NEAR EAST UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCES

MBA

MASTER'S THESIS

INVESTIGATION ON THE IMPACT OF INFLATION ON ECONOMIC GROWTH IN PAKISTAN FROM THE PERIOD 1970-2015

Bushra Munawar

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Thesis Defense

The Impact of Inflation on Economic Growth of pakistan

We certify the thesis is satisfactory for the award of degree of MBA

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DEDICATION

This study is dedicated to my ever caring late father and mother, my brothers Muhammad Awais Rana and my younger sister Maryam Rana. Deepest appreciation also goes to my elder sister Sidra Rana who has played a greater role towards this milestone event.

ABSTRACT

The real motive behind this study is to look at the relationship between inflation and economic growth of Pakistan and observationally explore the impact of inflation on Gross Domestic Product (GDP) development of the economy . Similarly it has been researched that whether it invigorates or harms the economic growth reliably or under different level it acts distinctively. For the period 1972-2015annual time-series data has been taken. The procedure of OLS estimation is used in this study. Negative and imperative inflation development relationship has been seen to exist in the economy of Pakistan. Study exhibit that due to after effects, after a certain limit level the predominant inflation badly affects the economy. So we can recommend to the policy makers and state bank of Pakistan to limit inflation with the objective that it may bring helpful results on monetary development of the economy on the premise of the illustrative and econometric examination.

Key Words: *Inflation, Economic growth, Population, Pakistan*

ŐZ

Bu çalışmanın amacı , Pakistan'ın enflasyon ve ekonomik büyüme arasındaki ilişkiye irdelemek ve enflasyonun Gayri Safi Yurtiçi Hasıla (GSYİH) gelişimi üzerindeki etkisini araştırılmıştır. Benzer şekilde, ekonomik büyümeyi güvenilir bir şekilde güçlendirildiği veya farklı düzeylerde farklı bir şekilde hareket edip etmediği araştırılmıştır. 1972-2015 yılları arasındaki dönemi için zaman serisi verileri analizi yapılmıştır. Bu çalışmada EKK yöntemi prosedürü kullanılmıştır. Pakistan ekonomisinde enflasyon oranı ile ekonomik kalkınma ilişkisinin arasında negative bir ilişki olduğu görülmüştür. Çalışmada belli bir düzey üzerinde, enflasyon oranının ekonomi üzerinde olumsuz yönde etkide bulunduğu sonucuna varılmıştır. Bu nedenle, Pakistan'ın politika yapıcılarının ve merkez bankasının, enflasyonu sınırlandırıcı nitelikte ekonominin parasal gelişimini incelemeye dayanarak faydalı sonuçlar sağladığı görülmüştür.

Anahtar Kelimeler: *Enflasyon, Ekonomik büyüme,* Nüfus, *Pakistan*

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GDP-Gross Domestic Product

INFL- CPI Inflation rate

GCF- Gross Investment Formation/ Gross Capital Formation

TRADE – Trade openness as percent to GDP

PPLN- Population growth

LIT RATE - Literacy rate

GVT EXP – Government expenditure

UNEMPLO – Unemployment rate

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The main motive of the macroeconomic policy makers is to increase economic growth and reduce inflation rate. The main motive of the past studıes was to focus on the relation between inflation and economic growth and the distribution of income according to macroeconomics. Inflation has thus been a bone of contention with regards to being beneficial or harmful to economic growth. Economy suffers with different difficulties due to the excessive rate of inflation. In order to kill inflationary repercussions on the economy, monetary authorities are therefore entrusted with a mandate. The mirror of possible inflationary consequences on economy performance can be achieved by prevailing economic conditions.

Economic outcomes such as investment and economic growth are affected by substantial inflation which is synonymous to severe price volatility. In most cases the effects of inflation can be destructive and notable and the sectors of the economy can be hampered because of it. For example, the natural tendency of balance between lending and borrowing can be destructive due to inflation. The decline in monetary in value as it is wiped away by monetary pressure, reduces The main motive of the macroeconomic policy makers is to increase economic growth and reduce inflation rate. The main motive of the past studıes was to focus on the relation between inflation and economic growth and the distribution of income according to macroeconomics. Inflation has thus been a bone of contention with regards to being beneficial or harmful to economic growth. Economy suffers with different difficulties due to the excessive rate of inflation. In order to kill inflationary repercussions on the economy, monetary authorities are therefore entrusted with a mandate. The mirror of possible inflationary consequences on economy performance can be achieved by prevailing economic conditions.

Economic outcomes such as investment and economic growth are affected by substantial inflation which is synonymous to severe price volatility. In most cases the effects of inflation can be destructive and notable and the sectors of the economy can be hampered because of it. For example, the natural tendency of balance between lending and borrowing can be destructive due to inflation. The decline in monetary in value as it is wiped away by monetary pressure,reduces the significant amount of resources. The erosion of economic value will also be taking effect, as the effects of inflation become predominant, (Easterly and Bruno, 1996). People with fixed income or assets with fixed interest rates will experience significant decline in value during the consequence of exorbitant inflation (Dornbuusch, 1977). For further redistributing income, inflation has thus been greatly criticized. In addition, with the level of inflation, economic savings will move in a bilateral position. Individuals are therefore forced by the rationality to utilize their savings before their value is wiped away. It is evident on the other hand that increases in inflation is reciprocally related with unemployment. Efforts to promote employment are said to be inflationary especially when they involve an injection of money supply into the economy.

It shows that with increases in output the growth in money supply must be matched or exceeded. However, insights can be attained that there is a level at which increases in inflation have positive effects on economic growth which we call threshold inflationary level. These kind of ideas support that there is certain level of inflation which is very important for the economic growth but the threshold inflationary rates vary from nation to nation or from economy to economy. Different countries have different economic activities and the idea behind these differences is centered on these activities which are being enjoyed in those countries or the idea is centered on the level of economic

development. This shows that the economic activity stimulates due to certain increase in price level. Inflation postures adverse effects on economic performance and other major outcomes which are being revealed by major or significant contentions. Regardless of this affirmation there is a threshold inflation rate that is stimulative to economic growth, inflation needs to be capped below sustainability and this was assisted by insights provided by Boyd et al. (2001). According to this idea when inflation is considered sustainable it can pose no harm and when it is considered unsustainable it can give opposite effects which means it can pose harm for the economy. In the meantime, same argument is fortified by Easterly and Bruno (1996), citing that when the price level increases it can inflict severe economic damages especially under the unsustainable circumstances. Regardless of such ideas, revelations by Boyd et al. (2001), also revealed that in order to bring the inflation into controllable subjection, the country must use the policies of stabilization.

The nature of stabilization depends on inflation and nature of stabilization differs with the impact and magnitude of inflation which are being experienced in that country. Tight or restrictive monetary approaches are used to address the severe cases of inflation. Stabilization efforts are therefore strongly suggested to adopt a complementary approach in which there are the instruments of fiscal and monetary policy (Dornbusch, 1997). Very high assertions are that during the course of a wage the effects of inflationary pressure set in when a lag exists between changes in input, output prices and wage, a wage is an event or circumstance that transpires. Wage lag remain in force which makes the firm enable to attain the high level of profitability when notable effects of a wage lag can be attributed to incidents. When the profit is earned the wage lag provide opportunities for more and more investment which is an incentive to maximize more profits. According to Khan et al (2006), a model was developed in order to gather data from 1998 to 2005 for inflation in Pakistan. They developed this study so that they can identify the monetary factors of inflation in Pakistan. After analyzing private sector credit and CPI, the outcome of the research showed that there exists no tradeoff between growth and inflation in the long run but the case was totally different for the long run. The findings further showed that there is five percent contribution of inflation in economic stability and growth in the country.

1.2 Statement of the Problem

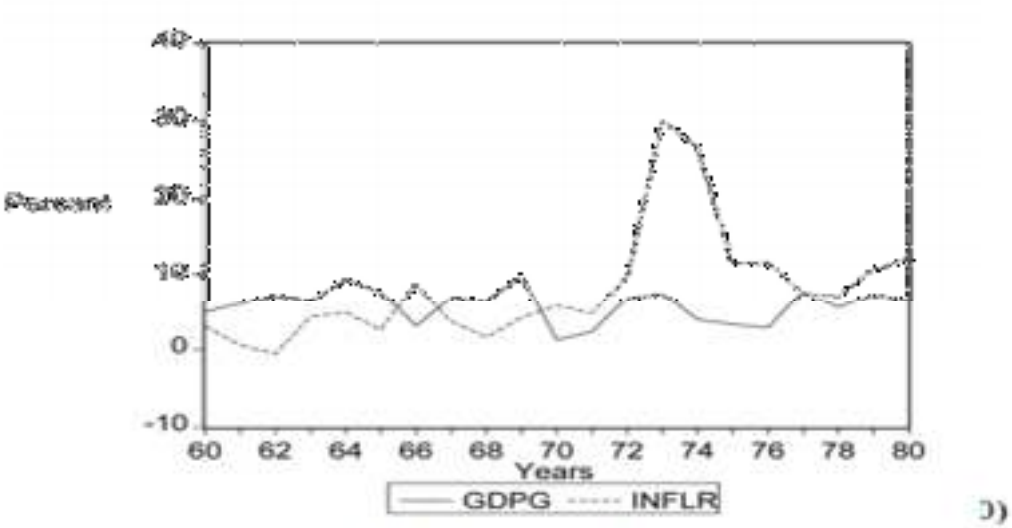
In South Asia, Pakistan is considered as developing economy. inflation was higher than ten percent and Gross Domestic Productivity observed to be lower than five percent while for the same period Until 1970s . In 1990s (Mubarak, 2005) same thing happened. In Pakistan since its independence, an even growth pattern is experienced. Since its inception (Khalid, 2005) high inflation and unemployment was experienced in the economy during most of the period. GDP rate was maintained at 4 percent on average.

Presently, the patterns of inflation and gross domestic product development rates in Pakistan are inspected. According to the Fig1. 1, in 1960's single digit inflation was experienced and had a positive effect on economic growth. Until late 1970's Gross domestic product development rate stayed beneath five percent while amid a similar period ,nation saw twofold digit inflation rate. Along these lines, high inflation rate stayed negative to monetary development is a visual proof that amid 1970's,. Inflation rate stayed underneath nine percent with most elevated figure of 8. 6 percent out of 1966 to 1967 while a great development rate was watched consistently.

In Fig 1.2, Amid 1980's, direct gross domestic product development was watched while inflation rate likewise stayed one digit with the exception of 11.1% and 10.4% out of 1981 to 982 and 1988 to 1989 individually. Pakistan has supported twofold digit inflation among 9.8 percent to 13.0 percent amid initial 7 years of the 1960's,. Gross domestic product development rate stayed temperamental amid 1990's and has diminishing pattern with a few vacillations. Most reduced 1990's figure was seen from 1996 to 1997 with 1.7 percent when contrasted with most elevated figure in 1991-92 with rate of 7.57%.

Presently with the Assistance of figure we will look at the example of inflation and gross domestic product growth rate in Pakistan. In Fig 1.1, amid 1960's the Pakistan’s economy encountered the one digit inflation and the development rate of Gross domestic product was adequate.

Fig 1.1: Survey of Pakistan economy (various issues)



Source: Pakistan Economic Survey (various issues)

Fig 1.2. GDP Growth Rates and Inflation from 1981 to 2005

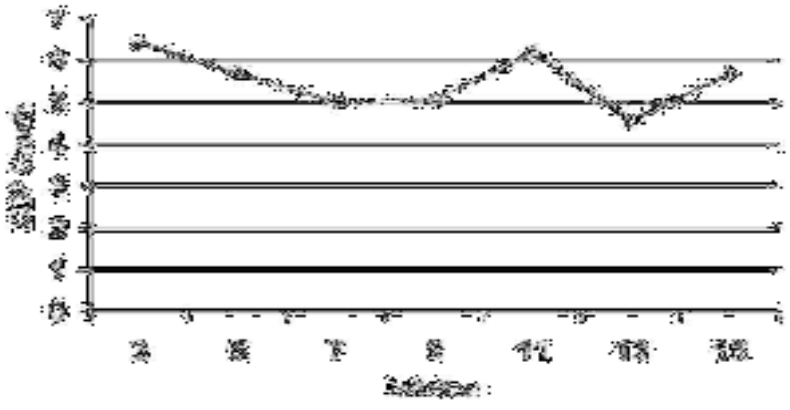


Fig 1.3. Inflation Rates and 10 Year Average GDP Growth from 1961 to 2006

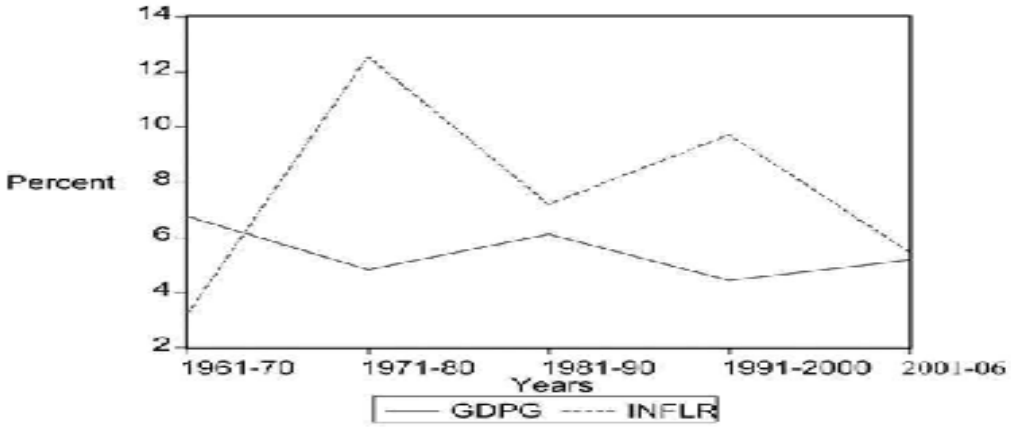
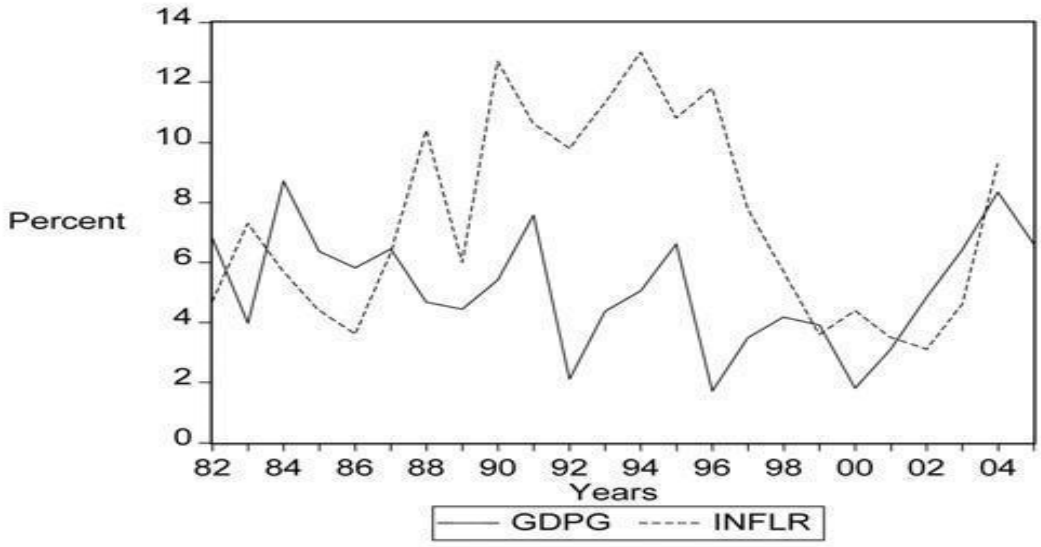


Fig1. 4. Linear Level of Inflation and Average GDP Growth



three years of 1990's staying in inflation eased back to a normal of 5.7%. Inflation rate diminished forcefully soon after 1990's and was seen underneath five percent with the exception of 2004 to 2005 (9.3%). Amid a similar period, gross domestic product development rate began to increment and the nation saw the figure of 8.35% of every 2004 to 2005. In Fig. 1.3, developments in financial development and inflation in various many years of Pakistan economy is shown between 1961 to 2006. From Fig 1.3 Concrete conclusions could not be drawn out but an opposite connection among monetary development and ınflation rate induced without much of a stretch. Mubarik proposes that relationship among inflation and development could be effortlessly comprehended through depicting their patterns after some time (2005). Henceforth, the information for the period (1961 to 2006) inside seven assembled perceptions was decayed. Using the system of maxima and minima, information of inflation has been chosen. In the event that inflation rate is not exactly or equivalent to three percent, it is measured by level three. Similarly, if the inflation level is more noteworthy than three percent yet not exactly or equivalent to five percent, it is evaluated by a level of five. The procedure is proceeded till the level fifteen that is on the off chance that inflation rate is over thirteen percent. In Figure1. 3 the normal level of monetary development for each purpose of ınflation is assessed for example what is the normal gross domestic product development rate in the entire specimen time frame from 1961 to 2006. If the rate of inflation is three percent or less et cetera. There is negative connection amongst gross domestic product development rate and inflation up to seven percent level of expansion shown in fig1. 4 . From seven percent to eleven percent level of swelling, there is certain connection amongst inflation and gross domestic product development rate. However negative connection found again among the two factors after eleven percent level of expansion.. (2001) Senhadji and Khan, likewise presumed that in creating nations, progressively the eleven percent level of inflation is negative to financial development.The investigation is not the same as the examination of (2005) Mubarik,. He has discovered positive relationship till seven percent level of inflation and after that level there is negative relationship. The more exact and precise photo of the connection amongst Gross domestic product development rate and inflationis Fig . It appeared in Fig 1.1 that amid 1960's the Pakistan’s economy encountered the one digit inflation rate and the development rate of Gross domestic product was sufficient.

1.3 Research objectives

Following are the research objectives by keeping in mind the above mentioned research

- Analyze the impact of inflation on economic growth of pakistan.
- Examine and determine the feasible threshold level of inflation for GDP growth.
- Analyze the effect of inflation on economic growth by keeping in view the obtained statistical significance result and to state the policy implications.

1.4 Research Questions

- How inflation does affects GDP growth in Pakistan?
- How do we examine and determine the feasible threshold inflation rate for economic development?
- What are the policy implications to view the effect of inflation on economic growth by keeping in view the obtained statistical significance result ?

1.5 Hypothesis of the study

H_0: Inflation has a negative impact on Pakistan's economic growth.

H_1: Inflation has a positive impact on Pakistan's economic growth.

1.6 Significance of the Study

On the off chance that the reason and wellspring of inflation in Pakistan was distinguished and explained, it will prompt an inflation in venture, efficiency, fares as well as work openings which would achieve increment in financial development and advancement in the nation. This examination plans to break down the effect of inflation on gross domestic product development in Pakistan. It is to assess the gross domestic product development execution and to survey the authentic patterns of inflation in Pakistan factors for example monetary shortfalls, cash supply, loan cost and trade rates (Bayo, 2005). The investigation would fill in as an instrument to take care of the issue of swelling in the nation and increment development.

CHAPTER TWO

THEORETICAL AND EMPIRICAL LITERATURE REVIEW

2.1 Theoretical Literature Review

2.1.1 Classical Growth Theory

The Classical Growth Theory forms a base upon which a significant number of economic growth models are based. The formulator of the Classical Growth Theory Adam Smith asserts that economic growth can be expressed in the form of a supply side model. Under this model, the supply side model is assumed to be determined by capital, labor and technology and expressed in the form of a production function and it assumes the following nature;

$$Y = f(K, L, T)$$

Where K is capital, L is labor and T is technology. Thus total output produced is determined by capital, labor and technology. This model further asserts that output
(Y) is primarily influenced by investment (I_k), changes in productivity (α), land growth (L_t) and population growth (P_L). As a result,

$$Y = f(I_k, L_t, P_L, \alpha)$$

This theory implies that growth can exhibit increasing returns to scale because it is self-reinforcing. It also contends that investment ascertained by amount of savings in the economy and that investment ultimately affect growth levels or patterns (Haslag 1995). The theory further posits that the rate at which the economy grows is driven by income distribution. In addition, it reveals that it is competition for workers among capitalists that causes a decline in profits through increases in wages and not decreasing marginal rate of productivity. This theory does not clearly give a detailed description of the nature of association between economic growth and inflation but outlines that inflation is as a result of increase in taxes and high wage and salaries which hamper profit levels. It therefore contends that the nature of association

between economic growth and inflation is bilateral.

2.1.2 Neo- Classical

The Neo-classical theory is based on the idea by Mundell (1963) which outlines that there is a linkage between economic growth and inflation. Mundell asserts that changes in inflation or inflationary expectations have an effect on wealth. An increase in inflation is thus said to reduce wealth through a decrease in the rate of return. Mundell posit that the need to acquire more assets causes people to save and in the process the prices of assets rise as their demand increases causing interest rates to fall. However, the higher the savings available the higher the level of capital accumulation and thus a high level of growth.

Tobin (1965) made improvements to the Neo-classical theory to come up with what is known as the „Tobin Effect". This model outlines that consumers postpone current consumption by either investing in capital or holding money. Thus individuals are assumed to hold money for either speculative or precautionary motives.

The model suggests that as people switch from money they switch to capital which causes an increase in capital stock which causes the steady state to increase as well. The increase in output is temporary as the economy is assumed to be in a period of adjustment or going through a transition. The changes caused by inflation on capital accumulation and economic growth are termed the „lazy dog effect" were it causes were both capital accumulation and economic growth will rise but will fall when the rate of return on capital starts to decline. Inflation is thus said to be having an upward effect on economic growth through capital accumulation

However, recent models have exhibited that a bilateral association between inflation and economic growth can also exist. For instance, Stockman (1991) argued that inflation causes the steady state to decline. This is based on the notion that inflation erodes the purchasing power of both capital and consumer goods so individuals will cut down their purchases and as a result the level of the steady state falls. It can also be noted that inflation negatively impacts the labor returns and cause individuals to substitute leisure for consumption. The marginal rate of return of labor falls in line with the increase in inflation and both the level of the steady state and capital returns will decline.

The neoclassical models can produce models with different theoretical results about the association between economic growth and inflation. For instance, the „Stockman Effect" contends that an upswing in inflation causes output to fall. Other assertions argue that output will not change while the „Tobin Effect" contends that output will increase. These differences can cause researchers to adopt different approaches which may make it difficult to compare or apply study results.

2.1.3 Neo-Keynesian

The Neo-Keynesian assumes that there exist an output level where production levels are optimum given the existing natural and institutional constraints. This optimum level of output is similar to the natural rate of unemployment (NAIRU) (Haslag 1995). At the NAIRU level, inflation is stable, that is, it neither falls nor rises. This theory asserts that inflation is ascertained by the natural rate of employment and the level of GDP. Three basis assertions can be deduced from this model and these are;

The first assertion outlines that assuming all other things remain constant, if GDP levels outweigh the unemployment level at a level where the unemployment level trails the NAIRU, inflation will cause suppliers to increase prices which further propels prices upwards (Blanchard and Kiyotaki 1987). Inflationary pressure will build and shift towards stagflation where both unemployment and inflation are greater.

The second assertion contends that when unemployment stands above the natural rate and GDP stands below its potential level ceteris paribus, suppliers will expand capacity causing prices and inflation to fall. The Phillips curve shifts to reflect low inflation and unemployment levels (Blanchard and Kiyotaki 1987).

The last assertions is based on the idea that inflation will not change when actual GDP equals is equivalent to expected level and is unemployment equivalent to the natural rate (NAIRU) assuming that there are no supply shocks. This theory posits that the Phillips will assume a vertical shape at the NAIRU.

It can be deduced that the natural level of unemployment and potential output can be determined with preciseness. Moreover, it can be criticized on the bases that inflationary behavior is not symmetrical and it changes asymmetrically. This is because downward changes

in prices are rigid.

2.1.4 Monetarism

Monetarism is an idea developed by Milton Friedman and centers on long run supply. Friedman contends that there are long run supply elements that can be used to relate money supply to growth (Gomme, 1993). For instance, the Quantity Theory of Money establishes a linkage between economic growth and inflation by equating the total amount of money in circulation to the economy‟s total spending. According to Friedman, the equation can be specified as follows;

MV = PY

V = velocity of circulation

M = money stock in circulation

Y = output

P = price

Using the above equation the inflation rate can be determined as follows; **p = v + m –**y

Where p = inflation rate

V=velocity of circulation

m= money stock,

y = output growth rate

From this equation, Friedman postulated that was aggravated by increases in velocity and supply of money that are greater than the prevailing level of economic growth.

He further argues that the effects of inflation on economic growth dependent on whether inflation is anticipated or not. Anticipated inflation causes consumers to adjust their patterns of consumption and lobby for wages increases such that the increase in inflation might match the increase in wages (Gomme, 1993). When this is the case an increase in inflation will have no effect on either employment or growth and this condition is known as neutrality of money. In this case inflation can be said to be harmless. It can therefore be deduced from the monetarism approach that money growth affects long run prices and not growth and that inflation occurs as a result of money supply being higher than the level of economic growth.

2.1.5 Endogenous Growth Theory

This theory is based on the idea that economic growth is determined by factors that are inherent of the production function such as technological change and economies of scale or returns to scale and not exogenous factors. The endogenous growth model is based on the concept of a single regression model where the dependent variable is economic growth and the independent variables can either be capital accumulation or inflation (Haslag, 1995). The significant difference endogenous growth model and the neo-classical model is that in the endogenous growth model capital returns tend to fall as the level of capital accumulation rises and will not fall to below negative values. The model does consider the idea of the impact of externalities on capital decisions and returns to scale‟ effects on the production process.

The endogenous growth model contends that economic growth is determined by capital returns, wages and salaries but taxes are seen as inducing a negative effect on rates of return on capital investments. High taxes will propel individuals to substitute work for leisure while imposing taxes on capital hinders economic growth. Arguments have been placed about the extent to which inflation affects economic growth (Gomme, 1993). The study revealed that the inverse relationship between inflation and employment induces negative shifts in growth levels. The channels through which inflation affects economic growth are marginal rate of productivity of labour and capital accumulation which diminish with the increase in inflation. Gomme (1993) further points to the fact that efforts to reduce inflation will have minimum effect on economic growth. Haslag (1995) however argues that inflationary effects are normally witnessed through a decline in deposits which eventually reduces savings, capital accumulation and hence ultimately economic growth.

2.1.6 Keynesian

This theory is posits that the association between economic growth and inflation can be analyzed using aggregate supply and aggregate demand curves. It is based on the idea that the short run aggregate supply curve is upward sloping and hence changes in demand will only cause a change in prices. Thus shifts in the AS curve will effect changes in both output and prices (Dornbusch et al., 1997). This applies in the short run period because output and inflation are determined by a lot of factors such as monetary and or fiscal policy, changes in labor force and expectations.

The model assumes that as the economy enters the long run „steady state", factors such as monetary and or fiscal policy, changes in labor force and expectations will have a balancing effect. The steady state thus implies that there are no changes but adjustments in the AS and AD curves result in what is known as the „adjustment path". The model further asserts that there will be a positive relationship between inflation and economic growth in the „adjustment path" or during the „adjustment period". A negative relationship can thus be only witnessed after the „adjustment period" or „adjustment path".

The positive relationship between inflation and economic growth is as a result of time inconsistency. This means that producers will be perceiving that their prices are higher than those of other producers in the economy and yet all prices have gone up causing them to continue to produce more output. The positive relationship between inflation and economic growth can be attributed to market agreements between suppliers and consumers to supply goods at a later date. Thus changes in prices of goods will not cause a change in output since the supplier has to supply the agreed quantity of goods at the agreed price (Blanchard and Kiyotaki, 1987).

It can also be ascertained that during the „adjustment period" the bilateral relationship between inflation and economic growth is termed stagflation. This is a situation which occurs when prices rise but causing output to either fall or remain the same. The model also suggest that during the „adjustment period" inflation does not necessarily increase but follows an „adjustment path" of temporal increase and then it falls.

2.2 Empirical Literature Examining the Link between Inflation and Economic Growth

The association among inflation and economic growth examined in the economic literature on very high level. Every researcher explained nature as well as existence of inflation and economic growth in different ways. There are different policies and strategies about inflation and economic growth.

The determinants of economic growth for twenty six countries was investigated by Bruno and Easterly (1995). The investigation shows the different level of inflation rate in different time frames. An inflation is named as inflation crisis when it is over forty percent. It was concluded that reduction in inflation would be helpful for an economy in order to recover from the inflation crisis. Also no damage occur in economy due to high inflation.

A negative correlation found between economic growth and inflation (Barro 1995). For the year 1960 to 1990, a study was carried out on the base of more than one hundred sample data. Regression equations were used to analyze the effect of inflation on economic development. There was an adverse relationship of 0.2 to 0.3 percent decrease in economic growth with a ten percent increase in inflation which shows that there was a negative correlation between growth and inflation.

The connection among inflation and economic growth based on panel data collected from ninety three countries was analysed by Fisher (1993). Simple regression analysis was used in this study. The results depicts a negative connection among inflation and economic growth which reduces productivity and investment levels. Also from the study, inflation affects price mechanisms and also disturb the allocation of resources.

Another study was done in the industrial sectors for one hundred and forty developing countries by (2001) Khan et al, on the effects of inflation on economic growth.From 1960 to 1998 the time series data was used.Inflation imposes negative effects on economic growth due to a threshold based on this study. For developing countries threshold was established to be within the range of eleven to twelve percent and for developed countries is one to three percent. The study shows that developing economies have higher thresholds than developed economies.

Mubarik (2005), find out that threshold is influenced by economic activities such as industrialization and the level of economic development and it changes from one country to another when he carried out a research on affect of inflation on economic development of Pakistan. Mubarik (2005), also find out that the inflation threshold on economic development of Pakistan is nine percent and if it exceeds from this level it will destroy the economy.

The investigation of the existence of nonlinear inflationary consequences on economic growth has been done by Sarel (1996), who used secondary data for ordinary linear squares estimation to analyse observations from eighty seven countries for the period 1971 to 1995. The study shows that below the structural break, marginally beneficial outcomes exist.

The study done by Bruno etal (1995) on the connection among inflation and economic growth. The study shows, when inflation rate increases from forty percent, economic growth start to decrease sharply. The connection among economic growth and inflation is negative but temporal above forty percent. Below forty percent level, economic growth rebounds back to a positive trend.

Malik et al (2001) did a study on the basis of the Vector Error Correction Model (VECM), for Pakistan, Bangladesh, Srilanka and India on the effects of inflation on economic development. Results shows that inflation affects positively on the four economies. It was also concluded that moderate inflation is important for economic development and long run connection exist among economic growth and inflation.

Ghosh and Phillips (1998), carried a research on an attempt to lower inflation rate at low levels of inflation using cross-sectional data from 1960-1996. It was observed that lowering inflation rate at low levels has a negative effect on economic growth. It was also observed from the result that two non-linearity associations existed among economic growth and inflation. At two to three percent levels of inflation, positive relationship exist among inflation as well as economic development and its called first non-linearity association. At ten to forty percent levels of inflation, bilateral relationship is found between inflation as well as economic growth and this is called second nonlinearity association (Ghosh and Phillips 1998).

Inflation has adverse effects on economic growth according to the result found by Neil (2000). This study used the Value at risk (VaR) analysis covering the period from 1960 to 1999 and the result depicts that the single digit inflation affects positively on economic development while double digit inflation affects negatively on economic development .

Inflation and economic development relationship in the context of the Brazilian economy was studied by Faria et al (2001). Value at risk (VaR) model was used in this study to analyse time series data from 1980 to 1995 and results depicts the productivity and output are not related to inflation in long run which means that there is no long term relationship among inflation and economic development. The study also depicts that there is short run connection among inflation and economic development.

Gillman et al. (2002), carried out a research about the relationship between inflation and economic growth through a reduction in capital among Organisation for Economic Co-operation and Development countries (OECD) from 1961 to 1997. The results depicts a negative association among economic growth and inflation and effects changes as inflation rate changes. The magnitude of the impact is low at low inflation rate and within the range of zero to ten percent and then the magnitude increases as inflation rate increases.

Khan and Qasim (1996), did a study on the aggregates of inflation in Pakistan's economy. Main focus of the study was to examine food and non-inflationary effects. The result shows that the main reason of increase in inflation was the prices of wheat, electricity and devaluation.

A cross sectional study based on time series data from 1960-1995 was carried out by Boyd et al. (2001). The study uses different variables such as stock market capitalization, bank liabilities, trading volume as well as domestic credit to non government sector to examine the linkage of economic development and inflation. From the results, there was nonlinear relationship between financial development and inflation and sustainable inflation rate associated with insignificant domestic credit to the private sector. An association is found among investment, inflation and economic growth which means that investment causes increase in economic growth. Barro (1999), also said that if inflation increases by ten percent, economic growth will increase by 0.2- 0.24% yearly.

From the period 2001-2009, annual time series data was used by Hasanov (2010), to examine connection among inflation and economic development for Azerbaijan. The study depicts that threshold affects association among inflation and economic development by using an additional variable which is gross fixed capital formation. According to the threshold result, there exist nonlinear association among inflation and economic development . At levels less than thirteen percent, there was a positive effect on inflation. The linkage among economic development and inflation tends to be significantly positive beyond thirteen percent and this means that when inflation increases to thirteen percent, economic growth decreases by three percent. Economic growth hampered with an increase in inflation was evaluated by Mallik et al (2001) in Ghana. They find out that the threshold revolves around eleven percent in Ghana. Frimpong et al (2010), studied on the association between inflation as well as economic growth from 1960 to 2008. At low levels of inflation, relationship is significantly positive. A study was done on the threshold effects of inflation on economic development using cross sectional analysis of one hundred and twenty four companies from 1950 to 2004 was done by Khan and Senhadji (2001). The study shows that for developing and developed economies, inflation targeting of seventeen percent and two percent were important.

Khan et al (2001), use longitudinal data from 1960 to 1999 to examine the relationship between inflation and economic development . The data was taken from one hundred and sixty eight countries. Non-instrumental as well as instrumental variables were used from Northern Lights Library System. The findings were that linkage among inflation and economic growth is associated with a threshold. According to result there are indicators of financial depth and bilateral relationship that exist between inflation and economic growth.

Khan et al. (2001) also employed panel data to see the connection among inflation and economic development

from 1960 to 1999 basing on an examination of 168 countries. Results showed that assosiation among inflation and economic growth is associated with threshold in which the effects of inflation on economic development are substantial until a certain level. The results also revealed that there are bilateral linkage among inflation and indicators of financial depth. It is also depicted in this study that the transmission effects are always adverse and non-linear. The ability of financial development to effect positive changes in growth is also undermined, so inflation has negative effect on financial intermediary roles, innovation and capital accumulation.

The empirical support is unresolved among inflation and economic development. Most of the studies have not provided us the same result about the association of inflation and economic growth such as non-linearity of the linkage among inflation and economic growth and inflation threshold. Some studies shows that inflation affects negatively on economic growth some shows that inflation affects positively on economic growth. Some studies revealed that economic growth increases at the low inflation level with a small proportion and when inflation rate increases, economic growth tends to fall. It is still not clear that at which lower level, inflation positively affect economic growth

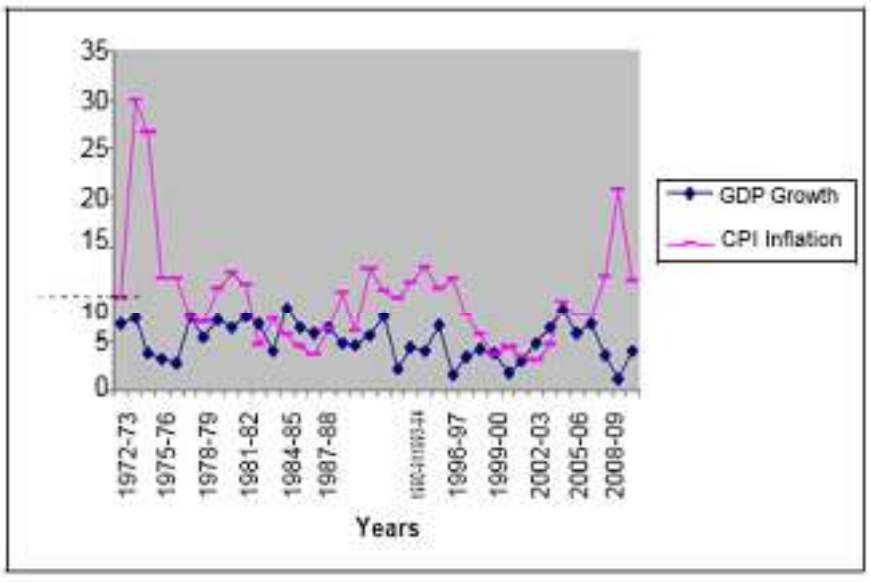
2.3 Empirical Implications about Pakistan's Inflation and Economic development

On the basis of all the literature, money supply hugely affect economic growth and inflation. Money supply is used as an adjustment mechanism or regulatory tool which is used to express economic growth. Two different features are outlined in literature to explore the problem among inflation and economic development. The first one is that there exist unsustainable relationship among inflation and economic growth which is very harmful for the economic growth. This means that if inflation is unsustainable in any country, economic growth will be badly affected by it. The second one is that the threshold effects which are associated with inflation rates on different levels below which self-determined linkage is found between economic growth and inflation. This shows that there exist low level of inflation which cause an increase in economic growth. When different countries use different economic activities or the development level vary then we can observe these kind of differences. So in order to find out the inflationary trend of a specific country, the main focus has to be on the development and economic activities. The economic activities and the development are the keys to find

inflationary pressure.

The increase in food prices is the main reason of inflation in pakistan. Different factors are also reasons for inflation in Pakistan such as demand and supply side factors. Inflation can cause shocks to the oil markets and supply of certain food. Inflation is also due to increase in prices of food and this happens because of less productivity in the agriculture sector. Lack of commodities and services can happen in economy. Due to price structure and rigid wage, in the world market, change in price level can cause rise in price level of almost all the goods. Wheat can also be an important factor causing inflation in Pakistan. Indirect taxes affects price level or we can say it affects the inflation rate of Pakistan. Price level can be affected by decrease in exchange rate. Inflation that come into exist due to any factor such as taxes wheat or food majorly hurts the poor people because half of the income of poor people is spent on food (Hasan et al . 1995) (Khan etal 1996). The main factor of long run inflation is excess money supply but some other factors are also responsible for long run inflation such as structural problems (Khan and Schimmelpfennig 2006). Inflation may cause increase in productivity as some sectors and inflation are mutually in relation with each other at some time. High inflation badly affects the economic growth. For the economy of Pakistan huge changes has been found in the economy of Pakistan and CPI inflation. Growth rate is not found negative in any fiscal year.

Figure 2.1 Pakistan's Trends in GDP development in Relation to CPI Inflation



There is negative correlation among CPI inflation & GDP development as depicted in figure 2.1 above. As the inflation cross the double-digit, GDP growth rate decreased.

The corresponding CPI inflation rate was at 5.7 percent level, during the fiscal year 1984 to 1985, the maximum GDP growth rate was 8.7 percent. With high inflation rate of 20.8% during the fiscal year 2008 to 2009, the minimum GDP development rate remained 1.2 percent which depicts the negative linkage among inflation and GDP development rate.

2.4 Sustainable Level of Inflation and Economic Growth

There are different agreement that depicts that inflation has negative impact on economic development. Despite of all these agreement, there is a level of inflation which is not harmful for economic growth and that level is sustainable. What inflation level is harmful for economic development and is there long run or short run linkage among inflation and economic growth are questions that need to be answered. Different people have different approaches about the linkage of inflation and economic growth. For example, there is a bilateral non-linear connection between inflation and development as suggested by Andres and Hernando (1990). Decrease in inflation cause increase in output as suggested by Sarel (1996) which means if inflation is decreased by one percent, output will be increased by 0.5% to 2.5%. On the other hand Stockman (1991), posits that a strong bilateral relationship found among economic development and inflation while (Barro et al, 1997), highlighted that inflation is not a major determinant of growth.

2.5 Transmission Mechanism between Inflation and Economic Growth

Transmission mechanism among inflation and economic development are based on the idea that inflation constricts returns to savings. There is information asymmetry in transmission mechanism among inflation and economic development . Due to inflation constriction, financial institutions are negatively affected by information asymmetry. Another term used for information asymmetry is named information friction. Information friction effects in the form of credit rationing and cause inefficient allocation of funds. The constriction in investment funds is the transmission mechanism and this mechanism decreases the economic growth. Low level of inflation in an economy is indicated

by credit rationing which is linked with low credit rationing measures. Through financial intermediaries, transmission mechanism between inflation and economic growth impose direct effect on economic growth. As Shown in figure 2.1, two transmission mechanism can be established and these are the level of investment and efficiency of investment.

Fig 2.2 Transmission Mechanism between Inflation and Economic Growth (Source: Malik and Chowdhurry, 2001)

Inflation has direct effects on financial intermediaries according to figure 2.2. Effect on economic growth result in two ways such as efficiency of investment and capital accumulation which create direct impact on economic growth.

2.6 Chapter Summary

This chapter depicts the empirical and theoretical frameworks for inflation and economic growth relationship. Classical Growth theory established that growth is expressed in the form of a production function and is determined by labour, technology and capital. The new Keynesian established that an increase in price level

occurs when unemployment is above the natural rate and GDP is below its potential. It can be criticized that the behavior of inflation is asymmetrical not symmetrical because the changes in price which is downward are rigid.

The Keynesian, classical, monetarism approach as well as the endogenous growth model are the frameworks that incorporate the concept of money supply. Increases in inflation are seen as emanating from increases in money supply. These theories neglect other causes of inflation such as demand and costs so as a result they do not provide conclusive evidence about the association between economic growth and inflation. Central bank efforts were seen to be having two way channels where by efforts to control inflation poses effects or contagion effects on other economic variables such as growth, employment as well as export promotion. Despite general agreements that inflation poses harmful effects on the economy, there is a level of inflation that can be sustainable and does not pose harmful effects on economic growth. It was also noted that the transmission mechanism between inflation and economic growth is through financial intermediaries and then ultimately imposing direct effect on economic growth. However, it was noted that empirical literature does not also provide conclusive evidence about the assosiation among inflation and economic development. Moreover, available literature showed that researchers have not yet reached a common consensus about the transmission mechanism or channels of inflation on economic growth. This therefore strongly justifies the conducting of this study. The next chapter will therefore proceed to look at the general overview of the Pakistan economy.

CHAPTER THREE

GENERAL OVERVIEW OF THE PAKISTAN ECONOMY

3.1 The Pakistan Macroeconomic Environment Outlook

Asian Development Outlook (2016), highlighted the forecasted growth for fiscal year 2016 as 4.5 percent and for fiscal year 2017 as 4.8 percent and growth in fiscal year 2015 was 4.2 percent. The study notes some continued damages such as power evacuation capacity, insufficient energy, and continued public sector enterprise losses. There will be continue check in the economy of the country by security concerns.. Pakistan needs to stay the course of structural reforms and macroeconomic especially in the energy sector, revitalizing public sector enterprises and in revenue collection that caused fiscal rain continuously said Werner Liepach, Asian Development Bank of country Director for Pakistan. In the first half of fiscal year 2016, the large scale manufacturing grew to 3.9% from 2.7% noted by Asian Development Bank (ADB). because of increase competition and less demand in export market,production in textile increased only 1% over the same period of time. In the same period the year earlier ADO notes that large scale manufacturing increased to 3.9% in the first half of 2016 from a rise of 2.7%, and increased increased by one percent over the same period due to less demand in export markets and due to increased competition with decrease in global commodity prices and heavy rains damaging cotton output. Transport connectivity,inadequate infrastructure,transport connectivity, weak governance and institutions as well as limited access to finance affects economic growth. because of all these problems, costs for doing business increases. Companies were producing goods with higher value due to low investment in human development. According to ADO the investment made or planned among Pakistan and China will enhance economic development and will improve business confidence by improving security environment. Asian Development Outlook is dedicated to control poverty in pacific and Asia through economic development, regional integration and environmentally sustainable growth.

3.2 Economic Growth Patterns in PAKISTAN

Pakistan's development designs distinguishes the fleeting dominating character of its undeniably rare development increasing speeds, the normal unpredictability of the development rate by global benchmarks. The high the diminishing relationship between general development and agrarian development, the long haul decay of its development rate to around 4.5 percent beneath the six percent rate of the 1960s or from the seven percent rate required for retaining the youthful work compel. During the 2000s, the significantly unfaltering fall in profitability measured by Total Factor Productivity and the main reason of these decline were to a lesser extent, capital accumulation. It is also analyzed that factor accumulation play an important role in labor reallocation across sectors, with industry slowing down. Services are playing important role for increasing employment and agriculture is increasing gross domestic product on another level. Total Factor Productivity play very important role to create more employment in every sector.

An Economy Prone to Booms and Busts

For the economy of Pakistan, Booms and Busts are not new. All booms happened under military administrations in the 1960s, 1980s and the period between 1999 and 2005 (World Bank 2010). Gross Domestic Product per-capita growth reached four percent a year.

During the 1970s and 1990s, stagnation as well as busts, have kindled debates about the trade-off between democracy and growth. Political instability was blamed in the past that none of the vote based administrations kept going. Their full term was put aside from the one under Zulfikar Bhutto in 1970s. The alternation between Benazir Bhutto and Nawaz Sharif took place every two years so they were particularly troubling in 1990s and economic growth was very poor. Governments failed to reduce poverty and failed to improve economic growth. Voter turnout declined from forty seven percent in 1977 to thirty one percent in 1998 in Pakistan (World Bank 2010).

Military regimes achieved higher growth rates than democratic regimes. Pakistan’s average rate of growth was 5.3 percent, between 1960 to 1961 and 2008 to 2009. Democratic regimes reached an average 4.3 percent and military regimes reached an average six percent rate of growth. The difference between the two occur due to policy continuity as well as political stability which was supported by generous external aid not because of the

fact that military provided better economic leadership (Burki 2007a). As lack of political legitimacy finally damage their durability, these military regimes were also unsustainable as pointed out by Hussain (2009). The barley based first class, propelling its private as well as parochial interests, is genuine leader in deciding administration changes in Pakistan featuring short-lived growth accelerations. GDP growth was quite better in Musharraf regime (1999 to 2007) then the democratic regimes (1988 to 1999) compared by Khan (2007), and in terms of social indicators the performance was very bad.

The economy of Pakistan has grown on average by around 5.4 percent per year over the last fifty years Hussain (2009). The growth pattern consists on short cycles of rapid growth and the country is not able to maintain high economic growth rate for a few years. Growth accelerations as periods with increase in GDP per-capita growth of two percent or more for at least eight years defined by Hausmann et al (2004). Growth accelerations tend to be correlated with increases in real exchange rate depreciations, increase in investment as well as political regime changes and with increase trade (Hausmann et al 2004).

Since 1962, there have been just two periods where acceleration stayed over five percent for over for years. This was in spite of the way that over fifty year time span, development stayed over five percent for twenty eight years. The period of growth was quite often and not sustained. Some countries managed to grow at relatively high rates for a considerable period of time such as Malaysia, South Korea, China as well as India. Achieving a high growth for considerable period of time was difficult for Pakistan and growth performance remain unsustainable and was rapid for very short period of time.

Entirely, instability as well as vulnerability are not precisely synonymous as the previous alludes to the general variety of one variable around some focal pattern, while the last alludes just to the eccentric piece of such variety. Development instability has been wrongly connected with fleeting development. The unpredictability of its Gross Domestic Product development, as measured by standard deviation of the development rate of the genuine GDP, was 2.2 percent, in the course of most recent five decades.

Pakistan is still relying on agricultural sector and is prone to natural disasters. Due to huge, solid, though declining dependence in the agricultural sector, Pakistan’s growth performance is not sustained. However agriculture’s share of GDP was forty two percent in 1960 and twenty one percent in 2009. There was a high correlation between real agricultural GDP and real GDP instead of the fact that such relationship debilitates in the 2000s.

Growth reversions caused by political uncertainty as well as natural disasters worldwide experience match with administration changes (Haussmann et al 2004). Taking a look at Pakistan's financial history, better than expected development rates in 1960s and 1980s corresponded with scenes of change as well as monetary and political strength alongside abnormal amounts of outside guide. Conversely, amid the 1990s, political change, monetary vulnerability and territorial pressures were joined by few or inadequate changes around end of 1990s. Observational terms, political vulnerability utilizing outer guide as well as specialists' settlements inflows as its intermediary additionally represents a huge clarification of development flow. More than five decades, the basic relationship coefficient between the guide GDP proportions and GDP development rates is 0.34 and it achieves 0.44 percent while including settlements receipts. Cataclysmic events have made their toll in clarifying a couple of scenes of development inversion. This is surely the instance of the late 2000s a period that saw for cataclysmic events in five years, and floods as of late 2010 to 2011.

Pakistan has remained dependent on foreign saving inflows to maintain its investments due to low domestic saving rate in the economy. Pakistan’s development spurts have turned out to be rare and development designs show a diminishing pattern. Growth performance periods have been positive in light of the fact that outside inflows were open and we can say that foreign investment positively affects economic development.

Pakistan lags in all factors of accumulation as compared to East Asian countries. Pakistan falls behind in human capital formation and total factor productivity (TFP) growth and also has low and decreasing investment rates. Having received less than 2% of education estimated in UNESCO, 30%of Pakistanis people live in extreme educational poverty,. One in ten of the world’s primary age children out of school live in Pakistan as mentioned in the Framework for Economic Growth Planning Commission of (2011). The ranking of Pakistan is on second number which is a global ranking of out of school children. In Pakistan less than half of the women have never attended school and twenty percent of the richest Pakistanis get almost seven years of more education than the poorest.

If Pakistan’s record of structural reform improves, TFP growth can barely improve. Myriad of policy reversals fragmented and littered the reform. Due to this when compared to other countries, structural reform has not yielded results. Liberalization had resulted in substantial growth in TFP (Bosworth, et al 2007) in other countries such as India. Through level playing field, creating institution, better use of available resources, incentives and markets to support innovation, economic policies should aim to harness private sector growth.

In short Pakistan's semi-industrialized economy depends on remittances, agriculture as well as manufacturing. The semi-industrialized economy is a growing economy. The average growing rate of GDP is five percent a year since 2005 which is not enough as the population is increasing day by day. In 2004 Pakistan undergo an economic liberalization such as decrease in budget deficit, aimed to attract foreign investment and privatization of all government corporations. In 2016 Pakistan was reported as the manufacturing hub. In Pakistan in 2015 the Gross Domestic Product increased 4.24 % from the last year and the average rate of GDP from 1952 until 2015 was 4.9 percent, reached -1.80 percent in 1952 the lowest one and 10.22 percent in 1954. As compared to last decades' performance, the Nominal GDP of Pakistan is 270.96 billion United States dollar due to high growth rate.

3.2.1 The Need for Economic Development

The two major obstacles to economic development in Pakistan are overpopulation as well as political instability. The other obstacles are inappropriate social structure, corruption, country's dual economy as well as market imperfection. Increase in population can be positive because it allows more human resources but more economic and social problems caused by increase in population. Different problem arises with the increase in population such as nation's inability to keep up with education, healthcare transportation as well as housing for the ever-increasing mass of people. An economy cannot grow, without any means of investment and increase in population rapidly reduces per-capita income which creates unemployment and reduces national income.

For the first fifty years of Pakistan's independence, the economy suffered from religious, sectarian and ethnic unrest. During most of that time, the government was under control of the military. These conditions led to political instability and subsequently economic instability with the misuse of resources and by dissuading foreign investment. National and global economic experts agree that political stability is necessary to transform Pakistan's economic growth into economic development. Under a stable government, Pakistan is capable of developing economic plans that efficiently allocate resources and gain the interest of foreign investors

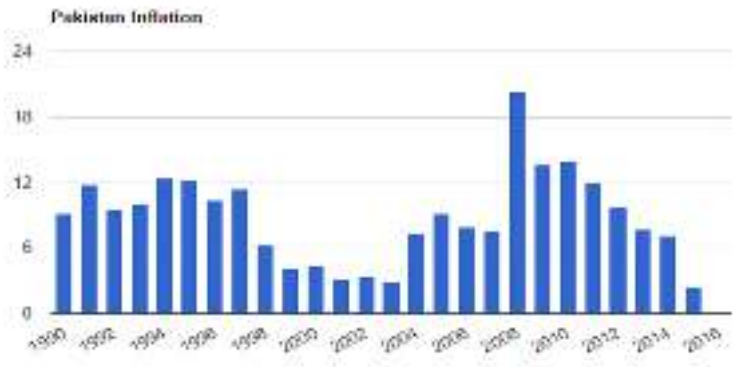
3.1 Inflation Trends in Pakistan

Pakistan Inflation: percentage change in the Consumer Price Index

From 1960 to 2015 the World Bank provides data for that indicator. During that period the average value for Pakistan was 8.15%with a minimum of -0.52% in 1962 and a max of 26.66 % in 1974 intervals like annualy.

The formula which is generally used is called Laspeyres.

Figure 3.1: Inflation trends in Pakistan



Inflation can also be calculated with other price indexes such as the Produce Price Index or the so-called GDP deflator….The CPI represents the prices paid by the average urban consumer in each respective country.Inflation is usually calculated as the percentage change in Consumer Price Index (CPI) from one year to the next...

Most countries try to keep inflation around 2 or 3% annually. For the businesses and households it creates less problems and saves from deflation too.

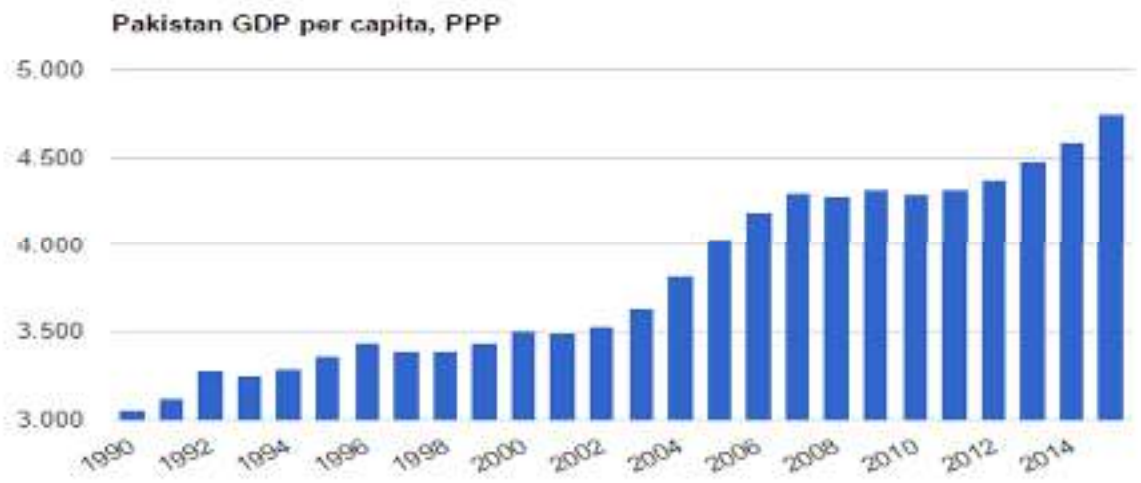
Pakistan: GDP per capita, Purchasing Power Parity

From 1990 to 2015 World Bank provides data for that indicator.. during that period the average value for Pakistan was 3804.94 USD with a minimum of 3056.97 USD in 1990 and a maximum of 4744.85 USD in 2015. GDP per capita in Pakistan and other countries is calculated as the Gross Domestic Product divided by the population. GDP per capita is shown in Purchasing Power Parity (PPP) terms that is the GDP per capita is calculated in different countries using U.S. prices. The PPP measure is useful to compare income across countries. It allows us to answer the following question, 'if they paid U.S. prices What can the average person in some country ?'

World Bank define GDP per capita basing on purchasing power parity. PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates.GDP at purchaser's prices is the sum of

gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States.. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2011 international dollars.

Figure 3.2: Pakistan's GDP per capita, PPP



CHAPTER FOUR

RESEARCH METHODOLOGY

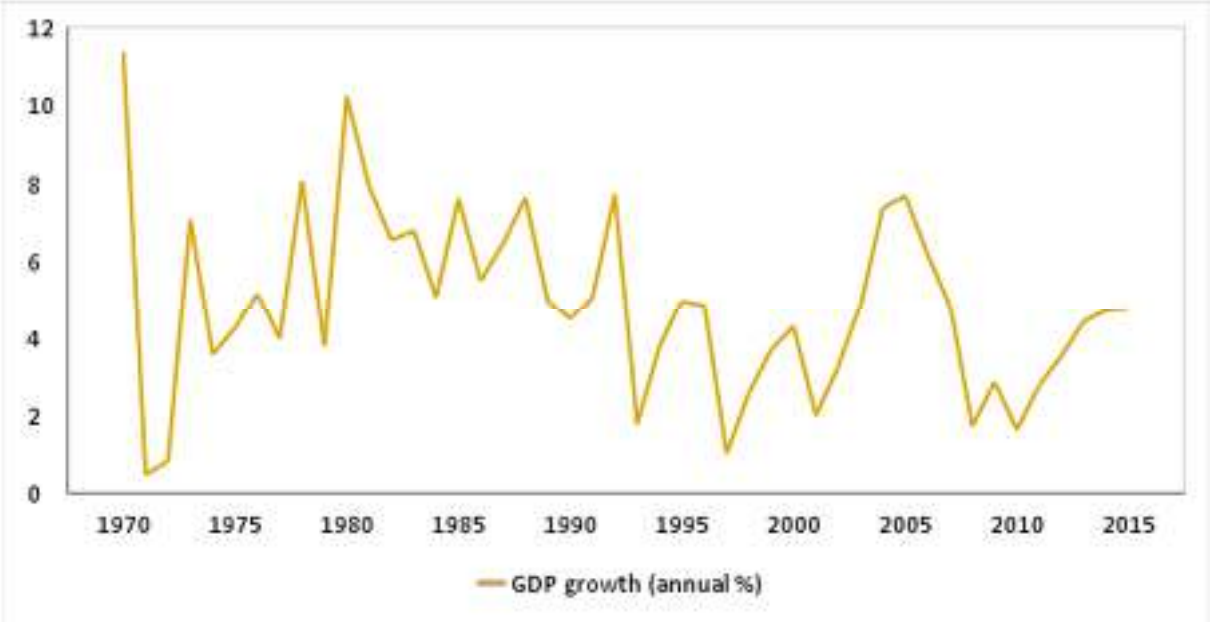
4.1 Introduction

In the following section of this research paper, some details shall be given in order to clarify the techniques applied to get the better of the objectives highlighted in the first chapter. Firstly, a brief explanation of the dependent variable and explanatory variables is conducted, accompanied with some theory of how these selected independent factors are expected to help reach the hoped results. Our methodological approach sets on a multiple regression analysis or factor analysis in which affection of explanatory variables on the dependent variable is statistically expected and in light of these expectations we reveal this study's conclusion and recommendations. The multiple regression method used is called Ordinary Least Squares or OLS, according to Gujarati (1998), it is distinguished from other statistical tools by its adequacy of giving linear unbiased estimators for the expected model. The following are the selected factors of the OLS model starting by GDP growth as the independent variable.

4.2 Macroeconomic fundamentals

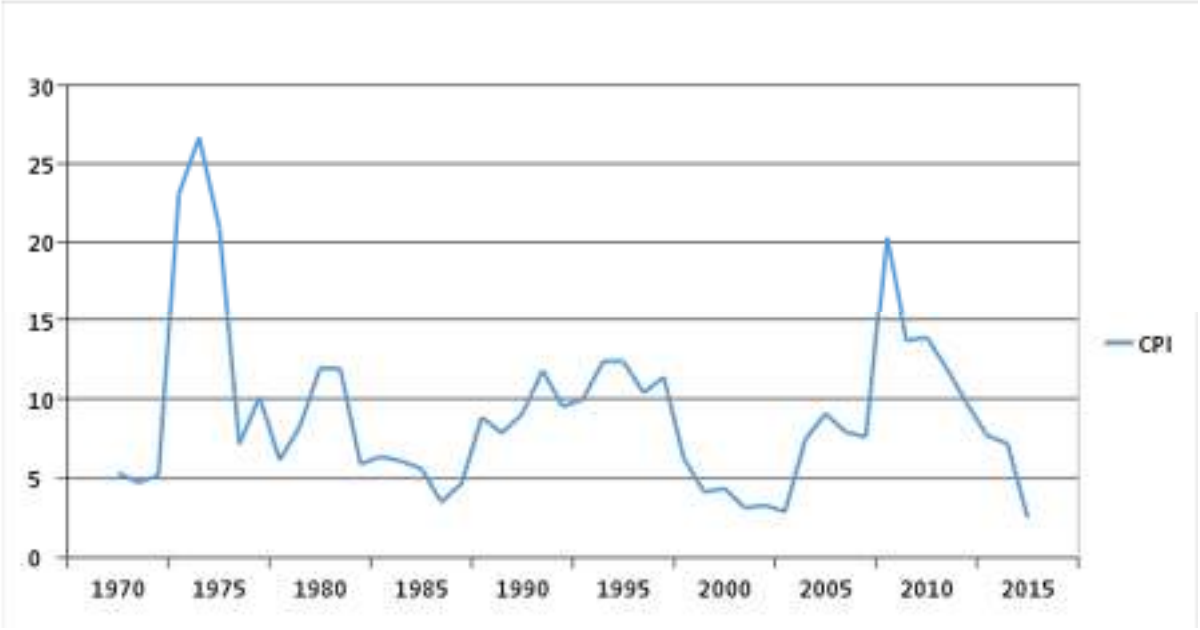
4.2.1 GDP Growth

In order to measure the overall activity of Pakistan's economy and see whether if high inflation sheds any influence, Gross domestic product in real value is used as the dependent variable in this study. Pakistan's GDP growth is illustrated below for the selected time period studied.



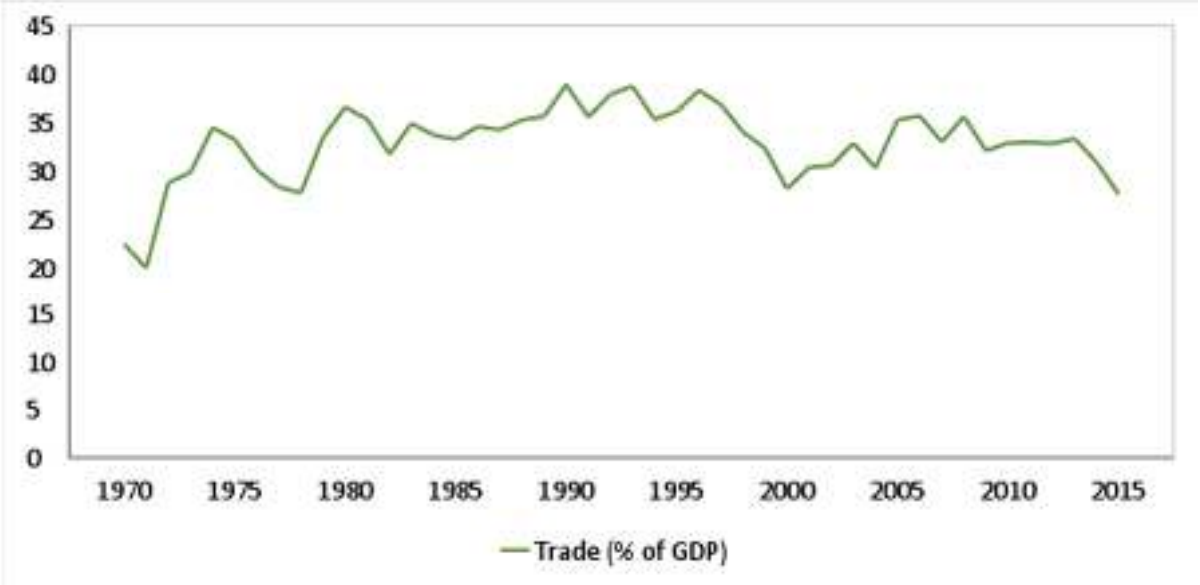
4.2.2 CPI Inflation

Inflation, defined as a general escalation in price levels accompanying with a fall in the purchasing value of money, and its stability is vital important for economic growth in any country. Studies such as Fountas et al 2006 Gillmanetal., 2004 and Hodge (2005) , and others all exhibit a negative effect of high inflation on economic development. Inflation reduces real interest rates distracting away foreign investors from domestic economy. Moreover, high inflation undermines a countries international competitiveness, decreasing its exports ability hence affecting negatively balance of payments. In this study the variations in consumer price index serve as a proxy of general price changes in Pakistan, as exemplified in the illustration below for the concerned time period of this study.



4.2.3 Trade Openness

Trade as a percent of GDP or trade openness is an indicator used to exhibit a country's place between outward or inward oriented economies. Economies in which have practical practices and seek trade opportunities with other countries are outward economies, meaning they are open to trade. On the other hand, inward oriented countries don't have incentives of trade or don't have the ability to trade due to trade policies, trade barriers, and economies of scale or other. In the lights of globalization and liberalization percent of trade to GDP has increased in the recent years worldwide.



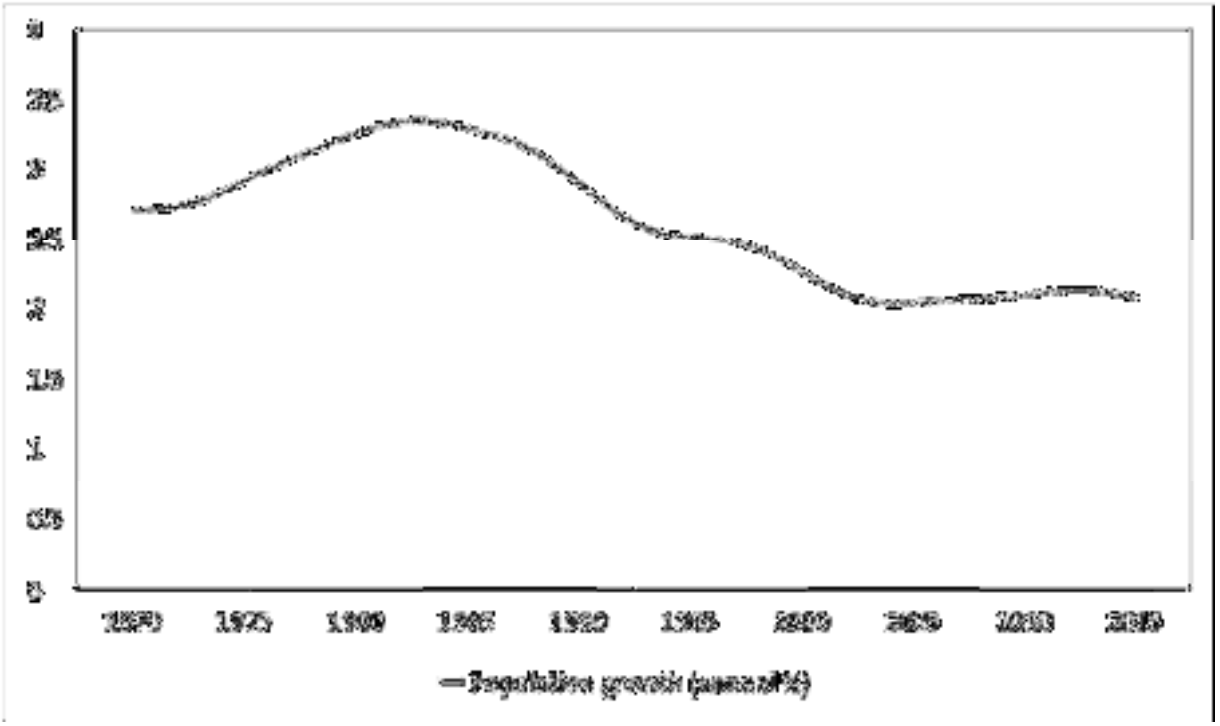
Trade Openness as follows;

$$Trade\ Openness = \frac{(Imports + Exports)}{GDP} x\ 100$$

Consensus among academic researchers and empirical practitioner's regards influence of trade openness on economic growth has not been met yet. Some say it has a positive relation because trade is the channel of FDI, capital inputs and flow of goods and services to other countries, pointing out these factors as incentives of growth. Findings of Adam Smith (1937) and David Ricardo (1973), suggested positive impact of trade on per-capita income. Other studies came to the same positive outcome like Sinha T. (2000) , (Edwards (1992) , Wacziarg (2001) and Sinha D. Others like Rigobon and Rodrik (2005), Rodrik (1992), examined a negative impact on economic development claiming that liberalization of trade leads to depreciation in local currency causing problem in balance of payments as well as economic growth. Leamer (1995) Battra and Slottje (1993) argue deduction in trade policies decreases trade tariffs and makes imports more attractive than domestic production leading to a downturn in growth.

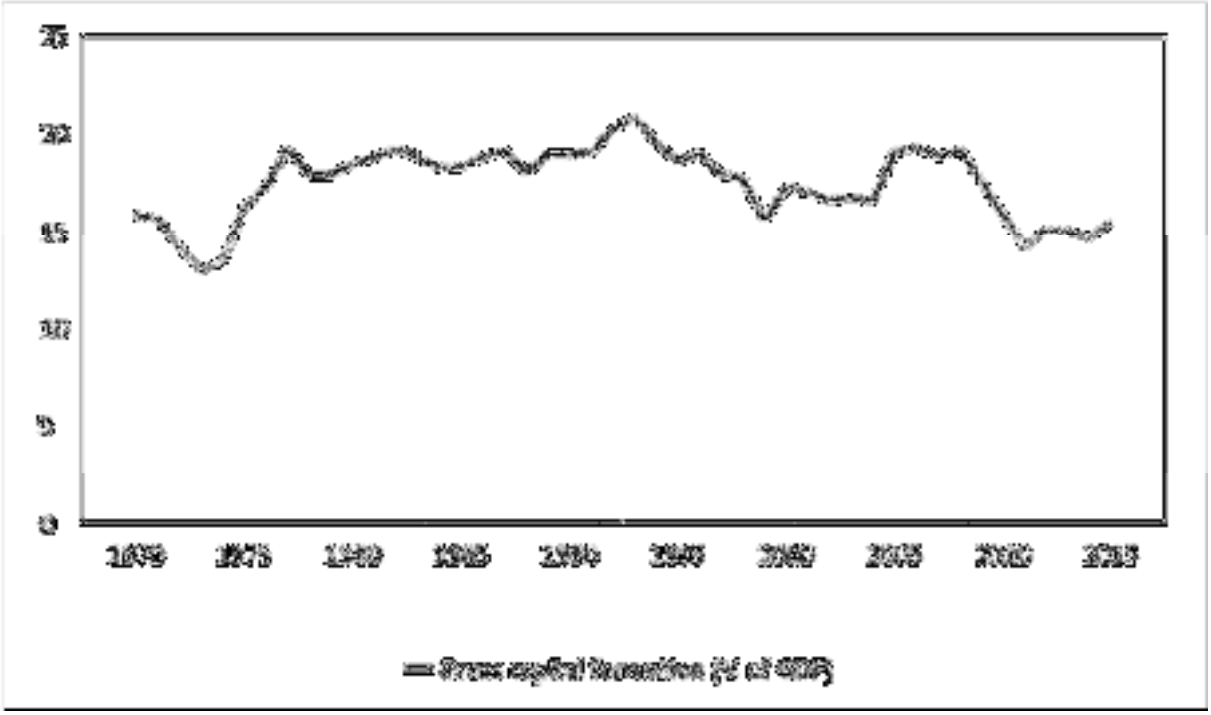
4.2.4 Population growth

Economic literature offers no consensus in theory to policy makers or academics on the relationship amid a country's population rate and economic growth. Annual population growth rate of Pakistan since 1970 has been used in this study. However, some suggest increase in a country's population stimulates increases competition which leads to better investment decisions and therefore may lead to economic growth to this country. This argument is in line with Boserup (1965), whom rejected the "Malthusian doctrine"



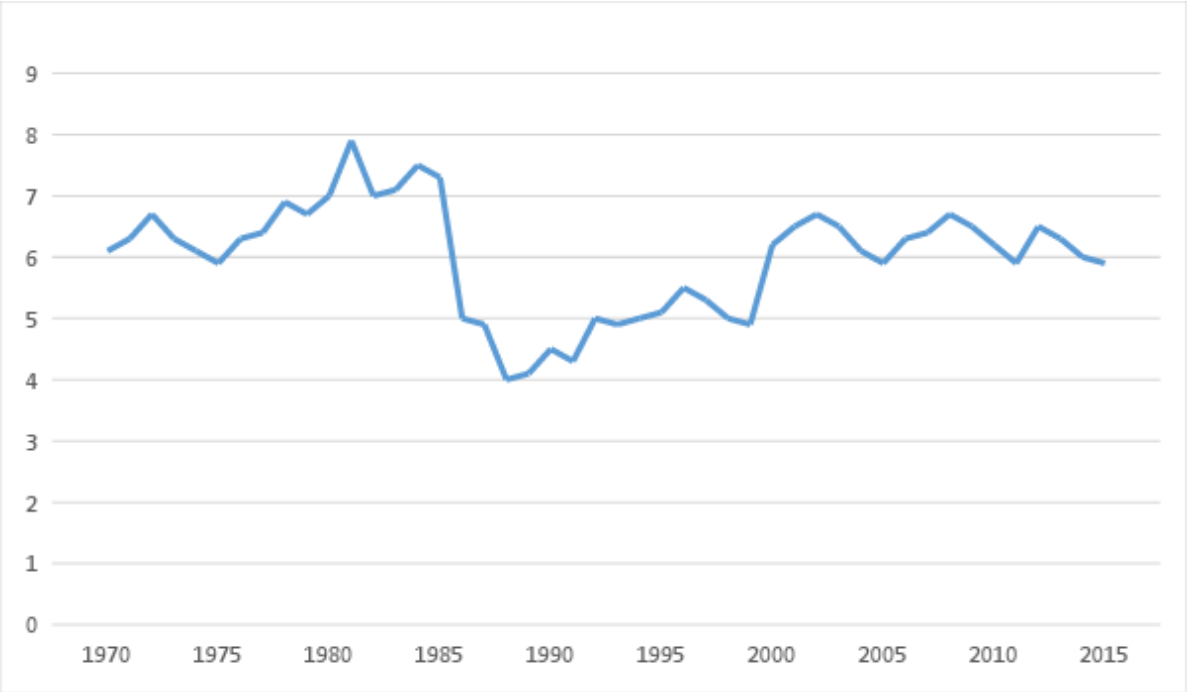
4.2.5 Investment

Investment is one of the main pillars of aggregate demand, fundamental economic theory dogmatizes importance of investment to economic growth. This assertion according to Adhikary (2011), is seen from the simulation of investment on creation of new jobs by increasing the production process, hence increase in employment rates raises potential savings to be reinvested and the chain goes on. So Investment expands an economies physical and human capital which is expected to be reinvested in the economy therefore escalating growth. In this study, the economic metric of investment applied is gross capital formation or formerly known as gross domestic investment as a percent to Pakistan's GDP.



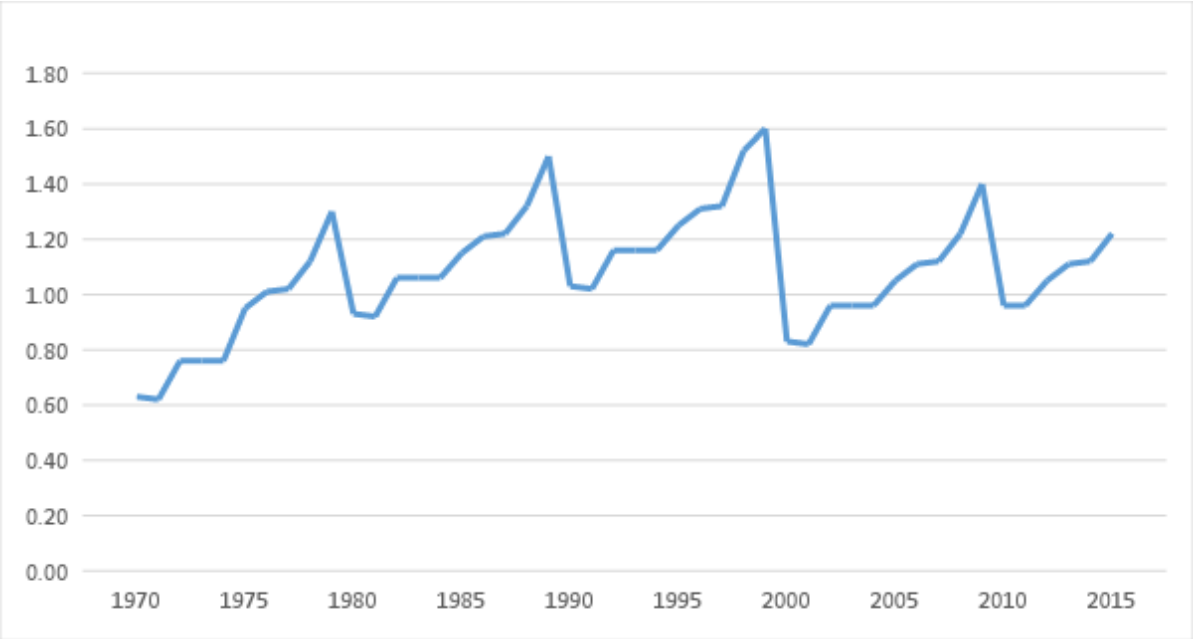
4.2.6 Unemployment

Unemployment is a state which occurs when someone looking for employment is not able to find work. Unemployment is measured by unemployment rate which is calculated by dividing number of unemployed people with number of people in labour force. Pakistan's annual unemployment rate from 1970 to 2015 was used in this research. The relationship between the country's gross domestic product growth rate and unemployment was evaluated by Okun in 1960s and the study is called Okun's law (Mankiw et al 1992). Okun find out that if unemployment increases by 1%, then GDP will fall by 2%. This research will also try to find out what happens to Pakistan's GDP growth rate when unemployment increases or decreases.



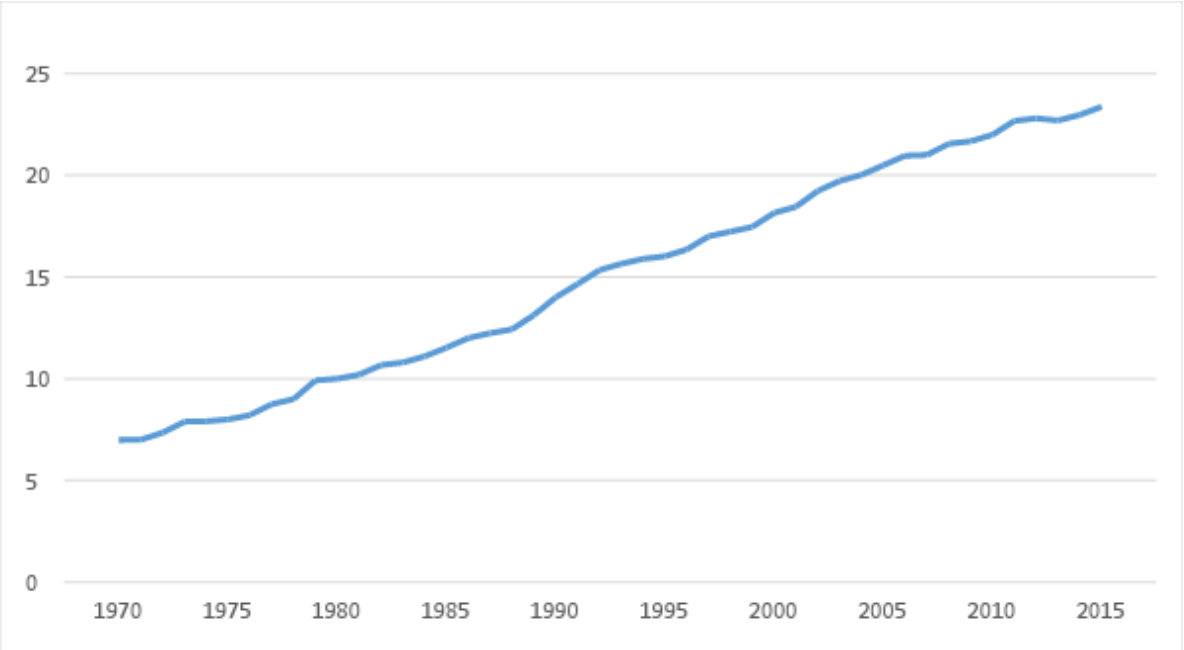
4.2.7 Government expenditure

There are different types of government expenditures which are, education, housing, health care, defense, public investments as well as current and capital expenditures. This research considered total government expenditure as a percentage of GDP for Pakistan from 1970 to 2015. Researches by Romer, (1990); Alexander, (1990) as well as Folster et al, (1999), find out that total government expenditures affect a country's growth rate negatively. Baum et al, (1993) also assessed the impact of three types for government expenditures, which are welfare, education as well as defense, on growth rate of per capita GDP and found out that, development rate of defense as well as education expenditures has positive impacts on the country's growth rate, whilst growth of the welfare expenditures has a negative and insignificant impact on economic development.



4.2.8 Literacy rate

The literacy rate is defined as percentage of people who have the ability to write and read. UNESCO, also define literacy as ability to be able to understand, identify, compute, create, interpret, communicate, as well as using written and printed materials which is associated with contexts that vary. Literacy rates is considered as an important measure to raise human capital for a region. A study by Coulombe, et al, (2006), for 14 OECD countries, indicated that human capital indicators which are based on literacy tests have a positive and significant effect on the country's development rate in transitory process toward steady state. The results also indicated that growth effects of human capital indicators which are based on literacy for female are stronger than effects measured from male literacy indicators. Rahman (2013), also did a study and find out that there is no significant relationship between GDP growth and literacy rate but a significant positive relationship found among literacy rate and Per-Capita GDP. Study will try to find out the connection among literacy rate and growth rate for Pakistan for the period under review.



4.2.9 Drought as dummy variable

A dummy variable is a numerical variable. It is used regression analysis to represent subgroups the sample.,A dummy variable is often used to distinguish different treatment groups in research design . In the simplest case, we would use a 0, 1 dummy variable where a person is given a value of zero (0) if they are in control group or a one (1) if they are in the treated group. In this study dummy variable represent politics. This study expect drought to have a negative influence on GDP growth.

4.3 Linear Regression Models

OLS regression analysis method is implemented. The dependent variable is GDP growth and the regressed independent factors are Investment, Population growth, Inflation and Trade Openness. All variables values are in percent

The given mathematical formula of (OLS) regression model can be expressed as,

GDP = (INFL, GCF, TRADE, PPLN, LIT RATE, GVT EXP, UNEMPLO, DR)

Whereas the Linear shape of the statistical formula is;

$$GDP = \beta_0 + \beta_1 INFL_t + \beta_2 GCF_t + \beta_3 TRADE_t + \beta_4 PPLN_t + \beta_5 LIT\ RATE_t + \beta_6 GVT\ EXP_t + \beta_7 UNEMPLO_t + \beta_8 DR_t + \varepsilon_t$$

Whereby GDP – represents GDP GROWTH

INFL- CPI Inflation rate

GCF- Gross Investment Formation/ Gross Capital Formation

TRADE – Trade openness as percent to GDP

PPLN- Population growth

LIT RATE - Literacy rate

GVT EXP – Government expenditure

UNEMPLO – Unemployment rate

DR – Drought as a dummy variable

Whereby $\mathcal{E}$ = the error term.

$\beta_{0,}\ \beta_1, \beta_2, \beta_{3,}\ \ldots \beta_8$, are the coefficients attempted to be estimated.

4.4 Statistical efficiency tests

Our study's findings shall first be tested based on statistical, well confirmed, tests in order to assure the validity of our findings before giving any recommendations and to avoid false interpretations of the revealed outcomes. Again this step is carried out to guarantee adequacy of the estimated regressed model as much statistically as possible. Some of the tests aim to make sure that the variables do not interfere with themselves positively or negatively. Other tests show the degree where the independent variables are related to the dependent variable, these inter-actions must be eliminated before jumping to conclusions as they may significantly impact the analysis results.

4.5 Serial correlation test

Serial-correlation is the name entitled to the case when an error term of an estimated model in a certain time

period is correlated with another error term in a previous time period. As an example the error term ε_t is correlated and influenced by the error term ε_{t-1} this is why it is called serial correlation as it appears in time series data. For simplicity and as far as this paper's concerns, second and higher serial-correlation is not aimed for; a test for first order correlation shall be done because it is the most common in multiple regression models (Schaum's, 1982).

Academic literature and previous studies have conducted various detection tests for auto-correlation in their data sets. In this study I will conduct Breusch – Godfrey serial correlation LM test as it is approved to be more accurate statistically and also as an upper hand compared to Durbun Watson test, as it is not contained by any restrictions to be conducted. Breusch–Godfrey assume no presence of any order of serial-correlation among the error terms estimated in a given model. In other words if their test results give significant statistical evidence that there is serial- correlation at any level, the null hypothesis is rejected and redemption must be made upon the model (Godfrey, L. G., 1978).

Breusch and Godfrey states that, if the below auxiliary regression model is fitted given the calculated residual sum of squares

$$\mu_t = \alpha_0 + \alpha_1 X_{t,1} + \alpha_2 X_{t,2} + \rho_1 \mu_{t-1} + \rho_2 \mu_{t-2} + \cdots \rho_\rho \mu_{t-\rho} + \epsilon_t$$

Then the following asymptotic approximation can be used for the distribution of the test statistic

$$nR^2 \sim X_\rho^2$$

No serial correlation of any order up to is when the null hypothesis holds

$$H_0 : \{ \rho_i = 0 \; for \; all \; i \}$$

4.5.1 Heteroscedasticity

Heteroscedasticity (which can also be spelled as Heteroscedasticity) it refers situation which the variability of a certain factor is not equal across the varieties of values of other factors in the same model which predict it. Homoscedasticity of error terms is present when the expected regression model predicts a dependent factor in which is consistent across all values of that Independent factor of the model studied. Heteroscedasticity, within the context of regression is exclusively associated with error terms.

4.5.2 Multicollinearity

In the statistical tests we focused on testing certain properties of the error term in the estimates model. Now this test focuses on properties or relation between the explanatory variables themselves. The situation where existence of a certain relation or influence among two independent variables or more may put the regression outcomes into jeopardy, due to in accurate estimation or presence of bias data. Consequently, this leads to misleading interpretations and findings. Co-linearity or multiple Co-linearity is one of the tests adopted to investigate such inter-relations among the variables. Exclusively this test investigates the existence of perfect linear relation among two or more independent variables.

Mathematically speaking, "N" number of factors is regressed in some model with the explanatory independent factors X_1, X_2, X_k(where $X_1 = 1$ for all observations to allow for the intercept term), if the above condition is fulfilled, the association amid the independent factors is said to be in perfect linear relationship:

$$\gamma_1 X_1 + \gamma_2 X_2 + \ldots\ldots + \gamma_k X_k = 0,$$
$$where\ \gamma_1, \gamma_2, \gamma_k\ are\ constants\ such\ that\ not\ all\ of\ them\ are\ zero\ simultaneously$$

4.6 Over all Expected model efficiency test

R-Square (R^2) or coefficient of multiple determinations is taken as a proxy for goodness of fit from the regression results. R-Square, depending on the results given in a certain regression analysis, explains how much statistically the change in explanatory variables have the ability and influence on the change in the dependent variable studied. Also significance of F-statistics probability is considered crucial to the acceptance of this study's expected model results. A probability result less than 5% significance level, shall be accepted. The above statistical credentials are widely accepted by previous research papers and in the theory.

4.7 Resource and Data mining

The World Bank Data base served as the main supplier for the economic data used to reach this study results. Particularly the database of world development indicators. This information and more can be freely reached at the official website of the World Bank.

4.8 Chapter Summary

This chapter presented the methodology of the study. The chapter also outlined the tests to be performed as well as justification of variables. The next chapter is for data presentation, estimation and results analysis.

CHAPTER FIVE

DATA ANALYSIS AND PRESENTATION

5.1 Unit root test results

This study utilised the Augmented Dickey-Fuller (ADF) unit root tests as given by Gujarati (2004). Non-stationary variables have been differenced until they became stationary. All regression variables were first tested for stationarity before estimating the equation.

Table 5.1 ADF unit root test results

	t- Statistic	Critical value 1%	Critical value 5%	Critical value 10%	Stationary level	Decision
GDP	-6.002301	-3.584743	-2.928142	-2.602225	0	Stationary
Gross capital formation	-6.467538	-3.584743	-2.928142	-2.602225	0	Stationary
Inflation	-6.421344	-3.584743	-2.928142	-2.602225	1	Stationary
Government expenditure	-3.550519	-3.584743	-2.928142	-2.602225	0	Stationary
Literacy rate	-6.457405	-3.584743	-2.928142	-2.602225	1	Stationary
Population	-3.835306	-3.600987	2.935001	-2.605836	2	Stationary
Trade	-7.450504	-3.584743	-2.928142	-2.602225	1	Stationary
Unemployment	-6.479561	-3.584743	-2.928142	-2.602225	1	Stationary

*See appendix for test details

The table above shows results from ADF test for all variables. Government expenditure, gross capital formation as well as GDP growth rate become stationary at level. Unemployment, trade openness, literacy rate and inflation become stationary at first difference whilst population become stationary at second difference.

5.2 Serial correlation test

LM Test Breusch - Godfrey Serial Correlation :

F-statistic	0.849105	Prob. F (2,33)	0.4369
Obs*R-squared	2.153461	Prob. Chi - Square (2)	0.3407

*See appendix for test details

From the Breusch-Godfrey Serial Correlation test we can reject the alternative hypothesis stating existence of serial correlation in the regressed model and accept the null hypothesis in return, meaning our estimated model is statistically clear from serial correlation because the probability of the F-statistic is 0.4369 which is greater than 0.05.

5.3 Heteroscedasticity Test

Penalties of Heteroscedasticity on our results may be 1) OLS estimates remain unbiased. 2) Variance of the OLS estimator is inflated. 3) OLS is not BLUE. When error variances aren't constant, then there is Heteroscedasticity. Once there is Heteroscedasticity, OLS estimations places a lot of weight on the observations with big error variances than those with less error variances. The white Heteroscedasticity test was adopted to test for Heteroscedasticity as shown in the table below. We reject the alternative hypothesis and accept the null hypothesis, concluding there is no Heteroscedasticity at 5% level in our model since the probability of the F-statistic is 0.6131 which is greater than 0.05.

Heteroskedasticity Test: ARCH

	0.2596		0.613
F-statistic	16	Prob. F(1,41)	1
	0.2705	Prob. Chi-	0.603
Obs*R-squared	67	Square(1)	0

*See appendix for test details

5.4 MultiCollinearity test

Pearson's correlation coefficient denoted as (r) measures the strength of the linear relationship among the studied variables. From the formula below it is conducted that the outcome of this correlation analysis must be (+1) and (-1). If positive correlation was indicated then that is interpreted as both variables increase and decrease simultaneously. On the other hand if negative correlation was indicated this clears that an increase in one variable will decrease in the other. The significance of the correlation test will not be much in consideration as the significance will be tested by the regression analysis, so only the direction of the correlation will be considered. The following is the mathematical expression of correlation formula.

$$r = \frac{\sum_{i=1}^{n} (X_i - X_{bar})(Y_i - Y_{bar})}{\sqrt{\sum_{i=1}^{n} (X_i - X_{bar})^2}\sqrt{\sum_{i=1}^{n} (Y_i - Y_{bar})^2}}$$

It is good to note that it is not about the presence or absence of multicollinearity rather than the degree of this linear relation between the variables (Gujarati, 1998). From the correlation matric below, we can see that the correlation between the explanatory variables is at very low levels, so no risk of continuing the study

Table 5.4 Pearson Correlation results

	gdp	Dinf	dlit_rate	dpplln	dtrade	dunempl	gcf	Gvt exp	dummy
gdp	1								
dinf	0.078	1							
dlit_rate	-0.128	0.221	1						
ddppln	0.137	-0.079	-0.369	1					
dtrade	-0.038	0.332	0.134	0.069	1				
dunempl	-0.016	-0.043	0.037	-0.790	0.015	1			
gcf	0.447	-0.109	0.183	0.085	-0.051	0.085	1		
gvt_exp	-0.080	-0.248	0.007	-0.227	-0.242	-0.226	-0.034	1	
dummy	-0.453	0.084	-0.118	0.142	0.026	-0.116	-0.256	-0.227	1

*See appendix for test details

5.5 Model Estimation

The table below shows the empirical results of the estimated parameters and its t-statistics with other diagnostic tests of equation. From the F-statistics probability we can conclude,our model is significant at 1% level, meaning that the explanatory variables have an effect on the change in the dependent variable. The result gotten from the estimation technique is presented in the table below:

Table 5.5: Estimated Model

Variable	Co efficient	Std . Error	t - Statistic	Prob.
C	8.076102	1.912859	4.222006	0.0002
DINF	-0.092751	0.062746	1.478198	0.0483
DLIT_RATE	-2.329514	1.270514	-1.833520	0.0752
DDPPLN	1.116894	2.678827	0.416934	0.0793
DTRADE	-0.058005	0.102153	-0.567828	0.0738
DUNEMPL	-0.454436	0.510939	-0.889412	0.0389
GCF	0.136194	0.046386	2.936106	0.0058
GVT_EXP	-0.016083	0.015621	-1.029549	0.0303
DUMMY	-1.938259	0.580785	-3.337307	0.0020

R squared = 0.907138 Adjusted R-squared = 0.853055

F-statistic = 18.684140 Prob F-statistic = 0.000062

Durbin-Watson= 2.056268

The coefficient of determination (R^2) is 0.907138 hence the model can be regarded as fit since about 90.7% of the variation in GDP growth is explained by unemployment, inflation, gross capital formation, government expenditure, literacy rate, government expenditure, trade openness, population as well as dummy variable which is represented by drought and the remaining percentage is explained by other variables not included in the model which are captured by the error term. The F-statistic of 18.684140 and the probability value of the F-statistic is 0.000062 which means that it is less than 0.01 and this supports the claim that the whole model is statistically significant at all levels. The Durbin-Watson test statistic which is 2.056268 shows the absence of autocorrelation among successive error terms.

5.5.1 Trade Openness

The regressed model estimates a coefficient of -0.058005 for trade openness and has a probability value of 0.0738 so it is significant at 10%. This means that trade openness affects Pakistan's GDP growth by -0.058005% for every 1% increase in trade openness. We can clearly say that trade openness influences negatively the GDP growth of Pakistan under our study period. This negative relation is consistent with previous research like Rigobon and Rodrik (2005), Rodrik (1992), who found a negative impact on economic development claiming that liberalization of trade leads to depreciation in local currency causing problem in balance of payments therefore decrease in GDP growth. Leamer (1995) , Battra and Slottje (1993) also argue that deduction in trade policies decreases trade tariffs and makes imports more attractive than domestic production leading to a downturn in growth.

5.5.2 Inflation

From the estimated regression model, inflation negatively affect GDP growth rate of Pakistan by 0.092751 and has a probability value of 0.0483 so it is significant at 5%. This means that economic growth rate takes a downward spiral in an inflationary environment due to ever increasing in prices of goods and services. Hence inflation has a negative influence on the growth rate of an economy. One unit increase in inflation reduces growth rate by 0.09%. This negative association supports the findings of Fischer (1979), Faria and Carneiro (2001), Goshand Phillips (1998) and Ayyoub et al (2011), who found negative effect of inflation on GDP development.

5.5.3 Investment

Gross capital formation was estimated and gave a coefficient of 0.136194 and it is significant at all levels because of the probability value of 0.0058 and this means it positively influences Pakistan's GDP growth. In other words, a one percent increase in investment capital will lead to 0.14% increases in Pakistan's growth. This positive influence is supported by Mubarik (2005), who found a positive relation amid Investment and economic growth.

5.5.4 Population

According to the estimated regression equation, population growth gave a positive influence on GDP growth of 1.116894 and is significant at 10% level because it has a probability value of 0.0793. For every 1% increase in population growth, Pakistan's growth rate tends to increase by 1.12%. This positive expected relation is along with Boserup (1965), who suggested that population stimulates economic growth by incentives of competitive investment in the economy. Ayyoub et al (2011), also revealed in their study a positive impact of population growth on Pakistan's GDP growth.

5.5.5 Literacy rate

Literacy rate was found to be significant at 10% level of significance and gave a coefficient value of -2.329514. it has a probability value of 0.0752 that is why it is significant at 10% level. This means that for every unit change in literacy rate, Pakistan's GDP growth will decrease by 2.33%. This is opposed by Coulombe, et al, (2006), who found a significant positive effect between a country's growth rate and human capital indicators such as literacy rate for 14 OECD countries. Rahman (2013), also did a study and find out no significant relationship among GDP development and literacy rate but there is a significant positive relationship between literacy rate and GDP Per-Capita.

5.5.6 Government Expenditure

The coefficient for government expenditure was found to be -0.016083 and it is significant at 5% level because

it has a probability value of 0.0303. This means,a unit increase in Pakistan's government expenditure will reduce GDP growth by 0.02%. This negative influence is supported by Romer, (1990); Alexander, (1990) as well as Folster et al, (1999). Baum et al, (1993) also assessed the impact of three types for government expenditures, which are welfare, education as well as defense, on development rate of per capita GDP and found out that, growth rate of defense as well as education expenditures has positive impacts on the country's growth rate, whilst growth of the welfare expenditures has a negative and insignificant impact on economic growth.

5.5.7 Unemployment

From the estimated equation results, unemployment was found to be significant at 5% level since it has a probability value of 0.0389 and it gave a coefficient of -0.454436. This means that if unemployment rises by 1%, growth rate of Pakistan will fall by 0.45%. Negative relationship of unemployment and growth rate is supported by Okun's law which says that if unemployment increases, GDP will fall.

5.5.8 Drought as a dummy variable

The dummy variable gave a coefficient of -1.938259 and a probability value of 0.0020 so it is significant at all levels. If there is drought in Pakistan, the growth rate will tend to fall by 1.94% as from the estimated results. This is true that drought has a negative effect on development rate of any country because there will be also loss of human lives who could have been working and stimulating economic growth.

5.5.9 Constant

The intercept which is often labelled the constant is the expected mean value of the dependant variable when all independent variables are equal to zero. In the model, if the explanatory variables are zero, it means the model will be represented by the constant value of 0.0020.

5.6 Chapter Summary

The chapter focused on data presentation, interpretation and analysis in relation to theory and empirical evidence from other studies. The chapter first outlined necessary procedural tests of stationarity, multi-

collinearity, heteroscedasticity, autocorrelation, as well as overall model specification to ensure validity and reliability of the variables under investigation. Results from the estimated equation run using a statistical package EViews 7 version shows that population, inflation, gross capital formation, government expenditure, unemployment, literacy rate, trade openness are significant in explaining economic growth rate of Pakistan. The next chapter will give recommendations based on findings.

CHAPTER SIX

POLICY RECOMMENDATIONS AND CONCLUSION

6.1: Chapter Introduction

This section of the research project summaries the whole study and gives out policy recommendations using econometric and economic results obtained in the previous chapter. The econometric results are then used for the conclusions and policy recommendations in this chapter.

6.2: Summary of the findings

The major objective of this study was to find the effect of macroeconomic fundamentals on the growth rate of Pakistan from 1970 to 2015. Literature was also reviewed on the macroeconomic fundamentals on economic growth. Time series data was used for testing the possible effects of inflation, unemployment rate, gross capital formation, literacy rate, population growth, government expenditure, trade openness as well as drought using Ordinary Least Squares methodology applied to Eviews 7. The presence of serial correlation, heteroskedasticity, multicollineriarity was tested.

6.3 Conclusion

After carrying out the study; it was found out that, inflation, unemployment rate, literacy rate, trade openness, government expenditure have a negative relationship on the growth rate of Pakistan. Population growth as well as gross capital formation have a positive effect on Pakistan's growth rate. There was also no presence of serial correlation, multicollinearity and heteroskedasticity in the data used for this study.

6.4 Policy recommendations

The explanatory variables explain 90% of the variation on the growth rate of Pakistan from 1970 to 2015. In order to boost the economic growth rate of Pakistan,

- The government should take decisions to maintain the general price levels in Pakistan's economy. As moderate inflation rates stabilizes uncertainty among investors and therefore give potential of increase in capital formation to be invested in the economy, which tradeoff with a positive reward on GDP growth.
- The government should use expansionary fiscal and monetary policy by cutting taxes as well as interest rates in order to reduce unemployment rate. Lower taxes will increase disposable income and will help to increase consumption, leading to GDP growth whilst lower interest rates will decrease cost of borrowing and also encourage people to invest and spend. This will increase the development rate of Pakistan economy and reduce demand deficient unemployment. Lower interest rates also reduce exchange rate and make exports more competitive.
- The government should suggest policies that to increase Pakistan's population since population has a positive relationship with GDP growth. Population growth stimulates an increase in competition which leads to better investment decisions and therefore may lead to economic development of Pakistan.
- The government of Pakistan should introduce barriers to trade since trade openness has a negative effect on economic development. This includes the introduction of tariff barriers such as surcharges, duties, non tariff barriers such as quotas, licensing rules.
- The government should also reduce its spending since government expenditure has a negative effect on economic development of Pakistan.
- There is need to reduce adult education since literacy rate has a negative effect on development. By reducing adult education, the fees that was supposed to be used on education will be used for investment in other sectors which are also suitable for boosting the economic growth of Pakistan for example agriculture and industrial sector.

6.5. Areas of further study

The study has not been exhaustive in explaining the impact of macroeconomic fundamentals on economic growth rate in Pakistan. Some essential macroeconomic fundamentals such as financial intermediation, capacity utilization, interest rates, and taxes have been neglected in the study. The model would have been

better if these variables were also included.

Since there is lack of empirical researches on the impact of macroeconomic fundamentals on Pakistan's growth rate, there is still plenty of space to verify exactly what can be done to attain suitable growth rate in Pakistan. There is still need to study on the impact of taxes, financial intermediation, capacity utilization, interest rates, imports, exports on economic growth in Pakistan and other countries.

The study also uses the ordinary least squares method hence other methods such as the generalized least squares (GLS) can be also be used. Moreover, there is needed to make use of a panel on this study. This can be done using Pakistan and other selected countries.

6.6 Chapter summary

The chapter concluded the study by giving the summary of the findings, conclusion, policy recommendations as well as areas for further research. The study find out that, inflation, unemployment rate, literacy rate, trade openness, government expenditure have a negative relationship on the growth rate of Pakistan. Population growth as well as gross capital formation have a positive effect on Pakistan's growth rate. The government or policy makers are recommended to take decisions to maintain the general price levels in Pakistan's economy. As moderate inflation rates stabilizes uncertainty among investors and therefore give potential of increase in capital formation to be invested in the economy, which tradeoff with a positive reward on economic development.

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APPENDICES

Unit root test results

Gross Domestic Product

Null Hypothesis: GDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

			Prob.
		t-Statistic	*
		-	0.000
Augmented Dickey-Fuller test statistic		6.002301	0
	1%	-	
Test critical values:	level	3.584743	
	5%	-	
	level	2.928142	
	10%	-	
	level	2.602225	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey - Fuller Test Equation

Dependent Variable: D(GDP)

Method: Least Squares

Date: 08/14/17 Time: 15:18

Sample (adjusted): 1971 2015

Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.819190	0.136479	-6.002301	0.0000
C	3.832068	0.739483	5.182087	0.0000

R-squared	0.455886	Mean dependent var	-0.1475

			56
	0.443233		2.944138
Adjusted R-squared		S.D. dependent var	
	2.196823		4.455328
S.E. of regression		Akaike info criterion	
	207.5194		4.535624
Sum squared resid		Schwarz criterion	
	-98.24489		4.485262
Log likelihood		Hannan-Quinn criter.	
	36.02761		1.549366
F-statistic		Durbin-Watson stat	
	0.000000		
Prob(F-statistic)			

Gross capital formation

Null Hypothesis: GCF has a unit root

Exogenous: Constant

Lag Length : 0 (Automatic - based on SIC, maxlag=9)

			Prob.
		t-Statistic	*
		-	0.000
Augmented Dickey-Fuller test statistic		6.467538	0
	1%	-	
Test critical values:	level	3.584743	
	5%	-	
	level	2.928142	
	10%	-	
	level	2.602225	

*MacKinnon (1996) one - sided p - values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D (GCF)

Method: Least Squares

Date: 08/14/17 Time: 15:14

Sample (adjusted): 1971 2015

Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

Inflation

Null Hypothesis: D(INF) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.421344	0.0000
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INF,2)

Method: Least Squares

Date: 08/14/17 Time: 15:22

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-1.001729	0.156000	-6.421344	0.0000
C	-0.049700	0.728307	-0.068241	0.9459

			-
	0.49539		0.0915
R-squared	6	Mean dependent var	91
	0.48338		6.7210
Adjusted R-squared	2	S.D. dependent var	76
	4.83085		6.0323
S.E. of regression	0	Akaike info criterion	11
	980.158		6.1134
Sum squared resid	6	Schwarz criterion	10
	-		
	130.710		6.0623
Log likelihood	8	Hannan-Quinn criter.	87
	41.2336		1.9780
F-statistic	6	Durbin-Watson stat	99
	0.00000		
Prob(F-statistic)	0		

Government expenditure

Null Hypothesis: GVT_EXP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

			Prob.
		t-Statistic	*
Augmented Dickey-Fuller test statistic		-3.550519	0.0109
Test critical values:	1% level	-3.584743	
	5% level	-2.928142	
	10% level	-2.602225	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GVT_EXP)

Method: Least Squares

Date: 08/14/17 Time: 15:27

Sample (adjusted): 1971 2015

Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GVT_EXP(-1)	-0.402359	0.113324	-3.550519	0.0009
C	44.69431	12.45947	3.587177	0.0008

R-squared	0.226705	Mean dependent var	1.311111
Adjusted R-squared	0.208721	S.D. dependent var	18.37714
S.E. of regression	16.34717	Akaike info criterion	8.469413
Sum squared resid	11490.89	Schwarz criterion	8.549710
Log likelihood	-188.5618	Hannan-Quinn criter.	8.499347
F-statistic	12.6061	Durbin-Watson stat	1.937300

	9	09
	0.00094	
Prob(F-statistic)	6	

Literacy rate

Null Hypothesis: D(LIT_RATE) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.457405	0.0000
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	

	10% level	-2.603064

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LIT_RATE,2)

Method: Least Squares

Date: 08/14/17 Time: 15:29

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LIT_RATE(-1))	-0.971644	0.150470	-6.457405	0.0000
C	0.361747	0.065868	5.492023	0.0000

R-squared	0.496196	Mean dependent var	0.008864
Adjusted R-squared	0.486249	S.D. dependent var	0.340302
S.E. of regression	0.243917	Akaike info criterion	0.060408
Sum squared resid	2.498803	Schwarz criterion	0.141508
Log likelihood	0.671017	Hannan-Quinn criter.	0.090484
F-statistic	41.69808	Durbin-Watson stat	1.998793
Prob(F-statistic)	0.000000		

Population

Null Hypothesis: D(PPLN,2) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on SIC, maxlag=9)

			Prob.
		t-Statistic	*
Augmented Dickey-Fuller test statistic		- 3.835306	0.005 4
Test critical values:	1% level	- 3.600987	
	5% level	- 2.935001	
	10% level	- 2.605836	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(PPLN,3)

Method: Least Squares

Date: 08/14/17 Time: 15:32

Sample (adjusted): 1975 2015

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PPLN(-1),2)	-0.554319	0.144531	-3.835306	0.0005
D(PPLN(-1),3)	0.116611	0.163064	0.715123	0.4790
D(PPLN(-2),3)	0.408914	0.150247	2.721614	0.0098
C	-0.000986	0.002289	-0.430627	0.6692

R-squared	0.352519	Mean dependent var	-0.000488
Adjusted R-squared	0.300021	S.D. dependent var	0.017457
S.E. of regression	0.014606	Akaike info criterion	-5.522358

			-5.3551
Sum squared resid	0.007893	Schwarz criterion	81
			-5.4614
Log likelihood	117.2083	Hannan-Quinn criter.	82
			2.1299
F-statistic	6.714849	Durbin-Watson stat	83
Prob(F-statistic)	0.000989		

Trade

Null Hypothesis: D(TRADE) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		Prob.
	t-Statistic	*
Augmented Dickey-Fuller test statistic	-7.450504	0.0000
Test critical values: 1%	-	

	level	3.588509
	5%	-
	level	2.929734
	10%	-
	level	2.603064

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(TRADE,2)

Method: Least Squares

Date: 08/14/17 Time: 15:34

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TRADE(-1))	-1.145614	0.153763	-7.450504	0.0000

C	0.202316	0.430477	0.469980	0.6408

R-squared	0.569275	Mean dependent var	-0.017955
Adjusted R-squared	0.559020	S.D. dependent var	4.289832
S.E. of regression	2.848721	Akaike info criterion	4.976006
Sum squared resid	340.8388	Schwarz criterion	5.057106
Log likelihood	-107.4721	Hannan-Quinn criter.	5.006082
F-statistic	55.51002	Durbin-Watson stat	1.632258
Prob(F-statistic)	0.000000		

Unemployment

Null Hypothesis: D(UNEMPL) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.479561	0.0000
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(UNEMPL,2)

Method: Least Squares

Date: 08/14/17 Time: 15:37

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UNEMPL(-1))	-0.998530	0.154105	-6.479561	0.0000
C	-0.009088	0.083732	-0.108531	0.9141

R-squared	0.499909	Mean dependent var	-0.006818
Adjusted R-squared	0.488002	S.D. dependent var	0.776216
S.E. of regression	0.555414	Akaike info criterion	1.706181
Sum squared resid	12.95634	Schwarz criterion	1.787281

	-35.53599		1.736257
Log likelihood		Hannan-Quinn criter.	
	41.98471		1.999624
F-statistic		Durbin-Watson stat	
	0.000000		
Prob(F-statistic)			

Regression equation results

Dependent Variable: GDP

Method: Least Squares

Date: 08/14/17 Time: 16:17

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	c	1.912859	4.222006	0.0002
DINF	-	0.062746	1.478198	0.0483

	0.092751			
	-2.329514		-1.833520	0.0752
DLIT_RATE		1.270514		
	1.116894			
DPPLN		2.678827	0.416934	0.0793
	-0.058005		-0.567828	0.0738
DTRADE		0.102153		
	-0.454436		-0.889412	0.0389
DUNEMPL		0.510939		
	0.136194			
GCF		0.046386	2.936106	0.0058
	-0.016083		-1.029549	0.0303
GVT_EXP		0.015621		
	-1.938259		-3.337307	0.0020
DUMMY		0.580785		

	0.907138		4.806818
R-squared		Mean dependent var	
	0.853055		2.143675
Adjusted R-squared		S.D. dependent var	

S.E. of regression	1.750668	Akaike info criterion	4.138122
Sum squared resid	107.2694	Schwarz criterion	4.503069
Log likelihood	-82.03867	Hannan-Quinn criter.	4.273462
F-statistic	18.68414	Durbin-Watson stat	2.056268
Prob(F-statistic)	0.000062		

Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.849105	Prob. F(2,33)	0.4369
Obs*R-squared	2.153461	Prob. Chi-Square(2)	0.3407

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 08/14/17 Time: 16:22

Sample: 1972 2015

Included observations: 44

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.314853	1.963576	-0.160347	0.8736
DINF	0.000238	0.063048	0.003772	0.9970
DLIT_RATE	0.042470	1.276687	0.033266	0.9737
DPPLN	0.530505	2.724815	0.194694	0.8468
DTRADE	-0.028358	0.110251	-0.257212	0.7986

DUNEMPL	0.148051	0.526322	0.281293	0.7802
GCF	-0.030935	0.054154	-0.571229	0.5717
GVT_EXP	0.003022	0.015922	0.189802	0.8506
DUMMY	0.184725	0.625445	0.295350	0.7696
RESID(-1)	0.158175	0.206186	0.767148	0.4484
RESID(-2)	0.206041	0.192971	1.067727	0.2934

R-squared	0.048942	Mean dependent var	-7.70E-16
Adjusted R-squared	-0.239257	S.D. dependent var	1.579442
S.E. of regression	1.758265	Akaike info criterion	4.178850
Sum squared resid	102.0194	Schwarz criterion	4.624898
Log likelihood	-	Hannan-Quinn criter.	4.3442

	80.93470		66
F-statistic	0.169821	Durbin-Watson stat	1.968567
Prob(F-statistic)	0.997363		

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	0.259616	Prob. F(1,41)	0.6131
Obs*R-squared	0.270567	Prob. Chi-Square(1)	0.6030

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 08/14/17 Time: 16:23

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.208813	0.604595	3.653377	0.0007
RESID^2(-1)	0.079784	0.156584	0.509526	0.6131

R-squared	0.006292	Mean dependent var	2.407835
Adjusted R-squared	-0.017945	S.D. dependent var	2.999331
S.E. of regression	3.026122	Akaike info criterion	5.097836
Sum squared resid	375.4540	Schwarz criterion	5.179752
Log likelihood	-107.6035	Hannan-Quinn criter.	5.128044

	0.25961		1.9325
F-statistic	6	Durbin-Watson stat	52
	0.61311		
Prob(F-statistic)	6		

Correlation matrix

	gdp	Dinf	dlit_rate	dppln	dtrade	dunempl	gcf	Gvt exp	dummy
gdp	1								
dinf	0.078	1							
dlit_rate	-0.128	0.221	1						
dppln	0.137	-0.079							

-0.369 1

dtrade

-0.038 0.332

0.134 0.069

1

dunempl -0.016 -

0.043 0.037 -

0.790 0.015 1

gcf

0.447 -0.109

0.1832 0.085

-0.051 0.085 1

gvt_exp

-0.08 -0.248

0.007 -0.227 -

0.242 -0.226 -

0.034 1

dummy

-0.453 0.084

-0.118 0.142

0.0267 -0.116 -

0.256 -0.227 1

Correlation matrix

	gdp	Dinf	dlit_rate	dppln	dtrade	dunempl	gcf	Gvt exp	dummy
gdp	1								
dinf	0.078	1							
dlit_rate	-0.128	0.221	1						
dppln	0.137	-0.079	-0.369	1					
dtrade	-0.038	0.332	0.134	0.069	1				
dunempl	-0.016	-0.043	0.037	-0.790	0.015	1			
gcf		-	0.1		-	0.0	1		

	0.447	0.109	832	0.085	0.051	85			
gvt_exp	-0.08	-0.248	0.007	-0.227	-0.242	-0.226	-0.034	1	
dummy	-0.453	0.084	-0.118	0.142	0.0267	-0.116	-0.256	-0.227	1