

*National College of Business
Administration & Economics
Lahore*



**INTERNAL AND EXTERNAL
DETERMINANTS OF INFLATION IN
PAKISTAN (1974-2011)**

BY

MUHAMMAD GULZAIB CHAUDHRY

**MASTER OF PHILOSOPHY
IN
APPLIED ECONOMICS**

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**A dissertation submitted to
School of Social Sciences**

**In Partial Fulfillment of the
Requirements for the Degree of**

**MASTER OF PHILOSOPHY
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Administration & Economics**

DECLARATION

This is to certify that this research work has not been submitted for obtaining similar degree from any university / college.

MUHAMMAD GULZAIB CHAUDHRY
May, 2013

DEDICATED
TO

My Parents
And
My Family

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RESEARCH COMPLETION CERTIFICATE

It is certified that the research work contained in this dissertation entitled “**Internal and External Determinants of Inflation in Pakistan (1974-2011)**” has been carried out and completed by **Muhammad Gulzaib Chaudhry** under my supervision during his **M.Phil. Applied Economics** program.

(Prof. Dr. A.R. Chaudhary)
Supervisor

SUMMARY

This study tries to find out the internal and external determinants of inflation in Pakistan. It covers the period from 1974 to 2011. For this purpose, ARDL Co-integration has been applied. Our dependent variable is inflation whereas independent variables used in this study are inflation expectations, exchange rate, oil prices, per capita GDP, wheat support price, interest rate and money supply (M2). The empirical results reveal that inflation expectations, per capita GDP, wheat support price, interest rate and M2 play a significant role in determining inflation in Pakistan. Inflation expectations, per capita GDP, wheat support price, interest rate and money supply (M2) are positively and significantly related with the inflation in Pakistan. Exchange rate and oil prices are positively and insignificantly related with inflation. The findings of this study show that internal determinants of inflation are more contributing than external determinants of inflation towards high inflation in Pakistan.

TABLE OF CONTENTS

	Page
DECLARATION	iv
DEDICATION	v
ACKNOWLEDGEMENT	vi
RESEARCH COMPLETION CERTIFICATE	vii
SUMMARY	viii
Chapter-1: INTRODUCTION	1
1.1 Problem Statement / Research Question	2
1.2 Objectives	3
1.3 Hypotheses	3
1.4 Organization of the Study	3
Chapter-2: INFLATION TRENDS IN PAKISTAN	4
Chapter-3: LITERATURE REVIEW	10
Chapter-4: METHODOLOGY AND DATA SOURCES	24
4.1 Econometric Model	24
4.2 Data Sources and Variables	25
4.2.1 Inflation	25
4.2.2 Inflation Expectations	26
4.2.3 Exchange Rate	26
4.2.4 Crude Oil Price	26
4.2.5 Per Capita GDP	27
4.2.6 Wheat Support Price	27
4.2.7 Interest Rate	28
4.2.8 Money Supply	28
4.3 Econometric Methodology	28
Chapter-5: RESULTS AND DISCUSSIONS	32
5.1 Long Run Coefficients	34
5.2 Short Run Dynamics	36
Chapter-6: CONCLUSIONS AND POLICY IMPLICATIONS	39
6.1 Conclusions	39
6.2 Policy Implications	40
REFERENCES	42
APPENDIX	48

CHAPTER 1

INTRODUCTION

Inflation is a worldwide phenomenon, which has always been a matter of interest for the policy makers. The rising rates of inflation have become a serious problem for the developed as well as developing nations of the world. It is a major obstacle in the way of economic growth and development, specifically in the developing countries like Pakistan. It can decrease the standard of living in a country and may hamper economic growth.

The prices of commodities rise due to inflation, making them uneconomical for the consumers and hence reducing the purchasing power of the individuals. People's access to the basic necessities of life, like food, shelter and clothing is restricted due to rise in inflation. Although both the rich and the poor have to suffer due to high inflation rates prevailing in the economy, yet the poor are more vulnerable because they have to spend a larger share of their income on basic needs of life.

The cost of investment also increases due to a rise in prices. As a result, the output declines and hence economic growth is adversely affected. Inflation, at different time periods has been a major problem in Pakistan. Many countries of the world have been endangered by the huge rise in inflation rates. Inflation has been a threat for almost all the nations, specifically the developing economies, like Pakistan.

Inflation generates uncertainty, which means expectations regarding future prices of goods and services, which are unpredictable. This affects the future decisions like savings and investments, and eventually, influences the economic growth of an economy. The financial development is frozen and the financial activities are decreased due to persistent and high inflation. This has led to the decline of the investment as well as the economic growth. Without uncertainty, better planning for the future can be done and efforts to enhance growth and development can be made.

High inflation rate is similar to a regressive tax, which has a negative influence on the poor and hinders economic development. The low income class is left with very low savings as they have less opportunity of shielding themselves from the rising prices. When the prices go beyond control, the fixed income group is adversely affected. Their incomes are limited and the rising prices restrict their purchasing power. Pakistan's economy has been

devasted due to high inflation no matter what the cause of inflation has been. The real income of a major part of the economy is negatively affected by such high rates of inflation. The government strategies and other measures have been unsuccessful in controlling inflation level.

Mild level inflation is not considered to be dangerous for an economy, however if it crosses the double-digit level, then the scenario is different (galloping inflation). Vast economic distortions are the result. Nordhasu et al. (1992) describes that the consequences are that people tend to hold the least amount of money as it depreciates rapidly.

The changes in price level have been discussed by various studies. Some researchers are of the opinion that the basic sources of inflation are the changes in the cost of production (cost-push inflation), while other studies suggest that inflation is generated by the changes in the demand side factors (demand-pull inflation). The rise in prices of oil, wages, energy and lending rates has led to the change in the cost of production in Pakistan. Moreover, in addition to these causes, the situation in Pakistan has been aggravated due to the depreciation of rupee against dollar.

In order to verify the contributing factors of inflation, although a lot of studies have been conducted, but detailed description of this phenomenon is still required as the present inflation hikes prevail. There are several factors which determine the inflation rate in an economy. In the empirical literature on Pakistan's economy we find different studies. Some of them consider demand side factors or supply side factors and others consider either internal factors or external factors to explain the inflation in the country. A literature survey on Pakistan's economy suggests that one can hardly find any study which considers both internal and external factors to explain the inflation rate.

Detailed information and scanning of the existing situation of the economy may lead to better and effective policy decisions. The existing research on the determinants of inflation in Pakistan considers either internal or external determinants of inflation. By considering both internal and external determinants of inflation, this study has provided more detailed information which would help the policy makers to formulate effective policies to control inflation hikes.

1.1 PROBLEM STATEMENT / RESEARCH QUESTION

Different studies have found the different determinants of inflation. Some studies focus only on the internal factors whereas others discuss external

factors of inflation. This study will try to find both internal and external factors as well as demand side factors and supply side factors of inflation in the context of Pakistan. While conducting this research, the following questions are considered:

- 1) How can internal and external factors explain the hike in prices in Pakistan?
- 2) What are the short-term and long-term effects of internal and external factors on prices in Pakistan?

1.2 OBJECTIVES

The objectives of this study are as following:

- 1) To investigate the internal determinants of inflation in Pakistan.
- 2) To investigate the external determinants of inflation in Pakistan.
- 3) To suggest policy measures to control inflation in Pakistan.

1.3 HYPOTHESES

The hypotheses of this study are as follows:

- 1) Inflation Expectations do not affect inflation in Pakistan.
- 2) Exchange Rate does not affect inflation in Pakistan.
- 3) Oil Prices do not affect inflation in Pakistan.
- 4) Per Capita GDP does not affect inflation in Pakistan.
- 5) Wheat Support Prices do not affect inflation in Pakistan.
- 6) Interest Rate does not affect inflation in Pakistan.
- 7) Money Supply does not affect inflation in Pakistan.

1.4 ORGANIZATION OF THE STUDY

The study is organized into different chapters. Besides this introductory chapter, inflation trends in Pakistan have been discussed in the second chapter. The review of literature has been presented in the third chapter. Methodology and Data sources have been presented in fourth chapter. Fifth chapter provides the empirical results. The sixth chapter presents conclusions and policy implications.

CHAPTER 2

INFLATION TRENDS IN PAKISTAN

A persistent increase in prices is known as inflation. There are several kinds of inflation which include cost-push inflation, demand-pull inflation, creeping, walking or running inflation, hyper or galloping inflation, mixed inflation or stagflation. Currently the kind of inflation that prevails in Pakistan is mixed inflation.

If we visualize worldwide situation of the economies, inflation has become an unavoidable phenomena. Usually mild inflation is a natural phenomenon. However, a drastic rise in the prices can pose threat to the economy. The sources of inflation have been explained by the theories put forward by various schools of thought. Some economists are of the view that the major source of inflation are the changes in demand side factors (demand-pull inflation) while according to the opinion of the others, changes in the cost of production (cost-push inflation) generate inflation. Moreover, it is also believed that several internal and external factors also contribute towards the rapidly increasing rates of inflation all over the world. A major problem faced by almost all the nations is the rising levels of inflation. Rising inflation rate is a major hindrance in their economic development.

Pakistan's inflation rate over the years has been an enigma to most of the analysts. The rising prices have created an alarming situation in the country and as observed from the historical trends of inflation in Pakistan, inflation has crossed the double digit, which is a major threat to the economic growth and development of the country. Majority of the population of Pakistan has been affected adversely due to high inflation rates. The presently prevailing inflation in the country is significantly influencing almost every sector of the economy. Appropriate strategic planning is required to control the threatening rates of inflation in the economy.

The possible factors contributing towards high inflation rates in Pakistan may include money supply, wheat support price, interest rate, inflation expectations, crude oil prices and exchange rate.

Upward pressure on price level may be due to the exchange rate, if it is depreciating. The exchange rate determines the trading relations among nations and hence is considered to be a major economic indicator. According to Cottarelli et al. (1998), exchange rate is the most essential determinant of

inflation rate. In addition to this, Hyder and Shah (2004) have also estimated the extent of the exchange rate impacts on prices of consumer goods and domestic wholesale prices in Pakistan.

An inflationary impact on consumer prices, specifically food prices, is the result of a substantial rise in the support price of wheat. This impact is due to the fact that wheat and wheat related products account for 5.1% of the CPI basket. According to Khan and Qasim (1996), a 7.4% increase in food price inflation is the result of a 10% rise in wheat support price, which is highly statistically significant. Moreover, the study by Khan and Schimmelpfenning (2006) also verifies that wheat support price enhances the inflation rate in Pakistan, as Pakistan is an agricultural land. Furthermore, Dorosh and Salam (2006) consider wheat procurement price the main determinant of inflation in Pakistan, and the research findings of Hassan et al. (1995) also conclude that wheat procurement prices are highly significant and essential in determining food prices.

Another major variable adding to high inflation rates in Pakistan is the inflation expectations. This refers to the perception of individuals about future inflation rates on the basis of prior rates of inflation prevailing in the country.

Money supply is another major determinant of inflation in the country. Khan and Schimmelpfenning (2006) suggest that inflation in Pakistan is majorly enhanced due to money supply.

Furthermore, interest rates and crude oil prices also play a vital role in rising inflation rates in Pakistan. It is a fact that the essential input in production is oil, and it is being utilized by almost every sector of Pakistan's economy. Frequent fluctuations in the oil prices have influenced the levels of inflation in the country. A powerful link between oil price shocks and general price level has been observed in Pakistan by Malik (2008).

The major components of inflation in Pakistan include transportation, health care, apparel, food and beverages, housing, communication and education, recreation and entertainment and miscellaneous. Transportation includes spending on cars, trucks, buses, etc. (both used and new), insurances, CNG, petrol, etc. Health care expenditures comprise of the hospital services, medicines, health insurances, doctor's or dental services, nursing homes, etc. Jewelry, dresses and shoes of men, women and children are included in apparel. Food and beverages consists of all types of eatables and drinks. Clocks, lamps, dishes, indoor plants, furniture, decorations, water and sewage are all included in housing expenses. Computers, internet, landline, laptops, college or school tuition fee, books and accessories, all make up

communication and educational spending. Cell phones have been added to the communication index in 1997. Recreation and entertainment expenses include spending on newspapers, magazines, pets, cable or TV, cameras, audio or video appliances. Miscellaneous spending includes expenses on haircuts, laundry, dry cleaning, personal cares, cosmetics, legal services, etc.

Over the course of the fiscal year, four various price indices are published by Pakistan. These include the Consumer Price Index (CPI), the Wholesale Price Index (WPI), the Sensitive Price Index (SPI) and the GDP Deflator.

The major measure of price changes at the retail level is the Consumer Price Index (CPI). Usually inflation rate in the country is indicated by CPI. It is the most widely used and commonly accepted tool to measure inflation. It measures the cost of the market basket of consumer goods and services. It is based on many commodities of day to day living. In CPI we weigh the prices of goods by measuring their economic importance. Each commodity is assigned fixed weight proportional to its relative importance. It measures changes in the cost of purchasing a representative fixed basket of goods and services. Initially, with 1948-49 as a base, the CPI has been estimated for industrial workers in the cities of Lahore, Karachi and Sialkot only. Since then, constant efforts have been made to make CPI more representative. For this purpose, its coverage and scope in terms of items, category of employees, markets and cities, have been enhanced and extended. Currently, the CPI covers the retail prices of 374 items in 35 major cities of Pakistan. The present study has utilized CPI as the major measure of inflation in Pakistan, using 2005 as the base year, because in Pakistan, CPI is the most representative as it covers a wide range of 374 items in 71 markets of 35 cities around Pakistan.

In order to measure the directional movement of prices for a set of chosen items in the primary and wholesale markets, Wholesale Price Index (WPI) has been designed. These are the items that are consumed on primary and secondary level in daily life. Wholesale markets and the mills at organized wholesale market level are the sources of these prices. For the first time, with 1959-60 as the base, WPI has been computed in Pakistan. For making it more representative, consistent efforts have been made since then, in order to enhance and extend its coverage and scope in terms of markets, commodities, etc. Currently, WPI covers the wholesale price of 106 commodities prevailing in 18 major cities of Pakistan.

In order to evaluate the price movements of necessities at short intervals, the Sensitive Price Index (SPI) is estimated on weekly basis so as to review the situation of prices in the country. The actual position of the supply is also

depicted by SPI. This means that it shows the availability of the commodities. In Pakistan, currently, the SPI is based on the prices prevailing in 17 major cities and is estimated for the basket of items being consumed by the households from all income groups combined.

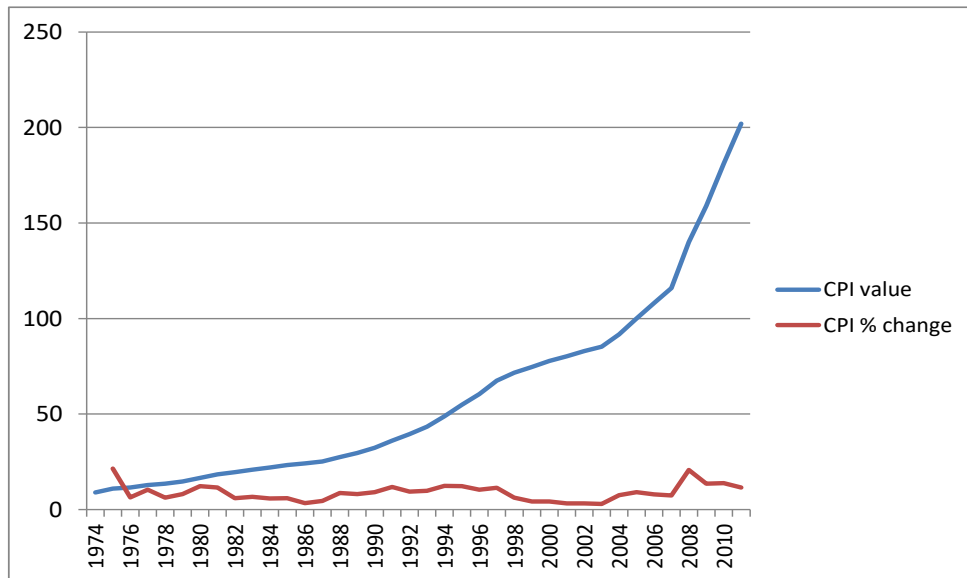
Table 2.1
Historical Inflationary Trends in Pakistan

Years	CPI (Value)	CPI (% change)	Years	CPI (Value)	CPI (% change)
1974	8.98		1993	43.4	9.87
1975	10.9	21.38	1994	48.8	12.44
1976	11.6	6.42	1995	54.8	12.30
1977	12.8	10.34	1996	60.5	10.40
1978	13.6	6.25	1997	67.4	11.40
1979	14.7	8.09	1998	71.6	6.23
1980	16.5	12.24	1999	74.6	4.19
1981	18.4	11.52	2000	77.8	4.29
1982	19.5	5.98	2001	80.3	3.21
1983	20.8	6.67	2002	82.9	3.24
1984	22	5.77	2003	85.3	2.90
1985	23.3	5.91	2004	91.7	7.50
1986	24.1	3.43	2005	100	9.05
1987	25.2	4.56	2006	108	8.00
1988	27.4	8.73	2007	116	7.41
1989	29.6	8.03	2008	140	20.69
1990	32.3	9.12	2009	159	13.57
1991	36.1	11.76	2010	181	13.84
1992	39.5	9.42	2011	202	11.60

(Annual Percentage Change, Period Average)
Source: World Development Indicators (2012).

Various structural and political changes have been observed in Pakistan's economy during 1974-2011. Approximately, all the macroeconomic variables (including inflation) and policies have been extensively influenced due to these changes. This section analyses tendencies of general inflation.

Table (2.1) shows the CPI values of every year from 1974 to 2011. It also shows the percentage change in inflation in Pakistan from 1974 to 2011. In 1975, percentage change in inflation was 21.38% and it decreased to 6.42% in 1976. Again there was an increase in inflation percentage and it was 10.34% in 1977. In 1978, it decreased to 6.25%, while a rise in inflation percentage was observed in 1979 and 1980 when it was 8.09% and 12.24% respectively. A decline in inflation percentage was observed in the next two years when it was 11.52% in 1981 and 5.98% in 1982. It has risen to 6.67% in 1983 and for the next three years, in 1984, 1985 and 1986, a constant decrease in inflation percentage has been observed and it was accounted to be 5.77%, 5.91% and 3.43% respectively. It increased to 4.56% in 1987 and for the next four years it was increased consistently, and it was estimated as 8.73%, 8.03%, 9.12% and 11.76% in 1988, 1989, 1990 and 1991, respectively. It has further declined in 1992 and 1993 to 9.42% and 9.87% respectively. An increasing trend was observed when it was 12.44% in 1994 and 12.30% in 1995. In 1996, it decreased to 10.40% and has risen in 1997 to 11.40%. In next six years, a decreasing trend was observed in inflation percentage and once again in 2004 and 2005, a rise in inflation percentage was observed. It decreased to 8% in 2006 and further decreased to 7.4% in 2004. A huge rise was observed in 2008 when it was accounted to be 20.69% and again it decreased to 13.57% in 2009. In 2010, it increased to 13.84% whereas in 2011, again a decreasing trend was observed when the inflation percentage has been 11.60%.



Historical Inflationary Trends 1974-2011

During 1974-2011, Pakistan’s economy has undergone several political and structural changes, which have extensively influenced almost all the macroeconomic variables, including inflation. The CPI values and percentage change in inflation have been represented in the line chart, here.

CPI values show an increasing trend throughout, represented by the blue line, and we can see that it has reached a maximum of 202 during the time period 1974-2011, while alternatively; fluctuating trends have been observed in the CPI percentage change. These are represented by the red line. Frequent increasing and decreasing trends have been observed in the CPI percentage change over the years, which can be clearly seen from the line chart, and it has reached to a maximum of 21.38% in 1975 and it has been at a minimum at 2.90% in 2003.

CHAPTER 3

LITERATURE REVIEW

A vast literature on the determinants of inflation exists. A lot of research has been conducted on developed and developing economies. Given a lot of findings on the inflation determinants, this chapter focuses only on those studies which are highly influential in the literature.

Since earlier times, various causes of inflation have been discussed in several theories presented by several schools of thought. We can break the history into different time eras and see what these theories assert. Ahmed et al. (2007) explain that initiating from the Keynesian view, the main source of inflation is either a decrease in the aggregate supply or an increase in the aggregate demand.

Later in 1950's the need has been felt to further investigate Keynesian explanations. This has resulted in the emergence of 'Philips Curve' modified by Lipsey (1960) and maintained by A.W. Philip. Ahmed et al. (2007) describe an inverse link between unemployment and the rates of inflation by this model. Hassan et al. (1995) describe a trade-off between unemployment and inflation.

During 1970's and 1980's inflation became the center of attention of economists. Classicists started preparing to discard the Keynesian approach to inflation. In such attempts the monetarist approach has been put forward. The main idea of this approach is that "inflation everywhere is a monetary phenomenon". This model has been tested by Schwartz (1971) and has been developed by Friedman (1968, 1971 and 1971). It asserts that the determining factor of inflation is the past behavior of money to output ratio (Ahmed et al. 2007).

Another competing approach is the "Structuralist Model" which has been advocated by Sunker (1958), Streeten (1962), Olivera (1964), Baumol (1967) and Maynard and Rujckeghem (1976). This model asserts that the supply side factors determine inflation. It amounts to productivity growth, administered prices, wages, import prices and so on (Hassan et al. 1995).

The aforementioned theories undoubtedly help to understand the causes of inflation but in case of developing economies like Pakistan none of the studies explain the internal and external factors which cause inflation. In

addition to policy variables, there is a dire need for detailed investigation of inflation causes from the supply and demand side (Ahmed et al. 2007).

Going through the literature, the following determinants have been identified in the case of Pakistan, inflation expectations, exchange rate, oil prices, GDP per capita, wheat support price, interest rate, and money supply.

The impacts of devaluation on the economy of US have been studied by Kahn (1987). Upward pressure on the costs, in direct as well as indirect manner, is inserted by depreciating dollar, in the opinion of the researcher. The costs of domestic products as well as imports are raised due to this. Decreased inflation rate is the result of appreciation of dollar, whereas increased inflation rate is due to devaluation of dollar. It has been estimated by the researcher on the basis of prior experience that dollar has a dual effect on inflation. Demand induced or supply induced inflation, both are the result of devaluation of dollar. The researcher suggests that persistent inflation is not generated just by devaluation of dollar, without consistent rise in the growth of money. Hence, depreciation of dollar does not have a permanent influence on inflation.

Inflation in Pakistan is initiated by several major variables which have been determined and quantified by Hassan et al. (1995). Monetary strategy shocks, supply shocks, external shocks, tax strategy shocks, anticipations and pricing strategy shocks are included in the factors considered for estimation. The monitored costs and the purchasing prices of wheat, sugar and cotton are included in the pricing strategy shocks. The regression, along with OLS, is run over the factors. For estimation, data from Pakistan is gathered for the time period of 1972-73 to 1993-94. This covers a period of 25 years. Least effect of supply of money is observed on the costs of agricultural products, from the research findings. The effect of cotton and sugar purchasing prices is marginal, whereas wheat's purchasing prices are observed to be crucially high. The raw material costs are essentially influenced by the costs of importable products.

CPI non-food costs and CPI food costs are the two major elements of the inflation equation, which has been evaluated by Khan and Qasim (1996). Wheat support costs, value added in agriculture, supply of money, cost of utility and import price index (food inflation) are included in the major factors which have been selected for conducting the research. Data from Pakistan for a time period of 25 years, from 1971-72 to 1994-95, has been gathered. In order to draw the conclusions, regression as well as co-integration ECM has been applied. By the rise in import price index, the entire inflation in Pakistan has been estimated. Price is increased by 4.6% due to a rise of 10% in import price index. Inflation in Pakistan is the result of commonly occurring depreciation of rupee, as claimed by this article. Wheat support price is mostly used to

estimate food price inflation. A 10 percent rise in wheat support price leads to 7.4 percent increase in food price inflation which is highly statistically significant. Some modern strategy for increasing it is visibly demanded by the co-efficient of wheat support price (0.74). However, supply of money, import price, real GDP and electricity cost are responsible for the increase in non-food price.

The inflation trends for many transition and industrial societies have been explained by Cottarelli et al. (1998). The part played by several non-monetary variables in increasing inflation has been elaborated by the study. For comprehending the findings, several factors have been considered. The study focuses on the most essential factor i.e. exchange rate regime. Annual data for 47 nations, from 1993-96 has been utilized. 10 of these nations belong to Eastern and Central Europe, 22 are industrial OECD nations, and 15 belong to the former Soviet Union. The data is analyzed using Multiple Regression Analysis. Decreased rates of inflation are experienced by nations with fixed exchange rate systems, according to the estimates of the researcher. Hence, in the estimation of inflation, the most important factor is exchange rate. However, it is determined by the researcher that inflation in the society is influenced by price changes.

The impacts of oil prices have been re-estimated by Hooker (1999). Costs of oil, GDP deflator, output growth, import price inflation and 3-month treasury bills are included in these factors. In order to examine the findings, Vector Autoregressive (VAR) approach is applied. 0.54 is the very crucial correlation which exists between import price inflation and changes in oil prices. It is claimed by the researcher that only output, and not unemployment is forecasted by symmetric and non-linear oil prices, if the factors such as inflation are not included in the equations and if over-year-over variation is used to represent output.

Innovative research has been conducted by Khan and Senhadji (2001), who have depicted the threshold level of inflation for both developing and industrialized nations, as well as have elaborated the link of economic growth with low and high inflation rates. Utilizing panel data from 1960-1998, for 140 industrialized and developing nations, they have conducted their study. Clear evidence of presence of a threshold beyond which inflation adversely affects the economic development of a country, has been provided by their research. According to their findings, for developing countries, the threshold estimates are 7-11%, whereas, in case of industrialized economies, it is 1-3%. The threshold estimates are 3-6% by Khan et al. (2001)

The relationship between inflation and exchange rate has been studied in detail in case of Australia by Korunaratne (2002). Relative prices, real exchange rate and relative output are the factors chosen for estimation. For drawing the conclusions, structural VAR (SVAR) approach has been applied. The findings reveal that in Australian economy, shocks have resulted in declining real exchange rate during post float period. Deflation, instead of inflation, has been generated due to these shocks. In small nations as Australia, relative price variations are related to exchange rate movements. The research suggests that a decline in overall costs and depreciation of exchange rate are created due to real supply and demand shocks.

The opinion that inflation in Pakistan is generated due to depreciation of rupee has been challenged by a study carried out by Choudhri and Khan (2002). According to them, the impacts of depreciation of rupee on inflation are speculative in Pakistan. Consumer price index (CPI), exchange rate and foreign consumer price index (PCPI) are included in the factors which have been selected for estimation. The data obtained from the first quarter of 1982 to the second quarter of 2001 has been used for conducting the research. The results have been obtained using VAR. It is claimed by the researcher that not a very strong long run and short run link between inflation and exchange rate, exists. According to the researchers, relationship between trends of inflation and rupee depreciation do not exist in Pakistan.

The extent of the exchange rate impacts on prices of consumer goods and domestic wholesale prices in Pakistan has been estimated by Hyder and Shah (2004). Considering data from January 1988 to September 2003, the major emphasis is on CPI and WPI inflation. For drawing the conclusions, VAR approach is adopted. According to the researchers, depreciation of rupee has dual impacts: direct as well as indirect. A lot of conclusions are drawn from the research. Initially, a decline in the exchange rate pass-through has been observed. Secondly, the pass-through has a powerful effect on CPI. Thirdly, commonly first four months, is the time when pass-through effects are observed. Fourthly, after the free float of rupee, weak impacts of pass-through on prices of consumer goods are observed. And lastly, the exchange rate pass-through is stronger in 'fuel and lightning' in WPI commodity group. However, within CPI commodity group it is stronger in the 'transport and communication' group. Moreover, in a low inflationary atmosphere, the exchange rate pass-through is not as strong as it is in a high inflationary atmosphere.

Hussain (2005) has utilized yearly data from 1973-2005 for evaluating the threshold level of inflation in Pakistan. In order to determine the threshold impact, standard econometric technique has been used in the study. The

research findings depict that a major threat to the economic development is the targeting inflation which exceeds a level of 4-6%. As inflation is generated due to both supply and demand side shocks, this range of inflation in Pakistan is tolerable. Hence, in order to attain economic growth and development, the central bank in Pakistan should keep inflation rate stable.

By utilizing annual data for the time period 1973-2000, the threshold level of inflation in Pakistan has been evaluated by Mubarik (2005), who is of the opinion that inflation above the currently prevailing threshold level, which is 9%, is dangerous for the economic development of the country.

Finding out the global reasons of vast inflationary pressures is the primary objective of Aisen and Veiga's (2005) study. The impacts of political factors on inflation are not demonstrated by majority of previously developed models. For conducting the estimation, a set of factors has been considered. Government crises, index of economic freedom polity scale, variations in cabinet, trade, agriculture, and rise in price of oil, GDP growth, and real overvaluation and US Treasury bill rate are included in this set of factors. The data for the time period 1960-99 has been taken into account, from 100 nations. In order to achieve the results, the generalized method of moments is implemented. Increased inflation is created by a high level of political instability, is the eventual conclusion of the researchers on the basis of economic evaluations. As each government has distinguished priorities for inflation, trends of inflation are enhanced due to frequently altering cabinet.

The impacts of exchange rate decline on inflation have been evaluated by Carranza et al. (2006). Real GDP growth, level of openness of society, investment growth and exchange rate regimes are included in the four sets of factors. The data which is gathered represents more than 100 nations. The sample includes data from 1996 to 2004. The results are generated by applying Regression Analysis. According to the estimations, it is suggested that dollarized societies experience a higher exchange rate pass-through. The substitution of employment and inflation is claimed to be constant with such societies, according to this study. Sustainability of exchange rate should be ensured by the development of monetary strategy.

The frequently discussed major query that inflation in Pakistan is created by money or wheat has been attempted to be solved by Khan and Schimmelpfenning (2006). This research verifies that inflation in Pakistan is enhanced by wheat support price, which is held liable for inflation in the economy, as Pakistan is an agricultural country. The factors have been obtained from the monetary side as well as from the supply side. Credit and money supply to the private sector is included in the earlier, whereas wheat

support price and exchange rate are included in the latter. The monthly data, from 1998-2005 is taken into account. Vector Correlation Model (VECM) in log levels has been applied. Both Islamic and Gregorian calendar impacts relate to the data. It is suggested that the increase in inflation is due to the monetary variables. Quite small impact is placed by the support price of wheat which is valid only in the short run.

In societies of East Asia, the pass-through impacts of exchange rate on domestic prices have been estimated by Ito and Sato (2006). In a few nations such as Indonesia, the devaluation has led to increased inflation growth rate, whereas in a few other economies such as Korea, very little impacts of strong nominal evaluation on inflation have been observed. CPI, producer price index (PPI), exchange rate, and import price index (IMP) are the factors. Conclusions have been drawn by utilizing VAR approach. Several findings have been estimated. Initially it is suggested that in economies which are facing crises, extent of exchange rate pass-through has been great. Secondly, it is concluded that there has been decreased pass-through to CPI excluding Indonesia. Thirdly, it determines that the responses of monetary strategy to exchange rate shocks and CPI responses to monetary strategy shocks are statistically of great importance. Hence, the main variable contributing to inflation in the economy has been CPI responsiveness to exchange rate variations.

The hypothesis that inflation is estimated by institutional and political variations has been testified by Aisen and Veiga (2006). Real overvaluation, GDP growth and oil prices variations constitute the economic set of factors. While other factors like index of economic freedom and decision-making variations are included in the political set of factors. The data for 100 nations for the time period of 1975-99 has been gathered. To find out the conclusions, regression has been run. The great statistical importance of the factors has been depicted by the findings. Inflation volatility is largely influenced by increased political instability, is the result drawn.

In Pakistan, impacts of wheat support price on the general price level have been described by Dorosh and Salam (2006). Estimation of wheat economy of Pakistan is the main focus of this research. Trade strategies on supply of wheat, demand, sales price, general inflation and wheat purchasing prices are the factors considered for the objective of estimation in this research. Price Multiplier Model, which has been initially developed by Rolan-Holdst and Tarp, and implemented in Pakistan by Dorosh et al. (2004), has been applied. This model depends on the social accounting matrix. The effect of production of wheat is least, not the wheat price level, according to their study. It is suggested that increase in the general price level is not due to the

wheat prices, but due to the less production of wheat. As the chief share in the CPI basket is of prices of wheat, hence the inflation in the country is influenced by it.

Current inflationary pressures in Pakistan are caused by certain main factors which have been focused by Ahmad et al. (2007). Major factors describing CPI are government taxes, government sector borrowing, prices of imports, exchange rates, anticipations, wheat support prices and real demand relative to real supply. Data for 35 years from 1972-73 to 2005-06 has been gathered. In order to draw the conclusions, in addition to regression analysis, OLS method has been implemented. It is determined that the factors that are statistically significant at less than 1% level are government taxes, government sector borrowing and anticipations. Significant factors at the level of 5% are exchange rate, import prices and demand relative to supply, whereas at the level of 10%, wheat prices are not significant. Hence, inflation in the economy is not essentially generated by the wheat prices.

A few impacts of political instability on inflation in Pakistan have been taken into account by Khan and Saqib (2008). Inflation and serious macroeconomic disequilibrium are the results of the political instability in the economy. Government crises, per capita GDP, oil prices, trade polity share, supply of money, credit to private sector, cabinet variations, production of agriculture and fiscal balance are the factors included in the research. Extensively covering the political and economic atmosphere, the data for 1941-2007 has been gathered on yearly time basis. In order to draw the conclusions for political chaos and crises, generalized method of moments (GMM) has been utilized. Inflation in Pakistan is essentially caused due to the above mentioned factors, according to the estimates of the study.

The effect of increasing oil prices on Pakistan's economy has been estimated by Malik (2008). A strong link between general price level and oil price shocks has been evaluated by the researcher. Real government expenditure, government revenue, real stock price, real GDP, real total debt, rate of interest, real effective exchange rate, foreign exchange reserves, real crude oil prices, inflation and output are the factors that are considered. To observe the research findings, the researcher has run multiple regressions. The fact, that in order to offset the rise in crude oil prices, some nations decrease their entire consumption of oil, has been concluded. A powerful link between oil price shocks and general price level has been observed in Pakistan.

Utilizing both, political and economic factors, the variables by which inflationary pressures are created have been found out in the research conducted by Cavusoglu et al. (2009). Interest rate variations, index of

government stability, wage, import price, rates of growth of money and index of political freedom are included in the factors studied. The data for 39 nations, for 1983-2002 has been gathered. The regression analysis and the methodology of two-steps GMM-SYS estimators have been utilized to develop the inflation model. Developing economies, due to their small size are exposed to highest risks of the international price variations, according to the researchers. Presently true for the developing countries, the negative impacts of political unrest or inflation have previously been proved for low inflation and developed countries.

In his study, Abbas (2009) describes the reasons of the three very destructive downturns of economic literature. These include 1930s great depression, stagflation of 1970s and 2008's worldwide recession. The researcher is of the opinion that oil price shocks in the international economy have been the cause of all these three disastrous downturns. Real GDP growth, inflation inertia, oil price shocks and crop productivity propositions are the factors selected for study. The data for the time period of 2007-2008 has been gathered to find out the link between the above discussed factors and inflation. Regression has been run to draw the results. High surges in the oil process globally created the inflation in 2008 as suggested by the researcher. Thus oil, as a chief import of our country, mainly estimates the trends of inflation.

For the time period of 1996-2008, in 10 CIS transition nations, determinants of inflation in the long run and short run have been analyzed by Agayev (2011), who has utilized time series data for this purpose. Regression analysis has been implemented and the factors considered for the study include supply of money, wage, rate of exchange and inflation. According to the findings of the research, in the short run monetary policy impacts inflation whereas inflation is not created by wage growth rate and rate of exchange and vice versa in the long run.

The dynamics of inflation in Egypt have been estimated by Helmy (2010), who has utilized co-integration procedure and has included nominal exchange rate, consumer price index, broad money or domestic liquidity, average annual rate of interest and percentage to trade deficit of GDP as the variables of the study. According to the findings, interest and growth rate of money supply, both affect inflation in Egypt.

For the period of 1970-2005, utilizing time series data, the link between supply of money, budget deficit and inflation in the long run, has been observed by Chimobi and Igwe (2010) in Nigeria. The factors included in the study are budget deficit; inflation and supply of money, and Granger causality and co-integration technique have been applied. The findings predict that a

close link between supply of money and inflation exists, and inflation is mainly created due to money supply. Moreover, a bilateral link between budget deficit and inflation exists. According to the research, the role of money supply for budget deficit and inflation needs to be balanced and for this purpose, appropriate monetary policy should be devised.

Utilizing time series data, in UK and Pakistan, the link between interest rates, exchange rates and inflation has been estimated by Rehman et al. (2010) for the time period 1994-2009. Interest rate differentials, inflation and exchange rate differentials are the considered factors. According to the findings of the study, the interest and exchange rates are inversely related, whereas direct relation exists between Pakistan and UK's inflation rates.

For the period of 1971 to 2006, the determinants of inflation in Pakistan have been studied by Khan and Gill (2010) utilizing time series data. The factors included are budget deficit and annual rate of interest, GDP deflation and CPI. Regression analysis has been utilized. According to the estimates, in the long run, there is no impact of budget deficit on inflation.

Thailand, Malaysia, Philippines and Indonesia are the four Asian nations for which the reliability of Phillips Curve has been evaluated by Puzon (2009), who has utilized time series data for 1980-2005. The variables included in the study are interest rate, unemployment and inflation. Regression analysis has been applied. According to the study, no one to one tradeoff between inflation and unemployment prevails. According to this study, there might be a probability that inflation rate is noticeably impacted by the monetary Policy of prior years' regarding rates of interest.

For the period of 1973-2007, utilizing time series for five inflation targeting nations (Sweden, UK, Finland, Canada, and Spain) a link between uncertain interest rates and inflation has been created by Mallik and Bhar (2009). The factors included in the study are inflation, economic growth and interest rates and time varying parameter model with generalized autoregressive condition heteroskedasticity (GARCH) specification has been utilized. According to the findings of the research, the rates of interest and the expected inflation are directly related. The study proposes that uncertainties have been successfully abolished and the inflation rate has been consequently controlled by the monetary authority.

For the time period of 1996-2003, by utilizing time series data, the short run price level with regard to domestic and foreign variables in Mexico, has been estimated by Castillo and Hernandez (2008). The researcher has utilized regression analysis and has considered variations between the wages, price

level and exchange rate, as the factors included in the study. Moreover, short run price level and exchange rate relationship have also been observed. The results suggest that the trend of the price level is mainly due to the variations in exchange rate and wages.

By utilizing VAR model, the sources of inflation in Ecuador, have been determined by Gachet et al. (2008). The factors included in the study are political events, global prices, inflation rate, exchange rate, public policy variable, transportation cost & weather conditions. According to the findings of the study, exchange rates, global prices and public policy are the major causes of inflation.

For the time period of 1972-2007 for Bahamas, 1965-2007 for Barbados and 1957-2007 for Jamaica, the link between inflation uncertainty and inflation, has been observed by Payne (2007). He has utilized time series data, and has applied ARMA GARCH models to evaluate inflation uncertainty, and for observing the link between inflation uncertainty and inflation, Granger Causality has been applied. A direct effect of rise in inflation has been observed on inflation uncertainly for each nation.

For 1970-2005, utilizing time series data, the inflation-targeting the exchange rate policy for an oil producing nation (Iran) has been observed by Sadeghi at al. (2007). The factors included are oil revenue, money supply and exchange rate. The findings depict that in the short run, the oil revenue will raise inflation and it will increase inflation in the long run.

In Pakistan, inflation for the time period of 1993-2004 has been estimated by Salam et al. (2006). Forecasting the monthly inflation on short term basis is the major objective of this study. The researcher has used Autoregressive Integrated Moving Average (ARIMA). The factor considered is consumer price index. For the estimation of inflation in the short run, the most appropriate model has been utilized, based on several estimation and decision criteria.

For the time period of 1963-1987, by utilizing the time series data, the determinants of unemployment and inflation have been estimated for Korea, by Darrat (1988). The factors included in the study are unemployment rate, time and rate of inflation. According to the findings, variations in inflation are not dependent on the extent of resource allocation and in the short run, no impact of defensive monetary policy on unemployment has been observed.

For time period 1960-1982, utilizing time series data, it has been observed that whether wage costs and budget deficits are the major inflation

determinants in USA and UK or not, by Darrat (1985). Multiple Regression technique has been applied. The variables considered are rate of unemployment, real GNP growth, and inflation rate, industrial wages growth rate and growth rate of money stock. According to the estimates the major inflation determinants in USA are wage growth and money growth and for inflation estimation; budget deficit is an insignificant factor. On the other hand, in UK, wage growth rate and budget deficit are the major determinants of inflation. It has been suggested that in order to eliminate inflation, the excess budget deficit should be decreased in the UK whereas in USA, the surplus money growth should be declined. Hence, for inflation reduction, the major focus is to decrease the growth of money wages. An income strategy with full employment should be adopted in order to regulate inflation.

Exchange rate affects the economy both through direct and indirect channels. In case of the former, the movements of exchange rate affect the prices of finished imported goods and inputs which further affect the cost of buying those goods and the purchasing power of the consumers. In the case of indirect channel the movements in exchange rate affect the prices of exports and the aggregate demand level (Hyder and Shah, 2004). Thus pass-through effect of exchange rate on different types of domestic prices and the inter-relation between them is worth discussing (Ito and Sato, 2006). McCarthy (2000) and Faraqee (2004) have tried to examine the pass-through effect on domestic prices at different stages of distribution.

Pakistan, since 1982, is following the flexible exchange rate policy (Choudhri and Khan, 2002). The stable value of the domestic and external currency leads to economic growth and hence the monetary policy of Pakistan also aims at this measure. Exchange rate movements can influence domestic prices. It is also asserted by Cottarelli et al. (1998) that countries with fixed exchange rate system face low inflation rates. Khan (1987) suggests that dollar depreciation in US brings twofold types of inflation; first is demand-induced and second is supply-induced. The concerns about inflation in Pakistan are made on the popular view that consumer prices are significantly affected by import prices which increase quickly as a result of devaluation of rupee (Choudhri and Khan, 2002). Akhtar and Siddique (1999) examine the impact of imported inflation and changes in monetary and real variables on domestic prices during 1972-78. It is however said that the magnitude of exchange rate pass-through to domestic prices depends on general inflationary environment prevailing in the economy (Taylor, 2000).

In case of Pakistan it is seen that inflation has been a frequent consequence of exchange rate fluctuations. As put forward by Ahmed et al. (2007), increase in inflationary trends during 1990's may roughly be attributed

to excessive money supply, rising wheat prices and the depreciation of rupee. Along with other factors the import price hike in 2003-04 and 2005-06 pulled inflationary pressures at an alarming level in the country. In Pakistan exchange rate is expressed as rupees per dollar. Any increase or decrease in the price of dollar affects the exchange rate. Depreciation of the Pakistani rupee would mean more rupees for a dollar and hence increases the costs of imports. This variable thus again has a positive sign indicating inflation in the country (Ahmed et al. 2007).

Hyder and Shah (2004) suggest that exchange rate movements have only a mild effect on domestic prices because major part of CPI and WPI contain wheat, sugarcane, cotton and energy. They also say that pass-through effect is more significant in non-food prices in both CPI and WPI. Depreciation and inflation have weak short run association. Nominal exchange rate does not impose inflationary cost on the economy. However, its stability may be desirable (Choudhri and Khan, 2002).

Ali et al. (2011) determines the role played by inflation and economic growth in reducing poverty in Pakistan. The presence of long run link between economic growth, poverty, inflation, trade openness and investment has been proved by the author, for the time period 1972-2008. The positive effect of inflation and the negative impact of investment and economic growth, on poverty, have been depicted by the research findings. In this study, it has been observed that the impact of trade openness on poverty is not significant. However, as observed in the short run analysis, trade openness and investment play an insignificant role in the reduction of poverty, while a positive effect of inflation and a negative effect of economic growth, on poverty, have been observed.

Oil is thought to be a major factor contributing to worldwide inflation. It adds to rising price in developed economies, generally, and in developing countries, specifically. Oil prices have been rising since 2003 and reached to the hike of \$137/bbl in July 2008 (Malik, 2008). Abbas (2009) asserts that the Great depression of 1930's, stagflation of 1970's and global recession of 2008's, all of them were a reaction of surging oil prices all around the globe. Hamilton (2005) also concludes that 9 out of 10 US recessions after World War II were the outcome of spikes in the oil price rather than the monetary management.

In the case of Pakistan, we have a very high demand for oil and oil related products. From sometime back we have been faced with not a very sound growth rate of GDP, the major contributing factor generating rise in oil prices. Ours is a country where energy sector is directly linked with the

economic development. The demand for energy is rising sharply. 32% of the total energy in Pakistan has been accounted as oil in 2005-06. After natural gas that accounts for 39% of the total, it is the second largest source of energy (Malik, 2008). Evidence shows that during the period of 1974-1980, the country witnessed highest average rate of inflation of about 15 percent. This high growth in CPI was attributed mainly to oil price shocks (Ahmed et al. 2007). The answer is that rising prices make our imports expensive and thus increase the cost of production. This is the reason that it has always been found to have a positive sign and being statistically significant in case of Pakistan. Thus, Pakistan, like other oil importing countries, is negatively affected by rising prices of oil (Malik, 2008).

Wheat is important for Pakistan from both producer and consumer side. The extensive importance of wheat has made every government intervene the wheat market to help farmers and the consumers by setting the minimum selling and purchasing prices for both respectively. From 1980s till 2000 various steps have been taken for wheat liberalization. However after the downturn in wheat harvests in 2002-04, the prices have shot up. The federal and provincial governments have taken a number of steps to increase the supply of wheat and stabilize the prices. These measures include the restriction on the transportation of wheat (Dorosh and Salam, 2006). Since it accounts for a major share in the Consumer Price Index (CPI) basket, its support price is thought to be the factor deriving inflation in the country. A substantial rise in wheat support prices has inflationary affect on food prices because wheat and wheat related products account for 5.1 percent in the CPI. In 2004-05 wheat has been an important factor contributing to inflation to 17.67% and 11.8% percent respectively (Ahmed et al. 2007). Procurement prices of wheat are seemed to be highly significant and important in determining food prices (40 percent) (Hassan et al. 1995). Wheat being the signal of government policies, its procurement price is seen as a major determinant of inflation in Pakistan (Dorosh and Salam, 2006). Khan and Qasim (1996) find food inflation to be driven by money supply, value added in manufacturing and the wheat support price. A substantial increase in the wheat support price is thought to have an inflationary effect on consumer prices especially food prices (Hasan et al. 1995).

However wheat support price is not always the main determining factor of inflation in case of Pakistan. Based on the results of VECM the wheat support price does not impact inflation and CPI in log run but only in the short run. This is due to the domestic prices of wheat, which have been influenced more by international prices than support price, though with a lag. Wheat prices are seen to be increasing even in the absence of support price (Khan and Schimmerpfenning, 2006). Sherani (2005) finds that increases in wheat

support price raise the CPI (but not necessarily inflation). The rise in market prices during 2005 has been a result of the production shortfall of wheat due to the damages posed by rains and high wind leading to lodging wheat. Moreover, analyses show little evidence on major effects of wheat procurement price on overall price level and inflation. Thus, procurement price does not necessarily and significantly add to inflation in the country (Dorosh and Salam, 2006).

CHAPTER 4

METHODOLOGY AND DATA SOURCES

In this study time series data has been used. It covers the period from 1974 to 2011. Our dependent variable is inflation whereas independent variables used in this study are inflation expectations, exchange rate, oil prices, per capita GDP, wheat support price, interest rate and money supply (M2). There are several ways to see the impact of different variables on inflation. However, before applying any methodology on time series data it is mandatory to see the time series properties of selected variables as most of the macroeconomic and financial time series variables have time trend and contain unit root problem. In the presence of unit root problem, the traditional econometric techniques i.e. ordinary least square (OLS) method does not provide reliable results.

4.1 ECONOMETRIC MODEL

Literature on the subject shows that there are several factors which determine the inflation. The present study takes Inflation expectations, exchange rate, oil prices, GDP per capita, wheat support price, interest rate, and money supply as determinants of inflation. CPI is taken as a measure of inflation. It is most widely used and commonly accepted tool to measure inflation. Following Khan and Saqib (2008), Cottarelli et al. (1998) and Dorosh and Salam (2006), the following model is developed to determine the contribution of internal and external factors in the movement of inflation rate of Pakistan:

$$INF_t = f(INF_{t-1}, EXR_t, OP_t, PGDP_t, WSP_t, INT_t, M2_t) \quad (4.1)$$

where

- t = 1, 2, 3 38. (Time period ranging from 1974-2011)
- INF_t = Inflation or general price level
- INF_{t-1} = Inflation expectations
- EXR_t = Nominal exchange rate measured as rupees per US dollar.
- OP_t = Oil prices measured through annual average of crude oil prices per barrel in US dollars.
- $PGDP_t$ = GDP per capita in Pakistani rupees.

WSP_t = Support price of wheat
 INT_t = Interest rate measured through discount rate.
 $M2_t$ = Money supply of broad money measured in current rupees.

The equation (4.1) can be written in the following form:

$$INF_t = \alpha_0 INF_{t-1}^{\beta_1} EXR_t^{\beta_2} OP_t^{\beta_3} PGDP_t^{\beta_4} WSP_t^{\beta_5} INT_t^{\beta_6} M2_t^{\beta_7} e^{\varepsilon_t} \quad (4.2)$$

where $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and β_7 are the elasticities of inflation expectations, exchange rate, oil prices, GDP per capita, support price of wheat, interest rate and money supply respectively. ε_t is usual error term at time t and independent from all explanatory variables.

Taking the natural logarithm (ln) of equation (4.2):

$$\ln INF_t = \beta_0 + \beta_1 \ln INF_{t-1} + \beta_2 \ln EXR_t + \beta_3 \ln OP_t + \beta_4 \ln PGDP_t + \beta_5 \ln WSP_t + \beta_6 \ln INT_t + \beta_7 \ln M2_t + \varepsilon_t \quad (4.3)$$

where $\beta_0 = \ln \alpha_0$ (intercept)

Appropriate econometric technique is used to check the short run and long run relationships between the variables considered in equation (4.3) and to check the validity of the hypotheses of our study.

4.2 DATA SOURCES AND VARIABLES

Annual data from 1974 to 2011 is used in this study. The data has been collected from the Pakistan Economic Survey 2011-12 by Government of Pakistan (2012), International Financial Statistics (IFS) by international Monetary Fund (2012) and World Development Indicators (WDI) by World Bank (2012).

4.2.1 Inflation (INF_t)

Consumer Price Index (CPI) is the most widely used and commonly accepted tool to measure inflation. It measures the cost of the market basket of consumer goods and services. It is based on many commodities of day to day

living. In CPI we weight the prices of goods by measuring their economic importance. Each commodity is assigned fixed weight proportional to its relative importance. The CPI used in this study is measured on the base of 2005 prices. The annual data of CPI for Pakistan is taken from World Development Indicators (2012).

4.2.2 Inflation Expectations (INF_{t-1})

Inflation expectations are used in this study in the form of adaptive expectations. The concept of adaptive expectations states that on the basis of past information about inflation, people form their expectations about the future rate of inflation. They also revise their expectations based on variation in inflation rate in past time period. In this study inflation expectations are measured through one year lag of consumer price index. The data for consumer prices is taken from World Development Indicators (2012).

4.2.3 Exchange Rate (EXR_t)

Exchange rate is considered an important factor in determining trade volume and trade patterns of a free and open economy. This type of importance makes the exchange rate a major economic indicator for policy makers. Trade among the nations and their trading relations are determined by exchange rate. In this study, the exchange rate is defined as local currency per US dollars. It is the average of market buying and selling rates. . According to Cottarelli et al. (1998), exchange rate is the most essential determinant of inflation rate. In addition to this, Hyder and Shah (2004) have also estimated the extent of the exchange rate impacts on prices of consumer goods and domestic wholesale prices in Pakistan. The data is taken from world development indicators by World Bank (2012).

4.2.4 Crude Oil Price (OP_t)

Oil is one of the major inputs in production all levels in Pakistan. An upsurge in its prices vibrates the world economy altogether. In case of Pakistan, it is supporting our household, power generating plants, automobile industry, lubricant industry to name the most important but a few among the others. Oil prices have not been constant from last some years. The international market of oil have shown massive increase in the price level because of its supply shortage due to high energy prices, uncertain political

situation in Middle East, vulnerability in Venezuela and unrest in Nigeria. This trend has spilled its effects on both developed and developing economies. We have added it in our analysis because our economy is heavily depending on its price shocks and supply adequacy. In this study annual average of per barrel nominal crude oil prices in US dollars is used as an indicator of oil prices. A powerful link between oil price shocks and general price level has been observed in Pakistan by Malik (2008). This study has taken the data of crude oil price from Tim McMahon's article "Historical Oil Prices Chart" published on the website inflationdata.com.

4.2.5 Per Capita GDP ($PGDP_t$)

Gross domestic product per capita is considered as an important indicator of economic growth as well as economic development. It is also an important determinant of money demand. This study has taken the data of GDP per capita from world development indicators (WDI) online database of World Bank (2012).

4.2.6 Wheat Support Price (WSP_t)

The purpose of government announced wheat prices is usually to motivate the farmer to produce more wheat and to reduce the degree of uncertainty for the farmers about their returns on this staple food crop. It is of vital importance policy tool for food security. In Pakistan, Ministry of Food, Agriculture and Livestock announce the wheat support prices in the start of wheat harvest season. In Pakistan it is thought to be important from both producer and consumer sides. It is the extensive importance of wheat that every government has intervened the wheat market to help farmers and producers by setting the minimum selling and purchasing price for both groups respectively. The main purpose of including this variable is that wheat related products account for 5.1 percent of the CPI basket. According to Khan and Qasim (1996), a 7.4% increase in food price inflation is the result of a 10% rise in wheat support price, which is highly statistically significant. Moreover, the study by Khan and Schimmelpfenning (2006) also verifies that wheat support price enhances the inflation rate in Pakistan, as Pakistan is an agricultural land. Furthermore, Dorosh and Salam (2006) consider wheat procurement price the main determinant of inflation in Pakistan, and the research findings of Hassan et al. (1995) also conclude that wheat procurement prices are highly significant and essential in determining food prices. Data on

wheat support prices is taken from the Pakistan Economic Survey by Government of Pakistan (2012).

4.2.7 Interest Rate (INT_t)

Interest rate is considered as an important tool of monetary policy. Interest rate on deposits, interest rate on lending and discount rate are commonly used measures of interest rate. Discount rate in this study is taken as the charges charged by state bank of Pakistan from depository institutions when these institutions borrow from the state bank. This study has taken the data on interest rate from International Financial Statistics (IFS) online database by International Monetary Fund (2012).

4.2.8 Money Supply ($M2_t$)

Money supply represents the supply of loanable fund in an economy and considered as an essential determinant of inflation rate. Inflation targeting policies mostly are channelized through control of money supply. In this study Broad Money which includes M1 and scheduled banks' time deposits, resident foreign currency deposits. Khan and Schimmelpfenning (2006) suggest that inflation in Pakistan is majorly enhanced due to money supply. We have taken the data on money supply from world development indicators (WDI) by World Bank (2012).

4.3 ECONOMETRIC METHODOLOGY

This study utilizes time series data covering the period 1974-2011. The selected model contains inflation expectations, exchange rate, oil price, per capita GDP, wheat support price, interest rate and money supply (M2). There are several ways to see the impact of different variables on inflation. However, before applying any methodology on time series data it is mandatory to see the time series properties of selected variables as most of the macroeconomic and financial time series variables have time trend and contain unit root problem. Therefore, in the presence of unit root problem, the traditional econometric techniques i.e. ordinary least square (OLS) method does not provide reliable results.

Unit Root Test

To see the time series properties of the concerned variables, Augmented Dickey-Fuller (ADF) test is used. The general forms of ADF test can be expressed as:

$$\Delta X_t = \mu + \gamma X_{t-1} + \sum_{j=1}^p \alpha_j \Delta X_{t-j} + \beta t + \varepsilon_t \quad (4.4)$$

where μ is the drift term, t denotes the time trend, ε_t is pure white noise and p is the optimum lag length. The following hypotheses are applied on above ADF equation to check whether the time series variables contain unit root or not:

$$H_0 : \gamma = 0 \text{ (} X_t \text{ is non-stationary)}$$

$$H_1 : \gamma < 0 \text{ (} X_t \text{ is stationary)}$$

The null hypothesis of non-stationarity cannot be accepted if the test statistic of γ is less than the critical value. The optimum lag length (p) in the ADF regression ensures the residuals are not serially correlated and imitates a white noise process.

ARDL Cointegration

After estimating the unit root problem, next step is to find out long run equilibrium or cointegration among the time series. The initial work on cointegration or long run equilibrium among the time series has been done by Granger (1981) and Granger and Weiss (1983). Engle and Granger (1987) further elaborated and formulized this idea. A stationary link between two or more time series, each of which is individually non-stationary, is explained by cointegration. Within a unified framework, the short run and long run relationships between variables can be integrated easily. This is a major advantage of cointegration technique. With a n objective of finding the number of linearly independent cointegration vector, or the cointegration rank, in a general vector autoregressive (VAR) method.

The research on cointegration techniques has extended after the initial work of Engle and Granger (1987). For this study, the bonds testing approach for cointegration known as autoregressive distributed lag (ARDL) modeling approach, established by Pesaran et al. (1996) (see Pesaran and Pesaran 1997; Pesaran and Shin 1998; Pesaran et al. 2001, has been implemented to investigate long run equilibrium r determinants of inflation.

The other procedures like the Engle and Granger (1987) two step residual-based process for testing the null of no cointegration or the system-based reduced-rank regression approach, developed by Johansen (1988,1995) and Johansen and Juselius (1990), are not as beneficial as this method. Irrespective of whether time series variables are 1(0), 1(1) or mutually cointegrated, this procedure can be implemented and moreover it is also applicable to time series with different order of integration.

Thus in this way ARDL approach bypasses the unit root test (Verma, 2007). The statistic underlying the procedure is the Wald or F-statistic.

The ARDL modeling approach involves estimating the following error correction model in our case:

$$\begin{aligned}
\Delta INF_t = & \theta_0 + \sum_{i=1}^{q_1} \theta_{1i} \Delta \ln INF_{t-i} + \sum_{i=0}^{p_2} \theta_{2i} \Delta \ln EXR_{t-i} \\
& + \sum_{i=0}^{p_3} \theta_{3i} \Delta \ln OP_{t-i} + \sum_{i=0}^{p_4} \theta_{4i} \Delta \ln PGDP_{t-i} + \sum_{i=0}^{p_5} \theta_{5i} \Delta \ln WSP_{t-i} \\
& + \sum_{i=0}^{p_6} \theta_{6i} \Delta \ln INT_{t-i} + \sum_{i=0}^{p_7} \theta_{7i} \Delta \ln M2_{t-i} + \lambda_{11} \ln INF_{t-1} \\
& + \lambda_{12} \ln EXR_{t-1} + \lambda_{13} \ln OP_{t-1} + \lambda_{14} \ln PGDP_{t-1} \\
& + \lambda_{15} \ln WSP_{t-1} + \lambda_{16} \ln INT_{t-1} + \lambda_{17} \ln M2_{t-1} + \varepsilon_t \quad (4.5)
\end{aligned}$$

where θ_0 is intercept and other θ s are the coefficients of explanatory variables at first difference, $q_1, p_2, p_3, p_4, p_5, p_6$ and p_7 represent the optimum lag length or order of ARDL equation, ε_t is white noise or error term and $\lambda_{11}, \lambda_{12}, \lambda_{13}, \lambda_{14}, \lambda_{15}, \lambda_{16}$ and λ_{17} are the coefficients of $\ln INF_{t-1}, \ln EXR_{t-1}, \ln OP_{t-1}, \ln PGDP_{t-1}, \ln WSP_{t-1}, \ln INT_{t-1}$ and $\ln M2_{t-1}$, respectively which determine the long run equilibrium. The other versions of ARDL equations can be constructed in the similar way by taking other explanatory variables as explained variables. First step in the ARDL-based cointegration approach is to estimate equation (4.5) using Ordinary Least Squares (OLS) method. The second step is to trace the presence of cointegration by restricting all estimated coefficients of lagged level variables equal to zero. The hypotheses for long run equilibrium by the means of F test in the case of equation (4.5) can be expressed as under:

$$H_0 : \lambda_{11} = \lambda_{12} = \lambda_{13} = \lambda_{14} = \lambda_{15} = \lambda_{16} = \lambda_{17} = 0 \quad (\text{no cointegration})$$

$$H_a : \lambda_{11} \neq \lambda_{12} \neq \lambda_{13} \neq \lambda_{14} \neq \lambda_{15} \neq \lambda_{16} \neq \lambda_{17} \neq 0 \quad (\text{cointegration})$$

Two asymptotic critical values or bounds provide a test for cointegration, when the independent variables are $I(d)$ with $0 \leq d \leq 1$. The lower bound assumes that all the regressors are $I(0)$ and the upper bound assumes that they are $I(1)$. If the computed F-statistic lies above the upper level of the bound, the null hypothesis is rejected, indicating cointegration. If the computed F-statistic lies below the lower level band, the null cannot be rejected, supporting the absence of cointegration. If the statistics fall within the bound, inference would be inconclusive. After confirmation of the existence of a long-run relationship between the variables in the model, the long-run and short-run models can be derived using information criteria such as the Schwartz, Bayesian or the Akaike Information Criteria.

CHAPTER 5

RESULTS AND DISCUSSIONS

This study utilizes annual time series data in empirical analysis covering the period 1974-2011. Our dependent variable is inflation whereas independent variables used in this study are inflation expectations, exchange rate, oil prices, GDP per capita, wheat support price, interest rate and money supply as determinants of inflation. The first step is to investigate the properties of the time series individually. The ADF is carried out to check the stationarity of each variable (discussed in previous chapter). The results of ADF test are given in Table 5.1 and Table 5.2 at level and first difference respectively.

Table 5.1
Augmented Dickey-Fuller Test at Level

Variables	T-statistic	P-value
$\ln INF_t$	1.2093	0.9976
$\ln INF_{t-1}$	1.1464	0.9971
$\ln EXR_t$	0.0129	0.9537
$\ln OP_t$	-1.3304	0.6048
$\ln PGDP_t$	-1.6361	0.4546
$\ln WSP_t$	0.1550	0.9658
$\ln INT_t$	-3.4667	0.0151
$\ln M2_t$	-1.8690	0.3427

Source: Author's Calculations

Table (5.1) shows the results of ADF unit root test at level. The results reveal that $\ln INF$ (natural logarithm of inflation), $\ln INF_{t-1}$ (natural logarithm of inflation expectations), $\ln EXR$ (natural logarithm of exchange rate), $\ln OP$ (natural logarithm of oil prices), $\ln PGDP$ (natural logarithm of per capita GDP), $\ln WSP$ (natural logarithm of wheat support prices) and $\ln M_2$ (natural logarithm of money supply) are non-stationary at level. $\ln INT$ (natural logarithm of interest rate) is stationary at level at 5% level of significance.

Table 5.2
Augmented Dickey-Fuller Test at First Difference

Variables	T-statistic	P-value
$\Delta \ln INF_t$	-4.4028	0.0013
$\Delta \ln INF_{t-1}$	-4.3198	0.0016
$\Delta \ln EXR_t$	-4.1550	0.0025
$\Delta \ln OP_t$	-6.1743	0.0000
$\Delta \ln PGDP_t$	-4.5855	0.0008
$\Delta \ln WSP_t$	-6.4932	0.0000
$\Delta \ln INT_t$	-5.1100	0.0002
$\Delta \ln M2_t$	-4.4176	0.0012

Source: Author's Calculations

Table (5.2) shows the results of ADF unit root test at first difference. The results shows that $\ln INF$ (natural logarithm of inflation), $\ln INF_{t-1}$ (natural logarithm of inflation expectations), $\ln EXR$ (natural logarithm of exchange rate), $\ln OP$ (natural logarithm of oil prices), $\ln PGDP$ (natural logarithm of per capita GDP), $\ln WSP$ (natural logarithm of wheat support prices), $\ln INT$ (natural logarithm of interest rate) and LM_2 (natural logarithm of money supply) are stationary at first difference at 1% level of significance. Results of table (5.1) and (5.2) show the mix order of integration so ARDL cointegration test is suitable to apply here. The study uses Schwarz Bayesian Criterion (SBC) to find optimum lag length in the model. Optimum lag length is 1 for $\ln INF$, 1 for INF_{t-1} , 0 for $\ln EXP$, 1 for $\ln OP$, 0 for $\ln PGDP$, 0 for $\ln WSP$, 1 for $\ln INT$ and 0 for $\ln M_2$. The calculated value of F-Statistic is given in table (5.3).

Table 5.3
The Results of ARDL Cointegration Test

ARDL (1, 0, 1, 0, 0, 1, 0) Schwarz Bayesian Criterion		
F-Statistic = 3.9719**		
Level of Significance	Pesaran <i>et al.</i> (2001)	
	Lower Bound Value	Upper Bound Value
5%	2.8737	4.2856
10%	2.4035	3.6361

Source: Author's Calculations

Table (5.3) shows that calculated F-Statistic falls between lower and upper critical bounds at 5% level of significance so test is inconclusive at 5% level of significance. The calculated F-Statistic is greater than upper value at 10% level of significance so cointegration exists in the model at 10% level of significance. Though the level of significance is low but we can conclude that the long run relationship is found in the variables of the study.

Co-integration test is applied and the results obtained are presented in the table given below.

5.1 LONG RUN COEFFICIENTS

Table 5.4

Dependent Variable: $\ln INF_t$			
Variables	Coefficient	t-Statistic	p-Value
$\ln INF_{t-1}$	0.4446	4.05174	0.0004
$\ln EXR_t$	0.1089	1.3958	0.1737
$\ln OP_t$	0.0212	1.3279	0.1949
$\ln PGDP_t$	0.1536	2.4357	0.0215
$\ln WSP_t$	0.1602	4.1279	0.0003
$\ln INT_t$	0.0995	5.5512	0.0000
$\ln M2_t$	0.1146	2.6683	0.0125
Intercept	-3.9935	-4.7860	0.0000

Source: Author's Calculations

Table (5.4) shows the long run coefficients which represent the long run elasticity. $\ln INF_{t-1}$ has a positive and significant impact on $\ln INF$ at 1% level of significance. There will be 0.44% increase in $\ln INF$ with 1% increase in $\ln INF_{t-1}$. $\ln EXR$ and $\ln OP$ have insignificant impact on $\ln INF$. $\ln PGDP$ has positive and significant impact on $\ln INF$ at 5% level of significance. There will be 0.15% increase in $\ln INF$ with 1% increase in $\ln INF_{t-1}$. $\ln WSP$ has a positive and significant impact on $\ln INF$ at 1% level of significance. There will be 0.16% increase in $\ln INF$ with 1% increase in $\ln WSP$. $\ln INT$ has a positive and significant impact on $\ln INF$ at 1% level of significance. There will be 0.10% increase in $\ln INF$ with 1% increase in $\ln INT$. $\ln M_2$ has a positive and significant impact on $\ln INF$ at 5% level of

significance. There will be 0.11% increase in $\ln INF$ with 1% increase in $\ln M_2$. Intercept is negative and significant at 1% level of significance.

The positive sign of the inflation expectations can be interpreted as when inflation expectations increase, it leads to higher rate of inflation in the country.

The positive sign of the exchange rate can be interpreted as when exchange rate increase, it leads to higher rate of inflation in the country. The positive sign of the oil prices can be interpreted as when oil prices increase, it leads to higher rate of inflation in the country.

The positive sign of the per capita GDP can be interpreted as when per capita GDP increase, it leads to higher rate of inflation in the country. The positive sign of the wheat support price can be interpreted as when wheat support price increase, it leads to higher rate of inflation in the country. The positive sign of the interest rate can be interpreted as when interest rate increases, it leads to higher rate of inflation in the country. The positive sign of the money supply can be interpreted as when interest rate increases, it leads to higher rate of inflation in the country.

The result shows that the elasticity of inflation with respect to inflation expectation is about 0.44, suggesting that if inflation expectation goes up by 1 percent, on average, the inflation goes up by about 0.44 percent. Thus, inflation is responsive to changes in inflation expectation. The slope coefficient β_1 measures the elasticity of inflation with respect to inflation expectation, that is, the percentage change in inflation for a given percentage changes in inflation expectation.

The result shows that the elasticity of inflation with respect to exchange rate is about 0.11, suggesting that if exchange rate goes up by 1 percent, on average, the inflation goes up by about 0.11 percent. Thus, inflation is responsive to changes in exchange rate. The slope coefficient β_2 measures the elasticity of inflation with respect to exchange rate, that is, the percentage change in inflation for a given percentage changes in exchange rate.

The elasticity of inflation with respect to oil prices is about 0.02, suggesting that if oil prices go up by 1 percent, on average, the inflation goes up by about 0.02 percent. Thus, inflation is responsive to changes in oil prices. The slope coefficient β_3 measures the elasticity of inflation with respect to oil prices, that is, the percentage change in inflation for a given percentage changes in oil prices.

The elasticity of inflation with respect to per capita GDP is about 0.15, suggesting that if per capita GDP go up by 1 percent, on average, the inflation goes up by about 0.15 percent. Thus, inflation is responsive to changes in per capita GDP. The slope coefficient β_4 measures the elasticity of inflation with respect to GDP, that is, the percentage change in inflation for a given percentage changes in GDP.

The elasticity of inflation with respect to wheat support price is about 0.16, suggesting that if wheat support price go up by 1 percent, on average, the inflation goes up by about 0.16 percent. Thus, inflation is responsive to changes in wheat support price. The slope coefficient β_5 measures the elasticity of inflation with respect to wheat support price, that is, the percentage change in inflation for a given percentage changes in wheat support price.

The elasticity of inflation with respect to interest rate is about 0.10, suggesting that if interest rate goes up by 1 percent, on average, the inflation goes up by about 0.10 percent. Thus, inflation is responsive to changes in interest rate. The slope coefficient β_6 measures the elasticity of inflation with respect to interest rate, that is, the percentage change in inflation for a given percentage changes in interest rate.

The elasticity of inflation with respect to money supply is about 0.11, suggesting that if money supply goes up by 1 percent, on average, the inflation goes up by about 0.11 percent. Thus, inflation is responsive to changes in money supply. The slope coefficient β_7 measures the elasticity of inflation with respect to money supply, that is, the percentage change in inflation for a given percentage changes in money supply.

5.2 SHORT RUN DYNAMICS

To determine whether there exists any short run relationship between the variables, ECM is applied. The results of ECM are given below.

Table 5.5
Dependent Variable = $\Delta \ln INF_t$

Variable	Coefficient	t-Statistic	p-Value
$\Delta \ln INF_{t-1}$	0.446109	4.172059	0.0003
$\Delta \ln EXR_t$	-0.001172	-0.016454	0.9870
$\Delta \ln OP_t$	0.010885	0.783921	0.4402
$\Delta \ln PGDP_t$	-0.009953	-0.062717	0.9505
$\Delta \ln WSP_t$	0.136833	4.088808	0.0004
$\Delta \ln INT_t$	0.121558	4.756964	0.0001
$\Delta \ln M2_t$	-0.029017	-0.362097	0.7202
ECM_{t-1}	-0.533259	-2.391647	0.0243
<i>C</i>	0.033212	1.976622	0.0588
$R^2 = 0.7545$ Adj- $R^2 = 0.6789$ F-Statistic = 9.9870 Prob (F-statistic) = 0.0000			

Source: Author's Calculations

Table (5.5) shows the short run results. The coefficients of $\Delta \ln EXR$, $\Delta \ln OP$, $\Delta \ln PGDP$, and $\Delta \ln M_2$ are insignificant. $\Delta \ln INF_{t-1}$, $\Delta \ln WSP$ and $\Delta \ln INT$ have positive and significant impact on $\Delta \ln INF$ in short run at 1% level of significance. The coefficient of ECM_{t-1} is negative and significant at 5% level of significance. So short run relationship exist in the model. The results also show the speed of adjustment from short run disequilibrium to long run equilibrium with 53.33% in a year. Due to the variables considered in the estimation, 75.45% variations in the dependent variable are observed from these findings. A summary measure which tells how well the sample regression line fits the data is R-squared. The goodness of fit of a regression model is measured by it.

Table 5.6
Diagnostic Tests

<i>Normality Test</i> (Jarque-Bera Statistics)	Jarque-Bera Statistics = 0.4064	Probability = 0.8161
<i>Serial Correlation</i> (Breush-Godfrey Serial Correlation LM Test)	F-statistics = 0.6705	Probability = 0.5201
<i>ARCH Test</i> (Autoregressive Heteroskedasticity Test)	F-statistics = 1.9068	Probability = 0.1656
<i>Heteroskedasticity Test</i> (White Heteroskedasticity Test)	F-statistics = 0.6606	Probability = 0.7912
<i>Model Specification Test</i> (Ramsey RESET Test)	F-statistics = 0.3483	Probability = 0.5600

Source: Author's Calculations

Table (5.6) shows the diagnostic test based on estimated model. The results show that probability values of all tests applied are greater than 0.10. Results conclude that model has no problem of serial correlation, heteroskedasticity, autoregressive conditional heteroskedaticity and functional form. The results also show that residual obtained from long run estimates is normally distributed.

Data is normally distributed because p-value is greater than 0.1. There is no serial correlation because p-value is greater than 0.1. There is no heteroskedasticity because p-value is greater than 0.1. Model is well specified because p-value is greater than 0.1.

Figure (1) and Figure (2) show the *CUSUM* and *CUSUMsq* test for the calculated model. Figure shows that calculated values fall between the critical values so the parameters of the model are stable and reliable.

CHAPTER 6

CONCLUSIONS AND POLICY IMPLICATIONS

6.1 CONCLUSIONS

The main purpose of present study is to investigate the impact of determinants of inflation in Pakistan. Our findings of the study show that internal determinants of inflation are more contributing than external determinants of inflation towards high inflation rate in Pakistan. Inflation expectations, per capita GDP, wheat support price, interest rate and money supply play an important role in determining inflation in Pakistan.

The empirical results of this study show a positive and significant relation between inflation and inflation expectations. It means that an increase in inflation expectations will increase the inflation in Pakistan.

This study shows a positive relation between inflation and exchange rate but it is an insignificant relationship. Ahmed et al. (2007) have found a strong relation between exchange rate and CPI in the past few years. Karunaratne (2002) also supports the same relation between both in the developing countries. It is because depreciation puts upward pressure on the prices in both direct and indirect ways. It increases the prices of imports and also the domestic goods.

Wheat support price plays a significant role in determining inflation in Pakistan. Wheat support price has a positive and significant impact on inflation. Thus, according to this study, if wheat support price increases, it will lead to a greater inflation in Pakistan.

Ahmed et al. (2007) have also reported that wheat support price influences inflation in the country. This strong relation between the two exists because wheat and wheat related products account 5.1 percent of CPI basket.

Variable of Oil prices has a positive and insignificant relation with the inflation in the economy. Previous literature suggests either a positive (Abbas, 2009) or a weak relation between the two (Bharat Trehan, 2005).

Our results show that there is a positive and significant relation of GDP per capita with inflation. It depicts that an increase in GDP per capita will increase the inflation in Pakistan.

There is a positive and significant relation of money supply with inflation. It means that an increase in money supply will increase the inflation in Pakistan. Khan and Schimmelpfenning (2006) suggest that inflation in Pakistan is majorly enhanced due to money supply.

The empirical results of this study show a positive and significant relation between interest rate and inflation in Pakistan. It means an increase in interest rate will increase the inflation in Pakistan.

6.2 POLICY IMPLICATIONS

The policy implications which have been drawn from the econometric results of this study are as follows:

Inflation expectations are positively and significantly influencing inflation rate in Pakistan. Expectations play a vital role in economic decision making. In this context, stable stock exchanges strengthened by stable long run fiscal policies and consistency in decision making by stable democratic government are some of the essential relevant variables. These can influence expectations with respect to inflation.

A positive and significant relationship between inflation and interest rates requires a revisiting of the monetary policy. Similarly positive and significant relationship between money supply and inflation demands rational monetary and fiscal policies reinforcing each other in order to curb inflationary trends to the desirable level. A positive and significant relationship between wheat support prices and inflation depicts injudicious government decision making in the determination of support prices. More in depth research studies should be conducted by researchers and academics to find out the optimum support prices. It should not be left to the whims of bureaucrats to do this delicate job. The production of major agricultural crops can be increased by using modern techniques of production, i.e., agriculture mechanization, proper irrigation facilities, better seeds, pesticides, insecticides etc. Smuggling of wheat must also be taken care of. Positive and significant relation of GDP per capita to inflation reflects demand side effect. Therefore, to discourage demand side factors and demonstration effects, attractive saving schemes should be introduced by monetary authorities. Globalization and influx of multinational corporations (MNCs) have turned Pakistan into a high consumption society. Brand names, international franchises, and MNCs have all played their role in eroding the indigenous culture of Pakistan. All these factors have contributed to the unprecedented inflation rate. In this regard, role

of the government officials is very important. They should not only adopt simplicity but should also reduce non-development expenditure particularly in daily business of the state. Moreover, government should take strict measures to impede unnecessary consumption of the households through direct and indirect fiscal and monetary measures.

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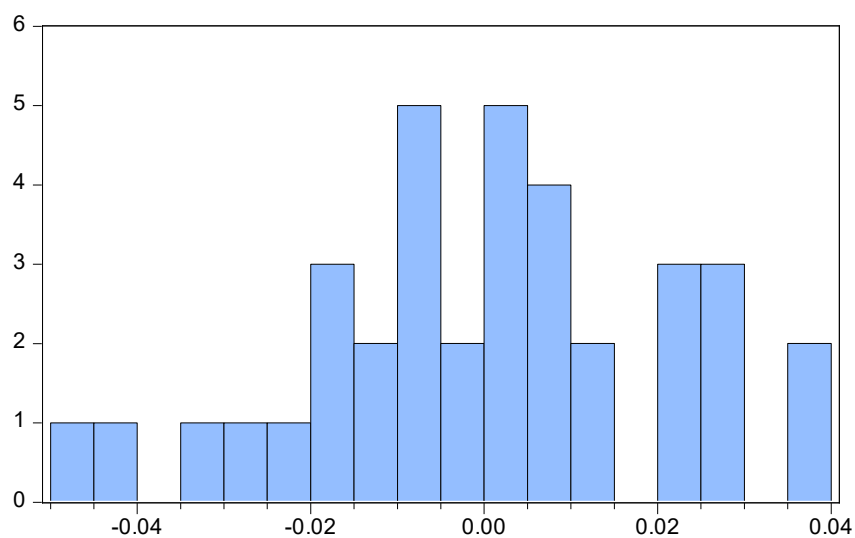
APPENDIX

Years	CPI	CPIEXP	EXR (WDI, Lcu per us\$ period average)	OP(Avg \$ per bbl)	PGDP (pak rupees)	WSP Rs/40kg	INT (ifs, DISCOUNT)	M2VAL CURRENT LCU (wdi)
1974	8.98		9.9	9.35	14594.31	26.79	9	3.12E+10
1975	10.9	8.98	9.9	7.67	14733.67	39.65	9	3.78E+10
1976	11.6	10.9	9.9	13.1	15013.12	39.65	9	5E+10
1977	12.8	11.6	9.9	14.4	15126.79	39.65	10	5.89E+10
1978	13.6	12.8	9.9	14.95	15850.51	39.65	10	7.06E+10
1979	14.7	13.6	9.9	25.1	15960.81	48.23	10	8.41E+10
1980	16.5	14.7	9.9	37.42	17086.05	50	10	9.73E+10
1981	18.4	16.5	9.9	35.75	17926.78	58	10	1.09E+11
1982	19.5	18.4	11.84747	31.83	18587.58	58	10	1.32E+11
1983	20.8	19.5	13.11698	29.08	19318.2	64	10	1.6E+11
1984	22	20.8	14.04633	28.75	19757.33	64	10	1.67E+11
1985	23.3	22	15.92839	26.92	20694.44	70	10	1.92E+11
1986	24.1	23.3	16.64751	14.64	21258.99	80	10	2.23E+11
1987	25.2	24.1	17.3988	17.5	22042.17	80	10	2.59E+11
1988	27.4	25.2	18.00329	14.87	23106.01	82	10	2.79E+11
1989	29.6	27.4	20.54149	18.33	23642.05	85	10	3E+11
1990	32.3	29.6	21.70738	23.19	24077.36	96	10	3.35E+11
1991	36.1	32.3	23.80077	20.19	24662.24	112	10	3.98E+11
1992	39.5	36.1	25.08279	19.25	25904.96	124	10	5.15E+11
1993	43.4	39.5	28.10718	16.74	25707.84	130	10	6.09E+11
1994	48.8	43.4	30.56659	15.66	26008.04	160	15	7.14E+11
1995	54.8	48.8	31.64268	16.75	26635.49	160	17	8.13E+11
1996	60.5	54.8	36.07868	20.46	27250.59	173	20	9.76E+11
1997	67.4	60.5	41.11153	18.97	26873.98	240	18	1.17E+12
1998	71.6	67.4	45.04667	11.91	26904.88	240	16.5	1.26E+12
1999	74.6	71.6	49.50069	16.55	27225.86	300	13	1.32E+12
2000	77.8	74.6	53.64819	27.4	27709.36	300	13	1.48E+12
2001	80.3	77.8	61.92716	23	27585.41	300	10	1.65E+12
2002	82.9	80.3	59.72378	22.81	27796.48	300	7.5	1.93E+12
2003	85.3	82.9	57.752	27.69	28449.28	300	7.5	2.26E+12
2004	91.7	85.3	58.25786	37.41	29817.91	350	7.5	2.73E+12
2005	100	91.7	59.51448	50.04	31339.37	400	9	3.2E+12
2006	108	100	60.27134	58.3	32599.4	415	9.5	3.66E+12
2007	116	108	60.73852	64.2	33820.04	425	10	4.38E+12
2008	140	116	70.40803	91.48	35065.27	650	15	4.63E+12
2009	159	140	81.71289	53.48	36294.11	950	12.5	5.32E+12
2010	181	159	85.711	71.21	34588.9	950	14.000	6.12E+12
2011	202	181	89.968	NA	34772.71	950	12.000	6.85E+12

Sources: World Development Indicators (WDI) by World Bank, Pakistan Economic Survey by Government of Pakistan, International Financial Statistics (IFS) by International Monetary Fund.

Descriptive Statistics of Variables

	INF	INFT	EXR	OP	PGDP	WSP	INT	M2
Mean	59.27316	55.41568	35.23707	28.27973	24626.01	235.5163	11.15789	1.44E+12
Median	41.45000	39.50000	26.59499	22.81000	25806.40	127.0000	10.00000	5.62E+11
Maximum	202.0000	181.0000	89.96800	91.48000	36294.11	950.0000	20.00000	6.85E+12
Minimum	8.980000	8.980000	9.900000	7.670000	14594.31	26.79000	7.500000	3.12E+10
Std. Dev.	49.69649	44.24016	24.66120	18.67924	6374.364	255.5511	2.947984	1.86E+12
Skewness	1.226728	1.108126	0.646889	1.675985	0.033584	1.779945	1.383706	1.523890
Kurtosis	3.854883	3.565478	2.175558	5.433477	2.047151	5.418171	4.217942	4.260980
Jarque-Bera	10.68793	8.065293	3.726483	26.45118	1.444686	29.32391	14.47476	17.22513
Probability	0.004777	0.017727	0.155169	0.000002	0.485613	0.000000	0.000719	0.000182
Observations	38	37	38	37	38	38	38	38



Series: Residuals	
Sample 1975 2010	
Observations 36	
Mean	-1.63e-15
Median	0.000859
Maximum	0.038732
Minimum	-0.046507
Std. Dev.	0.020385
Skewness	-0.252099
Kurtosis	2.870622
Jarque-Bera	0.406431
Probability	0.816102

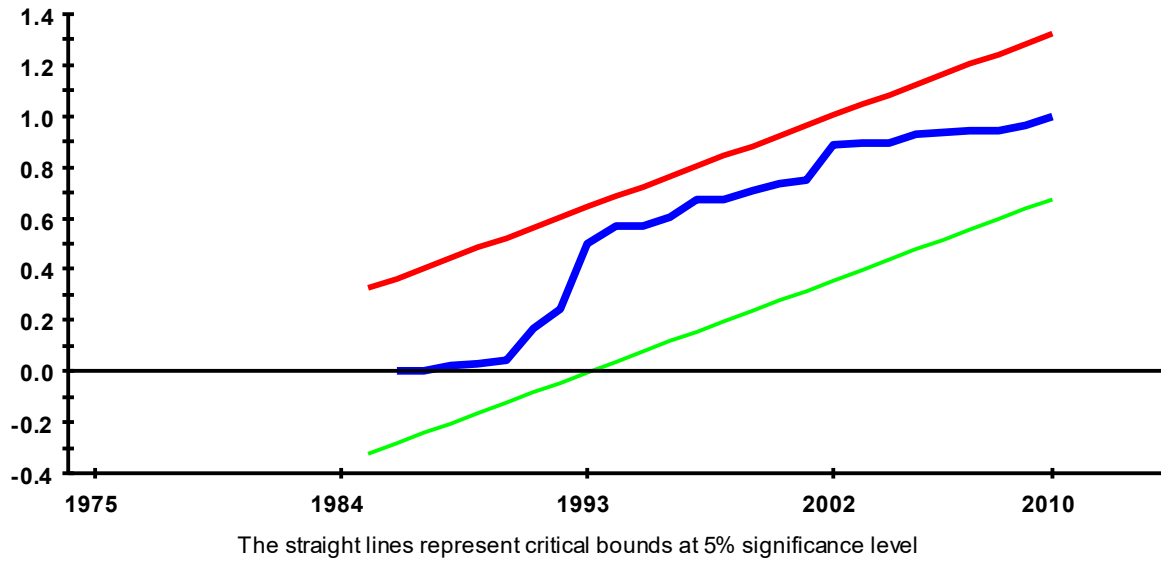


Figure (A-1): Plot of Cumulative Sum of Squares of Recursive Residuals

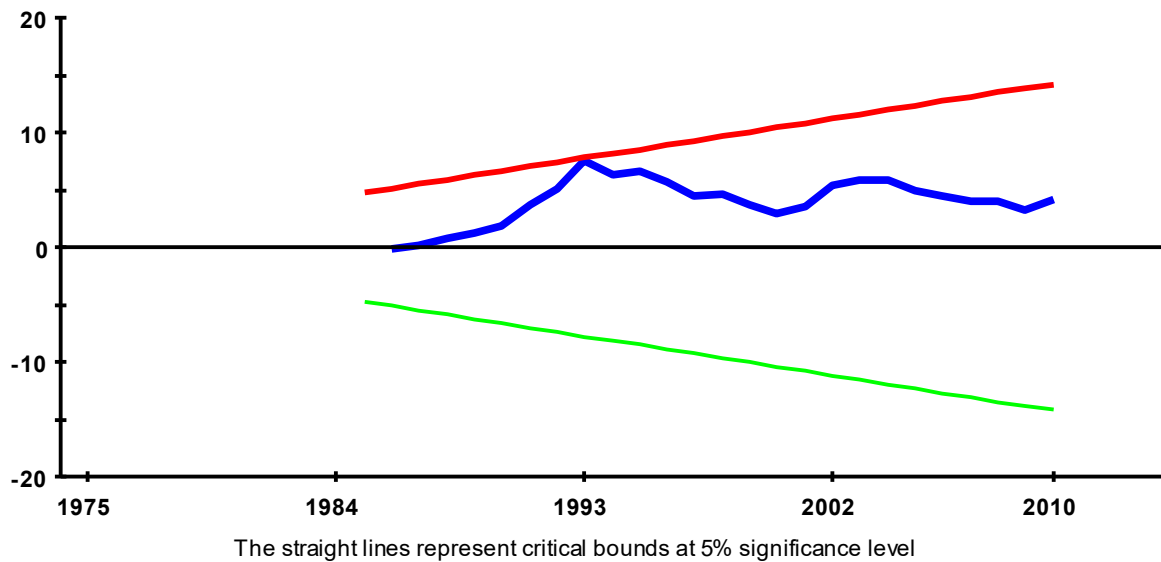


Figure (A-2): Plot of Cumulative Sum of Recursive Residuals