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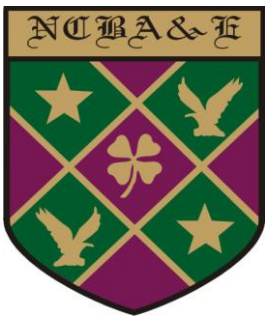

READJUSTED UNEMPLOYMENT RATE AND POTENTIAL GDP GROWTH RATE OF PAKISTAN

BY

SAMINA AMBREEN

MASTER OF PHILOSOPHY
IN
ECONOMICS

APRIL, 2024

NATIONAL COLLEGE OF BUSINESS ADMINISTRATION & ECONOMICS

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BY

Samina Ambreen

A dissertation submitted to
Faculty of Social Sciences

In Partial Fulfillment oft he
Requirements for the Degree of

MASTER OF PHILOSOPHY
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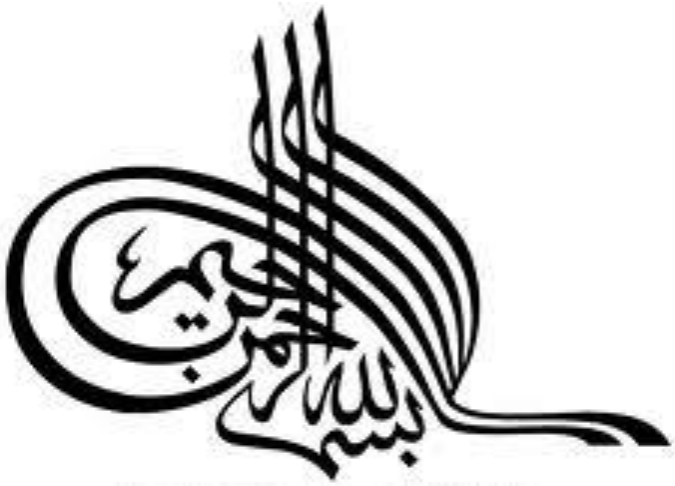

In the name of ALLAH,
The Most Beneficial,
The Most Merciful,

NATIONAL COLLEGE OF BUSINESS ADMINISTRATION & ECONOMICS LAHORE

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MASTER OF PHILOSOPHY IN ECONOMICS

Dissertation Committee:

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Chairman

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Member

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Member

DECLARATION

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

SAMINA AMBREEN
April, 2024

Dedicated
to

Holy Prophet (SAW):
The Most Prominent
Social Engineer additionally
my loving father
my devoted mother
&
My supportive husband
with their support
I was able to complete this.

ACKNOWLEDGEMENT

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RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis entitled **"Readjusted Unemployment Rate and Potential GDP Growth Rate of Pakistan"** has been carried out and completed by **Ms. Samina Ambreen** under my supervision during her **M.Phil. Economics** Programme.

(Dr. Zahid Pervaiz)
Supervisor

SUMMARY

Optimal utilization of human resources plays a crucial role in driving a country's economic progress. However, in less developed nations such as Pakistan, the underutilization of human capital presents a significant challenge that hampers economic growth. A considerable portion of the population cannot sustain prolonged periods of unemployment due to the absence of social security or unemployment benefits, coupled with their families' inability to provide financial support. Consequently, the majority of individuals are compelled to accept any available job opportunity or venture into entrepreneurship to make ends meet.

The term "unemployment," which often refers to a complete lack of employment, originates from macroeconomic research and policy. It suggests that the definition of employment encompasses all worker contributions to production; hence, any unemployment may be interpreted as an indication of insufficient utilization of labor resources. The definition of employment that is produced, meanwhile, is not consistent with how people view employment. Beyond only economic factors, it is crucial to take into account each person's perspective of employment and the employment relationship at the individual level.

The officially declared unemployment rate underreports the actual level of unemployment since it is calculated using the definition, which states that everyone working even one hour a week is deemed employed. By separating the partially employed labor force and counting them as an adjusted jobless labor force, the study seeks to determine the degree of unemployment and its consequences for the difference between the growth rate of GDP and potential growth rate of GDP. The World Bank (WB), the Pakistan Bureau of Statistics (PBS), the World Development Indicator (WDI), and several Pakistan Labor Force Surveys are the sources of the secondary yearly timeseries data for the years 1981–2020. To determine Okun's value, the gap version of Okun's Law is applied. The ordinary least squares method is used for analysis. The results show that the adjusted unemployment rate is really higher than the officially estimated rate, which affects the discrepancy between the GDP growth rates that are expected to occur and those that actually occur. The growth rate difference gets wider the higher the unemployment rate rises. The outcomes also demonstrated that, contrary to official reports, the potential GDP growth rate was really higher. As long as the issue of underemployment is not addressed, policies aimed at lowering unemployment will not be very successful.

LIST OF ABBREVIATIONS

GDP	Gross domestic production
ILO	International Labor Organization
IMF	International Monetary Fund
HDI	Human Development Index
OECD	Organization for economic co-operation and development
OLS	Ordinary Least Square
SAARC	South Asian Association for Regional Cooperation
DHS	Demographic and Health Survey
IRASD	International Research Alliance for Sustainable Development
ICLS	International Conference of Labor Statisticians

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Unemployment has emerged as a significant issue across various developing and developed nations. Pakistan is also experiencing elevated levels of unemployment. The effects of unemployment on families, communities, and economies are complex. Because of a lack of income, unemployment reduces a family's spending at the household level. Consumer spending is the factor most responsible for the GDP and economic growth. Prolonged unemployment can contribute to social instability, crime, and poverty. On an economic scale, unemployment raises the budget deficit as it lowers both total output and tax income received by the government. Thus, lowering unemployment is an essential macroeconomic objective.

For a number of reasons, a country still striving to overcome poverty must comprehend the connection between GDP and unemployment. An effective shift towards an economy focused on manufacturing and services requires a deeper understanding of the features of the labor market in cities (Vera-Toscanoa et al. 2020). The GDP and unemployment rate are two major indicators that the policymakers and general public closely monitor (Adams et al., 2021; Debaere, 2008). They act as a scorecard for an economy, giving an indication of its overall health (Debaere, 2008).

Pakistan is 5th populous country and having 9th largest labor force in the world. It is one of those countries which have youth bulge with 59% population under 15-59 age group, whereas 27% is between 15-29 years (Pakistan Economic Survey, 2020-21). The workforce as a whole in the nation increased to 68.73 million in 2019 from 65.5 million in 2018, indicating that 3.23 million new workers entered the labor market in a single year. However, the growth rate decreased to less than 2% in 2019 due to the increase in the unemployment rate from 5.8% in 2018 to 6.9% in 2019 (Pakistan Labor Force Survey, 2019). From 64.03 million in 2018–19 to 67.25 million in 2020–21, there were more employed workers. In 2020–21, the unemployment rate dropped marginally from 6.9 percent in 2018–19 to 6.3 percent. This indicates that 4.51 million members of the labor force were unable to find employment during that time (Pakistan Labor Force Survey, 2020-2021).

Pakistan's poor-quality human resources are by far the most difficult issue to solve. Because of this, there has been persistent significant underemployment and widespread unemployment over time. Due to rapid population increase that is outpacing the rate of economic expansion, these issues have surfaced (Chaudhary et al., 2017). One of the most important variables now affecting the country's social and economic development is its human resource base. However, high population densities and improper HRM practices can cause social unrest and worsen economic outcomes. Pakistan's rising population is the issue that is becoming worse every day. By the end of 2030, Pakistan's population is expected to exceed 245 million, according to study. As a result, the nation now faces a difficult problem with widespread unemployment. Not only is open unemployment a concern in Pakistan's labor market, but there is also a large underemployment rate. The primary issue with the officially announced unemployment rate is that it counts those who work one or two hours a day to support their families as employed.

All individuals ten years of age and over who were either "paid employed" or "self-employed" during the reference period and put in at least one hour of work are referred to as "Employed." All individuals ten years of age and older who were unemployed during the reference period (the previous week) who are actively seeking employment are considered "unemployed." (Pakistan Labor Force Survey, 2020-21). Because many people who are prepared to work full-time but are unable to obtain their ideal job are compelled to work part-time, this is not an accurate indicator of unemployment. These underemployed individuals comprise a sizable portion of the labor force. Therefore, the unemployment numbers would not truly reflect the health of the labor market if the issue of underemployment was not addressed. It could be quite difficult to have too many employees who are dissatisfied with their positions or who are not realizing their full potential. Employee dissatisfaction with their jobs might also result in lower productivity.

In 1925, the second International Conference of Labor Statisticians (ICLS) took a first look at underemployment. In 1957, the first international statistical definition of underemployment was accepted by the eleventh ICLS. At the Sixteenth International Conference of Labor Statisticians (ICLS), the term "time-related underemployment" was used by the International Labor Organization (ILO) to describe the idea of underemployment (ILO, 2014).

Underemployment refers to the underutilization of the working population's productive potential, especially those resulting from flaws in the local or national economic system. It has to do with situations where people are able and willing to work but find themselves in different types of jobs. The sole

aspect of underemployment that is included for measurement in the international criteria is time-related underemployment (ILO, 2018).

As per the International Labour Organization's definition, time-related underemployment includes all individuals in employment who meet the following three requirements within the given reference period:

1) Willing to take on a second job that requires greater hours in place of their existing one, be open to working longer hours in addition to their current employment, or do both
2) Willing to work longer hours
3) Work less hours than what a governmental authority has prescribed.

The US unemployment rate is divided into two categories. The true unemployment rate, U-6, is different from the officially estimated U-3 rate. In real unemployment rate all part time workers are included as unemployed because they are also searching jobs for full time (Amadeo, 2015).

When a person works less hours per week than equivalent full-time employees, they are classified as employed part-timers. One typical definition of part-time work is working a set amount of hours. While it varies from nation to nation, the threshold for classifying employees as full-time or part-time is often 30 or 35 hours per week (ILO, 2014).

Table 1.1
Statistical Definitions of Work

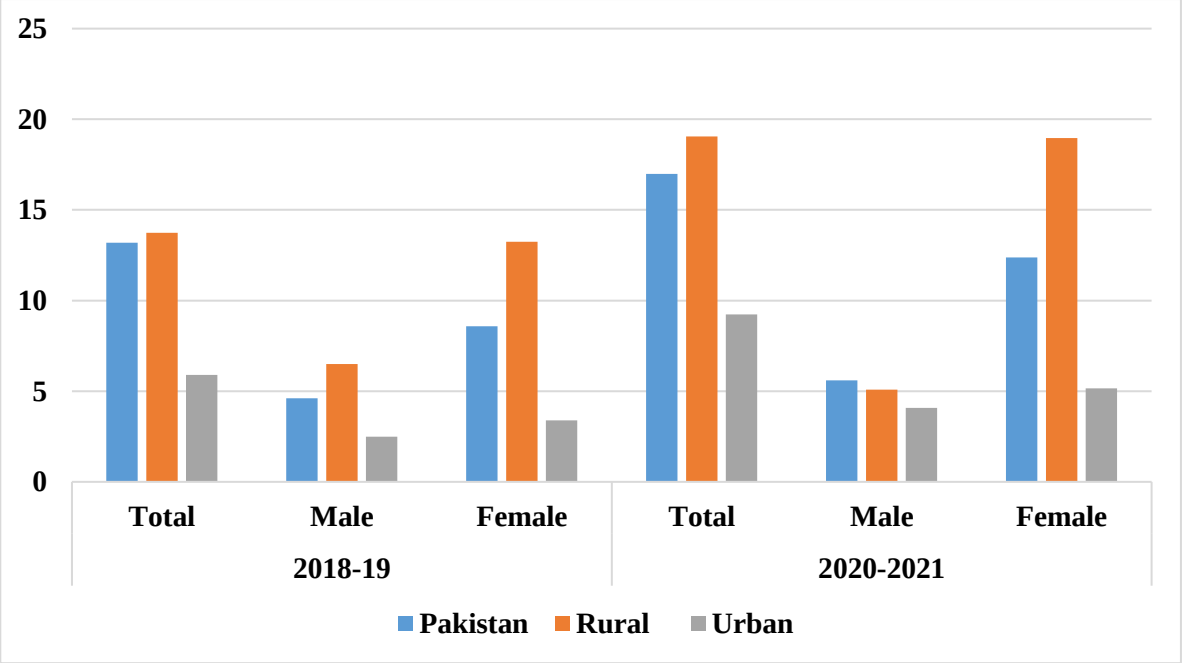
Country	**Threshold**
Finland, Canada, New Zealand	**30 hours**
Australia, Austria, Iceland, Japan, Sweden, United States	**35 hours**
Hungary, Turkey	**36 hours**
Norway	**37 hours**

Source: International Labor Organization, 2017

Increased economic activity within the work force is a sign of economic prosperity, as seen by a better GDP growth rate. It enhances the well-being of people and their homes and has a major impact on the economy's human capital (Nawaz et al., 2012). Changes in worker productivity are one of the key factors driving economic growth; other significant factors include rates of labor force participation and weekly average hours worked. In the short and long terms, there is a negative correlation between economic growth and unemployment. (Khobai et al., 2018).

The time frame of the current study is from 1981 to 2020. The COVID-19 pandemic of 2020 affected people all across the world. On a social, economic, and psychological level, all social groupings in both industrialized and developing countries suffered. In developing countries like Pakistan, the rate of unemployment has increased due to the implementation of lockdowns, limitations on cross-city mobility, and a halt to commercial operations.

While unemployment is a significant and frequently used measure of an economy's growth, it is not without limitations. It doesn't take into consideration employees who work less hours or at a lower capacity in terms of pay, experience, skill level, or other factors. If they are eager and searching for occupations with more capacity, these employed individuals are called "underemployed." Due to data restrictions, this study will concentrate on the underemployment notion based on labor hours (workers working fewer than 35 hours per week). The underemployment rate is the proportion of underemployed workers in the labor force overall.



Source: - Derived by the author from Statistical Tables of Pakistan LFS annual reports (2018-19) (2020-2021)

Figure 1.1: Pakistan's Time-Related Underemployment Rates by Gender and Area (%)

Underemployment rate goes up from (13.19%) in 2018-19 to (16.98%) in 2020-21 equivalently for females (8.59%, 12.38%) and males (4.61%, 5.6%). A significant fraction of the workforce works hours that are not regular. In particular, this is accurate with the labor force of women. The Pakistan Labor

Force Survey (2020–2021) reports that just 25% of women are employed professionally. This is significantly less than in most developing nations, where between 50 and 80 percent of women are employed, and those that are, are often willing to work less hours.

Considering the region-wise data, the same scenario is obtained in rural (13.74%, 19.06%) and urban areas (5.89%, 9.24%). It suggests that the underemployment is more prevalent in the rural sector. It implies that the rural sector has a higher rate of underemployment. The majority of underemployment in Pakistan occurs in rural areas, where the primary source of income for the populace is agriculture. The Pakistan Economic Survey (2020–2021) states that while agriculture produces food and raw materials for industry, it also generates 21.4 percent of GDP, 45 percent of employment, and aids in the growth of other industries. However, the devastating floods and challenges in obtaining high-quality fertilizers and animal feed have decreased agricultural output and the number of jobs available to low-income workers. Aaccording to a report by World Bank (2022), the floods will likely cause agricultural output to decline for the first time in over 20 years. In the medium run, economic growth is anticipated to decelerate and stay below potential. In FY23, real GDP growth is predicted to drop sharply to 0.4 percent.

Developing countries are finding it hard to utilize their resources properly and have failed to produce employment opportunities. Consequently, major portion of employed labor force has adjusted themselves in part time jobs. In Pakistan, people are inclined to accept such part time jobs due to financial problem and lack of opportunities, even though they are willing to provide their services for more than this time (Warren et al., 2015).

Short and medium-term potential output can be decreased by an economic collapse through negative effects on investment due to delayed capital accumulation, prolonged unemployment, detrimental effects on human capital, and additional reductions in potential output levels (Europejska, 2009).

Because they relate to different time horizons of economic dynamics, potential output and output gap are two notions that are relevant to macroeconomic analysis. Although the output gap records short-term variations, potential output tracks long-term shifts linked to economic growth (Hall et al., 2014). A country's potential GDP can be defined as its maximum output after all of its resources labor, capital, technology, natural resources, etc. are completely exploited. When an economy reaches its maximum level of production, full employment is achieved (Almeida et al., 2006). Policymakers compute the growth rate of potential GDP and compare the results with observed output trends to determine the level of excess capacity in the country and the

rate at which capacity and inputs of an economy are rising (Jahan et al., 2013). It is important because monetary planners utilize the "output gap," or the gap between the country's current and projected GDP, to calculate how much more or less monetary stimulus the country needs. Thus, changes in supply-side element inputs particularly, trends in the labor market, fluctuations in investment, and technical innovation are reflected in potential output growth (European Central Bank, 2011).

1.2 PROBLEM STATEMENT

Officially estimated unemployment rate includes those persons as employed who are even working for one hour that may not reflect exact picture of unemployment rate. Unemployment, unproductive use of labor and low marginal productivity for labor are issues of low productivity of overall economy. This subset needs to be excluded from the formal employed labor force to accurately determine the true picture of unemployment rate. Underemployed labor force generates output below its potential level and earns below its pay grade. This results in reduced consumption and reduced demand that pushes the economy towards recession or depression due to low GDP. It gives rise to a vicious cycle that needs to be addressed. Policy makers suggest the policies for generating employment opportunities on the basis of current unemployment rate that seems inappropriate for achieving desired results.

1.3 RESEARCH QUESTION

This study will investigate the following research questions.

1) How much potential GDP is influenced by the officially declared unemployment rate?
2) How much potential GDP is influenced by the readjusted unemployment rate?

1.4 OBJECTIVE OF THE STUDY

The following are the study's objectives:

1) To assess the degree to which the officially declared unemployment rate influences the potential GDP.
2) To assess the degree to which the officially declared unemployment rate influences the potential GDP.

1.5 SIGNIFICANCE OF THE STUDY

Pakistan relies on its labor force for both the production and consumption of products and services since it is a labor-driven nation. These laborers can only earn a livable salary when they are completely engaged in fulfilling work. However, Pakistan is facing a significant issue of underemployment. The officially announced unemployment rate is estimated on the basis of definition; People who work a few hours a week, or even just one hour, are considered employed, which misreports the true degree of unemployment. Therefore, it is crucial to investigate how underestimation of unemployment rates is affecting potential GDP growth rate. Numerous research efforts have explored the impact of readjusted unemployment rates on GDP, but there is a notable scarcity of studies in Pakistan that specifically address this issue of adjusted unemployment rates and their impact on potential GDP growth rates. This study will be a contribution in literature in terms of measuring readjusted unemployment rate by segregating the partially employed labor force and counting them as adjusted unemployed, and will provide insights of gap in potential GDP growth rate over the period. It will assist policy makers in formulating a rational policy aimed at eliminating underemployment and ensuring the provision of stable livelihoods. It will set up the framework for using human resources effectively. This ground-breaking study will pave the way for additional research on this important subject.

1.6 THE STUDY'S HYPOTHESES

The study will examine the following hypothesis.

H1: The potential growth rate of GDP is influenced by the officially estimated unemployment rate.

H2: The potential growth rate of GDP is influenced by the readjusted unemployment rate.

1.7 ORGANIZATION OF THE STUDY

In addition to the study's introduction in chapter 1, chapter 2 covers Pakistan's GDP growth rate and unemployment history. In Chapter 3, the literature review is provided. Chapter 4 provides the method and theoretical basis. The empirical findings and their implications are covered in Chapter 5. Chapter 6 presents the study's findings and a few policy suggestions.

CHAPTER 2

HISTORICAL OVERVIEW OF UNEMPLOYMENT AND GDP GROWTH RATE IN PAKISTAN

The primary issue facing Pakistan throughout its history has been that of underemployment and unemployment. Throughout her life, Pakistan prioritized production strategy, with the exception of the 1970–1977 period. The secondary goals of all policies have been the distribution of income and the development of jobs. Despite an increase in investment and an increase in output, the rate of unemployment increased in the 1950s and stayed essentially steady in the 1960s. While unemployment in 1950–51 was 22% of the labor force as a percentage of the total labor force, by the end of the decade, almost 25% of Pakistan's human resources were completely utilized. In absolute terms, the number of unemployed increased from 6 million in 1950–1951 to 8.04 million. Even in the 1960s, when the GNP expanded at a fast rate of 5.4 percent per year and the percentage of gross investment in 1965 doubled that of 1960, unemployment in 1969–70 remained high despite Pakistan's GNP growing at a compound annual growth rate of 2.4 percent during this time.

Remarkably, employment growth has a contradictory trend, peaking at three percent throughout the 1970s and tumbling to two percent in the 1980s and 1990s. The following table presents the concerning condition of the entire labor force, including both employed and unemployed individuals.

Table 2.1
Average Rate of Increase in the Labor Force for Employed and Unemployed (Millions)

Years	Labor Force	Labor Force Employed	Labor force Unemployed
1970s	21.4	20.9	0.5
1980s	27.8	26.8	0.99
1990s	34.9	32	1.9
2000s	46	42.3	4.03
2010s	54.1	48.4	5.89

Source: Handbook of Statistics on Pakistan's Economy 2020

Table 2.1 shows the significant increase in labor force. Current data indicates that while the labor force was growing, the economy's capacity was not keeping up with the labor force's pace of expansion. The 2010s saw a high unemployment rate.

Blanchard (1987) expanding upon traditional theories of growth and unemployment, argued that neither growth nor equilibrium unemployment are affected by unemployment in the long run. Under the endogenous growth theory, these ideas were reformulated.

Romer (1990) discovered that inter-sector change resulted from expansion, altering the economy's sectoral structure. This change was the cause of structural unemployment. The advancement of technology changed the modes of manufacturing. New technological developments result in employment losses for workers.

Pigou (1993) went on to explain that rather than being the result of the sum of its separate causes, unemployment was caused by a system of interrelated elements that together accounted for its full amount. Unemployment is a major problem in emerging nations and has several root causes. Developing nations want to grow at a rapid pace within a short amount of time. These nations profited from Western countries' technological advancements, but they also embraced unsuitable policies for faster growth, which led to a dramatic rise in unemployment.

Aghian(1994) discovered that one firm's positions were eliminated and another's were generated as a result of the structural shift. New production procedures result in high employment turnover. Increased economic growth will lead to the loss of jobs as a result of new machines and skill obsolescence. Joblessness turns into a persistent and serious issue. It is brought on by several things.

Lin (2004) Structural unemployment was the outcome of this change. Technological advancements changed the modes of manufacturing. Workers lose their jobs when new technological advancements are introduced. It emerged as the primary factor behind both the failure to attain high growth and policy distortion.

Pakistan's growth experience is comparable to rising economies, as are developing countries. Amjad et al. (1984) discovered that Pakistan's economy was predominantly agrarian at the time of its independence in 1947, with imports of manufactured products principally and exports of core commodities, especially cotton and jute. The nation lacked development. Since 1947,

Pakistan's economy has not shown much stability or nuance. Pakistan's GDP fluctuates and varies a lot during its history. Despite a few downturns, Pakistan's economic performance in the early decades has been incredibly impressive. The table 2.2 displays the real GDP growth rates' performance as a percentage.

Table 2.2
Growth Rates of Real GDP

Decades	Rates of GDP Growth	Decades	Rates of GDP Growth
1950s	4	1990s	4.6
1960s	6.7	2000s	4.5
1970s	5.0	2010s	3.5
1980s	6.1	-	-

Source: Handbook of Statistics on Pakistan's Economy 2020

The GDP should expand at a high and sustainable rate due to the uncertain economies of developing nations like Pakistan but the data indicates that Pakistan's GDP has grown at a variable rate since independence. The 1960s and 1980s saw a strong growth in Pakistan's gross domestic product (GDP). Growth began to decline in the 1990s and peaked in the 2010s. Major industries like manufacturing and agriculture performed extremely poorly, which made the unemployment issue worse.

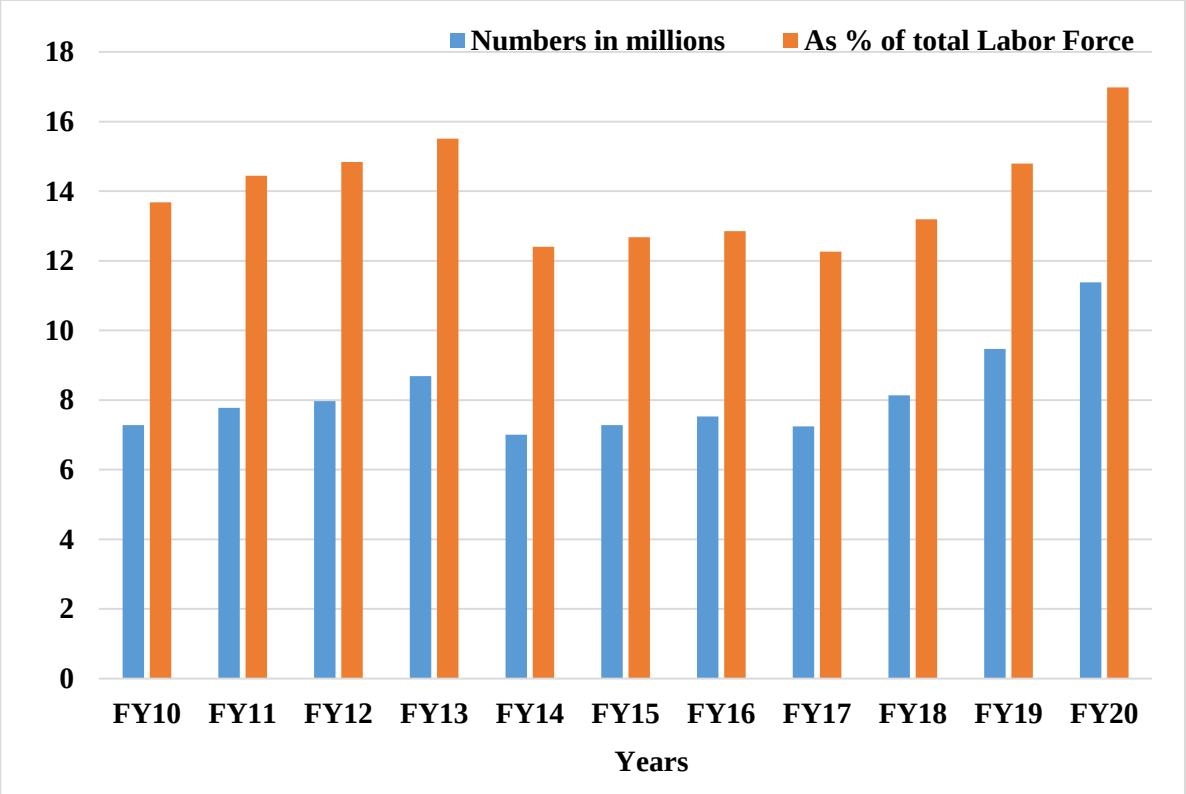
Source: World Bank, 2022

Figure 2.1: Relationship between growth rate of GDP and Unemployment rate (%) (1981-2020)

Figure 2.1 shows slow and fluctuated growth in GDP in the past decades of Pakistan. Unemployment rate have not appreciably enhanced and growth statistics have not increased over the years. It can be observed from given graph, initially in 1980s when the unemployment rate was lower, the growth accelerated and the growth slowed after 1990s when the unemployment rate continued to increase.

A significant segment of the labor force in employment puts in fewer than 35 hours per week, which could be considered as underemployment. If the country had invested enough in population control, health, education, literacy, human capital, etc., things would have turned out far better. The low rates of female labor force participation have also prevented the current human capital from being fully used.

Figure 2.2 shows the underemployment situation in Pakistan.



Source: - Derived by the author from Statistical Tables of Pakistan LFS annual reports (2010-2021)

Figure 2.2: Underemployment in Pakistan (2010-2020)

Prior to COVID-19, 55.75 million individuals, or 35 percent of Pakistan's population, were employed as workers. COVID-19 and other external factors—most notably Pakistan's lockdown and suspension of economic operations—have caused this percentage to drop to 35.04 million. After July 2020, things improved because, statistically speaking, working-class people resumed doing business. Of these, 52.56 million, or 33% of the working population, were impacted by this.

The pandemic had a negative impact on the sectors' performance, which led to a loss of employment and revenue (Pakistan Bureau of Statistics, 2020). Almost 80% of laborers lost their jobs and are unable to find work in the construction business, according to the Pakistan Economic Survey (2020–2021). Similar circumstances occurred in the manufacturing sector, when 72% of workers lost their employment or were unable to find any. As a result, a person's purchasing power decreases. Similar conditions had been noted in other sectors of the economy, including as transportation, retail, wholesale, and storage, suggesting that the epidemic had prevented between 63 and 67 percent of Pakistani workers from finding jobs.

CHAPTER 3

LITERATURE REVIEW

The expansion of the economies of both developed and developing nations worldwide is greatly influenced by human resources. Pakistan boasts the sixth-highest population in the world, with sixty percent of its citizens engaged in economic activities. Empirical data suggests that Pakistan's human capital is not being fully employed. This resulted in a high unemployment rate in Pakistan's economy (Economic Survey of Pakistan, 2020–2021). Economic growth is significantly impacted by the unemployment rate (Mallik et al. 2012). The nation's strong and stable economy is the result of high and consistent economic growth (Muhammad and Raza, 2013). By increasing its national output, Pakistan can potentially overcome the issue of a high unemployment rate (Jilani et al, 2010).

Chaudhry et al. (1999) investigated the elasticity of employment in Pakistan. According to conclusion there is high elasticity of employment for construction sector and low elasticity of employment for manufacturing sector. This study was helpful for policy makers to promote those sectors which have high elasticity of employment. This study also showed that officially estimated unemployment rate was low than actual.

Kalim (2003) conducted the study on unemployment's determinants in Pakistan. This study discovered a correlation between the population growth rate, unemployment and GDP growth rate. For the years 1986–1999, the findings showed a negative link between unemployment and GDP and a positive association between unemployment and population.

Paramsothy et al. (2004) discovered a mismatch in the relationship between output and unemployment using Okun's rule as an example. Additionally, Okun's coefficient was explained by a dynamic model that took into account the asymmetry in the link between cyclical output and unemployment.

Zagler (2006) collected data from 1982 to 1999 to investigate the connection between growth and unemployment in the United Kingdom. The panel regression approach with fixed effects was applied. The results showed a significant inverse relationship between unemployment and growth. It was determined that better human capital and effective planning may reduce unemployment.

Nagel (2006) examined the connection between GDP growth and unemployment and found a negative correlation between the two.

Noor et al. (2007) studied the relationship in the Malaysian economy between unemployment and economic growth using Okun's law and found that the two were negatively correlated.

Pierdzioch et al. (2009) discovered that there is a significant inverse relationship between the anticipated change in the unemployment rate and the anticipated growth rate of real output.

Tunah (2010) examined the macroeconomic factors and discovered that unemployment had a noteworthy favorable influence on Turkey's decline in real GDP.

Shahbaz et al. (2011) computed the Okun's coefficient for Pakistan using the Ordinary Least Squares approach from 1981 to 2005. They discovered that Pakistan's economy was less effective at creating jobs, as seen by the country's greater Okun coefficient than that of wealthy nations. Additionally, they found that the relationship between GDP and unemployment was asymmetrical, stronger during periods of economic contraction.

Ali et al. (2012) examined the connection between the unemployment rate and growth rate between 1991 and 2015. The findings demonstrated that Jordan's unemployment rate was positively and statistically significantly impacted by economic growth.

Ozel et al. (2013) found a relationship between Growth rate and unemployment using panel data from 2000 to 2011 in the context of the G7 countries (the United States, Japan, Germany, Canada, France, and the United Kingdom). The results showed that productivity significantly impacted unemployment.

Khan et al. (2013) investigated Okun's Law in the context of Pakistan using time series data spanning from 1976 to 2010. The GDP is rising at a pace of 2.8%, while the unemployment rate's coefficient is -0.36, per the study.

Babalola et al. (2013) carried a study to confirm the application of Okun's law in Nigeria. For this analysis, annual data from 1980 to 2012 was used. For causality, the Var-Granger test was applied. The result in Nigeria produced a positive Okun's coefficient.

Aqil et al. (2014) gathered the information between 1983 and 2010 for Pakistan. The Ordinary least squares (OLS) method of econometric research showed that unemployment has a major effect on GDP growth rate.

Ali et al. (2014) used quarterly data from 1981 to 2012 to determine the Okun coefficient for Pakistan. Their statistically significant negative coefficient indicated a 0.77% fall in the jobless rate for every 1% increase in GDP.

Cheema et al. (2014) collected time series data in Pakistan from 1973 and 2010. The ARDL technique was used by the authors to undertake an empirical analysis in which they examined the factors that determine unemployment. The study's findings showed that unemployment had a positive and substantial influence on the output gap.

Abbas (2014) examined the relationship between economic expansion and unemployment. Information was collected from 1990 to 2006. The autoregressive distributed lag (ARDL) method was employed by the author to obtain the empirical results. The results of the study showed that there was no relationship between unemployment and economic growth—at least not in the near run. However, there was a clear inverse correlation between unemployment and Pakistan's economic growth throughout time. The research also revealed that there was no significance in the short-run parameter estimations. The study's conclusions suggested that a number of governmental actions should be put into place in order to reduce Pakistan's unemployment rate.

Abdul-Khaliq (2014) gathered information for the years 1994–2010 and examined the relationship between the increase of the gross domestic product and unemployment in nine Arab nations. The growth rate was found to be significantly impacted negatively by the unemployment rate.

Ahmed (2014) collected data for a few SAARC countries (Bangladesh, Bhutan, India, Pakistan, and Sri Lanka) and looked at the relationship between the growth rate and the unemployment rate. The author concluded that there are variations in the signals of the relationship between the unemployment rate and the rate of economic growth among the SAARC countries using OLS.

Awan et al. (2015) used quarterly data from 1980 to 2012 to estimate the Okun coefficient for Pakistan as well. They discovered that the coefficient was statistically significant and negative, meaning that a 1% rise in GDP was associated with a 0.45% drop in the unemployment rate.

Faridi et al. (2015) examined the link between unemployment and GDP in Pakistan using yearly data from 1974 to 2014 and came to the conclusion that there was a negative association.

Ademola et al. (2016) collected yearly data from 1981 to 2014 in order to investigate the relationship between inflation, unemployment, and economic growth in Nigeria. The Ordinary Least Squares (OLS) method was employed by the writers to obtain empirical results. The study's findings showed that unemployment and economic growth were negatively correlated.

Khan et al. (2017) used yearly data from 1980 to 2015 to estimate Pakistan's Okun coefficient. They discovered that the coefficient was statistically significant and negative, meaning that a 1% rise in GDP was associated with a 0.33% drop in the unemployment rate.

Kukaj (2018) gathered data from 2001 to 2015 in the Western Balkans to examine the connection between unemployment and economic growth. The dependent variable in the study was GDP growth, while the independent variable was unemployment. The findings demonstrated that there was a trade-off between joblessness and economic expansion in the economies of the Western Balkans.

Soylu et al. (2018) looked at GDP growth and unemployment in Eastern European countries between 1992 and 2014 and found a significant negative correlation between the two.

Ahn et al. (2019) estimated age-specific Okun's coefficients for OECD countries using ordinary least squares utilizing time-series data from 1981 to 2015 from different age cohorts. The results demonstrated that the rate of unemployment among young individuals had a considerably greater impact on economic growth than either the total unemployment rate or older cohorts.

Ojima (2019) examined the 35-year span from 1980 to 2017 and the correlation between Nigeria's economic expansion and unemployment. The findings demonstrated the inverse relationship between unemployment and economic expansion. An increase in unemployment is detrimental to economic expansion. In order to maintain Nigeria's economic expansion, the author suggested monetary and fiscal measures that would generate employment.

Hussain et al. (2019) used quarterly data from 2001 to 2018 to investigate the Okun coefficient in Pakistan. They discovered that the coefficient is dependent on the sample period and estimation method selected, and that it has

been decreasing recently, suggesting that the labor market is becoming more efficient.

Anwar et al. (2019) looked at the relationship between unemployment rates and GDP growth in Pakistan between 1981 and 2013. The study finds that Pakistan is covered by Okun's law, with a 1% increase in GDP translating into a 0.427% decrease in the unemployment rate (coefficient of -0.427).

Ahmad et al. (2019) used quarterly data from 1990 to 2018 to estimate Pakistan's Okun coefficient. They found that the coefficient was negative and statistically significant, indicating that there was a 0.52% decrease in the jobless rate for every 1% increase in GDP.

Karikari et al. (2019) investigated the impact of China's unemployment rate on the nation's economic growth. For the econometric study of time-series data from 1991-2018, the authors used the autoregressive distributed lag (ARDL) model. The results of the study showed that unemployment and economic growth had a negative link throughout the short and long terms. The findings of the Granger causality test also showed that there was no connection between economic progress and China's unemployment rate.

Tamimi et al. (2019) gathered data for 2009–2016 in order to investigate how Jordan's unemployment rate affected economic growth. Using the OLS method, The author found that there was a significant negative correlation between the unemployment rate and GDP growth.

Ahmed et al. (2020) examined the relationship between Okun's Law and Pakistan's economic growth. The study verified Okun's Law in Pakistan by showing a substantial inverse link between GDP and unemployment.

Xesibe (2020) looked at how unemployment affected South Africa's economic growth from 1994-2017. The results showed that the rate of unemployment and the rate of economic growth in South Africa were negatively cointegrated.

Khalid et al. (2021) looked into the r elationship between joblessness and economic expansion in South Africa. To investigate cointegration, data was gathered between 1980 and 2020. The findings demonstrated that there was a substantial inverse relationship between South Africa's real GDP and unemployment rate.

Ahsan et al. (2021) investigated the connection between Pakistan's economic expansion between 1990 and 2019 and Okun's Law. The study's conclusion that unemployment and GDP growth rate have a substantial negative correlation supports Okun's Law's applicability in Pakistan.

Zulfiqar et al. (2022) studied the impact of Pakistan's unemployment rate on the growth rate of the nation from 1974 and 2020. In their empirical study, the authors used the Autoregressive Distributed Lag (ARDL) technique. The findings demonstrated a statistically significant negative relationship between the unemployment rate and GDP growth. Low living standards are caused by declining real GDP and per capita income as the unemployment rate rises in the economy. It promotes economic criminality, melancholy, and mourning all at once.

CHAPTER 4

THEORETICAL FRAMEWORK AND METHODOLOGY

4.1 THEORETICAL FRAMEWORK

Okun (1962) originally examined the connection between both of these variables: (1) the difference in output between the actual and potential levels; and (2) the difference in unemployment rates between the natural and actual rates. The term used to characterize this relationship is Okun's Law. According to Javed (2010), Okun introduced three models: the level version, the gap version, and the estimation of coefficients and output gaps caused by changes in unemployment.

According to Okun's rule, there is an inverse link between the output gap and the unemployment gap that is defined by cyclical oscillations. The coefficient values fluctuate over time and between different countries. According to the relationship's original formulation, a 0.3 percentage point drop in unemployment corresponds to a 1 percentage point gain in real GNP (Lal et al., 2010).

A one-point reduction in unemployment has a marginal impact of roughly 2/3% higher output, although weekly hour fluctuations have their own influence on the output gap in the US economy (Prachowny, 2015).

Policymakers can use Okun's law as a guide when determining how employment affects output growth. It might be regarded as a general guideline (Donald, 2014).

One of the most important variables is changes in labor productivity; weekly average hours and labor force participation also play a big role (Richard et al., 2014).

Regional differences in productivity growth help to partially explain the various values of Okun's coefficients. These variations suggest policy concerns: region-specific policies and aggregate demand and supply management policies ought to work together (Adolfo, 2008).

Variations in unemployment can be reflected in labor productivity, which is impacted by flaws in the commodities and labor markets. Furthermore, it is

conceivable that an economy may fluctuate between boom and trough levels, indicating that altering demand-side macroeconomic policies may lower unemployment rates, contingent on the specific measures chosen to counteract the anticipated outcomes of an economy (Molana, 2008).

Demand fluctuations across the sectors affect GDP. Additionally, there is a correlation between GDP and unemployment in business cycle oscillation; in the end, Okun's coefficient increases with an increase in average GDP (Masanao et al., 2007).

Underutilization of the labor force has an impact on the economy as a whole as well as the household. The number of workers who are only partially employed does not accurately represent the true state of unemployment in emerging nations. The average working hour is a reliable measure of the labor supply overall in the economy (Messenger et al., (2007).

Okun's law is validated by the inverse relationship between cyclical output and cyclical unemployment. Another noteworthy finding is that when the output gap is small, there are little variations in output and unemployment, and when the gap is high, there are substantial swings in unemployment (Ho-Chuan et al., 2006).

Under the deviations of unemployment from the oscillations in economic activity, Okun's Law coefficient is a primary macroeconomic metric (Roger etal.,2005).

With an estimated Okun's coefficient of around -2.25, the U.S. economy offers compelling evidence of a long-run equilibrium link between output and the unemployment gap (Clifford et al., 1997).

Traditionally, Okun's Law has been used to measure the output gap in relation to the unemployment rate, which has been a feature of the business cycle (Weber,1996).

Productivity and unemployment are closely related, therefore their effects on a country's economic growth can be significant. As a result, developing nations must concentrate on the unemployment problem (Paul Krugman, 1994).

A helpful foundation for comprehending the connection between GDP and unemployment is offered by Okun's Law. It affects policy in a significant way. It suggests that policymakers can influence the unemployment rate through economic policies aimed at stimulating or stabilizing the economy. For example, expansionary monetary or fiscal policies can boost real GDP growth and help

reduce unemployment during economic downturns. It serves as a valuable guideline rather than an exact prediction of how changes in unemployment will affect GDP.

4.2 DATA COLLECTION AND METHODOLOGY

In the current study we have revised the officially estimated unemployment rate (OUt) based on labor that is fully employed, that is, 35 hours per week.
Using time series analysis, we have determined Okun's value for the OUt and readjusted unemployment rate (RUt) in the setting of Pakistan. In the case of OUt, we have determined Okun's coefficient by examining the connection between the OUt gap (the variation between the rate of unemployment at natural and present levels) and the GDP growth rate (Yt). Next, by examining the connection between the GDP growth rate (Yt) and the RUt gap, we were able to compute Okun's coefficient in the context of RUt. In all scenarios, we have calculated the current gap in GDP growth rate and the prospective GDP growth rate (Y*t).

Since the foundation of this research project is secondary data, annual timeseries data covering the years 1981–2020 have been collected. The World Development Indicator (WDI), World Bank (WB), Pakistan Bureau of Statistics (PBS), several economic surveys conducted in Pakistan, and various labor force surveys are the sources of secondary data for the variables. The study's conclusions would offer numerical data about phenomena that enhance and inspire projects that work.

4.2.1 Model Specification

According to Lal et al. (2010), Okun's law is typically represented by two specifications for the model : the "gap model" and the "first difference model." The "Gap Model" developed by Okun has been used for the analysis because it offers a framework for comprehending the correlation between GDP and unemployment by tying the output gap and the real and natural unemployment rates together. Examining the degree to which the economy is functioning at full employment is a useful way to gauge its performance and efficiency. The standard model specification by Okun is given as:

$$Yt - Y^*t = \alpha + \beta\,(Ut - U^*) + \varepsilon t$$

where Ut is the current unemployment rate, U* is the natural rate of unemployment, and Y*t is the potential GDP growth rate. The intercept is represented by α, the disturbance term is represented by ε, and Okun's coefficient, β, determines the extent to which variations in the unemployment rate can be attributed to variations in the GDP growth rate.

We must first compute Okun's coefficient in order to determine the difference in GDP growth rates between the officially estimated unemployment rate and the readjusted unemployment rate, separately. In order to determine Okun's coefficient, we employed a linear regression model in accordance with Okun's law, which indicates the potential GDP loss incurred by a nation when its unemployment rate exceeds its natural rate.

4.2.1.1 Model One

The first model to calculate Okun's coefficient and analyze gap in GDP growth rate for officially estimated unemployment rate, is given as:

$$Yt = \alpha o + \beta o\ (OUt\text{-}U^*)$$

where

Yt	=	*GDP growth rate*
OUt	=	*officially estimated unemployment rate*
αo	=	*intercept term*
βo	=	Okun's coefficient (calculated using OUt). The percentage decrease in GDP growth rate when unemployment is above its natural rate, is the Okun coefficient, β0

βo(OUt-U*) = (G) Gap in Yt, calculated using OUt

Using gap in GDP growth rate(G), we can find potential GDP growth rate(Y*t) as:

$$Y^*t = Yt + G$$

where

Y*t = Potential GDP growth rate

4.2.1.2 Model Two

The second model to calculate Okun's coefficient and analyze gap in GDP growth rate for readjusted unemployment rate is given as:

$$Yt = \alpha r + \beta r\ (RUt\text{-}U^*)$$

where

Yt = GDP growth rate

RUt = readjusted unemployment rate

αr = intercept term

βr = Okun's coefficient (calculated using RUt)

$\beta r(RUt\text{-}U^*)$ = (RG) Gap in Yt, calculated using RUt

Using readjusted gap in GDP growth rate (RG), we can find readjusted potential GDP growth rate (RY*t) as:

$$RY^*t = Yt + RG$$

where

RY^*t = Readjusted Potential GDP growth rate

4.2.2 Description of Variables

4.2.2.1 Officially Estimated Unemployment Rate (OUt)

According to official government data or other relevant authorities, the officially estimated unemployment rate is the proportion of the labor force that is unemployed and actively looking for work. Those who are employed or jobless are included in the labor force.

4.2.2.2 Readjusted Unemployment Rate (RUt)

This is the unemployment rate that is determined using labor that is fully employed, or 35 hours a week.

4.2.2.3 GDP Growth Rate (Yt)

To measure how quickly an economy is expanding, the GDP growth rate looks at changes in a nation's economic production from year to year (or quarterly).

4.2.2.4 Potential Growth Rate of GDP (Y*t)

The potential growth rate of GDP is the fastest pace of economic expansion that can be achieved without increasing the unemployment rate. The Pakistani government does not disclose the official estimate of Y*t. Consequently, the Okun coefficient for the officially estimated unemployment rate is used to determine it in the study.

4.2.2.5 Readjusted Potential Growth Rate of GDP (RY*t)

The readjusted potential growth rate of GDP is an estimate that is calculated using the Okun coefficient for the readjusted unemployment rate.

4.2.2.6 GDP Growth Rate Gap (G)

The gap in GDP growth rate is the gap between the current growth rate of GDP and the potential growth rate of GDP calculated using OUt.

4.2.2.7 Readjusted GDP Growth Rate Gap (RG)

The readjusted gap in GDP growth rate is the gap between the current growth rate of GDP and the potential growth rate of GDP calculated using RUt.

4.2.2.8 Natural Rate of Unemployment (U*)

The natural rate of unemployment refers to the minimum level of unemployment that a healthy, well-functioning and growing economy can sustain and it exists at equilibrium demand and supply for labor. It is caused by structural and frictional (supply-side) factors like job transitions, skill mismatches, and geographic mismatches. It is not possible to have an accurate estimation of structural and frictional unemployment rates in any economy, so it is usually assumed and generally believed to be greater than zero. It can vary

over time and across different economies. In the study, it is assumed 2% for Pakistan, taken as an estimated average considering the data (1981-2020). The economy is said to be in full employment when the real unemployment rate is at or close to the natural rate.

4.2.3 Methodology

Time-series analysis is employed in the investigation. When analyzing time series data, it can be challenging to determine the stationary state of a series. A stationary time series is one whose characteristics don't change regardless of the observation time. As a result, over time, its mean, variance, and autocorrelation structure remain unchanged.

4.2.3.1 Unit Root Test

In order to choose the right models and draw reliable conclusions or predictions about the data, unit root tests are statistical procedures used in time series analysis to assess a time series' stationarity. Accurate prediction becomes challenging when the wrong kind of model is used as it might produce biased and wasteful estimates.

The Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test are two common unit root tests. These tests assess if a regression model's lagged dependent variable's coefficient deviates statistically from unity, a finding that would point to the existence of a unit root.

a) Augmented Dicky-Fuller Test:

The ADF method of unit root is regarded as a more trustworthy and suitable test. The Dickey-Fuller test has been expanded upon in order to accommodate more intricate models that incorporate time series that are not only autoregressive but also have a moving average component. The time series does not have a unit root (is stationary), according to the alternative hypothesis (H1), which is opposed by the null hypothesis (H0) that the time series has a unit root and is non-stationary.

b) Philips-Perron Unit Root Test:

Another unit root test like the Dickey-Fuller test is the Phillips-Perron test. It is non-parametric and does not require the distribution or structure of the autocorrelation to be specified. It accounts for serial correlation in a different way, but it uses a test statistic that is comparable to the ADF test.

Due to its foundation in asymptotic theory, the PP test has one major drawback. Finally, because it only functions well with huge samples, this is a luxury whenever used to financial time series data. Its shortcomings are also similar to those of ADF techniques, meaning that unit root findings are frequently the outcome due to limited sample power and susceptibility to structural fractures.

4.2.3.2 Ordinary Least Square Method (OLS)

The OLS technique is employed to determine the α and β, or unknown parameters, in a linear regression model. When we have a single independent variable and assume a linear relationship between that variable and the dependent variable, a basic linear regression model is adequate. By fitting a linear equation to the observed data, simple linear regression describes the connection between a dependent variable and a single independent variable. OLS can be applied directly in regression models if the independent and dependent variables are both stationary.

4.3 ESTIMATION TECHNIQUE

The adjustment of unemployment rate on the basis of fully employed labor i.e. 35 hours per week is given below.

Unemployment rate can be calculated as follows:

$$\text{Unemployment Rate} = \frac{\text{Unemployed Labor}}{\text{Total Labor Force}} * 100$$

Then, to find 'readjusted unemployment rate', adjusted unemployed labor (μ) would be added in unemployed labor.

Adjusted unemployed workers can be calculated as:

Number of labor which are working less than standard hours = X

Number of hours which are done by these labor (average) = n

Total working hours done by these number of labor = X*n

X*n = N (Where N shows working hours)

Labor required to fulfill these hours = N/35

N/35 =L (Where L is labor required to fulfill these hours)

Adjusted unemployed labor force = X-L

X-L = μ (Where μ shows the adjusted unemployed labor)

Readjusted unemployment rate=

$$\frac{\text{Unemployed Labor + Readjusted Unemployed Labor}}{\text{Total Labor Force}} *100$$

Table 4.1
Calculation of Readjusted Unemployment Rate (2018)

Working hours	%of employed by hours	Employed labor in millions, working less than 35 hours=X	No. of hours (average)=n	Actual working hours millions) =N =X*n	Labor required for these hours (millions) =L =N/35	Adjusted unemployed labor millions =μ= X-L
1-14	1.64	1.01	7.5	7.57	.22	.79
15-24	4.55	2.80	19.5	54.6	1.56	1.24
25-34	6.07	3.74	29.5	110.33	3.15	.59
-	-	-	-	-	-	2.62

Source: Labor Force Survey 2017-18 (Annual Report)

Officially calculated unemployment rate is as follows:

$$\text{Unemployment Rate} = \frac{\text{Unemployed Labor}}{\text{Total Labor Force}} *100$$

$$\text{Unemployment Rate} = \frac{3.79}{65.5} *100 = 5.78\%$$

Readjusted unemployment rate =

$$\frac{\text{Unemployed labor+ Adjusted unemployed labor}}{\text{Total labor force}} *100$$

$$\text{Readjusted unemployment rate} = \frac{3.79+2.62}{65.5} *100 = 9.78\%$$

CHAPTER 5

EMPIRICAL FINDINGS AND DISCUSSION

The study's empirical results are presented in this chapter. To verify data stationarity and ascertain the integration order, the unit root test is utilized. After that, more computations are made as part of the study.

5.1 UNIT ROOT TESTS

5.1.1 Model One: Yt = αo + βo (OUt-U*)

The results of the Augmented Dickey-Fuller (ADF) and Philips Perron (PP) tests are applied to model 1 to check stationarity, and the results are listed in Table 5.1.1 (a) and (b). The test statistic is used to check the stationarity of the data (Unit Root). The results depict that GDP growth rate and (OUt-U*) are stationary at level I (0). Details are given below:

Table 5.1.1 (a)
Augmented Dickey-Fuller test (ADF)

Variables	ADF Test at Level	
	T-Statistics	Probability
GDP growth rate (Yt)	-3.516921	0.0127
(OUt-U*)	-4.096393	.0023

Table 5.1.1 (b)
Philips Perron Test

Variables	ADF Test at Level	
	T-Statistics	Probability
GDP growth rate (Yt)	-3.490068	0.0136
(OUt-U*)	-4.080532	0.0024

5.1.2 Model Two: Yt = αr + β0072 (RUt-U*)

The results of the Augmented Dickey-Fuller (ADF) and Philips Perron (PP) tests are applied to model 2 to check stationarity, and the results are listed

in Table 5.1.2 (a) and (b). The test statistic is used to check the stationarity of the data (Unit Root). The results depict that GDP growth rate and (RUt-U*) are stationary at level I (0). Details are given below:

Table 5.1.2 (a)
Augmented Dickey-Fuller Test (ADF)

Variables	ADF Test at Level	
	T-Statistics	Probability
GDP growth rate (Yt)	-3.516921	0.0127
(RUt-U*)	-3.672539	.0077

Table 5.1.2 (b)
Philips Perron Test

Variables	ADF Test at Level	
	T-Statistics	Probability
GDP growth rate (Yt)	-3.490068	0.0136
(RUt-U*)	-3.644039	0.0083

5.2 CALCULATION OF READJUSTED UNEMPLOYMENT RATE

We have calculated readjusted unemployment rate by segregating the partially employed labor and counting them as adjusted unemployed on the basis of fully employed labor i.e. 35 hours per week. Results are given below in the table 5.2:

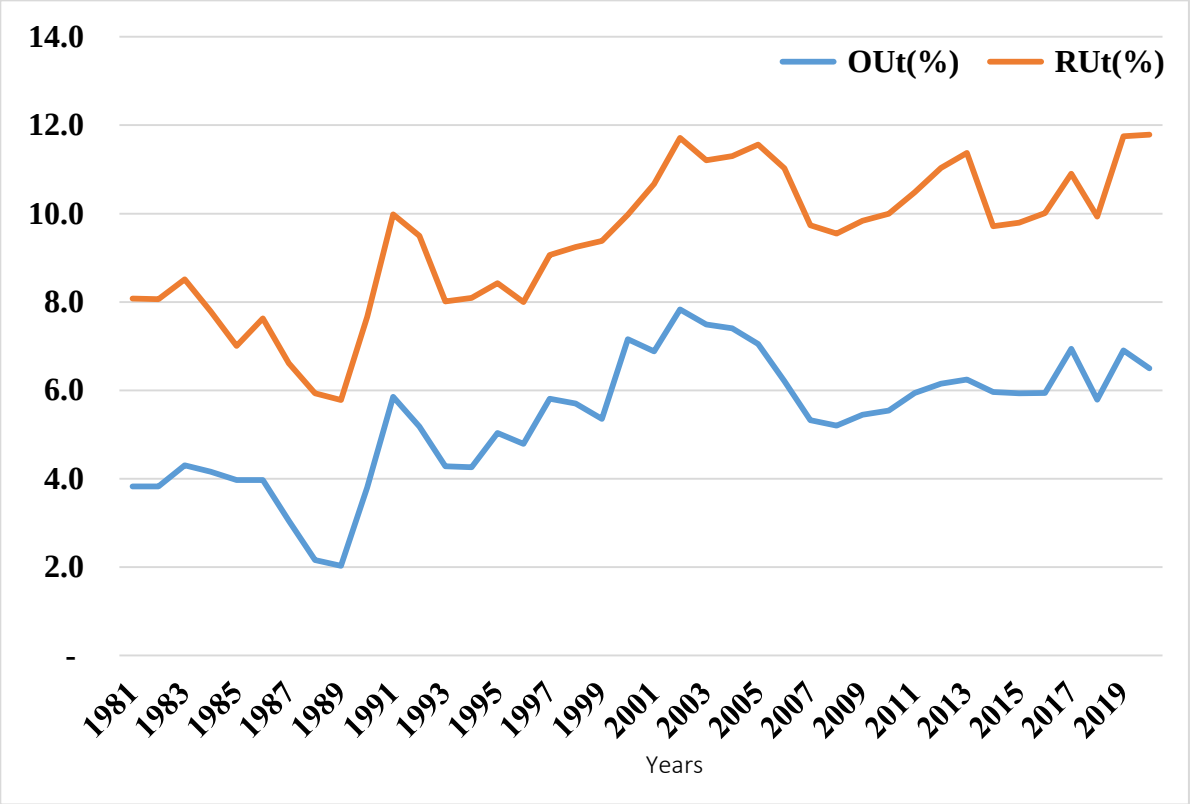
Table 5.2
Calculation of Readjusted Unemployment Rate (1981-2020)

Years	OUt%	RUt%	Years	OUt%	RUt%
1981	3.8	8.1	2001	6.9	10.7
1982	3.8	8.1	2002	7.8	11.7
1983	4.3	8.5	2003	7.5	11.2
1984	4.2	7.8	2004	7.4	11.3
1985	4.0	7.0	2005	7.1	11.6
1986	4.0	7.6	2006	6.2	11.0
1987	3.1	6.6	2007	5.3	9.7
1988	2.2	5.9	2008	5.2	9.6
1989	2.0	5.8	2009	5.5	9.8

Years	OUt%	RUt%	Years	OUt%	RUt%
1990	3.8	7.7	2010	5.5	10.0
1991	5.9	10.0	2011	5.9	10.5
1992	5.2	9.5	2012	6.2	11.0
1993	4.3	8.0	2013	6.2	11.4
1994	4.3	8.1	2014	6.0	9.7
1995	5.0	8.4	2015	5.9	9.8
1996	4.8	8.0	2016	5.9	10.0
1997	5.8	9.1	2017	6.9	10.9
1998	5.7	9.2	2018	5.8	9.9
1999	5.4	9.4	2019	6.9	11.7
2000	7.2	10.0	2020	6.5	11.8

Source: Author calculation (RUt)% and World Bank, 2022 (OUt)%

The graphical representation of above table is given below:



Source: Derived by the Author

Figure 5.1: Officially Estimated and Readjusted Unemployment Rates in Pakistan (1981-2020)

The line graph compares the percentages of unemployment, estimated officially and readjusted. It can be seen that the readjusted unemployment rates are far above the officially estimated unemployment rates and tend to follow the same pattern throughout the years. It does not even get closer to officially estimated unemployment rate at any point. This could be attributed to the fact that each year, the percentage of employees retiring is roughly equal to the percentage of new hires, with minor differences in percentages. Additionally, underemployed workers tend to work the same hours for several years, rather than just one year. It is clear from the graph that there is a marked difference between the estimated percentages. The officially estimated rates do not depict the real picture of unemployment rate in the economy of Pakistan.

5.3 CALCULATION OF OKUN'S COEFFICIENT

To find how the underestimation of percentages of unemployment rate, discussed above, underestimates the percentages of gap in growth rate of GDP, we calculate gap in growth rate of GDP in the case of officially estimated unemployment rate OUt and readjusted unemployment rate RUt separately. To calculate the gap in both cases using OUt and RUt, we need to calculate Okun's coefficient for both OUt and RUt separately. To determine the coefficients for both models, the Ordinary Least Squares (OLS) technique is employed as every variable involved in each model is stationary at level I(0).

5.3.1 Model One: $Yt = \alpha o + \beta o\ (OUt-U^*)$

Results are given in following table.

Linear Regression Analysis

Table 5.3.1
Ordinary Least Square Results (Model 1)

Dependent variable = GDP growth rate (Yt)				
Variable	**Coefficient**	**Standard Error**	**T-Statistics**	**Probability**
(OUt-U*)	-.409823	0.214816	-2.076540	0.0447
(Constant)	6.124670	0.784444	7.807657	0.0000

The coefficient of (OUt-U*), as can be shown in the data, has a statistically significant negative association with GDP growth rate. The estimate of Okun's coefficient is -0.41, meaning that the growth rate of real GDP decreases by 0.41 percentage points for every percentage point increase in the officially estimated unemployment rate. The findings of earlier research on Okun's law, which examined how a rise in the unemployment rate lowers Pakistan's real GDP growth rate, are consistent with this. (Javed, 2010), (Khan et al., 2013), (Ahmed et al., 2011), (Batavia et al., 2012), twenty-six American states (Blackley, 1991), America (Prachowny, 1999), ten provinces of Canada (Adanu, 2005), Sweden (Arshad, 2007), United Kingdom (Boussemart et al., 2012), Jordan (Kreishan, 2011), Philipine (Lam, 2014).

5.3.2 Model Two: $Yt = \alpha r + \beta r\ (RUt-U^*)$

Results are given in following table.

Linear Regression Analysis

Table 5.3.2
Ordinary Least Square Results (Model 2)

Dependent variable = GDP growth rate (Yt)				
Variable	**Coefficient**	**Standard Error**	**T-Statistics**	**Probability**
(RUt-U*)	-.446073	0.183958	-2.227807	0.0319
(Constant)	7.651063	1.393337	5.491180	0.0000

As seen in the results, the estimate of Okun's coefficient is -0.45, meaning that for every percentage point increase in the officially estimated unemployment rate, the growth rate of real GDP decreases by 0.45 percentage points. This indicates that the coefficient of (RUt-U*) exhibits a negative and statistically significant relationship with GDP growth rate. When the unemployment rate (officially estimated) is lower, Okun's coefficient is smaller in size; when the unemployment rate (readjusted) is higher, Okun's coefficient is bigger. Same results are supported in U.S. (Knotek, 2009), (Michael Owyang, 2001), (Tatevik Sekhposyan, 2009), (Ball et al. 2013) and (Loungani, 2011).

5.4 CALCULATION OF GAP IN GDP GROWTH RATE

Using Okun's coefficients, now we calculate gap in GDP growth rate for both models.

5.4.1 Model One: Yt = αo + βo (OUt-U*)

Where

Gap(G) = βo (OUt-U) (the percentage point difference in growth rate when the prevailing unemployment rate exceeds the natural unemployment rate)*

5.4.2 Model Two: Yt = αr + βr (RUt-U*)

Where

Readjusted Gap (RG) = βr (RUt-U) (the percentage point difference in growth rate when the readjusted unemployment rate exceeds the natural unemployment rate)*

Table 5.4
Results for Gap in GDP Growth Rate (%) (Model1, Model2)

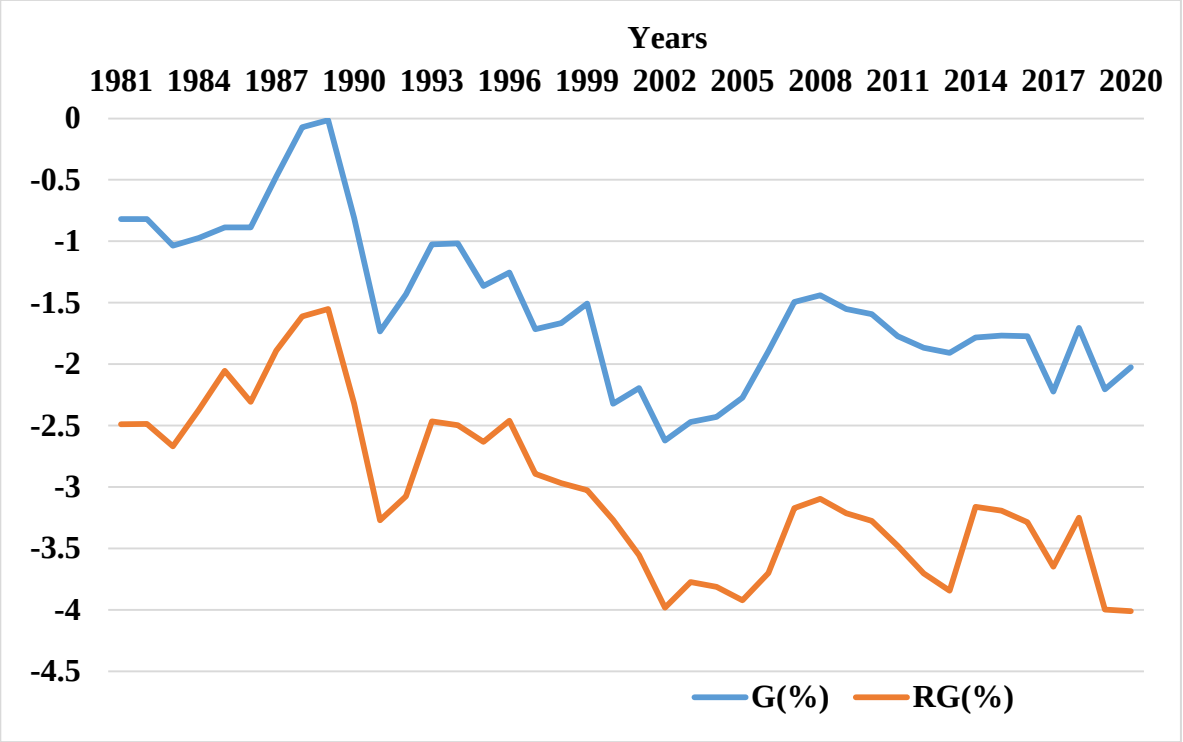
Years	Model	
	1	2
	G=βo(OUt-U*), βo=-.45	RG=βr(RUt-U*), βr=-.41
1981	-0.819	-2.490441475
1982	-0.819	-2.486202342
1983	- 1.035	-2.670100634
1984	-0.972	-2.371882613
1985	-0.8865	-2.053102095
1986	-0.8865	-2.306715953
1987	-0.4725	-1.89123734
1988	-0.072	-1.610921301
1989	-0.0135	-1.550608145
1990	-0.81	-2.320751114
1991	-1.7325	-3.271727225
1992	-1.431	-3.075055209
1993	-1.026	-2.4653628
1994	-1.017	-2.49718461

Years	Model	
	1	2
	G=βo(OUt-U*), βo=-.45	RG=βr(RUt-U*), βr=-.41
1995	-1.3635	-2.632765267
1996	-1.2555	-2.459583868
1997	-1.7145	-2.894086539
1998	-1.665	-2.96995554
1999	-1.5075	-3.025548143
2000	-2.322	-3.269429844
2001	-2.196	-3.556112
2002	-2.6235	-3.98292
2003	-2.4705	-3.774566
2004	-2.43	-3.814104
2005	-2.2725	-3.921533
2006	-1.8945	-3.700708
2007	-1.494	-3.170711
2008	-1.44	-3.095764
2009	-1.5525	-3.212665
2010	-1.593	-3.277398
2011	-1.773	-3.479062
2012	-1.8675	-3.702382
2013	-1.908	-3.844176
2014	-1.782	-3.16189
2015	-1.7685	-3.193939
2016	-1.773	-3.285523
2017	-2.223	-3.649805
2018	-1.7055	-3.250413
2019	-2.205	-3.997
2020	-2.025	-4.011585

Source: Author Calculation

Results showed negative GDP growth rate gap for both models over the years, indicating that the current growth rate of GDP is less than potential growth rate of GDP. This situation suggests that there is unused or underutilized productive capacity in the economy. It is also clear from the results that Potential GDP growth rate gaps for the whole data, calculated using readjusted unemployment rates are larger than Potential GDP growth rate gaps, calculated using Officially announced unemployment rates. A larger negative GDP gap indicates a more significant underutilization of the economy's productive capacity, suggesting a deeper economic downturn or recession.

The graphical representation of table: 5.4 is given below:



Source: Derived by the Author

Figure 5.2: Comparison of Calculated GDP Growth Rate Gaps using OUt and RUt (%)

The line graph compares the negative gap in GDP growth rate, calculated on the basis of Officially estimated unemployment rate (OUt) and readjusted unemployment rate (RUt). Growth rate gaps for (RUt) are much higher, suggesting a more substantial shortfall from potential GDP compared to the gaps calculated on the basis of (OUt). This is so because the calculated percentages of readjusted unemployment rates are higher than the percentages of officially estimated unemployment rates.

In 1991, Pakistan's GDP gap was significant due to various factors such as low productivity, inadequate infrastructure, inefficient governance, and external debt servicing. The gap between actual GDP and potential GDP indicated that the economy was not operating at its full capacity, reflecting the challenges and constraints faced by the country at that time.

The early to mid-2000s marked a period of economic expansion in Pakistan, with GDP growth rates averaging around 5-7%. This growth was driven by reforms in the financial sector, increased foreign investment, and improvements in macroeconomic stability.

In 2002, Pakistan was going through a significant phase politically and economically. Economically, Pakistan faced various challenges during this period, including high inflation and a growing external debt burden. The government implemented economic reforms and sought assistance from international financial institutions to stabilize the economy and promote growth. Overall, 2002 was a crucial year for Pakistan.

Underestimated unemployment rate, announced by government has implications on GDP growth rate gap. It undermines the actual gap that is actually much higher than the one, officially estimated. An increase in unemployment rate increases the GDP growth rate gap. Same results are supported in Pakistan (Cheema et al., 2014), (Shafeeq et al. 2021), (Adnan et al., 2010), (Sadia et al., 2009), (Shah, 2009), U.S. (Prachowny, 1998), (Singlair, 2009), (Weber, 1995), Algeria, Egypt, Morocco, Tunisia (Mosa, 2008).

5.5 CALCULATION OF POTENTIAL GDP GROWTH RATE:

5.5.1 Model One: $Yt = \alpha o + \beta o\ (OUt-U^*)$

5.5.2 Model Two: $Yt = \alpha r + \beta r\ (RUt-U^*)$

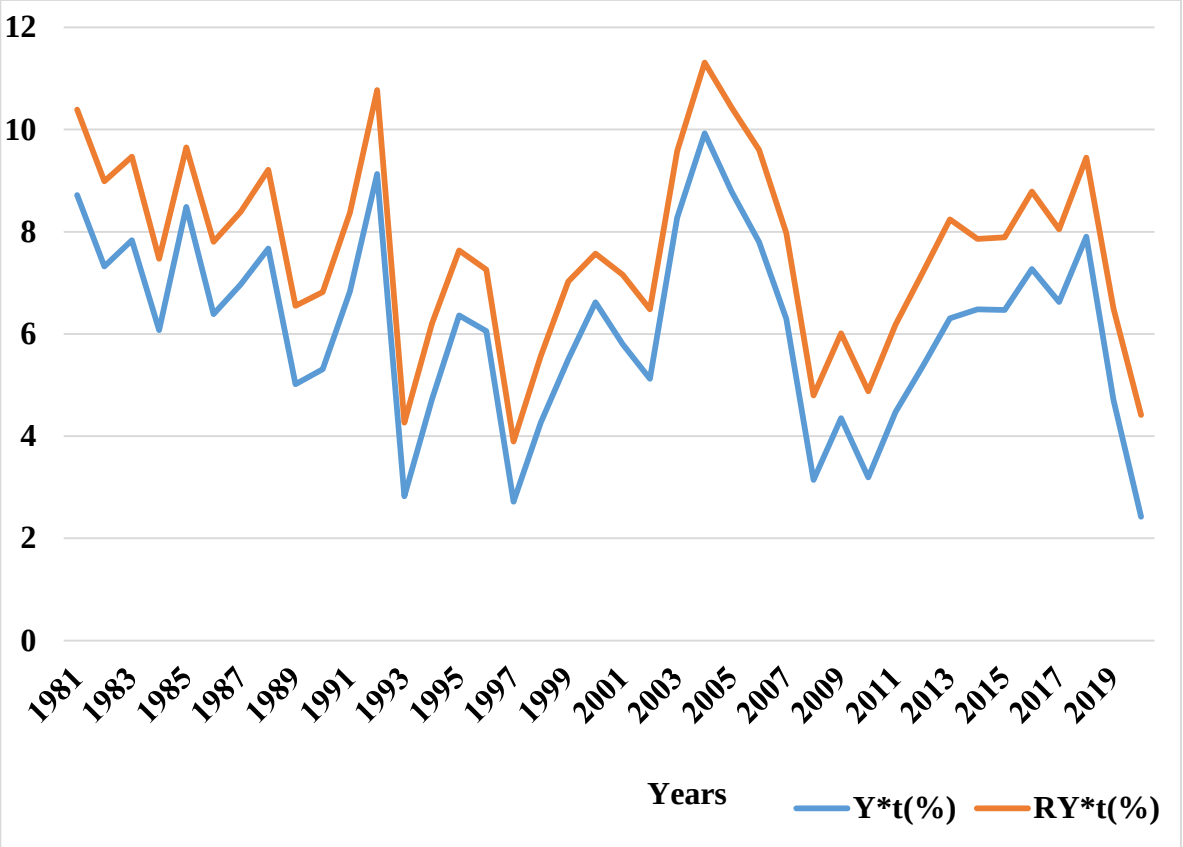
Table 5.5
Results for Potential GDP Growth Rate (%) (Model-1, Model-2)

Years	Model	
	1	2
	Y*t =Yt+G	RY*t =Yt+RG
1981	8.719	10.39044148
1982	7.319	8.986202342
1983	7.835	9.470100634
1984	6.072	7.471882613
1985	8.4865	9.653102095
1986	6.3865	7.806715953
1987	6.9725	8.39123734
1988	7.672	9.210921301
1989	5.0135	6.550608145
1990	5.31	6.820751114
1991	6.8325	8.371727225
1992	9.131	10.77505521
1993	2.826	4.2653628
1994	4.717	6.19718461
1995	6.3635	7.632765267

Years	Model	
	1	2
	Y*t =Yt+G	RY*t =Yt+RG
1996	6.0555	7.259583868
1997	2.7145	3.894086539
1998	4.265	5.56995554
1999	5.5075	7.025548143
2000	6.622	7.569429844
2001	5.796	7.156112
2002	5.1235	6.48292
2003	8.2705	9.574566
2004	9.93	11.3141
2005	8.7725	10.42153
2006	7.7945	9.600708
2007	6.294	7.970711
2008	3.14	4.795764
2009	4.3525	6.012665
2010	3.193	4.877398
2011	4.473	6.179062
2012	5.3675	7.202382
2013	6.308	8.244176
2014	6.482	7.86189
2015	6.4685	7.893939
2016	7.273	8.785523
2017	6.623	8.049805
2018	7.9055	9.450413
2019	4.705	6.497
2020	2.425	4.411585

Source: Author Calculation

The graphical representation of above table is given below.



Source: Derived by the Author

Figure 5.3: Comparison of Calculated Potential GDP Growth Rates using OUt and RUt (%)

The line graph compares the potential growth rate of GDP (Y*t), calculated on the basis of officially estimated unemployment rate (OUt) and readjusted unemployment rate (RUt) separately. There is a clear difference between both the potential GDP growth rates. RY*t calculated on the basis of readjusted unemployment rate is higher than Y*t, calculated on the basis of officially estimated unemployment rate, for the whole data. This occurs because the calculated percentages of readjusted unemployment rates exceed the percentages of officially projected unemployment rates. Therefore, it can be asserted that the government's understated unemployment rate, as declared, has consequences for the potential growth rate of GDP. It diminishes the actual potential growth rate of GDP, which is, in reality, significantly higher than the one derived from the officially stated unemployment rate.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

Pakistan's human resource base is vast, but the country's high rate of underemployment and unemployment still exists. The main factors are the population expansion that is occurring at a quicker rate, the low rate of female labour market involvement, and the underutilization of human resources, which results in an output growth that is erratic and slow. Because so many employed workers put in fewer than 35 hours a week, they cannot be deemed fully employed under the ILO's definition. Understanding the officially estimated unemployment rate and how it affects GDP growth rate is made easier by this study. It also allows us to analyse and compute the economic sequence, which will help us control the deviation between growth rate of GDP and rising unemployment rates and spur production expansion.

We have found that officially announced unemployment rate is actually underestimated. Readjusting unemployment rate by segregating the partially employed labor force and counting them as adjusted unemployed labor force, resulted in high percentages of unemployment. This change in the unemployment rate changed the difference in the growth rate of GDP. The more the unemployment rate grows, the greater the growth rate differential. The outcomes also demonstrated that, contrary to official reports, the potential GDP growth rate was really higher. As long as the issue of underemployment is not addressed, policies aimed at lowering unemployment will not be very successful.

The International Labour Organization (ILO) recommends a standard workweek of 35 hours as part of its efforts to promote decent work and work-life balance. Implementing this standard in Pakistan could have various implications and benefits for workers, businesses, and the economy.

The government of Pakistan can consider amending labor laws to establish a standard workweek of 35 hours. This would involve setting clear guidelines for maximum working hours per week for full-time employees across different sectors.

Recognize that certain sectors may require flexibility in work hours due to operational needs. For example, essential services such as healthcare, emergency services, and manufacturing may need exemptions or alternative

arrangements to ensure continuity of services while adhering to the 35-hour standard where feasible.

Encourage employers to adopt flexible work arrangements such as compressed workweeks, telecommuting, and flextime. These arrangements allow employees to adjust their work schedules within the 35-hour framework, promoting better work-life balance and productivity.

Provide training and awareness campaigns for employers and employees about the benefits of a 35-hour workweek, including improved productivity, employee well-being, and reduced burnout. Address misconceptions and concerns that employers may have about the feasibility of shorter workweeks.

Establish mechanisms for monitoring and ensuring compliance with the 35-hour workweek standard. This can include regular inspections, reporting requirements, and penalties for non-compliance to deter employers from violating the regulations.

Conduct research and evaluations to assess the impact of transitioning to a 35-hour workweek in Pakistan. Measure outcomes such as productivity, job satisfaction, work-related stress, and overall well-being to inform future policy decisions and adjustments.

Provide support and guidance to small and medium-sized enterprises (SMEs) to help them adjust to the 35-hour workweek standard. Offer resources such as technical assistance, financing options, and capacity-building programs to ensure a smooth transition.

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