subsequent developments, a fresh examination of the subject may well be in order.

The withholding tax on interest paid to nonresidents also tends to affect local banks more adversely than external banks. Local banks are to some extent inhibited from selling loan participations to outside banks, who may not always be fully able to credit this tax against the Federal tax. This condition has been noted, however, in previous studies of the banking system.¹¹ The external banks, of course, have no need to sell participations; they are not limited either by availability of funds or by statutory capital/loan ratios (because of their size) in meeting needs of individual Puerto Rican borrowers.

However, the question of Puerto Rican taxation on income paid to nonresident investors is obviously much broader than its applicability to the banking sector alone, and, presumably, has been and will continue to be resolved in the larger context.

Capital Needs

Although capital/asset ratios are not the only yardstick used by supervisory authorities to measure bank soundness, they remain important, and the need for additional capital by most, if not all, of the Puerto Rican banks remains acute—particularly if they are to maintain, or even increase, their relative share of banking activity. Ideally, capital increases would take the form of additional common stock equity; under present conditions, with major local bank stocks selling at 40 to 60 percent of book value (Popular and Ponce)¹² this can be accomplished only by retaining earnings. Other possibilities are the issuance of subordinated debt and preferred stock; so far none of the banks whose stock is held by the public have resorted to the latter device, although several of them have issued subordinated notes and/or debentures.

It is important to note that outside interests—notably Spanish—have not been deterred from investing in Puerto Rican banks because of apparent low profitability, although undoubtedly the terms on which their interests were acquired were influenced by profit prospects. However, as in the case of the mainland and Canadian banks operating in Puerto Rico, the overall attractiveness to an outside bank doing business in Puerto Rico—either directly or through a subsidiary—is not necessarily measured

¹¹ See, for instance, deBeers, *op. cit.*, pp. 21, 34. However, the subject has usually been discussed in terms of its effects on credit availability in general rather than on the competitive position of local banks.

¹² Currently the NASDAQ index for bank stocks stands at about 75 percent of its peak reached in 1972; the stocks of the two major local banks still widely traded, Popular and Ponce, are currently selling at about 45 and 30 percent, respectively, of their 1973 highs.

solely by the bottom line of the profit and loss statement of the Puerto Rican operation. A banking subsidiary in Puerto Rico could provide an entry into the U.S. banking market that might not be available, or not available on comparably advantageous terms, in the mainland,

FDIC Assistance

There are only two ways in which the FDIC can be of direct financial assistance to an insured bank. First, under section 13(e) of its statute, the Corporation may, in order to "reduce the risk or avert a threatened loss to the corporation," and "facilitate a merger or consolidation . . . with another insured bank" or "the sale of the assets . . . and assumption of (its) liabilities by another insured bank," make loans, purchase assets, or guarantee the assuming bank against loss. In general, these provisions have been interpreted by the Corporation to be an acceptable alternative to closing the bank and paying off the insured depositors only if the latter would be more costly to the Corporation. This procedure has been used once in Puerto Rico, when the FDIC purchased \$15 million of the assets of the former Banco Economias to facilitate the purchase of the remainder of the assets, and assumption of liabilities, by a new bank, Central-Economias. It is important to note that this procedure is available only when the bank is being merged or consolidated with, or its remaining assets sold to and its liabilities assumed by, another insured bank.

Under section 13 (c), the Corporation can render direct assistance to a closed bank or a bank in danger of closing, but only when "the continued operation of such bank is essential to provide adequate banking service in the community." This provision has been rarely used and it seems highly unlikely that it could be used to assist any Puerto Rican bank to continue in operation. Its use would require a finding that, if a particular bank were closed, the remaining banks would not be able "to provide adequate banking service."

Thus, for all practical purposes, direct financial assistance of the FDIC is available only in merger or takeover cases. This too has important aspects for market shares; in general, the FDIC is obligated to take the least costly route in settling the affairs of distressed banks, subject only to compliance with the laws of the local jurisdiction involved.

MONETARY POLICY

In chapter II a brief reference was made to the possibility of using monetary policy in Puerto Rico. The purpose of the present section is to examine this subject in somewhat greater depth, including

mention of those specific measures used in Puerto Rico that are generally thought of as being instruments of monetary policy.

Most commonly, monetary policy is understood to be that array of measures designed to influence the volume of money in the hands of the public and/or the volume and cost of credit. So far as the commercial banking system is concerned, the volume of credit extended (bank loans and investments) tends to vary more or less with changes in the deposit liabilities of the banks, including those liabilities which form the most important component of the supply of money. (The banks, of course, also obtain funds in ways that do not add to the supply of money: Equity capital, long-term borrowing, large negotiable certificates of deposit, and borrowing from external banks, to name the most significant.) However, the term monetary policy is also used to describe measures for influencing the allocation of credit among economic sectors; these selective, or qualitative, measures are usually intended to affect the structure of the economy, but they can be used for contracyclical purposes as well. The latter may occur, for instance, when cyclical fluctuations are accompanied—or even caused—by severe imbalances among economic sectors.

Puerto Rico, economically speaking, is a region of the United States. As such, there is virtually nothing that the local authorities can do to influence the "money supply" held by residents of the area. Both M_1 (checking account deposits and currency) and M_2 (M_1 plus savings and time deposits at commercial banks, exclusive of large negotiable certificates of deposit) will depend on the income, wealth, and asset preferences of local residents. Given the openness of a regional economy in a national system, any attempt to raise M_1 or M_2 by encouraging the banks in the region to expand their assets (i.e., to increase their loans and investments) will be largely frustrated by "leakages" to the rest of the country. These leakages could take the form either of shifts into external financial assets, or, more likely, of increased imports of goods and services—in either case resulting in a flow of funds from residents to nonresidents.

In any event, there is little or no reason to believe that aggregate demand in a particular region is affected significantly by the "money supply" in the hands of local residents; indeed, both demand for goods and services and money holdings are dependent on the other factors already mentioned—the income, wealth, and asset preferences of community residents. Thus, for a regional economy, "monetary policy" is really limited to "credit policy." In other words, the local authorities can employ, and have employed, measures which are designed to affect (a) the volume of credit extended by the banking system to residents of Puerto Rico (as distin-

guished from the total volume of bank assets) and (b) the allocation of such credit among various classes of domestic borrowers. Both kinds of measures, the quantitative and qualitative (or selective), contain elements of cost control; other things being equal, increasing the availability of credit will tend to lower its cost. However, as will be mentioned, there also exist specific measures designed to influence interest rates. We turn first to a discussion of the quantitative aspects of credit policy.¹³

The Volume of Credit

The volume of credit extended by the banking system to residents of Puerto Rico is a product of two factors: The total assets of the system, and the division of those assets between claims on residents and claims on nonresidents. By definition, the total assets of the system are equal to total liabilities and capital. As already argued, little can be done to influence the monetary liabilities of the banks—checking accounts and consumer-type deposits included in the M_1 and M_2 definitions of money. Hence policies designed to expand total bank liabilities/assets must operate mainly on the nonmonetary sources of banks funds—notably large certificates of deposit, borrowings from outside banks, and drawings on home office funds by the local branches of outside banks. Equity capital and the issuance of capital notes by local unit banks are also important, not so much for the amount of funds obtained by these means, but because of the need to maintain an adequate capital ratio to support the expansion of other types of liabilities.

As Ason and Martinez note,¹⁴ a restrictive local monetary (credit) policy would scarcely, if ever, be appropriate. Because of chronic unemployment, the need for development financing, and the inability of Puerto Rico to affect significantly the rate of inflation (which is a national phenomenon), the local authorities would almost always be trying to ensure that all legitimate local credit needs were being met, regardless of the state of the business cycle.

Most national monetary authorities employ a system of legal reserve requirements against deposits as the fulcrum on which the monetary lever operates. By prescribing a specific reserve ratio and controlling the volume of the assets (usually deposits at the central bank) in which the reserves must be held, the rate of growth of bank liabilities, and the money supply, can be fairly well controlled. It is true that local Puerto Rican banks are required to hold reserves (against demand deposits only), but these can be held in the form of cash, interbank deposits,

and Federal and local government securities. Because the supply of reserve assets in the hands of Puerto Rican banks cannot, for all practical purposes be limited or controlled, and because the requirement does not apply to the local branches of mainland banks, the device cannot be used to affect the volume of deposits or credit. But since there are few, if any, circumstances under which it would be advantageous to restrain the growth of local bank credit, an effective system of required reserves, even if technically feasible, seems to be neither necessary nor desirable in the Puerto Rican context.

The income tax exemption accorded to interest on time deposits of section 936 companies is the principal device presently employed for the purpose of (a) augmenting the total resources of the banking system and (b) affecting, in a manner favorable to Puerto Rico, the allocation of bank resources between external and local uses. The tax exemption itself is, of course, a fiscal rather than a monetary instrument, but the regulations which in effect compel banks to use the funds to extend credit to Puerto Rican borrowers is monetary in nature.

Since the purpose of section 936 of the U.S. Internal Revenue Code is to grant tax exemption to investment income only if the income arises in the same "possession" where the profits being reinvested arose, the provisions restricting the relending of section 936 funds to Puerto Rican residents were necessary in any event to accomplish the intent of Federal law. The actual effect of these provisions cannot be measured; to the extent they reduce the demand for funds from other sources and/or reduce interest rates, there may well be an offsetting outflow of capital from the island (or a reduced inflow) through other channels. Nevertheless, so far as the banks are concerned, the proportion of total assets employed in Puerto Rico, and therefore total bank credit extended locally, should be higher than if those limitations on the use of section 936 funds did not exist.

Another device that has the effect of increasing the proportion of bank assets used in Puerto Rico is the regulation limiting the proportion of non-Puerto Rican securities pledged as security for public deposits to not more than 25 percent of the total. Like the deposits of public funds themselves (see next paragraph), this practice has a one-time-only effect; nevertheless it has undoubtedly served to increase investments in local securities relative to investments in Federal issues.

Another instrument designed to augment the total resources of the local banking system, also mentioned by Ason and Martinez, is the deposit of public funds in local banks, as an alternative to deposits in banks outside Puerto Rico or investments in U.S. Treasury securities. This procedure tends to keep

¹³ The following discussion owes much to a paper, *Política Monetaria para Puerto Rico*, by Elias R. Ason and Ronald Martínez Cuevas, issued by the Finance Department, Faculty of Business Administration, University of Puerto Rico, November 1974, processed.

¹⁴ *Ibid.*, pp. 14–16.

local bank assets and liabilities higher than they otherwise would be. However, once all available funds are so deposited, there remains no room for maneuver; indeed, if it becomes necessary to use the money, the funds may have to be withdrawn from the banks, regardless of the economic situation at the time. One must also consider the cost to the Puerto Rican Government of such a use of public funds if a higher rate of return is available on alternative investment outlets. (The use of public deposits to affect bank portfolio decisions is discussed below.)

Setting ceilings on interest rates on either deposits or loans is also regarded as an instrument of monetary policy and is, indeed, usually intended to affect the cost of credit, and, indirectly, the volume thereof. In Puerto Rico, there is a Regulatory Board for Interest Rates and Finance Charges, which has the power to fix maximum interest rates on various types of loan transactions. However, the principal purpose of the regulations issued by this body apparently is to give maximum protection to the borrowers, without keeping the rates so low as to encourage the banks to place funds outside Puerto Rico instead of making local loans.

Interest rate ceilings on savings and small-denomination time deposits at banks in Puerto Rico are in effect determined by the Federal regulatory authorities, and are not designed to influence the volume of deposits. Rather, they are intended to restrain what might otherwise become destructive competition for such deposits, both among banks, and between banks and other depository institutions. Presumably if the banks are paying the maximum permitted rates, this may be taken as evidence that, in the absence of the ceilings, interest rates would be higher and the volume of deposits larger. However, the latter is by no means certain, since the total volume of funds available for these types of deposits in Puerto Rico may be more or less fixed at any given moment in time—unless rates were raised high enough to attract funds from outside, or fixed so low as to encourage capital outflow.

The Allocation of Credit Within Puerto Rico

Various statutory and regulatory measures are employed in Puerto Rico for the purpose of allocating bank credit among local users. Perhaps of greatest relative importance at present are the regulations surrounding the use of funds provided by section 936 deposits.

As already discussed, the section 936 regulations are framed to encourage banks to increase their investments in (eligible) Puerto Rican assets. However, loans to finance the purchase of consumption goods (with certain exceptions) are not "eligible

assets"—only those loans which tend to increase production, income, and employment (including all loans to the public sector) are eligible.

The requirement for specified collateral against public deposits mentioned above can also be regarded as a form of selective credit control, since it tends to channel funds into the eligible assets involved. However, the real purpose of such requirements is to give the public depositor a prior claim on the pledged assets in the event of bank failure.

Traditional selective controls on consumer credit, such as setting minimum down payments and maximum maturities on loans for financing purchases of consumer durables, have not been employed by the Puerto Rican authorities. As indicated in the discussion in chapter II, however, it seems clear that more direct measures of inhibiting excessive consumption expenditures, e.g. through taxation, would be more efficient than the indirect method of credit allocation.

The use of reserve requirements as an instrument of selective credit control is fairly widespread outside the United States, and was suggested in the Ason-Martinez paper. Their particular suggestion was a reserve against time deposits (no reserve is presently required), to be satisfied by investments in loans or other credits to whatever particular class of debtors it was desired to favor.

It would also be possible, again as suggested by the same two authors, to use interest rate regulation as a selective credit device, presumably by setting higher maximum rates on credits it was desired to favor. Of course, if the demand for credit were sufficiently elastic, this could have a perverse effect—a higher rate of interest could lead to less rather than more lending.

Summary

Puerto Rico has already adopted several measures designed to influence the total amount, and direction, of bank credit extended to Puerto Rican residents. Other measures are possible, and perhaps merit consideration. However, a vigorous cost/benefit analysis would seem to be in order, both of existing policies and of any new measures that come under serious consideration. Factors especially worthy of consideration are the effectiveness of specific policies in achieving desired goals, the side effects on other forms of financial flows and interest rates, and the manner of selecting the goals to be sought. As a member of the staff of the Federal Reserve Bank of New York put it, the impact of selective controls on credit and resource allocation "depends on whether administratively determined priorities would produce results superior to those that

normally emerge as a result of market processes.¹⁵ It might be particularly worthwhile to examine the experience of other areas, notably certain Latin American countries, that have made extensive use of selective credit controls.

As indicated in chapter II, fiscal measures designed to affect the decisions of the ultimate con-

¹⁵ Federal Reserve Bank of New York, Banking Studies Department, *Possibilities for Improving Puerto Rico's Finances*, December 20, 1974 (revised October 10, 1975), processed.

sumer or investor are more direct and efficient than the indirect method of credit allocation. These include such measures as selective excise taxes, deductions allowed in calculating taxable income, tax credits or exemptions, and, of course, outright grants and subsidies. Not only are such measures preferable on efficiency grounds, but their costs can more readily be determined. Moreover, with them in place, the allocation of credit can be left to market forces, also with a presumed increase in efficiency.

Appendix Tables

Appendix Table A.—Commercial Banks Operating in Puerto Rico

[Amounts in millions of dollars]

Name of bank	Number of Puerto Rican offices	Total assets	Loans and discounts	Total deposits	Private deposits
June 30, 1977					
Puerto Rican banks:					
Banco Popular	76	\$1,283	\$630	\$1,125	\$1,025
Banco de Ponce	34	832	467	645	597
Banco Crédito y Ahorro	50	755	491	675	593
Banco de San Juan	14	245	155	212	169
Banco Economías	13	210	143	175	161
Banco Obrero	4	111	57	97	87
Banco Mercantil	4	107	69	67	58
Roig Commercial Bank	7	91	40	68	63
Banco Commercial de Mayaguez	3	70	47	61	55
Banco de Santander-San Juan, N.A.	1	54	17	45	40
Banco Cooperativo	1	24	18	13	4
Banco Metropolitano de Bayamon	1	19	11	13	12
Banco Industrial y Comercial de Caguas	1	3	1	1	1
Total—Puerto Rican banks	209	3,803	2,147	3,198	2,866
External banks:					
Mainland banks:					
Citibank	13	1,543	944	772	754
Chase Manhattan Bank	10	1,493	1,134	979	961
Total—mainland banks	23	3,037	2,078	1,751	1,715
Canadian banks:					
Royal Bank of Canada	6	244	179	234	234
Bank of Nova Scotia	4	389	242	329	324
Total—Canadian banks	10	633	421	563	558
Total—external banks	33	3,670	2,499	2,314	2,273
Total all banks	242	7,473	4,645	5,513	5,139
June 30, 1976					
Puerto Rican banks:					
Banco Popular	73	1,047	552	918	818
Banco de Ponce	31	619	377	478	446
Banco Crédito y Ahorro	50	756	466	664	581
Banco de San Juan	14	228	164	194	165
Banco Economías	12	236	156	199	184
Banco Obrero	4	117	90	99	95
Banco Mercantil	4	103	74	72	61
Roig Commercial Bank	7	66	25	52	49
Banco Commercial de Mayaguez	3	71	49	66	59
First National Bank of Puerto Rico	1	25	15	23	19
Banco Cooperativo	1	23	18	13	12
Banco Metropolitano de Bayamon	1	13	8	10	9
Total—Puerto Rican banks	201	3,301	1,994	2,787	2,497
External banks:					
Mainland banks:					
Citibank	13	1,130	907	595	578
Chase Manhattan Bank	10	1,239	1,113	690	641
Total—mainland banks	23	2,369	2,020	1,285	1,219
Canadian banks:					
Royal Bank of Canada	6	202	166	189	188
Bank of Nova Scotia	4	242	164	135	135
Total—Canadian banks	10	444	331	324	324
Total—external banks	33	2,813	2,351	1,608	1,542
Total all banks	234	6,115	4,346	4,396	4,039

Appendix Table A.—Commercial Banks Operating in Puerto Rico—Continued

[Amounts in millions of dollars]

Name of bank	Number of Puerto Rican offices	Total assets	Loans and discounts	Total deposits	Private deposits
June 30, 1975					
Puerto Rican banks:					
Banco Popular	68	991	522	871	754
Banco de Ponce	29	536	360	433	567
Banco Crédito y Ahorro	50	755	462	642	404
Banco de San Juan	14	221	145	193	159
Banco Economías	12	275	166	219	199
Banco Obrero	4	119	89	99	94
Banco Mercantil	3	107	73	77	56
Roig Commercial Bank	7	60	23	50	46
Banco Commercial de Mayaguez	3	54	37	49	45
First National Bank of Puerto Rico	1	32	16	29	23
Banco Cooperativo	1	22	12	19	19
Banco Metropolitano de Bayamon	1	4	—	1	1
Total—Puerto Rican banks	193	3,177	1,901	2,681	2,368
External banks:					
Mainland banks:					
Citibank	13	952	737	497	468
Chase Manhattan Bank	9	1,102	1,018	496	467
Total—mainland banks	22	2,054	1,755	993	935
Canadian banks:					
Royal Bank of Canada	6	191	165	171	170
Bank of Nova Scotia	4	158	118	98	98
Total—Canadian banks	10	349	283	269	268
Total—external banks	32	2,402	2,038	1,262	1,203
Total all banks	225	5,579	3,939	3,943	3,571
June 30, 1974					
Puerto Rican banks:					
Banco Popular	67	968	549	805	687
Banco de Ponce	28	541	373	430	384
Banco Crédito y Ahorro	50	776	489	650	590
Banco de San Juan	14	182	132	156	127
Banco Economías	12	273	166	219	187
Banco Obrero	4	94	68	79	75
Banco Mercantil	3	103	69	86	78
Roig Commercial Bank	7	54	26	46	42
Banco Commercial de Mayaguez	3	30	20	26	24
First National Bank of Puerto Rico	1	25	15	22	20
Banco Cooperativo	1	6	2	4	4
Total—Puerto Rican banks	190	3,050	1,909	2,523	2,220
External banks:					
Mainland banks:					
Citibank	13	772	707	439	414
Chase Manhattan Bank	9	778	667	688	659
Total—mainland banks	22	1,550	1,374	1,126	1,073
Canadian banks:					
Royal Bank of Canada	6	204	174	145	144
Bank of Nova Scotia	4	96	78	81	80
Total—Canadian banks	10	300	253	226	224
Total—external banks	32	1,851	1,627	1,352	1,297
Total all banks	222	4,901	3,536	3,875	3,517
June 30, 1970					
Puerto Rican banks:					
Banco Popular	59	624	417	538	482
Banco de Ponce	25	350	227	300	267
Banco Crédito y Ahorro	44	470	380	407	369
Banco de San Juan	11	81	64	69	61
Banco Economías	8	61	40	51	49
Banco Obrero	3	32	17	25	20
Banco Mercantil	2	31	19	27	25
Roig Commercial Bank	6	30	17	26	24
Banco Commercial de Mayaguez	1	8	4	7	7
Banco Cooperativo	1	NA	NA	NA	NA
Total—Puerto Rican banks	160	1,687	1,187	1,450	1,305

Appendix Table A.—Commercial Banks Operating in Puerto Rico—Continued

[Amounts in millions of dollars]

June 30, 1970					
External banks:					
Mainland banks:					
Citibank	12	511	300	465	448
Chase Manhattan Bank	7	499	288	482	471
Total—mainland banks	19	1,010	588	947	919
Canadian banks:					
Royal Bank of Canada	6	103	88	83	82
Bank of Nova Scotia	4	87	80	50	50
Total—Canadian banks	10	190	168	132	131
Total—external banks	29	1,200	756	1,079	1,050
Total all banks	189	2,887	1,943	2,529	2,355
June 30, 1965					
Puerto Rican banks:					
Banco Popular	33	316	216	272	230
Banco de Ponce	19	172	101	152	135
Banco Crédito y Ahorro	30	237	157	209	177
Banco de San Juan	5	33	24	29	24
Banco Economías	3	9	6	7	6
Banco Obrero	2	14	6	11	6
Roig Commercial Bank	5	15	8	13	11
Banco Cooperativo	1	6	5	2	—
Banco de San German	1	4	3	4	3
Total—Puerto Rican banks	99	805	526	698	593
External banks:					
Mainland banks:					
Citibank	11	291	246	280	266
Chase Manhattan Bank	4	147	120	142	133
Total—mainland banks	15	438	366	422	399
Canadian banks:					
Royal Bank of Canada	5	43	36	41	40
Bank of Nova Scotia	3	38	35	24	23
Total—Canadian banks	8	81	71	65	63
Total—external banks	23	519	437	487	462
Total all banks	122	1,324	963	1,185	1,055
June 30, 1960					
Puerto Rican banks:					
Banco Popular	22	156	84	139	112
Banco de Ponce	17	71	43	57	49
Banco Crédito y Ahorro	22	128	76	107	88
Banco de San Juan	3	16	9	14	11
Banco Economías	3	4	2	3	3
Banco Obrero	5	8	4	7	6
Roig Commercial Bank	1	NA	NA	NA	NA
Banco Cooperativo	1	3	1	2	2
Banco de San German	1	—	—	—	—
Total—Puerto Rican banks	74	385	217	330	270
External banks:					
Mainland banks:					
Citibank	9	118	93	113	87
Chase Manhattan Bank	4	92	80	62	49
Total—mainland banks	13	210	173	175	136
Canadian banks:					
Royal Bank of Canada	5	22	16	19	18
Bank of Nova Scotia	3	13	11	7	7
Total—Canadian banks	8	35	27	26	25
Total—external banks	21	245	200	201	161
Total all banks	95	630	417	531	431

Note: Financial data for 1974-77 refer only to offices in Puerto Rico; data for earlier years include mainland branches of Puerto Rican banks. Detail may not add to totals, due to rounding. See also note to table 1.

Source: Puerto Rico Treasury Department; financial data for 1974-77 as transcribed by staff of Planning Board. Data for Banco Cooperativo not readily available for the years 1960 and 1970.

Appendix B.—Principal Assets and Liabilities

[Amounts in millions of dollars]

	External banks				All banks	Ratio local banks (percentage)
	Local banks	Main- land	Can- adian	Total		
June 30, 1977						
ASSETS						
Cash and due from banks	646	326	60	386	1,032	63
Banks outside Puerto Rico	451	166	—	166	617	73
Other	195	160	60	220	415	47
Bonds and other investments	837	361	2	363	1,200	70
U.S. Treasury and other mainland	438	57	—	57	495	88
Puerto Rican official agencies	391	294	—	294	685	57
Other	8	10	2	12	20	40
Loans and discounts	2,147	2,078	421	2,499	4,646	46
Real estate	615	712	34	746	1,361	45
Commercial and industrial	821	797	152	949	1,770	46
Industrial ¹	116	260	24	284	400	29
Individuals	612	316	43	359	971	63
Other	99	253	192	445	544	18
Due from head office	—	—	72	72	72	—
Other assets	173	272	78	350	523	33
Total assets	3,803	3,037	633	3,670	7,473	51
LIABILITIES AND CAPITAL						
Deposits total	3,199	1,751	563	2,314	5,513	58
Public deposits	333	36	5	41	374	89
Puerto Rico	298	35	5	40	338	88
Federal	35	1	—	1	36	97
Private deposits	2,866	1,715	558	2,273	5,139	56
Checking	506	362	66	428	934	54
Savings	915	198	35	233	1,148	80
Special time	1,111	996	352	1,348	2,459	45
(Memo: section 936 a/c) ²	(362)	(818)	(291)	(1,109)	(1,471)	(25)
Foreign accounts (including banks outside Puerto Rico)	56	77	67	144	200	28
Other deposits	278	82	38	120	398	70
Due to head office and other affiliates	—	938	4	942	942	—
Other liabilities	395	348	66	414	809	49
Capital accounts	209	—	—	—	209	100
Total liabilities and capital	3,803	3,037	633	3,670	7,473	51
June 30, 1976						
ASSETS						
Cash and due from banks	523	56	22	78	601	87
Banks outside Puerto Rico	314	—	—	—	314	100
Other	209	56	22	78	387	54
Bonds and other investments	654	3	2	5	659	99
U.S. Treasury and other mainland	364	—	—	—	364	100
Puerto Rican official agencies	270	3	—	3	274	99
Other	20	—	2	2	21	95
Loans and discounts	1,994	2,020	331	2,351	4,346	46
Real estate	565	772	27	799	1,364	41
Commercial and industrial	810	586	153	739	1,549	52
Industrial ¹	100	196	34	230	331	30
Individuals	521	248	42	290	811	64
Other	98	414	109	523	621	16
Due from head office	—	—	58	58	58	—
Other assets	130	290	31	321	451	29
Total assets	3,301	2,369	444	2,813	6,115	54

See footnotes at end of table.

Appendix B.—Principal Assets and Liabilities—Continued

[Amounts in million of dollars]

	External banks				All banks	Ratio of local banks (percentage)
	Local banks	Main- land	Can- adian	Total		
LIABILITIES AND CAPITAL						
Deposits total	2,787	1,286	324	1,610	4,397	63
Public deposits	290	66	—	66	357	81
Puerto Rico	274	65	—	65	339	81
Federal	17	1	—	1	18	94
Private deposits	2,497	1,220	324	1,544	4,040	62
Checking deposits	498	314	72	386	885	56
Savings	840	124	24	149	988	85
Special time	942	448	154	602	1,544	61
Foreign accounts (including banks outside Puerto Rico)	40	112	55	167	206	19
Other deposits	177	222	19	240	417	42
Due to head office and other affiliates	—	942	—	942	942	—
Other liabilities	271	141	120	261	533	51
Capital accounts	243	—	—	—	243	100
Total liabilities and capital	3,301	2,369	444	2,813	6,115	54
June 30, 1975						
ASSETS						
Cash and due from banks	549	60	22	82	631	87
Banks outside Puerto Rico	320	1	—	1	322	99
Other	229	59	22	81	309	74
Bonds and other investments	609	5	2	7	617	99
U.S. Treasury and other mainland	459	—	—	—	459	100
Puerto Rican official agencies	149	5	2	7	156	96
Other	1	—	—	—	1	100
Loans and discounts	1,902	1,755	283	2,037	3,939	48
Real estate	578	658	27	686	1,264	46
Commercial and industrial	831	539	147	686	1,517	55
Industrial ¹	100	178	33	211	311	32
Individuals	428	163	44	207	635	67
Other	65	395	63	458	523	12
Due from head office	—	—	23	23	23	—
Other assets	116	234	19	254	369	31
Total assets	3,176	2,054	349	2,403	5,579	57
LIABILITIES AND CAPITAL						
Deposits total	2,681	993	269	1,262	3,943	68
Public deposits	314	57	1	58	372	84
Puerto Rico	300	56	1	57	357	84
Federal	14	1	—	1	15	93
Private deposits	2,368	935	268	1,203	3,571	66
Checking	533	315	67	382	915	58
Savings	756	80	22	102	858	88
Special time	865	260	77	336	1,201	72
Foreign accounts (including banks outside Puerto Rico)	62	87	70	157	219	28
Other deposits	152	193	32	226	378	40
Due to head office and other affiliates	—	935	10	945	945	—
Other liabilities	245	126	71	196	441	56
Capital accounts	250	—	—	—	250	100
Total liabilities and capital	3,176	2,054	349	2,403	5,579	57

See footnotes at end of table.

Appendix B.—Principal Assets and Liabilities—Continued

[Amounts in million of dollars]

	External banks				All banks	Ratio of local banks (percentage)
	Local banks	Main- land	Can- adian	Total		
June 30, 1974						
ASSETS						
Cash and due from banks	485	74	26	100	585	83
Banks outside Puerto Rico	136	1	—	1	137	99
Other	349	73	26	99	448	78
Bonds and other investments	532	5	3	8	539	99
U.S. Treasury and other mainland	447	—	—	—	447	100
Puerto Rican official agencies	82	5	3	8	90	91
Other	3	—	—	—	3	100
Loans and discounts	1,909	1,374	253	1,627	3,536	54
Real estate	575	320	45	365	940	61
Commercial and industrial	792	605	156	762	1,554	51
Industrial ¹	125	167	25	192	317	39
Individuals	476	162	37	199	675	71
Other	66	287	15	301	367	18
Due from head office	—	—	—	—	—	—
Other assets	124	98	18	116	241	51
Total assets	3,050	1,551	300	1,851	4,901	62
LIABILITIES AND CAPITAL						
Deposits total	2,523	1,126	226	1,352	3,875	65
Public deposits	303	54	2	55	358	85
Puerto Rico	289	53	2	54	343	84
Federal	14	1	—	1	15	93
Private deposits	2,220	1,073	224	1,297	3,517	63
Checking	498	360	64	424	922	54
Savings	692	114	22	136	828	84
Special time	742	385	87	472	1,214	61
Foreign accounts (including banks outside Puerto Rico)	104	106	34	141	245	42
Other deposits	184	108	17	124	308	60
Due to head office and other affiliates	—	328	52	381	381	—
Other liabilities	285	97	22	118	403	71
Capital accounts	242	—	—	—	242	100
Total liabilities and capital	3,050	1,551	300	1,851	4,901	62
June 30, 1970						
ASSETS						
Cash and due from banks	162	33	11	44	206	79
Banks outside Puerto Rico	27	1	—	1	28	96
Other	135	32	11	43	178	76
Bonds and other investments	280	—	1	1	281	100
U.S. Treasury and other mainland	196	—	—	—	196	100
Puerto Rican official agencies	79	—	1	1	80	99
Other	5	—	—	—	5	100
Loans and discounts	1,187	588	168	756	1,943	61
Real estate	331	169	22	191	523	63
Commercial and industrial	546	281	102	383	929	59
Industrial ¹	55	41	15	56	110	50
Individuals	280	57	24	81	361	78
Other	30	81	20	101	130	23
Due from head office	—	355	—	355	355	—
Other assets	58	34	11	45	102	57
Total assets	1,687	1,010	190	1,200	2,887	58

See footnotes at end of table.

Appendix B.—Principal Assets and Liabilities—Continued

[Amounts in million of dollars]

	Local banks	External banks			All banks	Ratio of local banks (percentage)
		Main- land	Can- adian	Total		
LIABILITIES AND CAPITAL						
Deposits total	1,450	947	132	1,079	2,529	57
Public deposits	145	28	2	30	175	83
Puerto Rico	136	26	2	28	164	83
Federal	9	2	1	3	12	75
Private deposits	1,305	919	131	1,050	2,355	55
Checking	325	184	41	225	550	59
Savings	466	68	18	86	552	84
Special time	395	103	44	147	542	73
Foreign accounts (including banks outside Puerto Rico)	38	413	22	435	473	8
Other deposits	81	151	6	157	238	34
Due to head office and other affiliates	—	—	47	47	47	—
Other liabilities	104	63	11	74	178	58
Capital accounts	133	—	—	—	133	100
Total liabilities and capital	1,687	1,010	190	1,200	2,887	58

June 30, 1965

ASSETS						
Cash and due from banks	93	25	7	32	125	75
Banks outside Puerto Rico	27	1	—	1	28	96
Other	66	24	7	31	97	68
Bonds and other investments	149	—	—	—	149	100
U.S. Treasury and other mainland	87	—	—	—	87	100
Puerto Rican official agencies	61	—	—	—	61	100
Other	1	—	—	—	1	100
Loans and discounts	526	366	71	437	963	55
Real estate	129	113	3	116	245	53
Commercial and industrial	251	165	52	217	468	54
Industrial ¹	19	33	4	37	55	35
Individuals	134	55	8	63	196	68
Other	12	33	8	41	53	23
Due from head office	—	25	—	25	25	—
Other assets	37	22	3	25	62	60
Total assets	805	438	81	519	1,324	61

LIABILITIES AND CAPITAL						
Deposits total	698	422	65	487	1,185	59
Public deposits	105	23	2	25	130	81
Puerto Rico	87	15	2	17	104	84
Federal	18	8	—	8	26	69
Private deposits	593	399	63	462	1,055	56
Checking	187	106	22	128	315	59
Savings	224	57	17	74	298	75
Special time	124	54	17	71	195	64
Foreign accounts (including banks outside Puerto Rico)	16	158	5	163	179	9
Other deposits	42	24	2	26	68	62
Due to head office and other affiliates	—	—	13	13	13	—
Other liabilities	33	16	3	19	52	63
Capital accounts	74	—	—	—	74	100
Total liabilities and capital	805	438	81	519	1,324	61

See footnotes at end of table.

Appendix B.—Principal Assets and Liabilities—Continued

[Amounts in million of dollars]

	Local banks	External banks			All banks	Ratio of local banks (percentage)
		Main- land	Can- adian	Total		
June 30, 1960						
ASSETS						
Cash and due from banks	47	14	5	19	66	71
Banks outside Puerto Rico	8	2	—	2	10	80
Other	39	12	5	17	56	70
Bonds and other investments	96	—	2	2	98	98
U.S. Treasury and other mainland	45	—	1	1	46	98
Puerto Rican official agencies	51	—	1	1	52	98
Other	—	—	—	—	—	—
Loans and discounts	217	173	27	200	417	52
Real estate	43	28	1	29	72	60
Commercial and industrial	80	81	22	103	183	44
Industrial ¹	6	25	7	32	38	16
Individuals	77	26	2	28	105	73
Other	17	38	1	39	56	30
Due from head office	—	12	—	12	12	—
Other assets	25	11	1	12	37	68
Total assets	385	210	35	245	630	61
LIABILITIES AND CAPITAL						
Deposits total	330	175	26	201	531	62
Public deposits	60	38	2	40	100	60
Puerto Rico	52	8	2	10	62	84
Federal	8	30	—	30	38	21
Private deposits	270	136	25	161	431	63
Checking	91	62	13	75	166	55
Savings	109	35	8	43	152	72
Special Time	38	16	1	17	55	69
Foreign accounts (including banks outside Puerto Rico)	—	10	1	11	11	—
Other deposits	32	13	2	15	47	68
Due to head office and other affiliates	—	27	7	34	34	—
Other liabilities	27	8	2	10	37	73
Capital accounts	28	—	—	—	28	100
Total liabilities and capital	385	210	35	245	630	61

¹ Amount of industrial loans subsumed in commercial and industrial loans category.

Source: Consolidated reports of condition filed with Puerto Rico Treasury Department, 1974-77 transcribed and summarized by the staff of the Puerto Rico Planning Board. Section 936 deposits: Special tabulation by Puerto Rico Treasury Department. See also note to table 1.

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Employment, Wage Structure, and Migration

Acknowledgements

Several members of various Department of Labor agencies contributed to the preparation of the DOL report on Employment, Wages, and Migration. Special mention should be made of the following people. Arnold Packer, the Assistant Secretary for Policy, Evaluation and Research was the DOL representative on the Interagency Study Group on Puerto Rico. Donald Nichols, the Deputy Assistant Secretary for Economic Policy and Research was the DOL representative on the Interagency Study Group Deputies Committee. Larry Gold of the Office of the Assistant Secretary for Policy, Evaluation and Research served as the Study Coordinator and the DOL representative on the Interagency Staff Committee. Paul Flaim, Director, Division of Labor Force Studies, Bureau of Labor Statistics, prepared the paper on Employment and Unemployment in Puerto Rico. Josephine Stein, Director, Division of Industry Committees, Wage Hour Division, Employment Standards Administration prepared the paper on Wage Structure and Fringe Benefits in Puerto Rico. Kathy Naughton of the Office of Research and Development, Employment and Training Administration, coordinated and edited the paper on Employment and Training Programs in Puerto Rico. Charlotte Williams, Special Assistant to the New York Regional Director, Employment and Training Administration coordinated the preparation of materials furnished by the New York Regional Office for the Employment and Training Programs paper. Many other people, both professional and secretarial staff, from the Bureau of Labor Statistics, the Employment Standards Administration, the Employment and Training Administration, and the Office of the Assistant Secretary for Policy, Evaluation and Research contributed to this study.

Employment, Wage Structure, and Migration

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Chapter I.—Introduction

INTRODUCTION AND SUMMARY

The Employment, Wage Structure, and Migration Study is composed of five separate pieces: (1) Employment and Unemployment (including migration), (2) Department of Labor Employment and Training Programs in Puerto Rico, (3) Wage Structure in Puerto Rico, (4) Available Data on Fringe Benefits in Puerto Rico and (5) Illegal Immigration in Puerto Rico.

The major programs administered by the Department of Labor are in the Employment and Training area. These programs are for the most part run by the Puerto Rican Government or by local governments with the DOL providing funding and overall regulations and assistance.

The other program which has major impact in Puerto Rico is the Fair Labor Standards Act. While this is administered by the DOL, minimum wage levels are set by statute and the Secretary of Labor is basically limited to enforcing the FLSA statute.

PROBLEMS AND GOVERNMENT PROGRAMS THAT ADDRESS THEM

Employment and Unemployment

(Integrated in this study is material on migration trends and the role of returning migrants.) The study also covers the current and historical employment and unemployment situation, the duration of unemployment, underemployment, and trend in income.

Major Problems

(1) Secular long-term problems of high unemployment and underemployment.

(2) The deterioration in employment and unemployment associated with the 1974-75 U.S. economic recession. Though some cyclical recovery has occurred, certain sectors, particularly construction, were even more depressed in 1977 than 1975.

(3) A severe erosion of the competitive advantage previously enjoyed in the Americas by some industrial products and services of Puerto Rico.

(4) The increasing reliance on nonearned income (transfer payments in cash and in kind).

(5) A reversal of historical migration trends causing a reintensification of population growth over the last several years.

(6) The very large decline in labor force participation rates, primarily among males and its possible consequence "hidden unemployment."

These problems point to long-term difficulties for Puerto Rico in (1) reducing unemployment to its pre-1974 level of approximately 12 percent and reducing it below that level, (2) providing employment for an expanding population, particularly youth, and (3) providing opportunities out of the San Juan area where unemployment is far lower than for the rest of the island.

Employment and Training Programs

The employment and training programs of the Department of Labor are designed to meet some of the above problems. They are, however, not designed, to by themselves take up the slack created by very high unemployment and a lack of job opportunities in the private sector. These DOL programs fall into the categories of:

- training*, particularly for special groups such as youth, Aid to Families with Dependent Children (AFDC) parents, and other economically disadvantaged.
- public job creation* under the Comprehensive Employment and Training Act through decentralized, locally sponsored and locally run programs.
- job finding* through the U.S. Employment Service.
- income maintenance* through the Unemployment Insurance System.
- specialized training* through the apprenticeship programs.

The funding level of these programs by and large is either at a par or above the level of funding of similar programs on the mainland.

As an example, the funding level for CETA/PSE

in New York City is \$200 million as compared with \$220 million in Puerto Rico. Thus with roughly similar funding levels and a similar number of participants, the impact in Puerto Rico is substantially greater than in New York City.

In the Youth area this level of effort also outshines that of the mainland. Under the Youth Employment and Training program (YETP) open to both in-school and out-of-school youth ages 16-21, the seven prime sponsors in Puerto Rico were allocated by formula \$10.5 million for FY 1978, placing Puerto Rico eleventh among all States in YETP funds allocated. In the Youth Community Conservation and Improvement Project (YCCIP) the allocation of \$2.0 million placed Puerto Rico twelfth among all States. While the level of effort is quite good in terms of dollars and training slots, problems are noted in the performance of some programs. It should also be noted that not all youth in need can be served by the youth programs. In summary the DOL Work and Training Programs in Puerto Rico have been funded at least on par with mainland jurisdictions and in a number of cases most notably under CETA, PSE, and Youth programs, well above most mainland jurisdictions when population and unemployment is taken into account.

Wage Structure

While the Puerto Rico economy is rapidly changing from one of low wage, low skill, labor-intensive industries to one fairly similar to that of the United States a number of important differences remain; (a) the large percentage of Puerto Rican workers in the public sector, about double the percentage on the mainland including certain industries, e.g., sugar, shipping, communications which are in the private sector in the United States; (b) the large proportion of Puerto Rican workers in agriculture in spite of the rapid decline in agricultural employment; and (c) the relatively large unemployment in construction even after the 1974-75 recession.

With this in mind it is important to point out that the FLSA minimum wage has had an important impact on prevailing wages in most industries so that studies of wage structures have shown a heavy concentration at or close to the legal minimum wage with a relatively small spread between the minimum wage and the average wage.

The impact of the 1977 FLSA amendments will not be known for some time given that the new statutory minimums will go into effect in four stages, from January 1, 1978 through January 1, 1981.

Fringe Benefits

Because of the fragmentary data on fringe benefits

in Puerto Rico there is no valid or reliable basis for determining the impact of fringes on overall labor costs. It is also difficult to make a valid comparison with mainland fringes since the data on Puerto Rican fringes only cover mandatory fringe benefits provided for by Puerto Rican law.

A very tentative opinion can be made after reviewing the data at hand that the total mandatory and voluntary fringes in Puerto Rico may be smaller than those provided on the U.S. mainland. This possibility and the subject itself requires much more intensive study.

Illegal Immigration in Puerto Rico

While illegal immigration is thought to be a substantial problem in Puerto Rico the almost absolute lack of data makes it difficult to offer more than a general view of the problem. There is a twofold problem, illegal aliens coming into Puerto Rico from other Caribbean countries who may take jobs at the bottom of the ladder and illegal aliens who use Puerto Rico as a "gateway" to the U.S. mainland.

POLICY AND PROGRAM OPTIONS AND INITIATIVES

Vocational Education and On-the-Job Training

One concern expressed in the Puerto Rico Economic and Social Agenda is the quality of vocational education. A policy option for the Puerto Rican Government is to shift at least some emphasis from vocational education to on-the-job training in the private sector utilizing high technology industries for training purposes especially for young people who have completed their formal education. This issue might be looked at further by the Puerto Rican Government; the Department of Health, Education, and Welfare which is responsible for vocational education at the Federal agency level; and the Department of Labor.

The Secretary of Labor has already instituted a policy initiative by canceling the Industry Committee Hearings for those Puerto Rican industries which are below the mainland minimum wage. This initiative was taken because the automatic increases in the 1977 FLSA Amendments were considered substantial and exceeded those which the industry committees had recommended in past years. (A copy of the Secretary's Order of February 24, 1978 is on the last page of this chapter.)

Illegal Aliens

In an effort to discourage the hiring of illegal

aliens throughout the United States the Department of Labor is hiring some 260 new Wage-Hour inspectors who will be targeted to areas having undocumented aliens employment to enforce the Fair Labor Standards Act. Four of these inspectors will be assigned to Puerto Rico.

Data Needs

The Bureau of Labor Statistics (BLS) is working closely with the government of Puerto Rico to review the Puerto Rican statistical system and to provide technical assistance in improving various statistical series.

For some time now, the BLS New York Regional Office has been working with Puerto Rican statisticians to develop establishment employment and payroll survey data. Bureau representatives are now assisting the Puerto Rican Government to evaluate its household survey labor force and unemployment statistics.

The Bureau has also provided assistance to Puerto Rico on consumer price and expenditure data at various times over the past few years. Most recently, BLS staff have visited Puerto Rico and Puerto Rican staff have visited Washington to discuss issues in development of a Consumer Price Index and a Consumer Expenditure Survey. Further visits to Puerto Rico by BLS staff are planned to review the results of the Puerto Rican consumer surveys with the Puerto Ricans on the use of these data.

The Bureau, since 1974, has conducted occupational wage surveys each December for the Service Contracts Administration (ESA) in Puerto Rico. These surveys cover plant and office jobs common to both manufacturing and nonmanufacturing industries (area wage surveys), as well as occupations specific to food maintenance and laundry services. Some information on earnings and hours of work is also available from the establishment employment survey which is being evaluated by the BLS team now in Puerto Rico. A third source of information on wages is the Industry Committee Wage Studies conducted under the Fair Labor Standards Act minimum wage studies program.

Important gaps still exist in the wage data base for Puerto Rico—especially needed are data on total compensation (wages and benefits) and on the distribution of wage levels.

The BLS is prepared to assist the Employment Standards Administration and the Government of Puerto Rico to expand the wage data base should additional surveys be desired.

Note on Data

The data used in the study are based on calendar

year 1977 data expressed either in fiscal or calendar year terms. In certain cases, notably in the study on wage structure, calendar 1978 data is provided.

Note on CETA Discussion

The discussion of CETA in the section on Employment and Training Programs is based on the Comprehensive Employment and Training Act of 1973, as amended in 1974 and 1976. Changes in CETA brought about by the amendments of 1978 are not discussed.

FEDERAL REGISTER, VOL. 43, NO. 38—
FRIDAY, FEBRUARY 24, 1978
[4510-24]

Wage and Hour Division
[Administrative Order No. 654]

INDUSTRY COMMITTEES FOR VARIOUS INDUSTRIES IN PUERTO RICO AND THE VIRGIN ISLANDS

Notice of Cancellation of Industry Committee Hearings

For those industries in Puerto Rico and the Virgin Islands where the minimum wage rates are below the mainland minimum, the 1977 amendments to the Fair Labor Standards Act provide, in section 6(c), for a schedule of annual automatic increases effective January 1, 1978 and each successive January 1 thereafter until the mainland minimum is reached. The amendments provide for annual automatic increases ranging from \$0.20 to \$0.30 an hour depending on the level of the minimum wage rates in Puerto Rico and the Virgin Islands as of December 31, 1977.

The 1977 amendments to the Fair Labor Standards Act further provide that additional increases may be recommended by special industry committees if economic and competitive conditions warrant. Because the automatic increases prescribed by the 1977 amendments are substantial, and exceed those which industry committees have traditionally recommended in previous years. I have concluded that no purpose would be served by convening any further special industry committees for the purpose of considering appropriate minimum wage rates in Puerto Rico and the Virgin Islands.

Accordingly, no further industry committees will be convened. This order is subject to reconsideration on petition by any interested person.

Signed at Washington, D.C. on this 17th day of February 1978

RAY MARSHALL,
Secretary of Labor.

[FR Doc. 78-1339 Filed 2-23-78; 8:45 am]

Chapter II.—Employment and Unemployment in Puerto Rico

After improving gradually during the 1950's and 1960's, the employment situation in Puerto Rico has undergone a very severe deterioration during the 1970's. As 1977 was drawing to a close, there had not yet been much of a recovery from the 1974-75 recession. Although employment did post a healthy rise during 1977, nearly one-fifth of the Commonwealth's labor force was still unemployed as the year came to a close, and another large proportion (not as easily quantifiable) was underemployed. Moreover, the rates of labor force participation have continued their long-term decline, a development which may reflect some socioeconomic problems which do not even emerge from the statistics on employment and unemployment.

THE CURRENT SITUATION

At present, the employment situation for the island seems to reflect three underlying problems:

1. The secular, long-term problems of high unemployment and underemployment which are almost endemic of developing countries with high rates of population growth. Although Puerto Rico was making considerable progress in battling its population problems during the 1950's and 1960's, its unemployment rate never dropped below 10 percent even during this period. And with a reversal of the out-migration pattern during the 1970's, population growth has clearly reintensified, complicating the employment problems for the island.

2. The cyclical deterioration in employment and unemployment associated with the 1974-75 recession of the U.S. economy, with which the economy of Puerto Rico has become inextricably intertwined. Although there has been some cyclical recovery in some sectors of the island's economy, the level of activity in some other sectors, such as construction, was even more depressed in 1977 than in 1975.

3. A combination of internal and external structural changes which has gradually caused a severe

erosion of the competitive advantage previously enjoyed in the American market by some of the industrial products and services which Puerto Rico has to offer.

To give a brief synopsis of the current employment situation in Puerto Rico, the islandwide annual average unemployment rate for 1977 was 19.9 percent, even slightly higher than the rates for 1975 and 1976, which came in at 18.2 and 19.6 percent, respectively. (See table 1.) These rates are in sharp contrast to the 10 to 12 percent rates which prevailed in Puerto Rico from the early 1960's to the early 1970's. And, needless to say, the Puerto Rican rate for 1977 was nearly three times as high as the rate for the United States, which averaged exactly 7.0 percent.

It should be noted here that comparisons of the 1977 employment statistics for Puerto Rico with those of previous years are complicated by a change in the minimum age cutoff for inclusion in the labor force. This change, which was put into effect in 1977, raised the cutoff age from 14 to 16 years, partly to make the statistics for Puerto Rico more comparable with those for the United States which have been on a 16 and over basis since 1967. This change had almost no effect whatsoever on the unemployment rate for the island, and it had only a minimal impact on the employment and unemployment levels. It did, however, raise the rates of labor force participation, since the group that was excluded had an extremely low participation pattern. In any case, the historical data in this report are presented largely on a 14 and over basis, while most of the data for 1977 and early 1978 are presented on a 16 and over basis.

In terms of total employment, 16 years and over, there was an increase of about 49,000 (from 719,000 to 768,000) from January 1977 to January 1978. (See table 2. This was a relatively healthy gain when contrasted with the cyclical declines posted in 1974 and 1975 and the very small increase posted in 1976, and it indicated that the corner had finally been turned. However, it still left

Table 1.—Summary of the Employment Status of the Civilian Noninstitutional Population of Puerto Rico

(Thousands of persons 14 years of age and over)

(Average for selected calendar years)

In the labor force, both sexes									
Year	Popula- tion	Total		Employed		Unemployed		Not in the labor force	
		Number	Percentage of the population	Total	Agri- culture ¹	Nonagri- cultural industries	Number		Percentage of the labor force
1950	1,289	704	54.6	501	210	391	103	14.7	585
1955	1,320	643	48.7	551	161	390	92	14.3	678
1960	1,396	635	45.5	558	131	428	77	12.1	760
1961	1,417	650	45.9	568	138	430	82	12.6	767
1962	1,444	645	44.7	566	135	431	79	12.3	799
1963	1,467	651	44.4	577	130	448	74	11.3	816
1964	1,501	666	44.4	593	113	480	72	10.9	835
1965	1,553	698	44.9	617	103	514	81	11.6	855
1966	1,600	729	45.5	642	95	548	86	11.8	871
1967	1,626	737	45.3	650	88	562	87	11.7	889
1968	1,656	744	44.9	661	81	580	83	11.1	912
1969	1,695	759	44.8	684	74	610	76	10.0	936
1970	1,743	778	44.6	694	66	628	84	10.8	965
1971	1,808	814	45.0	719	59	660	95	11.6	995
1972	1,897	849	44.7	747	54	694	101	11.9	1,048
1973	1,957	869	44.4	768	50	717	102	11.7	1,088
1974	2,025	882	43.5	764	52	712	117	13.3	1,144
1975	2,099	875	41.7	715	47	668	159	18.2	1,224
1976	2,173	912	42.0	734	47	687	179	19.6	1,261
1972 ²	2,093	937	44.8	750	42	708	187	19.9	1,156

¹ Includes forestry and fishing.

² Data for 1977 apply only to persons 16 years of age and over.

Source: Division of Labor Statistics.

total employment only barely above the level that had been attained by 1973. And since 1973, the Puerto Rican population of working age has increased by over 300,000.

Not only has employment been slow in recovering from the 1973-75 declines, but there have also been further declines in labor force participation. By early 1978, the percentage of persons 16 years of age and over who were in the labor force had declined to less than 45 percent. By contrast, the U.S. rate had inched up to nearly 63 percent.

Taking into account both the stagnation in employment and the continuing expansion of the population of working age, which increased by about 100,000 persons during 1977, there have been even more drastic declines in the employment-population ratio (percentage of the working age population that

is employed) than in the labor force participation rate. For all of 1977, the employment-population ratio for the island (calculated on a 16 years and over basis) averaged only 35 percent while that for the United States was nearly 58 percent. Moreover, about one-tenth of the jobholders in Puerto Rico are considered to have been underemployed in recent years.

However, despite the deterioration of the Puerto Rican employment situation over the past few years, the purchasing power of the island population has not been seriously eroded. Thanks in part to vast amounts of Federal funds distributed throughout the island in the form of food stamps, Federal unemployment insurance benefits, etc., disposable personal income has shown only a slight decline, even after allowance for inflation. According to estimates

Table 2.—Employment Status of the Noninstitutional Population 16 Years of Age and Over in Puerto Rico, January 1977 and 1978

[Numbers in thousands]

Employment status	Both sexes		Male		Female	
	January 1977	January 1978	January 1977	January 1978	January 1977	January 1978
Civilian noninstitutional population	2,049	2,150	972	1,019	1,077	1,131
Civilian labor force	913	959	609	639	309	320
Participation rate (percentage)	44.6	44.6	62.7	62.7	28.2	28.3
Employed	719	768	460	495	259	272
Unemployed	195	191	149	143	45	48
Unemployment rate (percentage)	21.3	20.0	24.5	23.4	14.9	15.1
Not in labor force	1,135	1,191	362	380	773	810

Source: Compiled from monthly reports of Division of Labor Statistics of Puerto Rico's Department of Labor and Human Resources.

by the Planning Board of the Commonwealth, per capita disposable personal income, stated in constant dollar terms, has been held relatively stable after an abrupt decline between 1973 and 1974.

HISTORICAL EMPLOYMENT AND MIGRATION TRENDS

From 1950 until 1970, Puerto Rico made fairly consistent and very substantial progress in improving the employment situation of its people. Despite a reduction in agricultural employment from about 210,000 to 66,000 during this period, total employment showed a net increase of about 93,000. This means that, through the rapid industrialization of the island, nonagricultural employment expanded by about 237,000. Over the same period, the unemployment rate for the island declined gradually from the 15-16 percent range to about 10 percent. (See table 1.)

Contributing to the decline in the incidence of unemployment over the 1950-70 period was the outmigration of a large part of Puerto Rico's labor surplus to the U.S. mainland. The outmigration movement, the destination of which was generally New York and other Northeastern cities, was particularly large during the 1950's and early 1960's, when there was a net outflow of migrants from the island averaging about 40,000 a year.¹ Primarily because of this outlet, the local population of working age (14 years and over) showed only relatively modest gains over this period. Over the 13 years from 1950 to 1963, for example, it grew by only about 200,000, from 1.3 to 1.5 million (table 1). Thereafter, however, the outmigration flow became less consistent, and by the beginning of the 1970 decade it had turned into a net inflow into Puerto Rico. For the most recent 6-year period, it has been estimated that the net inflow, which consists largely of Puerto Ricans that had previously left the island, has been averaging 38,400 a year.²

As a result of the gradual reversal in migration trends, there has been a serious reintensification of population growth, with an expansion of 706,000, or 48 percent, in the population of working age over the 13-year period from 1963 to 1976. By way of contrast, the working age population of the United States, which received many migrants from other

lands as well as from Puerto Rico, showed a growth of only 25 percent over the same 13-year period.

The high rates of population growth, which reflect both the natural increase on the island as well as the recent wave of immigration, represent a formidable obstacle to a substantial improvement of the employment situation. As noted above, even though there was a 49,000 increase in employment between January 1977 and January 1978—the first sizable gain in 4 years—the population of working age (16 years and over) posted a gain of 100,000 during the same period, the labor force expanded by about 46,000, and unemployment declined only very slightly. (See table 2.)

LABOR FORCE PARTICIPATION TRENDS

Another disturbing long-term trend in terms of the Puerto Rican employment situation is the very large decline in labor force participation—that is, in the proportion of the working age population that is either working or looking for work. For the entire population 14 years of age and over, participation in the labor force declined from over 55 percent in 1950 to an average of only 42 percent for 1975 and 1976. This decline has been concentrated primarily among males, whose rate of labor participation plunged from about 80 to less than 60 percent over this period. (See table 3.)

Not all of this decline should, of course, be attributed to negative factors. At least a part of it stems from the growth in school enrollment rates of youths which has taken place in Puerto Rico,³ and part of

³ According to the report prepared by the Commonwealth of Puerto Rico, "A Socio-Economic Study of Puerto Rico," over the past 7 years there has been a large increase "in the number of students in intermediate and high school."

Table 3.—Participation Rates by Sex: Puerto Rico
Average for Selected Calendar Years 1955-76

[Persons 14 years of age and over]

Year	Both sexes	Males	Females
1950	54.6	79.8	30.0
1960	43.5	71.5	22.1
1961	45.9	71.3	22.6
1962	44.7	70.3	21.7
1963	44.4	69.2	22.1
1964	44.4	68.8	22.5
1965	44.9	68.8	23.7
1966	45.5	68.6	24.9
1967	45.3	68.0	25.3
1968	44.9	67.0	25.5
1969	44.8	66.3	26.0
1970	44.6	65.6	26.0
1971	45.0	65.5	26.6
1972	44.7	64.5	26.9
1973	44.4	63.8	26.8
1974	43.5	62.3	26.5
1975	41.7	59.7	25.2
1976	42.0	59.4	26.1

Source: Division of Labor Statistics, Puerto Rico's Department of Labor Human Resources.

¹ For analyses of the recent trends in the migration flows in and out of Puerto Rico—as well as for an attempted explanation of its causes—see Rita M. Maldonado, "Why Puerto Ricans Migrated to the United States in 1947-73," *Monthly Labor Review*, September 1976, pp. 7-18. For some contrasting views, see Steven P. Zell, "Analyzing Puerto Rican Migration: Problems with the Data and Model," *Monthly Labor Review*, August 1977, pp. 29-33.

² "Informe Económico al Gobernador, 1976-1977," Annual report to the Governor of Puerto Rico prepared by the Planning Board of the Commonwealth.

it stems from the trend toward earlier retirement under the Social Security System (which covers Puerto Rico as well as the mainland).

It might also be hypothesized that the movement of large sectors of the population from rural to urban areas (in Puerto Rico as well as in other countries) produces a decline in the "measured" rate of participation but not necessarily in the actual intensity of participation. This is because persons living in farm areas tend to be classified as a permanent part of the labor force regardless of how little of their time they spend in productive tasks. For persons residing in urban areas, on the other hand, there is a much more clearer dichotomy between being in and out of the labor force. Thus, a man moving from a farm to an urban area, where he might be in the job market, say, for 10 months each year, may contribute to a numerical decline in labor force participation although the intensity of his participation, or his productivity, may actually increase in the process.⁴

However, even after allowing for these and other possible mitigating circumstances, the drop in the Puerto Rican male participation rate to about the 60 percent mark—as compared with a rate of about 75 percent for U.S. males—is a very disturbing development. As for the participation rate of Puerto Rican females, it has held relatively steady over the past decade, but, at 26 percent in 1976, it was well below the rate for American women, which, continuing its rapid rise, had reached 47 percent. As shown on table 2, when computed on a 16 and over basis, the participation rate for Puerto Rican women was about 28 percent in early 1978. But by then the rate for American women had risen to over 48 percent.

To what extent the low labor force participation in Puerto Rico may be reflective of a "hidden unemployment" problem is a question that is difficult to answer. The Puerto Rican Government, through its household survey, does attempt to count the number of so-called "discouraged workers," and, in 1975 and 1976, turned up an average of 59,000 to 53,000.⁵ However, it should be noted that even if all these workers were added to the labor force, the overall participation rate for Puerto Rico would have risen only 2 percentage points to 44 percent.

Along with "hidden unemployment," there is also likely to be some "hidden employment" or "unreported work" in Puerto Rico, and this would also tend to depress the official rates of labor force participation. To what extent employment might go unreported on the island, it is, by definition, impossible

⁴ One might note that the large movement of blacks from rural to urban areas within the United States has been accompanied by a similarly puzzling, although not nearly as sharp, decline in labor force participation among males.

⁵ "Informe Especial Sobre las Personas Fuera del Grupo Trabajador" (Special Report on Persons Outside the Labor Force) Series E-10, Annual averages for 1975 and 1976, Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

to quantify. However, this is a problem that has recently been recognized to exist on one scale or another in several countries,⁶ and the conditions with which it is generally associated—a large role on the part of government to regulate wages and working conditions and to transfer income from the working to the nonworking—is quite prominent in Puerto Rico. Minimum wage laws affect a large part of the labor force, and the overtime provisions are even more strict than in the United States. This is likely to tempt some employers, particularly marginal ones, not to report all or some of their employees. More importantly, a large proportion of the local population—upwards of 60 percent—is benefiting from unemployment insurance, food stamps, and other income transfer programs. In light of the eligibility requirements, *real or perceived*, associated with these programs, it is possible that some of the participants who might be at least marginally employed might refrain from reporting it. It is also possible that some persons who would otherwise take casual jobs may decline to do so given the availability of other sources of income.

Summarizing, even if the unemployment statistics for Puerto Rico did not look as bad as they do, the trends in labor force participation would still be indicative of a very serious problem of underutilization—or nonutilization—of the local human resources. However, there is also probably some non-reporting of actual utilization.

EMPLOYMENT DEVELOPMENTS IN RECENT YEARS

Paralleling somewhat the trends in the United States, the unemployment rate in Puerto Rico reached its lowest point in many years during 1969, when it dropped to 10 percent (table 1). Then, partly a reflection of the 1970–71 recession in the United States, partly as a reflection of structural problems which were more unique to the Puerto Rican economy, the unemployment rate for the island began to inch up once more, to nearly 11 percent in 1970, and to almost 12 percent in 1971. Although the unemployment situation in the United States improved markedly after the 1970–71 recession, there was no such recovery in Puerto Rico. The unemployment rate for the island remained at the 12-percent level through 1973, rose to 13 percent in 1974, jumped to 18 percent in 1975, averaged 19.6 percent for 1976, and edged up even further, to 19.9 percent for 1977.

Total employment continued to expand by an average of about 20,000 a year until 1973, when it

⁶ See "The Fast Growth of the Underground Economy" and "Subterranean Economics Flourish Overseas," in the March 13, 1978, issue of *Business Week*, page 73 ff.

reached an historical high of 768,000. Then over the next two years, it dropped by more than 50,000 to an average of 715,000 for 1975. The causes for this severe drop were many. Because of the recession on the mainland, tourism to the island suffered considerably, bringing severe repercussions to an already semidepressed hotel industry. Manufacturing suffered both because of the cyclical decline in the demand for some products in the United States as well as because of acute competition from foreign manufacturers, particularly for the apparel industry. Construction activity plunged because of financing problems, a large inventory of unsold residences, and a slowdown in public works by the Commonwealth Government which was facing a severe fiscal problem. And in the meantime agriculture, particularly sugarcane cultivation and processing, continued to retrench.

The sharpest drops in employment over the 1973-75 period took place in construction and manufacturing. Construction employment plunged by about one-fourth and factory employment by one-tenth. There were also some small declines in trade

Table 4.—Employment in the Manufacturing Industries in Puerto Rico, Average for Selected Calendar Years
[In thousands]

Year	Total employment	Women	Production workers
1953 ¹	62.5	29.1	56.4
1960	80.7	36.4	68.6
1965	110.4	51.5	93.4
1970	135.3	65.5	113.1
1971	137.3	65.0	114.0
1972	143.5	67.8	119.6
1973	152.1	72.9	126.8
1974	150.9	72.3	124.7
1975	135.2	65.2	109.9
1976	143.2	70.5	117.3

¹ Earliest available figures.

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

Table 6.—Unemployment and Unemployment Rates in Major Industry Groups, Puerto Rico: Average for Selected Calendar Years
[In thousands]

Years	Total		Agriculture ¹		Construction		Manufacturing		Trade		Public Administration		Other Industries ¹	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1950	103	14.7	33	13.7	13	33.7	22	16.4	9	8.6	3	6.8	14	10.9
1960	77	12.1	21	13.9	13	20.2	16	15.2	7	6.7	3	3.9	11	8.3
1965	81	11.6	17	14.1	16	22.0	17	12.9	8	6.9	3	3.8	12	7.9
1970	84	10.8	11	13.7	16	16.8	24	15.2	9	6.6	5	4.1	12	6.4
1971	95	11.6	10	14.4	19	18.4	27	16.2	11	7.4	5	4.3	15	7.4
1972	101	11.9	8	13.0	22	22.4	27	16.2	13	8.3	7	4.4	15	7.1
1973	102	11.7	7	12.5	22	21.6	26	15.0	12	7.5	9	5.7	17	7.6
1974	117	13.3	9	14.0	26	25.4	27	15.7	13	8.4	11	6.8	19	9.0
1975	159	18.2	12	20.3	36	37.7	39	22.7	18	11.2	15	9.0	26	12.7
1976	179	19.6	15	24.7	39	45.2	40	22.7	21	13.3	19	10.3	30	13.4

¹ Includes forestry and fishing.

² Includes mining, services, transportation, communication, and public utilities; and finance, insurance, and real estate.

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

Table 5.—Employment in Selected Industry Groups—Puerto Rico, Average for Selected Calendar Years
[In thousands]

Year	Total employment	Agriculture ¹	Construction	Trade	Public administration
1950	601	210	26	92	47
1960	558	131	50	98	64
1965	617	103	57	113	82
1970	694	66	78	131	107
1971	719	59	83	135	119
1972	747	54	77	140	141
1973	768	50	81	148	141
1974	764	52	77	144	148
1975	715	47	60	141	154
1976	734	47	47	140	168

¹ Includes forestry and fishing.

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

employment, while agricultural employment continued its long-term decline, although at a slower pace relative to the reduction of the late 1960's and early 1970's. (See tables 4 and 5.)

From 1975 to 1976 there was some recovery in employment with the total rising from 715,000 to 734,000 on an annual average basis. The 1976 average, however, was still more than 30,000 below the 1973 level. And in the meantime, the Puerto Rican labor force had increased by more than 40,000 despite the continuing decline in labor force participation rates. Thus the nearly 80,000 increase in unemployment, from 102,000 in 1973 to 179,000 in 1976.

The only industry to show sustained employment increases in Puerto Rico during this severe recessionary period was the public administration sector. However, the job gains in this sector represent partly federally financed manpower programs. And despite the continuing growth in government employment, even the unemployment rate for public administration workers exceeded 10 percent in 1976. (See table 6.)

Manufacturing employment recovered somewhat between 1975 and 1976, but the unemployment rate for factory workers was just as high in 1976 as in 1975—22.7 percent. Moreover, certain sectors of this industry continued to retrench during 1977, as there were additional plant closings. As a result, very little progress was made in reducing unemployment in this important sector during the year. Thus in January 1978, the unemployment rate for manufacturing workers was still at 21.2 percent, only marginally lower than it had been at the beginning of 1977. (See table 7.)

In the construction industry, there was further deterioration between 1975 and 1976, with employment dropping from 60,000 to 47,000 on an annual average basis, and with the annual average unemployment rate for the industry rising to 45.2 percent. During 1977, the employment situation in the industry appears to have finally stabilized, but with employment at very depressed levels and with the unemployment rate still hovering near 50 percent. The reported rate for January 1978 was 48.6 percent, down from an extraordinarily high 57.8 percent for January 1977 (table 7).

For the other major industries the unemployment rates for wage and salary workers as of January 1978 were as follows: trade, 18.8 percent; transportation and public utilities, 13.2 percent; services and public administration combined, 14.6 percent; and agriculture, 46.8 percent. Of these four industries, only agriculture had a lower jobless rate in January 1978 than a year earlier. While none of these monthly rates are seasonally adjusted, this does not seriously hamper their analysis or invalidate any comparison with annual averages. Given the climatic conditions which prevail in Puerto Rico, seasonal fluctuations in employment are rather minimal for most industries, and thus the estimates for a given

Table 7.—Unemployment by Industry in Puerto Rico, January 1977 and 1978

Industry	Unemployment rate		Percentage distribution	
	Jan. 1977	Jan. 1978	Jan. 1977	Jan. 1978
All industries	21.3	20.0	100.0	100.0
Experienced wage and salary workers	22.4	20.7	88.0	86.6
Agriculture ¹	50.2	46.8	10.9	8.3
Nonagricultural industries	20.8	19.6	77.2	78.3
Construction	57.8	48.6	22.3	16.2
Manufacturing	23.9	21.2	22.4	21.5
Transportation, communication, and public utilities	12.2	13.2	2.3	2.7
Trade	17.2	18.8	9.5	11.1
Services including public administration	12.0	14.6	18.5	25.4
Other ²	19.8	11.2	2.2	1.4
Self-employed and unpaid family workers	7.5	6.4	5.2	4.7
No previous work experience .....	.....	.....	6.7	8.7

¹ Includes forestry and fishing.

² Includes mining; and finance, insurance, and real estate.

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

month or series of months tend to be fairly representative of the underlying trend.

Table 8 shows the course of total employment and unemployment in Puerto Rico for each month of 1977 both for the total labor force as well as for persons 16-19 and 20-24. Although even these data are not seasonally adjusted, their course would indicate that there was some improvement as the year was drawing to a close. And the situation for some industries would confirm this. Tourism, for example, enjoyed a very good season during the past winter and hotel occupancy rates remained very high even after the arrival of spring. So, at least for this industry the situation has improved considerably after several rather lean years.

Table 8.—Annual Average and Monthly Labor Force and Unemployment Data, by Selected Age Groups for Puerto Rico: 1977

Item	Annual average	January	February	March	April	May	June	July	August	September	October	November	December
All ages:													
Labor force	936,600	913,300	918,200	913,800	911,100	917,400	943,700	952,200	958,200	968,000	954,200	956,400	933,200
Unemployment	186,700	194,500	172,000	175,000	183,900	190,400	208,700	199,700	193,700	194,200	182,000	178,400	167,500
Unemployment rate	19.9	21.3	18.7	19.1	20.2	20.8	22.1	21.0	20.2	20.1	19.1	18.7	17.9
Employment	750,000	718,800	746,100	738,800	727,200	726,900	735,000	752,600	764,500	773,800	772,200	778,000	765,700
16 to 19:													
Labor force	52,900	49,900	50,100	47,300	47,100	48,100	64,300	65,000	51,500	58,100	52,000	51,000	49,900
Unemployment	25,900	26,000	24,600	24,300	23,900	26,100	28,900	27,100	27,700	29,000	26,800	24,000	22,700
Unemployment rate	49.3	52.2	49.2	51.3	50.6	54.2	44.9	41.6	53.7	49.9	51.5	47.2	45.6
Employment	26,900	23,900	25,400	23,000	23,300	22,000	35,400	38,000	23,800	29,100	25,200	26,900	27,100
20 to 24:													
Labor force	140,100	136,300	136,100	134,800	137,800	141,200	146,900	146,200	143,900	144,400	139,400	140,000	134,500
Unemployment	47,700	47,600	44,200	42,600	49,200	51,700	54,800	50,000	51,600	49,200	43,300	46,800	41,000
Unemployment rate	34.0	34.9	32.5	31.6	35.7	36.6	37.3	34.2	35.9	34.1	31.1	33.4	30.5
Employment	92,500	88,800	91,900	92,200	88,700	89,400	92,100	96,200	92,200	95,200	96,100	93,200	93,500

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

THE SITUATION FOR MAJOR GROUPS

As in the United States, the group with the highest unemployment rates in Puerto Rico consists of youths, particularly those 16 to 19 years of age. The 1977 monthly employment profile for this group is clearly shown on table 8. As indicated, the rates for this group fluctuated around the 50-percent mark all year.

Table 9 shows the January 1978 unemployment levels and rates for all the major age-sex groups in Puerto Rico. As shown, the jobless rates become progressively lower with age, both for males and females. This pattern is not dissimilar to that evidenced by the age-specific rates for the U.S. labor force. What is strikingly different between the unemployment pattern for the United States and that for Puerto Rico is the male-female relationship in rates. In the United States, the unemployment rates for women of practically every age have generally been higher than the rates of men of comparable age, with the situation generally attributed to the higher tendency of women to enter, leave, and reenter the labor force. In Puerto Rico, just the opposite obtains. There, the rates for women have, at least in recent years, been running lower than those for men. The reasons for this are not clear, but both cyclical and structural factors can be suggested. The industries which have been most depressed in recent years, construction and sugarmills, had generally been male dominated, and their acute problem could not but increase the unemployment rates for men. While there has also been a serious downtrend in

Table 9.—Employment Status of the Civilian Non-institutional Population, by Age and Sex, for Puerto Rico, January 1978

[Thousands of persons 16 years of age and over]

Age and sex	Total	Unemployed		Not in the labor force
		Number	Rate	
Total	959	191	20.0	1,191
Male	639	143	22.4	380
16 to 19 years	39	22	56.8	109
20 to 24 years	84	36	43.5	44
25 to 34 years	176	35	20.2	28
35 to 44 years	144	24	16.7	23
45 to 54 years	106	14	13.6	30
55 to 64 years	68	9	13.9	47
65 years and over	24	(¹)	(¹)	100
Female	320	48	15.1	810
16 to 19 years	11	5	49.4	137
20 to 24 years	52	15	28.3	93
25 to 34 years	111	14	12.9	132
35 to 44 years	80	8	10.5	114
45 to 54 years	48	3	6.9	100
55 to 64 years	16	(¹)	(¹)	107
65 years and over	4	(¹)	(¹)	127

¹ Not enough cases in the sample for a reliable estimate.

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

employment in the female-dominated apparel industry, this may have been partly offset by gains registered by the pharmaceutical industry another large employer of women in Puerto Rico. It should also be noted that unlike in the United States, the labor force participation rate for women has hardly shown any growth in Puerto Rico over the past decade. There thus has not been the type of upward pressure on female unemployment that might have come about had this group sought to rapidly expand its participation in the job market.

An indication of the severity of the unemployment situation in Puerto Rico is the abnormally high jobless rates for heads of households. The historical rates for this group of breadwinners are shown on table 10. For 1976, the rate for this group

Table 10.—Unemployment of Household Heads, Puerto Rico: Selected Calendar Years

Years	Rate	Years	Rate
1963 ¹	8.3	1973	7.5
1970	6.7	1974	8.5
1971	7.5	1975	13.5
1972	7.8	1976	15.8

¹ Earliest available figure.

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

was at 15.8 percent, about double the 7 to 8 percent levels of the early 1970's. By way of contrast the unemployment rate for household heads in the United States was only 4.7 percent in 1976. Although the average rate for 1977 was not yet available for Puerto Rico's as this was being written, it is not likely to have declined much below the 15-percent mark.

DURATION OF UNEMPLOYMENT

In addition to the incidence of unemployment, which is measured through the jobless rates, the duration of unemployment is another important indicator of the nature and severity of the unemployment problem in any given location. Generally speaking, it is assumed that the shorter the duration of unemployment the less severe is the burden of unemployment regardless of how high the rate might be.

In light of the very high unemployment rates for the island, duration of unemployment in Puerto Rico has been running relatively short. For 1976, for example, when the annual average unemployment rate for the island was nearly 20 percent, the average (mean) duration of unemployment was only 8.8 weeks (tables 11 and 12). On the other hand, in the United States, where the overall unem-

Table 11.—Distribution of the Unemployed, by Duration, for Puerto Rico, Average for Calendar Years 1976 and 1975

(Thousands of persons 14 years of age and over)

Duration	1976		1975	
	Number	Percentage	Number	Percentage
Total	179	100.0	159	100.0
Less than 5 weeks	87	48.5	78	49.2
5 to 14 weeks	62	34.6	59	37.1
15 weeks and over	30	17.0	22	13.7

Table 12.—Average Unemployment Duration, by Type of Industry for Puerto Rico

[Weeks]

Type of industry	1976	1975
Total	8.8	7.8
Agriculture	8.2	6.8
Nonagricultural industries	9.1	8.0
No previous work experience	7.2	7.1

ployment rate (7.7 percent) was nearly two-thirds lower than in Puerto Rico, duration of unemployment was nearly twice as high as on the island, averaging 15.8 weeks for the entire year.

These striking differences indicate that unemployment in Puerto Rico is a phenomenon that occurs widely but which, for some reason, does not last very long. This is a situation which has prevailed for many years and which has puzzled previous analysts. Writing in 1973, when the unemployment rate for the island was 11.7 percent, much lower than it is today, Steven Zell noted that:

... "The Puerto Rican economy continues to function with an official unemployment rate twice that which would be declared a disaster on the mainland. At the same time, however, average duration on the mainland is almost twice that found in Puerto Rico . . . the immediate implication of this pattern is that the labor market in Puerto Rico is characterized by a much greater degree of mobility and job instability than is the case for the United States."⁷

Given that the unemployment spells in Puerto Rico are usually short, the question is how do they end. Do the unemployed manage to find jobs that quickly? Or do they drop out of the labor force rather quickly because of discouragement?

With the very depressed employment situation on the island, it is difficult to see how the 80,000 to 90,000 persons who flow out of the unemployment stream each month could find jobs so quickly, if

only for a short period. And with the number of discouraged workers averaging from 59,000 to 53,000 not unusually large in view of the extremely high unemployment rate and the very large proportion of the population of working age that is not in the labor force, it would appear that not too many of the ex-unemployed find refuge among the discouraged. Or, if they do, they do not remain in that classification very long.

We are thus left with the notion of high job instability and "voluntary" mobility into and out of the labor force to explain much of the dynamics of unemployment in Puerto Rico. However, before we attribute too much to the notion of "voluntary" mobility, we ought to point out that there is yet another way in which the Puerto Rican workers can end their spell of unemployment, as far as the statistics for the island are concerned, *and yet still continue their search for jobs*. This can happen if, after searching unsuccessfully for a job on the island, they decide to try their luck in the United States. And while there has recently been a net inflow of migrants to Puerto Rico, the gross flow out of the island has not halted by any means. In fact, it could be as large as it ever was, and it undoubtedly includes many unemployed who have given up their search for jobs in Puerto Rico only to start searching anew on the mainland.⁸

Unfortunately, given the current state of the separate statistical systems for Puerto Rico and the mainland, one can only speculate as to the impact that the migration movement might be having on the duration of unemployment for the island. Nevertheless, the possibility that duration may often be "statistically" truncated because of the shift of many jobseekers to the United States cannot be ruled out.

GEOGRAPHIC DISTRIBUTION OF UNEMPLOYMENT

There are two principal sources of information on the geographic distribution of unemployment in Puerto Rico. One is the monthly household survey, which provides estimates for the entire island and for the five "regions" into which the island have been subdivided for the purposes of this survey. The other source consists of the monthly unemployment estimates constructed for all "labor areas" of Puerto Rico through the so-called "70-step method," using data from the unemployment insurance program as the principal building block.

Because these two sets of data were designed to serve different purposes and are based on different concepts and definitions, they do not necessarily

⁷ Steven Zell, "A Comparative Study of the Labor Market Characteristics of Return Migrants and Non-Migrants in Puerto Rico," Study published by Planning Board of Commonwealth of Puerto Rico, July 1973.

⁸ In 1973, for example, there were a total of 2.5 million departures from the island and a slightly larger number of arrivals.

agree with each other in terms of the level and rate of unemployment for a given locality. Yet, both sets of data show considerable agreement in terms of the relationship between the unemployment rate for the San Juan metropolitan area and the remainder of the island. Both show unemployment to be much lower in San Juan and neighboring "municipios" than in the hinterland.

For example, in January 1978 when the overall jobless rate for the island was 20 percent, the rate for Region I, which is dominated by the San Juan area, was 15.7 percent. In the other four regions, the rate was about 1½ times as high, averaging close to 23 percent. (See table 13.) For the same month, the independently derived "70-step" estimates showed the rate for the San Juan "labor area" to be 11.2 percent. However, the San Juan "labor area" relates more closely to the San Juan SMSA, whereas the Region I data from the household survey cover several other "municipios" on the northeast corner of the island as well as the San Juan SMSA.

The principal reason for the much lower unemployment rate for the San Juan area than for the rest of the island is probably related to the industrial

composition of the local economy. Much of the local labor force is employed by the government (Commonwealth, Federal, and local) and by commercial and service enterprises that enjoy a certain degree of immunity from cyclical swings and from the structural problems which have had such a deep impact on other areas of the island. In this sense, the San Juan situation is not unlike that of Washington, D.C., where unemployment has traditionally been running much lower than the national average.

UNDEREMPLOYMENT

Not only do the statistics for Puerto Rico reveal a grave problem of unemployment; they also show that a large proportion of the local labor force which has jobs is severely underemployed. The Puerto Rican Government computes an index of underemployment which includes the following persons:

1. Wage and salary workers on work schedules of less than 35 hours who report that they want to work more hours;
2. Self-employed persons (other than subsistence

Table 13.—Distribution of Unemployment and Participation by Region

[In percentages]

Rates and sex	Puerto Rico	Region I	Region II	Region III	Region IV	Region V
PARTICIPATION RATE						
Total	44.6	45.7	43.6	45.5	45.3	41.3
Male	62.7	64.0	60.6	63.1	63.2	60.7
Female	28.3	29.8	27.5	29.3	29.6	23.2
UNEMPLOYMENT RATE						
Total	20.0	15.7	23.1	22.5	23.2	22.9
Female	22.4	18.4	25.4	22.6	27.2	25.3
Male	15.1	10.8	18.4	22.3	15.6	16.9

Distribution of Municipalities by Region

Region I	Region II	Region III	Region IV	Region V
Barranquitas	Aguas Buenas	ARECIBO	Aguada	Adjuntas
Bayamon	Aibonito	Barceloneta	Aguadilla	Arroyo
Canovanas	CAGUAS	Camuy	Anasco	Coamo
Carolina	Cayey	Ciales	Cabo Rojo	Guanica
Catano	Cidra	Florida	Hormigueros	Guayama
Ceiba	Culebra	Hatillo	Isabela	Guayanilla
Comerio	Gurabo	Lares	Lajas	Jayuya
Corozal	Humacao	Manati	Las Marias	Juana Diaz
Derado	Juncos	Morovis	Maricao	Maunabo
Fajardo	Las Piedras	Orocovis	Moca	Patillas
Guaynabo	Naguabo	Quebradillas	Rincon	Penuelas
Loiza	San Lorenzo	Utua	Sabana Grande	Salinas
Luquillo	Vieques	Vega Baja	San German	Santa Isabel
Naranjito	Yabucoa		San Sebastian	Villalba
Rio Grande			MAYAGUEZ	Yauco
Toa Alta				PONCE
Toa Baja				
Trujillo Alto				
Vega Alta				
Rio Piedras				
SAN JUAN				

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

farmers who report that they want to work more hours regardless of the number of hours worked;

3. All subsistence farmers, regardless of how many hours they work or would like to work.

As in most underdeveloped countries, the most serious problem of underemployment in Puerto Rico existed originally in agriculture. About 40 percent of the workers in this industry were classified as underemployed in 1953. By the early 1970's, the underemployment rate in this industry had declined to about 25 percent, but by 1976 it had risen again to about 35 percent, before declining to about 30 percent in 1977. (Table 14.) Construction is another industry with a traditionally high rate of underemployment, 24 percent in 1976 and 21 percent in 1977.

For the entire Puerto Rican economy, the rate of underemployment declined from about 20 percent in the early 1950's to less than 8 percent in 1973. This long-term decline was largely a reflection of the reduced role of agriculture within the Puerto Rican economy. After 1973, however, underemployment rose again, with the rate approaching 12 percent in 1976. In 1977, the rate receded to 9.4 percent.

THE ROLE OF RETURNED MIGRANTS

As already noted, the migration trends, which from the 1940's to the late 1960's showed a sustained net flow out of Puerto Rico, have reversed dramatically over the past decade. During the last 6 years the net inflow of migrants has been estimated by the Planning Board of the Commonwealth to have averaged 34,400 per year. In fact, the inflow over the July 1976-June 1977 period has been

estimated to have run even higher—about 47,000 persons.⁹

The reasons for the reversal of the migration trends are obviously hard to determine, but several factors can be suggested: The 1967-68 riots in some large American cities, which made them less desirable places to live in; the deterioration of the employment situation in the United States both because of the 1970-71 recession and the much more severe 1974-75 recession; the substantial narrowing of the wage gap between Puerto Rico and the mainland; the extension of various income transfer programs, such as food stamps, to large sectors of the Puerto Rican population; and last but not least the unusually cold winters which have hit the mainland over the last couple of years. It might be of some interest to note here that at the same time that many Puerto Ricans were returning to the island, reversing the traditional flow, many blacks were also leaving the large cities of the Northeast and returning to the South.¹⁰

In any case, the net inflow of migrants to the Island must be considered as a disturbing development for Puerto Rico, which has long been suffering from high population pressure. The question is to what extent are the immigrants hindering the economic progress of Puerto Rico by competing for jobs and other scarce resources with local residents. While this question is difficult to answer, some inferences can be drawn by comparing the labor force characteristics of the immigrants with those of non-migrants, or "stayers."

According to the most recent of such comparison,¹¹ the majority of the immigrants are Puerto Ricans who had previously migrated to the main-

⁹ "Geographic Mobility: March 1975 to March 1977," U.S. Department of Commerce, Bureau of the Census, Series P-20, No. 320, Issued February 1978.

¹⁰ *Ibid.*

¹¹ "Informe Económico al Gobernador, 1976-1977," *op. cit.*

Table 14.—Percentage of Underemployed Persons by Major Industry Group, Puerto Rico Average for Selected Calendar Years

Years	Total	Agriculture ¹	Construction	Manufacturing	Trade	Transportation, communication, and public utilities	Domestic and personal services	Other services	Other industries
1953 ²	20.4	39.5	19.7	13.1	9.0	19.3	19.4	3.9	1.0
1960	17.1	35.3	20.8	15.1	6.7	18.1	17.2	6.4	3.2
1965	12.1	28.2	18.0	11.0	5.4	11.8	11.6	6.6	3.9
1970	9.0	24.5	13.4	9.2	4.7	8.7	9.4	5.7	4.4
1971	10.0	31.1	16.3	8.2	6.2	8.9	12.7	6.8	4.1
1972	9.4	29.5	15.0	7.8	5.8	8.5	12.2	7.1	5.3
1973	7.6	25.0	13.3	7.2	4.9	7.5	10.4	5.7	3.1
1974	10.2	30.6	15.0	10.0	7.2	10.0	13.0	7.2	5.5
1975	11.8	33.2	23.0	12.6	7.0	10.7	16.3	8.3	6.7
1976	11.7	34.7	23.6	10.4	9.3	10.5	16.8	9.3	6.7
1977	9.4	30.4	21.4	7.7	8.4	10.6	13.5	7.6	4.6

¹ Includes forestry and fishing.

² Earliest available figures.

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

land. They are generally young adults, whose median age is 33 years. Being of prime working age, they tend to compete in the local labor market after returning to the island. Though their educational level is generally somewhat higher than that of non-migrants, the average difference (8.8 years of schooling vs. 8.3 for the nonmigrants) has probably not enough to make much of a difference in the job market. In fact, it was found in the early 1970's that the unemployment rate for the return-migrants was considerably higher than that for non-migrants. It was actually calculated that the inclusion of the return-migrants in the employment statistics for Puerto Rico caused the unemployment rate for the island to be about one-third higher than it would have been had the return-migrants been excluded from the calculation.¹² And this did not take into account what the competition from the return-migrants might have done to the jobless rate for the nonmigrants.

In trying to explain the much higher incidence of joblessness among the return migrants, Steven Zell suggested that this group exhibited even greater instability in the job market than did the non-migrants. He attributed this to the fact that during their stay in the United States, the persons who subsequently returned to Puerto Rico were likely to have worked in the so-called secondary labor market where they might have grown accustomed to high rates of absenteeism and periodic job changes.

In short, the available evidence indicates that return-migrants do compete for jobs after they resettle in Puerto Rico and that the incidence of unemployment among them is relatively high. Their inflow is thus exacerbating the general employment situation for the island.

¹² Steven Zell, op. cit.

TRENDS IN INCOME

Estimates of both personal and family income in Puerto Rico indicate that after three decades of very rapid progress the expansion in real income came to an abrupt halt in 1973. In fact, between 1973 and 1974 there was a sharp decline. In subsequent years, however, there has been little further erosion despite the worsening employment situation.

As shown on table 15, per capita disposable personal income was \$2,312 in 1977. (The comparable figure for the mainland was \$6,035). Even, when translated into dollars of constant purchasing power, the figures for per capita disposable personal income showed a very rapid rate of increase in Puerto Rico until the early 1970's. In fact, from 1940 to 1973 real income expanded fivefold for the island's residents. From 1973 to 1974, however, real per capita disposable personal income declined about 4 percent (from \$1,100 to \$1,062 in 1954 dollars). After 1974, the series has shown remarkable stability despite the further deterioration of the employment situation. The estimate for 1977 (\$1,041 in 1954 dollars) was only marginally lower than that for 1974.

That there has not been any further decline in real personal income after 1974 is owed in large part to the step-up in Federal funds flowing to the island in the form of food stamps, Federal unemployment insurance benefits, and other income transfer payments. (It must be noted that noncash receipts such as food stamps are taken into account by the Planning Board in computing personal income.) The increasing role of Federal income transfer payments in the economic life of Puerto Rico can be quickly deduced from a peculiar anomaly in the behavior of the principal financial series for the island. As shown on table 15, since 1974 the aggregate dollar

Table 15.—Selected Series on Gross Product and Income for Puerto Rico, by Fiscal Year

Item	1940	1950	1960	1970	1973	1974	1975	1976	1977
Aggregates in current dollars (millions):									
Gross product	286.7	754.5	1,676.4	4,687.5	6,270.0	6,797.8	7,135.7	7,438.5	7,913.9
Personal income	219.2	653.4	1,373.6	3,752.6	5,336.2	5,894.3	6,843.0	7,644.3	8,182.1
Disposable personal income	218.2	637.8	1,333.5	3,564.8	5,039.8	5,564.3	6,446.0	7,182.4	7,653.6
Per capita in current dollars:									
Gross product	154	342	716	1,729	2,155	2,273	2,230	2,349	2,391
Personal income	118	296	587	1,384	1,834	1,971	2,225	2,414	2,472
Disposable personal income	117	289	569	1,315	1,732	1,860	2,096	2,268	2,312
Per capita in constant (1954) dollars:									
Gross product	269	399	630	1,070	1,186	1,168	1,114	1,093	1,086
Personal income	213	347	530	979	1,165	1,125	1,114	1,124	1,113
Disposable personal income	212	338	514	930	1,100	1,062	1,049	1,056	1,041
Mean family income:									
Current dollars	611	1,495	2,812	5,674	7,336	7,884	8,678	9,656	9,838
Constant (1954) dollars	1,103	1,752	2,539	4,013	4,661	4,500	4,343	4,497	4,452
Number of persons per family	5.2	5.1	4.8	4.1	4.0	4.0	3.9	4.0	4.0
Total population (thousands)	1,859	2,206	2,342	2,711	2,910	2,991	3,076	3,167	3,310

Source: Planning Board of Puerto Rico.

figures for personal income have exceeded those for the "gross product" for the island.

In the Planning Board estimates, average (mean) family income was estimated at \$9,898 for 1977. As in the case of personal income, the highest peak in family income, in constant dollar terms, was reached in 1973. Over the next 2 years, real family income declined about 7 percent before recovering slightly. In 1977, it was still nearly 5 percent below the 1973 peak.

There is yet another measure of family income that is derived occasionally by the Puerto Rican Department of Labor through the household survey which provides the basic employment and unemployment data for the Commonwealth. This survey, which counts only "monetary" income and does not therefore include the value of food stamps and other noncash items, yielded a mean family income of \$6,160 for 1976, much lower than the \$9,656 estimate constructed for the same year by the Planning Board.¹²

Of course, the differences between the two sets of estimates cannot be attributed solely to the different treatment of noncash income. It is likely that even cash income may be severely under-reported in the household survey, and Puerto Rico would not stand alone in this respect. It has long been recognized even in the United States that there is a considerable underreporting of income in the annual survey conducted through its own household survey. Perhaps if allowance could be made for the value of noncash income such as food stamps as well as for some underreporting of cash income, the gap between the two measurements of family income for Puerto Rico could be narrowed considerably.

COMPARABILITY AND RELIABILITY OF DATA

The basic employment statistics are collected very much in the same manner in Puerto Rico as they are obtained in the United States. There are essentially three sources of data: (1) the household survey which provides the monthly estimates of total employment and unemployment for the whole island and for the five subregions; (2) an establishment based survey which provides data on employment, hours of work, and earnings for the manufacturing sector of the economy (and more recently for some nonmanufacturing industries, as well); and (3) the insured unemployment data which, through the so-called 70-step method, are built up into employ-

ment and unemployment estimates for the various "labor areas" within the island.

Each of these three components of the Puerto Rican statistical system were modeled upon or are an extension of the counterpart component of the U.S. system. The household survey employs roughly similar concepts and definitions as are used in the Current Population Survey in the CPS. There are, however, some differences in questionnaire content. The establishment survey is also modeled on its counterpart run by the U.S. Bureau of Labor Statistics, and while it was previously restricted to the manufacturing industries it has recently been expanded to cover even some nonmanufacturing industries. The expertise and advice of U.S. technicians from the Bureau of the Census and the Bureau of Labor Statistics was drawn upon in setting up and modifying both of these surveys. As for the unemployment insurance programs, it is actually managed under supervision of the U.S. Department of Labor, and it is in practically all phases similar to the program run on the mainland.

The employment and unemployment data for Puerto Rico are thus quite similar—if not totally compatible—with those for the United States. One important change that was made recently to make them even more comparable was the increases of the minimum age cutoff for inclusion in the labor force. In the United States, the age cutoff had been raised from 14 to 16 years in 1967; in Puerto Rico this change was finally made in 1976. In effect, the change did not have much of an impact on the employment and unemployment levels, and the jobless rate, was hardly affected at all. (See table 16.) This is because the 14 and 15 year old group that was finally excluded had an extremely low participation rate and had carried very little weight in the computation of the unemployment rate. The only significant impact of the exclusion of this group from the measurements was to increase the overall participation rates for the island. Nevertheless, these re-

Table 16.—Effect of Changing Labor Force Statistics for Puerto Rico from a 14-Years-and-Over Basis to a 16-Years-and-Over Basis

Employment status	[Numbers in thousands]			
	Annual average 1976		July 1976	
	14 years and over	16 years and over	14 years and over	16 years and over
Civilian labor force	912	908	959	943
Employed	734	731	770	757
Unemployed	179	177	189	186
Not in labor force	1,261	1,103	1,218	1,070
Participation rate (percentage) ..	42.0	45.2	44.1	46.8
Unemployment rate (percentage) ..	19.6	19.5	19.7	19.7

Source: Division of Labor Statistics, Puerto Rico's Department of Labor and Human Resources.

¹² "Estudio Sobre el Ingreso Monetario de las Familias en Puerto Rico, Año Natural 1976." (Study of Money Income of Families in Puerto Rico, 1976 Calendar Year), paper published by the office of Labor Statistics of Puerto Rico's Department of Labor and Human Resources.

maintained much below those for the mainland even after this change.

Other changes designed to make the unemployment statistics for the island more directly comparable with those of the U.S. mainland are currently being contemplated. Several options for possible changes were set forth in a report based on a study conducted by an expert from the U.S. Bureau of Labor Statistics during 1978.¹⁴

In terms of statistical reliability, the figures for Puerto Rico appear to be rather sound. The household sample for the island consists of about 6,000 households, one out of every 108 as of 1975.¹⁵ (In the United States, the sampling ratio for the Current Population Survey is about one out of every 1,300 households, which yields a total sample of about 55,000 households.) The estimates for Puerto Rico should not be subject to too much sampling variability, and their relative consistency from one month to the next tends to confirm this hypothesis.

However, in addition to sampling errors, the estimates might also be subject to nonsampling errors stemming from nonreporting or misreporting of employment status by some sectors of the population. For example, if some of the participants in the food stamp program were to underreport their employment and to overreport job search activity out of fear of endangering their eligibility, the result would be an overestimation of the incidence of unemployment. It is, however, an open question whether there is such a tendency among the food stamp recipients.¹⁶

It should be noted that the Decennial census has, over the past three decades, turned up a much lower incidence of unemployment for Puerto Rico than was derived from the household survey for the same period. The unemployment rates from the two sources are shown below:

	April 1950	April 1960	April 1970
Decennial census	5.3	5.8	5.6
Household survey	11.3	8.8	10.1

While these differences have never been reconciled, one should not infer from them that the household survey contains such a large upward bias. In

¹⁴ Paul O. Flaim, "An Evaluation of the Statistics on Employment and Unemployment for Puerto Rico," Office of Current Employment Analysis, Bureau of Labor Statistics, November 1978 (unpublished).

¹⁵ Ruben A. Vilches, "La Medicion del Desempleo en Puerto Rico" (The Measurement of Unemployment in Puerto Rico), paper published by the Statistics Division of Puerto Rico's Department of Labor and Human Resources, November 1975.

¹⁶ According to Flaim, op. cit., there was a belief among some of the Puerto Ricans involved in the labor force survey that both the food stamp program and the rent subsidies for public housing led to some underreporting of employment. On the other hand, a study by Parimal Choudhury and Suphan Andie, "The Impact of the Food Stamps in Puerto Rico" (A Joint Research Project of the U.S. Department of Agriculture Food and Food Nutrition Service and the Commonwealth of Puerto Rico Department of Social Services does not mention any possible impact on the labor force status of the participants.

any comparison of labor force data from the Census and from a household survey of this type, the benefit of the doubt is usually given to the latter. This is because the monthly survey, although based on a smaller sample, is conducted by a cadre of generally well-trained and experienced interviewers, whose work is closely checked for quality and consistency by supervisors. The Decennial census data, on the other hand, are generally collected by a large number of hurriedly recruited and lightly trained interviewers who are not very familiar with labor force concepts.

What the large differences between the two sources may suggest is that many of the persons who turn up as unemployed in the monthly survey are probably not searching for work very intensively. If they did, they would probably be classified as unemployed in any survey. On the other hand, if their search for jobs is only marginal, they may turn up as unemployed only under the probing questions of an experienced interviewer.

In conclusion, the basic employment and unemployment data for Puerto Rico are produced by a statistical system which, on a smaller scale, is very similar to the system in place in the United States. The concepts and definitions are reasonably close to those used in the United States, though they lack some of the refinements introduced in the United States over the past decade. Although some allowance should be made for the possibility that, because of the large participation in the Food Stamp Program and other income transfer payments, some Puerto Ricans may tend to underreport employment and to overreport job-seeking activities, it should not be assumed that this has a large impact on the statistics for the island. Despite some probable biases and shortcomings, the numbers seem to give reasonably reliable indications of the socioeconomic trends for the Commonwealth.

SUMMARY AND CONCLUSIONS

As this was being revised, the employment situation in Puerto Rico had not yet shown any substantial improvement from the deep recession to which it plunged over the 1974-75 period. While employment began to rebound a bit during 1976 and posted an even larger gain during 1977, the unemployment situation continued to be very severe. The jobless rate for 1977 averaged 19.9 percent and the rates for the first 2 months of 1978 remained at roughly the same level. Moreover, labor force participation continued to run very low.

Unemployment in Puerto Rico is characterized by a much shorter duration than on the mainland, a

situation which might reflect high instability in employment as well as the possible impact of the continuing migration of unemployed persons to and from the mainland. Geographically, unemployment is much higher in the hinterland than in the San Juan area.

The stagnation in unemployment has been exacerbated by the inflow into the Puerto Rican labor force of large numbers of migrants returning from the mainland, a development that has reversed the traditional migration pattern. The reasons for this reversal are not clear, but the narrowing of the wage

gap between Puerto Rico and the mainland, coupled with the extension and liberalization of Federal income transfer payments to the island's residents, has probably served both to slow down the outflow from Puerto Rico and to encourage the return of some migrants from the mainland.

Despite the serious deterioration of the employment situation, real disposable personal income has held up fairly well. After an abrupt decline between 1973 and 1974, it has been stabilized, thanks in part to a large inflow of Federal income transfer payments.

Chapter III.—Employment and Training Programs

COMPREHENSIVE EMPLOYMENT AND TRAINING ACT

The Comprehensive Employment and Training Act (CETA), signed into law on December 28, 1973, and amended in 1974 and 1976, is designed to provide job training and employment opportunities for economically disadvantaged, unemployed and underemployed persons to enable them to secure self-sustaining, unsubsidized employment. This program provides Federal financial assistance, primarily distributed by a legislatively mandated formula, to over 450 State and local Prime Sponsors to help meet the employment and training needs of their areas via locally designed and operated manpower programs.

Prime sponsors are units of State and local government which are responsible for operating CETA manpower programs to serve the needs of their communities. Prime sponsors are generally one of the following: States; cities or counties with populations of at least 100,000; or combinations of units of government, called consortia, in which at least one member jurisdiction has a population of 100,000 or more. The Secretary of Labor may also designate additional areas, known as exceptional circumstance prime sponsors, which he determines have a special capacity to operate manpower programs within certain labor markets or rural areas with high unemployment rates.

Prime sponsors are responsible for determining local needs and providing programs to meet these needs. Sponsors can arrange to provide the services directly or through contracts or subgrants with such organizations as the State employment service, vocational education agencies, community groups, or private firms. The sponsors are also responsible for monitoring and evaluating programs to ensure that they meet local needs.

There are seven CETA programs in Puerto Rico, with each of the following cities operating its own program: San Juan (operating as a consortium with Guaynabo and Catano), Bayamon, Carolina, Ponce,

Mayaguez, and Caguas. Each of these cities is a prime sponsor. All other municipalities (about 71) fall under the jurisdiction of the "Balance of State" prime sponsor known as the Right to Employment Administration. Also, there is a special Governor's Grant operated within the Governor's Office of Federal Affairs.

Within each prime sponsor there are CETA staffs and organizations generally under the direction of an Executive Officer reporting directly to the Chief-Elected Official. An exception to this general rule is the Right to Employment Administration, where the Administrator reports to the Secretary of Labor and through him to the Governor. Program and/or operating decisions are usually made at the administrator/director level; however, policy decisions are generally made by the chief-elected official. The Governor's Grant is under the direction of the Director of the Office of Federal Affairs, who reports to the Governor.

The current FY 1978 CETA funding level in Puerto Rico is approximately \$290 million, which does not include the \$2.1 million targeted for Puerto Rico through the HIRE (Help through Industry Retraining and Employment) program. The funding level by program is as follows:

Title II	\$36,072
Title II	39,440
Title III	27,166
Title VI	181,761
Governor's Grant	5,377

In terms of impact and purpose, CETA programs should be considered separately.

The title I program for example, is designed to develop training programs leading to permanent full-time employment (i.e., unsubsidized and generally within the private sector). These programs include institutional and on-the-job training, work experience, vocational education, job placement, counseling and other supportive services. Title I

funds are also used for funding the Special Governor's Grant, which generally provides financial assistance to State Vocational Education boards in prime sponsors' areas as well as a variety of special programs operated through the Governor's office.

Title II provides unemployed and underemployed persons with temporary transitional employment in areas having an unemployment rate of 6.5 percent or more for 3 consecutive months. It is intended that these jobs will provide needed public services within the prime sponsor areas.

Title III is used to provide additional manpower services as authorized under titles I and II to special segments of the population in need of such services, including youth, persons of limited English-speaking ability, older workers, migrants and seasonal farmworkers and other groups having particular disadvantages in the labor market.

Title IV establishes a Job Corps for disadvantaged young people, as described below.

Title VI is referred to as the "Emergency Jobs Program" and is intended to provide temporary employment to the unemployed during periods of high unemployment. Title VI generally establishes a larger base for providing jobs for applicants and is considered as "counter-cyclical" (e.g., combating an increased rate of unemployment with increased Public Service Jobs).

Additionally, all of the prime sponsors have received funds under the Youth Employment Demonstration Project Act of 1977. The programs are being operated within the overall CETA structure, and in most instances the primes have appointed "youth coordinators" as the persons with day-to-day responsibility for the operation of the programs. The youth coordinators in all instances are reporting to the CETA Administrator/Director. All YEDPA youth applications have been recently approved; it is too soon to comment on their performance or impact. For a more complete description of these programs, see the section on Youth Programs below.

The titles are all operative in Puerto Rico and in terms of impact, must again be considered separately. For example, the largest programs are the CETA VI and II (PSE) programs which currently show a combined enrollment of about 28,000. The participants are enrolled in a variety of entry level; semiskilled and some technical occupations found at the Commonwealth and municipal levels. The positions are considered transitional. In considering PSE performance in Puerto Rico, it is significant to note that there are also 28,000 participants enrolled in similar PSE programs found in New York City. The impact the programs have had in their respective areas is seen below:

	Puerto Rico	New York City
Labor force (December 1977)	933,000	3,051,000
Approximate number of unemployed	167,000	300,000
PSE participants	28,000	28,000
PSE participants as percentage of labor force	3	.09
PSE participants as percentage of unemployed	17	9

The funding level for CETA/PSE in New York City is \$200 million as compared with \$220 million in Puerto Rico. Thus, with roughly similar funding levels and a similar number of participants, the impact in Puerto Rico is about two to three times as great as in New York City.

There are also clear indications of the fact that the CETA/PSE system in Puerto Rico is capable of mounting large hiring programs within short time frames. For example, during the recent "PSE Expansion," Puerto Rico hired about 14,000 participants during the period beginning in May and ending on March 3, 1978. This performance in terms of numbers hired was the best in the region. There are also clear indications that sound linkages have been developed between CETA prime sponsors and the Puerto Rico Bureau of Employment Security. The most recent data available (January 1978) indicates that a total of about 9,000 CETA/PSE placements have been made by the Puerto Rico Bureau of Employment Security. Of the 9,000 placements, about 3,500 were made during the period from October 1, 1977, to December 31, 1977. Although exact numbers are not available to coincide with the period of the PSE expansion, it is reasonable to assume that about 40 to 50 percent of the 14,000 people hired during the expansion were credited to the Puerto Rican Bureau of Employment Security. Onsite visits by ETA field staff have shown that the linkage is in place and to date no serious problems have been reported. The remaining number of PSE expansion hires were recruited by CETA prime sponsors using their own outreach and/or recruiting systems.

As seen in the case of the PSE expansion, linkages with other ETA-funded programs are encouraged, and ETA staff work with both CETA and Employment Service staff to ensure effective coordination. Another example of the linkages between CETA prime sponsors and Employment Service is seen in the title I program operated by the Right to Employment Administration (the single largest CETA sponsor in Puerto Rico) where the Prime Sponsor Agreement indicates that the placement of job-ready applicants will be carried out by the placement offices of Employment Service working cooperatively with the CETA sponsor. In addition, two other

CETA prime sponsors, namely San Juan and Carolina, have Employment Service staff outstationed in their facilities to assist in the direct placement area. The city of Bayamon reports that an Employment Service worker is specifically assigned to coordinate CETA/PSE placement activities. The employee is located in the local Employment Service offices and is responsible for referral to PSE positions.

As in the case of CETA Titles II and VI, each prime sponsor operates a CETA I program using the same administrative structure as outlined in the opening paragraphs of this report. The programs operated in title I differ significantly from those operated in CETA II and VI in that the CETA I mandate is to develop training programs leading to permanent unsubsidized employment. In order to meet this mandate, prime sponsors determine the type of training to be offered and the target groups to be served. Training can consist of Classroom Training;¹ On-the-Job Training;² Work Experience and/or Various Supportive Services.³

Prime sponsors also have the capability to offer participants a "mix" of services so that participants can be moved from "work experience" to "on-the-job training" as their ability to absorb more sophisticated training increases. The groups being served through title I are selected by the prime sponsors and are from those groups determined to be most in need of services by the people at the local level. As of September 30, 1978, the "significant segments" as reported to the regional office show that 91.3 percent of total participants were under 44 years of age. Specific breakdowns by percentage show that 43.1 percent were between the ages of 22-44; 19.6 percent were between 19-21 and 28.6 percent fell into the age group of 18 or less. The above percentages were based on a reported enrollment of 27,274 (as of September 30, 1978). In addition, 98 percent were reported as being economically disadvantaged. The percentage of males enrolled in the programs were at 45.3 percent and females totaled 54.7 percent. In terms of actual performance through the fourth quarter, prime sponsors reported that 6,418 participants had entered employment against a planned total of 9,215 (69.7 percent). The cost per employment was at \$5,846. However, it is also anticipated that as the fiscal year progresses, the cost per employment will decrease as persons now undergoing training will be placed into

unsubsidized employment. In terms of actual performance, assessment by the Regional Office has not been completed for the current fiscal year. In the past fiscal year, the Regional Office used a system which consisted of three specific categories.

1. *Eligible for Immediate Funding*.—generally defined as meeting program goals having no serious management problems and being in compliance with Grant Assurances.

2. *Problems Identified*.—generally defined as not meeting goals, etc. but expected to be able to correct problems between the period of assessment and the end of the fiscal year.

3. *Serious Problems*.—generally defined as not meeting goals, etc. and requiring corrective action which could not be fully accomplished by the end of the fiscal year.

Puerto Rico CETA sponsors fell into the Eligible for Immediate Funding (1); Serious Problems (2); Problems Identified (3). It should be noted, however, that in the past year, two programs (Mayaguez and Bayamon) which had been considered as having serious problems showed considerable improvement and were approaching satisfactory performance at the time of assessment. The programs having serious problems in FY 1977 have begun to show improvement in the current fiscal year and if improvement continues, we do not anticipate an unsatisfactory rating in FY 1978. Also to be considered is the fact that with the single exception of Mayaguez, all prime sponsors experienced changes at the chief-elected official level as well as the Director and Executive staff level and the transition undoubtedly affected performance.

YOUTH PROGRAMS

Beginning in FY 1978, additional CETA Title III funds are available, authorized by the recently enacted Youth Employment and Demonstration Projects Act of 1977 (YEDPA). YEDPA has two major focuses. First, as part of the President's Economic Stimulus Program, YEDPA will provide \$1 billion in new funds to attack the unemployment problems of young people particularly disadvantaged and minority youth; while coordinating and improving existing career development and employment and training programs. Second, the variety of programs created by YEDPA will test new and innovative approaches in serving youth. The results of such tests will provide Congress with the insights it needs to develop comprehensive youth employment and training legislation in the future.

A description of the four major programs created by YEDPA follows, along with a discussion of Puerto Rico's participation in these programs.

¹ Defined as any training conducted in an institutional setting designed to provide individuals with the technical skills and information required to perform a specific job or group of jobs.

² Defined as training conducted in a work environment designed to enable individuals to learn a bona fide skill and/or qualify for a particular assignment through demonstration and practice.

³ Defined as short-term and/or part-time work assignment with a public or private employing agency. It is designed to enhance the employability of individuals who have either never worked or who have not been working recently. The activity is designed to increase the employability of individuals by providing them with experience on a job.

Youth Employment and Training Programs (YETP)

YETP is the most comprehensive of the new programs, and, as such, is analogous to Title I of CETA. The program is open to both in-school and out-of-school youth, ages 16-21 (and, at the discretion of prime sponsors, 14 and 15 year olds), who are unemployed, underemployed, or in school, and whose family income is 85 percent or less of the Lower Living Standard Income Level. Certain types of counseling and informational services are available to all 14-21 year olds. In general, the services which can be provided are the same as those authorized under CETA Title I, with the exception of Public Service Employment. YETP is operated by CETA prime sponsors, with the provision that at least 22 percent of the funds to be spent under YETP be expended under agreements with local education agencies (e.g., public school systems).

The 7 prime sponsors in Puerto Rico were formula-allocated \$10.5 million YETP funds for FY 1978, out of total national YETP funds of \$402.5 million. Puerto Rico ranked 11th among all States as to the amount of YETP funds allocated. The prime sponsors within Puerto Rico plan to serve 5,809 persons under YETP in FY 1978 out of planned national totals of about 325,000. In addition, the Commonwealth government was allocated \$1 million for Governor's Youth Programs in which Puerto Rico plans to serve 900 persons in FY 1978.

Youth Community Conservation and Improvement Projects (YCCIP)

YCCIP is a work experience program for unemployed youth ages 16-21, both out-of-school and in-school. In general, although not required by the law or regulations, prime sponsors are tending to target this program to the economically disadvantaged. YCCIP is managed by CETA prime sponsors, although the actual operation of community improvement projects is done by other local government agencies or community based or other non-profit agencies.

The prime sponsors of Puerto Rico were formula-allocated \$2 million in YCCIP funds in FY 1978 out of total national YCCIP funds available to prime sponsors of \$86 million. Puerto Rico ranked 12th among all States as to the amount of YCCIP funds allocated. During FY 1978, the 7 prime sponsors in Puerto Rico plan to serve 621 persons under YCCIP out of planned national totals of 22,000-25,000.

Youth Incentive Entitlement Pilot Projects (YIEPP)

Puerto Rico entered into a national competition among prime sponsors to operate a YIEPP project to test the efficacy of guaranteeing part-time work to youth who will return to or remain in school. Although the Commonwealth was a finalist in the competition, it was not awarded a grant.

Young Adult Conservation Corps (YACC)

YACC, a program to employ young people ages 16-23 in conservation projects on public lands, is being planned and administered in Puerto Rico by the Department of Natural Resources. The program has no specific targeting provisions other than that disadvantaged and minority youth be served in the same proportion as their incidence in the general population. The program has two components, both under the overall administration of the Department of Labor: the Federal program operated jointly by the Departments of Agriculture and Interior, and the State grant program, comprising 30 percent of total YACC funds, operated by the Governors under the direction of Agriculture and Interior. No specific allocations are made by State under the Federal program. Currently, the U.S. Forest Service is operating a 40-person project in Puerto Rico under the Federal program. As of the third week in February, the Federal program had an onboard enrollment of about 9,200.

The State grant program in Puerto Rico will involve the creation of about 85 enrollee slots based on an allocation of \$834,466. Grant applications are now being readied for this program, but have not been formally submitted, pending the publication of the State grant regulations by the Departments of Agriculture and Interior.

Summer Program for Economically Disadvantaged Youth

Finally, all prime sponsors operate programs under the Summer Program for Economically Disadvantaged Youth (SPEDY). The general purpose of the SPEDY program is to provide economically disadvantaged youth between the ages of 14-21 with summer employment. The programs are designed and operated by CETA prime sponsors to provide summer work experience to participants. Another goal of this program is to provide income to participants who without this assistance would be unable to return to school. These programs are considered "ongoing" in that they have been funded

on a yearly basis. SPEDY program participants are typically enrolled with the beginning of the summer vacation, and participation lasts through until the youth return to school in the fall. In Puerto Rico this has generally been from May 1 to July 31. Participants may not be enrolled in activities beyond September 30. During the 1977 span of operation, the SPEDY program served approximately 68,000 youngsters.

Every effort is being made to link the SPEDY programs with those funded under YEDPA and to avoid duplication; however, there is simply no experience in this area. However, the YEDPA programs are intended to serve those youth who could not be reached with existing programs and/or funds.

Job Corps

The Job Corps program assists young people who need and can benefit from intensive programs of academic education, vocational skills training, and other services while living in a residential setting. All enrollees in the program are impoverished and unemployed youth between the ages of 16 and 21, who volunteer for the program. The Job Corps sends these young people to residential centers where they receive educational and vocational skills training, work experience, counseling, health services, and other assistance. This program antedates the Youth Employment Program of 1977. It is funded under Title IV of the Comprehensive Employment and Training Act of 1973, which transfers the provisions for Job Corps without change from the Economic Opportunity Act of 1964.

In FY 1977, the Job Corps had 60 centers located in 31 States and Puerto Rico. These centers include 27 Civilian Conservation Centers; 31 centers operated under contracts with business firms, nonprofit organizations, or State and local governments; and two extension centers. Job Corps is in the midst of an expansion effort which will increase the number of centers to over 90 by the end of FY 1978, and increase total Job Corps onboard capacity to 44,000 by April 1979.

The Puerto Rico contractor for Job Corps is the Commonwealth Department of Education which is currently operating two residential centers, one in Arecibo and one in Rio Grande, with a combined capacity of 310 men. These cannot accommodate women, though the program is available to women. Therefore, we urged the Puerto Rico Department of Education to seek other sites so that we can enlarge the program and include women in the new locations. A site has been located in Aguadilla, Puerto Rico, at the former Ramey Air Force Base and is being considered for the purpose of establishing a

coeducational center with a capacity of 125 men and 125 women.

The two existing centers offer courses in such occupations as: auto body repair, auto mechanics, carpentry, plumbing, and upholstery. These courses average somewhat less than a year in length.

The two Puerto Rico Job Corps Centers received 430 new corpsmembers in FY 1977. These new corpsmembers were recruited, screened, and enrolled for training by Puerto Rico Department of Education, which also performs the placement operation for Job Corps, with minimal assistance from the Puerto Rico Department of Employment Security. Of the 397 corpsmembers terminated during FY 1977 who were available for placement, 385 (97 percent) were placed in jobs or went on to higher education. This compares to the national placement rate of 92.6 percent (29,600 placements of 41,200 terminated corpsmembers available for placement). Nearly all corpsmembers in Puerto Rico who complete their course of instruction are placed.

WORK INCENTIVE (WIN) PROGRAM

Background

The Work Incentive (WIN) program, authorized by amendments to Title IV of the Social Security Act, is designed to help employable welfare recipients find jobs and achieve economic independence. All applicants for and recipients of Aid to Families with Dependent Children (AFDC) who are 16 years of age or older are required to register for WIN as a condition of eligibility for AFDC benefits, unless legally exempt by reason of health, incapacity, home responsibility, advanced age, student status, or remoteness from a WIN project. Exempt persons may volunteer for participation. The program is jointly administered by the Department of Labor and the Department of Health, Education, and Welfare, which together provide a broad spectrum of employment and social services necessary to enable registrants to enter and retain employment.

Program Operation

Services are provided to WIN registrants by the WIN sponsor (in most jurisdictions, including Puerto Rico, the employment service) and the local welfare agency.

The WIN sponsor is responsible for registering individuals legally required to register for WIN and those who volunteer to do so, and for providing or arranging for the provision of employment services. These may include referral to a job, job development, referral to on-the-job or institutional training, or referral to public service employment or "work

experience.”⁴ The sponsor may also provide such services as orientation to the program or to the world of work, appraisal, and counseling.

A separate administrative unit (SAU), located in the welfare agency, performs, to the extent possible, only WIN-related functions. The SAU provides or arranges for the provision of supportive services and certifies that an individual either does not require such services prior to entry into a job or preparation (training, etc.) for employment, or that needed services are available and will be provided. Frequently needed services include day care for children, assistance with home management and family planning, transportation, medical exams, and remedial aid, among others.

Inclusion of unemployed fathers (UF's) in the AFDC program is at the option of each State. About half of the States have chosen this option; Puerto Rico is one of those that has not. Therefore, a family with a male head of household does not receive AFDC benefits, even if the household head is unemployed, in Puerto Rico.

A tax credit provision allows an employer who hires WIN registrants to credit wages paid to such employees against his or her Federal (U.S.) income tax. The tax credit has had only limited use, in part because many employers are unaware of its existence; efforts are being made to give it more widespread recognition. It is available to any employer in Puerto Rico who has a Federal income tax obligation to the United States. Most employers in Puerto Rico do not.

WIN in Puerto Rico

Administration.—As in almost all other jurisdictions, the WIN sponsor for the Commonwealth is the employment service. Nine WIN offices were operating on the island in FY 1976; the number was reduced to 5 in April 1977. The reduction was part of an effort to increase the efficiency of operations in Puerto Rico, where over half of the AFDC population resides in rural areas. (See table 1.)

In FY 1977, the return for every WIN dollar spent in Puerto Rico was only 10 cents. Only one State posted a lower return—7 cents—and the highest return was \$2.42. The nationwide average was \$1.31. The average cost per entry into employment in Puerto Rico (for WIN registrants) was \$2,418, an amount exceeded in only two jurisdictions. Average for the United States was \$1,331.

One of the efforts directed to increasing the effectiveness of the WIN program in Puerto Rico is estab-

Table 1.—AFDC Statistics—U.S. Totals and Puerto Rico, 1975

	Puerto Rico	United States
Families on AFDC	41,364	3,609,593
Quarterly AFDC payment/ family/month ¹	\$47	\$234
Place of residence (percentages):		
Central city	13.6	58.4
Outside central city	15.1	20.3
Urban	4.1	16.2
Rural	11.0	4.1
Not in SMSA County:		
Urban	25.3	11.2
Rural	45.8	9.7
Unknown, and other	0.2	0.6

¹ Data from Employment Security Automated Reporting System (ESARS).

Source: U.S. Department of Health, Education, and Welfare. *Aid to Families With Dependent Children, 1975 Recipient Characteristics Study, Part 1. Demographic and Program Characteristics.* (HEW Publication No. (55a) 77-11777.)

lishment of an intensive manpower service (IMS) component in each of the five WIN offices there. IMS serves two essential purposes: (1) it provides guidance to basically job-ready individuals in their search for work and attainment of on-the-job success; and (2) it enhances the individual's capacity to function independently in the labor market, thus improving his/her chances for continued effective participation in the economy and lessening the chance that he/she will return to welfare dependence.

IMS services include appraisal (to ascertain the individual's aptitudes, interests, capabilities, and employability needs), orientation to the program and to the world of work, job development, referral to jobs, and development of jobseeking and job-retention skills. WIN sponsor staff help each participant develop a specific plan for looking for work and help to implement that plan. This is a concentrated course of service, usually involving the participant for no more than 6 weeks, and designed to enhance his/her ability to function effectively in the labor market without the need for continued institutional intervention.

Services

The full range of WIN services is available to registrants in Puerto Rico. In FY 1977, more than 500 individuals participated in institutional training; 276 were placed in on-the-job training, 138 in public service employment, and 15 in work experience. About a hundred registrants were entered in work and training programs funded from non-WIN sources, including CETA. About 4,000 individuals had been appraised, and 2,274 certified as ready for employment or for participation in a program of preparation for employment.

In FY 1975, 4,422 children in 1,567 families received day care services in Puerto Rico. About 1,200 families received assistance in family planning; 2,200

⁴ Work experience is unpaid work in a public or nonprofit private agency, to provide the individual with orientation to the world of work, the opportunity to sharpen skills, and/or become familiar with a work setting. There is not an employer-employee relationship and the individual is not necessarily employed by the agency in which placed upon termination of the work experience period.

were given remedial medical assistance and/or medical examinations. Other social services provided included home management training to 1,600 families, housing improvement aid to 570, and assistance with transportation to more than 900 families.

Program Results

In FY 1977, a little more than 25,000 persons in Puerto Rico were registered with WIN, about 7,500 of them new registrants in the fiscal year. (See table 2.) This is a drop of 11 percent from the previous year in new registrations. A possible reason for the decrease is the elimination of four WIN offices on the island in the spring of 1977. As a result, some AFDC recipients formerly in a WIN area are now geographically remote from the nearest project and therefore exempt from the mandatory registration requirement. More than half (56.8 percent) of the AFDC population in Puerto Rico resides in rural areas; only about 14 percent live in a central city. (See table 1.)

Despite fewer registrations, there was some rise in job entries in FY 1977. A total of 1,361 persons entered employment, a slight increase over the previous year's total of 1,335. (See table 2.) There was a concentration of employment in two occupational areas—services and benchwork, both relatively low-paid areas. More than 60 percent of the workers found jobs in those occupations, compared to less than 40 percent of all workers (nationwide) who entered employment from WIN. (See table 3.)

Average hourly wages at job entry were \$2.07. The average for men was \$1.98; for women, \$2.10.

Table 2.—WIN Statistics—U.S. Totals and Puerto Rico, FY 1977 (Preliminary)

	Puerto Rico	United States	Percentage, Puerto Rico of United States
Registrations:			
Total	25,082	2,328,294	1.1
On board			
Sept. 30, 1977	11,916	1,541,761	0.8
New	7,492	1,059,075	0.7
Entered employment	1,361	272,006	0.5
Employed, off AFDC	1,079	136,221	0.8
Job retention rates	77.8	76.7	
Services—WIN funded:			
Institutional			
training	518	32,183	1.6
Work experience	75	20,119	0.4
OJT	276	26,850	1.0
PSE	138	10,111	1.4
Services—non-WIN			
funded:	103	61,138	0.2
Percentage registrants			
completed:			
Less than 8 years			
of school	58.0	10.5	
9-11	33.1	48.7	
12	37.3	33.1	
More than 12	7.6	7.7	

Source: Employment Security Automated Reporting System (ESARS).

Table 3.—Job Entries, by Occupation—U.S. Total and Puerto Rico, FY 1977

[Percentage Distribution]

	Puerto Rico	United States
Total	100.0	100.0
Professional, technical, managerial	3.9	5.6
Clerical	6.9	13.7
Sales	3.5	4.3
Services	32.9	28.1
Farm, fishing, and forestry	3.2	2.1
Processing	4.1	3.8
Machine trades	4.7	5.5
Benchwork	29.7	8.5
Structural	4.9	8.4
All other	6.2	20.0

Puerto Rico is a non-UF jurisdiction (does not extend AFDC coverage to male heads of households). Therefore, male registrants are likely to be younger men with limited or no previous work experience, which may explain—at least in part—their lower wages as compared to those of women job entrants in Puerto Rico.

During the year, over a thousand employed WIN registrants were deregistered (terminated from the program) when their earnings were high enough for them to go off the AFDC rolls. Another 12,531 were deregistered when they left the AFDC rolls for reasons other than employment. The job retention rate of those entering employment compares favorably with that for WIN job entrants nationwide—a little more than three-fourths were still employed at the same job at the time of a 30-day followup. (See table 2.)

Funding

DOL funds are allocated to States (and other jurisdictions) on the basis of each jurisdiction's percentage of registrants during the previous January (i.e., January 1976 for FY 1977), and on the basis of incentives to improved program performance—as measured by welfare grant reductions and wages paid to WIN job entrants. The DHEW allocates social service funds on the basis of these same factors and previous social service expenditures.

In FY 1977, approximately \$1.9 million was expended for employment services in Puerto Rico, about 85 percent of the amount available for such services. Nearly \$1.2 million—the total amount available—was expended for social services.

The funding formula favors those jurisdictions with larger numbers of registrants, higher job entry wages, and higher welfare grant reductions. Registrants on board in Puerto Rico as of the end of September 1977 numbered 11,916—less than one percent of all WIN registrants on board at that time. Average job entry wages of \$2.07 per hour were lower than those in any other jurisdiction, well be-

low the national average of \$3.10. The \$47 month/average AFDC payment to families in Puerto Rico and Mississippi is the lowest paid in any jurisdiction, well below the national average of \$234 a month. Highest payment in any State was \$362 a month. Obviously, welfare grant reductions based on such a low-wage payment will be on a small scale.

Summary

In November 1977, unemployment in Puerto Rico stood at 18.7 percent—a rate substantially higher than that of any State on the mainland and only approached by that of Alaska (13.2 percent). No other State reported unemployment as high as 10 percent. The national average (unadjusted) was 6.4 percent.

The problem of unemployment in Puerto Rico is exacerbated by economic underdevelopment, a subject well documented and more appropriately dealt with by other agencies, and therefore not treated in this discussion.

A consideration for the WIN program in a depressed economy with extremely high unemployment is the nature of the population it serves. More than half of Puerto Rico's AFDC population resides in rural areas—if not remote from, at least not close to industry. Further, the educational attainment of the Puerto Rican WIN population is extremely low. Nationwide, only 10 percent of WIN registrants had failed to complete at least 8 years of school; the proportion in Puerto Rico was well over half (58 percent). (See table 4.) Fewer than 10 percent had completed 12 or more years of school. The WIN program is designed to help welfare recipients prepare for and enter employment, an objective hard to achieve in any economy with a shortage of jobs, an oversupply of labor (as measured by its unemployment rate), and a client population at a severe competitive disadvantage by reason of undereducation.

The impact of WIN upon the economy of the Commonwealth, then, must necessarily be very limited. The need for more industry and more jobs would appear to be overriding. However, efforts are being made to increase the efficiency and effectiveness of the program, and to direct its resources where they will have the greatest impact.

A reduction in the number of WIN offices from

Table 4.—Years of School Completed by WIN Registrants, United States and Puerto Rico, FY 1977

[Percentage Distribution]

	United States	Puerto Rico
Less than 8 years	10.3	58.0
8–11 years	48.7	33.1
12 years	33.2	7.3
More than 12 years	7.8	1.6

9 to 5 is a major step in this direction. Offices in locations that could not be effectively served were eliminated, to permit concentration of the WIN effort on areas of higher population density and proximity to sources of employment. Entries into employment have increased slightly as the early effects of the focus upon those most likely to find employment have become apparent.

Similar in intent—to direct services where they are most productive—is the inclusion of an IMS component in each of the 5 WIN offices in Puerto Rico. The component focuses upon job-ready segments of the WIN population, to facilitate their early entry into employment.

A related initiative is the Job Finding Club, first demonstrated (in WIN) in New York City's Harlem and then in other WIN projects, to give unemployed workers instruction and guided practice in job search. Participants in the club have found better jobs and in a shorter time than have control groups who have not had the job club experience. The project began in Puerto Rico on April 1.

A special effort project to train youthful workers for such jobs as autobody repairman and auto mechanic also began in Puerto Rico early in March and is expected to be a source of employment for youthful welfare recipients.

These initiatives will be closely examined. As their impact is assessed, other techniques and mechanisms will be explored, with the goal of improving the employment outlook for WIN clients in Puerto Rico.

EMPLOYMENT SERVICE

The basic role of the Employment Service as defined by the Wagner-Peyser Act is to place persons in employment by providing services to individuals in need of preparation and/or placement and to employers seeking qualified individuals to fill job openings. The USES and affiliated State agencies operate over 2,400 local offices to serve those seeking or needing employment and those providing it. General services offered include outreach, interviewing, testing, counseling and referral to placement, appropriate training, or other services involved in readying individuals for employment.

The Puerto Rico Bureau of Employment Service functions in a manner which is similar to all mainland employment service agencies. That is, their basic function is to serve those people seeking or needing employment by providing such services as outreach, interviewing, testing, counseling and referral to placement, and/or training. As a general rule, the basic difference between the service given through CETA I programs and ES agencies is that

the CETA I mandate is to provide training leading to employment. Thus, the CETA sponsors are generally dealing with participants who are *not* ready for direct job referral at the point of intake.

Employment Service agencies are generally dealing with participants who are ready for direct job referral at the time of intake. In those instances where CETA is dealing with programs that can utilize job ready participants (i.e., CETA II and VI), every effort is made to utilize existing ES systems to facilitate the recruitment process, and that section of this report dealing with CETA does discuss the degree to which linkages have been accomplished. In addition to the many CETA/PSE linkages, the Right to Employment Agency also used the Employment Service for recruitment in the Summer Youth Program. In the past year this amounted to 39,675 placements.

The agency's performance last year in terms of placements was outstanding and in terms of actual numbers was reported as 81,266, or 333 placements per ES staff year worked. This latter figure led the Nation in the past fiscal year. The most current data available (as of January 31) for the current year shows that the Puerto Rico agency has placed 9,024 persons which represents about 110 percent of their planned figure. For purposes of comparison, the agency had placed 13,000 people as of Jan. 31, 1977 and this figure represented 83 percent of their planned goals for Jan. 31, 1977.

In terms of persons served, the agency is serving economically disadvantaged (66,030 placements) and included in this group are women, youth, older workers, handicapped, and seasonal farmworkers. Unemployment insurance claimants and veterans were the bulk of other significant segments served by the agency. It is also worthy to note that even if CETA/PSE and summer placements were subtracted from agency totals, the agency still was one of the better producing agencies in the country and with

these placements removed, the agency was still in the top 10 nationally in terms of productivity.

In terms of organizational structure the Employment Service Agency is a part of the Puerto Rico Bureau of Employment Security, which includes an unemployment insurance division and a research and statistics division. The Bureau is under the direction of a director who has responsibility for the major organizational components. He in turn reports to the Puerto Rico Secretary of Labor through an Assistant Secretary for Human Resources. In addition to a central office staff there are 9 "area offices" staffed by ES employees who are considered as Commonwealth employees by the local government, with full Civil Service status. Subarea offices are also operated throughout the island and are available to provide services at the local level.

The Employment Service grants funding for FY 1978 is \$4,216,876. See tables 5 and 6 for further information.

UNEMPLOYMENT INSURANCE

The Unemployment Insurance (UI) program is a Federal-State program that pays financial benefits to insured workers who are involuntarily unemployed or seeking work. Each State has its own unemployment insurance law and is responsible for determining the criteria for eligibility, and amount and duration of benefits for its recipients.

All the States finance unemployment benefits from a trust fund supported by contributions from subject employers on the wages of their covered workers. The standard rate of taxation required of employers in most States is 2.7 percent, and is based on the first \$6,000 earned by a worker within a calendar year. Also, all State laws, except for Puerto Rico and the Virgin Islands, have in effect some system of experience rating by which individual employers' contribution rates are varied from the standard rate

Table 5.—U.S. Unemployment Service, Title III Funded Services to Target Groups, FY 1976 and FY 1977, Puerto Rico

	New and renewable applicants			Placed			Placed in jobs expected to last over 150 days			Counseled		
	FY 1977	FY 1976	Percent-age change	FY 1977	FY 1976	Percent-age change	FY 1977	FY 1976	Percent-age change	FY 1977	FY 1976	Percent-age change
Total	227,715	207,628	9.7	81,266	44,046	84.5	26,000	26,209	-0.8	8,819	6,848	28.8
Economically disadvantaged	182,828	150,755	21.3	66,030	33,496	97.1	20,585	18,323	12.4	7,101	4,950	43.4
Youth (under 22)	77,555	52,498	47.7	51,527	17,439	195.5	6,659	6,755	-1.4	3,790	2,987	26.9
Veterans:	12,555	13,777	-8.9	2,323	1,934	20.1	1,734	1,614	7.4	911	842	8.2
Vietnam era	6,785	7,692	-11.8	1,330	1,152	15.4	1,028	950	8.2	658	660	-0.3
Women	93,138	81,347	14.5	37,554	20,440	83.7	13,318	14,150	-5.9	4,251	3,566	19.2
Unemployment insurance claimants	106,319	116,552	-8.9	13,507	12,118	11.5	9,404	9,747	-3.5	3,020	2,495	21.0
Other welfare (non-WIN)	2,197	2,449	-10.3	900	996	-9.6	INA	INA	—	INA	INA	—
Handicapped	15,631	13,613	14.8	2,693	1,775	51.7	1,755	1,405	24.9	1,389	848	63.4

Note: Figures for Minority group not available.
INA—Information not available.

**Table 6.—U.S. Employment Service, Title III Funded Services to Target Groups,
FY 1976 and FY 1977, United States, Including Puerto Rico**

	New and renewal applicants			Placed			Placed in jobs expected to last over 150 days			Placed at \$3.50 per hour or more			Counseled		
	Percent-age change			Percent-age change			Percent-age change			Percent-age change			Percent-age change		
	FY 1977	FY 1976		FY 1977	FY 1976		FY 1977	FY 1976		FY 1977	FY 1976		FY 1977	FY 1976	
Total	13,647,738	12,629,436	8.1	3,732,152	2,981,488	25.2	2,467,439	2,044,647	20.7	866,164	506,137	71.1	613,035	569,328	7.7
Economically disadvantaged	2,780,109	2,494,945	11.4	1,070,138	774,058	38.3	557,810	535,157	4.2	178,870	81,118	120.5	193,105	180,319	7.1
Youth (under 22) ..	4,442,972	3,955,360	23.5	1,681,619	1,281,580	31.2	850,103	706,398	20.3	205,784	101,571	102.6	209,587	198,744	5.5
Veterans	2,352,382	2,334,541	0.8	644,426	527,483	22.2	525,376	524,270	23.8	298,849	183,445	62.9	153,288	148,399	3.3
Vietnam veterans ...	1,447,509	1,430,282	1.2	440,293	356,822	23.4	367,405	294,866	24.6	205,097	120,427	70.3	101,984	102,909	-0.9
Disabled veterans ...	127,000	125,600	1.1	36,600	30,000	22.0	29,600	23,400	26.5	15,500	8,700	78.2	15,900	15,600	1.9
Minority	3,637,631	3,196,071	13.8	1,131,268	877,791	28.9	648,749	546,016	18.8	214,655	119,715	79.3	185,630	176,747	5.0
Women	5,992,684	5,401,882	10.9	1,522,880	1,225,818	24.2	1,032,690	878,261	17.6	194,619	104,650	86.0	247,438	217,782	13.6
Unemployment insurance claimants ..	4,186,080	4,287,489	-2.4	687,218	600,946	14.5	570,996	502,021	13.7	258,345	160,353	61.1	161,937	165,532	-2.2
Other welfare (non-WIN) ..	393,219	395,005	-0.5	147,027	97,658	50.6	137,908	112,316	22.8	51,986	28,714	81.0	108,404	98,830	9.7
Handicapped ..	734,899	695,828	5.6	176,554	144,621	22.1									

on the basis of their experience with the risk of unemployment.

Regular Unemployment Insurance

All States require that an individual must have earned a specified amount of wages or must have worked for a certain period of time within the base period, or both, to qualify for benefits. Most States compute the benefit amount as a fraction of a claimants' wages in his highest calendar quarter of base period earnings. These formulas are generally designed to give the claimants about 50 percent of their weekly wages, up to a specified maximum. The duration in benefits in most States is related to the claimant's wages, but the most common maximum is 26 weeks.

Federal-State Extended Benefits

All States provide up to an additional 13 weeks of benefits during periods of high unemployment through a program financed equally from Federal and State funds. This program is "triggered" on and off by means of national and State seasonally adjusted insured unemployment rates that fall above or below a prescribed level.

Federal Supplemental Benefits and Special Unemployment Assistance

The Emergency Unemployment Compensation Act of 1974 allowed individuals who had exhausted both their regular unemployment insurance (RUI) and the extended benefits entitlement to draw additional emergency benefits equal to 100 percent of their RUI benefit entitlement, not to exceed 26 weeks.

The Federal Supplemental Benefits (FSB) program later was modified again so that benefits up to 13 weeks or a maximum of 52 weeks total could be paid in States with a rate of at least 5 percent.

The Emergency Jobs and Unemployment Assistance Act, Title II, provided a temporary program of Special Unemployment Assistance (SUA) funded entirely by Federal general tax revenues. This program was developed to provide benefits to unemployed workers who were not covered by regular Federal or State unemployment insurance programs of up to 26 weeks. The duration was increased later to a maximum SUA benefit duration of 39 weeks.

Both the FSB and SUA programs are now terminated.

UI—Puerto Rico

The Puerto Rico unemployment insurance law, enacted in June of 1956 and approved by the Secretary of Labor under the provisions of section 3304 of the Internal Revenue Code, enables Puerto Rico to participate in the Federal/State UI program to the same extent and with the same privileges afforded to the 50 States and the District of Columbia. This includes the EB and FSB programs.

The Unemployment Insurance Division is organized into 10 area offices, 18 suboffices, and 16 itinerant points to supplement the central office operations and provide services to UI claimants.

There are currently approximately 51,000 employers registered with the agency as subject to the UI law. Continued claims for benefits are filed in person at the various local offices on a biweekly basis except interstate and intrastate partial claims which are filed biweekly by mail.

Puerto Rico employers are presently paying into the State Unemployment Trust Fund at the rate of 3 percent of all covered wages, with the exception of agricultural employers, who pay 2.95 percent. Tax-exempt nonprofit organizations as well as hospitals and institutions of higher education operated by the Commonwealth are also subject to the tax. Agricultural labor is covered under the law with certain limitations. These rates are quite high compared with other States since they cover 100 percent of wages whereas most State taxes cover only a fraction of total wages or the first \$6,000. Currently, Puerto Rico's trust fund is depleted and they have had to borrow funds from the Federal Unemployment Account (loan fund), totaling \$88.7 million. Over the past 6 years, a total of 24 States have had to request such loans. These funds are repayable but require no interest and no specific time period during which they must be paid back. However, the Federal tax offset credit is reduced after the third year in which there is an outstanding loan. This offset credit reduction or Federal penalty tax has been deferred temporarily up through 1980 if States have taken action to improve the fund condition in accordance with the Secretary of Labor's regulations. To qualify for UI benefits, a registrant's earnings in a certain period must exceed the qualifying wage (this qualifying wage must be at least \$280 in wages earned in the base period with at least \$75 earned in each quarter) which is calculated as a multiple of the weekly benefit amount the registrant would receive. The duration of entitlement to regular UI benefits is a uniform 20 weeks for all those who qualify. When unemployment exceeds either the State or national trigger, claimants are also eligible for a uniform 10 weeks of extended benefits (EB). Puerto Rico claimants were eligible for FSB benefits prior to the termination of that program.

Table 7.—Proportion Percentage of Persons Collecting the Full Allotment of Weeks for Regular, Extended, and Federal Supplementary Benefits for Puerto Rico and the United States, 1975–77

Year	Puerto Rico	United States
Regular benefits		
1975	70.7	37.8
1976	72.5	38.3
1977	72.7	33.8
Extended benefits		
1975	70.4	70.0
1976	81.6	82.0
1977	95.1	65.0
Federal supplementary benefits		
1975	50.6	46.0
1976	80.2	71.0
1977	59.0	70.0

Source: ES 210 Reports.

Differences in the unemployment statistics of Puerto Rico and the United States are indicated in tables 11 to 16, presented at the end of this section. Although some of these statistics are not strictly comparable because of unique provisions contained in the Puerto Rico law, a large element of comparability remains. However, prior to considering the data, two significant factors must be taken into account. First, there is an unusual provision in their law which allows for extension of benefits for an additional 32 weeks in certain industries, occupations, or establishments where a "special unemployment situation" exists. There have been several such occurrences in the past, and certain sectors of the Puerto Rico economy are presently affected. Data cannot be readily obtained on the number of individuals involved since the agency does not report such activity separately. The second major factor is that unlike other State unemployment insurance laws, weekly earnings equal to the weekly benefit amount are disregarded when computing weekly benefits payable. Thus, Puerto Rico claimants receive benefits while under most other State unemployment insurance laws they would be disqualified due to earnings.

If due consideration is given to the variations between State unemployment insurance laws, comparisons such as the following may be made:

1. Total unemployment has remained consistently higher in Puerto Rico than in the United States as a whole. For example, in 1972 Puerto Rico experienced unemployment of 11.9 percent compared to the U.S. rate of 5.6 percent, or approximately double the national rate. While the national unemployment rate peaked in 1975, the Puerto Rico experience has increased steadily through 1977 (table 8).

Table 8.—Total Unemployment Rates, Percentage CY's 1970–77, United States and Puerto Rico

Year	Puerto Rico	United States
1972	11.9	5.6
1973	11.7	4.9
1974	13.3	5.6
1975	18.2	8.5
1976	19.6	7.7
1977	19.9	7.0

Source: Bureau of Labor Statistics.

2. As evidenced in table 9, Puerto Rico's insured unemployment rate (IUR) more closely parallels the national trend. That is, both IUP's peaked in 1975 and have been declining through 1977. However, again Puerto Rico has maintained a rate much greater than the national average. The latest data available from the Employment and Training Administration's Office of Administration and Management shows that for the 13-week period ending

Table 9.—Insured Unemployment Rates (Unadjusted)

[In percentages]

	Puerto Rico ¹	United States (including Puerto Rico)	San Juan	Ponce	Mayaguez
1972	11.3	3.5	3.1	6.6	9.1
1973	10.2	2.7	3.0	8.2	5.1
1974	10.9	3.5	3.3	10.4	9.4
1975	15.0	6.0	4.4	12.9	10.5
1976	12.8	4.6	(²)	(²)	(²)
1977	³ 12.5	³ 3.8			
January	14.8	5.5			
February	14.0	5.5			
March	12.3	4.8			
April	11.9	4.1			
May	11.8	3.6			
June	11.6	3.4			
July	12.1	3.6			
August	12.5	3.4			
September	12.1	3.1			
October	11.8	3.0			
November	12.2	3.3			
December	³ 11.7	³ 3.9			

¹ Excludes sugarcane workers.

² No data after 1975.

³ Preliminary.

Source: Employment Service 210 Reports, ETA and BLS.

March 4, 1978, the *seasonally adjusted* IUR was 4.12 percent nationally and 17.4 percent for Puerto Rico. To some degree this is explained by the fact that Puerto Rico is one of 9 States whose law contains the most liberal definition of "employer" with respect to UI coverage. Whereas most States have adopted the Federal definition of employer; i.e., a quarterly payroll of \$1,500 in the current or preceding calendar year or one worker in 20 weeks, Puerto Rico includes all employers who have any covered service in their employ. This significantly increases the base number of individuals potentially eligible for UI benefits by including the smallest of employing units. Also, the "special unemployment situation" provision in the Puerto Rico UI law increases the number and duration of possible UI beneficiaries.

3. The remaining tables reveal that the proportion of claimants who collect their final payments is higher in Puerto Rico than in the United States. In 1977, the exhaustion rates for regular benefits in Puerto Rico and the United States were 75 percent and 36.5 percent respectively (table 11). Although Puerto Rico's duration is 20 weeks while the majority of States provide a maximum of 26 weeks, this is insufficient to explain the large variance in exhaustion rates. The percentage of exhaustees for EB and PSB show smaller variances, which supports the theory that prolonged periods of unemployment are likely due to factors beyond the individual's control. (Note: Although table 13 shows a substantial decline in exhaustees for Puerto Rico, reporting errors by the agency are believed to be the cause.)

When analyzing Puerto Rico's UI system, several factors in addition to the economic situation must

be considered. Among these are differences in qualifying and eligibility requirements in the State laws, administrative interpretation of the statutes and the resultant administrative policies, the extent to which such policies are implemented and adhered to by the field staff, and agency understanding of the statistical reporting system. Administrative emphases are directly related to economic conditions; namely, the labor market situation and the solvency of the UI fund. Because Puerto Rico is in debt by \$88.7 million, qualification and eligibility requirements have become more stringent in an attempt to alleviate the severe financial drain on the UI fund. In addition the agency has expanded its efforts to assist claimants in obtaining employment via the Employment Service and CETA. Thus, the emphasis is now turning toward providing UI benefits only to those who truly meet the requirements and at the same time increasing their exposure to the existing labor market.

Table 10.—Number of Insured Unemployment in Puerto Rico, CY 1972–77

Year	San Juan	Ponce	Mayaguez	Puerto Rico total	United States excluding Puerto Rico (in thousands)
1972	8,600	2,900	2,200	54,600	1,793.9
1973	7,700	2,900	1,300	53,600	1,578.7
1974	9,600	4,000	2,700	59,500	2,202.4
1975	13,200	4,000	2,300	73,700	3,912.5
1976	15,000	4,700	2,400	69,100	2,922.4
1977	13,700	4,400	2,400	¹ 63,600	¹ 2,552.2
January				70,555	3,567.6
February				66,417	3,580.8
March				52,503	3,114.6
April				54,651	2,697.7
May				54,353	2,360.0
June				54,016	2,236.8
July				63,664	2,401.1
August				69,321	2,252.5
September				69,021	2,019.5
October				67,985	2,003.0
November				67,558	2,206.8
December				59,408	2,384.3

¹ Preliminary.

Source: *Employment and Training Report of the President*.

Table 11.—Regular UI State Benefits—First and Final Payments, CY 1972–77

[In thousands of dollars]

Calendar year	Puerto Rico		United States excluding Puerto Rico	
	First payments	Final payments	First payments	Final payments
1972	114.6	73.8	5,612.9	1,754.4
1973	126.8	68.4	5,218.5	1,439.6
1974	141.1	81.6	7,605.0	1,861.0
1975	154.3	109.0	11,021.2	4,101.6
1976	157.8	114.3	8,419.2	3,171.5
1977	142.6	107.0	7,859.5	2,865.0

Source: ES 213 Report, ETA.

Table 12.—State UI—Extended Benefits, First and Final Payments for Unemployed Workers, CY 1972–77

[In thousands of dollars]

Calendar year	Puerto Rico		United States excluding Puerto Rico	
	First payments	Final payments	First payments	Final payments
1972	66.8	30.1	1,022.0	502.4
1973	(1)	(1)	244.2	176.0
1974	(1)	(1)	915.2	467.1
1975	85.6	60.2	3,926.5	2,416.9
1976	95.7	78.1	3,157.6	2,327.5
1977	82.6	68.6	2,171.8	1,428.8

¹ EB "triggers" were off during this period for Puerto Rico.

Source: ES 213 Report, ETA.

Table 13.—Federal Supplemental Benefits, CY 1975–77

Item and calendar year	Puerto Rico	Percentage change	United States excluding Puerto Rico	Percentage change
First payments:				
1975	63,496		2,582,582	
1976	93,570	+47	2,124,676	-18
1977 (11 mos.)	51,911	-45	1,117,472	-47
Final payments:				
1975	32,129		1,178,677	
1976	74,998	+133	1,503,655	+28
1977 (11 mos.)	26,294	-65	848,034	-44
Average weekly number of beneficiaries:				
1975	10,593		627,306	
1976	21,326	+101	728,127	+16
1977 (11 mos.)	7,320	-66	163,632	-78

Source: ES 213 Report, ETA.

PUERTO RICO APPRENTICESHIP PROGRAM

The Department of Labor's role in apprenticeship was initiated through passage of the National Apprenticeship Act (The Fitzgerald Act) in 1937 and the responsibility for administering this Act is charged to the Department's Bureau of Apprenticeship and Training. Their task includes formulating and promoting labor standards necessary to protect the welfare of apprentices; bringing together employers and labor to formulate apprenticeship pro-

Table 14.—Special Unemployment Assistance, CY 1975–77

Item and calendar year	Puerto Rico	Percentage change	United States excluding Puerto Rico	Percentage change
Final payments:				
1975	32,589		1,082,160	
1976	35,332	+8	1,108,564	+2
1977 (11 mos.)	49,152	+39	561,322	-49
Final payments:				
1975	10,334		125,482	
1976	22,291	+116	194,247	+55
1977 (11 mos.)	23,166	+4	171,231	-12
Average weekly number of beneficiaries:				
1975	7,547		243,416	
1976	10,389	+38	332,658	+37
1977 (11 mos.)	17,602	+69	202,062	-39

Source: ES 213 Report, ETA.

grams; and cooperating with and assisting State apprenticeship agencies.

Puerto Rico has an Apprenticeship Council that, among their many responsibilities, registers programs and negotiates apprenticeship agreements in accordance with Federal standards. The BAT provides the Puerto Rico Apprenticeship Council with several types of support such as serving on the Council as consultants (i.e., legal advice or program development) or conducting reviews in possible grievance cases.

Support of apprenticeship programs, including those in Puerto Rico, are totally financed by industry. However, some support is given to cover the costs of producing State and National Apprenticeship Program Summaries (SNAPS) data and this amount is based upon the number of reported apprentices registered during the year. In 1977, Puerto Rico received \$1,300 for their SNAPS program.

The Bureau of Apprenticeship and Training recognizes 445 occupations as apprenticeable with Puerto Rico showing apprentices registered in approximately 170 different occupations. National registration figures for the first 6 months in 1977 show a decline from 254,008 to 244,597 while Puerto Rico shows an increase in registration from 1,566 to 1,828. This indicates that the recession af-

Table 15.—Ratio of Average Weekly Number of Beneficiaries to Number of Unemployed (Regular)

Year	Puerto Rico			United States		
	Average weekly number of beneficiaries	Number of unemployed (thousands)	Ratio	Average weekly number of beneficiaries	Number of unemployed (thousands)	Ratio
1972	37,737	111	0.34	1,534,231	4,840	0.32
1973	38,216	112	.34	1,332,007	4,304	.31
1974	43,275	116	.37	1,832,900	5,076	.36
1975	52,383	157	.33	3,311,487	7,830	.42
1976	45,177			2,388,200	7,288	.33
1977	138,579			2,151,900	6,856	

¹ Weighted average for first two quarters (using 25.8 weeks).

Source: ES 213 Report, ETA.

fects the apprenticeship program more in the United States than in Puerto Rico.

The Bureau of Apprenticeship and Training has no definite information regarding growth industries in Puerto Rico. However, we would suggest the promotion and development of apprenticeship training programs in the health services, energy and related trades, also the environmental protection and related trades. A review of table 17 shows that much more can be done in the many other recognized trades. Of a total of 1,828 registered apprentices, 1,043 or 57 percent of the apprentices were enrolled as automobile mechanics and automobile repairmen. These statistics indicate a need for much greater diversification of apprenticeship training programs. Apprenticeship registrations are influenced by the cyclical changes in the economy. In particular, weakness is noted in several of the construction trades as well as in some of the key miscellaneous trades.

Recently, we have learned that the BAT staff has suffered severe cuts which also tend to limit the ability of the current staff to promote and develop apprenticeship programs in new trade areas as cited in the New Initiatives in Apprenticeship.

Puerto Rico is in process of modifying the Apprenticeship Law in order to comply with provisions of Title 29 CFR, Part 29 "Apprenticeship Programs." One modification will reduce the minimum on-the-job work experience necessary to meet the apprenticeship criteria from 4,000 hours to 2,000 hours. This will open a number of occupations to apprenticeability, in particular, occupations in the health field, energy related field, the police and fire

Table 16.—Average Weekly Number of Beneficiaries Under the Regular State UI Program, CY 1972-77

Year	Puerto Rico (thousands)	Percentage change	United States (thousands)	Percentage change
1972	37.7		1,534.2	
1973	38.2	+1	1,332.0	-13
1974	43.3	+13	1,832.9	+38
1975	52.4	+21	3,311.5	+80
1976	45.1	-14	2,388.2	-28
1977	42.9	-5	2,151.9	-10
Percentage change 1972 to July 1977		+14		+40

Source: ES 213 Report, ETA.

Table 17.—Registered Apprentices as of June 30, 1977

Number of registered apprentices:		
Puerto Rico	1,828	
United States ¹	244,597	
Number of registered veterans:		
Puerto Rico	48	Percentage 2
United States ¹	75,682	29
Puerto Rico—Registered Apprentices by Occupational Group		
Occupational group	Number of apprentices	
Air-conditioning and refrigeration mechanic	108	
Auto and related mechanic	932	
Auto and related body repair	111	
Barbers, beauticians	25	
Bookbinders, bindery workers	10	
Bricklayers, stove and tile setters	7	
Butchers, meatcutters	7	
Cabinetmaker, wood machinists	125	
Carpenters	9	
Cement masons	10	
Compositors	6	
Cooks, bakers	39	
Drafters	12	
Electrical workers	19	
Electricians	14	
Electronic technician	1	
Lithographers	1	
Machine set-up	9	
Machinists	15	
Maintenance mechanics	6	
Mechanics and repairers	37	
Office machine servicers	1	
Optical workers	8	
Ornamental ironworkers	34	
Plumbers	5	
Press operators	2	
Radio and TV repairers	10	
Sheet metal workers	12	
Structural steel workers	3	
Toolmakers, diemakers	42	
Miscellaneous trades N.E.C.	208	
Total registered apprentices	1,828	
Total male apprentices	1,714	
Total female apprentices	114	

¹ United States totals include Puerto Rico.

fighter fields, as well as newly emerging occupations.

A very strong effort should be made to develop program linkages with the CETA/OJT, STIP, and HIRE programs. In fact, BAT has discussed this concept with the former Director of Apprenticeship. They have been informed that the CETA prime sponsors have had little or no contact with the persons responsible for apprenticeship programs and we are unable to determine whether or not the Right To Work Administration will initiate action in this area.

Chapter IV.—Wage Structure in Puerto Rico

INDUSTRIAL SETTING

Fundamental to an understanding of the differences in wage structure between Puerto Rico and the U.S. mainland is an appreciation of the changes that are taking place in the industrial and occupational composition of the economy. Not only have wage rates for comparable work risen rapidly, but the emphasis is changing from an economy concentrating on low-wage, low-skill, labor-intensive industries to one fairly similar to that of the U.S. labor force. Nevertheless, considerable and noteworthy differences remain.

With respect to the industrial mix, Puerto Rico in 1978 had more than twice as many workers in the public sector, 39 percent of the employed civilian wage and salary workers, as compared to 17 percent on the mainland. Moreover, this public sector employment is unique in that it includes a substantial number of workers engaged in activities normally handled by the private sector. For example, the sugar industry has been run by the Puerto Rican Government since early 1974. Shipping, bus transport, communications, certain types of fruit canning are further examples.

The larger proportion of Puerto Rican workers in agriculture should also be noted, as that is one of the lower paying industries (notwithstanding Government subsidies). The decline in agricultural employment has been a basic structural change in the U.S. economy as well as Puerto Rico. The change in Puerto Rico has been especially rapid: in 1950 agriculture represented over one-third of the employed labor force; in 1960 less than one-fourth; in 1965 less than one-fifth; and in 1972 less than one out of every 12 workers was in agriculture, but by 1978 the number had dwindled to only 3 percent.

As to be expected in a developing economy, the construction industry had been relatively more important in Puerto; and being a high wage industry, this would tend to exert an upward bias on average earnings. In 1950, this industry represented 4.5 percent of the employed civilian labor force; by 1972 it had risen to 10.9 percent; but with the recession in general construction activity in recent years, employment dropped to 7.5 percent of the labor force in 1976. By 1978 it was only 5.5 percent—or only slightly higher than the U.S. mainland. The following distributions of employed wage and salary workers were reported in 1978.

Industry Division	United States		Puerto Rico	
	Number (thousands)	Percent	Number (thousands)	Percent
All industries	90,730	100	657.0	100
Private sector	75,083	82.8	402.0	61.2
Agriculture	1,596	1.8	19.5	3.0
Mining	894	1.0	0.9	0.1
Contract construction	4,586	5.1	36.0	5.5
Manufacturing	20,651	22.8	134.2	20.4
Transportation and public utilities	4,908	5.4	20.4	3.1
Wholesale trade	4,932	5.4	29.2	4.4
Retail trade	14,702	16.2	67.7	10.3
Finance, insurance and real estate	4,724	5.2	19.1	2.9
Service industries (except private household)	16,245	17.9	64.0	9.7
Private households	1,845	2.0	11.0	1.7
Public sector	15,647	17.2	255.0	38.8
Federal Government	2,744	3.0	10.2	1.6
State and local government	12,903	14.2	244.8	37.3

Source: Employment Standards Administration, Division of Evaluation and Research. Data are for March 1978 for Puerto Rico and September 1978 for the United States.

Within the private sector, the distribution of employment by major industry group in 1978 was fairly similar, the nonmanufacturing and service trades being slightly less important, and manufacturing and construction somewhat more important, than on the mainland:

Private sector industries	United States	Puerto Rico
Total	100	100
Agriculture	2.1	0.2
Mining	1.2	0.2
Contract construction	6.1	9.0
Manufacturing	27.5	33.4
Transportation and public utilities	6.5	5.1
Wholesale trade	6.6	7.3
Retail trade	19.6	16.8
Finance insurance and real estate	6.3	4.7
Service industries	21.6	15.9
Private households	2.5	2.7

Source: Derived from above table, based on private sector employment of 75.1 million total for the United States and 402,000 for Puerto Rico.

It is within the manufacturing sector that differences occur in the industrial composition which would exert a depressing effect on the average hourly earnings of Puerto Rican workers. Manufacturing is important not only for being the largest of the major segments of the Puerto Rican economy, but also because it affects the growth of other sectors. It is estimated that for every manufacturing job two more jobs are created in such fields as construction, government, the service trades, finance and insurance. Furthermore, most of the output of Puerto Rican factories enters the U.S. mainland market in competition with mainland producers. For many years, among the most substantial manufacturing industries have been tobacco, textiles, leather goods (including footwear), and above all, apparel—all low-wage, labor-intensive, low-skill industries. In October 1978, these industries accounted for roughly 37 percent of all manufacturing employment in Puerto Rico, while in the States these same industries accounted for only about 15 percent. In earlier years these low wage industries had been even more important.

Not only the average hourly earnings but also the distribution of earnings differs markedly in Puerto Rico. In industry after industry studied in connection with the FLSA minimum wage order program, the wage structures have shown a heavy concentration at or close to the legal minimum; hence the relatively small spread between the minimum and average wage. Construction is one major exception. While this subject will be treated in more detail in the chapter on minimum wages, it will suffice to note that there has been some improvement in the size of the spread in the higher-skilled high-technology industries, as attested by increases in the average

hourly earnings in the chemical, petroleum, electrical products, and scientific instrument industries, where the FLSA statutory minimum has been in effect for at least 2½ years. In the low wage, labor intensive manufacturing industries, the picture has not changed appreciably over the years.

An illustration of the clustering around the minimum, taken from individual wage studies prepared between 1975 and 1977 for use at industry committee reviews, is shown in table 1. This represents the latest available data on 21 wage orders where the FLSA rate is below the mainland statutory level.

OCCUPATIONAL WAGE RATES

With respect to occupational wage rates, only piecemeal information is available. A study by the U.S. Bureau of Labor Statistics of office, clerical, and plant workers in larger establishments (with 50 or more workers) in 23 selected occupations showed straight-time average hourly earnings in December 1978 ranging from \$2.72 to \$2.77 for guards and watchmen, \$3.00 for shipping packers and \$2.97 for janitors, porters, and cleaners to \$6.79 for Class A computer operators. (See table 2.)

AVERAGE HOURLY EARNINGS IN MAJOR SECTORS

1. Manufacturing

Average hourly earnings in manufacturing industries in Puerto Rico amounted to \$3.45 in October 1978. This is about 55 percent of the \$5.78 average reported for October 1978 for the United States. Over the past decade, manufacturing earnings have doubled in both places with a slight edge for Puerto Rico. In 1966, manufacturing earnings in Puerto Rico were about 48 percent of those in the States, (\$1.31 vs. \$2.75) so that Puerto Rico has improved in relative as well as absolute terms. However, the improvement took place in the 1960's; during the 1970's—the ratio remained at around 53 to 54 percent.

	Average hourly earnings in manufacturing		
	Puerto Rico	United States	Puerto Rico as a percentage of United States
1966	\$1.31	\$2.75	47.6
1970	1.78	3.37	52.8
1971	1.91	3.59	53.2
1972	2.04	3.87	52.7
1973	2.17	4.15	52.3
1974	2.40	4.57	52.5
1975	2.59	4.90	52.9
1976	2.86	5.28	54.2
1977	3.10	5.78	53.6
1978	3.45	6.32	54.6

Table 1.—Percentage of Workers in Various Industries in Puerto Rico Earning Exactly the FLSA Minimum and Certain Specified Rates Above it, 1975-77

Industry and Classification	Survey date	FLSA minimum rate	Average hourly earnings	Exactly the FLSA minimum	Percentage of workers earning—		
					As much as—		
					10 cents above minimum	15 cents above minimum	20 cents above minimum
Construction	November 1976	\$2.10	\$2.99	10.7	12.7	25.2	25.3
Retail trade	February 1976	1.90	2.39	11.9	12.1	38.0	39.9
Agriculture:							
Sugar cane—other workers:							
Planting	August 1975	1.60	1.76	10.4	10.7	67.9	89.2
Harvesting	February 1976	1.60	1.77	33.3	33.8	48.5	79.4
Dairy—other workers	February 1976	1.55	1.62	76.8	79.4	90.3	90.7
Livestock—other workers	February 1976	1.55	1.62	74.1	78.8	82.1	92.7
Coffee farms—other workers:							
Planting	May 1975	1.40	1.41	98.2	98.8	98.8	99.1
Harvesting	November 1975	1.40	1.40	96.9	99.2	99.3	99.5
Tobacco—other workers:							
Planting	August 1975	1.40	1.40	100.0	—	—	—
Harvesting	February 1976	1.40	1.40	100.0	—	—	—
Other farms—other workers	February 1976	1.40	1.49	72.1	75.9	84.5	88.2
Manufacturing industries:							
Tobacco—pre-1961 coverage:							
Filler tobacco processing	August 1976	1.56	1.56	97.6	99.0	99.0	99.0
Wrapper tobacco processing	August 1976	1.82	1.93	72.8	78.0	78.7	78.7
Machine threshing other products	August 1976	2.04	2.37	25.0	39.3	39.3	46.4
Other products and activities	August 1976	2.11	2.25	40.4	57.5	68.9	78.7
Leather goods—pre-1961 coverage:							
Belts	May 1977	2.27½	2.43	2.3	68.9	79.0	80.6
Other products and activities	May 1977	2.10	2.36	38.1	55.2	62.0	66.4
Textile mill products pre-1961 coverage							
Hooked rugs—other products	November 1975	1.57	2.25	0	0	0	0.6
Other products and activities	November 1975	1.75	2.18	20.6	26.2	28.9	38.7
Non rubber footwear pre-1966 coverage	November 1975	1.75	2.02	35.3	42.3	50.6	62.0
Rubber and plastic footwear	November 1975	1.75	2.25	9.5	19.9	28.1	36.5
Gloves and mittens pre-1961 coverage:							
Other products and activities	May 1977	2.21	2.37	48.5	65.0	N.A.	78.4
Hosiery pre-1966 coverage:							
Women's hosiery	May 1977	2.18	2.42	30.0	50.0	55.0	63.0
Other hosiery	May 1977	1.97	2.30	8.5	27.1	34.0	38.3
Sweater and knit swimwear	May 1977	2.28	2.49	50.7	64.8	70.0	72.0
Stone, clay, and glass pre-1961 coverage:							
Art pottery	August 1976	1.67	2.16	0	40.0	45.0	45.0
Vitreous and semi-vitreous china	August 1976	2.13	2.39	0.4	0.8	57.6	68.9
Jewelry and miscellaneous industries:							
pre-1961 coverage:							
Straw and hair products	August 1976	1.84	1.98	0	67.9	79.8	88.1
Other products and activities	August 1976	2.05	2.28	39.1	43.0	64.8	68.4
Furniture and fixtures and lumber	August 1976	2.10	2.39	39.0	48.9	49.3	56.1
Handkerchiefs, scarves, and art linens							
pre-1961 coverage:							
Other products	May 1977	1.70	1.79	70.5	74.8	79.9	82.3
Women's outerwear, needlework and fabricated textile products							
1966 coverage	May 1977	2.29	2.48	43.8	72.9	77.0	78.0
Children's dress and related products							
pre-1961 coverage:							
Other operations	May 1975	1.90	2.08	30.6	47.0	74.9	78.6
Women's and children's underwear							
pre-1961 coverage	May 1977	2.20	2.42	39.7	47.8	67.8	70.9
Corsets and brassieres pre-1961 coverage	May 1977	2.28	2.57	17.9	18.5	57.4	66.1
Men's and boys' clothing pre-1961 coverage:							
Work clothing and separate trousers	May 1977	2.22	2.46	43.3	50.1	55.0	63.4
Other products and activities	May 1977	2.15	2.39	42.3	48.4	58.3	65.0
1961 coverage	May 1977	2.15	2.27	74.4	78.6	80.9	83.9
1966 coverage (trousers and other products)	May 1977	2.22	2.33	38.3	86.7	88.4	90.1
Food and kindred products pre-1966 coverage:							
Milk processing and distribution	May 1976	2.05	2.37	37.7	47.8	55.0	61.7
Candy and gum products 1961 coverage	May 1976	2.00	2.23	0	60.6	60.6	60.6
Other products and activities	May 1976	2.15	2.47	32.7	39.4	51.2	58.6

¹ Commonwealth of Puerto Rico minimum rate of \$2 applied to all except gasoline service station workers.

² As much as 7½ cents above the minimum.

³ As much as 12½ cents above the minimum.

⁴ Estimated.

⁵ Within 9 cents of minimum.

⁶ Within 19 cents of minimum.

⁷ Within 2 cents of the minimum.

⁸ Within 12 cents of the minimum.

⁹ Within 22 cents of the minimum.

¹⁰ Within 8 cents of the minimum.

¹¹ Within 13 cents of the minimum.

¹² Within 18 cents of the minimum.

¹³ Within 23 cents of the minimum.

Source: Studies by the Wage and Hour Division, U.S. Department of Labor.

Table 2.—Hourly Earnings of Office, Clerical, and Plant Workers in Puerto Rico, December 1976

Occupation ¹	Number of workers			Hourly earnings (all workers) ¹			Number of workers receiving straight-time hourly earnings of—				
	All	Men	Women	Mean	Median	Middle range	\$1.90 and under \$2.00	\$2.00 and under \$2.10	\$2.10 and under \$2.20	\$2.20 and under \$2.30	\$2.30 and under \$2.40
Secretaries	1,815	14	1,801	\$3.88	\$3.74	\$3.30-\$4.30	—	4	—	4	10
Secretaries, class A	120	—	120	4.67	4.37	4.00- 5.33	—	—	—	—	—
Secretaries, class B	412	12	400	4.05	3.78	3.46- 4.50	—	—	—	—	—
Secretaries, class C	509	1	508	4.03	4.00	3.40- 4.65	—	4	—	2	3
Secretaries, class D	774	1	773	3.56	3.49	3.14- 3.84	—	—	—	2	7
Stenographers, general	141	—	141	3.56	3.58	3.11- 4.12	—	—	—	—	1
Stenographers, senior	252	—	252	3.67	3.31	3.05- 4.20	—	—	—	—	4
Typists, class B	907	20	887	2.97	2.88	2.60- 3.19	—	—	—	4	71
File clerks, class B	146	56	90	3.24	3.02	2.73- 3.60	—	—	—	—	—
File clerks, class C	303	153	150	2.77	2.74	2.39- 3.01	—	—	17	—	63
Switchboard operators	200	9	191	2.84	2.77	2.59- 2.93	—	—	—	—	25
Key punch operators, class A	121	13	108	3.45	3.46	3.02- 3.89	—	—	—	—	—
Key punch operators, class B	278	43	235	3.28	3.20	2.95- 3.48	—	—	—	—	4
Electronics technicians	197	197	—	5.90	5.63	4.82- 7.01	—	—	—	—	—
Electronics technicians, class A	41	41	—	7.41	7.65	6.27- 8.29	—	—	—	—	—
Electronics technicians, class B	100	100	—	5.66	5.63	5.08- 6.32	—	—	—	—	—
Electronics technicians, class C	56	56	—	5.24	4.82	4.77- 6.51	—	—	—	—	—
Maintenance carpenters	152	152	—	3.83	3.74	3.09- 4.05	—	—	—	—	3
Maintenance electricians	373	373	—	4.52	4.82	3.88- 5.04	—	—	—	—	—
Maintenance painters	68	68	—	3.73	3.16	2.88- 5.28	—	—	—	—	—
Maintenance machinists	127	127	—	4.76	4.82	4.34- 5.63	—	—	—	—	—
Maintenance mechanics (machinery)	795	795	—	3.94	3.93	3.18- 4.41	—	—	8	2	18
Maintenance mechanics (motor vehicles)	354	354	—	3.96	3.96	3.35- 4.40	—	—	—	2	—
Maintenance pipefitters	130	130	—	5.53	5.66	5.66- 5.66	—	—	—	—	—
Tool and die makers	59	59	—	4.77	4.95	4.25- 5.00	—	—	—	—	—
Stationary engineers	84	84	—	4.77	4.82	3.86- 5.63	—	—	—	—	—
Boiler tenders	140	140	—	4.29	4.13	3.22- 5.20	—	2	—	—	—
Truckdrivers ^{1, 4}	1,962	1,962	—	3.29	3.05	2.65- 4.00	—	—	6	28	181
Truckdrivers, light truck	213	213	—	2.53	2.30	2.30- 2.55	—	—	1	8	99
Truckdrivers, medium truck	580	580	—	3.39	3.10	2.71- 4.45	—	—	5	2	26
Truckdrivers, heavy truck (trailer)	333	333	—	3.84	4.00	3.45- 4.59	—	—	—	18	18
Truckdrivers, heavy truck (other than trailer)	641	641	—	3.05	3.05	2.83- 3.05	—	—	—	—	38
Shipping packers	650	589	61	2.43	2.39	2.11- 2.71	33	97	60	66	93
Material handling laborers	1,880	1,874	6	2.86	2.69	2.30- 3.20	—	204	63	79	286
Forklift operators	772	772	—	3.14	3.02	2.80- 3.52	—	2	15	25	29
Guards and watchmen	4,227	4,164	63	2.30	2.20	2.20- 2.20	28	19	966	2,426	201
Janitors, porters, and cleaners	3,167	2,815	352	2.45	2.30	2.20- 2.60	82	192	419	556	528

¹ Excludes premium pay for overtime and for work on weekends, holidays, and late shifts. Incentive payments, such as those resulting from piecework, production bonuses, and commission systems, are included in the wages reported; nonproduction bonuses are excluded. Cost-of-living allowances are considered as part of the workers' regular

pay. Hourly earnings reported for salaried workers are derived from regular salaries divided by the corresponding standard hours of work. The wages of learners, apprentices, and handicapped workers are excluded. The mean is computed for each job by totaling the earnings of all workers and dividing by the number of workers. The median

Table 2.—Hourly Earnings of Office, Clerical, and Plant Workers in Puerto Rico, December 1976—Con.

Occupation ¹	Number of workers receiving straight-time hourly earnings of—														
	\$2.40 and under \$2.60	\$2.60 and under \$2.80	\$2.80 and under \$3.00	\$3.00 and under \$3.20	\$3.20 and under \$3.40	\$3.40 and under \$3.60	\$3.60 and under \$3.80	\$3.80 and under \$4.20	\$4.20 and under \$4.60	\$4.60 and under \$5.00	\$5.00 and under \$5.40	\$5.40 and under \$5.80	\$5.80 and under \$6.20	\$6.20 and under \$6.60	\$6.60 and under \$7.00
	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.80	4.20	4.60	5.00	5.40	5.80	6.20	6.60
Secretaries	27	48	107	182	174	435	323	184	131	96	43	10	15	5	9
Secretaries, class A	—	—	—	3	5	10	19	42	5	9	9	10	5	1	2
Secretaries, class B	11	19	18	17	28	113	63	50	20	41	16	2	5	3	6
Secretaries, class C	6	9	17	46	41	81	99	60	82	44	6	6	2	—	1
Secretaries, class D	10	20	72	116	100	231	142	32	24	2	12	—	3	1	—
Stenographers, general	2	12	11	18	13	34	32	15	3	—	—	—	—	—	—
Stenographers, senior	8	19	22	41	37	35	22	25	14	13	4	8	—	—	—
Typists, class B	132	189	140	152	91	76	11	19	21	1	—	—	—	—	—
File clerks, class B	20	32	14	13	17	22	11	11	4	2	—	—	—	—	—
File clerks, class C	45	43	51	36	22	18	4	—	—	—	—	—	—	—	—
Switchboard operators	31	79	24	10	8	18	3	—	—	1	1	—	—	—	—
Key punch operators, class A	21	2	6	15	15	25	15	21	1	—	—	—	—	—	—
Key punch operators, class B	16	24	34	61	45	54	24	—	16	—	—	—	—	—	—
Electronics technicians	—	—	1	1	5	15	1	11	23	10	39	9	28	1	253
Electronics technicians, class A	—	—	—	—	—	—	—	—	—	3	3	3	2	1	29
Electronics technicians, class B	—	—	—	—	—	12	1	8	4	7	36	6	2	—	24
Electronics technicians, class C	—	—	1	1	5	3	—	3	19	—	—	—	24	—	—
Maintenance carpenters	—	5	25	16	19	9	40	7	—	10	18	—	—	—	—
Maintenance electricians	—	2	—	28	17	33	74	14	26	113	66	—	—	—	—
Maintenance painters	1	6	17	10	6	2	7	—	—	16	3	—	—	—	—
Maintenance machinists	—	—	2	6	3	7	8	14	24	30	31	2	—	—	—
Maintenance mechanics (machinery)	7	9	13	147	30	153	85	168	48	5	95	7	—	—	—
Maintenance mechanics (motor vehicles)	6	4	14	36	32	46	92	61	5	37	19	—	—	—	—
Maintenance pipefitters	—	—	—	—	—	1	—	12	—	—	117	—	—	—	—
Tool and die makers	—	—	—	—	2	11	5	12	19	9	1	—	—	—	—
Stationary engineers	—	—	8	10	3	—	4	2	30	—	18	—	3	2	4
Boiler tenders	—	5	16	9	12	11	31	12	4	3	12	—	23	—	—
Truckdrivers ^{1,4}	146	261	138	464	65	83	200	254	112	24	—	—	—	—	—
Truckdrivers, light truck	54	16	12	14	3	3	—	—	—	3	—	—	—	—	—
Truckdrivers, medium truck	61	122	35	78	15	26	40	115	55	—	—	—	—	—	—
Truckdrivers, heavy truck (trailer)	1	27	4	5	5	10	148	64	22	11	—	—	—	—	—
Truckdrivers, heavy truck (other than trailer)	30	88	31	367	36	16	—	—	35	—	—	—	—	—	—
Shipping packers	79	143	39	19	15	1	4	1	—	—	—	—	—	—	—
Material handling laborers	275	75	277	143	108	43	105	221	1	—	—	—	—	—	—
Forklift operators	8	98	142	176	32	108	113	7	10	—	2	—	—	—	—
Guards and watchmen	207	109	70	50	32	47	47	24	1	—	—	—	—	—	—
Janitors, porters, and cleaners	527	471	100	108	115	48	1	11	—	3	—	—	2	4	—

designates position—half of the employees surveyed receive more than the rate shown; half receive less than the rate shown. The middle range is defined by 2 rates of pay; a fourth of the workers earn less than the lower of these rates and a fourth earn more than the higher rate.

² Workers were distributed as follows: 14 at \$7 to \$7.40; 23 at \$7.40

to \$7.80; 8 at \$8.20 to \$8.60; and 8 at \$8.60 to \$9.

³ Includes all drivers regardless of size and type of truck operated.

⁴ Includes workers other than those presented separately.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Area Wage Survey, Puerto Rico, December 1976, released March 1977.

Not only the diversity, but the sheer size of the manufacturing labor force in the United States, as compared to Puerto Rico should be noted when evaluating wage changes. Total employment in manufacturing industries in Puerto Rico, while making substantial strides since 1966, still remains at about $\frac{3}{4}$ of 1 percent of the U.S. total; and production workers represent less than $\frac{3}{4}$ of 1 percent of the U.S. total. These numbers are important because, for certain industries or products, Puerto Rico accounts for a substantial portion of the total U.S. output. It is also noteworthy that production workers in Puerto Rico represent a slightly higher proportion of the total employment than is the case in the mainland: $\frac{4}{5}$ ths of the total vs. $\frac{3}{4}$ ths for the mainland.

2. Nonmanufacturing

Data have been regularly collected since 1971 for a selected group of Puerto Rican nonmanufacturing industries—transportation; mining; finance; insurance; real estate; and business and personal services—industries which tend not to be directly competitive with the United States. These show earnings somewhat higher than manufacturing, and closer to their U.S. counterparts. It is noteworthy that the Puerto Rico earnings in the nonmanufacturing sector tend to be slightly higher than in manufacturing during this period—whereas on the U.S. mainland, manufacturing earnings have been higher—a difference attributable to the large working population concentrated in the low-wage industries in Puerto Rico.

Manufacturing

		October of—								
		1966	1971	1972	1973	1974	1975	1976	1977	1978
Puerto Rico										
Total employment	(thousands)	199.3	138.1	141.2	152.9	149.6	136.6	144.8	147.2	153.1
Production workers	(thousands)	100.5	114.7	122.5	127.7	122.7	111.9	118.6	120.0	125.1
Average hourly earnings		\$1.31	\$1.91	\$2.04	\$2.17	\$2.40	\$2.59	\$2.86	\$3.10	\$3.45
As percentage of U.S. (average hourly earnings)		47.6	53.2	52.7	52.3	52.5	52.9	54.2	53.6	54.6
United States										
Total employment	(millions)	19.7	18.7	19.6	20.4	20.2	18.7	19.2	19.9	20.7
Production workers	(millions)	14.7	13.6	14.4	15.1	14.7	13.4	13.8	14.3	14.9
Average hourly earnings		\$2.75	\$3.59	\$3.87	\$4.15	\$4.57	\$4.90	\$5.28	\$5.78	\$6.32

Source: Commonwealth of Puerto Rico Department of Labor and Human Resources, Bureau of Labor Statistics, Census of Manufacturing Industries, and for 1977 and 1978 data, The Statistical Report, Vol. 1, No. 1; and U.S. Bureau of Labor Statistics, *Employment and Earnings*.

For this industry group, average earnings rose from \$2.03 in 1971 to \$3.44 by June 1978; this is an increase of 69 percent. In the manufacturing sector, earnings increased by 81 percent between October 1971 and 1978, i.e., from \$1.91 to \$3.45. Puerto Rican earnings during the 1970's have re-

mained in the vicinity of 60 percent of the mainland.

When comparing to the mainland levels it should be noted that employment in this industry group represents less than one-fifth of 1 percent of the United States.

Reports for the 1970's are as follows:

Selected Nonmanufacturing Industries ¹

		June of—							
		1971	1972	1973	1974	1975	1976	1977	1978
Puerto Rico:									
Total employment	(thousands)	32.1	33.8	35.7	38.1	34.5	38.6	40.3	41.9
Nonsupervisory	(thousands)	27.5	30.5	30.5	32.6	28.7	32.4	34.2	35.8
Average hourly earnings		\$2.03	\$2.16	\$2.33	\$2.48	\$2.60	\$2.90	\$3.13	*\$3.44
as percentage of United States									
—average hourly earnings		61.1	60.8	61.3	60.0	58.6	60.7	61.4	
United States:									
Total employment	(millions)	21.1	21.7	22.6	23.5	23.6	24.4	25.5	26.4
Nonsupervisory	(millions)	18.4	19.0	19.7	20.4	20.4	21.1	21.9	22.5
Average hourly earnings		\$3.32	\$3.55	\$3.80	\$4.13	\$4.44	\$4.78	\$5.10	\$5.52

¹ This nonmanufacturing group includes mining; transportation; finance, insurance, and real estate; and services but excludes agriculture, government, construction, and wholesale and retail trades.

² Average does not include banking for which no hourly data were available.

Source: Department of Labor of Puerto Rico, *Employment, Hours and Earnings in some nonmanufacturing industries in Puerto Rico* and U.S. Dept. of Labor, *Employment and Earnings*.

For agriculture, the average hourly earnings for all hired farmworkers in Puerto Rico rose from \$1.48 in the last quarter of 1975 to an average of \$1.65 for 1977, up approximately 11.5 percent. During the same time span, a larger percentage increase occurred for the farmworkers in the United States, up from \$2.43 to \$2.87. For July 1978, the Puerto Rican farm earnings were about 59 percent of the mainland for all hired farmworkers, with 58 percent for field workers and 82 percent for livestock workers, as shown in the text tables.

Agriculture				
	1975	1976	1977	1978
Puerto Rico (quarterly averages):				
All hired farm workers	\$1.48	\$1.59	\$1.65	NA
As percentage of U.S.- average hourly earnings	60.9	59.8	57.5	-----
Field and livestock				
As percentage of U.S.- average hourly earnings	62.8	60.3	58.5	-----
United States (annual averages):				
All hired farm workers	\$2.43	\$2.66	\$2.87	\$3.07
Field and livestock	\$2.26	\$2.47	\$2.65	\$2.84

¹ Rate for the last quarter of 1975, the initial date for this series.

Source: U.S. Department of Agriculture, *Farm Labor*.

Separate data for Puerto Rico were not published after July 1978, so that annual comparisons after

1977 cannot be made. However the changes between July 1977 and July 1978 were as follows:

	July 1977	July 1978
All hired farm workers:		
Puerto Rico	\$1.69	\$1.73
United States	2.77	2.93
Puerto Rico as percentage of United States	61.0	59.0
Field workers:		
Puerto Rico	1.54	1.58
United States	2.57	2.74
Puerto Rico as percentage of United States	59.9	57.7
Livestock workers:		
Puerto Rico	1.86	2.20
United States	2.50	2.69
Puerto Rico as percentage of United States	74.4	81.8

EARNINGS IN SELECTED INDUSTRIES

Table 3 traces the changes in average hourly earnings in Puerto Rico in 10 important industries and makes comparisons with their counterparts in the United States. It also shows the Puerto Rican wage as a percentage of the mainland average.

Table 3.—Average Hourly Earnings in Puerto Rico and the United States for Selected Industries, 1966-77

Industry	October of—								
	1966	1971	1972	1973	1974	1975	1976	1977	1978
Food and kindred products:									
Puerto Rico	\$1.40	\$1.94	\$2.07	\$2.23	\$2.42	\$2.60	\$2.86	\$3.08	\$3.46
United States	\$2.52	\$3.38	\$3.62	\$3.88	\$4.26	\$4.65	\$5.04	\$5.42	\$5.89
Puerto Rico as percentage of United States	55.6	57.4	57.2	57.5	56.8	55.9	56.7	56.8	58.7
Tobacco:									
Puerto Rico	\$1.05	\$1.56	\$1.63	\$1.81	\$1.90	\$2.21	\$2.41	\$2.59	\$3.00
United States	\$2.08	\$3.03	\$3.42	\$3.66	\$4.06	\$4.27	\$4.69	\$5.31	\$5.99
Puerto Rico as percentage of United States	50.5	51.5	47.7	49.5	46.8	51.8	51.4	48.8	50.0
Textile mill products:									
Puerto Rico	\$1.23	\$1.71	\$1.79	\$1.94	\$2.10	\$2.15	\$2.36	\$2.58	\$2.80
United States	\$2.00	\$2.59	\$2.76	\$3.04	\$3.26	\$3.53	\$3.79	\$4.08	\$4.42
Puerto Rico as percentage of United States	61.5	66.0	64.9	63.8	64.4	60.9	62.3	63.2	63.3
Apparel:									
Puerto Rico	\$1.18	\$1.70	\$1.76	\$1.83	\$1.97	\$2.14	\$2.34	\$2.43	\$2.83
United States	\$1.93	\$2.51	\$2.67	\$2.85	\$3.10	\$3.24	\$3.49	\$3.69	\$4.01
Puerto Rico as percentage of United States	61.1	67.7	65.9	64.2	63.5	66.0	67.0	65.9	70.6
Chemical:									
Puerto Rico	\$1.64	\$2.36	\$2.64	\$2.87	\$3.22	\$3.64	\$3.90	\$4.25	\$4.63
United States	\$3.03	\$4.00	\$4.29	\$4.56	\$5.01	\$5.50	\$6.04	\$6.56	\$7.19
Puerto Rico as percentage of United States	54.1	59.0	61.5	62.9	64.3	66.2	64.6	64.8	64.4
Leather:									
Puerto Rico	\$1.08	\$1.59	\$1.62	\$1.69	\$1.84	\$2.02	\$2.18	\$2.34	\$2.56
United States	\$1.96	\$2.64	\$2.72	\$2.85	\$3.07	\$3.25	\$3.47	\$3.68	\$3.94
Puerto Rico as percentage of United States	55.1	60.2	59.6	59.3	59.9	62.2	62.8	63.6	65.0
Metal products:									
Puerto Rico	\$1.60	\$2.17	\$2.33	\$2.53	\$2.79	\$2.95	\$3.20	\$3.48	\$4.04
United States	\$2.92	\$3.77	\$4.06	\$4.34	\$4.76	\$5.19	\$5.49	\$6.00	\$6.49
Puerto Rico as percentage of United States	54.8	57.6	57.4	58.6	56.8	56.8	58.3	58.0	62.2

Table 3.—Average Hourly Earnings in Puerto Rico and the United States for Selected Industries, 1966-77—Continued

Industry	October of—								
	1966	1971	1972	1973	1974	1975	1976	1977	1978
Electrical:									
Puerto Rico	\$1.47	\$2.01	\$2.16	\$2.24	\$2.55	\$2.82	\$3.05	\$3.31	\$3.76
United States	\$2.67	\$3.50	\$3.73	\$3.95	\$4.31	\$4.66	\$5.03	\$5.47	\$5.96
Puerto Rico as percentage of United States	55.1	57.4	57.9	56.7	59.2	60.5	60.6	60.5	63.1
Stone, clay, and glass:									
Puerto Rico	\$1.69	\$2.27	\$2.51	\$2.64	\$2.99	\$2.93	\$3.15	\$3.44	\$3.65
United States	\$2.76	\$3.75	\$4.05	\$4.31	\$4.66	\$5.02	\$5.43	\$5.91	\$6.48
Puerto Rico as percentage of United States	61.2	60.5	62.0	61.3	64.2	58.4	58.0	58.2	56.5
As June of each year									
Hotels and motels:									
Puerto Rico	NA	\$2.09	\$2.25	\$2.39	\$2.54	\$2.69	\$2.98	\$3.06	\$3.46
United States	\$1.42	\$2.11	\$2.24	\$2.38	\$2.63	\$2.77	\$3.02	\$3.24	\$3.56
Puerto Rico as percentage of United States	—	99.1	100.4	100.4	96.6	97.1	98.7	94.4	97.2

NA: Not available.

Source: Department of Labor and Human Resources of Puerto Rico and U.S. Dept. of Labor, Bureau of Labor Statistics.

By and large, since 1966, Puerto Rican wages have made significant gains toward parity with the mainland, but there are exceptions. The tobacco industry average in October 1978 represented only 50.1 percent of the mainland rate, as compared to 50.5 percent in 1966, the wage gains in Puerto Rico over the decade notwithstanding.

Closest to parity is the hotel industry, which has been paying rates averaging 98 percent of U.S. levels during the 1970's. This, however, is a case of a low wage industry in the States.

Developments in the apparel industry are most significant, since this group accounts for about 27 percent of the total employment in manufacturing on the island. Since 1966, earnings jumped from \$1.18 to \$2.83 in Puerto Rico and from \$1.93 to \$4.01 on the U.S. mainland. Puerto Rican wages therefore rose from 61 percent to 71 percent of the U.S. level. With the exception of hotels, no other industry is as close. Other industries where Puerto Rican rates are 60 percent or more of the mainland levels are textiles, chemicals, electrical, leather goods, and fabricated metal products.

The Wage and Hour Division of the Department of Labor conducts surveys to obtain straight time hourly earnings for various classifications in an industry under FLSA review. Some of the most recent average hourly earnings for classifications in various industries are presented in table 4.

FOREIGN WAGE COMPARISONS

In August 1977, the Office of Productivity and Technology of the Bureau of Labor Statistics re-

leased estimated hourly compensation for production workers in manufacturing, textile mills, apparel, and leather goods industries for countries in Latin America. Colombia shows the lowest average hourly earnings, 42 cents in manufacturing, followed by El Salvador and Brazil. However, in total compensation, El Salvador is the lowest with 48 cents, followed by Colombia and Nicaragua (see table 5).

Further, the Office of Productivity and Technology has released the following information on hourly compensation for countries which are in proximity to Puerto Rico and/or engaged in the manufacture of apparel.

Country	Industry	Date	Estimated hourly earnings (U.S. dollars)
Dominican Republic	Textile	March 1977	1.33
Haiti	Manufacturing	April 1976	.16-.32
Mexico	Textile	June 1973	.85
Bangladesh	Apparel	Oct. 1974	2.37
Sri Lanka	Apparel	Nov. 1975	3.07-.16
India	Apparel	Nov. 1974	4.25
Malaysia (West) ..	Apparel	June 1974	6.24
Pakistan	Apparel	Oct. 1974	6.20-.25
Philippines	Apparel	Oct. 1974	7.14
Singapore	Apparel	Oct. 1973	.29

¹ Wage for exportation, otherwise \$0.43.

² Male machine operators in direct manufacturing.

³ Semiskilled workers minimum rates.

⁴ Estimated by applying the increase in basic wage rates in textile to 1971 earnings.

⁵ Based on total wages and salaries divided by employment and assuming a 208-hour month.

⁶ Men and women machine operators in shirt manufacturing.

⁷ Estimated by applying the increase in wage rates per day, all industries to 1971 earnings.

Source: U.S. Department of Labor, BLS Office of Productivity and Technology.

Table 4.—Straight Time Average Hourly Earnings for Various Industries and Classifications Recently Surveyed by the Wage and Hour Division of the U.S. Department of Labor

Industry and classification	Average hourly earnings	Date
Agriculture:		
Other workers in sugar cane	\$1.77	Feb. 1976
Other workers in livestock and dairy	1.62	Feb. 1976
Other workers in tobacco and coffee	1.40	Nov. 1975
Construction—general construction	2.99	Nov. 1976
Retail trade:		Feb. 1976
Motor vehicle and agricultural machinery and equipment	2.52	Feb. 1976
Supermarkets and grocery stores	2.35	Feb. 1976
Gasoline service stations	2.10	Feb. 1976
Building materials and hardware	2.30	Feb. 1976
Department and discount stores	2.50	Feb. 1976
Furniture, home furnishing, and appliances	2.45	Feb. 1976
Drug stores	2.27	Feb. 1976
Other retail enterprises	2.25	Feb. 1976
Tobacco:		
Filler tobacco processing	1.56	Aug. 1976
Wrapper tobacco processing	1.93	Aug. 1976
Machine threshing, other operations	2.37	Aug. 1976
Other products and activities	2.25	Aug. 1976
Textile mill products:		
Pre-1961—		
Hooked rugs—multiple power driven operation	2.56	Nov. 1975
Other operation, hooked rugs	2.25	Nov. 1975
Other products and activities	2.18	Nov. 1975
1961—other products and activities	2.42	Nov. 1975
1965—other products and activities	2.12	Nov. 1975
Leather:		
Pre-1961 coverage	2.39	May 1977
1966 coverage	2.85	May 1977
Footwear:		
Pre-1966:		
Nonrubber	2.02	Nov. 1975
Rubber and plastic	2.25	Nov. 1975
Stone, clay, glass, and nonmetallic:		
Art and pottery	2.16	Aug. 1976
Vitreous and semivitreous china	2.39	Aug. 1976
Gloves and mittens—other products and activities	2.37	May 1977
Hosiery:		
Women's hosiery	2.42	May 1977
Other hosiery	2.30	May 1977
Sweater and knit swimwear—pre-1966 coverage	2.49	May 1977
Men's and boys' clothing:		
Pre-1961 coverage:		
Work clothing and separate trousers	2.46	May 1977
Other products and activities	2.39	May 1977
1961 coverage	2.27	May 1977
1966 coverage:		
Trousers	2.26	May 1977
Other products	2.39	May 1977
Food and kindred products:		
Pre-1966 coverage:		
Milk processing and distribution	2.37	May 1976
Candy and gum products	2.38	May 1976
Other products and activities	2.47	May 1976

Table 5.—Estimated Hourly Compensation of Production Workers in Selected Manufacturing Industries, 31 Countries, 1977

(Preliminary estimates)

Country	National currency unit	Exchange rate		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
		National currency	U.S. dollar			National currency	U.S. dollars	Index U.S.=100
United States	Dollar			5.67	34.0	7.60	7.60	100
Canada	Dollar		1.063	6.38	23.4	7.87	7.40	97
Argentina ¹	Peso		417.8	420.6	33.0	559.4	1.34	18
Brazil	Cruzeiro		14.14	¹⁵ 15.80	25.0	19.75	1.40	18
Mexico ^{1,2}	Peso		22.57	29.01	42.0	41.19	1.82	24
Venezuela	Bolivar		4.293	7.84	48.0	48.47	1.97	26
Australia ⁵	Dollar		.9024	4.47	15.0	5.14	5.70	75
Hong Kong	Dollar		⁸ 4.615	⁷ 4.07	10-15	⁸ 4.58	.99	13
Israel	Pound		10.46	⁹ 19.68	40-45	⁸ 28.04	2.68	35
Japan	Yen		267.8	928	¹⁰ 14.6	1,063	3.97	52
Korea	Won		484.0	¹¹ 263	15-20	⁸ 309	.64	8
New Zealand ¹²	Dollar		1.032	2.67-30.1	15-20	⁸ 3.34	3.24	43
Taiwan	Dollar		38.00	21.66	15-20	⁸ 25.45	.67	9
Austria	Shilling		16.53	48.03	79.8	86.36	5.22	69
Belgium	Franc		35.83	172.9	74.1	301.0	8.40	111
Denmark	Krone		6.003	36.92	18.0	43.57	7.26	96
Finland ¹³	Markka		4.014	14.60	54.3	22.53	5.61	74
France	Franc		4.915	15.25	73.9	26.52	5.40	71
Germany	Mark		2.321	11.18	60.4	17.93	7.73	102
Greece	Drachma		36.84	53.97	30.0	70.16	1.90	25
Ireland	Pound		.5731	1.40	23.4	1.73	3.02	40
Italy	Lira		882.8	2,350	94.2	4,564	5.17	68
Luxembourg	Franc		35.84	204.4	45.2	296.8	8.28	109
Netherlands	Guilder		2.454	11.60	¹⁰ 73.6	20.14	8.21	108
Norway	Krone		5.322	32.91	40.1	45.90	8.62	113
Portugal	Escudo		38.12	49.14	25.0	61.42	1.61	21
Spain ¹²	Peseta		75.26	133-150	40.0	⁸ 197	2.62	34
Sweden	Krona		4.468	25.70	53.4	39.42	8.82	116
Switzerland	Franc		2.397	11.77	40.0	16.48	6.88	91
Turkey ¹⁴	Lira		18.00	14.9-16.8	15-25	⁸ 19.01	1.06	14
United Kingdom	Pence		57.31	150.6	27.2	191.6	3.34	44

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN TEXTILE MILL INDUSTRIES, 24 COUNTRIES, 1977

United States	Dollar			3.98	22.0	4.86	4.86	100
Canada	Dollar		1.063	4.74	21.3	5.75	5.41	111
Brazil	Cruzeiro		14.14	¹⁵ 12.02	¹⁵ 25.0	15.03	1.06	22
Mexico ¹⁶	Peso		22.57	27.34	39.0	38.00	1.68	35
Hong Kong	Dollar		⁸ 4.615	7.433	10-15	⁸ 4.87	1.06	22
Israel	Pound		10.46	⁹ 17.48	40-45	⁸ 24.91	2.38	49
Japan	Yen		267.8	661	¹⁰ 15.8	765	2.86	59
Korea	Won		484.0	¹¹ 219	15-20	⁸ 257	.53	11
Taiwan	Dollar		38.00	19.13	15-20	⁸ 22.48	.59	12
Austria	Shilling		16.53	37.19	73	64.52	3.90	80
Belgium	Franc		35.83	147.0	66.9	245.4	6.85	141
Denmark	Krone		6.003	31.58	17.4	37.07	6.18	127
France	Franc		4.915	12.75	68.8	21.52	4.38	90
Germany	Mark		2.321	9.24	55.8	14.40	6.20	128
Greece	Drachma		36.84	51.10	¹⁵ 30.0	66.43	1.80	37
Ireland	Pound		.5731	1.26	¹⁵ 23.4	1.55	2.70	56
Italy	Lira		882.8	2,069	92.3	3,779	4.51	93
Netherlands	Guilder		2.454	10.92	¹⁰ 68.4	18.39	7.49	154
Norway	Krone		5.322	26.48	36.0	36.01	6.77	139
Portugal	Escudo		38.12	39.11	¹⁵ 25.0	48.89	1.28	26
Spain ¹²	Peseta		75.26	108-121	¹⁵ 40.0	⁸ 161	2.14	44
Sweden	Krona		4.468	22.29	¹⁵ 53.3	34.17	7.65	157
Switzerland	Franc		2.397	9.93	¹⁵ 40.0	13.90	5.80	119
United Kingdom	Pence		57.31	129.1	22.5	158.1	2.76	57

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN APPAREL AND RELATED INDUSTRIES, 22 COUNTRIES, 1977

United States	Dollar			3.62	20.7	4.35	4.35	100
Canada	Dollar		1.063	4.23	16.0	4.91	4.62	106
Brazil	Cruzeiro		14.14	¹⁵ 9.77	¹⁵ 25.0	12.21	.86	20
Hong Kong	Dollar		⁸ 4.615	73.95	10-15	⁸ 4.44	.95	22
Israel	Pound		10.46	¹² 12.45	40-45	⁸ 17.74	1.70	39
Japan	Yen		267.8	496	¹⁰ 14.2	566	2.11	49
Korea	Won		484.0	¹¹ 168	15-20	⁸ 198	.41	9
Taiwan	Dollar		38.00	18.11	15-20	⁸ 21.28	.56	13
Austria	Shilling		16.53	34.52	69.4	58.48	3.54	81
Belgium	Franc		35.83	120.6	63.3	196.9	5.49	126
Denmark	Krone		6.003	30.69	19.1	36.55	6.09	140

See footnotes at end of table, (p. 632).

Table 5.—Estimated Hourly Compensation of Production Workers in Selected Manufacturing Industries, 31 Countries, 1977—Con.

(Preliminary estimates)

Country	National currency unit	Exchange rate		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
		National currency unit	U.S. dollar			National currency	U.S. dollars	Index U.S.=100
France	Franc		4.915	11.73	64.4	19.28	3.92	90
Germany	Mark		2.321	8.37	57.1	13.14	5.66	130
Greece	Drachma		36.84	44.60	¹⁵ 30.0	57.98	1.57	36
Ireland	Pound		.5731	.86	¹⁵ 23.4	1.06	1.85	43
Italy	Lira		882.8	1.874	82.8	3,426	3.88	89
Netherlands	Guilder		2.454	8.57	¹⁰ 62.6	13.93	5.68	131
Norway	Krone		5.322	25.14	36.5	34.13	6.41	147
Portugal	Escudo		38.12	38.08	¹⁵ 25.0	47.60	1.25	29
Spain ⁹	Peseta		75.26	87-98	¹⁵ 40.0	⁸ 130	1.73	---
Sweden	Krona		4.468	21.06	¹⁰ 53.3	32.28	7.22	166
United Kingdom	Pence		57.31	102.6	21.3	124.5	2.17	50

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN LEATHER AND LEATHER PRODUCTS INDUSTRIES, 16 COUNTRIES, 1977

United States	Dollar			3.61	23.9	4.47	4.47	100
Canada	Dollar		1.063	4.27	17.1	5.00	4.70	105
Brazil	Cruzeiro		14.14	¹⁰ 10.35	¹⁵ 25.0	12.94	.92	21
Israel	Pound		10.46	⁹ 15.33	40-45	⁸ 21.85	2.09	47
Japan	Yen		267.8	756	¹⁰ 12.6	851	3.18	71
Korea	Won		484.0	¹¹ 197	15-20	⁸ 231	.48	11
Taiwan	Dollar		38.00	18.61	15-20	⁸ 21.87	.58	13
Belgium	Franc		35.83	145.7	73.1	252.2	7.04	157
France	Franc		4.915	12.47	63.5	20.39	4.15	93
Germany	Mark		2.321	8.41	46.9	12.35	5.32	119
Greece	Drachma		36.84	53.00	¹⁵ 30.0	68.90	1.87	42
Italy	Lira		882.8	1,863	87.2	3,488	3.85	88
Netherlands	Guilder		2.454	9.72	¹⁰ 65.0	16.04	6.54	146
Spain ¹⁸	Peseta		75.26	87-98	¹⁵ 40.0	⁸ 130	1.73	---
Sweden	Krona		4.468	23.02	¹² 53.3	35.29	7.90	177
United Kingdom	Pence		57.31	129.4	22.9	159.0	2.77	62

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN LEATHER FOOTWEAR INDUSTRIES, 13 COUNTRIES, 1977

United States	Dollar			3.48	23.9	4.31	4.31	100
Canada	Dollar		1.063	4.13	17.1	4.84	4.55	106
Argentina	Peso		417.8	¹⁰ 345.2	¹⁵ 33.0	459.1	1.10	26
Brazil	Cruzeiro		14.14	¹⁰ 10.01	¹⁵ 25.0	12.51	.88	20
Hong Kong	Dollar		⁸ 4.615	²⁰ 4.40	10-15	⁸ 4.95	1.07	25
Korea	Won		484.0	¹¹ 203	15-20	⁸ 238	.49	11
France	Franc		4.915	12.52	63.2	20.43	4.16	97
Germany	Mark		2.321	8.38	46.5	12.28	5.29	123
Italy	Lira		882.8	1,806	87.3	3,383	3.83	89
Netherlands	Guilder		2.454	9.71	¹⁰ 62.8	15.81	6.44	149
Spain ⁹	Peseta		75.26	87-98	¹⁵ 40.0	⁸ 130	1.73	---
Sweden	Krona		4.468	22.53	¹² 53.3	34.62	7.75	180
United Kingdom	Pence		57.31	134.8	23.0	165.8	2.89	67

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN PRINTING AND PUBLISHING, 9 COUNTRIES, 1977

United States	Dollar			6.11	26.4	7.72	7.72	100
Hong Kong ²²	Dollar		⁸ 4.615	⁷ 4.04	10-15	⁸ 4.55	.99	13
Japan	Yen		267.8	1,008	¹⁰ 13.1	1,140	4.26	55
Korea	Won		484.0	¹¹ 388	15-20	⁸ 456	.94	12
Taiwan	Dollar		38.00	22.43	15-20	⁸ 26.36	.69	9
Belgium	Franc		35.83	177.7	66.3	295.5	8.25	107
Germany	Mark		2.321	12.55	53.3	19.24	8.29	107
Netherlands	Guilder		2.454	12.67	¹⁰ 67.3	21.20	8.64	112
United Kingdom	Pence		57.31	174.7	27.5	222.7	3.89	50

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN CHEMICALS AND CHEMICAL PRODUCTS INDUSTRIES, 15 COUNTRIES, 1977

United States	Dollar			6.43	34.7	8.66	8.66	100
Canada	Dollar		.9861	6.51	27.3	8.29	7.80	90
Brazil	Cruzeiro		10.68	¹⁰ 19.33	¹⁵ 25.0	24.16	1.71	20
Mexico ²³	Peso		15.43	29.07	43.0	41.57	1.84	21
Japan	Yen		296.4	1,270	¹⁰ 15.9	1,472	5.49	63
Belgium	Franc		38.58	198.9	70.7	339.6	9.48	109
France	Franc		4.775	17.15	84.4	31.62	6.43	74
Germany	Mark		2.517	12.29	65.5	20.34	8.76	101

See footnotes at end of table.

Table 5.—Estimated Hourly Compensation of Production Workers in Selected Manufacturing Industries, 31 Countries, 1977—Con.

(Preliminary estimates)

Country	Exchange rate		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
	National currency unit	National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S.=100
Greece	Drachma	36.58	56.90	¹⁵ 30.0	73.97	2.01	23
Italy	Lira	830.3	2,774	91.9	5,323	6.03	70
Netherlands	Guilder	2.642	12.67	¹⁰ 76.3	22.34	9.10	105
Spain ¹²	Peseta	66.85	147-165	¹⁵ 40.0	*218	.90	33
Sweden	Krona	4.356	25.88	²¹ 52.4	39.44	8.83	102
Switzerland ²³	Franc	2.499	14.27	¹⁵ 40.0	19.98	8.34	96
United Kingdom	Pence	55.41	161.3	32.0	212.9	3.71	43
ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN SYNTHETIC FIBER INDUSTRIES, 6 COUNTRIES, 1977							
United States	Dollar	—	5.83	36.6	7.96	7.96	100
Japan	Yen	267.8	1,195	²⁸ 15.9	1,385	5.17	65
Taiwan ²⁷	Dollar	38.00	25.82	15-20	*30.34	.80	10
Germany	Mark	2,321	13.00	61.4	20.98	9.04	114
Italy	Lira	882.8	2,936	93.7	5,687	6.44	81
United Kingdom	Pence	57.31	171.0	29.8	222.0	3.87	49
ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN RUBBER PRODUCTS INDUSTRIES, 9 COUNTRIES, 1977							
All rubber products							
United States	Dollar	—	5.88	41.4	8.31	8.31	100
Canada	Dollar	1.063	6.11	28.8	7.87	7.40	89
Brazil	Cruzeiro	14.14	*17.87	¹⁵ 25.0	22.34	1.58	19
Japan	Yen	267.8	975	¹⁰ 15.2	1,123	4.19	50
France	Franc	4,915	15.15	77.2	26.85	5.46	66
Italy	Lira	882.8	2,655	98.6	5,273	5.97	72
Spain ¹²	Peseta	75.26	173-195	¹⁵ 40.0	*258	3.42	41
United Kingdom	Pence	57.31	163.8	26.1	206.6	3.60	43
Tires and inner tubes							
United States	Dollar	—	7.23	41.9	10.26	10.26	100
Canada	Dollar	1.063	6.69	²⁸ 28.8	8.62	8.11	79
Argentina	Peso	417.8	640.48	¹⁶ 33.0	851.84	2.04	20
Brazil	Cruzeiro	14.14	*24.96	¹⁵ 25.0	31.20	2.21	21
ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN PLASTIC PRODUCTS INDUSTRIES, 6 COUNTRIES, 1977							
United States	Dollar	—	4.69	29.7	6.08	6.08	100
Brazil	Cruzeiro	14.14	*14.46	¹⁵ 25.0	18.08	1.28	21
Hong Kong	Dollar	*4.615	*3.94	10-15	*4.43	.96	16
Taiwan	Dollar	38.00	23.87	15-20	*28.05	.74	12
France	Franc	4,915	13.91	70.0	23.65	4.81	79
Italy	Lira	882.8	2,198	91.6	4,211	4.77	78
ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN GLASS AND GLASSWARE INDUSTRIES, 15 COUNTRIES, 1977							
United States	Dollar	—	6.11	36.3	8.33	8.33	100
Canada	Dollar	1.063	6.58	24.4	8.19	7.70	92
Mexico ¹⁸	Peso	22.57	26.27	41.0	37.04	1.64	20
Japan	Yen	267.8	993	²⁸ 15.2	1,144	4.27	51
Korea	Won	484.0	*1383	15-20	*450	.93	11
Taiwan	Dollar	38.00	27.04	15-20	*31.77	.84	10
Belgium	Franc	35.83	180.4	67.2	301.6	8.42	101
France	Franc	4,915	17.54	75.9	30.85	6.28	75
Germany	Mark	2,321	11.28	58.3	17.86	7.69	92
Ireland ²⁰	Pound	*5731	1.60	¹⁵ 23.4	1.97	3.44	—
Italy	Lira	882.8	2,539	87.5	4,761	5.39	65
Netherlands	Guilder	2,454	12.89	¹⁰ 74.6	22.51	9.17	110
Portugal	Escudo	38.12	57.30	¹⁵ 25.0	71.62	1.88	23
Sweden	Krona	4,468	26.91	²¹ 52.8	41.12	9.20	110
United Kingdom	Pence	57.31	157.9	24.8	197.1	3.44	41
ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN POTTERY AND RELATED PRODUCTS INDUSTRIES, 9 COUNTRIES, 1977							
United States	Dollar	—	4.81	32.3	6.36	6.36	100
Japan	Yen	267.8	649	²⁹ 15.2	748	2.79	44
Taiwan	Dollar	38.00	21.27	15-20	*24.99	.66	10
France	Franc	4,915	14.20	71.5	24.35	4.95	78
Germany	Mark	2,321	9.90	63.5	16.19	6.98	110

See footnotes at end of table.

Table 5.—Estimated Hourly Compensation of Production Workers in Selected Manufacturing Industries, 31 Countries, 1977—Con.

(Preliminary estimates)

Country	National currency unit	Exchange rate	Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
		National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S.=100
Italy	Lira	882.8	2,479	86.3	4,618	5.23	82
Netherlands	Guilder	2.454	10.76	1069.0	18.18	7.41	116
Portugal	Escudo	38.12	47.76	1025.0	59.69	1.56	25
United Kingdom	Pence	57.31	134.5	25.5	168.8	2.95	46

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN PRIMARY METAL INDUSTRIES, 15 COUNTRIES, 1977

United States	Dollar	7.40	42.9	10.57	10.57	100
Canada	Dollar	1.063	7.43	26.6	9.41	84
Brazil	Cruzeiro	14.14	²¹ 19.24	¹⁰ 25.0	24.05	16
Mexico ²²	Peso	22.57	31.79	37.0	43.55	18
Japan	Yen	267.8	1,324	¹⁰ 16.7	1,545	55
Austria	Shilling	16.53	55.52	85.7	103.1	59
Belgium	Franc	35.83	209.3	65.8	347.0	92
France	Franc	4.915	16.85	82.3	30.72	59
Germany	Mark	2.321	11.89	66.7	19.82	81
Italy	Lira	882.8	2,750	99.3	5,481	59
Luxembourg	Franc	35.84	226.4	47.7	334.3	88
Netherlands	Guilder	2,454	13.33	¹⁰ 78.7	24.18	93
Spain ²³	Peseta	75.26	156-176	¹⁰ 40.0	² 232	—
Sweden	Krona	4,468	28.07	54.2	43.28	92
United Kingdom	Pence	57.31	170.2	27.5	217.0	36

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN THE IRON AND STEEL INDUSTRIES,²⁴ 13 COUNTRIES, 1977

United States	Dollar	8.36	48.2	12.39	12.39	100
Canada	Dollar	1.063	7.75	26.2	9.20	74
Brazil	Cruzeiro ²⁵	14.14	²⁰ 20.12	¹⁰ 25.0	25.15	14
Japan	Yen	267.8	1,401	¹⁰ 16.8	1,636	49
Austria	Shilling	16.53	56.41	86.4	105.1	51
Belgium	Franc	35.83	214.5	65.1	354.1	80
France	Franc	4.915	17.88	86.2	33.29	55
Germany	Mark	2.321	12.00	69.5	20.34	71
Italy	Lira	882.8	2,868	98.8	5,702	52
Luxembourg	Franc	35.84	228.2	48.2	338.1	76
Netherlands	Guilder	2,454	14.07	¹⁰ 79.9	25.31	83
Sweden	Krona	4,468	28.42	²⁵ 54.2	43.82	79
United Kingdom	Pence	57.31	176.3	27.8	225.3	32

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN NONFERROUS METAL INDUSTRIES,²⁶ 15 COUNTRIES, 1977

United States ²⁷	Dollar	6.92	40.4	9.72	9.72	100
Canada ²⁸	Dollar	1.063	7.41	25.6	9.31	90
Brazil	Cruzeiro	14.14	²¹ 19.94	¹⁰ 25.0	24.93	18
Mexico ²⁹	Peso	22.57	28.81	38.0	39.76	18
Venezuela	Bolivar	4,293	⁴⁰ 8.21	8.0	8.87	21
Belgium	Franc	35.83	203.1	72.2	349.8	100
France	Franc	4.915	16.89	79.1	30.25	63
Germany	Mark	2.321	11.85	62.1	19.21	85
Italy	Lira	882.8	2,593	101.0	5,212	61
Netherlands	Guilder	2,454	11.73	¹⁰ 72.0	20.18	85
United Kingdom	Pence	57.31	⁴¹ 159.8	29.1	206.3	37

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN FABRICATED METAL PRODUCTS INDUSTRIES, 15 COUNTRIES, 1977

United States	Dollar	5.90	32.2	7.80	7.80	100
Canada	Dollar	1.063	6.69	21.7	7.66	98
Brazil	Cruzeiro	14.14	²¹ 16.86	¹⁰ 25.0	21.08	19
Japan	Yen	267.8	910	¹⁰ 13.8	1,036	50
Korea	Won	484.0	¹¹ 256	15-20	³ 300	8
Taiwan	Dollar	38.00	22.16	15-20	⁸ 26.04	9
Denmark	Krone	6.003	34.91	17.4	40.98	88
France	Franc	4.915	15.25	70.5	26.0	68
Germany	Mark	2.321	11.02	54.2	16.99	94
Greece	Drachma	36.84	54.50	¹⁰ 30.0	70.85	25
Italy	Lira	882.8	2,312	94.4	4,495	65
Netherlands	Guilder	2,454	11.51	¹⁰ 71.4	19.73	103

See footnotes at end of table.

Table 5.—Estimated Hourly Compensation of Production Workers in Selected Manufacturing Industries, 31 Countries, 1977—Con.

(Preliminary estimates)

Country	National currency unit	Exchange rate		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
		National currency unit	U.S. dollar			National currency	U.S. dollars	Index U.S.=100
Norway	Krone		5.322	33.14	⁴² 40.1	46.65	8.77	112
Switzerland ⁴	Franc		2.397	12.53	³⁵ 40.0	17.54	7.28	—
United Kingdom	Pence		57.31	152.3	24.7	189.9	3.31	42

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN TOOLS AND FINISHED METAL GOODS INDUSTRIES,⁴³ 7 COUNTRIES, 1977

United States	Dollar			5.67	31.0	7.60	7.60	100
Denmark	Krone		6.003	34.36	⁴⁴ 17.4	40.34	6.72	88
France	Franc		4.915	14.59	70.3	24.85	5.06	67
Germany	Mark		2.321	10.49	55.2	16.28	7.01	92
Italy	Lira		882.8	2,184	96	4,289	4.86	64
Netherlands	Guilder		2.454	10.93	¹⁰ 72.4	18.84	7.68	101
United Kingdom	Pence		57.31	147.9	25.5	185.6	3.24	43

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN MACHINERY, EXCEPT ELECTRICAL, INDUSTRIES, 16 COUNTRIES, 1977

United States	Dollar			6.25	33.6	8.35	8.35	100
Canada	Dollar		1.063	6.84	25.5	8.58	8.07	97
Brazil	Cruzeiro		14.14	²³ 80	²⁵ 25.0	29.75	2.10	25
Mexico ⁴⁵	Peso		22.57	31.57	40.0	44.20	1.96	—
Israel	Pound		10.46	⁴⁰ 23.38	40-45	⁸ 33.32	3.19	32
Japan	Yen		267.8	1,071	¹⁰ 14.3	1,224	4.57	55
Korea	Won		484.0	1,344	15-20	⁸ 404	.84	10
Taiwan	Dollar		38.00	22.36	15-20	⁸ 26.27	.69	8
Belgium	Franc		35.83	178.6	66.6	297.6	8.31	100
France	Franc		4.915	16.38	72.9	28.32	5.76	69
Germany	Mark		2.321	11.82	58.9	18.78	8.09	97
Italy	Lira		882.8	2,455	96.6	4,827	5.47	66
Netherlands	Guilder		2.454	11.68	¹⁰ 70.4	19.90	8.11	97
Sweden	Krona		4.468	25.27	⁴⁷ 53.4	38.76	8.68	104
Switzerland ⁴⁸	Franc		2.397	12.53	³⁵ 40.0	17.54	7.28	—
United Kingdom	Pence		57.31	156.1	25.5	195.9	3.42	41

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN THE MACHINE TOOL INDUSTRIES,⁴⁶ 7 COUNTRIES, 1977

United States	Dollar			6.48	31.0	8.49	8.49	100
France	Franc		4.915	17.65	70.3	30.06	6.12	72
Germany	Mark		2.321	12.14	60.1	19.44	8.38	99
Italy	Lira		882.8	2,535	95.5	4,956	5.61	66
Sweden	Krona		4.468	25.08	⁴⁸ 53.4	38.47	8.61	101
Switzerland ⁴⁹	Franc		2.397	12.53	³⁵ 40.0	17.54	7.28	—
United Kingdom	Pence		57.31	155.2	25.8	195.2	3.41	39

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN ELECTRIC AND ELECTRONIC EQUIPMENT INDUSTRIES, 16 COUNTRIES, 1977

United States	Dollar			5.39	35.1	7.28	7.28	100
Canada	Dollar		1.063	5.76	25.3	7.22	6.79	93
Mexico ⁵⁰	Peso		22.57	23.88	36.0	32.48	1.44	20
Hong Kong ⁵¹	Dollar		⁴ 6.615	⁵¹ 3.97	10-15	⁸ 4.47	.97	13
Japan	Yen		267.8	871	¹⁰ 14.0	993	3.71	51
Korea	Won		484.0	¹¹ 252	15-20	⁸ 297	.61	8
Taiwan	Dollar		38.00	21.14	15-20	⁸ 24.84	.65	9
Austria	Schilling		16.53	46.32	75.4	81.25	4.92	68
Belgium	Franc		35.83	171.1	68.3	287.9	8.04	110
France	Franc		4.915	14.80	72.0	25.46	5.18	71
Germany	Mark		2.321	10.43	60.5	16.74	7.21	99
Italy	Lira		882.8	2,372	97.8	4,692	5.31	73
Netherlands	Guilder		2.454	11.15	¹⁰ 80.5	20.13	8.20	113
Sweden	Krona		4.468	24.62	⁴⁷ 53.4	37.77	8.45	116
Switzerland ⁵²	Franc		2.397	12.53	³⁵ 40.0	17.54	7.28	—
United Kingdom	Pence		57.31	141.7	26.5	179.3	3.13	43

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN TRANSPORTATION EQUIPMENT INDUSTRIES, 13 COUNTRIES, 1977

United States	Dollar			7.28	44.7	10.53	10.53	100
Canada	Dollar		1.063	7.34	26.4	9.28	8.73	83
Brazil	Cruzeiro		14.14	²¹ 55	¹⁸ 25.0	26.94	1.91	18
Japan	Yen		267.8	1,157	¹⁰ 13.0	1,317	4.92	47
Korea	Won		484.0	¹¹ 461	15-20	⁸ 541	1.12	11

See footnotes at end of table.

Table 5.—Estimated Hourly Compensation of Production Workers in Selected Manufacturing Industries, Thirty-One Countries, 1977—Con.

(Preliminary estimates)

Country	National currency unit	Exchange rate	Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
		National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S.=100
Belgium	Franc	35.83	200.4	64.9	330.4	9.22	88
France	Franc	4.915	17.59	75.8	30.92	6.29	60
Germany	Mark	2.321	12.84	68.5	21.64	9.32	89
Italy	Lira	882.8	2.496	108.2	5.197	5.89	56
Netherlands	Guilder	2.454	11.56	¹⁰ 74.5	20.17	8.22	78
Spain ⁶	Peseta	75.26	156-176	¹⁵ 40.0	⁸ 232	3.09	—
Sweden	Krona	4.468	26.91	⁴⁷ 53.4	41.28	9.24	88
United Kingdom	Pence	57.31	170.7	27.1	217.0	3.79	36

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN THE MOTOR VEHICLES AND EQUIPMENT INDUSTRIES, 12 COUNTRIES, 1977

United States	Dollar	—	7.86	47.5	11.59	11.59	100
Canada	Dollar	1.063	7.51	28.7	9.67	9.10	79
Brazil ²	Cruzeiro	14.14	22.25	¹⁸ 25.0	27.81	1.97	17
Mexico ¹⁶	Peso	22.57	40.26	53.0	61.60	2.73	24
Japan	Yen	267.8	1,132	⁵³ 13.8	1,288	4.61	42
Korea ⁵⁴	Won	484.0	446	15-20	⁸ 524	1.08	9
France	Franc	4.915	17.15	75.6	30.12	6.13	53
Germany	Mark	2.321	13.01	68.7	21.95	9.46	82
Italy	Lira	882.8	2,459	109.1	5,142	5.82	50
Spain ⁶²	Peseta	75.26	156-176	¹⁵ 40.0	⁸ 233	3.10	—
Sweden	Krona	4.468	25.98	⁴⁷ 53.4	39.85	8.92	77
United Kingdom	Pence	57.31	173.5	27.7	221.6	3.87	33

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN THE AIRCRAFT INDUSTRIES,⁶⁶ 9 COUNTRIES, 1977

United States	Dollar	—	6.94	44.1	10.00	10.00	100
Canada	Dollar	1.063	6.47	25.5	8.12	7.64	76
Belgium ⁶⁸	Franc	35.83	195.2	69.1	330.0	9.21	—
France	Franc	4.915	22.08	76.0	38.86	7.91	79
Germany	Mark	2.321	12.24	63.3	19.99	8.61	86
Italy	Lira	882.8	2,698	90.7	5,145	5.83	58
Netherlands ⁶⁹	Guilder	2.454	12.15	¹⁰ 75.3	21.30	8.68	—
Sweden	Krona	4.468	26.14	⁴⁷ 53.4	40.10	8.97	90
United Kingdom	Pence	57.31	163.1	33.5	217.7	3.80	38

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN THE SHIPBUILDING INDUSTRIES,⁶⁷ 13 COUNTRIES, 1977

United States	Dollar	—	6.00	35.2	8.11	8.11	100
Canada ⁶⁸	Dollar	1.063	7.49	15.7	8.67	8.16	—
Japan	Yen	267.8	1,212	⁵³ 13.8	1,379	5.15	64
Korea	Won	484.0	⁶⁰ 528	15-20	⁸ 620	1.28	16
Denmark	Krone	6.003	40.59	18.1	47.94	7.99	99
Finland	Markka	4.014	17.01	51.5	25.77	6.42	79
France	Franc	4.915	19.66	77.0	34.80	7.08	87
Germany	Mark	2.321	12.19	67.5	20.42	8.80	109
Italy	Lira	882.8	2,634	118.0	5,742	6.50	80
Netherlands	Guilder	2.454	12.33	¹⁰ 76.7	21.79	8.88	109
Norway ⁷¹	Krone	5.322	35.40	⁶² 40.1	49.64	9.33	115
Sweden	Krona	4.468	28.27	⁴⁷ 53.4	43.37	9.71	120
United Kingdom	Pence	57.31	165.0	19.8	197.7	3.45	43

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN INSTRUMENTS AND RELATED INDUSTRIES, 14 COUNTRIES, 1977

United States	Dollar	—	5.29	32.6	7.01	7.01	100
Canada	Dollar	1.063	5.50	27.1	6.99	6.58	94
Japan	Yen	267.8	911	¹⁰ 13.3	1,032	3.85	55
Korea	Won	484.0	¹¹ 245	15-20	⁸ 287	.59	8
Taiwan	Dollar	38.00	24.60	15-20	⁸ 28.91	.76	11
Belgium	Franc	35.83	159.9	74.0	278.2	7.76	111
Denmark	Krone	6.003	35.58	19.7	42.59	7.09	101
France	Franc	4.915	15.01	68.8	25.34	5.16	74
Germany	Mark	2.321	10.25	57.3	16.12	6.95	99
Italy	Lira	882.8	2,202	94.2	4,276	4.84	69
Netherlands	Guilder	2.454	11.08	¹⁰ 75.3	19.42	7.91	113
Sweden	Krona	4.468	24.94	⁴⁷ 53.4	38.26	8.56	122
Switzerland ⁴³	Franc	2.397	12.53	¹⁵ 40.0	17.54	7.28	—
United Kingdom	Pence	57.31	137.6	27.2	175.1	3.05	44

See p. 632 for footnotes to table 5.

Footnotes to Table 5

- ¹ Average of selected manufacturing industries.
- ² Estimated on the basis of 1974 hourly earnings—derived from annual earnings by assuming 2,068 hours of work per year—and the average earnings trend in all industry since 1974.
- ³ Earnings estimated on the basis of 1974 hourly earnings and the trend in average monthly earnings since 1974. Ratio of additional compensation to hourly earnings refers to 1974.
- ⁴ Excluding contractual and private social insurance expenditures.
- ⁵ Including nonproduction workers other than managerial, executive, professional, and higher supervisory.
- ⁶ End-of-year exchange rate.
- ⁷ Estimated from average daily earnings by assuming 8.5 hours of work per day. Excluding overtime pay and shift differentials.
- ⁸ Midpoint of estimated average compensation range.
- ⁹ Estimated from average daily earnings by assuming 8 hours of work per day.
- ¹⁰ All employees.
- ¹¹ Earnings for production workers estimated on the basis of average hourly earnings for all employees adjusted for the relative level of production worker earnings to all employee earnings in 1975.
- ¹² Earnings are production worker estimate (80-90 percent of all employee earnings).
- ¹³ Including mining and electrical power plants.
- ¹⁴ Data refer to September, converted to U.S. dollars using annual average exchange rate. Earnings are production worker estimate (80-90 percent of all employee earnings) and are converted from daily to hourly earnings by assuming 9 hours of work per day.
- For concepts and methods, see attached general note.
- Prepared by: U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology, December 1978.
- ¹⁵ All manufacturing.
- ¹⁶ Earnings estimated on the basis of 1974 hourly earnings and the trend in average monthly earnings in all manufacturing since 1974. Ratio of additional compensation to hourly earnings refers to 1974.
- ¹⁷ Textiles, apparel, and leather.
- ¹⁸ Clothing, footwear, and leather. Earnings are production worker estimate (80-90 percent of all employee earnings).
- ¹⁹ Estimated on the basis of average minimum wage rates for skilled and unskilled workers adjusted to an average wage level using the all manufacturing average wage to minimum wage rate ratio.
- ²⁰ Daily earnings converted to an hourly basis by assuming 8.5 hours of work per day. Excluding overtime pay and shift differentials.
- ²¹ Earnings in leather footwear industries estimated on the basis of average hourly earnings for all employees in leather footwear industries adjusted for the relative level of production worker earnings to all employees in 1975.
- ²² Job printing.
- ²³ Average of selected chemical industries. Earnings estimated on the basis of 1974 hourly earnings and the trend in average monthly earnings in all manufacturing since 1974. Ratio of additional compensation to hourly earnings refers to 1974.
- ²⁴ Chemical, petroleum, rubber and plastic industries.
- ²⁵ Including petroleum refining.
- ²⁶ All employees. Chemicals and Chemical products industries.
- ²⁷ Synthetic resins, plastics, and fibers.
- ²⁸ Rubber products industries.
- ²⁹ All employees. Stone, clay, and glass industries.
- ³⁰ Glass and glassware, pottery, china, and earthenware.
- ³¹ Stone, clay, and glass industries.
- ³² Average of selected primary metal industries. Earnings estimated on the basis of 1974 hourly earnings and the trend in average monthly earnings in all manufacturing since 1974. Ratio of additional compensation to hourly earnings refers to 1974.
- ³³ Primary metals, metal products, machinery, and equipment. Earnings are production worker estimate (80-90 percent of all employee earnings).
- ³⁴ Blast furnaces, steel works, and rolling and finishing mills (U.S. SIC 331).
- ³⁵ Primary metal industries.
- ³⁶ Primary smelting and refining; rolling, drawing, and extruding mills (U.S. SIC 333-5).
- ³⁷ Excluding secondary smelting and refining (SIC 334).
- ³⁸ Excluding rolling, casting, and extruding mills.
- ³⁹ Copper refining, lamination, extrusion, drawing, foundries; aluminum lamination, extrusion, drawing. Earnings estimated on the basis of 1974 hourly earnings and the trend in average monthly earnings in all manufacturing since 1974. Ratio of additional compensation to hourly earnings refers to 1974.
- ⁴⁰ Estimate from average monthly earnings by assuming 182 hours worked per month.
- ⁴¹ October.
- ⁴² Primary metals, metal products, machinery, and equipment industries.
- ⁴³ Cutlery, handtools, and hardware only for the United States; handtools and agricultural tools, cutlery and tableware, general hardware boxes and packing products, domestic and kitchen heating appliances, metal furniture, domestic and similar articles of base metal, small arms and ammunition, and other small metal articles for the European countries.

- ⁴⁴ Fabricated metal products.
- ⁴⁵ Farm machinery and tools; office and computing machines. Estimated on the basis of 1974 hourly earnings and the trend in average monthly earnings in all manufacturing since 1974. Ratio of additional compensation to hourly earnings refers to 1974.
- ⁴⁶ Estimated from average daily earnings by assuming 8 hours of work per day.
- ⁴⁷ Metal products, machinery, and equipment industries.
- ⁴⁸ Metalworking machine tools, parts, and accessories (U.S. SIC 354).
- ⁴⁹ Radio, TV, phonographs; electrical apparatus and parts; primary and storage batteries. Earnings estimated on the basis of 1974 hourly earnings and the trend in average monthly earnings in all manufacturing since 1974. Ratio of additional compensation to hourly earnings refers to 1974.
- ⁵⁰ Electrical appliances, electronic products, and torch bulb manufacturing.
- ⁵¹ Daily earnings converted to an hourly basis by assuming 8.5 hours of work per day. Excluding overtime pay and shift differentials.
- ⁵² Primary metals, metal products, machinery and equipment. Earnings are production worker estimate (80-90 percent of all employee earnings).
- ⁵³ Transportation equipment industries. All employees.
- ⁵⁴ Earnings in motor vehicle industries estimated on the basis of average hourly earnings for all employees in transportation industries adjusted for the relative level of production worker motor vehicle earnings to all employee transportation equipment earnings in 1975.
- ⁵⁵ Aircraft and parts (U.S. SIC 372) and guided missiles, space vehicles and parts (U.S. SIC 376).
- ⁵⁶ Transportation equipment except motor vehicles.
- ⁵⁷ Ship and boat building and repairing (U.S. SIC 373).
- ⁵⁸ Excluding boat building and repairing.
- ⁵⁹ All employees. Transportation equipment industries.
- ⁶⁰ Earnings for all employees in transportation equipment industries adjusted for the relative level of production worker shipbuilding earnings to all employee transportation equipment earnings in 1975.
- ⁶¹ Adult male workers.
- ⁶² Basic metals, metal products, machinery, and equipment industries.

General Note on Estimates of Hourly Compensation of Production Workers in Manufacturing Industries

Published average hourly earnings may not include the same items of labor compensation in each country. Earnings generally include basic time and place rates; overtime pay and shift differentials; regular bonuses and premiums; and cost-of-living adjustments. In some countries, earnings also include bonuses not paid regularly each pay period, private or contractual family allowances paid by the employer, and pay in kind. In general, earnings are computed per hour paid and include pay for time not worked (e.g., holiday, vacation, and other leave pay) or else are computed per hour worked and exclude pay for time not worked. For some countries, however, earnings include pay for time not worked and are computed per hour worked. For all countries, earnings refer to gross payments made to the worker before payroll deductions for taxes and employee social security contributions.

Average hourly earnings have not been adjusted for differences in earnings definitions or for survey limitations such as the omission of small establishments. However, statistics for some years have been adjusted, where possible, to account for changes in coverage, sample benchmarks, or frequency of surveys. The estimates, therefore, may not coincide with data originally published abroad.

Total hourly compensation includes all direct payments made to the worker (pay for time worked, pay for vacations, holidays, and other leave, all bonuses, and pay in kind) before payroll deductions of any kind, plus employer expenditures for legally required insurance programs and contractual and private plans for the benefit of employees. In addition, compensation includes other significant taxes on payrolls or employment that are regarded as labor costs. Total compensation is computed per hour worked.

Total compensation per hour worked is estimated by adjusting average earnings for items of direct pay not included in earnings and for employer expenditures for social security and contractual and private insurance programs and for other labor taxes. Adjustment factors are obtained primarily from periodic labor cost surveys, censuses of manufacturers, or reports on social security and fringe benefit systems. Because compensation is partly estimated, small differences in compensation levels among countries should not be considered significant.

Hourly compensation is converted to U.S. dollars using the average daily exchange rate for the reference period. Changes in hourly compensation in U.S. dollars from one period to another are therefore affected by changes in currency exchange rates as well as by changes in compensation.

Hourly compensation in U.S. dollars indicates comparative levels of employer labor costs per hour worked. However, because compensation includes more than current labor income of workers and because prices of goods and services vary greatly among countries, it does not indicate relative living standards of workers.

Chapter V.—DOL Programs that Impact the Wage Structure

ROLE OF THE FAIR LABOR STANDARDS ACT

A variety of DOL programs directly affect the wage structure of Puerto Rico: Program, to train people for better paying jobs; programs that influence productivity improvements; measurement of the cost of living on which wage increases are based; assistance in collective bargaining involving wage adjustments; and minimum wage legislation. In Puerto Rico, where wages are heavily concentrated at the low end of the scale, the legal minimum wage is particularly significant. The key piece of legislation is the Fair Labor Standards Act. Under sections 5, 6, and 8, minimum wages in Puerto Rico are set on an individual industry basis, and, if conditions warrant, may be set at a level below that established for the U.S. mainland. However, the law calls for frequent periodic increases and biennial reviews by tripartite industry committees with the objectives of raising these rates as fast as economically feasible to the statutory mainland level. The law also requires that this be done in a manner that will not substantially curtail employment or give the Puerto Rican employer an unfair competitive advantage. Ability to pay is a very important criterion, and the law calls for submission by the employers of such financial data as balance sheets and profit-and-loss statements.

At the present time there are wage orders for 38 industries applicable to Puerto Rico, and most of these industries have several classifications within them which may carry different rates.

In 1974 the FLSA was amended to provide for annual automatic increases on May 1, 1974, and each subsequent May 1, until the \$2.30 mainland statutory level was reached. For those rates below \$1.40 the annual increases were 12 cents per hour, and 15 cents for those industries whose rates were \$1.40 or more. The regular biennial reviews were continued, with the annual automatic increases each May 1 in addition to the increases recommended by the industry committees. It was the legislative intent that by the end of the 1970's virtually all Puerto

Rican activities should reach the \$2.30 mainland rate. A floor of 60 percent of the Stateside minimum was another new feature in 1974.

Although previous amendments had called for general automatic increases, these had been done in two steps, 1 or 2 years apart. In 1961 there had been a 25 percent automatic increase; 15 percent in November 1961 and 10 percent more November 1963. In 1966 there was a 28 percent increase; 12 percent in April 1967, and 16 percent in April 1968. The provisions for appealing the increases via a hardship review had been included in the 1961 and 1966 amendments, but were dropped in 1974. Another important innovation in 1974 was the requirement in section 8(b) of the Act that the committee must recommend the statutory rate unless there is a showing that the industry, or a predominant portion thereof, is unable to pay that rate. This must be supported by tangible objective evidence, including pertinent unabridged profit-and-loss statements and balance sheets. The Sindicato II court decision in January 1976 interpreted this to permit the use of other evidence of equal probity and objectivity.

To judge how much progress has been made one needs to go back to 1950. Then the U.S. minimum was 75 cents an hour and average hourly earnings in manufacturing were \$1.50 in the United States, but only 42 cents in Puerto Rico. By mid-1977 the U.S. statutory minimum was three times as great (\$2.30), U.S. average hourly earnings four times higher (\$5.60), but the Puerto Rican average was 7½ times greater (\$3.15). In the past decade, also, there has been notable progress.

Overall Impact on Manufacturing Sector of Minimum Wage Increases 1966-76

During this period there were two changes in the FLSA, in 1967 and 1974, but for purposes of this report 1974 is most relevant.

The impact is best measured by using data for all manufacturing industries combined. Although the

Table 1.—Estimated Number of Employed Wage and Salary Workers in the Civilian Labor Force Classified by Their Status Under the Minimum Wage Provisions of the Fair Labor Standards Act, by Industry Division, Puerto Rico, March 1976

[In thousands]

Number of employed wage and salary workers in the civilian labor force										
Industry division	Exempt under section 13(a)(1) of FLSA ¹		Total	Non-supervisory employees excluding outside salesworkers	Number of nonsupervisory employees subject to the minimum wage provisions of the FLSA			Number of nonsupervisory employees not subject to the minimum wage provisions of the FLSA		
	Executive, administrative, and professional personnel	Outside salesworkers			Subject prior to the 1966 amendments ²	Subject as a result of the 1966 amendments ²	Subject as a result of the 1974 amendments ³	Total exempt from or not covered by FLSA	Subject to Common-wealth law only ⁴	Not subject to FLSA or Common-wealth law
All industries	88.1	11.4	612.0	512.5	213.2	101.3	158.5	50.9	45.1	5.8
Private sector	40.2	11.4	385.8	334.2	213.2	62.7	18.8	50.9	45.1	5.8
Agriculture	1.7	—	29.9	28.2	15.0	15.0	—	13.2	13.2	—
Mining	.1	—	9	.8	.7	—	—	.1	.1	—
Contract construction	3.7	—	46.0	42.3	39.7	2.6	—	—	—	—
Manufacturing	6.9	2.9	118.3	108.5	105.0	3.6	—	—	—	—
Transportation and public utilities	.7	.1	9.6	8.8	8.4	.1	—	6.4	6.4	—
Wholesale trade	4.0	5.6	27.4	17.8	17.3	1.2	—	.5	.5	—
Retail trade	6.0	.4	63.4	57.0	46.8	16.0	10.2	6.1	6.1	—
Finance, insurance, and real estate	3.0	2.3	18.1	12.8	11.7	.5	—	10.6	10.6	—
Service industries (except private households)	14.1	.1	61.2	47.0	42.3	23.7	—	3.4	3.4	—
Private households	11.0	—	11.0	11.0	5.2	—	3.4	4.8	4.8	—
Public sector	47.9	—	226.2	178.3	178.3	38.6	5.2	5.8	5.8	5.8
Federal Government	10.4	—	10.4	9.3	9.3	—	139.7	—	—	—
State and local government	215.8	—	215.8	169.0	169.0	35.5	6.2	—	—	—
	46.8	—					133.5	—	—	—

Note: Estimates are not stated.

Note: Estimates are not strictly comparable with previous estimates as a result of changes in estimating methodology.

¹ Section 13(a)(1) exempts from the minimum wage and overtime provisions of the Fair Labor Standards Act "... any employee employed in a bona fide executive, administrative, or professional capacity (including any employee employed in the capacity of academic administrative personnel, or teacher in elementary or secondary schools), or in the capacity of outside salesman. ...". Included are all employees in the specified activities whether employed in covered or noncovered establishments.

² Relates to currently employed workers who will be subject at a later date as a result of the phaseout of the minimum wage exemption under section 13(a)(2).

³ Number of employees subject to the Commonwealth minimum wage law or orders only refers to laws or orders that were enacted before January 1976.

⁴ These figures are stated without regard to the *National League of Cities* decision, since the applicability of that decision to employees of the Commonwealth of Puerto Rico or of its political subdivisions has not yet been fully determined by the Department of Labor.

Source: Minimum Wage and Maximum Hours Standards Under the Fair Labor Standards Act: An economic effects study submitted to Congress, 1977. U.S. Department of Labor, Employment Standards Administration, Table 7, pp. 60-61.

FLSA has covered the major part of the Puerto Rican economy during the past decade, manufacturing wages are the best available indicator of long-run changes. They are also the most relevant, as the major focus of the FLSA minimum wage order program has been in the manufacturing sector. Manufacturing represents about one-third of 1976 private sector employment. (See table 1.)

Gap Between Puerto Rico and the Mainland

In absolute terms, average hourly earnings in Puerto Rico have made substantial strides in the past decade—even more than on the mainland. (See table 2.) For example, between October 1966 and June 1977, average manufacturing wages in Puerto Rico jumped by two and one-quarter times (229 percent), from \$1.31 to \$3, while on the mainland the average doubled (204 percent), going from \$2.75 in October 1966 to \$5.60 in June 1977.

While Puerto Rican wages have remained well below those on the mainland, there was, nevertheless, some reduction in the gap during the past 10 years. In October 1966, the Puerto Rican average manufacturing earnings were about 48 percent of those in the mainland; by June 1977 they were about 54 percent.

Spread Between Minimum Wage and Average Hourly Earnings

The relationship of average hourly earnings to the statutory minimum wage (i.e., average earnings as a percentage of the minimum) or the spread between the minimum and the average wage, is a particularly significant measure. The historical pattern has been for the spread to constrict immediately after

the inception of a higher legal minimum rate and as the industry adjusts its entire wage structure to the higher rate the gap widens again. The longrun trend over the period 1966–1977, despite these fluctuations, has been for the spread to widen. This happened in both Puerto Rico and the United States.

The pattern of fluctuations in the spread following the 1967 and 1974 statutory changes in the minimum has varied. Small setbacks occurred in Puerto Rico in 1967 and 1968 following the 1966 FLSA amendments, but on the mainland there was a considerable loss—5 percent between 1966 and 1968 for Puerto Rico as compared to 13 percent for the United States. From 1969 through 1973 there was a marked improvement on both fronts. However, a sharp setback for both followed the May 1, 1974, FLSA amendments.

What is interesting is that this time the drop was approximately the same, percentagewise, for both Puerto Rico and the U.S. mainland—about 12 percent. Both areas have recovered since 1974, but in neither case have they yet achieved the spread between the minimum and the overall average that prevailed in 1973. (Individual industries differed, as will be discussed later.)

Relating the current averages to the \$2.65 statutory minimum that will become effective January 1, 1978, it is estimated that current Puerto Rican average hourly earnings for manufacturing will be 117 percent of the new statutory minimum, and the mainland average, 218.1 percent. This represents a further drop, which, coincidentally, is the same 13 percent for both Puerto Rico and the United States. It is significant, also, that the drop in 1977 is very similar in magnitude to what occurred in 1974 (13 percent vs. 12 percent). Excerpts from table 2

Table 2.—U.S. Minimum Wage and Average Hourly Earnings of Production Workers in Manufacturing Industries, Puerto Rico and United States, October 1966 to October 1977

Year	U.S. minimum wage (\$/hour)	Average hourly earnings, all manufacturing industries (\$)		Puerto Rico average hourly earnings as percentage of U.S. average hourly earnings	Average hourly earnings as percentage of statutory minimum	
		Puerto Rico	United States		Puerto Rico	United States
1966	1.25	1.31	2.75	47.6	104.8	220.0
1967	1.40	1.43	2.85	50.2	102.1	203.6
1968	1.60	1.59	3.06	50.2	99.4	191.3
1969	1.60	1.71	3.25	52.6	106.9	203.1
1970	1.60	1.78	3.37	52.8	111.3	210.6
1971	1.60	1.91	3.59	53.2	119.4	224.4
1972	1.60	2.04	3.87	52.7	127.5	241.9
1973	1.60	2.17	4.15	52.3	135.6	259.4
1974	2.00	2.40	4.57	52.5	120.0	228.5
1975	2.10	2.59	4.90	52.9	123.3	233.3
1976	2.30	2.86	5.28	54.2	124.3	229.6
1977	2.30	3.10	5.78	53.6	134.8	251.3
1978—January (projection)	2.65	3.10	5.78 ¹	—	117.0 ¹	218.1 ¹

Source: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Washington, D.C. Puerto Rico Department of Labor, Bureau of Labor Statistics.

¹ October 1977 earnings as percentage of new \$2.65 statutory rate.

show the relationships that prevailed in October of various years:

Year	U.S. minimum wage	Average hourly earnings in October in manufacturing as a percentage of statutory minimum	
		Puerto Rico	United States
1966	\$1.25	104.8	220.0
1967	1.40	102.1	203.6
1968	1.60	99.4	191.3
1969	1.60	106.9	203.1
1970	1.60	111.3	210.6
1971	1.60	119.4	224.4
1972	1.60	127.5	241.9
1973	1.60	135.6	259.4
1974	2.00	120.0	228.5
1975	2.10	123.3	233.3
1976	2.30	124.3	229.6
1977	2.30	134.8	251.3
1978	2.65	117.0 ¹	218.1 ¹

¹ October 1977 earnings as a percentage of new \$2.65 statutory rate.

CHANGES IN MINIMUM WAGE LEVELS RESULTING FROM THE 1974 AMENDMENTS

Since passage of the 1974 amendments, all 38 wage orders applying to Puerto Rico were reviewed as a result of industry committee action and the 12- and 15-cent annual automatic increases by the end of 1977. There were 17 wage orders providing for the payment of the \$2.30 mainland statutory level. Of the remaining 21 industry wage orders, many classifications within these individual industries also provided for the \$2.30 statutory rate. As of December 31, 1977, an estimated 63.4 percent or about two-thirds of all workers covered by the FLSA were subject to the \$2.30 rate. Of the remaining 36.6 percent, all but 7.4 percent were in classifications calling for a minimum of at least \$2. Table 3 shows this distribution of covered workers.

At present there is no comprehensive study of the impact of the 1974 FLSA amendments on the Puerto Rican economy.¹ There are available a number of studies of individual low-wage labor-intensive industries representing over half of all manufacturing employment, which give a good indication of what has happened. These studies were prepared for industry committee reviews held since the May 1, 1974, effective date of the 1974 amendments. They cover varying survey periods going back to 1973.

An assessment of the impact can be done in two ways: comparing the relationship of the average hourly earnings to the minimum wage, and comparing changes in the distribution of earnings, particularly in the concentration of employees around the legal minimum wage.

¹ Plans are underway for such a study by the Employment Standards Administration of the U.S. Department of Labor.

Data showing changes since the 1974 amendments are available for 18 industries:

Textiles
Leather goods
Tobacco
Hosiery
Gloves
Sweaters
Handkerchiefs
Men's and boys' clothing
Women's underwear
Corsets and brassieres
Women's outerwear, needlework, etc.
Children's dresses
Rubber footwear
Nonrubber footwear
Stone, clay, and glass
Jewelry
Furniture and lumber
Foods

A comparison was made of changes in the FLSA minimum with changes in average hourly earnings in each of these industries and their individual classifications at various survey dates extending from mid-1973 to mid-1977. During the interim there was generally one industry committee review and two May 1 annual automatic 15-cent increases, although there were some deviations from this pattern. The usual interim was 2 years, but in 9 cases, mostly apparel, it was possible to get additional material for February and May 1977, which thereby permitted assessment of the May 1, 1977, annual automatic increase.

Table 3.—Puerto Rico: Cumulative Percent Distribution of Nongovernment Plus Nontraditional Government Employees Covered by the Minimum Wage Provisions of the Fair Labor Standards Act by Applicable Wage Rate on December 31, 1977

Minimum wage	December 31, 1977
Under \$1.75	2.3
Under 1.80	2.7
Under 1.85	2.7
Under 1.90	2.7
Under 1.95	3.4
Under 2.00	7.4
Under 2.05	7.6
Under 2.10	8.9
Under 2.15	9.7
Under 2.20	12.0
Under 2.25	17.6
Under 2.30	36.6
\$2.30 and under	100.0
Number of employees	318,170

Source: Employment Standards Administration, Division of Evaluation and Research, July 26, 1977.

The significant finding is that in all but a handful of cases the increase in average hourly earnings was smaller than the increase in the FLSA minimum wage. This was true both in terms of cents-per-hour and as a percentage of the FLSA minimum wage. Stated another way, the average drew closer to the minimum and the wage structure was compressed. The exceptions—rubber and nonrubber footwear, textiles, and jewelry—involved changes from survey base periods prior to the May 1, 1974, effective date of the 1974 FLSA amendments.

The spread between the minimum and the average wage varied widely among the industries studied, influenced by the occupational mix, differences in technology, and other factors. For purposes of this

analysis, one must watch not the actual level but the change in relationship between the minimum and average wage during the transition period. Here again, the change is largely negative, as the spread between the two measures tends to shrink. Table 4 presents a series of individual examples of such changes between specific survey dates.

As a result of these changes there was an increase in the number of workers at the low end of the wage scale. The latest available data on the clustering of employment at or close to the minimum is shown in table 1 of chapter IV.

These data obviously skim the surface of a complex issue. Detailed case histories of individual industries are not appropriate within the confines of this

Table 4.—Changes in the Differential Between Average Hourly Earnings and the FLSA Minimum Wage in Selected Industries in Puerto Rico, 1972-77

Industry and classification	Survey dates		Change in spread between FLSA minimum and average hourly earnings	
	First survey	Second survey	In cents-per-hour	As percentage of spread in earlier period
Tobacco:				
Wrapper tobacco processing	August 1974	August 1976	1	10.0
Other products and activities	August 1974	August 1976	-6	-30.0
Textile mill products—pre-1961 coverage:				
Other operations on hooked rugs	August 1973	November 1975	13	23.6
Other products and activities	August 1973	November 1975	4	10.3
Leather goods—pre-1961 coverage:				
Belts	February 1977	May 1977	-4	-20.5
	June 1975	May 1977	5	1.5
Other products	February 1977	May 1977	-4	-10.8
Hosiery—pre-1966 coverage:				
Women's hosiery	May 1975	May 1977	-1	-4.0
	February 1977	May 1977	-3	-11.1
	May 1975	May 1977	1	3.1
Other products	February 1977	May 1977	-9	-21.4
Gloves and mittens:				
Other products and activities	May 1975	May 1977	-1	-5.9
	February 1977	May 1977	-1	-5.9
	May 1975	May 1977	-8	-27.6
Sweaters and knit swimwear	February 1977	May 1977	-4	-16.0
Nonrubber footwear	August 1973	November 1975	4	17.4
Rubber footwear	August 1973	November 1975	14	38.9
Handkerchief, scarf and art linen—pre-1961 coverage:				
Other products	May 1975	May 1977	0	0
	February 1977	May 1977	-5	-35.7
Women's and children's underwear—pre-1961 coverage	May 1975	May 1977	3	15.8
	May 1976	May 1977	1	4.8
	February 1977	May 1977	-3	-12.0
	May 1975	May 1977	1	3.6
Corsets and Brassieres	February 1977	May 1977	-11	-27.5
Women's outerwear, needlework, and fabricated textiles—pre-1961 coverage:				
Other products	August 1972	May 1975	4	26.7
	May 1975	May 1977	-4	-17.4
1966 coverage	February 1977	May 1977	1	5.6
Children's dresses:				
Other operations	August 1972	May 1975	-2	-10.0
Jewelry and miscellaneous manufacturing—pre-1961 coverage:				
Straw, hair, and related products	November 1973	August 1976	-7	-33.3
Other related products	November 1973	August 1976	13	130.0
Furniture and fixtures and lumber	November 1973	August 1976	-4	-12.1
Men's and boys' clothing—pre-1961 coverage:				
Work clothing and separate trousers	May 1975	May 1977	1	4.3
	February 1977	May 1977	-3	-11.1
	May 1975	May 1977	-1	-4.0
Other products and activities	February 1977	May 1977	-4	-14.3
Food and related products—pre-1961 coverage:				
Milk processing and distribution	May 1974	May 1976	0	0
Candy and gum—1961 coverage	May 1974	May 1976	-8	-25.8
Other products and activities	May 1974	May 1976	-9	-22.0

Source: Wage and Hour Division Studies.

overview, but could be compiled from existing information, if desired at a later date.

IMPACT ON THE WAGE STRUCTURE RESULTING FROM THE DAVIS-BACON AND SERVICE CONTRACTS ACTS

In the administration of both acts in Puerto Rico it has been the practice to follow the rates established under the FLSA so there is no special impact on the wage structure attributable to this legislation. Furthermore, the number of workers involved has been very small.

1977 AMENDMENTS TO THE FAIR LABOR STANDARDS ACT

With respect to Puerto Rico, the 1977 amendments to the Fair Labor Standards Act established higher statutory levels and a new schedule of annual automatic increases effective January 1, 1978. The statutory levels provided in section 6(a) of the act are as follows:

Through December 31, 1977	\$2.30
Through January 1, 1978	2.65
Through January 1, 1979	2.90
Through January 1, 1980	3.10
Through January 1, 1981	3.35

The 15-cent annual automatic increases effective May 1 were changed to a sliding scale of increases, effective each January 1, which range from 20 to 35 cents, depending on rates in effect on December 31, 1977. For those rates at the statutory level (\$2.30 for all nonagricultural activities, \$2.20 for agricultural work) the new rate was \$2.65 on January 1, 1978, and it will move upward in accordance with the statutory changes. For those rates between \$2.10 and \$2.29, the annual increases will be 25 cents the first year and 30 cents thereafter, till the mainland statutory level is reached. Rates less than \$2 as of December 31, 1977 moved up by 20 cents the first year, by 25 cents the second year, and by 30 cents at such time as they reach or surpass \$2.30, as illustrated by the following schedule:

Dates as of December 31, 1977	January 1, 1978	Increase effective:			January 1, 1981
		January 1, 1979	January 1, 1980	January 1, 1981	
Under \$2.00					
\$1.65-\$1.84	\$0.20	\$0.25	\$0.25	\$0.30	
\$1.85-\$1.99 .....	.20	.25	.30	.30	
\$2.00-\$2.29 .....	.25	.30	.30	.30	
\$2.30 .....	.35	.25	.20	.25	

The 1977 amendments made no change in the law regarding the industry committee review procedure for all rates currently below the statutory level, i.e., that additional increases may be recommended by special industry committees if economic and competitive conditions warrant. However, because the automatic increases prescribed by the 1977 amendments were substantial, and exceed those which industry committees have traditionally recommended in previous years, the Secretary of Labor concluded that no purpose would be served by convening any further special industry committees for Puerto Rico. Accordingly, on February 24, 1978, in Administrative Order No. 654, the Secretary of Labor said that no further industry committees will be convened in Puerto Rico. The Secretary pointed out, however, that this order is subject to reconsideration on petition by any interested person. No such petitions have been received since the order was signed.

There are 38 wage orders with 140 separate classifications within them. On January 1, 1978, 21 out of the total of 38 wage orders for Puerto Rico had one or more classifications where the rates were below the statutory level. Under the schedule of automatic wage increases, even after January 1, 1981, there will still remain a number of wage orders carrying subminimum rates. The numbers summarized from the attached schedule of rates in effect through January 1981, are as follows:

Date	Number of wage orders	Number of Classifications
January 1, 1979	21	60
January 1, 1980	15	40
January 1, 1981	13	29

Important sections of the apparel industry, such as men's and women's underwear, will still have minimum rates below the statutory level during 1980. The principal activities continuing to carry subminimum rates in 1981 include agriculture (both public and private sector), small leather goods, rubber and nonrubber footwear, hosiery, textiles, and tobacco. The proportion of the labor force affected at that time should be quite small, however, judging from current employment in these categories.

Minimum wage rates for Puerto Rico required by the Fair Labor Standards Act are listed below. The wage rates shown are those in effect immediately prior to January 1, 1978, and the rates scheduled to become effective on January 1, 1978, and on each subsequent January 1 through 1981, as a result of the automatic increases required by the 1977 Fair Labor Standards Amendments. The mainland statutory level was raised to \$2.65 on January 1, 1978, and will go to \$2.90 on January 1, 1979, \$3.10 on

January 1, 1980, and \$3.35 on January 1, 1981. For those industries where the rates were below the mainland statutory level as of December 31, 1977, the schedule of automatic increases is as follows:

Rates as of Dec. 31, 1977	Increase effective January 1—			
	1978	1979	1980	1981
Under \$2.00				
\$1.65-1.84	\$0.20	\$0.25	\$0.25	\$0.30
1.85-1.99	.20	.25	.30	.30
2.00-2.29	.25	.30	.30	.30

Additional information on the Minimum Wage Program for Puerto Rico may be obtained from the National Office of the Wage and Hour Division of the U.S. Department of Labor, Washington, D.C. 20210, Telephone: (202) 523-8720 or from the following offices in Puerto Rico:

Hato Rey, Puerto Rico 00918
(Office of the Director)
New Federal Office Building, Room 403
Carlos Chardon Street
Telephone: 753-4442

Hato Rey, Puerto Rico 00918 (Area Office)
New Federal Office Building, Room 152
Carlos Chardon Street
Telephone: 753-4463 or 4263

Mayaguez, Puerto Rico 00708 (Area Office)
Americo Marin Building
105 East Mendez Vigo Street
Telephone: 832-3495

The offices listed below are staffed by personnel whose duties frequently require them to be away from the office. Telephone messages and requests for information may be left at these offices when regular personnel are not on duty. Personal appointments may be arranged by either telephone or mail.

Arecibo, Puerto Rico 00612
Orriola Building, Room 203
107 Gonzalo Marin Street
Telephone: 878-2690

Ponce, Puerto Rico 00731
Post Office Building, Room 123
Atocha and Guadaloupe Street
Telephone: 842-9018

Table 5.—Minimum Wage Rates for Puerto Rico

Industry and subdivision and wage order number	Minimum hourly rate				
	In effect December 31, 1977	1978	1979	1980	1981
	Effective January 1—				
I. NONMANUFACTURING					
Agriculture (727)—					
Sugarcane farms:					
Principal operators of mechanical loaders, harvesters, and sowers; operators of other mechanical equipment and craftsmen	\$2.20	\$2.65	\$2.90	\$3.10	\$3.35
Other workers	1.98	2.18	2.43	2.73	3.03
Other farms:					
Drivers, tractor and machinery operators, milkers and craftsmen	2.20	2.65	2.90	3.10	3.35
Other workers on livestock and dairy farms	1.90	2.10	2.35	2.65	2.95
Other workers on tobacco and coffee farms	1.70	1.90	2.15	2.40	2.70
Other workers on pineapple farms	1.95	2.15	2.40	2.70	3.00
Other workers on ornamental plant farms	1.95	2.15	2.40	2.70	3.00
Other workers on other farms	1.75	1.95	2.20	2.45	2.75
Banking, Insurance and Finance (661)—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Business, Professional, and Miscellaneous Services (672)—					
Pre-1966 Coverage:					
Watching, protective and janitorial services	12.30	12.65	12.90	13.10	13.35
Other activities	12.30	12.65	12.90	13.10	13.35
1966 Coverage:					
Watching, protective and janitorial services	12.30	12.65	12.90	13.10	13.35
Other activities	12.30	12.65	12.90	13.10	13.35
Communications, Utilities and Transportation (671) ² —					
Pre-1966 Coverage:					
Radio broadcasting	12.30	12.65	12.90	13.10	13.35
Other activities	12.30	12.65	12.90	13.10	13.35
1966 Coverage	12.30	12.65	12.90	13.10	13.35
Construction (726)	2.25	2.50	2.80	3.10	3.35
Education (725) ³	12.30	12.65	12.90	13.10	13.35
Hospital and Related Institutions (724) ³	12.30	12.65	12.90	13.10	13.35
Hotels and Motels (formerly 728) ³	12.30	12.65	12.90	13.10	13.35
Laundry and Cleaning (723)	12.30	12.65	12.90	13.10	13.35
Restaurant and Food Service Establishments (formerly 729) ³	12.30	12.65	12.90	13.10	13.35
Retail Trade (721)—					
Pre-1966 Coverage:					
Gasoline service stations	2.20	2.45	2.75	3.05	3.35
Other activities	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35

Table 5.—Minimum Wage Rates for Puerto Rico—Con.

Industry and subdivision and wage order number	Minimum hourly rate				
	In effect December 31, 1977	Effective January 1—			
		1978	1979	1980	1981
Wholesaling and Warehousing (683)—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
II. MANUFACTURING—APPAREL					
Children's Dress and Related Products (610)—					
Pre-1961 coverage	12.30	12.65	12.90	13.10	13.35
1961 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	2.28	2.53	2.83	13.10	13.35
Corsets, Brassieres, and Allied Garments (614)—					
Pre-1961 coverage	2.28	2.53	2.83	13.10	13.35
1961 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Gloves and Mittens (603)—					
Pre-1961 coverage:					
Handsewing on fabric and leather gloves	1.65	1.85	2.10	2.35	2.65
Other products and activities	42.25	2.50	2.80	13.10	13.35
1961 and 1966 coverage	42.30	12.65	12.90	13.10	13.35
Handkerchief, Scarf, and Art Linen (608)—					
Pre-1961 coverage:					
Oblong scarves	12.30	12.65	12.90	13.10	13.35
Other products and activities	1.70	1.90	2.15	2.40	2.70
1961 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Hosiery (687)—					
Pre-1966 coverage:					
Women's hosiery	2.18	2.43	2.73	3.03	3.23
Other products and activities	1.97	2.17	2.42	2.72	3.02
1966 coverage:					
Women's hosiery	2.18	2.43	2.73	3.03	3.33
Other products and activities	1.995	2.195	2.445	2.745	3.045
Men's and Boys' Clothing and Related Products (615)—					
Pre-1961 coverage:					
Work clothing and separate trousers	42.27	2.52	2.82	13.10	13.35
Military style hats and caps	2.25	2.50	2.80	13.10	13.35
Nonmilitary style hats and caps	2.15	2.40	2.70	3.00	3.30
Other products and activities	42.20	2.45	2.75	3.05	13.35
1961 coverage	42.20	2.45	2.75	3.05	13.35
1966 coverage					
Trousers	42.24	2.49	2.79	3.09	3.35
Other products and activities	42.27	2.52	2.82	13.10	13.35
Military Hats and Caps (617)—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Sweater and Knit Swimwear (611)—					
	2.28	2.53	2.83	13.10	13.35
Women's and Children's Underwear and Women's Blouse (609)—					
Pre-1961 coverage	2.20	2.45	2.75	3.05	13.35
1961 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Women's Outerwear, Needlework, and Miscellaneous Fabricated Textile Products (612)—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	2.29	2.54	2.84	13.10	13.35
III. MANUFACTURING—EXCEPT APPAREL					
Chemical, Petroleum, and Related Products (670)—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Electrical, Instrument and Related Products (606)—					
Pre-1966 coverage					
Single-vision lens	12.30	12.65	12.90	13.10	13.35
Other products and activities	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Food and Kindred Products (673)—					
Pre-1966 coverage:					
Alcoholic beverage, yeast, canned tuna fish, biscuit, cracker, bread, rice, lard, animal feeds, soft drinks, ice cream, ices, and similar frozen products	12.30	12.65	12.90	13.10	13.35
Milk processing and distribution	2.28	2.53	2.83	13.10	13.35
Candy and gum products:					
Pre-1961 coverage activities	2.28	2.53	2.83	13.10	13.35
1961 coverage activities	2.28	2.53	2.83	13.10	13.35
Other products and activities	12.30	12.65	12.90	13.10	13.35
1966 coverage:					
Alcoholic beverage, yeast, canned tuna fish, biscuit, cracker, bread, rice, lard, animal feeds, soft drinks, ice cream, ices, and similar frozen products	12.30	12.65	12.90	13.10	13.35

Table 5.—Minimum Wage Rates for Puerto Rico—Con.

Industry and subdivision and wage order number	Minimum hourly rate				
	In effect December 31,	Effective January 1—			
	1977	1978	1979	1980	1981
Milk processing and distribution	2.28	2.53	2.83	3.10	3.35
Candy and gum products	2.28	2.53	2.83	3.10	3.35
Other products and activities	12.30	12.65	12.90	13.10	13.35
Furniture and Fixtures and Lumber and Wood Products (675)—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Jewelry and Miscellaneous Products Manufacturing (613)—					
(1) Jewelry, Novelty, Decoration, Straw, Hair and Related Products Sector of the Industry—					
Pre-1961 coverage:					
Gem stone, industrial jewel, precious jewelry, metal expansion watch band, hair ornaments and accessories, and emble- matic and military insignia	12.30	12.65	12.90	13.10	13.35
Straw, hair, and related products	2.15	2.40	2.70	3.00	3.30
Other related products and activities	12.30	12.65	12.90	13.10	13.35
1961 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
(2) Other Miscellaneous Products Manufacturing Sector of the Industry—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Leather, Leather Goods and Related Products (602)—					
Pre-1961 coverage:					
Belt manufacturing	12.29	2.54	2.84	3.10	3.35
Hide curing	12.29	2.54	2.80	3.10	3.35
Sporting and athletic goods	12.25	2.50	2.80	3.10	3.35
Other products and activities	12.19	2.44	2.74	3.04	3.34
1961 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.29	2.54	2.84	3.10	13.35
Metal, Machinery, Transportation Equipment and Allied Products (604)—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Nonrubber Footwear (601)—					
Pre-1966 coverage	2.05	2.30	2.60	2.90	3.20
1966 coverage	2.20	2.45	2.75	3.05	13.35
Paper, Paper Products, Printing and Publishing (677)—					
Pre-1966 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Rubber and Miscellaneous Plastics Products (720)—					
Pre-1966 coverage:					
Rubber products	12.30	12.65	12.90	13.10	13.35
Plastic dinnerware, sprayers, vaporizers, phonograph records and artificial flowers	12.30	12.65	12.90	13.10	13.35
Plastic pipes and fittings	12.30	12.65	12.90	13.10	13.35
Other plastic products	12.30	12.65	12.90	13.10	13.35
1966 coverage:					
Rubber products	12.30	12.65	12.90	13.10	13.35
Plastics products	12.30	12.65	12.90	13.10	13.35
Rubber and Plastics Footwear (730)—					
Pre-1961 coverage	2.05	2.30	2.60	2.90	3.20
1961 coverage:					
Rubber footwear	2.20	2.45	2.75	3.05	13.35
Other products and activities	2.05	2.30	2.60	2.90	3.20
1966 coverage	2.20	2.45	2.75	3.05	13.35
Stone, Clay, and Glass Products and Nonmetallic Mining (678)—					
Pre-1961 coverage:					
Art pottery	1.85	2.05	2.30	2.60	2.90
Vitreous and semivitreous china food utensils	2.28	2.53	2.83	3.10	3.35
Other products and activities	12.30	12.65	12.90	13.10	13.35
1961 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
Textile Mill Products (699)—					
Pre-1961 coverage:					
Multiple-needle power-driven machine operations on hooked rugs—	12.30	12.65	12.90	13.10	13.35
Other operations on hooked rugs	2.00	2.25	2.55	2.85	3.15
Pillow	12.30	12.65	12.90	13.10	13.35
Cotton swab and bandage	12.30	12.65	12.90	13.10	13.35
Other products and activities	2.10	2.35	2.65	2.95	3.25
1961 and 1966 coverage	12.30	12.65	12.90	13.10	13.35
Tobacco Manufactures (657)—					
Pre-1961 coverage:					
Filler tobacco processing	1.71	1.91	2.16	2.41	2.71
Wrapper-type tobacco processing	2.00	2.25	2.55	2.85	3.15
Machine threshing, other operations	2.22	2.47	2.77	3.07	3.35
Cigarette	12.30	12.65	12.90	13.10	13.35
Other products and activities	2.28	2.53	2.83	3.10	3.35
1961 coverage	12.30	12.65	12.90	13.10	13.35
1966 coverage	12.30	12.65	12.90	13.10	13.35
(1) Government Service (700) b—					
Commonwealth Government employees ^a	12.30	12.65	12.90	13.10	13.35

Table 5.—Minimum Wage Rates for Puerto Rico—Con.

Industry and subdivision and wage order number	Minimum hourly rate				
	In effect December 31,	Effective January 1—			
	1977	1978	1979	1980	1981
Municipal government employees ⁶	2.00	2.25	2.50	2.80	3.10
Right to Employment Administration employees ⁶	1.95	2.15	2.40	2.70	3.00
Puerto Rico Land Authority and Sugar Corporation of Puerto Rico employees ⁷					
Agricultural phase—					
Sugarcane farms:					
Craftsmen	2.20	2.65	2.90	3.10	3.35
Other employees	1.98	2.18	2.43	2.73	3.03
Pineapple farms	1.95	2.15	2.40	2.70	3.00
Cattle farms	1.90	2.10	2.35	2.65	2.95
Other farms	1.75	1.95	2.20	2.45	2.75
Industrial phase—					
Sugar manufacturing	2.20	2.45	2.75	3.05	3.35
Other activities	2.20	2.45	2.75	3.05	3.35

IV. 1974 COVERAGE ACTIVITIES

(2) 1974 Coverage Employment Other than Government Service (701)—					
Domestic service workers	2.30	2.65	2.90	3.10	3.35
Small retail and service establishments	2.30	2.65	2.90	3.10	3.35
Small telegraph agencies	2.30	2.65	2.90	3.10	3.35
Processing of shade-grown tobacco	2.20	2.65	2.90	3.10	3.35
Small logging operations	2.20	2.65	2.90	3.10	3.35
Agricultural employees of large conglomerates	2.20	2.65	2.90	3.10	3.35
Motion picture theaters	2.30	2.65	2.90	3.10	3.35

¹ Minimum wage rate has reached the mainland statutory level.

² With respect to government-operated institutions in the case of *National League of Cities v. Usery* on June 24, 1976, the Supreme Court held that the Minimum Wage and Overtime provisions of the Fair Labor Standards Act could not constitutionally be applied to employees of State and local governments engaged in activities which are an integral part of traditional governmental services. With respect to private operated institutions, the rates shown herein set forth will apply.

³ The 1974 FLSA amendments removed these industries from the Puerto Rican wage order program, and made them subject to the rates that apply to similar activities in the 50 States.

⁴ Effective since November 20, 1977.

⁵ The publication of wage rates in this industry classification should not be construed as a definitive opinion by the U.S. Department of Labor as to the applicability of the Supreme Court's decision in *National League of Cities v. Usery*, 426 U.S. 833 (1976), to employees of the Commonwealth of Puerto Rico or of its political subdivisions. In *National League of Cities*, the Supreme Court held that the minimum wage and overtime provisions of the Fair Labor Standards Act are not constitutionally applicable to the integral operations of the States and their political subdivisions in areas of traditional governmental functions. While this decision dealt with the 50 States and their political subdivisions, it is apparent, as a matter of statutory interpretation, that the restrictions imposed by *National League of Cities* should be the same in Puerto Rico as in the 50 States. Determinations of whether particular functions are traditional or nontraditional governmental functions will be made by the Department of Labor on a case-by-case basis, and determinations that particular functions are nontraditional will be published in the Federal Register in the form of amendments to 29 CFR 775.3.

⁶ Rates set forth herein apply to such operations of these government agencies as are nontraditional under the *National League of Cities* case.

⁷ On March 28, 1977, the U.S. Department of Labor took the position that activities of the Puerto Rico Land Authority and Sugar Corporation of Puerto Rico are nontraditional government activities and therefore subject to the minimum hourly rates set forth in the Wage Order.

Source: WH Publication 1348, No. 16, April 1978, Wage and Hour Division, United States Department of Labor, Employment Standards Administration, Washington, D.C.

Chapter VI.—Fringe Benefits

SUMMARY OF AVAILABLE DATA ON FRINGE BENEFITS IN PUERTO RICO

In evaluating the available information on fringe benefits in Puerto Rico, one should recognize that such information is fragmentary and gives only a rough indication of existing practices. The data on Puerto Rico deals only with the mandatory fringes; such important voluntary benefits as pensions or health plans are not included. The U.S. Chamber of Commerce study for the mainland is based on a relatively small sample taken from among the large firms, and therefore cannot be considered as representative of all United States firms. Because of the limitations on both sets of data, it is not possible to make any truly valid comparisons of Puerto Rico and the U.S. mainland. Some general conclusions can be drawn, however.

The sum total of voluntary and mandatory fringe benefits in Puerto Rico appears to be somewhat smaller than that provided in the U.S. mainland. In rough terms, the increment for fringes in Puerto Rico amounts to less than a quarter of the payroll, while in the United States it is over a third. Employers in Puerto Rico have maintained that the mandatory fringes are higher than the States, but when voluntary fringes are added in, the opposite picture emerges.

A summary of the available information is as follows. It is derived from these seven sources, copies of which are attached.

(1) Report on fringe benefits as of April 1977, by the Economic Development Administration of Puerto Rico. (Attachment 1.)

(2) Straight-time average hourly earnings, fringe benefits, and total compensation for a series of 33 individual industries as of April 1977, prepared by the Commonwealth of Puerto Rico Minimum Wage Board. (Attachment 2.)

(3) Excerpts from the Wage-Hour October 1977 Apparel Industry Report. (Attachment 3.)

(4) Excerpt from *Chemical Week*, November 10, 1976. (Attachment 4.)

(5) U.S. Chamber of Commerce, *Employee Benefits*, 1975, tables 20 and 21. (Attachment 5.)

(6) U.S. Department of Labor, Bureau of Labor Statistics, *Employee Compensation in the Private Nonfarm Economy*, 1976. Summary 78-7. (Attachment 6.)

(7) U.S. Department of Labor, Bureau of Labor Statistics, *Estimated Hourly Compensation of Production Workers in Manufacturing, Ten Countries 1960, 1965-1978*. (Attachment 7.)

Fringe Benefits in Puerto Rico and the United States

Directly comparable fringe benefits

Only a few fringe benefits are directly comparable; social security, unemployment insurance, and workers' compensation. These are mandatory in both Puerto Rico and the United States.

In 1977, prior to the recent amendments to the Social Security law, employers were obliged to pay the following percentages of their payroll:

	United States	Puerto Rico
Social Security	5.85%	5.85%
Unemployment insurance	\$0.10-\$6.60	\$3.20
Worker's compensation	\$0.50	\$2.65 ¹

¹ In clothing manufacturing.

Unemployment insurance rates in the United States vary by State and existing rates of unemployment. The ranges are due to experience rating or some other method provided in the State law for measuring the risk of unemployment. In 1976, the rates ranged from the minimum of 0.1 percent to a maximum of 6.6 percent in the United States.

Fringe benefits for individual industries or industry groups

The Commonwealth of Puerto Rico Minimum Wage Board reported fringe benefits, plus straight-time hourly earnings, for April 1977, in its "Economic Report-Impact of the Proposed Amendments to the Fair Labor Standards Act of 1938."

This study covered 33 separate industry groups, representing the entire nonagricultural sector of the Puerto Rican economy. As of April 1977, average straight-time hourly earnings of \$2.44 were reported,

with fringe benefits amounting to an additional 51 cents. Fringe benefits therefore amounted to 17.3 percent of the \$2.95 total compensation. (See attachment 2.)

Fringe benefits for manufacturing industries appear to be a bit higher. The Economic Development Administration of the Commonwealth Government (Fomento) in a special report released July 1977, entitled "Cost of Mandatory Fringe Benefits," presented data for twenty 2-digit SIC manufacturing industries, i.e., the entire manufacturing sector of the economy. (See attachment 1.) Fringe benefits in April 1977 for all 20 manufacturing industry groups combined totaled 71 cents per hour, of which 47 cents was for mandatory benefits and 24 cents for items such as vacation, sick, and maternity leave which are included in the payroll. The \$2.94 average hourly earnings figure reported for April 1977 included vacation and sick leave, etc., benefits averaging 24 cents. Thus, the total cost to the employer (i.e., the total compensation) was \$2.94 plus \$.47 or \$3.41 per hour. Total fringes of \$0.71, therefore, represent 20.8 percent of total compensation in April 1977; mandatory fringes (social security, unemployment insurance, workmen's compensation, disability insurance, and the Christmas bonus) represent 13.8 percent of total compensation.

The aforementioned article in *Chemical Week*, in discussing fringe benefits, cites the United States Chamber of Commerce figure of 35.4 percent of total compensation for all industries for the U.S. mainland in 1975 as compared to 24.1 percent for Puerto Rico. Details are shown in attachments 3 and 5. These findings are not inconsistent with the studies cited earlier, once it is recognized that the fringe benefits are stated in terms of their relationship to pay for time worked (average hourly earnings) rather than to total compensation. Recent studies by the U.S. Bureau of Labor Statistics bear out this assumption. (See attachment 6.) For example, in 1976, for all private nonfarm establishments with 20 or more employees, pay for time worked amounted to 76.7 percent of total compensation, and fringe benefits, 23.3 percent, i.e., \$5.32 and \$1.62, respectively, for a total compensation of \$6.94.

The \$1.62 in fringe benefits represented 30.5 percent of average hourly earnings. If we use data for manufacturing industries only, fringe benefits were \$1.83, average hourly earnings \$5.35, for a total compensation of \$7.18; fringe benefits were, there-

fore, 25.5 percent of total compensation but 34.2 percent of average hourly earnings. Using the same ratios for the Puerto Rican data compiled by Fomento, fringe benefits represented an increment of 24.1 percent over and above the \$2.94 average hourly earnings in manufacturing industries. (Translating the fringe benefit shown in the Chamber of Commerce study into percentages of total compensation, they amount to 26.1 percent for the United States.¹ For Puerto Rico, as noted earlier, the comparable figure is 20.8 percent.)

The Office of Productivity and Technology of the U.S. Bureau of Labor Statistics has estimated hourly compensation of production workers in manufacturing as of midyear 1975 through 1978, as follows:²

Year	Amount		Fringe benefits as percentage of—	
	Average hourly earnings	Fringe benefits	Average hourly earnings	Total compensation
1975	\$4.83	\$1.53	31.7	24.1
1976	5.22	1.72	33.0	24.8
1977	5.67	1.93	34.0	45.2
1978	6.14	2.12	34.5	25.7

The available figures for fringe benefits in the continental United States vary with each study, so strict comparisons are not possible. Nevertheless, it is clear from the following comparisons of ratios of fringe benefit to total compensation that the fringe benefits paid by Puerto Rican employers are somewhat lower:

(1) U.S. Chamber of Commerce, in 1975: 26.1 percent for all industries and 26.5 percent for manufacturing in the United States.

(2) U.S. Bureau of Labor Statistics in 1976: 23.3 percent for all nonfarm industries, 25.5 percent for all manufacturing; and 24.8 percent for production workers in manufacturing in the United States.

(3) U.S. Bureau of Labor Statistics—for production workers in manufacturing in midyear 1976—24.8 percent, 1977—25.4 percent, 1978—25.7 percent.

(4) Commonwealth Minimum Wage Board, April 1977: 17.3 percent in all nonagricultural industries.

(5) Fomento, April 1977: 20.8 percent in all manufacturing industries.

¹ This is calculated from data in attachment 5, table 20 of the Chamber of Commerce study, which shows benefits of \$1.932 per hour, representing 35.4 percent of payroll. Payroll (pay for time worked) therefore, is \$5.458 per hour, and total compensation is \$7.39 per hour.

² Details are in attachment 7.

COST OF MANDATORY FRINGE BENEFITS

Introduction

The legislated fringe benefits growth during recent years has substantially improved worker well-being in Puerto Rico, and has also increased the cost of doing business as well. In an effort to determine the actual cost of legally required benefits to the employer we have estimated the hourly cost per worker that each benefit represents.

Payment for vacations, sick leave, holidays, and maternity leave are included as a portion of employee wages. Such payments give employees increased compensation for each hour actually on the job. Consequently, they also increase the employer's cost for each hour of productive labor. Social Security, unemployment insurance, and other employer payments for employee benefits, since they are not part of the payroll, are not reflected in current earnings of employees. Such benefits, however, greatly increase employee security and well-being, and also the cost to the employer.

The following are summary tables of labor and fringe benefits cost required for 2-digit industry groups (SIC). They are intended for no more than guidelines of such costs.

Industrywide Summary

Labor and Fringe Benefit Costs Required

Average hourly earnings (payroll) April 1977	\$2.94
Annual average earnings (\$2.94 × 2,080 hrs.)	\$6,115
<i>Mandatory fringe benefits:</i>	
<i>Not included in payroll—</i>	
Social security (5.85% up to \$16,500)	358
Unemployment insurance (5% up to \$4,200 + \$2.95 of payroll)	201
Workmen's compensation (average \$4.50 per 100 payroll)	275
Disability insurance (.30% up to \$9,000) ..	18
Christmas bonus (2% up to \$10,000)	122
	<u>\$974</u>
Average cost per hour per worker .....	.47
Total average hourly cost to employer	\$3.41

Included in payroll—

Vacation (10 days per year)	235
Sick leave (9 days per year)	212
Maternity leave (8 weeks at half pay—49.0 female work force—25% receive benefit)	58
	<u>\$505</u>
Average cost per hour per worker .....	.24
Total fringe benefit cost per hour per worker .....	.71
Percent of average hourly earnings (\$2.94)	24.1
Percent of average hourly cost to employer (\$3.41)	20.8

The Food and Kindred Products Industry in Puerto Rico

Labor and Fringe Benefits Cost Required

Average hourly earnings (payroll) April 1977 (SIC-20) ..	\$2.97
Annual average earnings (\$2.97 × 2,080 hrs.)	\$6,178

Mandatory fringe benefits:

Not included in payroll—

Social security (5.85% up to \$16,500)	361
Unemployment insurance (.5% up to \$4,200 \$2.95 of payroll)	203
Workmen's compensation (\$5.25 per 100 payroll)	324
Disability insurance (.30% up to \$9,000) ..	19
Christmas bonus (2% up to \$10,000)	124
	<u>\$1,031</u>
Average cost per hour per worker .....	.50
Total average hourly cost to employer	\$3.47

Included in payroll—

Vacation (10 days per year)	\$238
Sick leave (10 days per year)	238

Maternity leave (8 weeks
at half pay—20.8 fe-
male work force —
25% receive benefit) — 25
\$501

Average cost per hour per
worker — .24
Total fringe benefit cost per hour
per worker — .74
Percent of average hourly earn-
ings (\$2.97) — 24.9
Percent of average hourly cost to
employer (\$3.47) — 21.3

*The Tobacco Manufactures Industry in
Puerto Rico
Labor and Fringe Benefits Cost Required*

Average hourly earnings (pay-
roll) April 1977 (SIC-21) — \$2.39
Annual average earnings (\$2.39
× 2,080 hrs.) — \$4,971
Mandatory fringe benefits:
Not included in payroll—
Social security (5.85% up
to \$16,500) — 291
Unemployment insurance
(.5% up to \$4,200
\$2.95 payroll) — 167
Workmen's compensation
\$4.85 per 100 pay-
roll) — 241
Disability insurance
(0.30% up to \$9,000) — 15
Christmas Bonus (2% up
to \$10,000) — 99
\$813
Average cost per hour
per worker — .39
Total average hourly
cost to employer — \$2.78

Included in payroll—
Vacation (9 days per
year) — \$172
Sick leave (7 days per
year) — 134
Maternity leave (8 weeks
at half pay—50.0 fe-
male work force—25%
receive benefit) — 48
\$354

Average cost per hour per
worker — .17
Total fringe benefit cost per hour
per worker — .56

Percent of average hourly earn-
ings (\$2.39) — 23.4
Percent of average hourly cost to
employer (\$2.78) — 20.1

*The Textile Mill Products Industry in Puerto Rico
Labor and Fringe Benefits Cost Required*

Average hourly earnings (pay-
roll) April 1977 (SIC-22) — \$2.44
Annual average earnings
(\$2.44 × 2,080 hrs.) — \$5,075
Mandatory fringe benefits:
Not included in payroll—
Social security (5.85%
up to \$16,500) — 297
Unemployment insurance
(.5% up to \$4,200
\$2.95 payroll) — 170
Workmen's compensation
(\$3.05 per 100 pay-
roll) — 155
Disability insurance
(0.30% up to \$9,000) — 15
Christmas bonus (2% up
to \$10,000) — 102
\$739

Average cost per hour
per worker — .36
Total average hourly
cost to employer — \$2.80

Included in payroll—
Vacation (12 days per
year) — \$234
Sick leave (6 days per
year) — 117
Maternity leave (8 weeks
at half pay—60.0 fe-
male work force—25%
receive benefit) — 59
\$410

Average cost per hour per
worker — .20
Total fringe benefit cost per hour
per worker — .56
Percent of average hourly earn-
ings (\$2.44) — 22.9
Percent of average hourly cost to
employer (\$2.80) — 20.0

*The Apparel Products Industry in Puerto Rico
Labor and Fringe Benefits Cost Required*

Average hourly earnings (pay-
roll) April 1977 (SIC-23) — \$2.40
Annual average earnings
(\$2.40 × 2,080 hrs.) — \$4,992

*Mandatory fringe benefits:**Not included in payroll—*

Social security (5.85% up to \$16,500)	292
Unemployment insurance (.5% up to \$4,200 \$2.95 payroll)	168
Workmen's compensation (\$3.00 per 100 payroll)	150
Disability insurance (0.30% up to \$9,000) ..	15
Christmas bonus (2% up to \$10,000)	100
	<u>\$725</u>

Average cost per hour per worker .....	.35
Total average hourly cost to employer	\$2.75

Included in payroll—

Vacation (12 days per year)	\$230
Sick leave (deducted from vacation)	—
Maternity leave (8 weeks at half pay—86.1 female work force—25% receive benefit)	83
	<u>\$313</u>

Average cost per hour per worker .....	.15
Total fringe benefit cost per hour per worker .....	.50
Percent of average hourly earnings (\$2.40)	20.8
Percent of average hourly cost to employer (\$2.75)	18.2

*The Lumber and Wood Products, Except Furniture Industry in Puerto Rico
Labor and Fringe Benefits Cost Required*

Average hourly earnings (payroll) April 1977 (SIC-24)	\$2.28
Annual average earnings (\$2.28 × 2,080 hrs.)	\$4,742

*Mandatory fringe benefits:**Not included in payroll—*

Social security (5.85% up to \$16,500)	277
Unemployment insurance (.5% up to \$4,200 \$2.95 payroll)	160
Workmen's compensation (\$5.40 per 100 payroll)	256

Disability insurance (0.30% up to \$9,000) ..	14
Christmas bonus (2% up to \$10,000)	95
	<u>\$802</u>

Average cost per hour per worker .....	.39
Total average hourly cost to employer	\$2.67

Included in payroll—

Vacation (15 days per year)	\$274
Sick leave (15 days per year)	274
Maternity leave (8 weeks at half pay—8.3 female work force—25% receive benefit)	8
	<u>\$556</u>

Average cost per hour per worker .....	.27
Total fringe benefit cost per hour per worker .....	.66
Percent of average hourly earnings (\$2.28)	28.9
Percent of average hourly cost to employer (\$2.67)	24.7

*The Furniture and Fixtures Industry in Puerto Rico
Labor and Fringe Benefits Cost Required*

Average hourly earnings (payroll) April 1977 (SIC-25) ..	\$2.50
Annual average earnings (\$2.50 × 2,080 hrs.)	\$5,200

*Mandatory fringe benefits:**Not included in payroll—*

Social security (5.85% up to \$16,500)	304
Unemployment insurance (.5% up to \$4,200 \$2.95 payroll)	174
Workmen's Compensation (\$5.40 per 100 payroll)	281
Disability insurance (0.30% up to \$9,000) ..	16
Christmas bonus (2% up to \$10,000)	104
	<u>\$879</u>

Average cost per hour per worker .....	.42
Total average hourly cost to employer	\$2.92

Included in payroll—

Vacation (15 days per year)	\$300
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Sick leave (15 days per year)	300
Maternity leave (8 weeks at half pay—18.2 female work force—25% receive benefit)	18
	<u>\$618</u>

Average cost per hour per worker .....	.30
Total fringe benefit cost per hour per worker .....	.72
Percent of average hourly earnings (\$2.50)	28.8
Percent of average hourly cost to employer (\$2.92)	24.7

*The Paper and Allied Products Industry
in Puerto Rico*

Labor and Fringe Benefits Cost Required

Average hourly earnings (payroll) April 1977 (SIC-26) ..	—	\$3.18
Annual average earnings (\$3.18 × 2,080 hrs.)	\$6,614	
<i>Mandatory fringe benefits:</i>		
<i>Not included in payroll—</i>		
Social security (5.85% up to \$16,500)	387	
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	216	
Workmen's Compensation (\$4.85 per 100 payroll)	321	
Disability insurance (0.30% up to \$9,000) ..	20	
Christmas bonus (2% up to \$10,000)	132	
	<u>\$1,076</u>	

Average cost per hour per worker .....	.52
Total average hourly cost to employer	<u>\$3.70</u>

Included in payroll—

Vacation (12 days per year)	\$305
Sick leave (6 days per year)	153
Maternity leave (8 weeks at half pay—13.3 female work force—25% receive benefit)	17
	<u>\$475</u>

Average cost per hour per worker .....	.23
Total fringe benefit cost per hour per worker .....	.75

Percent of average hourly earnings (\$3.18)	23.6
Percent of average hourly cost to employer (\$3.70)	20.3

*The Printing, Publishing, and Allied Industries
in Puerto Rico*

Labor and Fringe Benefits Cost Required

Average hourly earnings (payroll) April 1977 (SIC-27) ..	—	\$3.72
Annual average earnings (\$3.72 × 2,080 hrs.)	\$7,738	
<i>Mandatory fringe benefits:</i>		
<i>Not included in payroll—</i>		
Social security (5.85% up to \$16,500)	453	
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	249	
Workmen's compensation (\$2.60 per 100 per payroll)	201	
Disability insurance (.30% up to \$9,000) ..	23	
Christmas bonus (2% up to \$10,000)	155	
	<u>\$1,081</u>	

Average cost per hour per worker .....	.52
Total average hourly cost to employer	<u>\$4.24</u>

Included in payroll—

Vacation (12 days per year)	\$357
Sick leave (6 days per year)	179
Maternity leave (8 weeks at half pay—17.2 female work force—25% receive benefit)	26
	<u>\$562</u>

Average cost per hour per worker .....	.27
Total fringe benefit cost per hour per worker .....	.79
Percent of average hourly earnings (\$3.72)	21.2
Percent of average hourly cost to employer (\$4.24)	18.6

*The Chemicals and Allied Products Industry
in Puerto Rico*

Labor and Fringe Benefits Cost Required

Average hourly earnings (payroll) April 1977 (SIC-28) ..	—	\$4.18
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Annual average earnings (\$4.18 × 2,080 hrs.)	\$8,694	
<i>Mandatory fringe benefits:</i>		
<i>Not included in payroll—</i>		
Social security (5.85% up to \$16,500)	509	
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	277	
Workmen's compensation (\$3.00 per 100 payroll)	261	
Disability insurance (.30% up to \$9,000)	26	
Christmas bonus (2% up to \$10,000)	174	
	<u>\$1,247</u>	
Average cost per hour per worker		.60
Total average hourly cost to employer	\$4.78	
<i>Included in payroll—</i>		
Vacation (10 days per year)	\$334	
Sick leave (10 days per year)	334	
Maternity leave (8 weeks at half pay—28.7 fe- male work force—25% receive benefit)	48	
	<u>\$716</u>	
Average cost per hour per worker		.34
Total fringe benefit cost per hour per worker		.94
Percent of average hourly earn- ings (\$4.18)	22.5	
Percent of average hourly cost to employer (\$4.78)	19.7	

*The Petroleum Refining and Related Industries
in Puerto Rico
Labor and Fringe Benefits Cost Required*

Average hourly earnings (pay- roll) April 1977 (SIC-29)	\$5.71	
Annual average earnings (\$5.71 × 2,080 hrs.)	\$11,877	
<i>Mandatory fringe benefits:</i>		
<i>Not included in payroll—</i>		
Social security (5.85% up to \$16,500)	695	
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	371	
Workmen's compensation (\$2.40 per 100 payroll)	285	

Disability insurance (0.30% up to \$9,000)	30	
Christmas bonus (2% up to \$10,000)	200	
	<u>\$1,581</u>	
Average cost per hour per worker		.76
Total average hourly cost to employer		<u>\$6.47</u>
<i>Included in payroll—</i>		
Vacation (10 days per year)	457	
Sick leave (10 days per year)	457	
Maternity leave (8 weeks at half pay—7.4 fe- male work force—25% receive benefit)	17	
	<u>\$931</u>	
Average cost per hour per worker		.45
Total fringe benefit cost per hour per worker		1.21
Percent of average hourly earn- ings (\$5.71)	21.2	
Percent of average hourly cost to employer (\$6.47)	18.7	

*The Rubber and Miscellaneous Plastic Products
Industry in Puerto Rico
Labor and Fringe Benefits Cost Required*

Average hourly earnings (pay- roll) April 1977 (SIC-30)	\$2.70	
Annual average earnings (\$2.70 × 2,080 hrs.)	\$5,616	
<i>Mandatory fringe benefits:</i>		
<i>Not included in payroll—</i>		
Social security (5.85% up to \$16,500)	329	
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	186	
Workmen's compensation (\$3.70 per 100 payroll)	208	
Disability insurance (0.30% up to \$9,000)	17	
Christmas bonus (2% up to \$10,000)	112	
	<u>\$852</u>	
Average cost per hour per worker		.41
Total average hourly cost to employer		<u>\$3.11</u>

Included in payroll—

Vacation (8 days per year)	\$173
Sick leave (8 days per year)	173
Maternity leave (8 weeks at half pay—38.5 female work force—25% receive benefit)	42
	<u>388</u>

Average cost per hour per worker .....	.19
Total fringe benefit cost per hour per worker .....	.60
Percent of average hourly earnings (\$2.70)	22.2
Percent of average hourly cost to employer (\$3.11)	19.3

*The Leather and Leather Products Industry
in Puerto Rico**Labor and Fringe Benefits Cost Required*

Average hourly earnings (payroll) April 1977 (SIC-31) ..	\$2.21
Annual average earnings (\$2.21 × 2,080 hrs.)	\$4,597

*Mandatory fringe benefits:**Not included in payroll—*

Social security (5.85% up to \$16,500)	269
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	156
Workmen's compensation (\$5.10 per 100 payroll)	234
Disability insurance (0.30% up to \$9,000) ..	14
Christmas bonus (2% up to \$10,000)	92
	<u>\$765</u>

Average cost per hour per worker .....	.37
Total average hourly cost to employer	\$2.58

Included in payroll—

Vacation (5 days per year)	\$88
Sick leave (2 days per year)	35
Maternity leave (8 weeks at half pay—70.6 female work force—25% receive benefit)	62
	<u>\$185</u>

Average cost per hour per worker .....	.09
Total fringe benefit cost per hour per worker .....	.46
Percent of average hourly earnings (\$2.21)	20.8
Percent of average hourly cost to employer (\$2.58)	17.8

*The Stone, Clay, and Glass Products Industry
in Puerto Rico**Labor and Fringe Benefits Cost Required*

Average hourly earnings (payroll) April 1977 (SIC-32) ..	\$3.23
Annual average earnings (\$3.23 × 2,080 hrs.)	\$6,718

*Mandatory fringe benefits:**Not included in payroll—*

Social security (5.85% up to \$16,500)	393
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	219
Workmen's compensation (\$3.90 per 100 payroll)	262
Disability insurance (.30% up to \$9,000) ..	20
Christmas bonus (2% up to \$10,000)	134
	<u>\$1,028</u>

Average cost per hour per worker .....	.49
Total average hourly cost to employer	\$3.72

Included in payroll—

Vacation (15 days per year)	\$388
Sick leave (13 days per year)	336
Maternity leave (8 weeks at half pay—9.6 female work force—25% receive benefit)	12
	<u>\$736</u>

Average cost per hour per worker .....	.35
Total fringe benefit cost per hour per worker .....	.84
Percent of average hourly earnings (\$3.23)	26.0%
Percent of average hourly cost to employer (\$3.72)	22.6%

The Primary Metal Products Industry in Puerto Rico
Labor and Fringe Benefits Cost Required

Average hourly earnings (payroll)
 April 1977 (SIC-33) \$3.55
 Annual average earnings (\$3.55
 × 2,080 hrs.) \$7,384

Mandatory fringe benefits:

Not included in payroll—

Social security (5.85% up to
 \$16,500) 432
 Unemployment insurance
 (.5% up to \$4,200 +
 \$2.95 payroll) 238
 Workmen's compensation
 (\$4.70 per 100 payroll) .. 347
 Disability insurance (0.30%
 up to \$9,000) 22
 Christmas bonus (2% up to
 \$10,000) 148
 \$1,187

Average cost per hour per
 worker57

Total average hourly cost
 to employer \$4.12

Included in payroll—

Vacation (8 days per year) \$227
 Sick leave (10 days per
 year) 284
 Maternity leave (8 weeks at
 half pay—10.0 female
 work force—25% receive
 benefit) 14
 \$525

Average cost per hour per
 worker25

Total fringe benefit cost per hour
 per worker82

Percent of average hourly earn-
 ings (\$3.55) 23.1%

Percent of average hourly cost to
 employer (\$4.12) 19.9%

The Fabricated Metal Products Industry
in Puerto Rico

Labor and Fringe Benefits Cost Required

Average hourly earnings (payroll)
 April 1977 (SIC-34) \$3.27
 Annual average earnings (\$3.27
 × 2,080 hrs.) \$6,802

Mandatory fringe benefits:

Not included in payroll—

Social security (5.85% up
 to \$16,500) 398
 Unemployment insurance
 (.5% up to \$4,200 +
 \$2.95 payroll) 221

Workmen's compensation
 (\$4.50 per 100 payroll) .. 306
 Disability insurance (0.30%
 up to \$9,000) 20
 Christmas bonus (2% up to
 \$10,000) 136
 \$1,081

Average cost per hour per
 worker52

Total average hourly cost to
 employer \$3.79

Included in payroll—

Vacation (8 days per year) \$209
 Sick leave (10 days per
 year) 262
 Maternity leave (8 weeks at
 half pay—7.1 female work
 force—25% receive bene-
 fit) 9
 \$480

Average cost per hour per
 worker23

Total fringe benefit cost per hour
 per worker75

Percent of average hourly earnings
 (\$3.27) 22.9%

Percent of average hourly cost to
 employer (\$3.79) 19.8%

The Machinery Except Electrical Industry in Puerto
Rico

Labor and Fringe Benefits Cost Required

Average hourly earnings (payroll)
 April 1977 (SIC-35) \$3.47
 Annual average earnings (\$3.47
 × 2,080 hrs.) \$7,218

Mandatory fringe benefits:

Not included in payroll—

Social security (5.85% up
 to \$16,500) 422
 Unemployment insurance
 (.5% up to \$4,200 +
 \$2.95 payroll) 233
 Workmen's compensation
 (\$3.05 per 100 payroll) .. 220
 Disability insurance (0.30%
 up to \$9,000) 22
 Christmas bonus (2% up to
 \$10,000) 144
 \$1,041

Average cost per hour per
 worker50

Total average hourly cost
 to employer \$3.97

Included in payroll—

Vacation (8 days per year)	\$222
Sick leave (10 days per year)	278
Maternity leave (8 weeks at half pay—34.8 female work force—25% receive benefit)	48
	<u>\$548</u>
Average cost per hour per worker	.26
Total fringe benefit cost per hour per worker	.76
Percent of average hourly earnings (\$3.47)	21.9%
Percent of average hourly cost to employer (\$3.97)	19.1%

*The Electrical Machinery, Equipment, and Supplies Industry in Puerto Rico**Labor and Fringe Benefits Cost Required*

Average hourly earnings (payroll)	
April 1977 (SIC-36)	\$3.14
Annual average earnings (\$3.14 × 2,080 hrs.)	\$6,531

*Mandatory fringe benefits:**Not included in payroll—*

Social security (5.85% up to \$16,500)	382
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	213
Workmen's compensation (\$3.40 per 100 payroll)	222
Disability insurance (0.30% up to \$9,000)	20
Christmas bonus (2% up to \$10,000)	131
	<u>\$968</u>

Average cost per hour per worker	.47
Total average hourly cost to employer	\$3.61

Included in payroll—

Vacation (8 days per year)	201
Sick leave (10 days per year)	251
Maternity leave (8 weeks at half pay—62.4 female work force—25% receive benefits)	78
	<u>\$530</u>

Average cost per hour per worker	.25
Total fringe benefit cost per hour per worker	.72

Percent of average hourly earnings (\$3.14)	22.9%
Percent of average hourly cost to employer (\$3.61)	19.9%

*The Transportation Equipment Industry in Puerto Rico**Labor and Fringe Benefits Cost Required*

Average hourly earnings (payroll)	
April 1977 (SIC-37)	\$3.15
Annual average earnings (\$3.15 × 2,080 hrs.)	\$6,552

*Mandatory fringe benefits:**Not included in payroll—*

Social security (5.85% up to \$16,500)	383
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	214
Workmen's compensation (\$7.50 per 100 payroll)	491
Disability insurance (0.30% up to \$9,000)	20
Christmas bonus (2% up to \$10,000)	131
	<u>\$1,239</u>

Average cost per hour per worker	.60
Total average hourly cost to employer	\$3.75

Included in payroll—

Vacation (8 days per year)	\$201
Sick leave (10 days per year)	252
Maternity leave (8 weeks at half pay—25.0 female work force—25% receive benefit)	32
	<u>\$485</u>

Average cost per hour per worker	.23
Total fringe benefit cost per hour per worker	.83
Percent of average hourly earnings (\$3.15)	26.3%
Percent of average hourly cost to employer (\$3.75)	22.1%

*The Professional and Scientific Instruments and Allied Products Industry in Puerto Rico**Labor and Fringe Benefits Cost Required*

Average hourly earnings (payroll)	
April 1977 (SIC-38)	\$3.12
Annual average earnings (\$3.12 × 2,080 hrs.)	\$6,490

<i>Mandatory fringe benefits:</i>		<i>Included in payroll—</i>	
<i>Not included in payroll—</i>		Vacation (8 days per year)	\$200
Social security (.85% up to \$16,500)	\$380	Sick leave (10 days per year)	250
Unemployment insurance (.5% up to \$4,200 + \$2.95 payroll)	212	Maternity Leave (8 weeks at half pay—66.4 female work force—25% receive benefit)	83
Workmen's compensation (\$1.75 per 100 payroll)	114		\$533
Disability insurance (0.30% up to \$9,000)	19	Average cost per hour per worker	.26
Christmas bonus (2% up to \$10,000)	130	Total fringe benefit cost per hour per worker	.67
	\$855	Percent of average hourly earnings (\$3.12)	21.5%
Average cost per hour per worker	.41	Percent of average hourly cost to employer (\$3.53)	19.0%
Total average hourly cost to employer	\$3.53		

Attachment 2

Straight Time Hourly Earnings, Fringe Benefits Per Hour, and Straight Time Hourly Earnings Plus Fringe Benefits, Puerto Rico, April 1977

Industry	Straight time hourly earnings	Fringe benefits per hour ¹	Straight-time hourly earnings plus fringe benefits
Alcoholic Beverage and Industrial Alcohol Industry	\$2.70	\$0.56	\$3.26
Banking, Insurance, and Finance Industry	3.07	.64	3.71
Bread, Crackers, Bakery Products, and Alimentary Pastes Industry	2.51	.52	3.03
Button, Jewelry, Lapidary Work, Artificial Flowers, Decoration, and Party Favor Industry	2.49	.52	3.01
Chemical, Petroleum, Rubber, and Related Products Industry	3.24	.67	3.91
Communication Industry	2.70	.56	3.26
Construction Industry	2.99	.62	3.61
Corsets, Brassieres, and Related Products Industry	2.27	.47	2.74
Dairy in its Manufacturing Phase Industry	2.37	.49	2.86
Educational Service Industry	2.74	.57	3.31
Food and Related Products Industry	2.51	.52	3.03
Hospital, Clinic, and Sanatorium Industry	2.59	.54	3.13
Hotel Industry	2.37	.49	2.86
Laundry and Dry Cleaning Industry	2.17	.45	2.62
Leather, Leather Goods, and Related Products Industry	2.23	.46	2.69
Lumber and Wood Products, Metal Furniture, Doors and Windows and Straw, Hair, and Related Products Industry	2.38	.50	2.88
Metal, Machinery, Transportation Equipment, Electrical Products, Instruments, and Related Products Industry	2.86	.59	3.45
Miscellaneous Activities Industry	2.54	.53	3.07
Needlework Products Industry	1.69	.35	2.04
Paper, Paper Products, Printing, and Publishing Industry	2.69	.56	3.25
Plastic Products Industry	2.61	.54	3.15
Recreation, Sporting, or Amusement Service Industry	2.52	.52	3.04
Restaurant, Bar, and Soda Fountain Industry	2.36	.49	2.85
Retail Trade Industry	2.39	.50	2.89
Shoe and Related Products Industry	1.95	.41	2.36
Stone, Clay, Glass, Cement, and Related Products Industry	2.61	.54	3.15
Sugar in Its Manufacturing Phase Industry	2.26	.47	2.73
Textile and Textile Products Industry	2.02	.43	2.44
Theater and Motion Picture Industry	2.52	.52	3.04
Tobacco in Its Manufacturing Phase Industry	2.09	.43	2.52
Transportation Industry	2.89	.60	3.49
Watching and Protective Service Industry	2.33	.48	2.81
Wholesaling and Warehousing Industry	2.68	.56	3.24
Total	2.44	.51	2.95

¹ Represents 20.8 percent of the payroll.

Source: Commonwealth of Puerto Rico Minimum Wage Board.

The Apparel Industry in Puerto Rico
An Economic Report
U.S. Dept. of Labor, Employment Standards Admin-
istration
October 1977 Update, pages 21-29

H. Earnings

1. AVERAGE HOURLY EARNINGS IN THE UNITED STATES

In 1976, the average hourly earnings for production workers in the apparel and other textile products industry were \$3.41, as compared with \$5.19 for all manufacturing. Average hourly earnings in the apparel industry increased from \$2.62 an hour in 1972 to \$3.41 in 1976, up 79 cents or roughly 30 percent; and the increase has been continuing in the first quarter of 1977. In all manufacturing, the average hourly earnings rose from \$3.81 to \$5.19, up \$1.38 or 36 percent between 1972 and 1976.

Earnings vary greatly among the individual industry segments of the apparel and other textile products major group—from \$3.03 an hour in hats, caps, and millinery to \$4.18 an hour in men's and boys' suits and coats.

Following is a listing of the apparel industry employment and average hourly earnings for 1976 by industry and industry subgroup:

	Employment (thousands)	Average hourly earnings
Apparel and other textile products	1,117.3	\$3.42
Men's and boys' suits and coats..	78.0	4.18
Men's and boys' furnishings	328.0	3.08
Women's and misses' outerwear..	340.8	3.51
Women's and children's undergarments	85.9	3.14
Hats, caps, and millinery	13.7	3.03
Children's outerwear	66.3	3.13
Fur goods and miscellaneous apparel	57.9	3.45
Miscellaneous fabricated textile products	146.7	3.85

2. LABOR COSTS AND TOTAL COMPENSATION

Production workers' wages in the apparel industry in the United States in 1974 represented 18.8 percent of the total value of shipments according to the U. S. Census of Manufactures. This is a very im-

portant figure as it represents that portion of the labor costs with which the Apparel Industry Committees are concerned. It does not, however, represent the total labor cost. Over the years a variety of mandatory and voluntary benefits has evolved. Mandatory benefits in the United States include unemployment insurance, old age, and survivors insurance. Voluntary benefits include pensions, vacation and holiday pay, bonuses, health and life insurance. These may vary widely from State to State, and from one industry or company to another.

In mid-1976, the average hourly earnings in manufacturing in the United States were \$5.20, but the additional compensation increased this by one third, i.e., 33 percent, bringing the total compensation to \$6.90. In the apparel industry additional compensation added about 22 percent to the \$3.39 average hourly earnings, bringing the total compensation up to \$4.13. These increments should be compared to the package of mandatory and voluntary benefits given to workers in Puerto Rico.

3. TOTAL COMPENSATION— UNITED STATES AND FOREIGN

Although it might have been true in the 1960's, the United States no longer provides the highest compensation of any country in the world. In mid-1976, Germany paid its apparel workers total hourly compensation of \$4.94, which was 20 percent higher than the \$4.13 average for the United States. Canadian workers got \$4.62, or 12 percent more. Swedish apparel workers did the best of all, getting an estimated 68 percent more than the Americans.

Estimated total compensation per hour worked was \$4.13 in mid-1976 for production workers in the U.S. apparel industry, up 6.4 percent over mid-1975 rate. Average hourly earnings were \$3.39, and the additional compensation as a percent of hourly earnings was estimated at 21.7 percent, slightly lower than the percentage of mid-1975. For comparison in mid-1976, the estimated compensation for apparel workers was the lowest in Japan at \$1.68 and the highest in Sweden at \$6.94. For mid-1975, the estimated hourly compensation was lowest in Korea at about \$0.28, followed by Taiwan and Hong Kong.

These estimates were developed by the U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology. Data for mid-1976 are shown in table 6 and data for mid-1975 on table 7. The methodology and limitation described in the concluding section of each table should be carefully noted.

Table 6.—Estimated Hourly Compensation of Production Workers in the Apparel Industries, Eight Countries, Midyear 1976

[Preliminary estimates]

Country	Exchange rate ¹		Hourly Average earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
	National currency unit	National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S. = 100
United States	Dollar		3.39	21.7	4.13	4.13	100
Canada	Dollar	.9857	3.86	18.0	4.55	4.62	112
Japan	Yen	296.4	450	10.9	499	1.68	41
France	Franc	4.772	10.19	55.7	15.87	3.33	81
Germany	Mark	2.517	8.05	54.7	12.45	4.94	120
Italy	Lira	828.7	1,430	59.2	2,277	2.75	67
Sweden	Krona	4.356	19.98	* 51.4	30.25	6.94	168
United Kingdom	Pence	55.38	88.1	18.8	104.7	1.89	46

¹ Annual average estimate. ² Textiles, apparel, and leather.

For concepts and methods, see attached General Note.

Prepared by: U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology, December 1976.

General Note on Estimates of Hourly Compensation of Production Workers in Manufacturing Industries

Published average hourly earnings may not include the same items of labor compensation in each country. Earnings generally include: basic time and piece rates, overtime pay and shift differentials, regular bonuses and premiums, and cost-of-living adjustments. In some countries, earnings also include bonuses not paid regularly each pay period, private or contractual family allowances paid by the employer, and pay in kind. In general, earnings are computed per hour paid and include pay for time not worked (e.g., holiday, vacation, and other leave pay) or else are computed per hour worked and exclude pay for time not worked. For all countries, earnings refer to gross payments made to the worker before payroll deductions for taxes and employee social security contributions.

Average hourly earnings have not been adjusted for differences in earnings definitions or for survey limitations such as the omission of small establishments. However, statistics for some years have been adjusted, where possible, to account for changes in coverage, sample benchmarks, or frequency of surveys. The estimates, therefore, may not coincide with data originally published abroad.

Total hourly compensation includes all direct payments made to the worker (pay for time worked, pay for vacations, holidays, and other leave, all bonuses, and pay in kind) before payroll deductions of any kind, plus employer expenditures for legally required insurance pro-

grams and contractual and private plans for the benefit of employees. In addition, compensation includes other significant taxes on payrolls or employment that are regarded as labor costs. Total compensation is computed per hour worked.

Total compensation per hour worked is estimated by adjusting average hourly earnings for items of direct pay not included in earnings and for employer expenditures for social security and contractual and private insurance programs and for other labor taxes. Adjustment factors are obtained primarily from periodic labor cost surveys projected for intervening years on the basis of other available information. Because compensation is partly estimated, small differences in compensation levels among countries should not be considered significant.

Hourly compensation is converted to U.S. dollars using the average daily exchange rate for the reference period. Changes in hourly compensation in U.S. dollars from one period to another are therefore affected by changes in currency exchange rates as well as by changes in compensation.

Hourly compensation in U.S. dollars indicates comparative levels of employer labor costs per hour worked. However, because compensation includes more than current labor income of workers and because prices of goods and services vary greatly among countries, it does not indicate relative living standards of workers.

U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology.

Table 7.—Estimated Hourly Compensation of Production Workers in the Apparel Industries, 14 Countries, Midyear 1975

(Preliminary estimates)

Country	Exchange rate ¹		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
	National currency unit	National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S.=100
United States	Dollar	.....	3.16	22.9	3.88	3.88	100
Hong Kong	Dollar	² 5.035	² 2.83	⁴ 10-15	3.11-3.25	.62-.64	16
Japan	Yen	296.7	422	11.4	470	1.59	41
Korea	Yen	484.0	108.5	⁴ 20-30	130.2-141.0	.27-.29	7
Taiwan	Dollar	38.00	13.66	⁴ 15-20	15.71-16.39	.41-.43	11
Belgium	Franc	36.69	93.14	62.9	151.7	4.14	107
Denmark	Krone	5.735	² 24.48	⁴ 15-20	28.2-29.4	4.91-5.12	127-132
France	Franc	4.282	9.19	53.7	14.13	3.30	85
Germany	Mark	2.455	7.49	49.5	11.20	4.56	118
Ireland	Pence	45.01	68.37	⁴ 10-20	75.2-82.0	1.67-1.82	43-47
Italy	Lira	652.4	1,174	877.	2,204	3.38	87
Netherlands	Guilder	2.523	6.85	53.8	10.54	4.18	108
Sweden	Krona	4.152	16.68	² 40.9	23.50	5.67	146
United Kingdom	Pence	45.01	77.04	18.7	91.45	2.03	52

¹ Annual average. ² Yearend. ³ Average of March and September. ⁴ All manufacturing. ⁵ Including footwear. ⁶ Textiles, apparel, and leather. For concepts and methods, see attached General Note.

Prepared by: U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology, June 1976.

General Notes on Estimates of Hourly Compensation of Production Workers in Manufacturing Industries

Published average hourly earnings may not include the same items of labor compensation in each country. Earnings generally include basic time and piece rates, overtime pay and shift differentials, regular bonuses and premiums, and cost-of-living adjustments. In some countries, earnings also include bonuses not paid regularly each pay period, private or contractual family allowances paid by the employer, and pay in kind. In general, earnings are computed per hour paid and include pay for time not worked (e.g., holiday, vacation, and other leave pay) or else are computed per hour worked and exclude pay for time not worked. For all countries, earnings refer to gross payments made to the worker before payroll deductions for taxes and employee social security contributions. Average hourly earnings have not been adjusted for differences in earnings definitions or for survey limitations such as the omission of small establishments.

Total hourly compensation includes all direct payments made to the worker (pay for time worked, pay for vacations, holidays, and other

leave, all bonuses, and pay in kind) before payroll deductions of any kind, plus employer expenditures for legally-required insurance programs and contractual and private plans. Total compensation is computed per hour worked. Total compensation per hour worked is estimated by adjusting average hourly earnings for items of direct pay not included in earnings and for employer expenditures for social security and contractual and private insurance programs. Adjustment factors are obtained primarily from periodic labor cost surveys, censuses of manufactures, or reports on social security and fringe benefits systems. Hourly compensation is converted to U.S. dollars using the average daily exchange rate for the reference period.

Hourly compensation in U.S. dollars indicates comparative levels of employer labor costs per hour worked. However, because prices of goods and especially of services vary greatly among countries, they do not indicate relative living standards of workers.

U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology.

The Office of Productivity and Technology has released the following information on hourly compensation for countries which are in proximity to Puerto Rico and/or engaged in the manufacture of apparel. Please note the limitations of the available information, i.e., that some of the rates relate to total manufacturing or textile mill products instead of apparel manufacturing.

Country	Industry	Date	Estimated hourly earnings (U.S. dollars)
Dominican Republic	Textile	March 1977	¹ \$0.33
Haiti	Manufacturing	April 1976	.16-.32
Mexico	Textile	June 1973	.85
Bangladesh	Apparel	October 1974	2.37
Sri Lanka	Apparel	November 1975	9.07-.16
India	Apparel	November 1974	4.25
Malaysia (West)	Apparel	June 1974	5.24
Pakistan	Apparel	October 1974	9.20-.25
Philippines	Apparel	October 1974	7.14
Singapore	Apparel	October 1973	.29

¹ Wage for exportation, otherwise \$0.43.

² Male machine operators in direct manufacturing.

³ Semiskilled and skilled workers minimum rates.

⁴ Estimated by applying the increase in basic wage rates in textile to 1971 earnings.

⁵ Based on total wages and salaries divided by employment and assuming a 208-hour month.

⁶ Men and women machine operators in shirt manufacturing.

⁷ Estimated by applying the increase in wage rates per day, all industries to 1971 earnings.

Source: U.S. Department of Labor, BLS, Office of Productivity and Technology.

4. EMPLOYEE BENEFIT STUDY IN THE UNITED STATES¹

The 1975 employee benefit payments averaged 35.4 percent of payroll for all companies reporting. The manufacturing companies paid 34.4 percent (see text table below). Table 20 in attachment 5 present additional details on employee benefits by type of payment.

	Total all companies	Total all manufacturing	Total all non-manufacturing
Legal required payments (employer's share only)	8.0%	8.8%	6.9%
Pension, insurance, and other agreed upon payments (employer's share only)	11.6	11.6	11.4
Paid rest periods, lunch periods, etc.	3.6	3.7	3.5
Payments for vacations, holidays, sick leave, etc.	10.1	10.1	10.3
Profit sharing payments, bonuses, etc.	2.1	1.9	2.3
Total	35.4%	36.1%	34.4%

Employee benefit payments varied widely from industry to industry. The highest paid percentage rate was in the chemical and allied products industry, with a rate of 42.2 percent, and the lowest was 24 percent in the hospitals.

In the textile products and apparel industry, the benefit payment rate was 27.8 percent. Expressed as cents per payroll hour, it was 108.2 cents; and as annual dollars per year per employee, it averaged \$2,183 (see tables 20 and 21 in attachment 5).

Benefit payments by region was shown in the text table for major groupings and for textile products and apparel. Benefit payments in the textile products and apparel industry were at a lower level than the major groupings for all regions but the differentiations between regions were reflected in textile products and apparel rates.

¹ *Employee Benefits, 1975*, done by the Economic Analysis and Study Group of the Chamber of Commerce of the United States. The study was made possible by the cooperation of 761 reporting employers throughout the United States.

Group	Regions				
	All	North-east	East North Central	South-east	West
Total, all industries	35.4%	36.9%	36.2%	32.7%	34.4%
Total, all manufacturing	36.1	37.5	37.2	32.2	35.0
Textile products and apparel	27.8	30.3	28.8	24.4	(¹)
Total, all non-manufacturing	34.4	36.0	33.9	33.2	33.9

¹ Fewer than three companies reporting.

Benefit payments tended to increase with the size of the firm. However, benefit payment rates for some industries in the manufacturing group decreased where employment reached 5,000 and over. The following text table gives employee benefits as percent of payroll, by size of company for major groupings and the textile products and apparel.

	Number of employees—					
	All	Under 500	500-999	1,000-2,499	2,500-4,999	5,000 and over
Total, all industries	35.4%	34.0%	33.4%	36.8%	36.2%	38.1%
Total, all manufacturing	36.1	33.7	34.3	38.4	39.9	39.2
Textile products and apparel	27.8	29.1	33.9	*	*	21.4
Total, nonmanufacturing	34.4	34.5	34.6	35.3	33.6	35.8

* Fewer than three companies reporting.

Attachment 4

Excerpt from *Chemical Week*, Nov. 10, 1976¹

Fringe Benefits as Percentage of Payroll—1975

	Pulp, paper, lumber, and furniture	Chemicals and allied products	Primary metal industries	Rubber and leather products	Stone, clay, and glass products	Total, all industries
Total, all U.S. _____	32.7%	42.2%	40.6%	40.4%	35.1%	35.4
Northeast: Conn., Maine, Mass., N.H., N.J., Pa., R.I., Vt., N.Y. _____	36.7	44.7	36.6	29.4	37.6	36.9
East North Central: Ill., Ind., Mich., Ohio, Wis. _____	30.9	46.9	42.1	46.2	33.8	36.2
Southeast: Ala., Ark., Del., D.C., Fla., Ga., Ky., La., Md., Miss., N.C., S.C., Okla., Tenn., Tex., Va., W. Va. _____	28.0	38.5	42.7	—	34.5	32.7
West: Ariz., Calif., Colo., Hawaii, Idaho, Iowa, Kans., Minn., Mont., Nebr., Nev., N.Mex., N.Dak., Oreg., S.Dak., Utah, Wash., Wyo., Alaska _____	39.6	36.7	—	—	35.1	34.4
Puerto Rico _____	26.7	22.6	23.2	21.6	26.2	24.1

¹ Published by McGraw Hill, Inc., New York, N.Y.

Source: Chamber of Commerce of the U.S., *Employee Benefits—1975*, Economic Development Assn.—Puerto Rico.

Manpower requirements in the chemical industry are more demanding relative to quality than to numbers because only a few segments of the business are labor-intensive. Hence, it's not surprising that State industrial development agencies place big emphasis on free labor-training services.

The latest wrinkles have emerged in Alabama and Louisiana where mobile training facilities and videotape equipment are being employed. Several \$65,000–\$70,000 training units that can be driven to the plant site have been placed into service in Alabama, replete (in some cases) with chemical plant simulators. On-the-site training in welding, says Alabama's Industrial Development Director Fred F. Denton, eliminated a major delay in the construction of one big chemical plant threatened with a lack of welders.

And in Louisiana, videotape machines are now used in 3- to 6-week training sessions that turn out graduates 60–80 percent fully trained for jobs.

Use of nonunion labor is expanding swiftly along the Gulf Coast, especially in the chemical strip between New Orleans and Baton Rouge, which for years has been a bastion of union strength in the construction trades. A few months ago, Louisiana became the 20th State to adopt a "right-to-work" law.

The trend toward nonunion construction labor in Louisiana apparently stems from success that open-shop contractors have had in winning new business. Although the wage scales for union and nonunion shops are similar, open shops afford substantial savings because of the lack of restrictive craft work rules. Craft unions, however, are becoming noticeably more willing to bargain on work rules. Meanwhile, AFL-CIO's Building and Construction Trades Dept. and the National Constructors Assn. (a group of large unionized contractors) are negotiating a national contract. The deal, still far from complete, would set national wage and working conditions for

big industrial jobs and have a profound effect on plant construction costs.

Increases in plant construction costs are now running at a 6–8 percent annual rate, far below the 22–24 percent peak reached in 1974. And indications are that the present rate will hold for the near term. Site engineers note that land requirements for new plants are rising. Specifications for new plants now commonly call for a land-to-plant ratio of at least 10:1 instead of the 5:1 ratio that was popular before environmental requirements (settling ponds, isolation from population) came to the fore.

Increases in wages also appear to be moderating. First-year wage hikes in major contracts are now under 8 percent, down more than two points from the 10.2 percent increases in 1975.

Average hourly earnings of chemical workers are still lower in the South than elsewhere. The highest wage scales (over \$7 per hour) are in Texas and Louisiana. The wage spread between Northern States and Southern States, which had been narrowing, now appears to have stabilized. Since 1970, wages in Texas and Louisiana have climbed 48.3 percent and 44.1 percent, respectively; figures that are not much different from the boosts in Mid-Atlantic and East North Central States.

Union membership, as a percentage of nonagricultural employment, continues to slip fractionally nationwide: in 1974, 26 percent of the workforce was unionized. Peak: 34.7 percent (1954).

Major organizing efforts are now being planned in the South. Emphasis is on textiles, long the toughest nut to crack. If the drive is successful, it could pave the way for intensive organizing efforts in virtually all Southern industry, including chemicals.

Workers are least likely to strike in South Atlantic and selected Plains States where work time lost to strikes is typically less than one-tenth of 1 percent.

States with a high United Mine Workers membership, such as West Virginia, have lost work time figures in the 0.5–1.0 percent range.

Fringe benefits continue to climb in importance in overall labor costs. Last year's survey by the Chamber of Commerce of the United States pegged fringe benefits at 42.2 percent of payroll nationwide for

the chemical industry, a gain of 5 points from 1973.

Workmen's compensation insurance and unemployment insurance costs, which collectively can exceed 2–5 percent of payroll, are becoming somewhat more significant in assessing total labor costs, as is the question of strikers being eligible for unemployment insurance payments.

Attachment 5

Table 1.—Employee Benefits by Type of Payment, 1975

Type of benefit	Total, all companies	Total, all manu- facturing	Total, all nonmanu- facturing
Total employee benefits as percent of payroll	35.4	36.1	34.4
1. Legally required payments (employer's share only)	8.0	8.8	6.9
a. Old-Age, Survivors, Disability and Health Insurance	5.7	5.8	5.4
b. Unemployment Compensation	1.0	1.2	0.8
c. Workmen's compensation (including estimated cost of self-insured)	1.2	1.7	0.6
d. Railroad Retirement Tax, Railroad Unemployment and Cash Sickness Insurance, State sickness benefits insurance, etc. ²	0.1	0.1	0.1
2. Pension and other agreed-upon payments (employer's share only)	11.6	11.6	11.4
a. Pension plan premiums and pension payments not covered by insurance type plan (net)	5.5	4.9	6.4
b. Life insurance premiums, death benefits, accident and medical insurance premiums, hospitalization insurance, etc. (net)	5.2	6.1	3.8
c. Salary continuation or long-term disability	0.2	0.2	0.2
d. Dental insurance premiums	0.1	0.1	0.1
e. Discounts on goods and services purchased from company by employees	0.2	(1)	0.3
f. Employee meals furnished by company	0.2	0.1	0.3
g. Miscellaneous payments (compensation payments in excess of legal requirements, separation or termination pay allowances, moving expenses, etc.)	0.2	0.2	0.3
3. Paid rest periods, lunch periods, wash-up time, travel time, clothes-change time, get-ready time, etc.	3.6	3.7	3.5
4. Payments for time not worked	10.1	10.1	10.3
a. Paid vacations and payments in lieu of vacation	5.2	5.4	4.8
b. Payments for holidays not worked	3.3	3.5	3.2
c. Paid sick leave	1.2	0.8	1.8
d. Payments for State or National Guard duty, jury, witness, and voting pay allowances; payments for time lost due to death in family or other personal reasons, etc.	0.4	0.4	0.5
5. Other items	2.1	1.9	2.3
a. Profit-sharing payments	1.1	1.1	1.1
b. Contributions to employee thrift plans	0.3	0.2	0.4
c. Christmas or other special bonuses, service awards, suggestion awards, etc.	0.4	0.4	0.4
d. Employee education expenditures (tuition refunds, etc.)	0.1	0.1	0.2
e. Special wage payments ordered by courts, payments to union stewards, etc.	0.2	0.1	0.2
Total employee benefits as cents per payroll hour	193.2	191.3	195.8
Total employee benefits as dollars per year per employee	3,984	3,954	4,025

¹ Less than 0.05 percent.

² Figure shown is considerably less than legal rate, as most reporting companies had only a small proportion of employees covered by tax.

Source: U.S. Chamber of Commerce, *Employee Benefits, 1975*.

Table 2.—Major Types of Employee Benefits by Industry Groups, 1975

Industry group	Employee benefits as percent of payroll								Number of companies
	Total, all employee benefits	Legally required payments (employer's share only)	Pension and other agreed-upon payments (employer's share only)	Paid rest periods, lunch, etc.	Payment for time not worked	Profit sharing payments, bonuses, etc.	Total employee benefits as cents per payroll hour	Total employee benefits as dollars per year per employee	
Total, all industries	35.4	8.0	11.6	3.6	10.1	2.1	193.2	3,984	761
Total, all manufacturing	35.1	8.8	11.6	3.7	10.1	1.9	191.3	3,954	445
Manufacture of:									
Food, beverages, and tobacco	36.2	9.0	11.7	4.2	9.3	2.0	184.8	3,822	26
Textile products and apparel	27.8	8.8	7.3	4.0	6.6	1.1	108.2	2,183	25
Pulp, paper, lumber, and furniture	32.7	8.4	9.7	3.1	10.1	1.4	163.7	3,447	46
Printing and publishing	32.2	7.4	9.4	3.0	10.2	2.2	177.8	3,633	15
Chemicals and allied products	42.2	7.9	13.3	5.2	12.3	3.5	239.5	5,008	30
Petroleum industry	39.2	6.4	13.5	5.0	12.2	2.1	248.9	5,280	9
Rubber, leather, and plastic products	40.4	9.3	15.6	4.0	10.7	0.8	190.1	3,915	15
Stone, clay, and glass products	35.1	9.4	11.4	4.5	9.4	0.4	179.7	3,694	24
Primary metal industries	40.6	9.5	15.8	3.2	9.6	2.5	232.7	4,784	32
Fabricated metal products (excluding machinery and transportation equipment)	35.1	9.3	11.1	3.4	9.7	1.6	182.7	3,723	52
Machinery (excluding electrical)	36.1	8.3	12.2	3.4	10.0	2.2	197.4	4,162	64
Electrical machinery, equipment, and supplies	35.0	8.1	9.9	3.8	10.6	2.6	186.9	3,834	47
Transportation equipment	39.9	10.3	14.1	3.4	10.5	1.6	224.0	4,582	35
Instruments and miscellaneous manufacturing industries	34.8	8.1	10.3	4.0	9.7	2.7	177.1	3,590	25
Total, all nonmanufacturing	34.4	6.9	11.4	3.5	10.3	2.3	195.8	4,035	316
Public utilities (electric, gas, water, telephone, etc.)	37.5	6.4	14.1	3.5	12.1	1.4	239.2	5,003	116
Department stores	28.4	7.9	9.4	3.6	6.8	0.7	108.5	2,141	20
Trade (wholesale and other retail)	28.2	8.0	6.6	4.1	7.3	2.2	134.1	2,795	18
Banks, finance and trust companies	37.3	6.9	11.0	4.2	9.8	5.4	186.6	3,745	50
Insurance companies	35.2	6.3	11.8	3.8	10.5	2.8	189.5	3,717	53
Hospitals	24.0	7.0	6.6	2.0	8.0	0.4	107.1	2,204	23
Miscellaneous nonmanufacturing industries (mining, transportation, research, hotels, etc.)	32.2	7.7	9.6	2.9	9.9	2.1	206.9	4,384	36

Source: U.S. Chamber of Commerce, *Employee Benefits*, 1975.

Attachment 6

EMPLOYEE COMPENSATION IN THE PRIVATE NONFARM ECONOMY, 1976

Summary 78-7

Bureau of Labor Statistics, U.S. Department of Labor, August 1978

Employers spent \$7.53 to compensate an employee for an hour of work in 1976 according to the Bureau of Labor Statistics interim survey of employer expenditures for employee compensation in private nonfarm industry (table 1). The nationwide survey, which covered establishments with 20 employees or more, included in compensation not only pay for time worked, but pay for leave time and employer payments for a variety of legally required and privately sponsored insurance, retirement, and unemployment benefit programs.

The major component of compensation, pay for time worked, amounted to \$5.77 an hour, or 76.7 percent of the total. The remainder consisted primarily of three programs which have increased in im-

portance and concern for employers, employees, and government during the last four decades—retirement programs; insurance and health benefit programs; and paid leave programs.

Retirement programs constituted 8.6 percent of the total or 65 cents a work hour, about evenly divided between social security (covering almost all workers) and private retirement plans. In 1976, employer payments for social security were 5.85 percent of the first \$15,300 of an employee's earnings. As earnings rise beyond this ceiling, the payment as a percent of total earnings declines.

Paid leave (except sick leave) represented 6.1 percent of compensation, or 46 cents an hour. Vacations accounted for a little less than three-fifths of the total; most of the remainder consisted of holidays.

Expenditures for life insurance and health benefit programs made up 6 percent of compensation or 45 cents an hour. Over two-thirds of this consisted of life, accident, and health insurance. The remaining expenditures were about evenly divided between sick leave and workers' compensation.

Unemployment benefit programs, nonproduction bonuses, and savings and thrift plans, the other components of compensation, together accounted for only 2.6 percent of the total.

Compensation by Employee Group and Industry

Office employee compensation was \$9.43 a work hour, \$2.89 an hour higher than nonoffice employee compensation. Although they are mostly clerical workers, office employees also include highly paid executive, administrative, and professional; and supervisory employees, whereas the nonoffice group is limited to nonsupervisory employees engaged in activities such as production, construction, vehicle operation, maintenance, and retail selling.

Straight-time pay for time worked accounted for just under 75 percent of both office and nonoffice employee compensation. However, premium pay made up only 0.8 percent of office employee compensation, compared to 2.8 percent of nonoffice employee compensation. Thus, all pay for time worked was 75.7 percent of the total for office workers (\$7.14 an hour), but 77.4 percent for nonoffice workers (\$5.06 an hour).

Employers spent 25 cents more an hour for paid leave and 31 cents more for retirement for office than for nonoffice workers. These expenditures accounted for a greater part of office than of nonoffice worker compensation. Most of the difference in expenditures for retirement reflected payments for private retirement plans, which were twice as high for office as for nonoffice workers. On the other hand, expenditures for life, accident, and health benefit programs were only 6 cents higher and accounted for a smaller part of the total for office than nonoffice employees.

Life, accident, and health insurance was the major component of these programs for both groups. However, sick leave was next in importance for office

workers, while workers' compensation was next for nonoffice workers.

Nonproduction bonuses and savings and thrift plans together represented 2.4 percent of office worker compensation compared to 0.5 percent for nonoffice workers.

Employers spent \$7.90 for an hour of work in manufacturing compared with \$7.30 in nonmanufacturing. The interindustry difference was substantially greater for office workers than for nonoffice workers—\$1.80 an hour compared with \$.78 an hour—since supplements to pay for time worked were more costly and accounted for a greater part of compensation in manufacturing than in nonmanufacturing.

Composition of Payroll Hours

In 1976, work hours accounted for 92.1 percent of all hours for which employees were paid (table 5). The remaining 7.9 percent consisted of paid leave time—vacations, 3.9 percent of all paid time; holidays, 2.8 percent; sick leave, 1.0 percent; and civic and personal leave, 0.2 percent. Paid leave hours constituted 9.4 percent of all office worker hours and 7.1 percent of all nonoffice worker paid hours. Paid leave made up 9.1 percent of all hours in manufacturing, compared with 7.1 percent in nonmanufacturing.

A Note on Differences From Earlier Surveys

The 1976 compensation survey was limited to establishments with at least 20 employees, whereas earlier surveys covered establishments of all sizes. Consequently, the results of this survey are not strictly comparable with those of earlier surveys. Tables 2 to 5 which contain data from earlier surveys indicate general trends for the various components of compensation and their relative importance in the total.

A full survey, covering establishments of all sizes, is being conducted for 1977.

Table 1.—Employee Compensation, Private Nonfarm Economy, 1976

Industry and compensation item	All employees			Office employees			Nonoffice employees		
	Percent of compensation	Dollars per hour		Percent of compensation	Dollars per hour		Percent of compensation	Dollars per hour	
		All hours	Work hours		All hours	Work hours		All hours	Work hours
ALL INDUSTRIES									
Total compensation	100.0	\$6.94	\$7.53	100.0	\$8.54	\$9.43	100.0	\$6.08	\$6.54
Pay for time worked	76.7	5.32	5.77	75.7	6.47	7.14	77.4	4.71	5.06
Straight-time pay	74.7	5.18	5.63	74.9	6.40	7.06	74.6	4.54	4.88
Premium pay	1.9	.13	.15	.8	.07	.07	2.8	.17	.18
Overtime, weekend, and holiday work	1.6	.11	.12	.6	.05	.06	2.4	.15	.16
Shift differentials .....	.3	.02	.02	.1	.01	.01	.4	.02	.03
Paid leave (except sick leave)	6.1	.43	.46	6.7	.57	.63	5.7	.35	.38
Vacations	3.5	.24	.26	3.9	.33	.36	3.1	.19	.21
Holidays	2.3	.16	.17	2.5	.22	.24	2.1	.13	.14
Civic and personal leave .....	.2	.01	.01	.2	.02	.02	.1	.01	.01
Employer payments to vacation and holiday funds .....	.2	.01	.02	(¹)	(¹)	(¹)	.3	.02	.02

Table 1.—Employee Compensation, Private Nonfarm Economy, 1976—Continued

Industry and compensation item	All employees			Office employees			Nonoffice employees		
	Percent of compensation	Dollars per hour		Percent of compensation	Dollars per hour		Percent of compensation	Dollars per hour	
		All hours	Work hours		All hours	Work hours		All hours	Work hours
Employer expenditures for retirement programs	8.6	.60	.65	9.1	.77	.85	8.3	.50	.54
Social security	4.3	.30	.32	4.0	.34	.37	4.6	.28	.30
Private plans	4.3	.30	.32	5.1	.44	.48	3.7	.22	.24
Employer expenditures for life insurance and health benefit programs ²	6.0	.42	.45	5.2	.44	.49	6.6	.40	.43
Life, accident, and health insurance	4.1	.28	.31	3.6	.31	.34	4.4	.27	.29
Sick leave	.9	.06	.06	.12	.10	.11	.6	.04	.04
Workers' compensation	1.1	.07	.08	.4	.04	.04	1.5	.09	.10
Employer expenditures for unemployment benefit programs	1.3	.09	.09	1.0	.08	.09	1.5	.09	.10
Unemployment insurance	1.1	.08	.08	.8	.07	.08	1.3	.08	.08
Severance pay	.1	.01	.01	.1	.01	.01	.1	.01	.01
Severance pay funds and supplemental unemployment benefit funds	.1	(¹)	(¹)	(¹)	(¹)	(¹)	.1	(¹)	(¹)
Nonproduction bonuses	1.1	.08	.08	2.0	.17	.19	.4	.03	.03
Savings and thrift plans	.2	.01	.01	.4	.03	.04	.1	(¹)	(¹)
Wages and salaries (gross payroll) ³	84.7	5.87	6.37	85.6	7.31	8.07	84.0	5.11	5.49
Supplements to wages and salaries ⁴	15.3	1.06	1.15	14.4	1.23	1.36	16.0	.97	1.05
MANUFACTURING									
Total compensation	100.0	7.18	7.90	100.0	9.61	10.74	100.0	6.38	6.98
Pay for time worked	74.5	5.35	5.89	73.2	7.04	7.86	75.2	4.80	5.25
Straight-time pay	71.8	5.16	5.68	72.2	6.94	7.76	71.7	4.57	5.00
Premium pay	2.7	.19	.21	1.0	.10	.11	3.5	.22	.24
Overtime, weekend, and holiday work	2.2	.16	.18	.9	.08	.09	2.9	.19	.20
Shift differentials	.4	.03	.03	.1	.01	.02	.6	.04	.04
Paid leave (except sick leave)	7.0	.50	.55	7.5	.72	.80	6.8	.43	.47
Vacations	3.9	.28	.31	4.2	.40	.45	3.8	.24	.27
Holidays	2.7	.20	.22	2.9	.28	.31	2.6	.17	.18
Civic and personal leave	.2	.01	.02	.2	.02	.03	.2	.01	.01
Employer payments to vacation and holiday funds	.1	.01	.01	.1	.01	.02	.1	.01	.01
Employer expenditures for retirement programs	8.8	.63	.69	9.2	.89	.99	8.5	.54	.60
Social security	4.2	.30	.33	3.7	.36	.40	4.5	.28	.31
Private plans	4.5	.33	.36	5.5	.53	.59	4.1	.26	.28
Employer expenditures for life insurance and health benefit programs ²	6.9	.50	.55	6.1	.58	.65	7.4	.47	.51
Life, accident, and health insurance	5.0	.36	.40	4.5	.44	.49	5.3	.34	.37
Sick leave	.7	.05	.06	1.1	.10	.12	.6	.04	.04
Workers' compensation	1.1	.08	.09	.5	.04	.05	1.5	.09	.10
Employer expenditures for unemployment benefit programs	1.4	.10	.11	1.1	.10	.12	1.6	.10	.11
Unemployment insurance	1.2	.08	.09	.9	.08	.09	1.3	.08	.09
Severance pay	.2	.01	.02	.2	.02	.02	.2	.01	.01
Severance pay funds and supplemental unemployment benefit funds	.1	(¹)	(¹)	(¹)	(¹)	(¹)	.1	(¹)	(¹)
Nonproduction bonuses	1.1	.08	.09	2.3	.22	.25	.5	.03	.03
Savings and thrift plans	.3	.02	.02	.6	.06	.07	.1	(¹)	(¹)
Wages and salaries (gross payroll) ³	83.4	5.99	6.59	84.1	8.08	9.03	83.1	5.30	5.80
Supplements to wages and salaries ⁴	16.6	1.19	1.31	15.9	1.53	1.71	16.9	1.08	1.18
NONMANUFACTURING									
Total compensation	100.0	6.78	7.30	100.0	8.14	8.94	100.0	5.84	6.20
Pay for time worked	78.1	5.30	5.70	76.8	6.25	6.87	79.4	4.63	4.92
Straight-time pay	76.7	5.20	5.60	76.1	6.20	6.80	77.2	4.51	4.79
Premium pay	1.4	.10	.11	.7	.06	.06	2.2	.13	.14
Overtime, weekend, and holiday work	1.3	.09	.09	.5	.04	.05	2.0	.11	.12
Shift differentials	.2	.01	.01	.1	.01	.01	.2	.01	.01
Paid leave (except sick leave)	5.6	.38	.41	6.3	.51	.56	4.8	.28	.30
Vacations	3.1	.21	.23	3.7	.30	.33	2.6	.15	.16
Holidays	2.0	.14	.15	2.4	.19	.21	1.7	.10	.10
Civic and personal leave	.2	.01	.01	.2	.02	.02	.1	.01	.01
Employer payments to vacation and holiday funds	.2	.02	.02	(¹)	(¹)	(¹)	.4	.02	.03
Employer expenditures for retirement programs	8.5	.58	.62	9.0	.73	.80	8.0	.47	.50
Social security	4.4	.30	.32	4.1	.33	.36	4.7	.27	.29
Private plans	4.1	.28	.30	4.9	.40	.44	3.3	.20	.21
Employer expenditures for life insurance and health benefit programs ²	5.4	.36	.39	4.8	.39	.43	5.9	.34	.37
Life, accident, and health insurance	3.4	.23	.25	3.2	.26	.29	3.6	.21	.22
Sick leave	.9	.06	.07	1.2	.10	.11	.7	.04	.04
Workers' compensation	1.0	.07	.07	.4	.03	.04	1.6	.09	.10
Employer expenditures for unemployment benefit programs	1.1	.08	.08	.9	.08	.08	1.4	.08	.08
Unemployment insurance	1.0	.07	.08	.8	.07	.07	1.3	.07	.08
Severance pay	(¹)	(¹)	(¹)	.1	.01	.01	(¹)	(¹)	(¹)
Severance pay funds and supplemental unemployment benefit funds	.1	(¹)	(¹)	(¹)	(¹)	.1	.1	(¹)	.01
Nonproduction bonuses	1.1	.08	.08	1.9	.15	.17	.4	.02	.02
Savings and thrift plans	.2	.01	.01	.3	.02	.02	.1	(¹)	(¹)
Wages and salaries (gross payroll) ³	85.5	5.80	6.24	86.3	7.02	7.71	84.8	4.95	5.26
Supplements to wages and salaries ⁴	14.5	.98	1.06	13.7	1.12	1.23	15.2	.89	.94

See footnotes at top of p. 663.

¹ Less than 0.05 percent or less than \$0.005.² Includes other health benefit programs, principally State temporary disability insurance, not presented separately.³ Wages and salaries include all direct payments to workers. They consist of pay for time worked; pay for vacations, holidays, sick leave, and civic and personal leave; severance pay; and nonproduction bonuses.⁴ Supplements to wages and salaries include all employer expenditures for compensation other than wages and salaries. They consist of expenditures for retirement programs (including direct pay to pensioners under pay-as-you-go private pension plans); expenditures for life insurance and health benefit programs (except sick leave); expenditures for unemployment benefit programs (except severance pay); payments to vacation and holiday funds; and payments to savings and thrift plans.

Note: Because of rounding, sums of individual items may not equal totals.

Table 2.—Employee Compensation and Percent Increases, Private Nonfarm Economy, 1966–76

Compensation item	1966		1968		1970		1972		1974		1976	
	Dollars per work hour	Dollars per work hour	Percent increase over 1966	Dollars per work hour	Percent increase over 1968	Dollars per work hour	Percent increase over 1970	Dollars per work hour	Percent increase over 1972	Dollars per work hour	Percent increase over 1974	Percent increase over 1966
Total compensation	\$3.44	\$3.89	13.1	\$4.54	16.7	\$5.23	15.2	\$6.33	21.0	\$7.53	19.0	118.9
Pay for time worked	2.85	3.22	13.0	3.72	15.5	4.21	13.2	4.95	17.6	5.77	16.6	102.5
All other items combined .....	.59	.67	13.6	.82	18.8	1.02	24.1	1.38	35.3	1.76	27.5	198.3
Total compensation in 1967 dollars	3.54	3.73	5.4	3.90	4.6	4.18	7.2	4.29	2.6	4.42	3.0	24.9

Table 3.—Employee Compensation, Private Nonfarm Economy, 1966, 1974, and 1976

Compensation item	1966						1974					
	All industries		Manufacturing		Nonmanufacturing		All industries		Manufacturing		Manufacturing	
	Percent of compensation	Dollars per work hour	Percent of compensation	Dollars per work hour	Percent of compensation	Dollars per work hour	Percent of compensation	Dollars per work hour	Percent of compensation	Dollars per work hour	Percent of compensation	Dollars per work hour
Total compensation	100.0	\$3.44	100.0	\$3.76	100.0	\$3.23	100.0	\$6.33	100.0	\$6.72		
Pay for time worked	83.0	2.85	81.6	3.07	84.0	2.71	78.2	4.95	76.2	5.12		
Straight-time pay	80.6	2.77	78.1	2.94	82.4	2.66	76.3	4.83	73.3	4.93		
Premium pay	2.4	.08	3.5	.13	1.6	.05	1.9	.12	2.9	.19		
Overtime, weekend, and holiday work	2.1	.07	2.9	.11	1.5	.05	1.7	.10	2.3	.16		
Shift differentials .....	.3	.01	.6	.02	.1	(¹)	.3	.02	.5	.04		
Paid leave (except sick leave)	5.2	.18	5.8	.21	4.7	.15	6.0	.38	6.9	.47		
Vacations	3.1	.11	3.5	.13	2.7	.09	3.4	.22	3.9	.26		
Holidays	1.9	.07	2.2	.08	1.7	.05	2.3	.14	2.7	.18		
Civic and personal leave .....	.1	(¹)	.1	(¹)	.1	(¹)	.2	.01	.2	.01		
Employer payments to vacation and holiday funds .....	.1	(¹)	(¹)	(¹)	.2	.01	.1	.01	.1	.01		
Employer expenditures for retirement programs	5.6	.20	5.9	.22	5.5	.17	8.1	.51	8.4	.56		
Social security	3.1	.11	3.0	.11	3.2	.10	4.4	.28	4.3	.29		
Private plans	2.5	.09	2.9	.11	2.3	.07	3.7	.23	4.0	.27		
Employer expenditures for life insurance and health benefit programs ²	3.5	.12	3.8	.15	3.4	.11	4.9	.31	5.9	.39		
Life, accident, and health insurance	2.1	.07	2.6	.10	1.8	.06	3.3	.21	4.3	.29		
Sick leave .....	.5	.02	.5	.02	.6	.02	.7	.04	.6	.04		
Workers' compensation .....	.9	.03	.7	.03	1.0	.03	1.0	.06	.9	.06		
Employer expenditures for unemployment benefit programs	1.1	.04	1.2	.04	1.2	.04	1.1	.07	1.1	.08		
Unemployment insurance	1.1	.04	1.1	.04	1.1	.04	.9	.06	1.0	.06		
Severance pay	(¹)	(¹)	(¹)	(¹)	.1	(¹)	(¹)	(¹)	.1	(¹)		
Severance pay funds and supplemental unemployment benefit funds	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	.1	(¹)	.1	.01		
Nonproduction bonuses	1.2	.04	1.3	.05	1.2	.04	1.5	.09	1.2	.08		
Savings and thrift plans .....	.1	(¹)	.2	.01	.1	(¹)	.2	.01	.3	.02		
Wages and salaries (gross payroll) ³	89.9	3.09	89.2	3.35	90.4	2.92	86.3	5.46	84.9	5.71		
Supplements to wages and salaries ⁴	10.1	.35	10.8	.41	9.6	.31	13.7	.87	15.1	1.01		

Table 3.—Employee Compensation, Private Nonfarm Economy, 1966, 1974, and 1976—Continued

Compensation item	1974		1976	
	Nonmanufacturing		Manufacturing	
	Percent of compensation	Dollars per work hour	Percent of compensation	Dollars per work hour
Total compensation	100.0	\$6.13	100.0	\$7.30
Pay for time worked	79.4	4.86	76.7	5.77
Straight-time pay	78.0	4.78	74.7	5.63
Premium pay	1.4	.09	1.9	.15
Overtime, weekend, and holiday work	1.3	.08	1.6	.12
Shift differentials	.1	.01	.3	.02
Paid leave (except sick leave)	5.4	.33	6.1	.46
Vacations	3.1	.19	3.5	.26
Holidays	2.0	.12	2.3	.17
Civic and personal leave	.1	.01	.2	.01
Employer payments to vacation and holiday funds	.2	.01	.2	.01
Employer expenditures for retirement programs	7.9	.49	8.6	.65
Social security	4.4	.27	4.3	.32
Private plans	3.5	.21	4.3	.32
Employer expenditures for life insurance and health benefit programs ²	4.4	.27	6.0	.45
Life, accident, and health insurance	2.7	.16	4.1	.31
Sick leave	.7	.04	.9	.06
Workers' compensation	1.0	.06	1.1	.08
Employer expenditures for unemployment benefit programs	1.0	.06	1.3	.09
Unemployment insurance	.9	.06	1.1	.08
Severance pay	(1)	(1)	.1	.01
Severance pay funds and supplement unemployment benefit funds	(1)	(1)	.1	(1)
Nonproduction bonuses	1.6	.10	1.1	.08
Savings and thrift plans	.2	.01	.2	.01
Wages and salaries (gross payroll) ³	87.0	5.33	84.7	6.37
Supplements to wages and salaries ⁴	13.0	.79	15.3	1.15

¹ Less than 0.05 percent or less than \$0.005.

² Includes other health benefit programs, principally State temporary disability insurance, not presented separately.

³ Wages and salaries include all direct payments to workers. They consist of pay for time worked; pay for vacations, holidays, sick leave, and civic and personal leave; severance pay; and nonproduction bonuses.

⁴ Supplements to wages and salaries include all employer expenditures for compensation other than for wages and salaries. They

consist of expenditures for retirement programs (including direct pay for pensioners under pay-as-you-go private pension plans); expenditures for health benefit programs (except sick leave); expenditures for unemployment benefit programs (except severance pay); payments to vacation and holiday funds; and payments to savings and thrift plans.

Note: Because of rounding, sums of individual items may not equal totals.

Table 4.—Employer Expenditures for Compensation of Production and Related Workers in Manufacturing, 1959, 1974, and 1976

Compensation item	1959		1974		1976	
	Percent of compensation	Dollars per hour of work	Percent of compensation	Dollars per hour of work	Percent of compensation	Dollars per hour of work
Total compensation ¹	100.0	\$2.61	100.0	\$5.88	100.0	\$6.98
Pay for time worked	85.4	2.23	76.9	4.52	75.2	5.25
Straight-time pay	81.5	2.13	73.0	4.29	71.7	5.00
Premium pay	3.9	.10	3.9	.23	3.5	.24
Overtime, weekend, and holiday work	3.1	.08	3.2	.19	2.9	.20
Shift differentials	.8	.02	.7	.04	.6	.04
Paid leave (except sick leave) ²	5.2	.14	6.8	.40	6.8	.47
Vacations	3.3	.09	3.8	.22	3.8	.27
Holidays	1.9	.05	2.6	.15	2.6	.18
Employment expenditures for retirement programs	4.2	.11	8.2	.48	8.5	.60
Social security	2.0	.05	4.6	.27	4.5	.31
Private plans	2.2	.06	3.5	.21	4.1	.28
Employer expenditures for life insurance and health benefit programs ³	3.0	.08	6.4	.37	7.4	.51
Life, accident, and health insurance	2.0	.05	4.7	.28	5.3	.37
Sick leave	.2	.01	.4	.03	.6	.04
Workers' compensation	.8	.02	1.2	.07	1.5	.10
Employer expenditures for unemployment benefit programs ⁴	1.5	.03	1.3	.08	1.6	.11
Wages and salaries (gross payroll) ⁵	91.4	2.38	84.4	4.96	83.1	5.80
Supplements to wages and salaries ⁶	8.6	.23	15.6	.92	16.9	1.18

¹ Includes data for nonproduction bonuses, and savings and thrift plans not represented separately.

² Data for civic and personal leave and employer payments to vacation and holiday funds included.

³ Includes other health benefit programs, principally State temporary disability insurance, not represented separately.

⁴ Includes unemployment insurance, severance pay, and severance pay funds and supplemental unemployment benefit funds.

⁵ Wages and salaries include all direct payments to workers. They

consist of pay for time worked; pay for vacations, holidays, sick leave, and civic and personal leave; severance pay; and nonproduction bonuses.

⁶ Supplements to wages and salaries include all employer expenditures for compensation other than for wages and salaries. They consist of expenditures for retirement programs (including direct pay to pensioners under pay-as-you-go private pension plans); expenditures for health benefit programs (except sick leave); expenditures for unemployment benefit programs (except severance pay); payments to vacation and holiday funds; and payments to savings and thrift plans.

Table 5.—Composition of Payroll Hours, Private Nonfarm Economy, 1974 and 1976

[Percentage distribution of paid hours]

Industry and paid hour item	All workers		Office workers		Nonoffice workers	
	1974	1976	1974	1976	1974	1976
ALL INDUSTRIES						
All paid hours	100.0	100.0	100.0	100.0	100.0	100.0
Work hours	92.8	92.1	91.2	90.6	93.7	92.9
Straight-time hours	88.7	88.0	89.5	88.9	88.1	87.5
Overtime hours	4.1	4.1	1.7	1.7	5.6	5.4
Paid leave hours	7.2	7.9	8.8	9.4	6.3	7.1
Vacations	3.6	3.9	4.3	4.5	3.3	3.5
Holidays	2.6	2.8	3.1	3.1	2.3	2.6
Sick leave	8	1.0	1.2	1.5	.6	.8
Civic and personal leave	.2	.2	.2	.3	.1	.2
MANUFACTURING						
All paid hours	100.0	100.0	100.0	100.0	100.0	100.0
Work hours	91.4	90.9	90.2	89.5	91.9	91.4
Straight-time hours	85.4	85.4	87.8	87.1	84.6	84.8
Overtime hours	6.0	5.6	2.4	2.4	7.3	6.6
Paid leave hours	8.6	9.1	9.8	10.5	8.1	8.6
Vacations	4.4	4.6	4.9	5.2	4.2	4.4
Holidays	3.3	3.4	3.5	3.6	3.2	3.3
Sick leave	.7	.9	1.2	1.4	.5	.7
Civic and personal leave	.2	.2	.3	.3	.2	.2
NONMANUFACTURING						
All paid hours	100.0	100.0	100.0	100.0	100.0	100.0
Work hours	93.5	92.9	91.5	91.0	95.0	94.2
Straight-time hours	90.4	89.6	90.1	89.5	90.6	89.7
Overtime hours	3.1	3.2	1.4	1.5	4.4	4.5
Paid leave hours	6.5	7.1	8.5	9.0	5.0	5.8
Vacations	3.2	3.4	4.1	4.2	2.6	2.9
Holidays	2.3	2.4	3.0	2.9	1.7	2.0
Sick leave	.8	1.1	1.2	1.5	.6	.8
Civic and personal leave	.2	.2	.2	.3	.1	.1

Note: Because of rounding, sums of individual items may not equal totals.

Attachment 7

ESTIMATED HOURLY COMPENSATION OF PRODUCTION WORKERS IN MANUFACTURING, 10 COUNTRIES, 1960, 1965-78

Prepared by: U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology, October 1978. Table for 1978 revised for annual average exchange rates, January 1979.

Estimated Hourly Compensation of Production Workers in Manufacturing, 10 Countries, Midyear 1978

[Provisional estimates]

Country	Exchange rate ¹		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
	National currency unit	National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S.=100
United States	Dollar	.....	6.14	34.5	8.26	8.26	100
Canada	Dollar	1.140	6.83	24.1	8.48	7.44	90
Japan	Yen	208.4	984	² 14.6	1,128	5.41	66
Belgium	Franc	31.44	182.9	75.0	320.1	10.18	123
France	Franc	4.501	17.42	75.7	30.61	6.80	82
Germany	Mark	2.005	11.73	60.9	18.87	9.41	114
Italy	Lira	848.8	2,707	93.4	5,235	6.17	75
Netherlands	Guilder	2.161	12.30	² 73.5	21.34	9.88	120
Sweden	Krona	4.517	27.92	60.7	44.87	9.93	120
United Kingdom	Pence	52.13	172.7	29.4	223.5	4.29	52

Estimated Hourly Compensation of Production Workers in Manufacturing, 10 Countries, Midyear 1978—Continued

[Provisional estimates]

Country	Exchange rate ¹		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
	National currency unit	National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S.=100
1977							
United States	Dollar		5.67	34.0	7.60	7.60	100
Canada	Dollar	1.063	6.38	23.4	7.87	7.40	97
Japan	Yen	267.8	928	² 14.6	1,063	3.97	52
Belgium	Franc	35.83	172.9	74.1	301.0	8.40	111
France	Franc	4.915	15.25	73.9	26.52	5.40	71
Germany	Mark	2.321	11.18	60.4	17.93	7.73	102
Italy	Lira	882.8	2,350	94.2	4,564	5.17	68
Netherlands	Guilder	2.454	11.60	² 73.6	20.14	8.21	108
Sweden	Krona	4.468	25.70	53.4	39.42	8.82	116
United Kingdom	Pence	57.31	150.6	27.2	191.6	3.34	44
1976							
United States	Dollar		5.22	33.0	6.94	6.94	100
Canada	Dollar	.9861	5.76	23.2	7.10	7.20	104
Japan	Yen	296.4	8.50	² 15.0	978	3.30	48
Belgium	Franc	38.58	156.9	72.4	270.5	7.01	101
France	Franc	4.775	13.37	71.7	22.96	4.81	69
Germany	Mark	2.517	10.39	59.9	16.61	6.60	95
Italy	Lira	830.3	1,838	100.6	3,687	4.44	64
Netherlands	Guilder	2.642	10.77	² 71.5	18.47	6.99	101
Sweden	Krona	4.356	24.08	49.5	36.00	8.26	119
United Kingdom	Pence	55.41	138.0	25.6	173.3	3.13	45
1975							
United States	Dollar		4.83	31.7	6.36	6.36	100
Canada	Dollar	1.017	5.06	22.8	6.21	6.11	96
Japan	Yen	296.7	791	² 14.3	904	3.05	48
Belgium	Franc	36.69	140.4	74.9	245.6	6.69	105
France	Franc	4.282	11.60	70.1	19.73	4.61	72
Germany	Mark	2.455	9.74	58.1	15.40	6.27	99
Italy	Lira	652.4	1,520	99.3	3,029	4.64	73
Netherlands	Guilder	2.523	9.75	² 70.5	16.62	6.59	104
Sweden	Krona	4.142	20.45	45.6	29.78	7.19	113
United Kingdom	Pence	45.01	118.9	23.9	147.3	3.27	51
1974							
United States	Dollar		4.43	30.0	5.76	5.76	100
Canada	Dollar	.9779	4.37	22.0	5.33	5.45	95
Japan	Yen	291.5	687	² 13.2	778	2.67	46
Belgium	Franc	38.89	118.4	70.3	201.6	5.18	90
France	Franc	4.807	9.97	67.4	16.69	3.47	60
Germany	Mark	2.582	9.01	55.2	13.98	5.41	94
Italy	Lira	650.5	1,218	95.9	2,386	3.67	64
Netherlands	Guilder	2.683	8.52	² 69.3	14.42	5.37	93
Sweden	Krona	4.432	17.81	40.6	25.04	5.65	98
United Kingdom	Pence	42.73	92.4	22.3	113.0	2.64	46
1973							
United States	Dollar		4.09	28.5	5.26	5.26	100
Canada	Dollar	1.000	3.85	21.2	4.67	4.67	89
Japan	Yen	270.9	523	² 13.1	592	2.19	42
Belgium	Franc	38.82	98.09	67.7	164.5	4.24	81
France	Franc	4.437	8.38	65.6	13.88	3.13	60
Germany	Mark	2.648	8.06	50.7	12.15	4.59	87

Estimated Hourly Compensation of Production Workers in Manufacturing, 10 Countries, Midyear 1978—Continued

[Provisional estimates]

Country	Exchange rate ¹		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
	National currency unit	National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S. = 100
1973							
Italy	Lira	581.7	989	89.0	1,869	3.21	61
Netherlands	Guilder	2.780	7.23	² 65.9	11.99	4.31	82
Sweden	Krona	4.354	16.05	34.1	21.52	4.94	94
United Kingdom	Pence	40.80	78.1	18.5	92.5	2.27	43
1972							
United States	Dollar		3.82	26.6	4.84	4.84	100
Canada	Dollar	.9907	3.54	20.8	4.28	4.32	89
Japan	Yen	303.1	422	² 13.7	480	1.58	33
Belgium	Franc	44.02	85.25	64.3	140.1	3.18	66
France	Franc	5.044	7.35	62.3	11.93	2.37	49
Germany	Mark	3.188	7.26	47.9	10.74	3.37	70
Italy	Lira	583.7	809	86.7	1,510	2.59	54
Netherlands	Guilder	3.210	6.33	² 60.2	10.14	3.16	65
Sweden	Krona	4.757	14.83	28.7	19.09	4.01	83
United Kingdom	Pence	39.99	69.1	17.7	81.3	2.03	42
1971							
United States	Dollar		3.57	25.9	4.49	4.49	100
Canada	Dollar	1.010	3.28	20.4	3.95	3.91	87
Japan	Yen	347.5	363	² 13.2	411	1.18	26
Belgium	Franc	48.55	75.01	58.9	119.2	2.46	55
France	Franc	5.510	6.66	61.1	10.73	1.95	43
Germany	Mark	3.476	6.66	45.3	9.68	2.78	62
Italy	Lira	618.3	718	84.0	1,321	2.14	48
Netherlands	Guilder	3.490	5.67	² 58.6	8.99	2.58	57
Sweden	Krona	5.104	12.90	28.8	16.62	3.26	73
United Kingdom	Pence	40.91	61.2	16.1	71.0	1.74	39
1970							
United States	Dollar		3.36	24.7	4.19	4.19	100
Canada	Dollar	1.044	3.01	19.8	3.61	3.46	83
Japan	Yen	358.2	314	² 13.2	355	.99	24
Belgium	Franc	49.65	66.05	56.2	103.2	2.08	50
France	Franc	5.529	5.99	60.3	9.60	1.74	42
Germany	Mark	3.646	5.99	43.1	8.57	2.35	56
Italy	Lira	627.2	615	80.5	1,110	1.77	42
Netherlands	Guilder	3.617	4.93	² 56.7	7.73	2.14	51
Sweden	Krona	5.186	12.01	27.7	15.34	2.96	71
United Kingdom	Pence	41.74	53.8	15.0	61.9	1.48	35
1969							
United States	Dollar		3.19	23.1	3.93	3.93	100
Canada	Dollar	1.077	2.79	19.3	3.33	3.09	79
Japan	Yen	358.4	267	² 13.3	303	.85	22
Belgium	Franc	50.15	59.67	53.1	91.35	1.82	46
France	Franc	5.181	5.33	59.9	8.52	1.64	42
Germany	Mark	3.923	5.33	40.5	7.49	1.91	49
Italy	Lira	627.4	501	84.2	923	1.47	37
Netherlands	Guilder	3.624	4.39	² 56.3	6.86	1.89	48
Sweden	Krona	5.170	10.60	26.8	13.44	2.60	66
United Kingdom	Pence	41.84	47.3	13.6	53.8	1.29	33

Estimated Hourly Compensation of Production Workers in Manufacturing, 10 Countries, Midyear 1978—Continued

[Provisional estimates]

Country	Exchange rate ¹		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
	National currency unit	National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S. = 100
1968							
United States	Dollar		3.01	22.2	3.68	3.68	100
Canada	Dollar	1.078	2.58	18.9	3.07	2.85	77
Japan	Yen	360.5	225	² 13.4	255	.71	19
Belgium	Franc	49.94	54.65	51.7	82.90	1.66	45
France	Franc	4.953	4.73	64.5	7.78	1.57	43
Germany	Mark	3.992	4.81	39.5	6.71	1.68	46
Italy	Lira	623.4	457	81.6	830	1.33	36
Netherlands	Guilder	3.620	3.95	² 54.3	6.09	1.68	46
Sweden	Krona	5.168	9.85	24.2	12.23	2.37	64
United Kingdom	Pence	41.78	43.6	13.1	49.3	1.18	32
1967							
United States	Dollar		2.83	21.6	3.44	3.44	100
Canada	Dollar	1.079	2.40	18.3	2.84	2.63	76
Japan	Yen	362.1	192	² 13.3	217	.60	17
Belgium	Franc	49.69	51.95	50.3	78.08	1.57	46
France	Franc	4.921	4.28	64.2	7.03	1.43	42
Germany	Mark	3.987	4.61	38.3	6.38	1.60	47
Italy	Lira	624.1	440	81.2	797	1.28	37
Netherlands	Guilder	3.602	3.65	² 50.7	5.50	1.53	44
Sweden	Krona	5.162	9.28	23.0	11.41	2.21	64
United Kingdom	Pence	36.36	40.6	12.8	45.8	1.26	37
1966							
United States	Dollar		2.72	21.3	3.30	3.30	100
Canada	Dollar	1.077	2.25	17.9	2.65	2.46	75
Japan	Yen	362.3	170	² 13.2	193	.53	16
Belgium	Franc	49.83	48.58	49.0	72.38	1.45	44
France	Franc	4.914	3.99	62.8	6.50	1.32	40
Germany	Mark	3.999	4.44	37.4	6.10	1.53	46
Italy	Lira	624.5	416	75.3	729	1.17	35
Netherlands	Guilder	3.619	3.36	² 48.9	5.00	1.38	42
Sweden	Krona	5.166	8.46	22.3	10.35	2.00	61
United Kingdom	Pence	35.80	39.0	13.9	44.5	1.24	38
1965							
United States	Dollar		2.61	20.3	3.14	3.14	100
Canada	Dollar	1.078	2.12	16.2	2.46	2.28	73
Japan	Yen	361.5	153	² 13.1	173	.48	15
Belgium	Franc	49.64	44.27	47.9	65.48	1.32	42
France	Franc	4.902	3.76	62.0	6.09	1.24	39
Germany	Mark	3.994	4.13	36.5	5.64	1.41	45
Italy	Lira	624.8	398	77.4	706	1.13	36
Netherlands	Guilder	3.600	3.10	² 43.8	4.46	1.24	39
Sweden	Krona	5.158	7.85	22.1	9.58	1.86	59
United Kingdom	Pence	35.77	36.2	13.3	41.0	1.15	37
1960							
United States	Dollar		2.26	18.0	2.67	2.67	100
Canada	Dollar	.9697	1.79	15.4	2.07	2.13	80
Japan	Yen	359.9	83	² 12.6	94	.26	10
Belgium	Franc	49.87	29.96	38.9	41.61	.83	31
France	Franc	4.905	2.62	54.5	4.05	.83	31
Germany	Mark	4.171	2.63	35.0	3.55	.85	32

Estimated Hourly Compensation of Production Workers in Manufacturing, 10 Countries, Midyear 1978—Continued

[Provisional estimates]

Country	Exchange rate ¹		Average hourly earnings in national currency	Ratio of additional compensation to hourly earnings	Estimated compensation per hour worked		
	National currency unit	National currency units per U.S. dollar			National currency	U.S. dollars	Index U.S. = 100
1960							
Italy	Lira.....	621.0	228	71.7	391	.63	24
Netherlands	Guilder.....	3.772	1.85	238.5	2.56	.68	25
Sweden	Krona.....	5.168	5.31	16.0	6.16	1.19	45
United Kingdom	Pence.....	35.62	26.5	10.9	29.4	.83	31

¹ Annual average exchange rate. ² All employees.

For concepts and methods, see attached General Note.

Prepared by: U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology, October 1978. Revised for annual average exchange rates, January 1979.

General Note on Estimates of Hourly Compensation of Production Workers in Manufacturing Industries

Published average hourly earnings may not include the same items of labor compensation in each country. Earnings generally include basic time and piece rates, overtime pay and shift differentials, regular bonuses and premiums, and cost-of-living adjustments. In some countries, earnings also include bonuses not paid regularly each pay period, private or contractual family allowances paid by the employer, and pay in kind. In general, earnings are computed per hour paid and include pay for time not worked (e.g., holiday, vacation, and other leave pay) or else are computed per hour worked and exclude pay for time not worked. For all countries, earnings refer to gross payments made to the worker before payroll deductions for taxes and employee social security contributions.

Average hourly earnings have not been adjusted for differences in earnings definitions or for survey limitations such as the omission of small establishments. However, statistics for some years have been adjusted, where possible, to account for changes in coverage, sample benchmarks, or frequency of surveys. The estimates, therefore, may not coincide with data originally published abroad.

Total hourly compensation includes all direct payments made to the worker (pay for time worked, pay for vacations, holidays, and other leave, all bonuses, and pay in kind) before payroll deductions of any kind, plus employer expenditures for legally required insurance pro-

grams and contractual and private plans for the benefit of employees. In addition, compensation includes other significant taxes on payrolls or employment that are regarded as labor costs. Total compensation is computed per hour worked.

Total compensation per hour worked is estimated by adjusting average hourly earnings for items of direct pay not included in earnings and for employer expenditures for social security and contractual and private insurance programs and for other labor taxes. Adjustment factors are obtained primarily from periodic labor cost surveys prorated for intervening years on the basis of other available information. Because compensation is partly estimated, small differences in compensation levels among countries should not be considered significant.

Hourly compensation is converted to U.S. dollars using the average daily exchange rate for the reference period. Changes in hourly compensation in U.S. dollars from one period to another are therefore affected by changes in currency exchange rates as well as by changes in compensation.

Hourly compensation in U.S. dollars indicates comparative levels of employer labor costs per hour worked. However, because compensation includes more than current labor income of workers and because prices of goods and services vary greatly among countries, it does not indicate relative living standards of workers.

U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology.

TRADE ACT OF 1974

Restraint Actions, Trade Adjustment Assistance, and Generalized System of Preference

Restraint action.—As of June 1, 1977, the United States had signed or reached understandings on new textile agreements with 28 foreign countries. The agreements are intended to restrain the level of textile imports by specifying the annual amounts that the exporting country can ship to the importing country. The following extract from the *International Economic Report of the President*¹ describes the goals of the Arrangement:

In late 1973, the United States together with some 48 other nations negotiated the Arrangement Regarding International Trade in Textiles, usually referred to as the Multilateral Fiber Arrangement (MFA). The MFA provides a general framework for bringing order and stability to the world textile trade, heretofore noted for its economic and political volatility. It establishes standards and procedures for regulating trade in cotton, wool, and manmade fiber textiles, and apparel. The participating nations agreed to certain criteria and minimum growth rates for textile restraints to encourage increased interfiber flexibility, and to give special consideration to developing countries for expanded market access in the developed countries.

The restraint agreements are set under "specific limit" and "consultative level" and may be set for varying lengths of time. The "specific limit" is set at a certain level which cannot be changed during the definite period, but consultation procedures are specified in the agreement. The "consultative level" allows for renegotiation of amount of restraint during the life of the agreement.

Of all the bilateral agreements, 18 are "specific limit" in form and 10 are consultative mechanism type. The agreements with other countries are inactive and will only be activated if shipments from each country become of such quantity to warrant a restraint.

The following list shows the restraint level of 18

countries, in equivalent square yards,² agreed upon by the exporting country and the United States. Even though there is a bilateral agreement with Japan, there is no restriction on the amount of apparel imports from Japan; the agreement is more of a consultative mechanism type.

Current year aggregate for cotton, wool, and manmade fiber textile products

Country	Equivalent square yards (millions)
Hong Kong	943.0
Taiwan	758.9
Korea	573.2
Mexico	355.0
Singapore	232.0
Philippines	202.2
Colombia	97.2
Thailand	70.0
Haiti	65.3
Malaysia	37.7
Macao	35.9
Japan	None

Current year aggregate for cotton textile products

India	147.9
Pakistan	139.5
Brazil	114.0
Egypt	105.0
Romania	20.6
Poland	17.2

The present restraint levels by groupings of non-apparel and apparel are given below. Also shown are the restraint levels for cotton goods, presented in two groupings—yarn and fabrics and apparel and miscellaneous items.

Trade adjustment assistance.—Under the Trade Act of 1974, if a firm's production and sales were greatly affected by imports, that firm may apply for financial assistance. The workers of that firm or subdivision thereof, their union, or a duly authorized representative may also apply for trade adjustment assistance. An application filed by a firm for financial assistance to the Department of Commerce does

¹ Transmitted to the Congress in March 1975. Submitted to the President by the Council on International Economic Policy.

² Unit of measure for textile products in which the quantity of the item is converted into square yard equivalents.

Bilateral Agreements Covering Multifibers and Cotton, as of June 1, 1977

Restraint Levels for Multifibers

Country	Length of agreement	Year aggregate	Current level in million square yards		
			Cotton and manmade fiber nonapparel	Cotton and manmade fiber apparel	Wool textile products
Hong Kong	10/1/74-12/30/77	943.0	315.8	585.2	42.0
Taiwan	1/1/75-12/31/77	758.9	165.9	558.1	5.0
Korea	10/1/74-9/30/77	573.2	117.1	442.2	13.4
Mexico	5/1/75-4/30/78	355.0	199.0	156.0	—
Singapore	1/1/75-12/31/77	232.0	37.0	192.6	3.4
Philippines	10/1/75-9/30/78	202.0	—	202.2	—
Colombia	7/1/75-6/30/78	97.2	64.8	32.3	—
Thailand	1/1/76-12/31/78	70.0	20.0	50.0	—
Haiti	1/1/76-12/31/78	65.3	165.3	165.3	—
Malaysia	1/1/75-12/31/77	37.7	14.9	21.8	1.0
Macao	1/1/75-12/31/79	35.9	135.9	135.9	—
Japan	10/1/75-12/31/77	None	None	None	None

Restraint Levels for Cotton Only

Country	Length of agreement	Year aggregate	Current level in million square yards	
			Yarn and fabrics	Apparel and miscellaneous
India	10/1/73- 9/30/77	147.9	128.4	21.4
Pakistan	7/1/74-12/31/77	139.5	114.1	25.4
Brazil	4/1/76- 3/31/79	114.0	89.0	25.0
Egypt	1/1/75-12/31/77	105.0	NA	NA
Romania	1/1/75-12/31/77	20.6	NA	NA
Poland	1/1/75-12/31/77	17.2	NA	NA

¹ Includes apparel and nonapparel.

Source: Bureau of International Labor Affairs and Office of Trade Adjustment Assistance.

not necessarily result in the employees receiving aid under the trade adjustment program.

Falling sales or production due to imports is the prime criterion for applying for trade assistance by both employer and employees. The workers must be laid off from work, substantially as a result of imports. To be eligible for aid, the workers must have worked for 6 months in the subdivision affected by imports and the Department of Labor must certify the petition. Principal benefits available to eligible workers include cash allowances, counseling and placement services, training programs, job search grants, and relocation allowances.³

From April 3, 1975, to July 31, 1977, there were 2,234 cases affecting an estimated 531,447 workers. Of the total cases, 772 petitions, affecting 229,247 workers, were certified for assistance. Of the 1,655 petitions certified or denied, 400 petitions, or 24 percent, were in the apparel and other finished products industry, and affected approximately 47,875 workers. Petitions in the apparel and other finished products accounted for roughly 30 percent of all certified petitions, with an estimated 33,250 workers, and roughly 19 percent of the denied petitions, representing approximately 14,625 employees

³ Note: The breakdown of petitioners for the employees is not available. Also, the number of petitions to the Department of Commerce, which resulted in assistance to employees, is not obtainable.

**Cumulative Summary of Trade Adjustment Cases,
April 3, 1975-July 31, 1977**

Status	Number	All Industry	Apparel and other finished products	
		Estimated number of workers	Number	Estimated number of workers
Petitions certified	772	229,247	230	33,250
Petitions denied	883	288,139	170	14,625
Petitions in process	475	—	—	—
Withdrawals	41	7,170	—	—
Terminations	68	6,891	—	—
Totals	2,239	531,447	400	47,875

Source: U.S. Department of Labor, Bureau of International Labor Affairs and Office of Trade Adjustment Assistance.

During the period from April 3, 1975, to July 31, 1977, there were 22 petitions filed by firms in various industries in Puerto Rico. Nine firms, with approximately 1,468 workers were certified; and nine firms, with roughly 838 employees, were denied assistance. Four petitions were filed in May and June of 1977 and are still waiting determination.

More recent reports indicate that for the period April 3, 1975, through March 31, 1979, a total of 73 petitions were filed by various firms in Puerto Rico. Certifications were approved in 52 plants with over 4,300 workers and denied in 13 other cases; four applications were withdrawn because the plant

terminated its operations, and four were still pending. Close to 6,000 workers were involved in these petitions; the exact number of employees affected in plants closing down or being denied certification was not known. Major industries receiving certification were the agricultural and industrial phases of the

sugar industry, textiles, apparel, leather goods, and rubber footwear.

Latest known employment, by industry, in plants filing for trade adjustment assistance in the 4-year period between April 1975 and March 1979 was as follows:

Industry	Total employment	Certification granted	Application denied	Terminated	In process
Sugar	1,936	1,836	—	—	100
Agricultural phase	1,405	1,305	—	—	—
Industrial phase	531	531	—	—	—
Textiles	770	650	—	—	120
Apparel	1,657	1,376	111	60	110
Leather (including footwear)	1,589	427	112	150	—
Rubber footwear	412	412	—	—	—
Fabricated metal products	8	—	8	—	—
Electrical products	1,491	253	NA	50	188
Scientific products	35	—	35	—	—
Miscellaneous manufacturing	30	20	10	—	—
Miscellaneous business services	NA	—	—	NA	—
Total	15,928	4,324	1,826	1,260	518

¹Excludes plants where employment data were not available.

NA—Not applicable.

Generalized System of Preference.—The system of preference for developing nations was proclaimed by the President under the Trade Act of 1974. The generalized system of preference went into effect on January 1, 1976, and will remain in effect until 1985. This system will help developing nations to improve their financial or economic condition through export

trade, by providing duty-free importation of a wide range of products from certain countries.

However, most textile articles, including clothing, are excluded from preferential treatment. Other stated exclusions were for most footwear, watches, some electronic products, and certain glass and steel products.

Chapter VII.—Illegal Immigration into Puerto Rico

The question of the magnitude and impact of illegal immigration into Puerto Rico is one of the more difficult issues to address, (a) because of the lack of data and (b) because there is no way, as yet determined, to assess its impact on the Puerto Rican economy and, more specifically, on employment in Puerto Rico. This discussion will look at the possible magnitude of the problem, the mechanics of how illegal aliens come into Puerto Rico, and how the Department of Labor is attempting to deal with the overall problem of undocumented workers on the mainland and how these policies affect Puerto Rico.

MAGNITUDE OF THE PROBLEM

In attempting any estimates of the number of illegal aliens who arrive in Puerto Rico, one is faced with very much the same problem as in looking at the problem in the entire United States, there is no single reliable basis for determining the number of persons entering illegally, their country of origin, and their composition, by age, sex, etc.

The Puerto Rican Economic and Social Agenda in its only mention of illegal immigration states that, the problem "though unquantified, is suspected to be high."¹ A report of the General Accounting Office of September 8, 1975, states that Immigration and Naturalization Service representative estimate "that there are between 10,000 and 50,000 illegal aliens in Puerto Rico. . . ." ² The GAO report expresses the view of Commonwealth officials that "illegal aliens have an adverse effect on (1) the economy, especially by increasing unemployment; (2) health conditions; and (3) law enforcement." It was also stated that "aliens primarily violate their status to get employment."³

¹ *An Agenda for a Socio-Economic Study of Puerto Rico*, Part Two, June 1977, Office of the Governor, p. 324.

² *Aliens are Illegally Entering the U.S. Mainland through Puerto Rico and the U.S. Virgin Islands*, September 8, 1975, U.S. General Accounting Office, p. 2.

³ *Ibid.*, p. 2.

MECHANISM OF ILLEGAL IMMIGRATION

There are two kinds of illegal immigrants who come to Puerto Rico: (1) the illegal immigrant who decides to stay in Puerto Rico and (2) the illegal immigrant who uses Puerto Rico as a "gateway" to the mainland.

Federal regulations provide that residents of British, French, and Dutch territories in the Caribbean and Nationals of adjacent independent countries in the Caribbean may enter Puerto Rico (and also the U.S. Virgin Islands) without obtaining a visa (visa waiver). If an alien attempts to enter the mainland, the period for which he is admitted to Puerto Rico is automatically terminated.

Because of the proximity of Puerto Rico and for certain political and humanitarian reasons, large numbers of nationals of the Dominican Republic have entered Puerto Rico legally. It is believed however that Puerto Rico has large numbers of aliens in apparent illegal status from visa waiver countries and from the Dominican Republic. Evidence given in the GAO report points to Puerto Rico as a significant gateway into the mainland for illegal aliens. While this problem is identified and recommendations are made for controlling the "gateway" problems, the GAO report does not deal with the problems of illegal aliens in Puerto Rico who stay on the island.

EFFORTS TO DEAL WITH THE OVERALL PROBLEM OF ILLEGAL ALIENS IN THE UNITED STATES AND THEIR EFFECT ON PUERTO RICO

On August 4, 1977, President Carter proposed a set of actions to reduce the flow of undocumented workers to the United States. In a February 1978 report on these actions⁴ the Dominican Republic,

⁴ *Illegal Immigration: Presidents Program*, February 1978, U.S. Department of Labor.

Haiti, and Jamaica were listed as the Caribbean countries which were major sources of illegal immigration. While the report did not deal with the problem in Puerto Rico as such, one proposal to make illegal aliens less attractive to employers has been applied to Puerto Rico as well as the mainland. Quoting from the report—

The principal attraction of the United States for undocumented aliens is economic—the availability of jobs that pay considerably more than any available in the home countries. To restrict that opportunity is to limit the flow of individuals who attempt illegal entry. The first step in this regard will be to increase enforcement of two existing laws, the Fair Labor Standards Act (minimum wage) and the Farm Labor Contractor Registration Act. To date the inability of the Government to enforce fully these acts, due in part to lack of resources, has resulted in the hiring of undocu-

mented aliens at substandard wages thereby displacing American workers.

—The Fair Labor Standards Act, which mandates payment of the minimum wage and provides other employee protections, will be strictly enforced. Its existing civil and criminal penalties will be sought much more frequently by the Government. Two hundred sixty new inspectors will be hired and targeted to areas of heavy undocumented alien employment.⁵

As a result of this policy four new inspectors are to be assigned to Puerto Rico to carry out directed investigations targeted to firms suspected of having large numbers of illegal alien employees. Additionally, the President proposed far reaching legislation, now pending to make it unlawful to hire undocumented workers.

⁵ *Illegal Immigration: Presidents Program*, February 1978, U.S. Department of Labor, Policy Proposals, p. 3.

Social Conditions and Human Services

Acknowledgements

Many individuals have contributed to the preparation of the HEW report on social conditions and human service programs in Puerto Rico. Arabella Martinez, Assistant Secretary for Human Development Services, was the HEW representative on the Interagency Study Group on Puerto Rico. George Grob of the Office of the Assistant Secretary for Planning and Evaluation served as Study Coordinator. Direct assistance in the preparation of the report was provided by Doug Henton, Staff Assistant; Evelio Grillo, Special Assistant to Arabella Martinez; Kent Earnhardt, Consultant; and Isidoro Rodriguez, Special Advisor. Advice and material for the report was provided by the HEW Working Group on Puerto Rico: Michael Staren, Ralph Martini, Judy Boggs, Nora Kelly, Jack Summerfield, Elvira Crocker, Larry Mason, John Bayne, Jerrie Ellison, Mary Scott, Juan Rivera, and Jennifer Warlick. Additional material and review was provided by personnel from HEW's Regional Office in New York: Cesar Perales, Principal Regional Official; Art O'Leary, Ann Schreiber, Joseph J. Kelly, Nicholas J. Galluzzi, William Toby, John Sokol, John Devine, and Jed Diaz. Policy review was provided by Benjamin W. Heineman, Jr., Assistant Secretary for Planning and Evaluation, Henry Aaron, former Assistant Secretary for Planning and Evaluation; Jerry Turem; Gerald Britten; Isadore Seeman; Peter Relic; and Peter Fox. Clerical support was provided by Jan Donaldson, Diane Green, and Roszina Richardson. The National Conference Group, Inc., Falls Church, Va., assisted in the physical composition of the final manuscript. Finally, appreciation is extended to the many individuals in Puerto Rico who assisted the HEW study team by providing advice, information, and material needed to complete the report.

Social Conditions
and
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Executive Summary

Social Conditions and Human Services Programs

INTRODUCTION

This report was prepared by the Department of Health, Education, and Welfare (HEW) as its contribution to a Federal study of social and economic conditions in Puerto Rico requested by the President in March 1977. The HEW report describes social conditions in Puerto Rico as of 1976 and assesses Federal health, education, human development, and income security programs serving the Commonwealth as of FY 1977. However, changes made in Federal laws in 1978 are noted.

The study presents options for dealing with major social problems. The structure of the human services sector in Puerto Rico is such that almost all options involve joint Federal-Puerto Rico action. Some of these options can be achieved through changes in existing programs utilizing current resources; others require new legislation or additional resources from within Puerto Rico or from the Federal Government.

SOCIAL CONDITIONS IN PUERTO RICO

Puerto Rico has been undergoing rapid economic development in the past few decades as it has changed from a rural society to a more industrialized urban society. Furthermore, the island and the U.S. mainland have become and increasingly are more interdependent, both economically and socially. Puerto Rico has made gains in personal income, health status, and school enrollment in this century. Personal per capita income has risen from \$118 in 1940 to \$2,472 in 1977. In constant 1954

dollars, the growth of personal income was from \$213 in 1940 to \$1,113 in 1977. Life expectancy has also risen dramatically during this century and is currently approximately that of the U.S. mainland. General mortality rates are lower, and rapid progress has been made in reducing the infant mortality rate from 200 deaths under 1 year per 1,000 live births in 1900 to 20 in 1975. (The infant mortality rate of the United States was 16.) While only half the eligible school children were in school in 1940, four out of five are enrolled today. In 1940 only 5,000 persons were enrolled in colleges and universities, but more than 100,000 are enrolled at present. Still, significant problems remain.

The fundamental social and economic problem in Puerto Rico is the extent and degree of poverty. Sixty percent of the island's 3 million people have incomes below the U.S. Federal Government's official poverty cutoffs. Because the cost of living in Puerto Rico is higher than on the mainland, actual poverty may be greater than this. The underlying source of this chronic poverty is an imbalance between population growth and economic growth resulting in persistently high unemployment. Despite rapid industrialization, the population growth rate has exceeded and nearly doubled the rate of employment growth since 1940.

Since 1970, however, population growth has averaged 3 percent per year, while real economic growth has been averaging less than 2 percent. Natural population growth is now 1.7 percent per year, which is approximately the rate for the world, but much higher than the 0.6 percent rate in the U.S. mainland. Substantial net in-migration in recent years has raised the overall population growth rate to the 3-percent level. Unemployment has been

about 20 percent generally and for youth almost 50 percent. Some lowering of both the unemployment rate and possibly the in-migration have accompanied the economic recovery of 1977 and 1978.

The widespread poverty and chronic unemployment combined with rapid industrialization of an area which was predominantly rural less than 50 years ago have weakened family stability. Puerto Rico has a high divorce rate; more than 15 percent of its families are headed by a single parent. Mental health problems have become increasingly serious.

The illiteracy rate is approximately 11 percent (compared to less than 2 percent in the United States as a whole). This problem is compounded by a lack of English and even Spanish language skills among a significant portion of the population. Average school years completed is 7. School facilities are overcrowded, supplies are inadequate, and teachers are hampered by poor training. While elementary and secondary education is weak, there are large numbers of college graduates. However, many of these graduates cannot find jobs. There is little technical training in the higher education system and little vocational training at the secondary level.

OVERVIEW OF THE HUMAN SERVICES SECTOR

The human services sector, which provides health, education, and human development services as well as income security assistance to Puerto Rican residents, is based on a mutual cooperation among the Puerto Rico and Federal Governments and the private sector. Human services programs are administered by the Puerto Rico Government or by the private sector, with the exception of Old Age and Survivors insurance and the medicare programs, which are administered by the Federal Government. The Federal Government is the major funding source for income security, health care financing, and student financial assistance programs, and provides substantial funds for human development and social services, health services, and elementary and secondary education.

The public medical care system in Puerto Rico serves approximately two-thirds of the population. The educational system consists of both public and private schools, with an emerging trend toward increased enrollments in private schools. The social services sector is not as well developed. As on the mainland, it is organizationally fragmented due, in part, to the categorical nature of Federal programs. Income security programs are largely controlled by Federal policies which provide most of the funding.

ASSESSMENT OF FEDERAL PROGRAMS

Because of Puerto Rico's high poverty rate, some Federal programs whose benefits are administratively linked to family income provide very large Federal outlays to the island. However, in some Federal programs, U.S. citizens residing in Puerto Rico do not receive the same level of benefits as those who reside in the States.

The four largest income security programs in Puerto Rico are: Unemployment Insurance; Social Security (Old Age, Survivors, and Disability Insurance); Public Assistance Cash Payments (Aid to Families with Dependent Children; Aid to Aged, Blind, and Disabled); and Food Stamps. It is estimated that almost 70 percent of the population is eligible for and 50 percent actually receives some benefits from the Food Stamp program, which provides more than \$600 million of Federal transfer payments (in the form of food coupons) to Puerto Rico. The Public Assistance programs provide smaller cash transfers largely because, unlike the 50 States, a Federal ceiling of \$24 million is applied to these cash assistance programs. Benefits under the Supplemental Security Income programs, which would provide a minimum income of \$102 per month for an eligible individual and \$153 per month for a couple are not available to residents of Puerto Rico. If Puerto Rico were included in these programs, as much as \$650 million of additional cash transfer payments would be made available to Puerto Rico residents. Puerto Rico residents participate fully in the Social Security and Unemployment Insurance programs, receiving more than \$600 million in benefits annually. However, because wages are lower than on the U.S. mainland, benefits under these programs are generally lower in Puerto Rico. The combined benefits from the Social Security, Cash Assistance, and Food Stamp programs in Puerto Rico provide average benefits equal to about half of the U.S. official poverty level.

Federal assistance for health services in Puerto Rico exceeded \$100 million in FY 1977. The Medicaid program provides \$30 million annually to the Public Health Care System of Puerto Rico. Under full entitlement, Puerto Rico would receive an additional \$190 million. Residents of Puerto Rico do receive full entitlement under Medicare which provided another \$5 million to public hospitals and \$56 million to private hospitals and physicians in FY 1976. Other Federal programs supplement Puerto Rico health services in fields such as mental health, alcohol and drug abuse, family planning, community health, and disease control.

In the area of elementary and secondary education, the Federal Government provided more than \$93 million to Puerto Rico in 1977. Of this, \$56 million was made available through Title I of the Elementary and Secondary Education Act of 1965. The 1978 amendments would increase this to \$102 million in FY 1979, but full entitlement would add an additional \$78 million beyond that. Another \$12 million was provided for vocational education. A variety of other grants are made in fields such as bilingual education, adult education, and right-to-read programs.

In the area of higher education, residents of Puerto Rico are fully entitled to the various Federal student financial assistance programs, such as Basic Educational Opportunity Grants and Guaranteed Student Loans. These provided more than \$100 million in FY 1977 to public and private universities and colleges. The recent inflow of such large amounts of Federal funds may well account for the rapid growth of private universities.

The Federal Government provided a total of \$60 million for human development services in Puerto Rico in FY 1977. Funds for social services are provided through Title XX of the Social Security Act and, to a more limited extent, through the cash assistance programs. The FY 1977 grant under Title XX was \$15 million; full entitlement to this program would provide an additional \$25 million. Other human development service grants included \$1.5 million in FY 1977 for the work incentives program, \$1.5 million for child welfare services, \$3 million for special programs for the aging, \$25.9 million for vocational rehabilitation services, \$1.2 million for other rehabilitation programs, and \$16.6 million for Head Start child development programs.

In Puerto Rico, activities carried out or expenditures incurred in one program may affect those in another. For example, mental health or family planning services may be provided through either the Medicaid or Title XX Social Services programs, as well as in special mental health or family planning programs. Another example is the use of funds from Title I of the Elementary and Secondary Education Act to finance diagnostic health services which are delivered through the school system. Such services are authorized under Medicaid, but competing demands for these limited funds make it necessary to use the education funds instead. Proposals to restructure Federal programs to suit special conditions in Puerto Rico must be made in the context of their effects on one another as well as their specific purposes.

POLICY OPTIONS

Opportunities to improve economic and social

conditions in Puerto Rico are available to the public and private sectors both within Puerto Rico and the U.S. mainland. Options range from adoption of broad economic strategies to more modest modification of administrative practices or programs. An important objective is to promote the self-sufficiency of the residents of Puerto Rico. To reach this objective, options to improve the economic and human service institutions of Puerto Rico must have certain broad features. Specifically, they must be part of a well-thought-out developmental strategy which links the development of human services to economic development, extensively involves citizens and private sector groups in its planning and execution, and builds on Puerto Rico culture and institutions. In addition, the relationship between the Federal and Puerto Rico Governments in the improvement effort should be that of mutual cooperation. Federal efforts should complement Puerto Rico development activities; and an effort should be made to eliminate Federal impediments to planning for the development of the social and economic infrastructures in Puerto Rico. These broad features provide the framework for improving conditions both within current budget constraints and as additional resources become available in the future.

Options for economic development are discussed primarily in the General Economic Assessment, and the Industrial sector study of the Economic Study of Puerto Rico of which this report is a part. The following options pertain to social development, but are closely linked to economic development.

Strategic Options

A major strategic element for dealing with fundamental problems of unemployment and poverty involves a concerted effort to promote a balance between population growth and economic development. Additional strategic elements include: emphasis on service delivery and job creation over cash transfers, development of medical, educational, and social services in underserved rural areas, and emphasis on improvements in education, keying training to industrial development.

Promoting a Balance Between Population Growth and Economic Development.—More moderate population growth may accompany economic development and higher levels of education, as has occurred on the U.S. mainland. Hence, efforts to promote economic development may well bring population growth more in line with economic growth.

Net return migration of U.S. mainland Puerto Ricans to Puerto Rico has been a significant factor in population growth in recent years. Much of the migration to and from Puerto Rico is of different persons, with many second and third generation

Puerto Rican families going to the island for the first time. Part of the recent phenomenon of net in-migration may be due to lack of competitive advantage for Puerto Ricans in the mainland job market during the economic recession. In that case, return migration may slow down and possibly reverse as economic conditions on the mainland improve. Other factors may include discrimination or poor living conditions on the mainland. A more stable pattern of migration could be achieved by improving Puerto Ricans' basic education, job skills, and English-speaking ability and by reducing discriminatory practices. This would provide the greatest opportunity and flexibility for Puerto Ricans, both on the island and on the mainland.

Still, some immediate efforts to moderate the current population growth rate could be undertaken through increased family planning services and a concerted public education campaign. These would be primarily a responsibility of the Puerto Rico Government. Some Federal programs which could be used for this purpose include: Title X (the Family Planning Program) of the Public Health Act; Title XX (the Social Services Program) of the Social Security Act; Maternal and Child Health Program; the Medicaid program. However, the Medicaid and Title XX funds in Puerto Rico are limited and are in demand for other necessary health and social services. Another source could be project grant funding under the Administration's Adolescent Health Services and Pregnancy Prevention Program. These latter project grants would help Puerto Rico improve access to existing services and would provide supplemental funds for prevention of repeat pregnancy.

Emphasizing Service Delivery and Job Development.—Puerto Rico could establish a policy to emphasize service delivery over income transfers. While an adequate income security system is essential for maintaining dignified living conditions for the needy, human service programs in the areas of health, education, and human development would build up necessary social and economic infrastructures (i.e., schools, health facilities, employment training and family services). Services would also provide jobs directly while building the economic capacity of the society. In addition, quality services are attractive to business. While the evidence from income maintenance experiments on the work disincentive effects of income transfer programs is mixed, given the low prevailing wage and high unemployment rate in Puerto Rico, dramatic increases in cash transfers might act as a disincentive to job seeking and lead to a condition of dependency for some residents of the island. Furthermore, since 1974, the Food Stamp program has provided several

hundred million dollars annually in income support to needy families, but no comparable increases have occurred in the Medicaid program, or in Federal aid for elementary and secondary education or social services.

Promoting Rural Development.—To the extent that agriculture and rural development will be part of an economic plan, it will be necessary to strengthen medical, educational, and social services in the rural areas. These areas are currently underserved or suffer from a very low quality of services when compared to metropolitan areas. An alternative to building new human service facilities in rural areas is to strengthen public transportation in these areas and thereby increase the access to services provided in urban areas.

Focusing on Education.—One aim of social and economic development policies should be to ensure a balanced growth among the various human services. On the basis of social indicators, the development of the education sector in Puerto Rico seems to have fallen behind the health sector. Furthermore, far greater resources have been expended on income transfers through the Food Stamp program than on basic education in recent years. A key policy to both economic and social development in Puerto Rico, then, would be to focus attention on education.

The elementary and secondary education systems, particularly, need improvement. This is necessary to provide basic reading and analytic skills as a source of manpower for economic development. Even more fundamentally, educational opportunities are inherent rights of individuals and basic educational skills are valuable in themselves.

At the secondary and postsecondary levels, attention could be paid to improving vocational and technical training. These aspects of the educational system would have to be developed as both inputs to and products of an economic development strategy—that is, it would be necessary to identify those skills which would be needed in industries or services which have been singled out for development or those from which jobs are likely to become available as a result of development.

Program Options

Education.—Major options for improving education in Puerto Rico fall into four major areas: (a) the improvement of facilities, services, and supplies, and upgrading of teachers' skills at the elementary and secondary levels; (b) improvement of long-range planning of the postsecondary systems; (c) the development of vocational training programs at the secondary level; and (d) development of special extraschool programs dealing with illiteracy and bilingual and adult education.

Upgrading Elementary and Secondary Education.—Options for elementary and secondary education involve both increased funding and improved administration.

- **Funding:** Additional Puerto Rico funds for education will become available as economic development brings about an increase in personal income, thus enlarging the tax base. The major mechanism for Federal funding is Title I of the Elementary and Secondary Education Act of 1965. The allotment to Puerto Rico has been increasing under recent legislation but it could be increased even more by changing the formula established in title I for Puerto Rico. Increases could be phased in over time to ensure orderly program growth. Beyond the issue of the level of funding, an additional issue is whether the funds can be used for the purpose of generally upgrading the education system or whether they must be targeted exclusively to compensatory education programs. An appropriate way to deal with this problem might be a legislative modification which would allow an adjustment to be made in the purposes for which title I funds are used in Puerto Rico. A plan of expenditures, mutually agreed upon by the Commonwealth and the Department of Health, Education, and Welfare of the Federal Government, could govern the particular uses of the funds and could also stipulate the manner in which the title I funds are distributed throughout the school system, particularly with regard to the appropriate shares for rural and urban areas. The 1978 amendments to the Elementary and Secondary Education Act allows Puerto Rico to obtain a temporary waiver of certain requirements if a plan is approved by the Federal Government.
- **Administration:** Some administrative improvements can be made without major expenditures, e.g., maintenance procedures to eliminate some unsanitary conditions in elementary and secondary schools. Distribution of supplies to rural schools could be improved. Administrative procedures could be established to provide opportunities for parental or community involvement in school administration. Also, the appropriateness of the assignment of responsibility for school construction, renovation, and maintenance to Puerto Rico's General Services Administration could be reexamined. The arrangement may cause schools to receive less emphasis than other public buildings and hamper the ability of the Department of Education to plan for adequate educational facilities.

Planning of Postsecondary Education.—In the face of the rapid expansion in postsecondary enrollments, fundamental questions about the makeup of postsecondary education systems in Puerto Rico need to be addressed. Issues involve the appropriate mixture of private and public schools; the effect of rapid growth on the quality of education; and the relationship between university training and the economic development of the island.

The future directions of postsecondary education could be analyzed by a strengthened Puerto Rico planning commission such as the current Commission on Higher Education which supports the Puerto Rico Council on Higher Education. The task of the planning commission would be to develop an overall developmental plan for public and private postsecondary education. The commission could establish budgetary policy for the public institutions, examine licensing and quality control systems for private institutions, and establish goals for establishing the proper mixture of basic and technical training within both public and private schools.

Vocational Education and Technical Training.—A major effort to enhance vocational education and technical training could be launched. This could include involvement with private business as well as government to provide vocational training and development of improved information to students concerning skills necessary to enter various job markets in Puerto Rico and on the mainland. Emphasis could be shifted toward technical training for specific types of skilled jobs which are in demand either in Puerto Rico or on the U.S. mainland or which have been identified as being important to the future economic development of Puerto Rico.

Federal aid to Puerto Rico for vocational education could be used for this purpose. Another method would be to make greater use of Federal student financial assistance programs.

Literacy, Bilingual, and Adult Education Programs.—Adult educational grants from HEW and increased spending by the Commonwealth could be used to create a major program for reducing illiteracy and upgrading basic educational competency of the adult population. The Federal Right-to-Read program could also be used to improve the reading skills of citizens. A goal of eliminating functional illiteracy or reducing it to certain rates by a special target date could be set by the Commonwealth Government to focus its efforts on this problem. Commonwealth bilingual programs could be expanded to cover a larger population in both urban and rural areas. Bilingual education programs are needed for teaching both Spanish and English.

Income Security.—Options for income security involve: developing a special program to promote job

creation in Puerto Rico and making changes to existing income security programs while increasing the number of jobs and training opportunities. The first option tries to promote job creation exclusively, although it would not be sufficient by itself because some cash assistance would still be necessary for those unable to work or to find jobs. The second option aims at making maintenance payments more adequate than they are now, and providing jobs for those wanting to work.

Wage Subsidy Program.—Unemployment is so extensive on the island that a special program to provide incentives for private job creation may be useful. The approach could involve a payment of a government subsidy to a private business to cover part of the wage of a person hired. The subsidy could be targeted to certain groups of workers, such as those who have been unemployed for more than 3 months, or those who have been unemployed and receiving food stamps for those months. Pilot testing and analysis may be necessary before undertaking a large-scale program. In order to be effective, it would be necessary to involve several departments (those involved in labor, commerce, and welfare policies) of the Federal and Puerto Rico Governments in the design and analysis of such an experiment, and the design would have to be related to the economic development tactics of the Puerto Rico Government and the private sector.

Changes to Existing Programs.—Until FY 1979, there was a permanent ceiling of \$24 million on Federal financial participation in the Aid to Families with Dependent Children (AFDC) and Aid to Blind, Aged, and Disabled (Adult Categories) programs; and Federal matching rates for AFDC and Adult Categories were 50 percent, which is less than those used for low-income States. (Legislation in 1978 raised the ceiling for FY 1979 only to \$72 million and increased the matching rate to 75 percent.) In addition, citizens residing in Puerto Rico are excluded from receiving benefits under the Supplemental Security Income program. Some expansions of these programs could be achieved by:

- Modifying AFDC and Adult Categories by raising the ceiling and changing the matching rate.
- Extending SSI to Puerto Rico at the full level or at lower benefit levels than on the mainland.

Health.—Options in the health area involve: (a) improving the public health care system, (b) coordinating public and private sector services through integrated planning, and (c) concentrating on specific health problems.

The Public Health Care System.—The public

health care system in Puerto Rico directly serves approximately two-thirds of the population, making it unique among comparable jurisdictions within the United States. The dramatic improvements over the last few decades in health status indicators (such as life expectancy and mortality and morbidity rates) are evidence that the public health care system has met health needs with a considerable measure of effectiveness. Yet there are growing signs of deterioration due to rising costs, insufficient planning resources, and attraction of physicians away from the public to the private sector. A fundamental issue is whether emphasis should be given to the future development of the public rather than the private health care system. With a relatively successful public system already in place, and a large medically indigent population, it would seem appropriate for the Commonwealth to continue to support and to improve the public system. Resources for development of the private system will more naturally become available with improved economic development. However, the public and private systems can be more effective in their total effect if their future development are jointly planned.

Improving the public health care system will require: increased funding and redistribution of health manpower.

- *Funding:* Additional resources may be available to Puerto Rico as economic development takes place. In the meantime, it may be necessary to look to the Federal Government for additional support. Options include raising the Federal ceiling and matching rate for Medicaid, substituting a program aimed at priority medical and administrative problems of the public health care system, or modifying other Federal health programs to make them more compatible with conditions and service delivery systems in Puerto Rico.
- *Manpower:* Current health manpower is not targeted to areas of greatest need. Options include providing incentives to encourage health professionals to enter primary care and locate in underserved areas.

Planning.—Current health planning is hampered by organizational problems. Options include reorganizing health planning based on a change in Health Systems Agency and State Planning Agency relationship.

Specific Health Problems.—Continued health progress is becoming more difficult as the population ages and as degenerative and mental disorders become more prominent. Given the types of health problems which are now dominant in Puerto Rico, the kinds of services which should be emphasized in

future development of the health care system are primary care, preventive health services, and mental health services. Specific health problems requiring immediate attention are infant mortality, low levels of child immunization, and high incidence of mental problems.

- **Infant mortality:** While infant mortality has declined dramatically during this century, it is still high compared to the mainland. Options for dealing with the problem include developing a special program for reducing infant mortality, possibly using expanded Federal funding from Medicaid or Maternal and Child Health.
- **Child immunization:** The level of child immunization is low compared to the mainland. Options include implementing a joint Commonwealth-Federal child immunization program.
- **Mental Health:** Improvements in this area involve both a reexamination of the current organizational structure for alcohol, drug abuse, and mental health programs and additional funds—Federal and Commonwealth—for alcohol, drug abuse, and mental health programs with emphasis on prevention and education.

Human Development Services.—Options for human development services involve: developing broadly based and coherent service programs for the family, children, youth, aged, handicapped, and developmentally disabled; improving Federal support through the Title XX Social Services Program.

Restructuring Social Services Systems.—Services generally provided under the rubric of human development services programs cover a wide range of populations, problems, and purposes. These programs which range from planning and advocacy on behalf of the aged or retarded, from child care to child welfare, from vocational rehabilitation to in-home care of the homebound, also include a number of possibilities for supporting a developmental program in Puerto Rico. While the necessity exists to increase the level of resources associated with Federal social services programs, that course by itself will contribute only partially to solving what this report has earlier described as social problems on the island. What is required is a redesign of social service systems to identify the most serious problems, support the institutions and traditions of the island, develop local community capacities, and build up the social service infrastructure. This redesign would be part of an overall economic development effort.

Given what we have described as imbalances between population and jobs, for example, expanding vocational rehabilitation may be less useful than establishing an authority for independent living rehabilitation in which the essential services which benefit the impaired person need not be tied to the probability of job placement. As another example, the focus of service delivery could be on families rather than individuals, and greater use could be made of volunteers for service delivery.

It may be useful to consider the option of consolidating some of the current Federal categorical programs and using the funds for a redesigned social service system.

Federal Support Through the Title XX Services Program.—Title XX of the Social Security Act could be modified to provide better financial support for social services in Puerto Rico. One improvement would be to provide direct appropriation of Federal funds for social services. This involves making a fixed allotment of title XX for Puerto Rico in addition to the entitlement of the States. While this would not mean Puerto Rico would be included under title XX on the same basis as a State or that it would receive more Federal funds than it does now, it would mean that the island would be assured a fixed amount of money, thereby improving Puerto Rico's ability to plan its social services program. Another improvement would be to include Puerto Rico fully in the title XX program. On this basis, it would qualify for about \$40 million annually, \$25 million more than its current level. It is also possible to raise the level of financial support above its current level but not as high as \$40 million.

Followup Mechanism.—To promote the Federal-Puerto Rico partnership in planning and economic development and to follow through on the strategic and program options identified in this report, an ongoing mechanism may be needed which would involve Federal departments as well as the Government of Puerto Rico. Any one of a number of already existing Puerto Rico offices (such as the Office of Federal Affairs in Fortaleza, the Office of Federal Affairs at the Bureau of the Budget, or the Planning Board) could coordinate the Puerto Rico effort and interface with some Federal body such as the Federal Regional Council or the Commerce or Interior Department. The purpose of this mechanism would be to plan for development and promote specific projects utilizing funds from Federal and Puerto Rico agencies or from a special supplemental Federal-Puerto Rico fund established for this purpose.

Chapter I.—Social and Economic Conditions of Families and Individuals

INTRODUCTION

Puerto Rico has been undergoing rapid economic development in the past few decades as it has moved from being a rural society toward a more industrialized urban society. Furthermore, the island and the U.S. mainland are becoming interdependent both economically and socially. Puerto Rico has made great gains in personal income and health status and school enrollment in this century. Personal per capita income has risen from \$118 in 1940 to \$2,472 in 1977. In constant 1954 dollars, the growth in personal income was from \$213 in 1940 to \$1,113 in 1977. Life expectancy has also risen dramatically during this century and is currently approximately the same as the U.S. mainland. General mortality rates are now lower than the U.S. rates, and rapid progress has been made in reducing the infant mortality rate from 200 deaths under 1 year per 1,000 live births in 1900 to 20 in 1975. (The infant mortality rate of the United States is 16.) In 1940, only half the eligible school children were in school, now almost all are. In 1940 only 5,000 persons were enrolled in colleges and universities. Now more than 100,000 are enrolled. Still, significant problems remain.

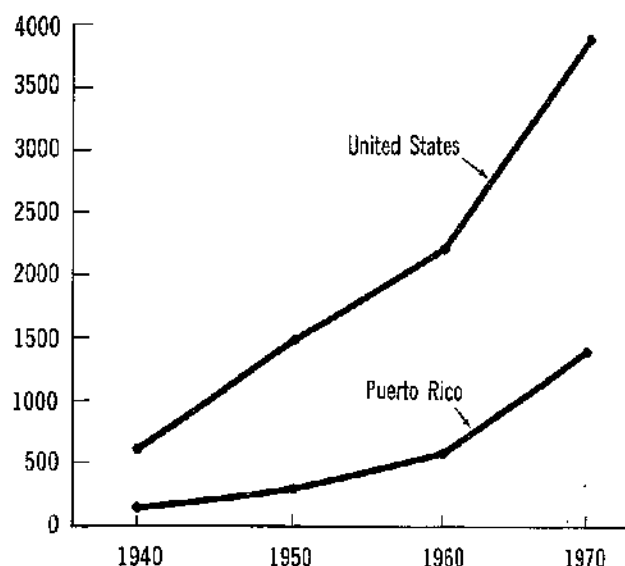
EXTENT OF POVERTY

The fundamental social and economic problem of Puerto Rico is chronic poverty among much of the population. Such chronic poverty has long historical roots in the even more severe poverty of the first half of the 20th century. The condition has been described in various reports of U.S. and Puerto Rican officials and in many other studies¹ which were prepared after U.S. jurisdiction was extended to Puerto Rico in 1898. In historical perspective, it

¹For example, see the *Annual Report of the Governor of Puerto Rico* to the President of the United States (1900-52), the exhaustive 1930 Brookings Institution (Clark) *Study on Porto (Puerto) Rico and Its Problems*, the 1934 Report of the [U.S.] Puerto Rico Policy Commission, and the 1934 and 1940 staff reports to the first and second U.S. Interdepartmental Committee(s) on Puerto Rico.

may be seen that much severe poverty has in fact been reduced or eliminated through economic growth. For example, personal income per capita in current dollars in Puerto Rico increased from \$118 in 1940 to \$296 in 1950, to \$587 in 1960, to \$1,384 in 1970, and to \$2,472 in 1977. In constant 1954 dollars, the growth in personal income was from \$213 in 1940 to \$1,165 in 1973, with a slight decline to \$1,113 in 1977.²

Chart 1.
Personal Income Per Capita
Current Dollars



Source: Puerto Rico—Puerto Rico Planning Board
United States—U.S. Statistical Abstract

However, in comparison to the United States, it

² Puerto Rico Planning Board, 1978, 1977 *Informe Económico al Gobernador* (1977 Economic Report to the Governor).

must be noted that per capita income in Puerto Rico is only about half of that of the poorest U.S. State (Mississippi) and only 40 percent of that of the United States as a whole in 1977—\$6,035.

Reported income distribution has also improved somewhat, although it remains quite uneven. U.S. census statistics indicate that the upper 10-percent income group received 45 percent of the total income in 1959, declining to 36 percent in 1969. In contrast, all other income groups except the lowest 10-percent income group have increased slightly their share of total income. The lowest 10-percent income group, however, received only 0.44 percent of reported income in 1959; and this declined to only 0.31 percent in 1969. (See table 1.)

Table 1.—Distribution of Family Incomes, Puerto Rico, 1959 and 1969

Deciles of families from lowest to highest income	Percentage of total income		Percentage change (+) increase (−) decrease
	1959	1969	
0 to 9.99	.44	.31	−.13
10 to 19.99	1.18	1.39	+.21
20 to 29.99	2.37	2.78	+.41
30 to 39.99	3.37	4.43	+.106
40 to 49.99	4.79	6.05	+.126
50 to 59.99	6.43	7.86	+.143
60 to 69.99	8.56	8.97	+.41
70 to 79.99	11.63	13.54	+.191
80 to 89.99	16.35	18.88	+.250
90 to 100.00	44.81	35.82	−9.06

Source: Prepared on the basis of data appearing in the U.S. Department of Commerce, Bureau of the Census, Census of Population 1960 and 1970. Cited from Government of Puerto Rico, Office of the Governor, 1977, *An Agenda for a Socio-Economic Study of Puerto Rico*, Part 1, p. 33; and Part 2, p. 127.

These statistics suggest that there is a segment of the Puerto Rico population—the lowest income group—which has not received any relative benefit from the economic growth and development which have provided the large majority of Puerto Ricans with both relative and absolute benefits.

The most recent measure of the degree of extent of poverty in Puerto Rico is contained in a 1976 Survey of Income and Education of the United States Census Bureau, abstracted in tables 2 and 3. These tables also contain the most current estimates about population size and composition.

Sixty-two percent of all residents of Puerto Rico in 1975 were poor when their incomes are compared to the U.S. official poverty measure. The poverty measure consists of 124 income cutoffs which vary according to family size, composition, and farm or nonfarm residence. The cutoff was \$5,469 for a family of four in 1975.³ Some groups within the population are more likely to be poor—the elderly,

³ U.S. Bureau of the Census; data derived from the 1976 Survey of Income and Education; poverty cutoff cited from *Money Income and Poverty Status of Families and Persons in the United States: 1975 and 1974 Revisions (Advance Report)*; Current Population Reports, Consumer Income, Series P-60, No. 103, September 1976.

Table 2.—Persons Below Specified Poverty Levels in 1975 by Family Status and Sex of Head for Puerto Rico

[Numbers in thousands]

All persons	Total	Below current poverty level	
		Number	Percentage
Total	3,166	1,964	62.0
65 years and over	235	154	65.3
In families	3,050	1,879	61.6
Head	697	397	56.9
Related children under 18	1,318	905	68.7
Less than 6 years	434	282	64.8
5 to 17 years	963	673	69.9
Unrelated individuals	116	85	72.8
Persons in families with male head:			
Total	2,572	1,492	58.0
65 years and over	145	79	54.3
Head	576	308	53.5
Related children under 18	1,098	712	64.9
5 to 17 years	783	516	65.8
Persons in families with female head:			
Total	478	387	81.0
65 years and over	38	31	(¹)
Head	121	89	73.5
Related children under 18	220	193	87.6
5 to 17 years	180	157	87.3

¹ Base level less than 60 sample cases.

Source: U.S. Bureau of the Census, data derived from the 1976 Survey of Income and Education.

Table 3.—Families Below Specified Poverty Levels in 1975 by Presence of Related Children Under 18 Years

[Numbers in thousands]

	Total	Below current poverty level	
		Number	Percentage
All families, total	697	397	56.9
No related child under 18 years	212	95	44.8
With related children under 18	485	302	62.2
Families with male head	576	308	53.5
No related child under 18 years	173	72	41.2
With related children under 18	403	237	58.7
Families with female head, total	121	89	73.5
No related child under 18 years	39	24	(¹)
With related children under 18	82	65	79.4

¹ Base less than 60 sample cases.

Source: U.S. Bureau of the Census, data derived from the 1975 Survey of Income and Education.

children, and women. Almost all female-headed families with three or four children are poor.

There are different ways to measure poverty and family income needs.⁴ It would be theoretically desirable to identify minimum standards for basic necessities and to determine the prices for a suitable "market basket" of items including housing, transportation, food, medical services, etc. However, very few practical measures of this type have been developed. The official U.S. poverty measure (used in the statistics presented in tables 1 and 2) is based on the

⁴ See "The Measure of Poverty," a report issued by the Department of Health, Education, and Welfare, in April 1976. The report was prepared by an Interagency Poverty Studies Task Force.

cost of the U.S. Department of Agriculture's economy food plan of 1961. Based on expenditures of U.S. families, the cost of other items is estimated to be approximately twice that of food. The poverty measure is adjusted for various family types and size and is updated each year by price changes, as measured by the Consumer Price Index.

It is worth noting that there are different interpretations of poverty statistics. It might be argued, for example, that the extent of poverty in Puerto Rico is smaller than indicated above because the Food Stamp benefits are not included in the measure of income associated with the U.S. poverty measure. This exclusion may have a greater potential effect in reducing poverty in Puerto Rico than in the 50 States because the Food Stamp program is relatively larger in Puerto Rico than elsewhere. (See the discussion of this program in later sections of this chapter.) On the other hand, poverty may be more extensive than the statistics indicate because of a higher cost of living in Puerto Rico.

COST OF LIVING

One measure of a higher cost of living in Puerto Rico can be obtained by examining the cost of food. The U.S. Department of Agriculture has developed

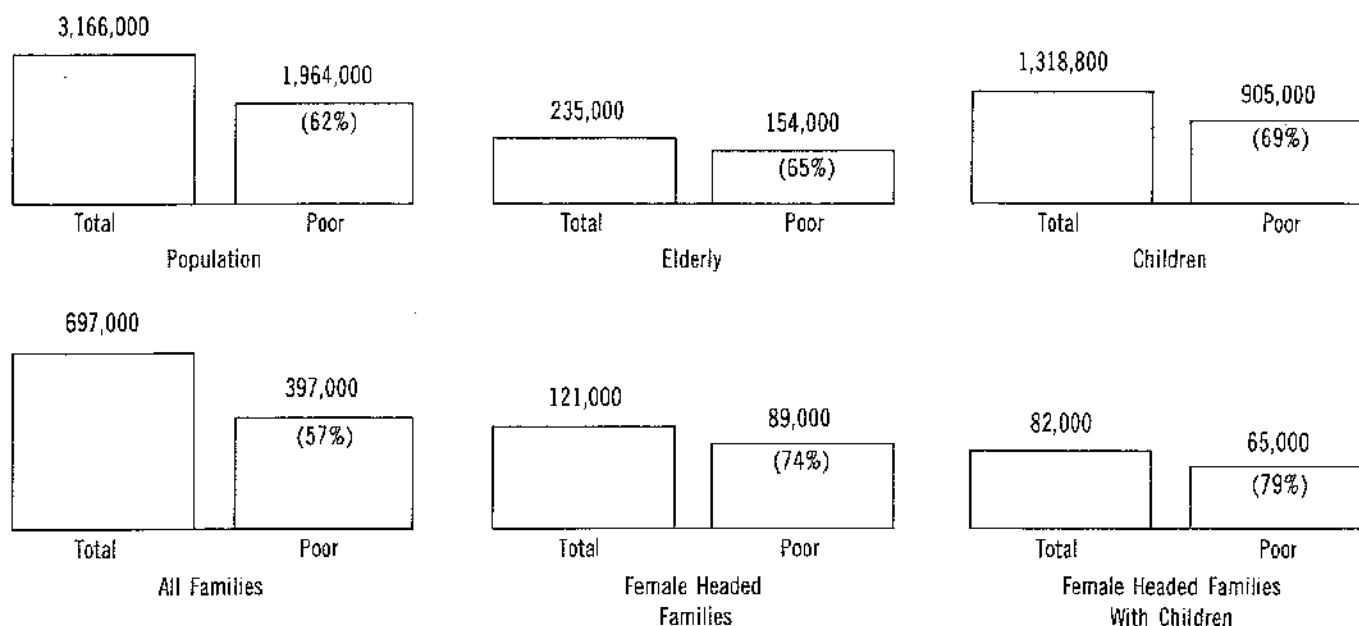
a "thrifty" food plan which is used to determine benefit levels for the Federal food stamp program. A special thrifty food plan incorporating Puerto Rican consumption habits was developed for Puerto Rico. The cost of this plan is measured by the Agricultural Department at regular intervals. Between February 1976 and February 1978, the cost of the thrifty food plan in Puerto Rico varied between 100 and 104 percent of the plan in the U.S. mainland.⁵ This slightly higher cost of food in Puerto Rico is due in large part to the costs of importing from the U.S. mainland over half of all food consumed in Puerto Rico.

Another indication of a higher cost of living in Puerto Rico may be provided by a recently updated United States Civil Service Commission study⁶ comparing the cost of living of Federal employees in San Juan with that in Washington, D.C., itself acknowledged to be a "high cost" city. On the basis of this study, the supplemental cost-of-living allowance long provided to eligible Federal employees in Puerto Rico was revised in late 1977 to 12.5 percent

⁵ U.S. Department of Agriculture, Agricultural Research Service, Consumer and Food Economics Institute.

⁶ See U.S. Civil Service Commission, Federal Personnel Manual System EPM letter 591-18; August 25, 1977. In addition to Puerto Rico, other areas where eligible U.S. Government employees receive a cost of living allowance include the U.S. Virgin Islands, Hawaii, and Alaska.

Chart 2.
Extent of Poverty in Puerto Rico in 1975



Source: U.S. Bureau of the Census, Data Derived from the 1976 Survey of Income and Education

for the San Juan Standard Metropolitan Statistical Area and 5 percent for the rest of Puerto Rico. Similar adjustments are made in per diem allowances given to Federal employees while on official travel in Puerto Rico.

Some believe that while prices of goods and services are higher in Puerto Rico than on the U.S. mainland, the "cost of living" is lower because Puerto Ricans have or are used to a lower "standard of living." However, care must be exercised in using these expressions. Any traveler to Puerto Rico can observe that the manner or style of life and expectations for housing, transportation, medical services, education, and nutrition in San Juan or any large city in Puerto Rico are similar in most respects to those in large cities in the U.S. mainland. It would be difficult to conclude scientifically that residents of Puerto Rico need less food, housing, medical care, and other services or that they have lower expectations than in other parts of the United States.

Given the above description of chronic poverty in Puerto Rico, one question which should be addressed is why poverty in Puerto Rico is so widespread. Included in the answer to this question of poverty should be, in the words of a U.S. Department of Commerce Guideline for this Interagency Study on Puerto Rico, an "attempt to assess the extent to which Puerto Rico's problems are structural and likely to persist even in periods of high economic activity"—or, it might be added, in periods of high and increasing levels of various income transfer programs to and within Puerto Rico. In this connection, it is necessary to examine unemployment and population.

UNEMPLOYMENT

At the root of poverty in Puerto Rico is a long history of excessively high levels of unemployment, by any U.S. standards. This problem has generally become worse in recent years (although it has improved marginally during the economic recovery of 1977 and 1978). Apparently, since at least the beginning of this century and of U.S. sovereignty over Puerto Rico, the island has never experienced full employment of its human resources. According to conventional U.S. standard labor force statistics available from 1940 to the present, the unemployment rate in Puerto Rico has ranged from 11 percent in 1940 to a low of 10 percent in 1970 and then increased sharply to an all time annual high of 22 percent in 1977.⁷

Moreover, it appears that the official unemploy-

ment rate in Puerto Rico is a serious undercount of the unemployed as viewed by mainland standards. The overall labor force participation rate of the population of labor force age in Puerto Rico has long been and remains much lower than the corresponding rate for the overall U.S. population. In the period 1940-76 the overall labor force participation rate in Puerto Rico fell from 52 percent in 1940 to 42 percent in 1976, as compared to an increase in the comparable U.S. rate from 56 percent in 1940 to 62 percent in 1976. Thus, one study calculated an unofficial unemployment rate of 31 percent—by comparing actual employment there with a hypothetical, U.S. standardized labor force calculated through the application of U.S. labor force participation rates by age and sex group.⁸

The problem of unemployment and government attempts to solve it have long existed in Puerto Rico. Any discussion of the problem and its solutions in the present and future, therefore, must be based on a comprehension of the basic historical dynamics of unemployment in relation to the attempts and failures of solutions which have already been tried.

During the 30-year period from 1898 to 1928 the attempted solutions to unemployment in Puerto Rico were a dependence on private enterprise and various outmigration projects of private or public sponsorship.⁹ Then came the Great Economic Depression of the 1930's—with the disappearance of much private enterprise from Puerto Rico and the return and reappearance in Puerto Rico of an estimated 9,000 or approximately one-fifth of the 50,000 Puerto Ricans then living abroad (primarily on the U.S. mainland).¹⁰

During the 10-year period of the 1930's the attempted solutions to poverty were:

- Federal relief,
- Attempted economic reconstruction (largely of the agricultural economy) according to the recommendations of the U.S. Puerto Rico Policy Commission (known in Puerto Rico as The Chardón Plan),
- Brief programs of family planning sponsored by the Federal or insular governments. This era ended in 1941 with the inauguration of Governor Tugwell—who established a policy that planning for increased productivity, and not population limitation through the promotion of outmigration or fertility reduction, would be the

⁷ Government of Puerto Rico, Office of the Governor, 1977, *An Agenda for a Socio-Economic Study of Puerto Rico*, part 1, table 12; and 1977 *Informe Económico al Gobernador* [1977 Economic Report to the Governor], p. A-36.

⁸ Barton, H. C., 1970, "Dependence of the Puerto Rican Economy on the Development of Its Human Resources" (San Juan, P.R.: Puerto Rico Development Group).

⁹ By "labor outmigration projects" is meant efforts to recruit laborers in Puerto Rico for temporary or permanent employment outside of Puerto Rico.

¹⁰ Vazquez Calzada, José L., 1964, "The Demographic Evolution of Puerto Rico," p. 322 (Chicago: The University of Chicago, unpublished Ph. D. dissertation in sociology).

solution to Puerto Rico's social and economic problems.

During the 37-year period from 1941 to 1978 the primary officially attempted solution to unemployment has been the implementation of an industrial promotion program based on tax incentives. Although this program succeeded in creating 117,000 jobs during 1941-77, it did not succeed in solving the unemployment problem of Puerto Rico. During the same period the loss of jobs in other sectors (primarily agriculture) resulted in both the size of the labor force and the number of jobs available actually declining or fluctuating in the 15-year period 1950-65—while the total population of Puerto Rico increased 17 percent, from 2,200,000 to 2,564,000.¹¹

POPULATION GROWTH

Just as massive unemployment can be seen to be a cause of poverty in Puerto Rico, so can the most basic cause of this unemployment be seen as a long and perhaps worsening imbalance between population and employment generated through economic growth. As used in this report, the term "imbalanced population growth" means a basic and chronic maladjustment between human needs and resources. It is to be distinguished from temporary economic imbalances. A large number of socioeconomic studies on Puerto Rico since 1930 have concluded that economic development has been hampered by a serious population problem.¹²

The description of the current and historical population situation in Puerto Rico may be summarized as follows:

Puerto Rico is a Caribbean island of almost rectangular shape, 100 miles by 34 miles in size (3,421 square miles) with an estimated mid-1977 population of 3.3 million. This combination of relatively small size (smallest of the Greater Antilles Islands) and large population (fourth in the Caribbean after Cuba, Haiti, and the Dominican Republic) presents Puerto Rico with an overall population density of 965 persons per square mile—a density which greatly exceeds that of almost every comparable population in the world. Puerto Rico has a population density 16 times as great as the United States, of

which it became a territory in 1898 and a Commonwealth in 1952.

Puerto Rico's political integration with the United States has included demographic integration since 1917 in the form of U.S. citizenship which facilitated the well-known, economically motivated mass migration of Puerto Ricans to the U.S. mainland—largely to New York City—from 1945 to 1970. This migration served to reduce greatly both population growth and population density, as a variously estimated 1.5 to 2.0 million, or about one-third of all Puerto Ricans, now live on the U.S. mainland.

In addition to having one of the world's highest population densities, until recently the island has also had one of the world's highest rates of population growth—around 3 percent per year—until reduced first by the massive net outmigration of 1945-70 and then by a substantial, and presumably continuing, real fertility decline in 1940-75 and especially in 1960-75. Puerto Rico's total fertility rate was 5.9 in 1940, 5.4 in 1950, 4.8 in 1960, 3.3 in 1970, and 2.8 in 1975.

Present birth and death rates per 1,000 population, however, are 23 and 6—yielding a relatively high rate of natural increase of 1.7 percent per year as compared to 0.6 percent in the United States or 0.4 percent in Europe. Because of its relatively high fertility as well as its comparatively "young" population age structure (37 percent of its population age structure is under the age of 15), Puerto Rico cannot expect an end to population growth within this century without an extreme—and extremely unlikely—fertility reduction, such as one child per couple after 1977, or without some recurrence of and reliance on the mass net outmigration earlier experienced.

Since 1970 Puerto Rico's rate of population growth has, in fact, risen sharply to an average 3 percent per year due to an unprecedented net immigration averaging 31,000 per year—composed largely of "return migrants" or persons born in Puerto Rico, or of Puerto Rican parentage on the U.S. mainland, who are returning from the U.S. mainland. This recent mass immigration was not predicted nor has it been satisfactorily explained in any study known to this writer; most such studies generally assume continued outmigration of the labor force in response to relatively better employment opportunities on the U.S. mainland. Possible contributing factors include unexpectedly high unemployment in the United States, particularly among the Puerto Rican population there, and greater equalization of U.S.-funded social welfare programs in both the United States and Puerto Rico within the past 5 years. A noteworthy example is the U.S. food stamp program under which some 70 percent of the

¹¹ Puerto Rico Planning Board, 1974 *Informe de Recursos Humanos* 1973 (1973 Report on Human Resources, p. A-80).

¹² The studies since 1930 which have concluded that a serious population problem exists in Puerto Rico are far too numerous to discuss here; most of these studies are reviewed and discussed in Earnhardt, Kent C., forthcoming 1978 *Development Planning and Population Policy in Puerto Rico* (San Juan: University of Puerto Rico Press). Examples of these studies include: the 1930 Brookings Institution study on *Porto [Puerto] Rico and Its Problems*, the 1950 University of Puerto Rico Study on *Puerto Rico's Economic Future* by Harvey Perloff, and the 1965 Massachusetts Institute of Technology study on *Labor Migration and Economic Growth* by Stanley Friedlander.

population of Puerto Rico currently [is eligible to] receive . . . some benefit.¹³

This conclusion that imbalanced population is a structural rather than temporary condition was also presented in the study entitled *An Agenda for a Socio-Economic Study of Puerto Rico* which was submitted in 1977 by the Government of Puerto Rico to the U.S. Interagency Study Group on Puerto Rico:

In the long run, population increased faster than employment in Puerto Rico. Population has increased at an average annual rate of 1.5 percent between 1940 and 1976 and employment at a rate of 0.8 percent in the same period of time. Although population has increased by 1,344,000 persons in the 36 years, only 182,000 new jobs have been created. There are now 4.47 inhabitants dependent on one person employed, while the average was 3.49 in 1940. Besides the proportional increase, the situation is aggravated by the fact that a larger share of the dependents are now in the labor force age groups. Consequently, the number of unemployed has increased from 66,000 in 1940 to 172,000 in 1976 or an average annual rate of increase of 2.7 percent.

It is evident that, in spite of Puerto Rico's economic development record, the unemployment problem has worsened; the degree of utilization of the manpower potential is now less than it was 36 years ago. However, since the economic sectors that have powered economic growth have created a substantial number of employment opportunities, we cannot blame the deterioration of the relative level of employment on insufficient development. It has been due, rather, to the collapse of agriculture and the excessive increase in population. This means that there is an imbalance between population and production resources in Puerto Rico. . . .

We have evidently exceeded the population level that can be adequately attended to in Puerto Rico, not only in economic terms, but in social, physical, and human terms as well. The projected growth in population and economic activity surpasses the absorption capacity of the Puerto Rican economy and geographical extension, and it is incompatible with the goal of maintaining and improving the quality of life. (Emphasis added.)¹⁴

POPULATION GROUPS WITH SPECIAL NEEDS

The related conditions of poverty, high living

¹³From Earmhardt, Kent C., 1977, "Population, Development Planning, and Population Policy in Puerto Rico," *Intercom: The International Newsletter on Population*, vol. 5, No. 7 (July 1977), pp. 8-9.

¹⁴Government of Puerto Rico, Office of the Governor, 1977, *An Agenda for a Socio-Economic Study of Puerto Rico*, part 2, pp. 32-37.

costs, unemployment, and overpopulation do not affect all segments of the population in the same way. These factors are combined with other social, physical, or personal conditions in complicated ways. As a result, some groups within the population face special problems or have special needs. These are discussed below.¹⁵

The Family

The family remains the basic unit for organizing social life in Puerto Rico. Yet it has been experiencing instability in recent years. Divorce rates in Puerto Rico are high. About 15 percent of the total number of households have a single parent, compared to 7 percent for the United States as a whole. Mental health, alcohol, and drug abuse problems are extensive. The difficulties of the family presumably have resulted from both the chronic economic problems of poverty and unemployment and the transformation from a rural agrarian to an urban industrialized society.

Children

Approximately one-third of the population is under 13 years of age. In 1977 there were approximately 471,000 children in the 0-5 age group and 567,000 in the 6-13 year age category.

The high incidence of female-headed households creates special problems for children and child development. Less than 30 percent of children are immunized for diphtheria, polio, measles, and rubella. The incidence of developmental disabilities among children is very high. As noted earlier, more than two-thirds of all children live in poor families. Almost 80 percent of female-headed families with children are poor.

Youth

Over 50 percent of the island's population is under 25 years of age. The general profile is one of high unemployment, sizable numbers of dropouts from school, increases in crime rates and drug addiction. During the peak outmigration years, more than half of the Puerto Rican migrants to the mainland were in the 15-24 age group and more than 85 percent were under age 35. Since 1970 the migration trends have reversed themselves and there has been a trend of "net return migration."

As in the U.S. mainland, unemployment is more severe for youths than for the labor force as a whole. In FY 1976, a total of 172,000 persons were recorded as unemployed. Of this total, 27,000 were

¹⁵Unless otherwise noted, all social statistics are from the publication *Socio-Economic Statistics of Puerto Rico* prepared by the Puerto Rico Planning Board, 1963-76.

youths in the 14-19 age bracket (7,000 young women and 20,000 young men). While the unemployment rate in Puerto Rico in 1976 was running at 19 percent, the rate for youth under 20 years of age was over 48 percent.¹⁸

While no direct measurements of youth crime are available, the indirect measurements reflect that minors are extensively involved in committing acts which are classified as offenses in Puerto Rican statutes and ordinances. The FY 1978 Criminal Justice Plan estimates that almost half of all serious crimes (including street crimes and burglary) are committed by juveniles who are no longer within the societal control of the educational system. Of the 3,854 minors who came before the juvenile court in 1976, 57 percent were not in school.

An analysis of 5,118 known drug addicts in Puerto Rico (out of an estimated total of 72,620 in the entire Puerto Rican population) showed that the median age when they started using drugs was 17.8 years old. Almost 7 out of every 10 drug addicts started their addiction between 11.5 and 24 years of age.

Elderly

Seven and a half percent of the total population of Puerto Rico in 1975 (235,080 out of 3,116,635) was in the age group 65 and over (see table 4). The

Table 4.—Growth of the Elderly Population in Puerto Rico

Year	Number of elderly (over 65)	Total population	Elderly as a percentage of total population
1899	19,065	953,234	2.0
1950	86,217	2,210,703	3.9
1960	122,176	2,349,544	5.2
1970	187,156	2,712,033	6.9
1975	235,080	3,116,635	7.5

Source: U.S. Census Bureau; data derived from the decennial census and from the 1976 Survey of Income and Education.

elderly population on the island has not only been growing steadily over the years in absolute terms (there were only 86,217 in 1950); it has also been growing and will continue to grow relative to the total population (see table 4). One of the principal reasons for the growth was the application of modern medical knowledge to the island, resulting in a radically declining death rate. From 1901 to the present the island's death rate dropped from 36 per 1,000 to 6 per 1,000, a figure lower than that of the United States as a whole.

Agricultural activities were once the main source of employment for the older Puerto Rican popula-

tion, and these activities now have decreased greatly. As new jobs are created, they tend to be filled by people with special skills or with technical preparation. Preference in hiring is often given to the younger population. Despite the increase in literacy, a large percentage of those over 65 are still illiterate. Inadequate income is the single most critical social problem for the elderly; 65 percent of those over 65 have incomes below the official U.S. poverty cutoff (see table 2).

The Handicapped

Under a normal employment market it is difficult to place a handicapped person in gainful productive employment. Under the present economic conditions in Puerto Rico, with a 19-percent unemployment rate, it is virtually impossible to place the handicapped. The "rehabilitated" person has to compete with skilled workers and thousands of college graduates actively seeking employment.

Approximately 200,000 persons are estimated to be eligible for assistance through the vocational rehabilitation program. Puerto Rico's Department of Social Services estimates it will serve 66,000 or 33 percent of the eligible population. However, only 3,200 will be placed in jobs.

The Developmentally Disabled

Developmental disabilities includes mental retardation, cerebral palsy, epilepsy, and autism. There are an estimated 156,583 developmentally disabled people in Puerto Rico, 97,081 of whom reside in urban areas and 59,502 in rural parts of the island. Accessibility of specialized programs for neurologically impaired persons is very poor in rural parts of the island.

The highest concentration of developmentally disabled persons (60,000) is in the group of 5-13. There is a decline noted as age advances, with the 14-24 year group totaling 51,000 and only 13,000 known in the 25-44 year age group. The 45-64 year groups accounts for only 6,500, and it is estimated that there are less than 3,000 developmentally disabled persons above the age of 65 years currently residing in Puerto Rico.

The developmentally disabled population represents 4.9 percent of the total population of 3.2 million. It is projected that this population will increase by 13 percent in a period of 5 years. Slightly more than 25 percent of the developmentally disabled population comes from families with an income of less than \$4,000 per year.

It has been determined by the Governor's Planning Council for Developmental Disabilities that less than 2 percent of the developmentally disabled are being adequately served at present.

¹⁸ Government of Puerto Rico, Office of the Governor, *An Agenda for a Socio-Economic Study of Puerto Rico*, part 1, pp. 28-30.

INCOME SUPPORT PROGRAMS ¹⁷

There are four major income support programs in Puerto Rico: (1) unemployment insurance, (2) social security benefits, (3) public assistance cash payments, and (4) food stamps.

Unemployment Insurance ¹⁸

Unemployment insurance consists of a mix of Federal-Commonwealth programs that are designed to provide protection against unemployment in ordinary times and to provide additional protection in periods of high unemployment. The normal maximum benefit lasts for 20 weeks with a single extension of 10 weeks. Weekly benefits are computed as a fraction of high-quarter earnings with a minimum of \$7 and a maximum of \$70. Periodic adjustment of the maximum benefit keep it at a level of 50 percent of the average wage in covered employment.

In FY 1976, on a cumulative basis, a total of 402,933 claims were made under the unemployment insurance program. Of this total 289,989 claims re-

sulted in the payment of unemployment benefits. The weeks compensated for total unemployment under the regular and extended Puerto Rico programs and the programs for Federal employees and ex-servicemen added up to nearly 4.1 million in 1976.

A high percentage of workers exhausted their benefit rights. In the second half of calendar year 1975, about four out of five insured unemployed persons who qualified for benefits exhausted their rights to regular benefits.

Total disbursements during FY 1976 for Unemployment Insurance approached on a cumulative basis some \$153 million, a 30.8 percent increase from the previous fiscal year, when total disbursements amounted to some \$107.8 million.

The Unemployment Insurance program is discussed more fully in the sector study on manpower which has been prepared by the Department of Labor.

The three remaining income support programs provide benefits to those who are retired, are unemployable, have been unemployed for a long period of time, are not expected to work (e.g., children), or who have little or no income.

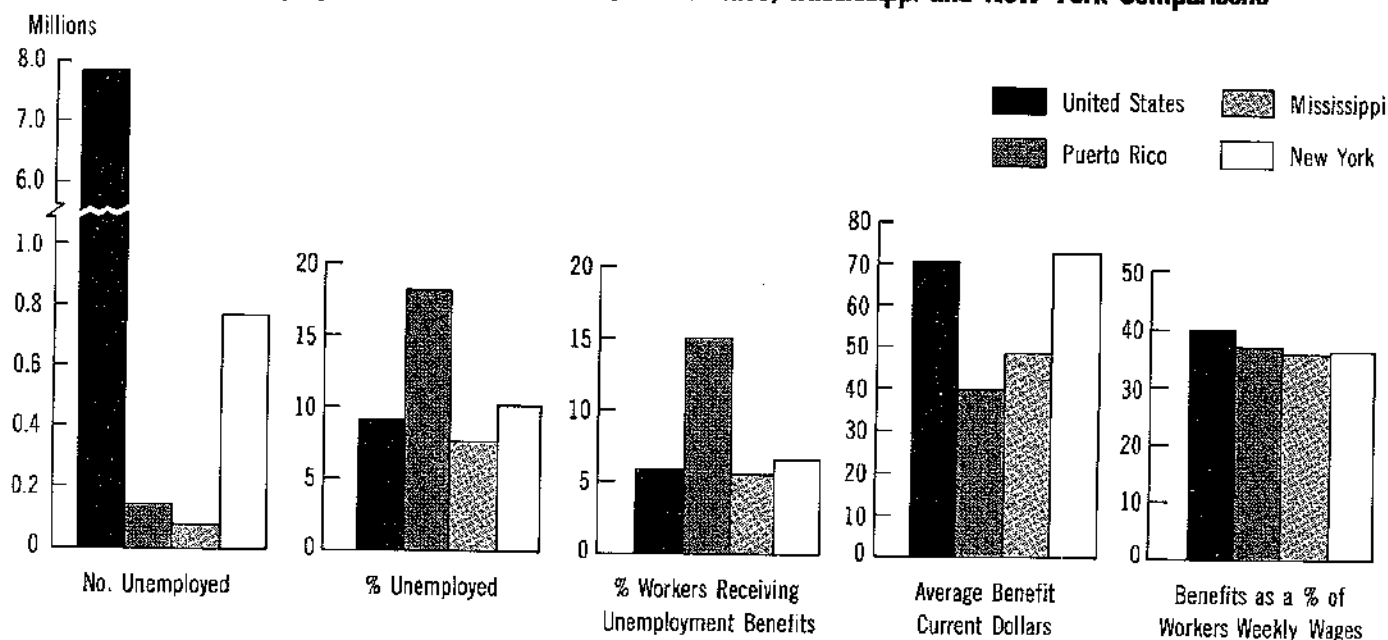
Puerto Rico is treated differently from the 50 States under each of these programs. The following sections describe the major features of these pro-

¹⁷ Unless otherwise noted all program and budget statistics are from program files of the Social Security Administration and the U.S. Budget 1976, 1977.

¹⁸ Text and statistics from the Government of Puerto Rico, Office of the Governor, 1977, *An Agenda for the Socio-Economic Study of Puerto Rico*, part 2, pp. 130-131.

Chart 3.

1975 Unemployment for United States, Puerto Rico, Mississippi and New York Comparisons



Source: U.S. Bureau of the Census

grams, the differences that exist in Puerto Rico, and what the experience has been in these programs since the last decennial census. To better understand the trends in each program, the Puerto Rico experience is compared to the experience in the United States as a whole, and in two States—Mississippi (the State with the lowest per capita income) and New York (the State with one of the highest welfare payment standards).

Old Age, Survivors, Disability Insurance (Social Security)

As indicated by its official title, Social Security benefits are received by those who are retired or disabled, and their respective survivors and dependents. Benefits are based on the level of covered earnings and the number of quarters of a year (i.e., coverage) that a person and his employer contribute to the Social Security Trust Fund. These contributions are made through a tax on the person's earn-

ings. Those with very low earnings histories are given a higher rate of return for their contributions. (The "rate of return" is the amount of the benefit in relation to the amount the person contributes to the trust fund.) The one exception to the above are special age 72 (Prouty) benefits which were given to people 72 and older (in 1972) without adequate Social Security coverage.

The program also provides a "minimum" benefit to those whose benefit, according to their earnings history record, would have fallen below a certain set minimum. Starting in July 1977 the minimum benefit for an individual was \$114.30 per month. Residents in Puerto Rico are eligible to participate in all parts of the Social Security program except Prouty benefits.

Because of the high unemployment rates and the generally low wages, residents of Puerto Rico receive, on the average, substantially lower benefits than in the United States (see table 5). For exam-

Table 5.—Social Security Program for the United States, Puerto Rico, Mississippi, and New York: Monthly Benefits and People in Pay Status for December 1969–December 1976

Year	United States		Puerto Rico		Mississippi		New York	
	Number	Average benefit	Number	Average benefit	Number	Average benefit	Number	Average benefit
ALL BENEFICIARIES								
1969	25,314,062	\$85.34	297,112	\$45.13	310,057	\$62.68	2,330,484	\$94.82
1970	26,228,629	100.21	320,594	52.89	323,560	73.98	2,377,874	111.39
1971	27,291,508	112.08	343,467	59.18	336,948	83.01	2,433,671	124.64
1972	28,476,028	137.53	373,287	72.75	353,730	102.44	2,502,461	152.91
1973	29,868,761	142.95	401,830	74.80	371,468	106.69	2,592,140	158.96
1974	30,852,720	162.12	431,391	85.00	382,771	122.06	2,636,947	180.16
1975	32,085,629	178.52	466,761	93.91	400,806	135.06	2,726,618	198.04
1976	33,023,496	194.26	498,052	102.54	411,464	148.14	2,778,333	215.31
RETIRED WORKERS								
1969	12,822,201	\$100.40	105,902	\$64.76	128,883	\$76.96	1,284,548	\$109.25
1970	13,349,175	118.10	112,273	76.17	135,025	91.14	1,320,102	128.51
1971	13,926,939	132.17	118,318	84.86	140,823	102.24	1,354,909	143.93
1972	14,535,475	162.35	125,542	104.17	147,680	126.40	1,394,936	176.88
1973	15,364,630	166.42	133,100	105.50	156,070	130.36	1,453,164	181.46
1974	15,926,172	198.46	139,440	119.51	162,309	148.91	1,486,123	205.22
1975	16,588,307	207.18	146,760	131.35	169,432	164.70	1,531,786	225.67
1976	17,165,362	224.86	153,715	142.40	174,949	180.00	1,565,139	244.94
WIDOWS AND WIDOWERS								
1969	3,032,241	\$87.48	14,113	\$64.13	31,676	\$70.67	291,998	\$93.20
1970	3,177,879	102.02	15,793	74.48	33,641	82.40	297,349	108.96
1971	3,309,561	113.56	17,557	82.07	35,722	91.56	303,709	121.53
1972	3,445,610	138.19	19,554	99.17	37,996	111.24	308,640	148.12
1973	3,577,564	157.34	21,455	106.60	40,231	122.95	313,612	169.97
1974	3,660,561	177.81	23,154	119.76	41,634	139.16	314,781	177.81
1975	3,779,247	193.91	25,044	130.05	43,335	151.85	318,948	209.93
1976	3,875,603	208.98	27,071	139.23	44,729	163.77	320,938	226.46
DISABLED WORKERS								
1969	1,394,291	\$112.74	22,380	\$81.46	22,380	\$97.45	121,762	\$116.90
1970	1,492,948	131.29	23,906	95.23	24,345	113.70	126,145	136.18
1971	1,647,684	146.52	28,195	106.53	26,690	126.85	135,583	151.97
1972	1,832,916	179.32	33,500	131.30	29,522	155.80	148,417	185.88
1973	2,016,626	183.02	39,383	134.95	32,330	158.88	161,379	189.88
1974	2,236,868	205.68	46,477	153.25	34,704	178.98	175,717	213.84
1975	2,488,991	225.89	55,217	169.80	38,653	169.80	200,245	235.21
1976	2,670,226	245.17	62,554	185.86	41,528	214.95	215,164	256.32

Source: Social Security Administration Office of Research and Statistics, 1977, "Income Support Programs in Puerto Rico" (unpublished document, HEW).

ple, in December 1976 the average Social Security benefit to a retired worker in Puerto Rico was \$142 compared to the U.S. average of \$225 and an average of \$180 in Mississippi and \$245 in New York. In December 1976, 48 percent of all retired workers in Puerto Rico received a benefit equal to or less than the minimum. This is because many beneficiaries take reduced benefits before the age of 65, as allowed by the law. This is a change from the situation in December 1969 when 62 percent of the retired workers were at the minimum or below.

In recent years there has been an increase of 68 percent in the number of people receiving Social Security benefits in Puerto Rico. Substantial growth has been exhibited among the disabled (180 percent increase from 1969 to 1976) and children. Children are either dependents of the Social Security beneficiary or survivors of those who would have been entitled to OASDI benefits. Children represented 35 percent of the increase in the Social Security caseload in Puerto Rico.

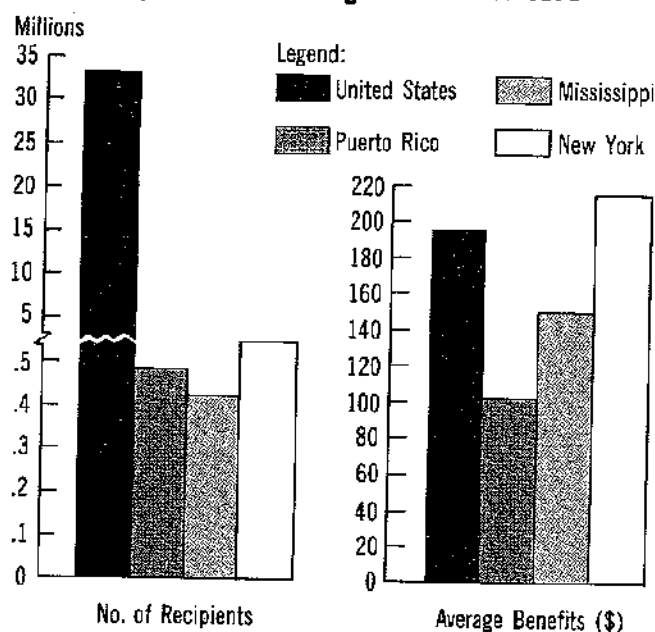
While the average Social Security benefit in Puerto Rico is substantially less than other areas of the United States, it has been keeping pace with the average increases that have taken place over the last 7 years. For example, the average benefit to a retired worker has increased by 124 percent in the United States, 120 percent in Puerto Rico, and 134 percent and 124 percent in Mississippi and New York, respectively. For disabled workers, comparable percentage increases were 118 percent in the United States, 128 percent in Puerto Rico, 124 percent in Mississippi, and 119 percent in New York. Overall, benefit increases for Puerto Ricans have at least kept pace with the mainland residents. Total Social Security benefits paid to residents of Puerto Rico were \$605 million in 1976. In 1977 slightly more than \$650 million in benefits were paid to over 500,000 beneficiaries.

Aid for Dependent Children; Old Age Assistance; Aid to the Blind; Aid to the Permanently and Totally Disabled: The Welfare Categories

Puerto Rico has the same welfare program that was designed for the United States in 1935. It is a program for certain categories of people (aged, blind, disabled, and single parents with children) with the States and Puerto Rico establishing levels of payment, administering their own program, and the Federal Government contributing funds to the program. However, unlike the rest of the United States, the Federal Government contribution in Puerto Rico was limited to \$24 million annually (i.e., the Federal ceiling) since 1972. The ceiling was tripled to \$72 million for FY 1979 only by the Revenue Act of

Chart 4.

Old Age, Survivors, and Disability Insurance Recipients and Average Benefit for 1976



Source: Text and Table 4

1978. In addition, while States with low per capita income received a larger amount of Federal funds for every State dollar (up to an 83 percent Federal share), the Federal matching rate of Puerto Rico was established at the same rate as States with high per capita income (i.e., 50 percent).

In January 1974 the Supplemental Security Income (SSI) program was implemented and was guaranteed by the Federal Government. SSI was designed to provide a minimum benefit to all aged, blind, and disabled people in the United States. Puerto Rico's residents, however, are specifically excluded from SSI. Instead, Puerto Rico retained all the elements of the old welfare adult categorical program. The welfare program has remained constant. The standard of need is \$34 monthly for adults and \$23.50 for each child. This standard was set in 1969 and has not been adjusted upward, even though the prices have risen substantially since then. Since payments are limited to 43 percent of the minimum "standard of need" and standards have not been adjusted since 1969, the caseload has not grown over the last 7 years and the average benefit has remained about the same.

This situation can best be illustrated by a look at the welfare program in the United States over the

Table 6.—Aid for Dependent Children Program: Number of Families, Recipients, and Average Benefits for the United States, Puerto Rico, Mississippi, and New York in the Month of December for the Years 1969 to 1976

Year	United States			
	Families		Recipients	
	Number	Average benefit	Number	Average benefit
1969	1,876,000	\$176.10	7,316,000	\$45.15
1970	2,552,000	187.30	9,657,000	49.50
1971	2,917,769	188.47	10,650,563	51.63
1972	3,133,068	191.17	11,063,932	53.95
1973	3,155,501	195.18	10,814,379	56.95
1974	3,312,202	217.53	11,004,283	65.48
1975	3,555,007	231.94	11,386,681	72.41
1976	3,570,035	236.40	11,180,965	75.48

Puerto Rico				
1969	44,800	\$46.20	223,000	\$9.30
1970	57,900	46.00	288,000	9.25
1971	52,776	45.95	268,820	9.02
1972	54,487	46.14	275,285	9.13
1973	51,154	46.24	256,213	9.23
1974	47,787	46.17	235,863	9.35
1975	44,487	45.06	208,064	9.63
1976	44,325	45.78	195,900	10.36

Mississippi				
1969	29,200	\$47.00	115,000	\$11.95
1970	36,200	46.40	139,000	12.10
1971	40,713	55.48	153,168	14.10
1972	46,603	53.07	171,613	14.41
1973	50,884	51.65	182,702	14.39
1974	52,938	49.82	184,594	14.29
1975	55,081	48.61	186,196	14.38
1976	52,812	47.93	175,961	14.39

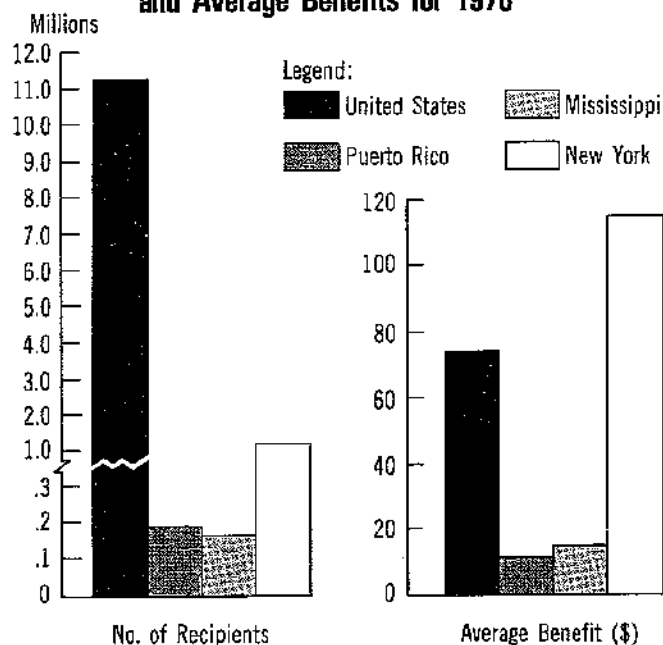
New York				
1969	272,000	\$248.00	1,045,000	\$64.50
1970	327,000	292.20	1,226,000	77.90
1971	347,848	287.68	1,275,446	78.46
1972	357,823	272.00	1,283,569	75.83
1973	342,467	269.05	1,190,320	77.41
1974	345,669	346.09	1,194,192	100.18
1975	368,696	356.55	1,230,410	106.84
1976	377,968	380.51	1,242,008	115.80

Source: Social Security Administration (see table 4).

last 7 years. (See tables 6 and 7.) While the average monthly benefit for Puerto Rico was \$46 for an AFDC family, \$18 for an aged case, and \$14 for a disabled case, the averages in the rest of the United States have been growing. In New York, the average monthly grant for an AFDC family increased from \$248 to \$380 over the 7 years. The same is true for the adult categories (i.e., aged, blind, and disabled). Before SSI, the average monthly benefit to this group was \$79 nationally in 1969 and \$90 in 1973. After SSI was implemented, it was \$120 (in December 1976). For Mississippi, the average benefit for the adult category was \$47 in December 1969 and \$98 in December 1976. This increase in average benefits coupled with the increase in caseload and full Federal funding contrasts sharply to the situation in Puerto Rico where the average monthly benefit in the adult category was relatively stable at \$17 per month for each of the 7 years.

Chart 5.

Aid for Dependent Children Recipients and Average Benefits for 1976



Source: Text and Table 5

The AFDC caseload increased by 90 percent in the United States, by 81 percent in Mississippi, and by 39 percent in New York. The disabled population has grown by 136 percent in the United States, 90 percent in Mississippi, and 205 percent in New York. By comparison, the AFDC caseload in Puerto Rico averaged 45,000 to 50,000 families over the 7 years and the average blind and disabled caseload has been stable at 17,000 people.

Because the extended family is a dominant pattern of social organization in Puerto Rico and because of the high level of poverty, households may be eligible to receive several types of public assistance grants. The aged, once on public assistance, tend to continue in the caseload until they die. Death was the reason for closing fully four-fifths of the cases in 1970 when the last survey of this kind was made. In the United States this is true for only one-third of the aged caseload. The disabled have little education, 70 percent having less than the fifth grade, and their disabilities tend to be of long duration. Psychiatric disorders are increasingly frequent. About two-fifths of the aged and one-third of the disabled live alone. Only 4 percent of the adult caseload had more than \$20 per month in nonwelfare income in 1975.¹⁹

¹⁹ U.S. Department of Health, Education, and Welfare; Assistant Secretary for Planning and Evaluation, 1977, unpublished internal memorandum.

Table 7.—Adult Assistance Programs: ¹ Number of Beneficiaries and Average Benefits for the United States, Puerto Rico, Mississippi, and New York in the Month of December for the Years 1969 to 1976

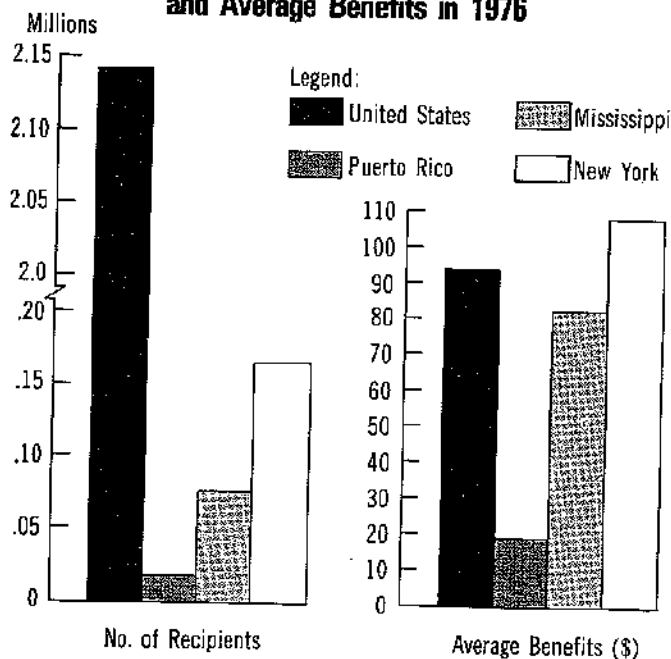
Year	United States		Puerto Rico		Mississippi		New York	
	Number	Average benefit	Number	Average benefit	Number	Average benefit	Number	Average benefit
AGED								
1969	2,076,000	\$74.00	21,300	\$13.45	73,900	\$44.60	91,700	\$97.25
1970	2,081,000	77.60	22,200	18.25	78,900	49.65	107,000	104.90
1971	2,024,235	77.36	20,559	18.24	81,141	58.48	111,954	102.36
1972	1,933,341	80.01	20,157	18.35	82,814	56.95	111,297	97.76
1973	1,820,434	76.16	18,960	18.32	80,566	53.82	106,250	107.56
1974	2,285,909	91.05	17,894	18.64	85,053	78.33	171,712	113.88
1975	2,307,105	90.93	17,979	18.91	81,546	80.17	178,911	107.47
1976	2,147,697	94.37	18,193	19.04	75,493	82.76	163,779	108.40
BLIND AND DISABLED								
1969	883,300	\$94.72	15,540	\$13.45	23,900	\$54.45	73,500	\$110.02
1970	1,014,000	100.45	18,710	13.52	27,000	59.00	98,000	131.20
1971	1,148,726	104.18	17,075	13.46	28,105	67.58	143,651	134.08
1972	1,247,697	109.44	17,925	13.50	29,146	67.07	165,523	116.94
1973	1,352,864	110.86	17,590	13.48	30,544	65.31	178,843	136.21
1974	1,710,155	141.92	17,008	13.66	38,036	112.38	202,407	184.45
1975	2,007,170	141.35	16,934	13.83	43,522	118.86	224,166	173.41
1976	2,088,242	145.77	17,642	13.99	45,322	123.03	224,595	172.80

¹ Before 1974 these programs were Old Age Assistance, Aid to Blind, and Aid to the Permanently and Totally Disabled. In January 1974 these programs became part of the Supplemental Security Income Program (SSI). SSI was not extended to Puerto Rico.

Source: Social Security Administration (see table 4).

Chart 6.

Aged Adult Assistance Recipients and Average Benefits in 1976



Source: Text and Table 6

Unlike the U.S. mainland, a higher share of public assistance funds always has been committed to children's programs in comparison to adult programs. In FY 1975 the ratio in Puerto Rico was about \$4

for the child programs for every \$1 for the adult. Nonetheless, the Commonwealth cannot afford to cover school children over 18 years of age nor are Federal funds sufficient to pay any of the cost of foster care for needy children.

Puerto Rico has a modified version of the earnings disregard in effect in the States for AFDC and adult programs. That is, when determining eligibility, the first \$15 of monthly earnings and one-fifth of the remainder is exempt as compared with \$30 and one-third in the States. Because of the high rates of unemployment, the constant scarcity of jobs, and the necessity for mothers with young children to remain at home, a lower share of the caseload is employed in Puerto Rico (about 10 percent in July 1975, with fathers significantly outnumbering mothers despite their disabilities). In this connection, the definition of disability in AFDC is interpreted somewhat more liberally than in the States. The result is that about half of the Puerto Rico caseload consists of male-headed families, among whom more than two-fifths have both parents at home, a far higher incidence than in the mainland.

Food Stamps

Those in need, depending upon their other income, can supplement that income by applying to a local welfare agency for food stamps. However, unlike Social Security benefits, or cash assistance payments, food stamps can be used only to acquire one of the basic needs of living—food and seeds for planting.

The food stamp program was not fully imple-

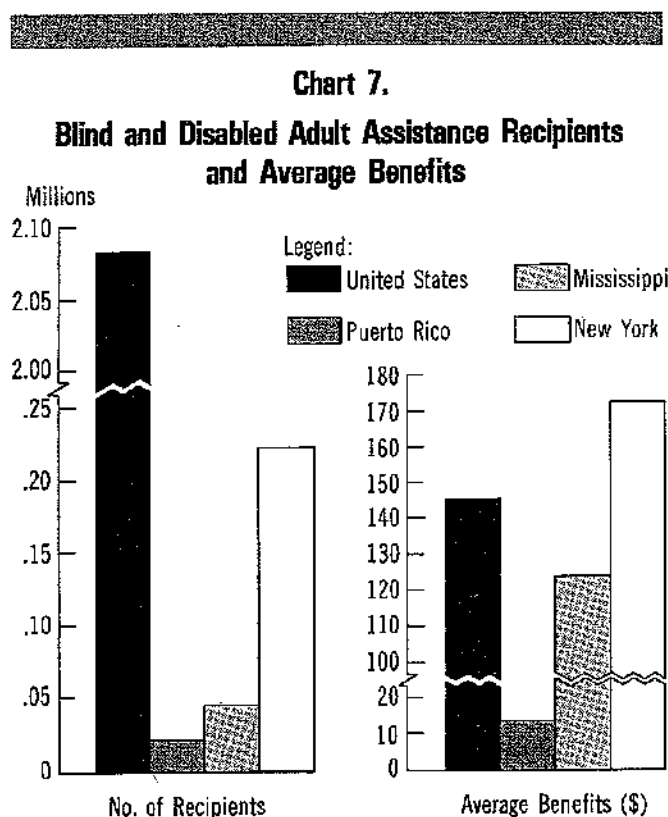
mented in Puerto Rico until 1975. However, since that time, the program has provided a substantial increase in the income of Puerto Rico residents. It has been estimated that almost 70 percent of the families in Puerto Rico are eligible and 50 percent receive food stamps. Preliminary December 1976 statistics (see table 8) indicate that almost \$59 million in food stamps were purchased in that month and that only \$14 million of the people's money was used to buy these stamps. This results in an increase of \$45 million in monthly personal income. (On an annual basis this is more than \$500 million more than the Federal contribution to Puerto Rico's Welfare program.)

Recently enacted legislation has removed the purchase requirement, Puerto Rico residents receive greater benefits under this program than residents of the U.S. mainland. As previously mentioned, the value of the Food Stamps are based on a "market basket" of items (called the thrifty food plan) and the cost of obtaining that food. The legislation specifically designates that a separate market basket be developed for Puerto Rico. The Puerto Rico market basket has been designed specifically to meet the cultural background of the people and the cost of importing food. The result has been that benefits have been slightly higher in Puerto Rico than on the U.S. mainland.

Inadequacy of the Income Support Programs

The basic question to be asked about the income support programs which have just been described is whether or not they are adequate—either alone or in combination with current economic development measures—for the needs of Puerto Rico.

It is fairly evident that the cash assistance programs alone (unemployment insurance benefits, So-



Source: Text and Table 7

cial Security benefits, and public assistance cash payments) are inadequate. Assuming that the U.S. poverty measure is a minimum level of adequacy (although, with a higher cost-of-living in Puerto Rico than in the U.S. mainland, a higher standard may be more appropriate), then the inadequacy of the cash assistance programs is demonstrated by the fact that widespread poverty exists after income from these sources is accounted for. The official poverty statis-

Table 8.—Food Stamp Program: Number of People Receiving Food Stamps, Total Value of Food Stamps and Bonus Value of Food Stamps in the United States, Puerto Rico, New York, and Mississippi for December 1969–December 1976

	1976	1975	1974	1973	1972	1971	1970
United States:							
Number of people	17,349,690	18,728,831	17,314,628	12,629,600	12,328,416	11,214,770	3,647,284
Total value	\$698,168,191	\$715,374,437	\$608,411,791	\$354,492,631	\$362,160,991	\$276,631,858	\$65,311,587
Bonus value	\$420,748,592	\$431,232,555	\$366,518,597	\$192,869,333	\$178,661,632	\$149,956,228	\$24,527,329
Puerto Rico:							
Number of people	1,420,264	1,557,720	864,081	(¹)	(¹)	(¹)	(¹)
Total value	\$58,551,853	\$55,804,536	\$35,520,503	(¹)	(¹)	(¹)	(¹)
Bonus value	\$44,600,089	\$41,832,805	\$24,591,502	(¹)	(¹)	(¹)	(¹)
New York:							
Number of people	1,611,803	1,417,639	1,261,283	1,223,036	1,224,574	1,238,811	61,050
Total value	\$63,080,983	\$54,501,262	\$43,084,698	\$34,304,630	\$32,677,882	\$31,101,349	\$1,358,008
Bonus value	\$28,799,484	\$24,386,642	\$16,908,321	\$11,212,948	\$10,971,906	\$10,462,592	\$357,802
Mississippi:							
Number of people	344,553	376,151	383,993	331,446	342,062	293,858	196,377
Total value	\$13,673,052	\$14,019,085	\$13,163,812	\$8,936,126	\$8,828,354	\$7,065,745	\$2,656,052
Bonus value	\$9,070,390	\$9,232,675	\$8,804,326	\$5,807,125	\$5,863,521	\$4,998,106	\$1,541,859

¹ No program.

Source: Social Security Administration (see table 4).

tics previously quoted in this report were derived by comparing income—including unemployment insurance, social security benefits, and public assistance cash payments, but not food stamps—to the Federal Government's poverty cutoffs.

However, there are significant supplements to the cash assistance programs. As will be described later, medical services are provided free to needy persons. A sizable number of residents also receive subsidized public housing. Food Stamps are, in effect, the largest welfare program in Puerto Rico. It is very difficult to measure the effect of combining these various benefits.

There is not sufficient data to identify which families receiving subsidized housing are also receiving cash assistance. Furthermore, even though public housing is widespread in Puerto Rico compared to the U.S. mainland, there are less than 60,000 public housing units in Puerto Rico, whereas there are almost 400,000 poor families and 116,000 poor unrelated individuals.²⁰ A practical working assumption, then, is to disregard the contribution of subsidized housing to the income support program.

Similarly, there are significant conceptual and data problems in assessing the contribution which free medical care might be construed as making to family income. As an example, counting the value of medical care provided to an individual as "income" would lead to the situation where an individual becomes "wealthy" by becoming so sick that he receives extremely expensive medical care. In assessing the adequacy of the U.S. income maintenance programs, the value of Medicaid and Medicare benefits may not be counted as income because of such conceptual problems. There is considerable disagreement among policymakers and analysts about how accurately an "income-equivalent" of medical benefits could be measured.

Although there are similar conceptual and data problems connected with Food Stamps, the bonus value of Food Stamps is probably an equivalent of cash income for all except the poorest of families. (The very poor may conceivably have immediate needs of greater importance than food. For example, if a poor family has a week's stock of food, but no place to live, Food Stamps would be less valuable than cash.) The average monthly Food Stamp bonus value in Puerto Rico in December 1976 was \$31.40, or \$125.60 for a family of four. The average monthly family benefit under AFDC in Puerto Rico in 1976 was \$45.78. Thus, Food Stamps and AFDC provided approximately \$171 to an AFDC family. This amount alone would be inadequate, for the official poverty cutoff for a four-person family in

the United States in 1976 was \$5,815, or \$484 per month.²¹

Similarly, an elderly person receiving an average Food Stamp bonus value of \$31.40 and a Social Security benefit of \$102.54, would have had a total monthly income of \$134, or an annual income of \$1,600, far below the official poverty cutoff of \$2,730 for an elderly individual.²²

In both hypothetical cases above, the "cash" value of the income support programs was, on the average, about one-half the official poverty cutoff. Compared to that standard, these programs alone are inadequate. Furthermore, few policymakers or analysts would argue that the value of free medical care is greater than one-half of a family's total needs. It follows that the combination of Food Stamps, public assistance cash payments, and free medical care is not adequate. There may, of course, be other cash available to a family and other in-kind supplements. However, the retired worker is not likely to be receiving earnings or unemployment benefits; nor is the female head of a family with very young children. Clearly, there are large groups in Puerto Rico for whom the income support system is inadequate.

It may be, however, that a completely adequate income support system for Puerto Rico will not be achievable in the short term. The "poverty gap" is defined to be the total amount of money required to bring each poor family out of poverty—that is, it is the sum of each poor family's (or poor unrelated individual's) poverty deficit. It is administratively impractical to eliminate poverty by supplying each family and individual with the cash necessary to eliminate the deficit; however, the poverty gap is a useful statistical indicator of the scope of poverty. It is estimated by the U.S. Census Bureau that the poverty gap in Puerto Rico in 1975 was more than \$1.3 billion.²³ This poverty gap is the cash required in addition to Social Security benefits, unemployment insurance, and public assistance cash payments to eliminate poor families' and poor individuals' poverty deficit. The \$500 million of food stamp bonus values provided to residents of Puerto Rico is 38 percent of the poverty gap (although it does not necessarily eliminate 38 percent of the poverty gap).

An argument may be made, however, that cash assistance payments and Food Stamps should not be provided in amounts which exceed prevailing earning rates. If, for example, the income support programs provided supplements up to the poverty level, then many of the residents of Puerto Rico would fare better as welfare recipients than as earners. The

²¹ U.S. Bureau of the Census.

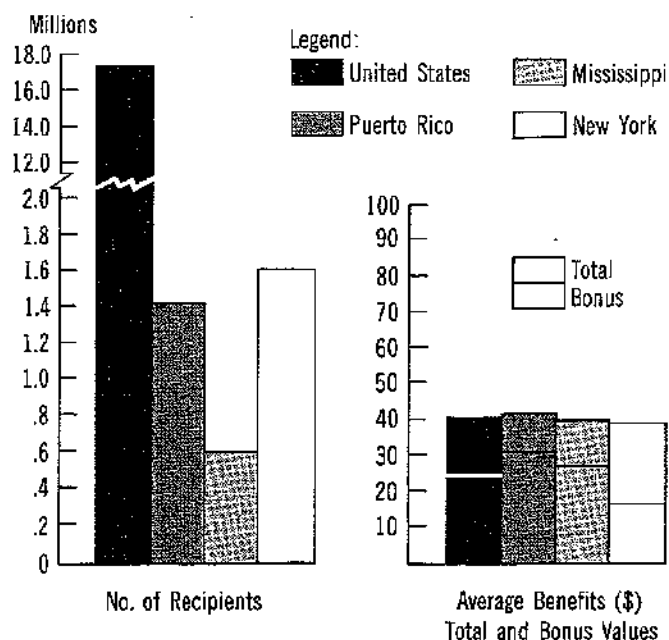
²² *Ibid.*

²³ U.S. Bureau of the Census, data derived from the 1976 Survey of Income and Education.

²⁰ Public housing data supplied by Government of Puerto Rico Urban Renewal and Housing Corporation. Poverty data from table 2.

Chart 8.

**Food Stamp Program Receipts
and Average Benefits in 1976.**



Source: Text and Table 7.

disincentive to work under these circumstances is obvious. However, it is probably the very high levels of unemployment rather than work disincentives that is the crucial problem.

HUMAN DEVELOPMENT PROGRAMS ²⁴

Social Service System of Puerto Rico

In addition to the income support programs just described, various social and human development services are available to the needy. Most of these are administered by the Department of Social Services in Puerto Rico, the same department which administers the public assistance cash payments and Food Stamp programs. In FY 1977 this department spent \$71.8 million, of which almost \$50 million consisted of Puerto Rico shares of public assistance payments or administrative expenses connected with Food Stamps or public assistance payments. The remainder supported a broad range of social services.

²⁴ Information on human development programs is from a document entitled "HEW Study of Social Conditions in Puerto Rico and the Impact of OHDS Programs" prepared by Region II Office of Human Development Services, HEW, Dec. 28, 1977. Budget information is from HEW tables for Puerto Rico, 1978.

In addition to social services provided by the Department of Social Services, the Department of Drug Addiction Services provided more than \$10 million of preventive and remedial services in FY 1977. Also, some family planning assistance is provided through the Department of Health, as well as the Department of Social Services. A variety of Federal programs are available to provide assistance to the Puerto Rico Government in the social services and human development area. These are described below and provide a convenient summary of the spectrum of services available through Puerto Rico and Federal programs.

Social Services

The primary vehicle through which the Federal Government provides financial assistance to States for social services is title XX of the Social Security Act. Approximately \$2.5 billion is distributed across the United States annually through this program.

The law establishing the title XX program does not apply to Puerto Rico. Instead the island continues to operate under title IV (Services to Families with Children) and title XVI (Adult Services). However, the title XX law permits the use of up to \$15 million for social services in Puerto Rico only when the States certify their need for less than the \$2.5 billion national allocation of title XX funds. There is, therefore, a lack of certainty about the availability of Federal funds for social services which complicates the planning of services programs. For example, in 1976 although \$15 million was available, Puerto Rico was able to spend only \$8.7 million because they received notification of the availability of these funds several months after the beginning of the fiscal year. In 1978, while Puerto Rico received timely notification, only \$10.3 million was available as a result of high State certification. If Puerto Rico received a full entitlement, it would receive approximately \$40 million annually under title XX.

In addition to the title XX funds, Puerto Rico receives \$24 million under section 1108(a) of the Social Security Act, which is used for income maintenance and social services. Puerto Rico uses approximately \$2 million of the \$24 million for services.

The title IV program aims at promoting the social and economic rehabilitation of AFDC families and promoting home environments which foster the well-being of all family members. Title IV-A provides services primarily to families with dependent children. Services under this program include foster care, protective services, family planning, and services which promote employment and self-sufficiency. Services are available to AFDC recipients

and former and potential AFDC families. Title IV-B provides grants for child welfare services, primarily family foster care. Title IV-B receives appropriation under a separate formula. Title XVI aims at promoting and maintaining self-sufficiency of adult population served. Services include day-care services for adults, homemaker services, group homes for the mentally retarded, and family planning. All former, current, and potential recipients of the adult categories of welfare and medicaid recipients are eligible. There are approximately 5,000 families served by the title XVI program and 18,000 families served by title IV-A. Approximately 70 percent of social services expenditures are for services to families with children and 30 percent for adult services.

Child Care Services

(Title II of the Community Services Act) (13.600)²⁵

The Head Start program offers preschool children of low-income families comprehensive services which enable them to perform in school at the level of their more advantaged peers. It provides project grants, with an 80 percent Federal financing share, to public and private nonprofit agencies. HEW granted \$16 million to Puerto Rico in FY 1977 to provide a full year, part day Head Start Program to 10,000 preschool-aged economically deprived children. In addition, \$790,000 was allocated to Head Start services to the handicapped. There are two grantees in Puerto Rico—the municipality of San Juan serving 3,000 children and the Puerto Rico Community Action Agency serving 7,000. The program provides comprehensive services to all its enrollees, including education, health, and social services. In FY 1978-79, Head Start services are being expanded by an additional \$5.3 million to serve 3,000 more children. In addition to Head Start, there are approximately 9,300 children in 312 day care centers. Of the 78 towns in Puerto Rico, 52 offer day care services for children. In addition, Puerto Rico received \$200,000 in FY 1977 for child abuse and neglect services and \$200,000 in FY 1977 for two child advocacy demonstrations.

Programs For The Aged

Older American act programs are administered by the Gericulture Commission of the Department of Social Services.

Community Services Program.—Title III of the Older Americans Act of 1965 (13.634).

The Community Services Program builds capacity for State and area agencies on aging to function as focal points for fostering development of a compre-

hensive, coordinated services delivery system in each planning and service area to meet the needs of older persons. The Puerto Rico Gericulture Commission has divided the Commonwealth into 10 planning and services areas, each of which has an Area Agency on Aging. Total Federal funding was \$1,261,711 in FY 1977.

Multipurpose Centers.—Title V-C of the Older Americans Act of 1965 (13.639).

Grants or contracts may be awarded to pay the cost of acquiring, altering, or renovating existing facilities to serve as multipurpose senior centers. Multiservice centers provide facilities that will serve as a focal point in communities for developing and delivering social and nutritional services. The majority of projects have developed day-care-type centers with a multiplicity of services.

Nutrition Programs.—Title VII of the Older Americans Act of 1965 (13.635).

The nutrition program provides low cost, nutritious meals served primarily in congregate settings. This is a formula grant service program which pays up to 90 percent of the costs of nutrition projects based on the proportion of persons aged 60 or over in a service area. The program funds 34 projects and 67 centers in Puerto Rico and serves an average of over 4,000 meals daily. In addition, the Federal Community Service Administration funds approximately 40 projects which serve 3,500 elderly through community action agencies.

Vocational Rehabilitation.—Rehabilitation Act of 1973 (13.624).

The vocational rehabilitation program provides services to eligible handicapped individuals which are intended to help lead them to their maximum participation in gainful employment. In this effort priority is given to the severely handicapped. This program provides formula grants (80 percent Federal match) to State agencies which provide services on an individual basis. The formula is based on State population and per capita income. State agency staffs coordinate and authorize needed services to clients from other public programs or purchase them from vendors on a fee for service basis.

The Puerto Rico Department of Social Services administers the Vocational Rehabilitation program, and it is estimated that it will serve 65,000 handicapped individuals in 1978 and rehabilitate 4,900. Federal funding in FY 1978, under the Basic State grant program of the Vocational Rehabilitation Act, is approximately \$24 million.

Developmental Disabilities

Mental Facilities and Community Mental Health

²⁵Numbers in parentheses are the program identification symbols used in the Catalogue of Federal Domestic Assistance published by the U.S. Office of Management and Budget.

Centers Construction Act of 1963 (13.630, 631, 632).

This program has two methods of support for aiding individuals with developmental disabilities:

A. Formula Grants to Assist States in developing and implementing a comprehensive and continuing plan for meeting the needs of persons who have a disability resulting from mental retardation, cerebral palsy, or autism which originated before age 18. Allotments under basic formula grants may be used for State or local planning and administration relating to services and facilities, for providing assistance to public or private nonprofit agencies for the delivery of services, and for the construction of service facilities.

B. Project Grants provide partial support to improve the quality of services, informational programs, new techniques, service delivery, coordination of resources, technical assistance, or the cost of administration and operation of demonstration facilities and training programs needed for personnel to render specialized services. The Department of Health in Puerto Rico is the designated State agency for administering the program and the Developmental Disabilities Council is the official permanent planning and advisory body. The primary focus of this program is planning, protection, and advocacy. Federal funding in FY 1977 was approximately \$600,000.

Family Planning

Title X of Public Health Service Act (13.217, 260).

The Family Planning Program provides educational, medical, and social services to enable indi-

viduals to plan the number and spacing of their children. This program awards project grants to public and nonprofit private organizations for the support of family planning services, training of family planning personnel, development and distribution of family planning educational materials, and research and technical assistance to improve the delivery of family planning services. Services include contraceptive advice, counseling, diagnosis and treatment of infertility, contraceptive supplies, and periodic followup examinations. Services are provided to anyone who desires, but who would not otherwise have access to, them. Priority is given to low-income and high-risk clients.

Puerto Rico has three family planning grants—the Department of Health, the University of Puerto Rico School of Public Health, and Loiza Health Center. The Department of Health is responsible for the community education outreach and nonmedical service component. Areas of responsibility are island-wide except for the San Juan Metropolitan and Bayamon regions. The University of Puerto Rico's project provides comprehensive family planning services at four clinic sites in northern San Juan. The Loiza Health Center Project provides comprehensive services as part of its comprehensive health center program. Total Federal funding is \$1,030,000 for FY 1977. In addition, Family Planning is funded using social services funds under 1108(b) of the Social Security Act and from the title XX allotment. The Department of Social Services contracted with the Puerto Rico Department of Health to administer over \$3 million in funds for family planning services in FY 1976 and FY 1977. In October 1977 the Family Planning contract was terminated. However, the Department of Social Services is in the process of renegotiating a new \$2 million Family Planning contract with the Department of Health.

Chapter II.—Health Conditions and Delivery Systems

HEALTH CONDITIONS IN PUERTO RICO

This section will briefly describe the health status of the population in Puerto Rico by presenting and discussing indicators in five important health areas: (1) life expectancy at birth, (2) general and infant mortality, (3) the leading causes of death, (4) morbidity and the incidence of chronic, acute, and communicable diseases, and (5) alcoholism, drug abuse, and mental health. In order to place the indicators within a frame of reference, relevant figures are also shown for the United States as a whole. (It should be noted that data which describe U.S. national health indicators usually do not include information collected from Puerto Rico and the Virgin Islands.)

Life Expectancy at Birth

Health conditions in Puerto Rico were so deplorable at the beginning of the present century that the life expectancy was only 30 years. By 1940 it had increased to 46 years, equivalent to an average increase of 4 years per decade. However, since 1940 one of the greatest achievements in the history of public health in modern times has been observed in the island. From 1940 to 1950, life expectancy increased from 46 years to 61 years, 15 years in one decade. This is equivalent to an average increase of 1.5 years in expectation of life per calendar year. Then, from 1950 to 1960, an increase of 9 years was achieved (from 61 to 70 years); from 1960 to 1970, an increase of 2 years (from 70 to 72 years); and from 1970 to 1975, an increase of only 0.3 years.¹

This very noticeable tapering off of increases in life expectancy at birth in Puerto Rico is not due primarily to any lack of or decline in health care progress in Puerto Rico. Rather the reduction is pri-

marily due to the simple fact that the population of Puerto Rico has largely completed the so-called "epidemiological transition" characteristic of developed countries—a transition from low to high life expectancy with the elimination of infectious diseases followed by a tapering off in the growth of life expectancy with the emergence of degenerative and chronic diseases as the leading causes of death.

This epidemiological transition has been so complete in Puerto Rico that its population now enjoys one of the highest life expectancies in the world. In comparison with the United States, life expectancy in Puerto Rico has increased from 17 years less than that in the United States in 1900 to slightly more than the life expectancy in the United States after the late 1960's. In 1975, the comparative life expectancies for the populations of Puerto Rico and the United States were respectively 72.3 and 71.9 years for the total population, 77.0 and 75.9 for the female population, and 68.9 and 68.2 for the male population.²

General and Infant Mortality

The general mortality rates (or number of deaths per 1,000 population) in Puerto Rico has declined rapidly during this century—from well above 30 in 1900, to 20 in 1930, 18 in 1940, 10 in 1950, and slightly less than 7 since 1960. Thus, the most rapid drop was observed during the decade of 1940–50 when the crude death rate declined from 18.4 to 9.9. This relative reduction in mortality during the 10-year period 1940–50 was almost identical to that observed during the first 40 years of the present century. From 1950 to 1960 the crude death rate was reduced by almost 33 percent, but little change has occurred since 1960.³ During the decade 1965–75 the average death rate in Puerto Rico was 6.6 deaths per 1,000 population. This rate compares

¹ Government of Puerto Rico, Department of Health, Analysis and Information Control Section, *Informe anual de estadísticas vitales 1976* [Annual Vital Statistics Report 1976], table 54. The discussion of data for the period prior to 1960 is paraphrased from José L. Vázquez Calzada, 1964, "The Demographic Evolution of Puerto Rico," ch. 6, see footnote 10.

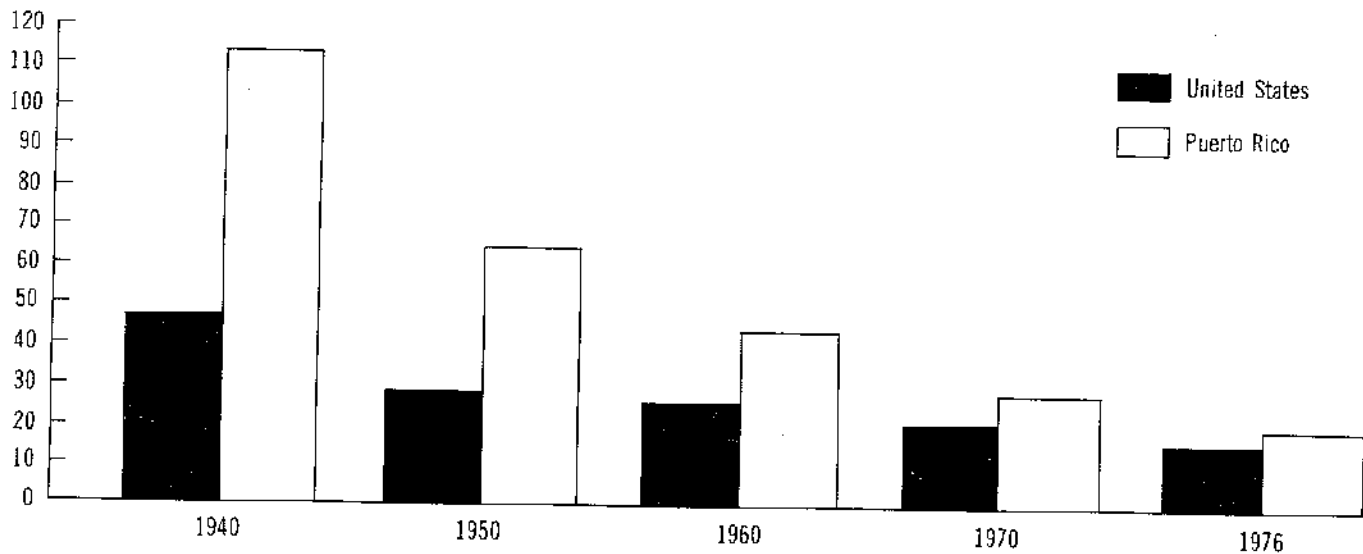
² Source of the data for Puerto Rico is cited in note 1. Source of data for the United States is U.S. National Center for Health Statistics, *Vital Statistics of the United States*, figures for U.S. in 1974.

³ These data are from same source cited in note 1: *Annual Vital Statistics Report 1976*, table 1; and Vázquez, 1964, ch. 6.

Chart 9.

Infant Mortality

(Deaths Under One Year Per 1000 Live Births)



Source: U.S. Bureau of the Census

favorably with countries whose public health has reached significantly high levels. However, the fact that Puerto Rico's population is fairly young may lead to a lower death rate in relation to other populations with a higher portion of aging persons. If the 1972 death rate for Puerto Rico is adjusted using as a base the age breakdown in the United States in 1970, the rate would increase from 6.7 to 9.1. Even after the adjustment, the rate is lower than that of the United States in 1970 (10 deaths per 1,000 population).⁴

The infant mortality rate (number of deaths under 1 year per 1,000 live births) has also declined radically during this century—from around 200 in 1900, to 130 in 1930, 113 in 1940, 68 in 1950, 44 in 1960, 29 in 1970, and 20 in 1976.⁵ The U.S. infant mortality rate has declined from about 100 in 1910 to 16 in 1976.⁶ Thus, while infant mortality in Puerto Rico has declined rapidly to a low level, it does, however, remain 25 percent above the U.S. rate.

⁴ U.S. Department of Health, Education, and Welfare, 1977, "Outline of Study Paper on Social Conditions in Puerto Rico (Health Sections)," p. 2 (unpublished paper for agency use).

⁵ *Ibid.*

⁶ U.S. Department of Health, Education, and Welfare, 1977, "Outline of Study Paper on Social Conditions in Puerto Rico (Health Sections)," p. 2 (unpublished paper for agency use).

Leading Causes of Death⁷

An analysis of the causes of death provides an indication of the prevailing socioeconomic conditions of a population. It is known, for example, that agricultural communities have a different pattern of cause of death than industrial ones. Infectious diseases predominate in less developed areas, while chronic diseases predominate in industrial societies. Tuberculosis is concentrated among lower income populations, while heart ailments are increasingly more common in higher income populations.

Up to about 1950 Puerto Rico was an area where infectious diseases predominated. All the 10 leading causes of death reported in 1907 were of this type, or of a nutritional deficiency. In 1913 and 1920 only one disease of degeneration (diseases of the heart) was included among the 10 leading causes, and it ranked eighth. Diarrhea and enteritis, and tuberculosis were the two leading causes of death up to 1950. Pneumonia, nephritis, and malaria also alternated among the most frequent causes of death.

In 1930 diseases of the heart ranked sixth, while cancer (for the first time included among the 10

⁷ Sources of data on leading causes of death are cited in note 1: *Annual Vital Statistics Report 1976*, pp. 27-59; also, discussion of data from period prior to 1960 is paraphrased from Vazquez, 1964, ch. 6.

leading causes) ranked tenth. From 1940 to the present, radical changes in the pattern of causes of death have occurred, so that in 1975 the three leading causes of death were: diseases of the heart, cancer, and cerebrovascular diseases. Arteriosclerosis and diabetes mellitus were also among the 15 top causes. Diarrhea and enteritis, which up to 1950 were the leading killers, dropped to the fourth position in 1960 and out of the top 10 causes of death in 1975.

Forty-eight percent of all deaths in 1930 were attributed to diarrhea and enteritis, tuberculosis, pneumonia, and malaria, and were the most important infectious causes in Puerto Rico. Only 9 percent were attributed to the leading chronic diseases (diseases of heart, cancer, cerebrovascular diseases, arteriosclerosis, and diabetes mellitus), while in 1975 these accounted for 58 percent of mortality. On the other hand, in 1975 only 7 percent of all deaths were attributed to the above-mentioned infectious diseases.

Chronic diseases now occupy the leading position of causes of death in Puerto Rico—a situation comparable to that of the United States and the most industrialized and modern countries of the world. The death rate from heart disease is as high as that of the United States—and represents the leading cause of death in both areas. Table 9 compares the ten leading causes of death in Puerto Rico for the years 1940, 1965, and 1975.

Puerto Rico now enjoys one of the lowest mortality rates in the world. This low rate has been achieved primarily through public health measures serving to eliminate infectious diseases in a relatively young population. With an increasing shift to degenerative diseases characteristic of an industrialized and somewhat older population, the mortality rate in Puerto Rico can be expected to increase as a function of both this new disease pattern and, of course, the gradual aging of the population.

Morbidity⁸

Morbidity is the frequency with which a disease or pathological condition occurs in a population group. As a population experiences a decline in health problems resulting from infectious diseases, a substantial increase in the more slowly operating chronic, degenerative diseases is inevitable. The increased longevity of the population and the resultant shift in its composition toward the older ages result in a greatly increased frequency of chronic rather than acute diseases. Factors such as poor eating habits, smoking, excessive drinking, insufficient exercise, occupational hazards, and exposure to environmental contaminants may also contribute to the development of a disabling chronic condition.

Acute Conditions.—Acute conditions are those with a period of duration of less than 3 months involving medical treatment or restriction of activity. In 1973 about 4.9 million acute diseases were reported in Puerto Rico, which represents a general rate of 164.8 conditions for each 100 persons. The principal acute conditions reported for 1973 are diseases of the respiratory system, infections and parasitic diseases, diseases of the digestive system, and skin diseases and diseases of the subcutaneous cellular tissue, in this order of importance. The order of importance in the first four groups of conditions has been maintained through the years 1966 to 1973. Some comparative statistics for Puerto Rico and for the United States are given in the accompanying table 10.

Chronic Conditions.—Chronic conditions, for the purpose of this analysis, are those with a duration exceeding 3 months or those which are otherwise classified as chronic without taking into consideration their duration. The following are included among the latter: diabetes, hypertension, heart dis-

⁸ All data on morbidity in Puerto Rico are cited from the Health Systems Agency of Puerto Rico, Inc., 1977, "Puerto Rico Health Systems Plan, 1978-82" (unpublished draft), pp. 68-78. Some discussion of morbidity above is paraphrased from the same source.

Table 9.—First 10 Causes of Death, Puerto Rico, 1940, 1965, 1975

1940		1965		1975	
Causes of Death	Rate ¹	Causes of Death	Rate ¹	Causes of Death	Rate ¹
All causes	1,835.8	All causes	679.8	All causes	638.5
Diarrhea-enteritis	405.2	Heart diseases	137.4	Heart diseases	166.7
Tuberculosis	260.2	Cancer	85.5	Cancer	95.7
Pneumonia	169.2	Vascular lesions	52.7	Cerebrovascular diseases	49.5
Heart diseases	125.4	Diarrhea-enteritis	36.8	Accidents	32.8
Nephritis	108.4	Accidents	36.2	Arteriosclerosis	32.7
Malaria	96.8	Certain early childhood diseases	35.3	Pneumonia	31.8
Certain early childhood diseases	96.5	Pneumonia	32.5	Hepatic cirrhosis	24.9
Influenza	64.7	Tuberculosis	17.8	Diabetes mellitus	23.0
Cancer	51.7	Arteriosclerosis	17.7	Certain early childhood diseases	20.3
Accidents	34.5	Congenital deformities	16.5	Homicides	16.1

¹ Rate per 100,000 inhabitants.

Source: Health Systems Agency of Puerto Rico, Inc., 1977, "Puerto Rico Health Systems Plan, 1978-1982" (unpublished draft), p. 96. (Data abstracted from Puerto Rico Health Department *Annual Vital Statistics Report* for 1965, 1975.)

Table 10.—Rate of Acute Conditions Per 100 Persons by Year, and Group of Conditions—Puerto Rico, 1966 and 1973, and the United States, 1973

Conditions	Puerto Rico		United States
	1966	1973	1973
All conditions	190.0	164.8	172.0
Respiratory system	101.0	85.9	91.5
Infections and parasitic diseases	19.8	19.1	19.8
Digestive system	10.3	5.6	8.1

Source: Puerto Rico Department of Health Basic Sample, 1966 and 1973, and Vital and Health Statistics, Series 10, No. 120 (PHS 78-1548), January, 1978.

eases, arteriosclerosis, epilepsy, arthritis, cancer, hyperthyroidism, and bronchial asthma.

For the year 1973 the general rate of chronic conditions was 94.7 cases per 100 persons, or 26.3 percent above those reported for the year 1966. The principal chronic conditions reported for 1973 were: diseases of the circulatory system, diseases of the respiratory system, diseases of the osteomuscular system and of conjunctive tissue, diseases of the digestive system, and diseases of the endocrine glands, those related to nutrition and metabolism. Although not in this same order, these were the conditions mainly reported for the year 1966. Some comparative statistics for Puerto Rico are presented in the accompanying table 11.

Table 11.—Chronic Conditions Per 100 Persons by Groups of Conditions and Years, Puerto Rico, 1966 and 1973

Conditions	Puerto Rico	
	1966	1973
All conditions	75.0	94.67
Diseases of the circulatory system	10.5	14.78
Diseases of the respiratory system	3.7	11.48
Diseases of the Osteomuscular system and of the conjunctive tissue	8.5	10.49
Diseases of the endocrine glands, nutrition, and metabolism	9.0	4.13
Diseases of the digestive system	5.7	5.62

Source: Puerto Rico Department of Health Basic Sample, 1966 and 1973.

Communicable Diseases.—The incidence of communicable diseases is an additional source of information on health status. Successful control and immunization programs for many of these diseases have caused significant declines in disease incidence. An exception is venereal disease which is experiencing a increasing rate of incidence in the United States and in Puerto Rico, although the incidence has declined in Puerto Rico in the past year.^{9,10}

Another aspect relating to reportable communicable diseases is the level of immunization among preschool and school-age children. Data for HEW

Region II show that over 90 percent of the school enterers (kindergarten or first grade) were immunized for diphtheria, pertussis, tetanus, polio, measles, and rubella, in New Jersey, New York, and the Virgin Islands. Puerto Rico, however, reported considerably lower levels of immunization among school enterers, with less than 30 percent of the children immunized for diphtheria, polio, measles, and rubella.¹¹

Alcohol, Drug Abuse, and Mental Health

Alcohol, drug abuse, and mental health problems are closely related to the socioeconomic climate in which they develop. Until the beginning of the 20th century Puerto Rico was mainly a rural area. Since the early decades of this century there has been progressive shift to urban living, and by 1950 a vigorous industrialization process was taking place. By 1970 more than half the population lived in urban surroundings and the island economy could be considered essentially industrialized. The rapid economic development brought about new jobs, higher wages, and an increased rate of participation by women in the labor force. Increased demands for skilled employment created new occupational structures, more sophisticated attitudes, and rising expectations.

Economic development has been accompanied, however, by increased use and abuse of alcohol and other drugs, and by increased incidence of mental and emotional illness. These, along with the deficiency of alcohol, drug abuse, and mental health services, have undoubtedly affected the economic and social well-being of Puerto Rico and its people.

Alcoholism.¹²—Puerto Rico ranks with the top 10 countries in the world with highest per capita consumption of alcohol. The Puerto Rico Department of Services Against Addiction uses a standard formula to calculate indirectly the prevalence of alcoholism in Puerto Rico based mainly on the deaths reported due to liver cirrhosis. By applying the formula to Puerto Rico, it estimates that there are more than 100,000 alcoholics in Puerto Rico, who might be affecting directly over 500,000 persons (since the average members in a family is 5.5 members). From 3,699 cases actually analyzed in the department, it was found that 95 percent were males and that 45 percent were working, 31 percent were unemployed, and 24 percent were not included in the labor force. Seventy-nine percent were 39 years old or over.

Among the indicators connected with the alcoholism problem the following stand out:

(a) Deaths caused by hepatic cirrhosis: The rate

⁹ Source cited in footnote 8.

¹⁰ San Juan Star, Sunday Magazine, March 28, 1976, pp. 1-2.
¹¹ Center for Disease Control, *Reported Morbidity and Mortality in the USA*, 1975, vol. 24, No. 54, August 1976, p. 64.

¹² All data on alcoholism in Puerto Rico are quoted from the source cited in footnote 8, from which the discussions here are selectively paraphrased.

of death as a result of hepatic cirrhosis rose from 10 to 13 per 100,000 population in 1930-60 to 23-26 in 1970-76, and represented 4 percent of the total of deaths in Puerto Rico in 1975.

(b) Deaths as a result of traffic accidents: A study carried out in the island in 1971 revealed that 49 percent of the persons who died in traffic accidents had a high percentage of alcohol in their blood.¹³ In 1972 there was a total of 552 deaths as a result of traffic accidents, of which 242 cases were analyzed and 153, or 63.2 percent, had concentration of alcohol in the blood.

Drug Abuse.—Puerto Rican authorities currently estimate that during 1976-77 there were approximately 72,920 addicts in the Commonwealth. This estimate is based on Puerto's figure of 7,292 known addicts in treatment for this time period. Heroin was the primary drug problem for 71.2 percent of the clients admitted to treatment in Puerto Rico in 1976, while the corresponding percentage on the mainland was 62.3 percent. While there were also higher percentages of clients in Puerto Rico reporting primary abuse of marijuana and inhalants than there were nationally, there were virtually no admissions in Puerto Rico with primary drug problems of other opiates, alcohol, or amphetamines.

Mental Health.¹⁴—According to 1976 report of a special Puerto Rican Commission on Mental Health, 6.75 percent of the Puerto Rican population needed some form of mental health care. The report concluded that 20.6 percent of those suffering from chronic disorders have mental health problems. Breaking chronic disorders into three categories, the study found that mental health led the list with 20.6 percent, diseases of the circulatory system was second with 15.6 percent, and diseases of the respiratory system third with 12.3 percent.

The incidence of mental health problems has increased steadily since 1966, when it was estimated that 5.6 percent of the population required some form of treatment for mental health. The percentage went up to 6.5 percent in 1969 and to 6.75 percent in 1973, the latest figure available.

The study defined mental health problems as including psychosis, neurosis, personality disorders and other disorders without psychosis, alcoholism, addiction, and nervousness and depression.

In FY 1976 the Assistant Secretariat of Mental Health of Puerto Rico treated in its centers a total of 69,341 persons. The figures show a rate of 22 patients per 1,000 inhabitants. Of the total number of patients treated: 4,031 (6 percent) were hospital-

ized; 12,237 (18 percent) were treated for the first time; 24,207 (35 percent) suffered from neurosis or personality adjustment failures while still in touch with reality; and 17,382 (25 percent) suffered from severe psychosis or personality adjustment failures including loss of contact with reality.

HEALTH DELIVERY SYSTEMS

The Public Health Care and Prevention System of Puerto Rico¹⁵

During the four centuries of the Spanish regime in Puerto Rico, the provision of personal health care was the responsibility of municipal governments. The central government was responsible for professional licensure, the provision of preventive services, and epidemiological surveillance.

In 1898 the United States annexed Puerto Rico under the Treaty of Paris and in 1899 a Health Board was established with responsibility for health legislation, environmental health, preventive care, licensure of health personnel, and quarantine services. In 1912 a Department of Health was created and was headed by a Commissioner who was a member of the Governor's cabinet. During the next 10 years, attempts were made to create a health infrastructure for the provision of treatment and preventive health services and in 1924, following the U.S. pattern, public health units were organized on the island.

In 1934 the U.S. Public Health Service, under the leadership of Joseph W. Mountain, conducted a study of the island's health and medical problems. The two major recommendations related to the reduction of illness through the application of preventive measures and improvement of the nutritional status and to the development of certain elements of the health care system on a district basis. Following these recommendations, four general hospitals were built which, together with a small district hospital in the southern region, constituted the framework of acute care facilities from which a regional hospital system would evolve.

The enactment of the Hill-Burton Act in 1946 gave impetus to the design of a health care system. In 1947 the Bureau of Hospital Survey and Construction of the Department of Health drafted a plan for the reorganization of health services by service areas. The first attempt to regionalize health services was made in 1958 and the area selected was that

¹³ Kay Sidney, 1971, "Alcohol and Its Effects on Man," *Medical Association Bulletin of Puerto Rico*, vol. 23, pp. 303-306. This study is referenced in source cited for Note 12.

¹⁴ Except where noted otherwise, all data and information on mental health are cited from the *San Juan Star*, Dec. 21, 1976, p. 3; and *San Juan Star*, *Sunday Magazine*, July 31, 1977, p. 8.

¹⁵ This description of the public health system in Puerto Rico is largely paraphrased from the source cited in note 4, pp. 6-13, and from the Government of Puerto Rico, Office of the Governor, 1977, "Testimony of the Honorable Carlos Romero-Barcelo, Governor of Puerto Rico, before the Subcommittee on Health, Committee on Interstate and Foreign Commerce, U.S. House of Representatives, Sept. 8, 1977."

served by the Bayamon District Hospital which included the San Juan metropolitan area and 16 municipalities. In 1960 the original scheme was expanded and the island was divided into five regions ranging in population from 350,000 to 900,000 inhabitants. Each region was defined as the catchment area surrounding a regional hospital.

The three levels of care comprehended within this scheme were: local health centers (primary care), regional hospitals (secondary and tertiary care), and specialty care at the Rio Piedras Medical Center in the San Juan metropolitan area.

In 1970 the then-existing system was restructured. Under the new plan, the island was divided into three regions: the northeast, the south, and the west with the base hospital for each region being the Rio Piedras, Ponce, and Mayaguez Medical Centers, respectively. Each region was divided into several areas. The revised mapping of regions and the redefinition of levels did not work as planned, and the original five regions continued to function as such.

In 1977, regionalization was modified by Puerto Rico in both its geographic and functional aspects. The island has been divided into six health regions, each having approximately 500,000 inhabitants. Each region is subdivided into two or three areas to be served by an area hospital providing secondary levels of care. Each area contains three to seven municipalities, each having a primary care health center; the health center in each municipality is the entry point to the health care system. The inpatient component within most of these centers is being phased out. While municipal governments share funding through agreements with the Department of Health, operational responsibility rests with the Department of Health, except for the municipality of San Juan.

The Regional Hospitals located in Caguas, Arecibo, and Bayamon provide secondary and tertiary care. The three medical centers in Ponce, Mayaguez, and Rio Piedras offer specialty services. These medical centers are staffed and equipped to provide quality specialized services and training opportunities for health personnel. The system includes 6 tertiary care facility hospitals and 77 primary care centers exclusive of the City of San Juan. Patients are referred from the local level (municipal) to an intermediate level (area hospital) or to regional hospitals, and from there, if the medical condition so requires, to one of the three modern medical centers located in the northeast, south, and west portions of the island.

This health care delivery system offers public health and preventive services to the entire population and provides medical care to approximately 1.7 million people considered medically indigent. Of this total, 1.3 million users are eligible for benefits under the Federal Medicaid program and about 0.4 mil-

lion receive services financed exclusively by the Commonwealth.

Title XI of the Social Security Act requires Professional Standards Review Organizations (PSRO's) to review the quality and necessity of health care received by Medicare and Medicaid patients in institutional settings. In early 1978 the Puerto Rico PSRO began implementation of the review of care provided these patients in hospitals by working with the Commonwealth's Health Department.

The State Insurance Fund (Workers' Compensation) and the Auto Accident Compensation Administration are compulsory insurance schemes administered by the Commonwealth Government. The former mechanism provides coverage and care for work-related illness and injuries. The latter provides payment for medical costs incurred as a result of automobile accidents.

According to the current State Health Planning and Development Agency proposal for Federal funding under the National Health Planning and Resource Development Act of 1974, the Health Department employs 15,400 individuals. Of these, 824 are physicians both full-time and part-time and 3,374 are registered nurses and licensed practical nurses. A limited number of private general practitioners, some specialty physicians, and clinical and radiological laboratories work for the department on a contractual basis to complement its services.

The San Juan City Health Department provides primary, secondary, and tertiary care to a population of approximately 464,000. Primary care services are provided through a network of eight diagnostic and treatment centers; secondary and tertiary care at the Municipal Hospital; and supraspecialty services at the Rio Piedras Medical Center. In addition, the municipal government operates two nursing homes. The Puerto Rico Health Department administers preventive and public health services in the Municipality of San Juan.

The services provided by the public health care system are available to about 60 percent of the total population of the island and must be provided according to the standards of the Joint Commission on Accreditation of Hospitals, Medicare, Medicaid, and local legislation. To keep the system operating with these standards and servicing that large clientele, the Puerto Rico Government invests around 10 percent of its total budget in health care services. It has increased its appropriations from year to year, from \$37.8 million in 1965 to \$109 million in 1975, an increase of 188.4 percent in 10 years. During the same period, the municipalities have also increased their share from \$24.2 million to \$53.8 million, or an increase of 122.3 percent in 10 years. Puerto Rico Government and local appropriations for health services to the medically indigent have, therefore,

increased from \$62 million in 1965 to \$162.8 million in 1975, or an equivalent of 162.8 percent in 10 years. The following table presents the increase in local appropriations:

Table 12.—Puerto Rico Government and Local Municipal Appropriations for Health in Selected Fiscal Years

Sources	Appropriations (millions of dollars)	
	FY 1965	FY 1975
Commonwealth	\$37.8	\$149.0
Municipal	24.2	53.8
Total	62.0	162.8

Source: Government of Puerto Rico, Office of the Governor, Testimony of the Governor before U.S. House of Representatives, September 8, 1977.

The Puerto Rico Government has also invested heavily in physical facilities. Around \$210.5 million has been expended from local funds in the construction of diagnostic and treatment centers, area hospitals, regional hospitals, and medical centers to provide services to medically indigent.

During FY 1974 the Puerto Rico share in the construction program amounted to \$18.9 million. This effort was duplicated in FY 1975 when the share reached \$37.3 million, for a total investment of \$56.2 million in the 2 fiscal years. For the same 2-year period the Federal share for the program was only \$6.8 million.

While significant progress has been made in the development of the public health care system, some problems remain. Despite increased expenditures by Puerto Rico, funds are not available to provide all necessary services, particularly nursing home, home health, and mental health services. Also, evidence from audits conducted by the U.S. Department of Health, Education, and Welfare in connection with the medicare program indicate deficiencies in procedures for proper certification of facilities of the public health system under medicare.¹⁶ Many of these deficiencies were found to constitute potential health or physical hazards, and providers were permitted to continue to dispense substandard services for long periods of time. The U.S. Department of Health, Education, and Welfare is working with the Puerto Rico Health Department to improve the procedures for certification of facilities.

The Private Sector Health System

The private sector health system in Puerto Rico consists of hospitals, laboratories, dispensaries, nursing homes, and physicians. It is generally estimated

that approximately one-third of the population receives its medical care from the private sector. Private medical facilities of most if not all types are visibly concentrated in the northeastern (San Juan metropolitan area region of the island.

From 1973 to 1976 private personal consumption expenditures for private sector health care increased from 5.1 percent to 8.8 percent of the gross internal (domestic) product of Puerto Rico—representing, in 1978, a \$543 million expenditure; this level of personal consumption expenditure for private medical care was greater than personal expenditures in the categories of food, transportation, articles for the home, housing, and recreation. Private medical costs and fees have been rising rapidly in Puerto Rico as in the United States over the past decade. During the period 1970–76 expenditures for private medical services increased at an average annual rate of almost 8 percent, and was approximately matched by a medical cost inflation rate averaging 8 percent per year.¹⁷

The Puerto Rico Department of Health has certain licensing and regulatory powers with regard to the private health sector; however, these licensing and regulatory powers represent certification and enforcement of health standards rather than the exercise of private health sector planning and development.

Health Manpower

An analysis of the health manpower situation in Puerto Rico reveals some similarities and differences as compared to the United States and other developed areas. Similar aspects include a relative concentration of physicians and most other health professionals in urban rather than rural areas and populations and a trend toward medical specialization resulting in a decreased relative supply of medical generalists to provide primary care. In contrast, perhaps the most notable difference between the health manpower situation in Puerto Rico and the United States is that the large majority of Puerto Rican medical students are attending medical schools of questionable standards both in foreign countries as well as in Puerto Rico rather than in the few public or private medical schools of recognized standards in Puerto Rico. There has also been a notable influx of foreign-trained, foreign-origin medical personnel (particularly M.D.'s) in Puerto Rico. This influx of foreign physicians has also been a common phenomena in the United States—but insofar as little comparative data is available, it is not possible here to compare statistically the situation in Puerto Rico with that of the United States.

¹⁶ Department of Health, Education, and Welfare, *Audit of Medicare Activities Under Section 1864, Title XVIII of the Health Insurance for the Aged Act, for the period July 1, 1970, to June 30, 1973* (Audit Control No. 50026-02).

¹⁷ Health Systems Agency of Puerto Rico, Inc., 1977, "Puerto Rico Health Systems Plan 1978–82," pp. 376–377 (San Juan, P.R., unpublished draft).

Health manpower can, for analytical purposes, be divided into a series of categories.¹⁸ There were approximately 3,500 doctors (M.D.'s) in Puerto Rico in 1973—representing 122 per 100,000 population overall; however, the number of doctors per 100,000 population varied from 133 in the northeastern region (and 209 in its San Juan metropolitan area component) to 83 in the western region and 68 in the southern region. While physicians are concentrated in urban areas (especially that of San Juan), they also serve to some extent the population of adjacent rural areas—which within a relatively small island 100 miles long by 35 miles wide are not greatly distant; however, Government officials concerned with health care in Puerto Rico consider a more equal distribution of physicians to be more desirable, and certain legal and regulatory practices are designed to require newly licensed physicians to practice only, at least initially, in rural areas (however, with some exceptions). In 1973 an (incomplete) survey of concentration by type of practice revealed 1,050 generalists and 1,670 specialists, with concentrations (per 100,000 population) as follows: pediatrics, 9.4; gynecology, 7.4; internal medicine, 6.1; and surgery, 5.9.

The number of dentists in Puerto Rico in 1973 was 662—representing 22 per 100,000 population overall; this ratio varied from 25 in the northeast region (and 42 in the San Juan metropolitan area component) to 14 in the southern and western regions. Of the total number of dentists, 12 percent (or 77) were specialized.

The number of professional nurses in Puerto Rico in 1973 was 5,025—representing 176 per 100,000 population overall; this ratio varied from 191 per 100,000 in the southern region to 172 per 100,000 in the northeastern and western region—with the unique concentration of professional nurses in the southern rather than northeastern region perhaps representing a compensation for the lowest concentration of doctors there. The number of practical nurses in 1975 was 188 per 100,000 inhabitants; this rate varied from 631 per 100,000 in the western region to 605 in the southern and 501 in the northeastern—again, as with professional nurses, representing a higher concentration in the regions where physicians were lowest.

Pharmacists in Puerto Rico in 1973 numbered 875—representing 30 per 100,000 inhabitants overall, and apparently concentrated in the northeast region. The number of medical technicians was 40 per 100,000 population, and slightly concentrated in the northwestern region (42 per 100,000). The number of health educators in Puerto Rico (1973) was 183, representing 6 per 100,000 population

¹⁸ Unless otherwise attributed, all statistics for these health manpower categories are cited or derived from the source listed in note 33, pp. 321–359.

overall, with a concentration in the northeastern and western regions. Finally, most other paramedical personnel are said to be represented with low personnel to population ratios, but again generally concentrated in the northeast region.

A general assessment of the health manpower situation in Puerto Rico is that the problem is not so much one of scarcity of personnel as it is one of distribution by geographic area and specialty. Moreover, various reports indicate a possible surplus in some categories, especially physicians, within the next 5 years. To a large extent this parallels a similar situation on the U.S. mainland. Another general problem in the health manpower area is, as might be expected, existing public salary levels which—although perhaps otherwise reasonable in Puerto Rico—are too low compared to salaries and incomes in the private sector to permit a relatively stable supply to the public sector; instead, there appears to be considerable turnover in the public sector—partly compensated by allowing doctors in public practice also to maintain a private practice (apparently sometimes with shared hours and patients) and other imperfect incentive mechanisms. Salaries for public sector physicians range from approximately \$15,000 to \$30,000 per year—compared to an estimated private sector income average of \$45,000 to \$50,000.¹⁹

HEALTH PROGRAMS OF THE FEDERAL GOVERNMENT²⁰

Major health programs of the Federal Government involve health care financing, health services, and health resources development. Federal health programs build on the extensive public health care system in Puerto Rico. That public health care delivery system offers public health and preventive services to the entire population and provides medical care to approximately 1.7 million people considered medically indigent. In FY 1977 the Puerto Rico Department of Health expenditures were \$224 million, of which \$55.4 million was from the Federal Government.

Health Care Financing

Medicaid.—Title XIX of the Social Security Act (13.714).²¹

¹⁹ University of Wisconsin—Madison, Center for Medical Sociology and Health Services Research, "Report of the Evaluation Group to the Senate of the Commonwealth of Puerto Rico on the Development of a Universal Health System and on Steps for the Improvement of Health Services" (unpublished report), pp. 53–54.

²⁰ Program information is from material prepared by HEW's Public Health Service describing major Federal health program operating in Puerto Rico, Nov. 7, 1977. Budget information is from HEW tables for Puerto Rico, 1978, Assistant Secretary for Management and Budget.

²¹ Numbers in parentheses are the program identification symbols used in the Catalogue of Federal Domestic Assistance published by the U.S. Office of Management and Budget.

In Puerto Rico medically indigent persons obtain their health care through public health facilities. Under the Medicaid program the Federal Government matches Puerto Rico expenditures for services provided to approximately 1.3 million Medicaid beneficiaries. These beneficiaries are the aged, blind, disabled, members of families with dependent children (as defined by AFDC), and children under the age of 21. Congress has imposed a statutory ceiling of \$30 million on the Medicaid program in Puerto Rico. Within this ceiling Puerto Rico's expenditures for Medicaid services are matched by the Federal Government at a basic rate of 50 percent. The matching rate for the States is based on a formula and can vary from 50 to 83 percent. Currently, Puerto Rico is spending approximately \$130 million on Medicaid services, considerably overmatching the \$30 million.

Puerto Rico is exempt by law from the general Medicaid requirement that States allow beneficiaries to select, from among providers qualified to participate in the Medicaid program, the providers they wish to use. The Puerto Rico Department of Health is the single agency responsible for the administration of the Medicaid program, and virtually all services under the Medicaid program are provided by the public health care system. The Medicaid program is administered through six regional health offices. Since Puerto Rico's public health care system does not include private providers, the Health Department allocates among those six regions the Federal and Puerto Rico funds received in its capacity as provider, taking into consideration services delivered under Medicaid to eligible persons residing in those regions.

In the past, the Medicaid program in Puerto Rico has lacked adequate accounting procedures. Recently a private firm completed a contract with the Department of Health to improve the Department's financial management capability.

Medicare.—Title XVIII of the Social Security Act (13.773-774).

The elderly and disabled entitled to Social Security benefits are eligible to participate in the Federal Medicare program under Title XVIII of the Social Security Act. The Medicare program has two parts. Hospital Insurance (part A) helps to pay for medically necessary inpatient hospital care, care in skilled nursing facilities, and for care at home provided by a home health agency. Supplementary Medical Insurance (part B) is voluntary and helps to pay for physicians services, outpatient hospital services, durable medical equipment, diagnostic laboratory services, and a number of other medical services which are not covered under Hospital Insurance. A pre-

mium is charged for the Supplementary Medical Insurance coverage, currently \$8.20 per month.

The percentage of individuals in Puerto Rico enrolling in part B of Medicare (approximately 50 percent of eligibles) is much lower than in the 50 States (approximately 96 percent of eligibles). There are two reasons for this. First, Social Security benefit payments in Puerto Rico are low because of lower earnings, and many individuals whose primary source of income is Social Security benefits cannot afford the part B premium. Puerto Rico has no "buy-in" program to pay the part B premium for Medicaid beneficiaries. Such buy-in agreements exist in most of the States participating in the Medicaid program. Second, because of the public health system, many individuals do not have an incentive to enroll in part B. In contrast, individuals seeking services from private sources tend to be insured under part B.

Under the Medicare program physicians and hospitals are reimbursed differently. Both public and private hospitals are reimbursed directly on a reasonable cost basis. Thus, whether a Medicare beneficiary is treated in a public or private hospital, the hospital is reimbursed directly by the Federal Government on the basis of reasonable cost. Physicians in public health care are paid a salary by the Department of Health and, although they do not directly bill the Medicare program for their services as do physicians in private practice, services rendered by public health physicians are included in computing the public hospitals' reasonable costs. The regional hospitals bill the Medicare program for covered services provided in primary care clinics to patients who are enrolled in part B of Medicare. Physician reimbursement in the private sector is based on reasonable charges, and reimbursement is made directly to the physician.

Total Medicare payments for services rendered in Puerto Rico in 1976 were \$61.2 million. Five million dollars of this was reimbursement to the Government of Puerto Rico for care rendered to Medicare beneficiaries through the public health system. The remainder was paid for care provided by private practitioners and facilities.

Professional Standards Review Organizations.—1972 Amendments to the Social Security Act (Public Law 92-603).

The establishment of Professional Standards Review Organizations (PSRO's) was mandated by Congress to assure that health care services for which payment is made by Medicare and Medicaid are of acceptable professional quality and are medically necessary. PSRO's are primarily responsible for the review of care in institutional settings. By reducing inappropriate utilization of hospitals, PSRO's should

help control the costs of the Medicare and Medicaid programs.

Department of Health, Education, and Welfare regulations designate Puerto Rico as a single PSRO area. In early 1978 the PSRO was awarded conditional status and began implementation of review. About 40 percent of Puerto Rico's hospitals are expected to be under review by the end of 1978.

Health Services

Community Health Centers.—Section 330 of the Public Health Service Act (13.224).

The Federal Community Health Center Program develops primary health services delivery capacity in medically underserved areas. Project grants are awarded to public or nonprofit private entities in areas where there is inadequate access to health care. Grants help meet the costs of planning, development, and, to the degree necessary, the cost of continuing operations of Community Health Centers. Centers provide medical services with third party reimbursement or payment directly by the patient. Four comprehensive health center grants have been awarded to Puerto Rico. Two of the grantees—for the Loiza Health Center and the Ponce Health Center—are private not-for-profit organizations. The other two projects are sponsored by the Puerto Rican Department of Health and the municipalities of San Juan, respectively. Three of these centers serve urban populations while one serves five rural municipalities in the central mountainous region of the island. Each center provides comprehensive primary care and an entry point to the public health care system. In a sense, these Community Health Centers function like the area primary care health centers of the public health care system. Total Federal funding for community health centers in Puerto Rico is \$4.4 million in FY 1977.

Maternal and Child Health.—Title V of the Social Security Act (13.232).

The program provides financial support to extend and improve services for reducing infant mortality and morbidity, to improve the health of mothers and children, and for services to crippled children. This program provides a formula grant based on the number of births in each State relative to other States. Under the program, funds are provided to the Puerto Rico Department of Health to maintain special projects for maternity and infant care in the metropolitan Bayamon and Ponce Health Regions and a program of intensive care of high risk infants at the tertiary care center at the children's hospital of the University Medical Center. Services may be provided regardless of income and include: hospitalization before and during delivery; medical and nursing care for high risk infants; visits of public health

nurses; screening, diagnosis, and treatment of defects and aftercare of preschool and school children. In addition, this program develops and improves services for locating, diagnosing, and treating children who are crippled or suffering from conditions which lead to crippling, and for providing these children with medical and rehabilitative care. Total Federal funding was \$6.7 million in FY 1977.

Community Mental Health Centers.—Community Mental Health Centers Act of 1970 as Amended in 1975 (13.240).

This program seeks to stimulate the provision of community-based mental health services and to encourage reduction in hospitalization through time-limited startup grants for community mental health centers. Services are provided through project grants to entities servicing catchment areas of 75,000 to 200,000 people. Funds may be used for planning grants for comprehensive mental health services or conversion grants to support development of additional mental health services as required by the law. Grants are awarded on a decreasing percentage basis for a period of 8 years. Twelve mental health centers were funded through the program. Nearly \$5 million was awarded by the National Institute of Mental Health for mental health projects in Puerto Rico in FY 1977.

Alcohol and Drug Abuse Services.—Community Mental Health Center Amendments of 1970; Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970; Drug Abuse Office and Treatment Act of 1972 (13.235, 239, 254, 257, 269).

Alcohol and drug abuse services are organizationally combined in a Department of Addiction Control Services in Puerto Rico. The following Federal programs provide support to Puerto Rican activities.

Alcoholism Community Programs.—Alcoholism community programs support efforts in localities to reduce the seriousness, prevalence, and incidence of alcoholism through community treatment rehabilitation and prevention programs. This program supports treatment and preventive services through:

1. Project grants and contracts to support community efforts to prevent and treat alcoholism. Support is provided on a matching basis. On the average, 80 percent of the funds are from the Federal program.

2. Formula grants to States in support of planning, development, maintenance, coordination, and evaluation of services. The Federal matching rate varies according to a formula of need, which also takes into account population and per capita income.

Puerto Rico received \$1,054,979 as its alcohol formula grant award in FY 1977 for community-based treatment programs.

Drug Abuse Community Program.—Drug Abuse community programs provide partial support of professional and technical personnel for community-based services. The program is geared to reach, treat, and rehabilitate narcotic addicts, drug abusers, and drug dependent persons through two principal components:

1. Project grants and contracts for services, demonstration, and prevention paying the cost of treatment, rehabilitation, and aftercare.

2. Formula grants to States for planning, establishing, and maintaining prevention projects. There is no matching requirement, but current policy encourages the identification and use of alternative funding sources.

Puerto Rico received \$1.9 million for drug abuse, treatment, and rehabilitation and \$1.2 through a formula grant for a variety of drug related activities in 1977.

Disease Control Project Grants.—Public Health Service Act; Lead Based Paint Poisoning Prevention Act of 1973 (13.268, 13.266).

The program assists State and local health authorities and other health-related organizations to control and prevent disease, especially communicable diseases. It awards service and development project grants for venereal disease control, immunization, rat control, and lead-based paint poisoning control. The Puerto Rico Department of Health has received assistance from this program for the control of dengue fever and schistosomiasis. In addition, the U.S. Public Health Service is involved in research and diagnosis of these diseases.

Health Resources

Health Planning.—National Health Planning and Resources Development Act of 1974.

The program endeavors to improve the quality and accessibility of health services, while containing the cost of providing these services and preventing unnecessary duplication of health facilities. It regulates the development of new health facilities by designating and funding local health systems agencies, state health planning and development agencies, and state health coordination councils. These agencies exercise control through the issuance of certificates of need for new health facilities and institutional health services and approval of applications for Federal funds for health programs. In Puerto Rico there is a single health systems agency for the entire island as well as a State health planning and development agency and a State health

coordinating council. Federal funding for Puerto Rico was \$1.6 million in FY 1977. Virtually all money is spent on the salaries of staffs of these planning agencies, rent, and other direct operating expenses.

Health Manpower.—Titles VII and VIII of the Public Health Service Act (13.381–386).

The program has as its special goals to correct geographic and specialty maldistribution of health professionals with an emphasis on increasing primary care, to provide the disadvantaged access to health career, and to promote health education in underserved areas.

It finances special educational programs which provide targeted project grants to schools to train medical and dental students in primary care, train physician and dental extenders, create partnerships with communities through area health education centers, and support recruitment, admission, and placement of students from disadvantaged backgrounds.

Puerto Rico received \$6 million for planning, initiating, conducting, and evaluating health manpower programs in FY 1977. Individual grants were provided to 16 institutions.

The Migrant Health Program.—Section 319, Public Health Service Act (13.246).

This program provides project grants to support comprehensive health care services to agricultural migrants, seasonal farmworkers, and their dependents with priority areas defined as health service areas where the concentration of these beneficiaries is 6,000 or more present at least 2 months of the calendar year. Three projects operated in Puerto Rico as of October 1, 1977, of which two are under the Puerto Rico Department of Health and one under University of Puerto Rico sponsorship. The Puerto Rican Department of Health/Mayaguez project proposes to serve during the 12-month period starting September 1, 1977, approximately 80 percent of the migrant population in 12 municipalities (16,000 population). The Puerto Rican Department of Health/Naranjito project proposes to serve during the 12-month period beginning October 1, 1977, 50 percent (3,000) of the migrant population of the target area of five municipalities. The University of Puerto Rico/Cidra project will serve in the 12-month period starting September 1, 1977, 22 percent (4,000) of the migrant population in five municipalities.

Special efforts to improve and maintain health status of migratory workers will enable these workers to compete in the employment market of the agricultural industry and thereby reduce the burden on the Puerto Rico economy for an otherwise un-

employed or underemployed segment of the population.

Funding level of these projects in FY 1977 was: Puerto Rico Department of Health/Mayaguez \$708,180, Puerto Rico Department of Health/Naranjito \$225,000, University of Puerto Rico/Cidra \$738,470; total of \$1,671,650.

National Health Service Corps.—Title VII of the Public Health Service Act (13.258).

The National Health Service Corps is designed to improve the delivery of health services in manpower shortage areas through the assignment to such areas of members of the corps (physicians, dentists, physician extenders, and other health professionals). These areas are designated as health manpower shortage areas by the Secretary of HEW after consultation with State and local health planning agencies. Many of the new corps personnel are assigned to primary health centers operated in conjunction with other health services programs. Services provided by corps assignees are available to anyone who wishes them, with fees based on ability to pay. The program reimburses a portion of fees collected to those entities having corps personnel assigned in order to help cover costs of management and other expenses related to providing health services. National Health Service Corps personnel in Puerto Rico are currently assigned to solo or dual practice sites or to sites receiving Federal support through migrant health and rural health initiative programs.

Rural Health Initiative (RHI).—Section 330, Health Service Act.

This program is an administrative effort of the Federal Public Health Service to integrate (conjointly fund) several Federal health programs with State and local programs and resources to create or expand primary care capacity in rural medically underserved areas. Among the Federal resources relevant to Puerto Rico are community health centers, migrant health, National Health Service Corps, family planning, and maternal and child health programs. The rural health initiative project grant authority derives from the Section 330 Community Health Centers legislative authority and is awarded up to a maximum of \$200,000 per initial grant.

Two grants to the Puerto Rico Department of Health have been awarded in Puerto Rico and integrated with existing primary care services at Rincon and at the central areawide project serving five mountain towns (Naranjito, Barranquitas, Orocovis, Corozal, Comercio) in the central part of the island. Four additional grants to the Puerto Rico Department of Health will establish sites at Camuy, Quebradillas, Maunabo, and Patillas. These grants augment the primary care capability of these Puerto Rico Department of Health health centers by increasing medical, dental, clinical, and administrative support staff of these centers. These projects also make use of National Health Service Corps manpower at the delivery sites.

Funding level of these projects in FY 1977 was: PRDH/Rincon \$190,058, PRDH/Naranjito \$132,000, PRDH/Camuy, Quebradillas, Maunabo, Patillas at \$200,000 each. The total is \$1,122,058.

Chapter III.—Educational Attainment and the School System

GENERAL CONDITIONS AND TRENDS IN EDUCATION IN PUERTO RICO

During the past three decades, Puerto Rico has moved from education for some to some education for all. In 1940 only half the eligible school-age children were in school; now four out of five are. Nearly 30 percent of the men, women, and children of Puerto Rico are now enrolled in some type of educational institution—day or night, academic or vocational, public or private, elementary, secondary, college, professional, correspondence, television, veteran's rehabilitation, short-term job training, etc. This growth, and this proliferation of schools has not, however, been accomplished without price. Some educational standards, at least, have declined

and there are severe problems in the operation of the educational system.

Public and private school enrollment has increased rather rapidly and significantly since 1940, as illustrated in tables 1 and 2 below. From 1940 to 1976 (1) total enrollment more than tripled—from 303,000 to 914,000, (2) public elementary and secondary school enrollment increased from 286,000 to 710,000, (3) private elementary and secondary enrollment increased from 11,000 to 99,000, (4) enrollment in the University of Puerto Rico increased from 5,000 to 51,000, and (5) enrollment in private colleges and universities increased from 400 to 54,000. At the same time, the population of Puerto Rico increased by 68 percent—from 1.9 million to 3.2 million. Thus, the high rates of increase for all types of educational enrollment

Table 1.—Enrollment in Public and Private Schools in Puerto Rico, Selected Fiscal Years, 1940–76

[Enrollment in thousands]

Schools	1940	1950	1960	1970	1976
Total all institutions	303	443	652	750	914
Public schools, grades 1–12	286	408	573	612	710
Private schools, grades 1–12	11	23	54	81	99
Subtotal, public and private schools, grades 1–12	(297)	(431)	(627)	(693)	(808)
University of Puerto Rico	5	11	18	38	51
Private schools of college level	0.4	1	6	19	54
Subtotal, public and private colleges and universities	(5)	(12)	(24)	(57)	(105)

Source: Government of Puerto Rico, Office of the Governor 1977 *An Agenda for a Socio Economic of Puerto Rico*, part I, table 3.

Table 2.—Index of Growth of Enrollment in Public and Private Schools—Puerto Rico, Selected Fiscal Years, 1940–76

Schools	1940	1950	1960	1970	1976
Total all institutions	1.0	1.5	2.2	2.5	3.0
Public schools, grades 1–12	1.0	1.4	2.0	2.1	2.5
Private schools, grades 1–12	1.0	2.1	4.9	7.4	9.0
Subtotal, public and private schools, grades 1–12	1.0	1.4	2.1	2.3	2.7
University of Puerto Rico	1.0	2.2	3.6	7.6	10.2
Private school, college level	1.0	2.5	15	48	135
Subtotal, public and private college and universities	1.0	2.4	4.8	11.4	21

Source: Derived from table 1.

result more from increases in enrollment and retention—as indicated in table 3 below—than from

Table 3.—Percentage of the Schoolage Population Attending School, Puerto Rico, 1940–41 to 1976–77

Age bracket	1940–41	1950–51	1960–61	1970–71	1976–77 ^a
6–12	64	75	90	96	89
13–15	45	69	83	91	84
16–18	14	31	43	50	46
6–18	48	65	79	86	78
19–22 ¹	3	8	16	29	48

¹ Percentage relationship between population age group 19–22 and enrollment in postsecondary institutions generally serving this age group.

^a Figures for previous years (1949–50 and 1959–60).

^a Apparent decline in enrollment rates after 1970 may be statistical error due to several factors, including (1) increase in number of private schools—some of which do not comply with voluntary enrollment reporting program, (2) noninclusion of night school enrollment in advanced grades in above statistics, (3) errors in population age group estimates resulting primarily from incomplete data on and problems in estimating net migration by age group between Puerto Rico and (primarily) the U.S. States, and (4) some impact of changes in the population age structure on the overall age group enrollment rates.

Source: Puerto Rico Education Department, Puerto Rico Planning Board.

increases in population itself. It must be added, however, that while enrollment and retention rates have generally reached a fairly high level no longer subject to dramatic increases, the population growth rate in Puerto Rico is still high and can be expected to affect significantly total and higher level educational enrollment. In the last several years, however, a decline and leveling of the birthrate has begun to reduce the historical demographic pressure on enrollment—a phenomenon already experienced at lower grade levels. In 1977 there was a reversal of this trend, as a result of increases in first-grade enrollment as well as increases in students transferring from mainland schools.

Accompanying the rapid increase in enrollment—especially between 1940 and 1960—were corresponding strains on educational services. There were: heavy increases in pupil/teacher and pupil/classroom ratios; a decline in cumulative retention rates; a decrease in teacher training, experience, and duration of employment in the public school teachers; and use of double and interlocking sessions.

THE SCHOOL SYSTEMS OF PUERTO RICO

The Public Elementary and Secondary School System

The Department of Education of Puerto Rico is responsible for the planning and administering of the public elementary and secondary education and the licensing of private educational institutions. Efforts are geared towards enrolling all school-age children

and to retain them in school as long as possible. Thus, free educational services are given at the elementary and secondary levels and in academic and vocational schools. There are also special adult educational programs such as evening courses, extension courses, educational radio and television programs, and community education services.

The Puerto Rico educational system is not funded through local property and other tax levies or local bond issues. Rather, it is centrally funded, using over 25 percent of the Government's general fund. There are no local educational agencies in Puerto Rico. There are only a few mechanisms for direct citizen involvement in policymaking or administration. All Federal funds are applied for, coordinated, and administered by the Puerto Rico Education Department.

Data from the U.S. Office of Education indicate that Puerto Rico is the second largest school system in the United States. Only New York City's system is larger. The Puerto Rico Department of Education operates through three levels: the central office, six regional offices, and 100 local school district offices. The central office is responsible for all aspects of the educational system at the elementary and secondary school levels, including the finances, personnel, curriculum, textbooks, teacher certification, purchase and distribution of materials, and supportive services for all school districts; it delegates operational authority to other levels.

Given the high poverty level on the island, a system of local taxes for education is considered to be unrealistic. There has been a relative decline in funding in recent years. In 1969 and 1972 elementary and secondary education expenditures were more than 28 percent of the Commonwealth budget, compared to 25 percent today. Per pupil expenditures in Puerto Rico were \$694 in 1977, compared to \$1,740 for the United States as a whole, and \$900 for Arkansas, the State with the lowest per pupil expenditure.

Manifestations of the underfinanced condition of the Department of Education are seen in the condition of its physical facilities, in the preparation of its teaching staff, in its paucity of textbooks, and in its practically nonexistent student services.¹

Physical Plant Facilities.—As school enrollments increased threefold in the past 30 years, the expansion, construction, and maintenance of physical facilities lagged behind. School buildings have for many years been unable to accommodate the number of students enrolled. The Department of Education

¹ The following information on the physical plant facilities, teachers, school schedules, textbooks, and auxiliary services is paraphrased from testimony of the Secretary of Education Carlos Chardón before House Subcommittee on Elementary, Secondary, and Vocational Education, Nov. 10, 1977. The general conditions described were confirmed by inspection of HEW personnel in a site visit conducted in October and early December of 1977.

estimates that a sizable part of the school-age population does not attend school due, in part, to the lack of physical facilities to accommodate them. Puerto Rico has had to resort to double-enrollments, interlocking, and 5-semester schedules in order to make room for and provide some classroom-contact hours to each student. Yet 20 percent of the students reportedly receive less than 6 hours of schooling daily.

There are 1,860 school nuclei. A nucleus consists of either one large building (usually in urban areas) or a grouping of small school buildings (mostly in rural communities). There are 21,448 classrooms serving an enrollment of 722,121 day students.

All school facilities are in need of repairs and 60 percent require major improvements. Overcrowding and serious building deterioration have resulted in substandard sanitary conditions. Funds for construction and repairs are limited. Resulting physical deterioration has invited disrespect for school property and an increasing incidence of vandalism.

School buildings are also inadequate in other respects, such as poor building materials (many are wooden structures), poor locations, and haphazard physical layouts unsuited to functional use. Some 6,500 classrooms are made of materials that do not provide adequate protection. At the kindergarten level more than half of all classrooms are not constructed to withstand the hazards of termites, hurricanes, floods, or vandalism. They are primarily temporary structures. There are 513 schools consisting of three or fewer classrooms, 99 percent of which are at the elementary level. Most of these, 95 percent, are in rural areas.

Teachers.—Given a salary scale ranging from \$465 to \$616 per month, the teaching profession is not always the first career chosen by college graduates. Over 28 percent of the 27,209 teachers do not have a bachelor's degree and only 4 percent hold degrees beyond that. A critical area is in the teaching of English. A 1974 study showed that at the elementary school level less than 3 percent of the teachers in grades 1-3 were certified to teach English. Teachers certified only for elementary school do not have a command of the English language and, therefore, adequate English cannot be taught successfully. This results in low or no student achievement in English, which constitutes a problem not only in Puerto Rico, but even more seriously for families that migrate to or from the mainland.

School Schedules.—Because of classroom shortages, Puerto Rico must use an interlocking system and double enrollment to extend educational opportunities to some students. In the interlocking system, two groups of students, each with its own teacher, share the same classroom at different times in 5-hour

daily shifts. In double-enrollment, one teacher has two different groups, each of which receives 3 classroom-contact hours. During FY 1976-77, more than 722,000 students were served through the interlocking or alternate class schedules, double-enrollment, and 5-semester system.

Double enrollment exists only in the elementary school and is concentrated in the rural areas. As of August 1976 there were 29,500 of those students in this type of organization. Ninety percent of those students in double-enrollment were in the first to third grades and the other 10 percent were in the fourth to sixth grades. Eighty-five percent of those students from the first to sixth grade were concentrated in rural areas.

Textbooks.—The goal of providing each child with one textbook for every curriculum subject area has never been met. On the average, less than 50 cents per child has been spent annually on instructional materials over the past years.

Auxiliary Services.—Nonacademic student services are severely limited. In his 1976 report to the Governor, the Health Commissioner indicated that emotional and behavioral problems constitute the chief public health and social problem in Puerto Rico, accounting for over 20 percent of all chronic health conditions and ranking ahead of circulatory and respiratory diseases. Public schools in Puerto Rico provide no nurses, no doctors on site, and only one counselor per 2,100 children. In addition, school transportation, physical education, art, music, and other enrichment programs are marginally offered in Puerto Rico. In 1976-77 there were only 275 physical education teachers, 232 music teachers, and 198 art teachers to serve the entire school population. There are no substitute teachers.

Private Elementary and Secondary School System

From 1940 to 1976 the private school system grew three times more rapidly than the public school system in Puerto Rico—increasing its percentage of the total public and private student body from 4 percent in 1940 to 12 percent in 1976.² This private student body is generally made up of both children of North American descent as well as the children of the middle and upper socioeconomic classes of Puerto Rican and other descent.

The private school system in Puerto Rico includes both nonsectarian and church-sponsored schools. Nonsectarian schools generally conduct their classes in English, with Spanish as a course offering. Catholic and Protestant schools normally employ both languages and textbooks are in English for most

² Percentages figures derived from table 1.

subjects. There are over 80 private sectarian and nonsectarian schools with facilities for English-speaking children in Puerto Rico. Nearly all are accredited by the Department of Education of Puerto Rico. The majority provide complete academic instruction from kindergarten through high school.

There are 115 Catholic schools in the 76 municipios (county-like divisions which include surrounding areas near towns) of Puerto Rico. Most of them have special facilities for U.S. mainland students. Nuns and priests, many of them from the mainland, comprise the largest part of the teaching staffs.³ Most Catholic schools provide facilities for English-speaking children. Classes are conducted both in Spanish and English; that is, English-speaking and Spanish-speaking children learn together in one classroom, with special attention given to non-Spanish speaking students. The teachers are generally bilingual. Private transportation to and from private schools is provided by many of these institutions.

The Public University of Puerto Rico⁴

The University of Puerto Rico is supported by the Government and consists of three campuses: the Rio Piedras Campus, Mayaguez Campus, and the Medical Sciences Campus located at Rio Piedras. There are also two 4-year colleges at Cayey and Humacao, and five 2-year regional colleges located at Aguadilla, Arecibo, Bayamon, Carolina, Humacao and Ponce. These operate under the control of the Chancellor of the Administration of Regional Colleges. The system is coeducational and partly bilingual. It offers graduate, professional, and 5-, 4-, and 2-year programs. Academic degrees are granted in the usual fields of study. Total graduates numbered 8,013 in 1976-77. Fall enrollment for 1976-77 was 60,225, including full- and part-time students. The university is fully accredited by the Middle State's Association as well as a variety of specialized professional accrediting associations.

The university has been supported by the Government since its establishment in 1903. The governing board is the Council on Higher Education composed of the Secretary of Public Education and eight members appointed by the Governor, who represent the public interest in higher learning. The president of the University of Puerto Rico, who is appointed by the Council on Higher Education, is the director of the entire university system. The various campuses are directed by a chancellor with an administrative

board as advisory body. The regional colleges form a subsystem. The Cayey and Humacao University Colleges are under the authority of a director and are directly responsible to the president.

Academic staff for 1976-77 numbered 3,096: 425 professors, 688 associate professors, 888 assistant professors, 936 instructors, 95 assistant instructors, and 56 lecturers. Of this total 1,020 held doctoral degrees; 1,757 had masters degrees; 270 held baccalaureates; and 49 others obtained degrees in foreign countries in which degree classification is different.

The FY 1977 budget for the University of Puerto Rico was \$179 million. Of this amount 21 percent came from U.S. Federal appropriations, and 79 percent came from Puerto Rico Government appropriations and other sources—including 6 percent from tuition and fees. Of the 41,000 full-time students—29,000 or 71 percent were receiving scholarships averaging \$1,060 each (for a total of \$31 million).

The low percentage of revenue from tuition and fees may be explained by the high level of scholarship assistance plus the fact that the average tuition for Puerto Rico public institutions in 1974-75 was lower than the average tuition for public institutions in any of the 50 States (according to the United States National Center for Education Statistics). Public university tuition in Puerto Rico is under \$100 per semester for most, if not all, undergraduate and graduate programs. Until recently there was no administrative distinction between residents and nonresidents of Puerto Rico with regard to tuition and fees. In recent years fees have been raised to \$1,500 per year for foreign residents and to a varying amount for nonresidents who are residents of the U.S. mainland and who pay rates equal to what would be charged a resident of Puerto Rico at State colleges and universities of the particular State involved.

The Private College and University System in Puerto Rico

There are approximately 70 private postsecondary institutions in Puerto Rico.⁵ The majority of these are small proprietary, secretarial, vocational, or technical institutions. The principal private institutions are: Inter-American University with campuses in San German, San Juan, Guayama, and Fajardo; the Catholic University of Puerto Rico with a campus in Ponce, and the Ana G. Mendez Educational Foundation with two Puerto Rican junior college campuses in San Juan and Turabo College campus in

³ Commonwealth of Puerto Rico, Economic Development Administration, Office of Economic Research, 1976, "Educational Facilities in Puerto Rico."

⁴ This description of the public university of Puerto Rico is paraphrased from University of Puerto Rico, Central Administration, Office of Academic Affairs, "Annual Institutional Data Summary 1976-77," pp. 2-3.

⁵ U.S. Department of Health, Education, and Welfare, Education Division, National Center for Educational Statistics, Office of the Administrator, Memorandum of Dec. 2, 1977, to the Special Assistant to the Deputy Secretary for Education.

Caguas. Total enrollment in the three main private college and university systems in 1976-77 was 48,000.⁶

Private colleges and universities depend much more heavily on tuition and fees than the University of Puerto Rico, and, as would be expected, these tuition and fees are much higher than those of the public university. Federal scholarship and other aid to students has become a major indirect source of income for private colleges and universities in Puerto Rico. While the Puerto Rico Government's contribution through scholarships has been maintained at a constant level, in recent years Federal aid contributions to students have generally increased. Thus, private colleges and universities and other post-secondary educational institutions in Puerto Rico have indirectly become increasingly dependent on U.S. Federal funds for direct aid to their students.

SIGNIFICANT PROBLEMS IN EDUCATION

A massive effort to expand enrollment and enrollment ratios permitted the achievement of near-universal enrollment of all elementary school-age children by 1960. There were also corresponding escalations in secondary enrollment ratios. Yet these developments have not been accompanied by commensurate increases in educational output, either qualitatively or quantitatively.

The major problems relating to education in Puerto Rico are: the development of a segregated two-class school system; inadequate facilities in the public elementary and secondary school system; low achievement and high illiteracy; lack of educational facilities and programs for handicapped children; inadequate bilingual education in both English and Spanish; and inadequate vocational education and lack of technical training in colleges and universities.

Two-Class School System⁷

In Puerto Rico, partly as a direct result of the influence of the United States and partly in reaction

⁶ Puerto Rico Planning Board, 1977, *Compendio de Estadísticas Sociales 1977* [Compendium of Social Statistics 1977], p. 75.

to the history of Spain (where the church had had an effective monopoly on education), government's role as a supplier of educational services is viewed quite differently from government's role as a supplier of other social services. In Puerto Rico, at least until recently, it has generally been assumed that government should provide schools for everyone. Under no other assumption could near-universal education have become a reality in Puerto Rico. However, social and economic changes, induced partly at least by more universal education, have broken the practical monopoly which the Puerto Rico Government has historically enjoyed in the supply of education services. With increasingly higher incomes many Puerto Rico families have become increasingly selective about where they send their children to school. The tendency of those who can afford it is now to send their children to private schools. It is noteworthy, however, that in sharp contrast to public hospitals, public housing, and public welfare, the clients of the public schools two decades ago were largely the children of families with above-average income.

The percentage of all children in grades 1-12 who are enrolled in private schools has risen from 4 percent in 1940 to 12 percent in 1976. In the same time period the percentage of all college and university students enrolled in private institutions rose from 7 percent to 52 percent—while the percentage enrolled in the public University of Puerto Rico has declined from 93 percent to 48 percent. Table 4 documents these trends for 1940-76.

The 12 percent of children in grades 1-12 who are enrolled in private schools in Puerto Rico is comparable to an overall U.S. percentage of 10.7. However, the 52 percent of college and university students in private institutions in Puerto Rico contrasts sharply with the overall U.S. percentage of 21. While there are undoubtedly many positive aspects of this situation, at least one major negative aspect would seem to be the clear emergence of a two-class school system reinforced by and reinforcing social and economic segregation in Puerto Rico. As a result, the

⁷ This section is partly paraphrased from Everett Reimer, *et al.*, 1966, *The "Client Analysis" Approach to Social Programming*, pp. 17-18. (Washington, D.C.: Pan American Union, Department of Social Affairs, Technical Document UP/Ser. H/VII. 43).

Table 4.—Percentage Enrollment in Public and Private Schools in Puerto Rico,
Selected Fiscal Years, 1940-76

Schools	1940	1950	1960	1970	1976
Public schools, grades 1-12	96	95	91	88	88
Private schools, grades 1-12	4	5	9	12	12
Total public and private schools, grades 1-12	100	100	100	100	100
University of Puerto Rico	93	91	75	67	49
Private schools of college level	7	8	25	33	51
Total public and private colleges and universities	100	100	100	100	100

Source: Government of Puerto Rico, Office of the Governor, *An Agenda for a Socio-Economic Study of Puerto Rico*, Part I, table 13.

more privileged in Puerto Rico have abandoned the public elementary and secondary school systems to the less privileged. Ironically, the 12 percent of graduates from private high schools in Puerto Rico have in recent years represented 36-40 percent of admissions into the most sought after Rio Piedras Campus of the University of Puerto Rico; conversely, less well-educated graduates of public high schools have represented a disproportionate percentage of admissions into the less sought after (and much more expensive) private colleges and universities.⁸ Thus, public funds of the Puerto Rico Government which finance the public universities benefit the affluent students. The private universities, supported to a larger extent by Federal student assistance programs, benefit the less affluent.

Another indication of the wide disparity between public and private elementary and high schools is a higher dropout rate in public schools compared to private schools. As a result, only about one-third of persons entering public school in 1964-65 later graduated, while almost all those entering private schools at the same time later graduated.⁹

Facilities of the Public Elementary and Secondary Education System

The inadequacy of the physical plant of the elementary and secondary education system, described in previous sections of this report, is in itself a significant problem in education.

A study prepared by Puerto Rico's General Services Administration provides the estimates of resources required to provide adequate facilities which are shown on table 5. The FY 1978 budget for the Commonwealth of Puerto Rico published in July 1977 identifies only \$8 million for capital improvements of education facilities.

Under the existing government structure, the construction and maintenance of school buildings are not the responsibility of the Department of Education. Rather, Puerto Rico's General Services

Administration and its Public Building Authority are in charge of the public buildings. One exception is the Health Department which now controls the public hospitals and health care centers.

Low Achievement and Illiteracy¹⁰

Sixty percent of the children enrolled in the first grade in the 1964-65 school year reached the ninth grade and only 36 percent received a high-school diploma. In the U.S. mainland approximately 75 percent received a high-school diploma. The median number of years completed in school in Puerto Rico according to the U.S. 1970 Census was 6.9. The national median is 12.1. The lowest median among the States was 9.5.

The student failure rate is also high, particularly in the elementary schools. It reaches 13 percent in the first grade, 9 percent in the second grade, 8 percent in the third, and 4 percent in the fourth grade.

It has been estimated that the illiteracy rate in Puerto Rico is over 10 percent. Out of 2 million persons 10 years old and over, more than 200,000 are unable to read and write in any language and almost 100,000 are functionally illiterate.

The largest number of illiterates are located in the central and northwestern parts of Puerto Rico, which is the rural area of the island. Topographical features in the region and socio-economic conditions of a large number of families residing in these areas have limited the availability and scope of programs to overcome illiteracy.

The illiteracy problem is aggravated by the rate of school dropouts and failures. The percentage of withdrawal in regular days schools was 5.1 percent from 1971-72 to 1975-76. Yet illiterates in educational programs do well once enrolled. Of 17,849 illiterates who enrolled in education programs, 13,365 were promoted to a higher level of literacy. Also, every year approximately 3,000 illiterate persons acquire minimum reading skills.

¹⁰ U.S. Department of Health, Education, and Welfare, Education Division, Special Assistant to the Deputy Assistant Secretary for Education, Memorandum of Sept. 1, 1977.

Table 5.—Estimated Cost of New and Improved Facilities for Elementary and Secondary Education

[In millions of dollars]

Item of Expenditure	Total	1977-78	1978-79	1979-80	1980-81
Construction of new facilities ¹	169.5	50.0	26.0	78.9	14.6
Permanent improvements ²	30.2	12.2	8.0	8.0	2.2
Repairs and maintenance	49.5	12.4	12.4	12.4	12.4
Rent to public buildings authority ³	66.7	13.6	13.6	14.7	24.8
Total	316.2	88.2	60.0	114.0	54.0

¹ Based on investment program for 71 new schools recently completed and 64 schools now under construction by the Public Buildings Authority.

² Based on a school-by-school study conducted by the General Services Administration.

³ Based on construction schedule and anticipated rents provided by the Public Buildings Authority.

Source: General Services Administration, Commonwealth of Puerto Rico.

Education of Handicapped Children¹¹

The Department of Education of Puerto Rico defines as handicapped any child who is mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, emotionally disturbed, orthopedically impaired, or suffering from other health impairments or specific learning disabilities—and who because of these impairments needs special educational services.

Based on data collected on children registered in other child activities during October 1974 to February 1977 it is estimated that there are 77,000 handicapped children on the island. Of these, 55,000 were attending regular classes or other special programs to ameliorate their condition. Of the remaining 22,000 there are 12,000 handicapped children receiving special education or complementary services while the other 10,000 children in this category are receiving no educational services. They are outside the school system, and there is no public institution to assist and work with handicapped children on the island.

Of the 3,239 children ages 3 to 5 identified as handicapped, only 344 were receiving instructional services in regular or special education classrooms; these are in private institutions. Lack of prevocational or vocational training for the handicapped, lack of adequate classroom facilities and specially trained personnel, insufficient resources for early identification, lack of scholarship funds, and lack of personnel for followup activities prevent delivery of adequate services to this group.

Bilingual Education¹²

Student achievement in English skills at the elementary and secondary level is far below the objectives set by the Department of Education. The low achievement rate can be attributed in part to a shortage of qualified teachers. Less than 3 percent of those teaching English in the first three grades and 30 percent of those teaching English at the elementary level are certified. The situation improves at the junior and senior high school level. Respectively, 40 percent and 90 percent of the teachers are certified. Approximately 5,000 teachers need to be retrained or replaced for the teaching of English in the public schools of Puerto Rico. Lack of textbooks, audiovisual aids, and other materials also hampers the language program.

Low or no achievement in English constitutes a

basic problem that extends to the mainland; as Puerto Ricans migrate to the U.S. mainland, the language barrier is an impediment to economic mobility within the U.S. social structure.

Another aspect to the bilingual problem which is unique in Puerto Rico is the cultural and language barrier faced by return migrants. In 1976 alone 65,000 Puerto Ricans migrated to the island. The vast majority of the return migrants have adopted the language and cultural patterns of the American mainland. Upon their return to the island, these migrants find that the new cultural patterns, together with language handicaps in Spanish, constitute a barrier in their struggle to adapt socially and culturally to the island.

A 1975 study sponsored by the Office of Coordination of Education Service to Migrants, Department of Education, showed that there were more than 42,000 return migrants in the school population at the elementary and secondary public schools. Poor academic achievements and school desertions are two of the side effects of the inadequate command of Spanish by the returning migrants. The language barrier together with the different cultural patterns causes a cultural clash between the migrant and nonmigrant student, leading to socially related mental problems.

Vocational Education¹³

Vocational education is offered in business, industrial, agricultural, health, home economics, and marketing distribution fields. However, a lack of reliable data regarding occupational demands hampers effective planning. There also is a serious need to repair and remodel physical facilities of vocational technical schools.

Of the total 491 facilities available for vocational training purposes, 203 are used for occupational training. Approximately 35 percent of these need to be repaired. The deterioration in some of the shops or classrooms, especially due to roof leakage, results in damage of equipment and dangerous risk to students and personnel in those shops where electrical machines are used. Equipment in many of the shops of vocational schools is deficient and obsolete and little technical material and equipment exists. There also is a lack of comprehensive vocational guidance and counseling in both prevocational and vocational stages of student training. Shortcomings in the upgrading and retraining of occupational teachers to cope with advancement of industrial technology and educational methods pose additional problems.

¹¹ U.S. Department of Health, Education, and Welfare, Education Division, Special Assistant to the Deputy Assistant Secretary for Education, Memorandum of Sept. 1, 1977.

¹² U.S. Department of Health, Education, and Welfare, Education Division, Special Assistant to the Deputy Assistant Secretary for Education, Memorandum of Sept. 1, 1977.

¹³ U.S. Department of Health, Education, and Welfare, Education Division, Special Assistant to the Deputy Assistant Secretary for Education, Memorandum of Sept. 1, 1977.

FEDERAL PROGRAMS FOR EDUCATION¹⁴

Grants for the Educationally Disadvantaged

Title I of the Elementary and Secondary Education Act of 1965 (14.422-431)¹⁵

This formula grant program provides funds for compensatory education services to meet the special needs of educationally disadvantaged children. A count of poor school-age children, the number of children in nonpoor families who are receiving benefits under the program of Aid to Families with Dependent Children (AFDC), the number of institutionalized children, and the per pupil expenditures of each State are the basis for the formula funding. Special provisions of the law restrict Puerto Rico's entitlement to less than it would receive if it were like a State.

During FY 1977, Puerto Rico received \$56 million in title I funds. The amount has been increasing each year. During FY 1978 Puerto Rico will receive \$75 million, and the 1978 amendments increased this to \$102 million in FY 1979. It is, therefore, the largest program providing financial assistance to the elementary and secondary school system. The most recent program performance report indicated that 236,000 children were served during FY 1975. Title I funds go to all local districts and are used for teaching Spanish, English, and mathematics. In the past, title I funds were also used for general upgrading of education.

Bilingual Education

Title VII of the Elementary and Secondary Education Act of 1965 (13.403).

The program provides financial assistance to local school districts to develop and carry out programs designed to meet the educational needs of children of limited English-speaking ability. Project grants are awarded to local school districts, State departments of education, and institutions of higher learning for demonstration projects of 1 to 5 years to plan and implement bilingual programs, develop materials, train teachers, and disseminate the results of these efforts. Following completion of the project grant, local school districts are expected to assume responsibility for providing the most valuable services identified by the project. In FY 1977, Puerto Rico received \$491,000 in funds for this program.

¹⁴ Program information is from material prepared by HEW's Office of Education describing major Federal education programs operating in Puerto Rico, December 1977. Budget information is from HEW table for Puerto Rico, 1978, Office of the Assistant Secretary for Management and Budget.

¹⁵ Numbers in parentheses are the program identification symbols used in the Catalog of Federal Domestic Assistance published by the U.S. Office of Management and Budget.

Vocational Education

Vocational Education Act of 1963 (13.493, 494, 495, 499, 500).

This program provides training for youth and adults to increase their occupational skills so that they may be able to compete more effectively in the labor market. Programs include basic grants, program improvement, supportive services, special programs for the disadvantaged, and consumer and homemaker education.

The basic grant program provides States with formula grants for vocational education services at a Federal/State matching ratio of 50/50. Funds are allocated according to population age ratios. The State education department is required to set aside 20 percent of the basic grant for disadvantaged students, 15 percent for postsecondary programs, and 10 percent for the handicapped.

Puerto Rico received approximately \$8.5 million during FY 1977 for vocational education. In addition, project grants were awarded for vocational education curriculum, research and innovation, and bilingual vocational training.

Handicapped Education

Parts B, C, and G of the Education of the Handicapped Act (13.444, 445, 449, 450).

This program consists of two parts:

1. Through the State assistance program a formula grant based on the number of handicapped children and average per pupil expenditures helps pay additional cost of educational services for the handicapped; contracts are awarded to regional, State, local, and private organizations to provide specialized educational and diagnostic services for blind and deaf children; and project grants are awarded to States to encourage the expansion of educational services to preschool children, ages 3 to 5.

2. The Special Population Programs award contracts and grants through national competition to develop and demonstrate methods for teaching the severely handicapped, children with specific learning disabilities, and handicapped preschool children.

Puerto Rico received approximately \$1.5 million for handicapped education in FY 1977.

Adult Education

Title III of the Adult Education Act (13.400).

The program promotes the establishment of public education programs which provide adults with the opportunity to achieve basic and secondary level educational competency, including training leading to meaningful employment. Formula grants

at a 90-percent Federal match are provided on the basis of the number of residents above 16 years of age who have not completed high school.

The focus of the adult education program in Puerto Rico is to develop new methods to deal with illiteracy problems in the island, experiment with new methods to upgrade the adult population's academic level to at least the 12th grade, and improve adult performance level in English by experimenting with new techniques. Approximately 19,600 adults participated in programs in 1977 supported by \$1.2 million of Federal funds.

Right to Read

Title VII Educational Amendments of 1974 (13.533).

The program provides services and resources to stimulate educational institutions, governmental agencies, and private organizations to improve and expand their activities related to reading.

It is a national effort for developing and improving the reading skills of all citizens, enabling each to function effectively in society. The long-range goal is to eliminate functional illiteracy. Puerto Rico received \$183,000 from the Federal Government for right to read in FY 1977, about half going to the Department of Education and half to the public schools in the district of Loiza.

Student Financial Assistance

There are currently six programs administered by HEW's Bureau of Student Financial Assistance, all of which are available in Puerto Rico. These programs are the Basic Educational Opportunity Grant Program, the Supplemental Educational Opportunity Grant Program, the College Work Study Program, National Direct Student Loan Program, the Guaranteed Student Loan Program, and the State Student Incentive Grant Program.

These programs provide significant financial supplements to Puerto Rico's postsecondary education system. They may be the primary reason why the private system has seen phenomenal growth in recent years.

There are currently 42 institutions in Puerto Rico that are eligible to participate in the Basic Educational Opportunity Grant Program. Under this program students apply directly to the U.S. Office of Education for financial assistance grants. The institutions act only as disbursing agents for the program. Applicants must be undergraduates enrolled on at least a half-time basis in eligible institutions. The amount of award is based on a determination of the student's eligibility and cost of education at the institution. In the 1978-79 aca-

ademic year the awards will range from \$200 to \$1,600. Puerto Rico received \$88.6 million for basic grants in 1976-77, compared to \$57 million in 1975-76. The number of recipients rose from 55,435 in 1975-76 to 89,338 in 1976-77. Students of the University of Puerto Rico received \$25 million in assistance while Inter American University students received \$27 million. In comparison, the entire State University of New York system received \$25 million in 1976-77.

Supplemental Education Opportunity Grants along with National Direct Student Loan and College Work Study programs are administered by the financial aid officers at the institutional level. Thirty institutions of postsecondary education in Puerto Rico participate in these programs. The grants are for students of exceptional financial need who, without the grant, would be unable to continue their education. Grants range from \$200 to \$1,500 a year. Puerto Rico was awarded \$3.8 million in 1977 and \$3.7 million for 1978.

The National Direct Student Loan Program is for students enrolled at least half time in a participating postsecondary institution and who need a loan to meet their educational expenses. Students may borrow up to (a) \$2,500 if they have completed less than two years of a program leading to a bachelor's degree; (b) \$5,000 if they are undergraduate students who have already completed 2 years of study; (c) \$10,000 for graduate study. Repayment begins 9 months after the student graduates or leaves school. The student has 10 years to pay back the loan at 3 percent interest. In 1978, \$3.4 million was provided to residents of Puerto Rico under this program.

The College Work Study Program provides jobs for students who have great financial need and who must earn a part of their educational expenses. Students are employed for an average 20 hours a week on or off campus with a public or private non-profit agency. Puerto Rico received \$6.7 million in 1977 and \$6.1 million in 1978.

The Guaranteed Student Loan program enables students to borrow directly from lenders in order to finance educational expenses. While the bulk of these loans are made by commercial lenders, some States and educational institutions also are lenders. The loans are insured by the Federal Government or guaranteed by a State or private nonprofit guarantee agency. The maximum amount a student may borrow as an undergraduate is \$2,500 per academic year. Graduate and professional students may borrow up to \$5,000 per academic year. The total amount allowed for undergraduate or vocational study is \$7,500. The total for graduate and professional students is \$15,000, including any amount borrowed for undergraduate study. The interest rate is 7 percent.

In most cases, the Federal Government will pay the interest until the student begins to repay the loan, which must be repaid within 10 years. Twenty-two educational institutions in Puerto Rico are eligible under the guaranteed loan programs. In 1977, 4,000 students received \$6 million in loans, the average loan being \$1,400. The default rate in Puerto Rico is well in excess of 20 percent, where as the national default rate at the end of FY 1977 was 10.6 percent.

Grants to Postsecondary Institutions

Puerto Rico's postsecondary institutions receive funding directly through several grant programs of HEW in addition to the Federal funds they receive indirectly through student financial assistance programs. Grants for developing institutions (Title III of the Higher Education Act of 1965, 13.354) are to assist in raising the academic quality of institutions of higher education which are primarily concerned with education of low-income students. All institutions of higher education from Puerto Rico

that have applied for title III funds have been classified as "developing institutions" according to HEW criteria, and thus have been eligible for grants. Eight institutions received a total of \$1.6 million under this program in FY 1977 and have received a total of \$10 million since 1966.

The Cooperative Education Program (13.510) provided \$111,000 in FY 1977 to Puerto Rico's institutions of higher education for programs which alternate periods of academic study with periods of public and private employment. The university Community Service and Continuing Education Program (13.491) is designed to encourage colleges and universities to assist in the solution of community problems and to expand education opportunities to adults. Puerto Rico's postsecondary institutions received \$123,000 in FY 1977. In addition to these grant programs, they received \$245,000 in general aid to land grant colleges (13.453), \$1.6 million in special programs for the disadvantaged (13.482, 13.488, 13.543) and \$152,000 for support of veterans' cost of instruction (13.54) during FY 1977.

Chapter IV.—Policy Options for Social Programs

INTRODUCTION

Opportunities to improve economic and social conditions in Puerto Rico are available to the public and private sector both within Puerto Rico and the U.S. mainland. Options range from adoption of broad economic strategies to more modest modification of administrative practices or program structures. An important objective is to promote greater self-sufficiency for the residents of Puerto Rico. To help reach this objective, options to improve economic and human services institutions of Puerto Rico should have certain broad features. Specifically, they must be part of a well-thought-out developmental strategy which links the development of human services to economic development, which involves citizens and private groups in its planning and execution, and which builds on Puerto Rico culture and institutions. Furthermore, the relationship between the Federal and Puerto Rico Governments in the improvement effort should be that of mutual cooperation.

Federal efforts should complement Puerto Rico development activities; and an effort should be made to eliminate Federal impediments to planning for the development of the social and economic infrastructures in Puerto Rico. These broad features are described in the next section and provide the framework for improving conditions both within current budget constraints and as additional resources become available in the future.

A Developmental Strategy

With respect to the human services area, a developmental strategy is one which aims not only to improved specific service programs or to deal with immediate problems, but also to insure the long range, orderly growth of social institutions and human services systems. Furthermore, such a strategy would carefully link the development of human services systems to economic development.

Health, education, income security, and social

services systems are an important part of the overall development of any society and an ingredient of economic development for several reasons.

First, each of the human services has its own intrinsic value and is the result of economic development. The extent of development may well be measured by the effectiveness of its human services systems.

Second, the human services are an important part of the social and economic infrastructure without which economic development is made very difficult. This is especially true of the health and education systems and, particularly during economic recession, of social services. These provide necessary support for a productive workforce. If these are inadequate, the climate necessary to attract business and industrial operations is lacking.

Third, the education system, in particular, is linked directly to economic development. Elementary and secondary education provides the basis upon which work skills can be developed. Increasingly, the postsecondary education system is being called upon to provide specialized training in advanced technical and entrepreneurial skills and sophisticated management techniques to support modern industries.

Fourth, human services programs mitigate the disruptive impacts of economic development on individuals, families, and communities.

Thus, the particulars of a social development program will be both an influence on and an effect of economic policies. Some characteristics of an economic development plan for Puerto Rico which are discussed in the Agriculture, Manpower, and Industrial Development sector studies of the overall Federal study of which this report is a part are: the establishment of a strong agricultural sector and electrification of rural areas; the attraction of U.S. mainland and foreign business enterprises to the island; and the identification and development of industries and services which are viable in Puerto Rico. Given current conditions, a corresponding social development plan would: Seek to improve

schools, medical services, and social services in rural areas; generally improve the quality of human service systems, especially schools, in industrial areas; emphasize training in those skills which will be necessary to develop viable businesses or for which demand will emerge as a result of the growth of successful enterprises.

Citizen Involvement

The development of social institutions and human services systems should involve all sectors of the Puerto Rican society, urban and rural, rich and poor. This is necessary to ensure that the future directions and growth of social systems on the island will necessarily be distinctively Puerto Rican and not mere transplants of U.S. mainland social concepts, and that every sector of Puerto Rican society, private and government, which can bring some resource or insight to the problems at hand is involved in planning and executing the development effort. Such an approach would build on progress already made in dealing with social problems and be compatible with social and economic conditions which are unique to the island. As an example, the future development of medical care systems can build on the current extensive public medical system, and improvements in the educational system can take advantage of the highly developed postsecondary school system. However, both public and private medical personnel as well as citizen groups would be involved in planning the future growth of the health care systems, and local communities would be very actively engaged in improving the elementary and secondary schools. In addition, citizens can play a crucial role in service delivery as volunteers helping to provide care for the homebound or sick, assisting in school maintenance and in instruction, or working with the elderly. Given changing social and economic conditions in Puerto Rico, it may be useful to investigate in depth the viability of the family as an economic unit and as a socially stabilizing element in Puerto Rico society.

Federal Government-Puerto Rico Cooperation

With the exception of the Old Age and Survivors Insurance Program and the Medicare Program, Puerto Rico has the primary responsibility for administering human services programs within Puerto Rico. However, the Federal Government provides significant financial assistance. Of the total dollars spent on the island by the Puerto Rico and Federal Governments, Federal expenditures accounted for 28 percent of total spending in the area of education, 46 percent in the area of health, 56 percent

in the area of social services, and 98 percent of all cash assistance payments in FY 1977.

A consequence of the structure and financing of human services programs is that most policy options to deal with major social problems in Puerto Rico require joint action by the Puerto Rico and Federal Governments. However, the joint action need not be governed by the current financial and administrative arrangements. An effective developmental strategy would be derived from an assessment of what resources and expertise each partner—the U.S. Federal and Puerto Rico Governments—can bring to bear on the problems. It may be desirable to modify Federal programs in Puerto Rico to make them more adaptable to special conditions (e.g., bilingualism) and responsive to special problems (e.g., a high unemployment rate), or to take advantage of unique institutions or service systems (e.g., the extensive public health care system), or to remove impediments to planning for the development of social and economic infrastructures.

The Federal Government may be effective as a source of technical assistance, which might include outstationing of Federal personnel in Puerto Rico, or extended stays by technical teams. It may also be able to help in tailoring statistical measures, such as poverty statistics, to make them more compatible with conditions in Puerto Rico than the standard statistical systems. The establishment of a mechanism whereby Federal resources can be applied to plans developed by Puerto Ricans may be a more successful developmental strategy than one which causes Puerto Rico to become increasingly reliant on Federal funds. To promote the Federal-Commonwealth partnership in planning and economic development and to follow through on the strategic and program options identified in this report, an ongoing mechanism may be needed which would involve Federal departments as well as the Government of Puerto Rico. Any one of a number of already existing Puerto Rico offices (such as the Office of Federal Affairs in Fortaleza, the Office of Federal Affairs at the Bureau of the Budget, or the Planning Board) could interface some Federal body such as the Federal Regional Council or the Commerce or Interior Department. The purpose of this mechanism would be to plan for development and promote specific projects utilizing funds from Federal and Puerto Rico agencies or from an especially supplemental Federal-Puerto Rico fund established for this purpose.

An important aspect of the U.S.-Puerto Rico developmental partnership is the relationship among Federal departments and agencies. A continuing examination of this interrelationship is necessary to insure the total effect of the various programs is complementary to and not an impediment to pro-

ductive social and economic planning. A total policy for economic development in Puerto Rico would involve a strong job creation effort and could include tax and other incentives for business, programs to encourage growth in industrial, agricultural, and service sectors, public works, and public and private employment. This would not only require a balance of public and private efforts and of Federal and Commonwealth actions, but could also involve several Federal departments, whose programs could be mutually supportive if carefully coordinated.

Existing employment programs, primarily under the Comprehensive Employment and Training Act (CETA), administered by the U.S. Department of Labor, and the economic development program under the Economic Development Administration, within the U.S. Department of Commerce, are the most direct Federal mechanisms for increasing employment and economic activity. These programs can also be used to provide resources for education, health, and social services—e.g., for school maintenance, immunizations, and social service outreach. These activities would develop new skills as well as employ unemployed and underemployed workers. In a similar way, the Department of Housing and Urban Development's community development funds could be used both to promote economic development and employment and to construct and repair schools, and health care and community long-term care facilities.

Even in the narrower field of social programs, there are complex interactions among programs. For example, mental health for family planning services may be provided through either the Medicaid or Title XX Social Services programs as well as in special mental health or family planning programs. Another example is the use of funds from title I of the Elementary and Secondary Education Act to finance diagnostic health services which are delivered through the school system. Hence any assessment of the effectiveness of these programs or any proposals to modify them to suit special conditions in Puerto Rico must be made in the context of their effects on one another as well as their specialized purposes.

A final aspect of Federal Government-Puerto Rico cooperation is the fact that in some of the larger programs, such as title I of the Elementary and Secondary Education Act, Medicaid, and Aid to Families with Dependent Children, Puerto Rico is not entitled to the same level of benefits as the States. Also, Puerto Rico residents are not eligible for benefits under the Supplemental Security Income Program.

At the same time, in some programs, such as Food Stamps, the Basic Educational Opportunities Grant (student financial assistance) program, and

the Community Services Administration Senior Citizen's and Community Action programs, Puerto Rico receives considerably higher amounts of financial assistance than most of the States because the formulas for these programs are linked to the poverty rate. In some cases, like Medicaid and title I of the Elementary and Secondary Education Act, special administrative procedures apply to Puerto Rico. The special administrative arrangements and the limitations on funds under some Federal programs are adjustments which have been made because of special economic or social conditions in Puerto Rico, or because residents of Puerto Rico do not pay Federal income taxes.

STRATEGIC OPTIONS

Options for economic development are discussed in the General Economic Assessment, Industrial Development, Manpower, and other sectors of the larger Federal study of which this report is a part. The options in the remainder of this report pertain to social development, but are closely linked to economic development. Keeping in mind the need for a developmental strategy, citizen involvement and a Federal-Puerto Rican partnership, and recalling the economic and social conditions described in the first three chapters of this report, it is possible to sketch the broad outlines of social development for Puerto Rico. The major elements are: To promote a balance between population growth and economic development; to emphasize service delivery and job development over cash transfers; to promote the development of medical, educational, and social services in rural areas; and to focus on education, keying training to industrial development.

Population Growth

Since 1970, population growth has averaged 3 percent per year, while real economic growth has been averaging less than 2 percent. Natural population growth in Puerto Rico is now 1.7 percent per year, which is approximately the rate for the world, but much higher than the 0.6 percent in the U.S. mainland. Substantial net immigration in recent years has raised the overall population growth rate to the 3-percent level. Unemployment has been about 20 percent generally and for youth almost 50 percent.

More moderate population growth may accompany economic development and higher levels of education, as has occurred on the U.S. mainland. Hence, efforts to promote economic development may well help bring population growth more in line with economic growth. Net return migration of U.S. mainland Puerto Ricans to Puerto Rico has been a

significant factor in population growth in recent years. Much of the migration to and from Puerto Rico is of different persons, with many second and third generation families going to the island for the first time. Part of the recent phenomenon of net immigration may be due to a lack of competitive advantage for Puerto Ricans in the mainland job market during the economic recession. In that case, return migration may slow down and possibly reverse as economic conditions on the mainland improve. Other factors may include discrimination or poor living conditions on the mainland. A more stable pattern of migration could be achieved by improving Puerto Ricans' basic education, job skills, and English-speaking ability and by reducing discriminatory practices.

This would provide the greatest opportunity and flexibility for Puerto Ricans both on the island and on the mainland. Still, some immediate efforts to moderate the current population growth rate could be undertaken through increased family planning services and a concerted public education campaign. These would be primarily a responsibility of the Puerto Rican Government. Some programs which could be used for this purpose include: Title X (the Family Planning Program) the Public Health Act (no legislative change is required); title XX (the Social Services Program) of the Social Security Act; the Maternal and Child Health program; the Medicaid program. However, the Medicaid and title XX funds in Puerto Rico are limited and are in demand for other necessary health and social services. Another source could be project grant funding under the Administration's new Adolescent Health Services and Pregnancy Prevention Program. These project grants would help Puerto Rico improve access to existing services and would provide supplemental funds for prevention of repeat pregnancy.

Service Delivery and Job Development

Puerto Rico could establish a policy to emphasize service delivery over income transfers. While an adequate income security system is essential for maintaining dignified living conditions for the destitute, human service programs in the areas of health, education, and human development would build up necessary social and economic infrastructures (i.e., schools, health facilities, employment training, and family services). Services would also provide jobs directly while building the economic capacity of the society. In addition, quality services are attractive to business.

While the evidence from income maintenance experiments on the work disincentive effects of income-transfer programs is mixed, given the low prevailing wage and high unemployment rate in

Puerto Rico, dramatic increases in cash transfers might act as a disincentive to job seeking and lead to a condition of dependency for some residents of the island. Furthermore, since 1974, the Food Stamp program has provided several hundred million dollars annually in income support to needy families, but no comparable increases have occurred in the Medicaid program or in Federal aid for elementary and secondary education or social services.

Policy options related to the development of the health, education, and social services systems are discussed in the latter sections of this chapter. A job development approach to income security is also discussed in the section entitled *Policy Options for Income Security*.

Rural Development

To the extent that agricultural and rural development will be part of an economic plan, it will be necessary to strengthen medical, educational and social services in the rural areas. These areas are currently underserved or suffer from a very low quality of services when compared to metropolitan areas. Policy options related to rural development are discussed in the sections on health, education, and human development later in this chapter. An alternative to building new human service facilities in rural areas is to strengthen public transportation in these areas and thereby increase the access to services provided in urban areas.

Focus on Education

One aim of social and economic development policies should be to insure a balanced growth among the various human services. On the basis of social indicators, the development of the education sector in Puerto Rico seems to have fallen behind other sectors, such as health. Similarly, far greater resources have been expended on income transfers through the Food Stamp program than on basic education in recent years. A key policy of both economic and social development in Puerto Rico, then, would be to focus attention on education. The elementary and secondary education system, particularly, needs improvement. Basic reading and analytic skills necessary for economic development would be derived from the elementary and secondary school system and from special extra school programs. Even more fundamentally, educational opportunities are inherent rights of individuals and basic educational skills are valuable in themselves.

At the secondary and postsecondary levels, attention could be paid to improving vocational and technical training. These aspects of the educational system would have to be developed as both inputs

to and products of an economic development strategy—that is, it would be necessary to identify those skills which would be needed in industries or services which have been singled out for development or those from which jobs are likely to become available as a result of development. Options for improving the educational system are discussed in greater detail in the section entitled *Policy Options for Improved Education*.

POLICY OPTIONS FOR IMPROVED EDUCATION

A strategy to improve education in Puerto Rico can build on Puerto Rico's commitment to provide universal education and on the fact that the postsecondary system is well developed. Given the general conditions discussed in chapter III and the relationship between education and economic development, the appropriate lines of future development would be: (1) the improvement of basic education by upgrading of facilities, services, supplies, and teachers' skills at the elementary and secondary levels; (2) improvement of long-range planning of the postsecondary system; (3) development of vocational training programs at the secondary level and improved technical education at the postsecondary level; and (4) development of special extra-school programs dealing with illiteracy and bilingual and adult education.

Elementary and Secondary Education

Elementary and secondary education has been experiencing a deterioration of its physical plant and a decline in funding relative to other parts of the Puerto Rican budget. Facilities are inadequate and teachers are hindered by inadequate training and insufficient supplies and services. To improve the quality of education it will be necessary to secure additional funds and to improve school administration, encouraging broad community participation in school affairs.

Funding.—The inadequacy of funding for Puerto Rico's education is evident by comparing its per pupil expenditure rate of \$694 in 1977–78 to the U.S. national average of \$1,740. There are only two available sources of revenues for the island's educational system—the Puerto Rico and Federal Governments. The availability of additional funds from the Puerto Rico Government is dependent directly upon the tax system and indirectly on the rate of economic development and on the level of fiscal relief received in other (noneducational) Federal programs. Puerto Rico funds are quite limited because the extensive poverty of the island results in a low

tax base. Economic development may gradually make additional funds available. Not all Federal programs providing increased funds would make additional revenues available to Puerto Rico for education. This is due to the fact that many of the largest Federal programs, particularly those in the income-security area, either provide their benefits directly to individuals (rather than to the Puerto Rico Government) or they require Puerto Rico to match the Federal funds with its own expenditures. Thus, if Puerto Rico does not establish a high priority for education or if Federal matching rates remain unchanged, increased Federal funding in other areas may actually draw Puerto Rico funds away from education and continue the trend of lower shares of Puerto Rico revenues being allocated to educational programs.

Title I of the Elementary and Secondary Education Act of 1965 is the primary vehicle by which Federal funds are made available to the elementary and secondary school system of Puerto Rico. In FY 1977, Puerto Rico received \$56 million through this program. The FY 1978 ESEA amendments increased the allotment by providing that Puerto Rico will receive an allocation based in part on the ratio of its average per pupil expenditure to the lowest average per pupil expenditure among the States. Two methods of allocation increased the allotment to Puerto Rico to \$75 million in FY 1978 and \$102 million in FY 1979. Additional funds could be made available to Puerto Rico through this program. In either such additional increases could be phased in over several years. Since there are about 720,000 students, each \$10 million increment would raise the per pupil expenditures by \$14.

Through cooperative arrangements between the Puerto Rico Government and community groups, public service jobs and construction projects such as those authorized by the Comprehensive Employment and Training Act (administered by the U.S. Labor Department) or the Community Development Block Grant Program (administered by the U.S. Department of Housing and Urban Development) could also provide additional resources for rebuilding the school system. (However, it would be necessary to change Federal program regulations for the community development block grant program to use those funds for school construction. Since these funds can be used for economic development activities it would seem especially appropriate to use them for vocational education facilities.) Additional public service jobs have also been proposed under the Carter Administration's welfare reform proposal.

Some administrative improvements can be made without large expenditures. As an example, routine and inexpensive maintenance procedures could elimi-

nate some unsanitary conditions in elementary and secondary schools. Distribution of supplies to rural schools could be improved. Administrative procedures could be established to provide opportunities for parental or community involvement in school administration. Also, responsibility for school construction, renovation, and maintenance by Puerto Rico's General Services Administration could be reexamined. The current arrangement may mean that schools receive less attention than other public buildings and may hamper the ability of the Department of Education to plan for adequate educational facilities. Removing school construction and maintenance from GSA jurisdiction and placing it under the Department of Education may also reduce administrative costs and speed up construction and maintenance activities. However, some disadvantages may result from lack of expertise of the school administrators in the construction area.

There are important issues related to citizen involvement which arise in connection with the Federal program under title I of the Elementary and Secondary Education Act. Since the Puerto Rican educational system is centralized, Puerto Rico is considered to be a single school district for purposes of receiving and accounting for title I funds. This situation is quite different from most of the States where there are many local school districts which receive funds directly from the Federal Government. One consequence is that parents and community groups are not closely involved in budget formulation or accounting for those funds. They may, therefore, be less aware of conditions at the schools which could be repaired easily through local community action. Other courses of action may also be preempted because decisions are made at the central office rather than in local area school offices. Consequently, efforts to involve citizens in local decisionmaking may have to be intensified.

Another administrative issue connected with the title I program is whether the funds can be used for the purpose of generally upgrading the education system (such as for building maintenance) or whether they must be targeted exclusively to compensatory educational programs.

A proper balance between general support and programs of compensatory education might be achieved through a legislative modification which would allow an adjustment to be made in the purposes for which title I funds are used in Puerto Rico. A plan of expenditures, mutually agreed upon by Puerto Rico and the Department of Health, Education, and Welfare of the Federal Government, could govern the particular uses of the funds. Such a plan could also stipulate the manner in which the title I funds are distributed throughout the school system, particularly with regard to the appropriate shares for

rural and urban areas. The 1978 amendments to the Elementary and Secondary Education Act allow Puerto Rico to obtain a temporary waiver of certain requirements if a plan is approved by the Federal Government.

Postsecondary Education

Postsecondary educational systems in Puerto Rico, both public and private, have experienced rapid growth in recent years. Postsecondary enrollment doubled between 1960 and 1970 and then doubled again between 1970 and 1976. Private enrollments have increased by a factor of nine since 1960. Much of this increase can be associated with a rapid increase in the availability of Federal assistance which rose from \$13 million in 1973-74 to \$89 million in 1976-77. There are now more than 100,000 college students. Many of them will find it difficult to obtain jobs when they graduate.

In the face of rapid expansion, fundamental questions about the makeup of postsecondary education systems in Puerto Rico need to be addressed. Issues involve the appropriate mixture of private and public schools, the effect of rapid growth on the quality of education, and the relationship between university training and the economic development of the island.

The future directions of postsecondary education could be analyzed by a strengthened Puerto Rico planning commission such as the current Commission on Higher Education which supports the Puerto Rico Council on Higher Education. Its task could be to develop an overall plan for both public and private postsecondary education. This commission could establish budgetary policy for the public institutions, examine licensing and quality control systems for private institutions, and establish goals for establishing various kinds of technical training within both public and private schools. It could also suggest improvements in the management and organization of public institutions and the various student assistance programs.

Vocational Education and Technical Training

At present a large number of youths and adults lack necessary skills for effectively entering the job market. Vocational guidance and counseling, training services, and facilities are inadequate. Vocational education within the public elementary and secondary school system and in private schools and technical training at the postsecondary level are underdeveloped. There is also a lack of reliable data regarding occupational opportunities and about the kinds of jobs necessary for economic development.

A major joint Federal Government and Puerto Rico program to enhance vocational education and technical training could be developed. This could include involvement with private business as well as government to provide vocational training, job counseling, and development of improved information to students concerning skills necessary to enter various job markets in Puerto Rico and on the mainland. Of course, increased vocational or technical training will be of little use unless there are jobs into which students can move after completing their educational program. Emphasis could be toward technical training for specific types of skilled jobs which are in demand either in Puerto Rico or in the U.S. mainland or which have been identified as being important to the future economic development of Puerto Rico.

Federal aid to Puerto Rico for vocational education is available through the Federal Vocational Education program. Federal student assistance programs for higher education can be used by students without high school diplomas for some types of technical education. Greater use of these programs might be especially appropriate for the special conditions in Puerto Rico where high school graduation is not as common as in the U.S. mainland, but where more extensive vocational education would be an important ingredient in economic development.

Literacy, Bilingualism, and Adult Education

Underlying a large part of the other education problems is a basic lack of educational competency among the general population. The illiteracy rate is approximately 11 percent compared to 1.7 percent in the United States as a whole. This high degree of illiteracy limits the economic and social potential of a significant part of the population. In addition, the lack of bilingual skills limits the ability of many Puerto Ricans to gain economic and social advancement through entry into the English speaking and bilingual job markets. The reverse problem is also true because many children in the United States and to some extent in Puerto Rico who return to Puerto Rico from the mainland have difficulty with Spanish.

Options to deal with these problems involve increased expenditures in several areas, including:

- Increased spending for adult education: Adult educational grants from HEW and increased spending by Puerto Rico could be used to create a major program for reducing illiteracy and upgrading basic educational competency of the adult population. At present, less than 50,000 adults participate in adult-education programs.
- Greater use of the Right-to-Read Program: the

Federal Right-to-Read Program could be used to improve the reading skills of all citizens. A goal of eliminating functional illiteracy or reducing it to certain rates by a special target date could be set by the Puerto Rico Government to focus its efforts on this problem.

- Bilingual Education: Federal and Puerto Rico bilingual programs could be expanded to cover a larger population in both urban and rural areas. Bilingual education programs are needed for teaching both Spanish and English.

POLICY OPTIONS FOR INCOME SECURITY

The overriding social and economic problems in Puerto Rico are the high unemployment and poverty rates (about 20 and 60 percent, respectively). Income security programs are inadequate even though more than \$600 million is expended annually for food stamps and cash assistance programs on the island. There are basically two approaches to take, singly or in combination—to provide jobs or to provide additional funds for cash assistance. Two sets of options are described here: (1) developing a special program to promote job creation in Puerto Rico; and (2) modifying existing income security programs while increasing jobs and training opportunities. The first option tries to promote job creation exclusively, although it would not be sufficient by itself as cash assistance would still be necessary for those unable to work or to find jobs. The second option aims at providing additional funds to make income maintenance payments more adequate than they are now and providing jobs for those wanting to work.

Wage Subsidy Program

The development of new jobs is probably the most pressing social need in Puerto Rico. The primary method of job-creation would be through industrial, agricultural, and service development. These are discussed in other sector studies on industrial development, agricultural, and manpower. In connection with such development efforts, a wage subsidy program could be beneficial.

The concept of this approach is the payment of a Government (Puerto Rico or Federal) subsidy to a business to cover part of the wages of a person hired. The subsidy could be limited to businesses which hire more than, for instance, 102 percent of the number of persons hired in the previous year and those which are having difficulty competing in world markets because of initial startup costs. Such a subsidy could be targeted to certain groups of workers

such as those who have been unemployed for more than 3 months or those who have been unemployed and receiving food stamps for 3 months. The subsidy could, for example, be in the order of \$1,500 for the first year, \$1,000 for the second year, and \$500 for the third year of employment for a qualified individual in a qualified firm. In the first year this amount is about 20 percent of the Federal minimum wage. Because prevailing wages in Puerto Rico are near or below the minimum wage, a subsidy of this amount would be a strong incentive for a business to develop new products or service lines. It would be a particularly suitable incentive for new development in the agricultural sector or for a U.S. business enterprise to locate a facility in Puerto Rico. If the subsidy were restricted to the hiring of unemployed food stamp recipients, the gross costs could be offset by savings in the Food Stamp program. Each person who receives employment under such a program would, because of his wages, be eligible for significantly lower food stamp benefits than before his employment.

Wage subsidies have been available through the Federal income tax system on a limited basis in the U.S. mainland. However, experience has not yet been extensive enough to judge whether or not these programs are successful. It is also difficult to use the U.S. experience to judge potential effectiveness in Puerto Rico where conditions are significantly different, particularly with regard to the unemployment rate. These two incentives are quite different. Another difference would relate to the use of the Federal income tax system as the transfer mechanism. Because businesses in Puerto Rico do not pay Federal income taxes, a tax credit cannot be used as the mechanism for subsidy. Some kind of voucher system would have to be used instead. It may be useful to test such a voucher system experimentally in Puerto Rico.

The administration of a wage subsidy system is naturally complex, and this may be a strong disincentive for business to use such a system. One reason for the complexity would be the need to insure that there is not simple substitution of government for private funds—in other words, to insure that each worker subsidized is in fact filling a newly created job. This may be a practical impossibility.

The details of an appropriate wage-subsidy program would have to be worked out jointly by Puerto Rico and Federal officials and could require several years of experimentation before they were properly designed. In order to be effective, it would be necessary to involve several departments (those involved in labor, commerce, and welfare policies) of the Federal and Puerto Rico Governments in the design and analysis of such an experiment, and the design would have to be related to the economic develop-

ment tactics of the Puerto Rico Government and the private sector. Federal funding of such a program would require new legislation.

Changes to Existing Programs

Incremental reform options which involve modifying the AFDC and adult programs focus on policy adjustments within existing program structure. These approaches can lead to expansion in coverage or adjustments in benefit levels or financing formulas that can improve the adequacy, efficiency, and incentive structure of existing programs.

Given the high rate of unemployment in Puerto Rico, expanded coverage under existing programs or increasing benefits alone will not be enough to deal with the problem of poverty on the island. For this reason it would be useful to examine the possibility of linking manpower programs, like unemployment insurance, through reorganization or by referral mechanisms between the Puerto Rico Department of Social Services and the Department of Labor. Additional public service jobs and training may be necessary to help promote economic development as well as provide increased income for the poor who are able to work but cannot find jobs. Given the low prevailing wage on the island, the benefit level should not be raised to a level that would provide disincentives to work. Still, the average monthly AFDC and adult benefits are quite low (compared to even the poorest State, Mississippi) and some increase in benefits would appear warranted.

Between 1972 and 1978 there was an absolute ceiling of \$24 million on Federal financial participation in AFDC and the adult categories and Federal matching rates for AFDC and the adult categories were 50 percent, which is less than those used for the States. Congress tripled the ceiling to \$72 million and raised the matching rate to 75 percent for FY 1979 only. This is still only about half of the amount which a State would receive under similar circumstances, and is only a temporary increase. Inflation has significantly reduced the real value of Federal payments under the ceiling and high matching rates have been a burden on Puerto Rico's fiscal capacity. In addition, citizens residing in Puerto Rico are excluded from receiving benefits under Supplemental Security Income (SSI) or the Prouty Amendments.

Legislation would be required to substantially change the income security programs. Options include:

Modifying AFDC and Adult Categories.—Cash assistance payments are made available in Puerto Rico through the Aid to Families with Dependent Children (AFDC) program and the adult categories. Most options involve increases in Federal funding.

The standard of need now used in Puerto Rico's cash assistance program has not been altered since 1969. In addition, actual payment made to a person with no other income is only 40 percent of the full standard.

The two features in the present Federal approach of financing the welfare program in Puerto Rico which have affected the levels of welfare payments—the Federal ceiling and the matching rate of 50 percent—can be changed singularly or in combination. The following describes some of the options:

Permanently Raise the Ceiling, but Retain Current Federal Matching Rate.—If the Federal matching rate would remain permanently at 50 percent, the cost of doubling the ceiling would be \$24 million, the cost of tripling it, \$48 million. For each additional Federal dollar received, Puerto Rico would be required to spend one dollar of its own funds. Thus, if the Federal ceiling were permanently doubled and Puerto Rico would participate fully by spending an additional \$24 million, then a total of \$48 million would be added to the cash assistance programs. It is difficult to predict which groups would benefit from these actions as benefits would be raised for beneficiaries according to a complicated set of eligibility factors such as income and family size and composition. However, one way to look at it would be as follows: Since there are approximately 230,000 persons receiving benefits in the AFDC and adult programs, then doubling the ceiling would provide \$17.40 per month additional for each beneficiary.

Presumably, most of the beneficiaries are also receiving food stamps. The additional cash payments may reduce the value of food stamps which they would receive. The Federal income transfers provided through the Food Stamp program would be reduced, and the net effect would be the equivalent of lowering the Federal matching rate below 50 percent at the margin. A disadvantage of this approach is the large sums of money are required to be spent from the general funds of the Puerto Rico Government. Such funds would be hard to come by, especially since demands for expenditures in the area of education and in other areas are very pressing.

Permanently Raise the Ceiling and Establish a Higher Federal Matching Rate.—One way to overcome the problem of higher Puerto Rico expenditures under the previous option would be to permanently increase the ceiling and raise the Federal matching rate. The rate could be raised to 83 percent, which applies to Mississippi, or to any arbitrarily larger number, for instance, 75 percent. While the reduction of food stamps would still occur as in the previous option, more Federal dollars would be

available without severely draining the Puerto Rico budget.

Eliminate the Ceiling and Establish New Federal Matching Rate.—By eliminating the ceiling and establishing the Federal matching rate at 83 percent, Puerto Rico would be entitled to full public assistance (AFDC and the adult categories) benefits. The cost of this option would depend on the levels of the benefit and payment standards set by Puerto Rico, participation rates, and Puerto Rico's ability to match Federal dollars. For example, if Puerto Rico allocated \$17 million then the Federal Government would match this with \$83 million.

Extend Supplementary Security Income (SSI) to Puerto Rico.—The option of extending the SSI programs to Puerto Rico would involve replacing the adult categories with SSI. SSI could be extended with the full Federal guarantee or at a reduced level (for example, based on the ratio of the per capita income in Puerto Rico to the per capita income in the lowest State in the United States, Mississippi) cost estimate would depend on benefit levels, participation rates, and numbers of disabled persons applying for benefits. Extending SSI with reduced benefit levels to current eligible adults would have cost about \$140 million in FY 1978. Providing the full Federal guarantee to the total potential eligible population might be as high as \$450 million. This would be partially offset by a reduction of food stamp benefits for some recipients. The amount of the offset has not been estimated. This proposal provides no additional funds for the AFDC beneficiaries. Presumably, one of the previous options would have to be used along with this one to provide greater relief to families with children.

Extend Prouty Benefits.—The Prouty benefits provide coverage for certain persons aged 72 and over who were not covered by Social Security by virtue of prior earnings. The cost estimate of extending Prouty benefits in FY 1979 would be \$10 million. Since very few people will become newly eligible for these benefits, the cost of this program will decrease in future years. One factor that should be considered is that a welfare program with an adequate payment standard would cover all of the people covered by the Prouty benefits, and this option would not be necessary. If SSI were extended to Puerto Rico, it would not be necessary to extend Prouty benefits.

All of the above options for revising the current cash assistance programs have some serious drawbacks: they require large increases in Federal funds; they provide only partial relief; by themselves, they do not deal with unemployment because they provide cash but no jobs; and they share the adminis-

trative difficulties and complexities which characterize the current welfare system.

POLICY OPTIONS FOR BETTER HEALTH CARE

A strategy to improve the health care systems of Puerto Rico can focus on improving the extensive public medical care system already in existence; coordinate the system's public and private sector services through improved planning; and concentrate on the specific health problems facing the population, especially those amenable to known preventive and control measures.

Improving the Public Health Care System

The public health care system in Puerto Rico directly serves approximately 60 percent of the population, making it unique among comparable areas or jurisdictions within the United States. The dramatic improvements over the last few decades in health status indicators (such as life expectancy and mortality and morbidity rates) are evidence that the public health care system has met health needs with a considerable measure of effectiveness. However, continued medical progress will be more difficult as the population ages and as the degenerative disorders become more prominent. These more challenging problems arise at a time when the public health care system is showing signs of stress due to rising costs, insufficient planning resources, and attraction of health professionals away from the public to the private sector.

A fundamental issue is whether emphasis should be given to the future development of the public rather than the private health care system, or whether both can be successfully integrated to reinforce each other. With a proven effective public system already in place, and a large medically indigent population, it would seem appropriate for Puerto Rico to strengthen its support of and improve this system. Resources for development of the private system will more naturally become available with improved economic development. However, the public and private systems can be more effective in their total effect if their future development is jointly planned.

Given the types of health problems which are now dominant in Puerto Rico, specific kinds of services which should be emphasized in future development of the health care system are primary care, preventive health services, and mental health services. Some of these subjects are discussed in the section dealing with specific health problems.

For the public health care system, further im-

provements in primary care and advanced preventive services can be associated with an upgrading of the primary care centers. Already, several such centers have been upgraded, using a combination of municipal, State, and Federal resources. Their operation is linked to newly developed area hospitals for improved productivity and resource conservation. Some improvements have resulted from tighter management, including accounting procedures developed by the new Health Facilities and Services Administration. The Department of Health has strengthened its staff responsible for licensing and accrediting of facilities in an effort to improve the quality of services rendered in public and private hospitals. This effort is supplemented by those of the Federally funded Professional Standards Review Organization.

The Federal Role.—The current Federal role in Puerto Rican health care is mainly that of providing financial assistance through the Medicare and Medicaid programs and through various specialized or categorical health programs. The total amount of financial assistance extended to Puerto Rico was more than \$140 million in FY 1977. These programs have been designed primarily to reflect conditions of public and private health care systems on the mainland and do not reflect the conditions that prevail in Puerto Rico. The fact that Puerto Rico has an extensive public health care system and that approximately 60 percent of the population is considered to be medically indigent makes it reasonable to question whether or not the Federal programs should be modified in their application to Puerto Rico. There are two issues to be considered—the structure of the programs themselves, and the level of Federal funding.

It is useful to consider separately the Medicaid program and the categorical programs.

Medicaid.—Because the poor cannot afford private medical insurance, they rely on the public health care system, which in turn relies partially on Federal Medicaid financing. Therefore, a close examination of this program is warranted. A fundamental issue is whether or not Medicaid funds should be made available to the private sector. Currently the public health care system is the sole provider of Medicaid reimbursable services in Puerto Rico. This policy has been challenged by the local medical association. The effect of changing this law might be to establish some competition between the public and private systems, and to draw financial resources away from the public system. Under the present allocation limits, this could be detrimental to the public system and increase the total cost of caring for the medically indigent.

Another alternative to the current Medicaid structure would be a general appropriation of funds each

year to Puerto Rico to help defray costs incurred by the public health care system. Rather than enforcing requirements of the Medicaid program with respect to the kinds of services offered, Puerto Rico could negotiate with the Federal Government a plan of expenditures and services. This plan could reflect the medical priorities of the Puerto Rico Department of Health with the approval and technical assistance from HEW. This approach would permit health expenditures to be tailored to the specific health needs and health delivery system of Puerto Rico. A disadvantage is that it would be difficult to specify in the law what kind of a health plan would be acceptable to the Federal Government. This approach would require new legislation.

Regarding the level of Federal support, a \$30 million ceiling on the Medicaid payment to Puerto Rico was established in 1972. Increases in the cost of medical care between 1972 and 1977, amounting to about 50 percent, have eroded the buying power of the Federal assistance. Furthermore, the matching rate requires Puerto Rico to pay 50 percent, while the matching rate for many states is much lower. If it is desired to increase Federal assistance to Puerto Rico for medical services through the Medicaid program, this can be accomplished by raising either the ceiling or the Federal matching rate, or both, in line with the experience in the States. Since Puerto Rico already "overmatches" Federal funds by more than \$45 million, modifying the matching rate alone would have little effect; the ceiling would have to be raised by at least that amount. Raising the ceiling would provide additional Federal funds as long as the Federal matching rate is 50 percent or higher. One solution could be to eliminate the ceiling and increase the matching rate to at least that of the poorest State. Cost estimates for this alternative depend on medical prices, participation rates, number of SSI eligibles, and extent of long-term care provided. Estimates range from \$100 million to \$190 million for FY 1980.

Any of the above approaches would require action by Congress. The effect of increasing Medicaid funds for Puerto Rico would be that certain services that are required by law but are not now provided (e.g., nursing home, home health, and some mental health) could be provided to the program's beneficiaries. It might then also be possible for Puerto Rico to offer the "buy in" option for Medicare part B.

Other Health Programs.—The categorical programs could also be modified to provide a more appropriate support to Puerto Rico. Direct support can be provided to the public health care system through programs like the Community Health Centers program. Some primary health care centers

sponsored by this program are already established in Puerto Rico. The "public agency" criteria can be used to increase Federal support for existing and planned health centers, both rural and urban. Other possibilities include the integration of the maternal and child health, mental health, drug abuse, and alcohol abuse programs into Puerto Rico's primary care system. Puerto Rico and Federal health officials could also examine the adequacy of the placement of National Health Service Corps personnel on the island.

Another possibility is to change the law to insure a continuing allocation of Federal funds for community mental health centers. Current law makes funds available on a declining basis and only for the first 8 years of program operations, on the assumptions that successful programs will eventually be financed by private payments and public funds. Such an outcome is not likely in Puerto Rico since the majority of the population is poor and public funds are limited. The Administration has submitted to Congress a proposal to modify the mental health support program. This would provide needed funding beyond the 8 years authorized under current law for some services. This provision would assist Puerto Rico.

Despite an apparently adequate overall ratio of physicians to population in Puerto Rico, there is a shortage of physicians in rural areas and small towns. Further, a relatively large number have entered the various specialties, with a resulting need for more primary care practitioners. Dentists are in short supply as are nurses and pharmacists. Shortages in the latter may be due to withdrawal from the labor market because of lower salaries.

Actions which Puerto Rico could take either alone or in partnership with the Federal Government through its health manpower programs to improve this situation—some of which are already being done—are to: provide incentives, through student financial assistance, for students in the medical schools to enter the primary care field rather than the various specialties; to encourage, through salary differentials, newly graduated physicians to provide services to underserved areas; develop firm data on the number and availability of various categories of key health personnel in the island; develop a coordinated policy for maintaining, expanding, or contracting the training of specific health professions categories, depending on accurate determinations of need and demand for each category; and make greater use of the Federal National Health Service Corps to increase the number of health professionals in underserved areas.

A careful modification of Federal administrative or legislative requirements to make them more compatible with the extensive poverty in Puerto Rico

and with Puerto Rico's public health care system, may be appropriate. This may provide an opportunity for testing alternative health delivery concepts, such as primary care centers, and comparing them to approaches under consideration in the U.S. mainland.

Improving Health Planning

Further improvements in health care would involve strengthening management control systems, upgrading the primary health care centers, increasing physicians' and others' salaries, providing preventive health services, and dealing with mental and emotional disorders. To achieve these objectives, it will be necessary to establish an operating plan outlining the steps to take as economic development makes resources available for health care. Such a plan would include both public and private sectors. The Federal Government provided \$1.6 million to Puerto Rico for this purpose in FY 1977.

Failure of the Health Systems Agency to obtain full designation has reduced these funds to only \$0.4 million for FY 1979. This has limited the effectiveness of the existing health planning efforts. The organizational questions associated with this lack of full designation go to the heart of the question of how the planning, and hence the future development of health care systems in Puerto Rico, should be carried out. While not all of the required planning can be conducted exclusively with Federal funds, it is useful to consider ways to restore the lost Federal funds and redirect planning resources; the options reflect approaches Puerto Rico could follow to organizing its planning effort.

- Designating Puerto Rico as a jurisdiction with a Single State Planning Agency: This would require the Amendment of Public Law 93-641 to include the Commonwealth of Puerto Rico as a section 1536 jurisdiction. Under section 1536, Health Service areas are not established and, therefore, Health Systems Agencies would not be designated. The responsibility for carrying out the functions of the Health System Agency would be at the State (Commonwealth) level. This would put Federal planning resources more directly at the disposal of the Government of Puerto Rico, and hence of Puerto Rico's public health care system. This has the advantage of providing ample resources to develop an operating plan for the public health system. The disadvantage is that planning for the development of the private sector would be deemphasized.
- Designating more than one Health Systems Agency (e.g., for various health service areas)

within the Commonwealth: This has the advantage of involving broader participation in health planning and decreasing the authority of the current Health Systems Agency. The disadvantage is that it does not provide additional funding and would be less cost effective because of increased administrative costs.

- Allow, through an amendment of the Health Planning Act proposed by the Administration, the Governor to approve the health plan prepared by Puerto Rico's Statewide Health Coordinating Council: This has the dual advantage of making the plan responsive to the needs of the public sector while simultaneously including plans for the development and control of the private sector. The disadvantage is that the planning process may become inappropriately politicized.

Dealing with Specific Health Problems

Infant Mortality.—In 1976 the infant mortality rate in Puerto Rico was 20.2 deaths per 1,000 live births. By comparison with nationwide figures (16.1 deaths in 1975), the rate is high. However, the infant mortality rate in the island has been steadily declining during the past five decades as a result of Puerto Rico's public health improvements. The main causes of death in infants include neonatal problems, prematurity, congenital malformations, and pneumonia. Deaths have also been related to diarrhea. This is a condition that has been identified by Puerto Rico's Department of Health as one in which there is still significant room for improvement.

Studies have shown variations in infant mortality between different regions in Puerto Rico; the region with the highest rate of infant mortality was found to be similarly below par in all parameters (e.g., education, employment, per capita income, etc.). This clearly suggests a relationship between infant mortality rates and factors not directly identified with the health system. The existing public health care system has been used to mount a program aimed at reducing infant deaths. Use of nurse midwives, nurse practitioners, and other appropriate physician-extender personnel could be increased in underserved areas, particularly rural areas. Federal funds are available through Maternal and Child Health grants for programs targeted to reduce infant mortality. If the Medicaid ceiling were raised and administrative restrictions altered in order to allow Medicaid reimbursement to Puerto Rico's Maternal and Child Health and Crippled Children's programs, additional resources would be available. A pending legislative change to extend Medicaid to allow all low-income pregnant women would provide more adequate prenatal care.

Childhood Immunizations.—Officials of Puerto Rico's Department of Health believe the current figures showing 30 percent child immunization rates are underestimated and that, in reality, more children have been immunized than the data suggest but that poor recordkeeping makes data unreliable. Nevertheless, it is acknowledged that child immunization efforts need strengthening. Puerto Rico's Department of Health is already carrying out a child immunization campaign using, among other resources, manpower to be made available through the programs of the U.S. Labor Department under the Comprehensive Employment and Training Act. An additional step being taken is improving the collection and maintenance of child immunization records in order to have a reliable basis for policy decisions and action, to assure coverage, and to avoid duplicative immunization of the same child.

Alcohol, Drug Abuse, and Mental Health.—With respect to mental health, it has been reported that of the total of persons seeking services from the public health care system, approximately 20 percent have mental health problems. Some of this problem may have its genesis in stresses and worries about employment, education, housing, and other factors not directly related to health. Any improvement in these other factors could lead to a lower incidence of mental illness. In addition, it would be useful to provide mental health services through primary care centers with emphasis on prevention and health education. It may also be beneficial to reexamine the overall organization structure of the alcohol, drug abuse, and mental health services in Puerto Rico—to assure that staff and other resources are properly directed and efficiently organized.

In Puerto Rico, alcohol, drug abuse, and mental health services are delivered through two different organization structures: mental health is under the Department of Health; alcohol and drug abuse are under a separate cabinet level Department of Addiction Services. Depending on whose perspective is involved, such separation may be viewed as either an asset or a liability. A separate Addiction Service Agency is seen as an asset in that it is able to focus its efforts more sharply on the two target concerns: alcoholism and drug abuse. On the other hand, all three services—alcohol, drug abuse, and mental health—have enough common elements to argue for a coordinated approach, possibly within the same organizational structure.

POLICY OPTIONS FOR HUMAN DEVELOPMENT

Developmental Policies

Current social services policy on the island, like

that of the mainland, is targeted on individuals and their individual needs; e.g., crisis interventions, child abuse, foster care, etc. Broad programs designed to give families, children, youth, aged handicapped, or disabled persons support do not exist. Social services systems are as categorical and uncoordinated as those within the U.S. mainland. For example, five different agencies in Puerto Rico are involved in coordinating programs for youth—Juvenile Justice System, Department of Social Services, Department of Addiction Control Services, Youth Action Administration, and Department of Education. Three essentially parallel structures deliver services to the aged: the Gericulture Commission, Community Action Agencies, and the Department of Social Services. One set of policy options, then, could be a new effort to develop more cooperative, and coherent service programs for the family, children, youth, aged, handicapped, and developmentally disabled. This would require joint effort of Puerto Rico and the Federal Governments, with extensive involvement of community leaders.

There are many possible approaches for services and social and economic development together. One approach is based on the theory the entire family must be moved to a new level of functioning, not just one member, and encourages service institutions to address the family as a unit. In this mode, for example, the head of household would be given rehabilitation and job skills, the spouse and older child would be taught marketable skills related to whatever opportunities exist or are being created as a result of a mainland-island joint planning effort. School-age children would receive tutoring. Younger children would be enrolled in Head Start. Parent-child development would be taught. Health care, psychological counseling, addiction services, and legal assistance would all be provided as needed and possible. Some families might need to be taught home maintenance skills to use modern household equipment; they could receive home economic training in purchase and preparation of food. One could easily envision a project in which a number of housing units of poor condition are purchased with a HUD loan, the families taught to repair and live in them and, given the full range of needed services, the families eventually brought to an adequate level of income—whether wages or welfare—the housing sold to them, and the proceeds used to start the next cycle. One could also envision long-term care and rehabilitation services drawing plentifully from the more well-developed health care system and using some resources from the Department of Labor and Department of Housing and Urban Development to work on behalf of the aged, the developmentally disabled, and the handicapped.

Restructuring Social Services Systems

Services generally provided under the rubric of human development services programs cover a wide range of populations, problems, and purposes. These programs which range from planning and advocacy on behalf of the aged or retarded, from child care to child welfare, from vocational rehabilitation to in-home care of the homebound, also include a number of possibilities for supporting a developmental program in Puerto Rico. While the necessity exists to increase the level of resources associated with Federal social services programs, that course by itself will contribute only partially to solving what this report has earlier described as social problems on the island. What is required is a restructuring of social service systems to identify the most serious problems, support the institutions and traditions of the island, develop local community capacities, and build up the social service infrastructure. This restructuring would be part of an overall economic development effort.

Given what we have described as imbalances between population and jobs, for example, expanding vocational rehabilitation may be less useful than establishing an authority for independent living rehabilitation in which the essential services which benefit the impaired person need not be tied to the probability of job placement.

It may be useful to consider the option of consolidating some of the current Federal categorical programs and using the funds for social programs which would be planned jointly by Federal and Puerto Rico officials.

The primary administrative vehicle by which Federal funds can be provided to Puerto Rico in a way which allows for coherent planning and which provides flexibility for meeting special problems is title XX of the Social Security Act. A special appropriation extends up to \$15 million annually to Puerto Rico for social services under title XX of the Social Security Act. However, the full \$15 million is available only if the 50 States do not spend their entire share of funds under the \$2.5 billion annual pro-

gram. This uncertainty about the actual amount of funds to be received further complicates the inherently difficult job of planning the social services program. Furthermore, the \$15 million ceiling is less than half of what Puerto Rico would receive if it were treated similarly to the States under title XX.

One improvement would be to provide direct appropriation of Federal funds for social services. This involves making a fixed allotment of title XX for Puerto Rico in addition to the entitlement of the States. This need not mean Puerto Rico would be included under title XX on the same basis as a State or that it would receive more Federal funds than it does now. It would mean, however, that the island would be assured a fixed amount of money, thereby improving Puerto Rico's ability to plan its social-services program. Another improvement would be to include Puerto Rico in the title XX program. The primary purpose of this option is to increase the amount of funds available to Puerto Rico for social services. If Puerto Rico participated fully in title XX, it would qualify for about \$40 million annually, \$25 million more than its current allocation of \$15 million. (This change would require legislation.) Puerto Rico would be required to match the additional funds with \$6 million of its own funds.

Additional resources may be available from the Community Development Block Grant program of the Department of Housing and Urban Development, from the Comprehensive Employment and Training Act program of the Department of Labor, and from additional appropriations for social services programs sponsored by the U.S. Department of Health, Education, and Welfare, and the Community Services Administration. Given the extent of poverty in Puerto Rico, some consideration could be given to eliminating or modifying the requirement in some Federal programs that Puerto Rico match Federal grants with expenditures from its own budget.

Increased funding for the various social services will be most effective if expenditures are controlled by a well-conceived plan linking social and economic development.

