IMPACT OF GOVERNMENT BORROWING FROM CENTRAL BANK VS COMMERCIAL BANKS ON INFLATION: EMPIRICAL EVIDENCE FROM PAKISTAN

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This thesis is dedicated to Mr. Baz Khan & Mrs. Gulzar Begum

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Mobina Yasmeen

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LIST OF ACRONYMS

ADF	Augmented Dickey Fuller test
AJK	Azad Jammu and Kashmir
ARCH	Auto Regressive Conditional Heteroscedasticity
ARDL	Autoregressive Distributed Lag model
BD	Budget Deficit
CPI	Consumer Price Index
C.V	Critical Value
ECM	Error Correction Model
FBS	Federal Bureau of Statistics
FMOLS	Fully Modified Ordinary Least Square
FY	Fiscal Year
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
IMF	International Monetary Fund
MB	Monetary Base
MRTBs	Market Related Treasury Bills
M2	Board money
NPLs	Non-Performing Loans
OLS	Ordinary Least Square model
PIBs	Pakistan Investment Bonds
PSE	Pakistan Stock Exchange

SBP	State Bank of Pakistan
SLR	Statutory Liquidity Ratio
SVAR	Structural Vector Autoregressive
T-BILLS	Treasury Bills
VAR	Vector Autoregression model
VECM	Vector Error Correction

ABSTRACT

In a resource constraint country like Pakistan a budget deficit is compensated by government borrowing and most of this is borrowed from the banking sector, which creates inflation hikes in an economy. In order to analyze this empirically, in this study the impact of 'Borrowings of government from central bank (SBP)' and 'Borrowings of government from commercial banks' on inflation is accessed. The monthly time series data of Pakistan; from June 1998 to June 2017 is taken. Volatility in both government borrowings is measured by GARCH model. Whereas the long run relationship among these two borrowings and inflation is estimated by ARDL model. Furthermore, the ECM model is also used to estimate their short run relationship. The study runs all these models separately for these two borrowings in order to check their impact on inflation. The empirical result suggests that the both borrowings have its positive impact on inflation and have strong relationship in long run. However the borrowings of government from central bank (SBP) has more impact on inflation rather than the borrowings of government from commercial banks, which hinders the monetary policy makers to keep the inflation at its desirable level.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

One of major objective in most of economies worldwide is high economic growth at a stably low inflation. While determining the growth of economy the stabilizing price level plays a critical role in it; therefore in many countries monetary authorities implement monetary policies to control and maintain inflation at a desirable level. A great and overwhelming hike in inflation has its adverse effect on the economy. An analysis by Fischer *et al.*,(2002) show that fiscal deficit is one of main determinants of high inflation. Most governments invest in social and public sector in order to stimulate the economic growth in the economy and employment opportunities. But since in a resource constraint like Pakistan a deficit arises which is compensated by government borrowing. This budget deficit arises because the budget revenue from tax cannot offset the government spending. To deal with such kind of deficits most of governments borrow domestic and external debts.

It might seems harmless in the FY10 Pakistan's fiscal deficit was 6.3 percent. By reviewing the history of fiscal deficit of Pakistan it was deduced that Pakistan has faced persistent fiscal deficit throughout the fiscal years. The fluctuations of fiscal deficit were around the range of 2.9 percent and 12.2 percent of GDP. The insufficient government measures to raise revenues were the cause behind such fiscal deficit which prompted tax aviation undocumented and parallel economy. The persistent reliance on government borrowings has a direct

consequence on the accumulated fiscal deficit. Since external borrowings has its limitations which is unpredictable due to the flows of receipts and payments. By considering these repercussions to meet the financial needs the government relies on central bank (SBP) and commercial banks.[1]

The central bank uses 'printing money' as a source to finance the government borrowings (i.e. monetizing debt) then it is injecting that money in the economy which was not in circulation. Ultimately money supply will become high in economy through government spending which in the end reflect in the prices and resultantly inflation will be high in the economy. Whereas if government borrows from commercial banks then commercial banks have the only source to finance the borrowing i.e. to extract the money from public in form of deposits creation, in this way only that money will comes in circulation which was extracted from economy in form of borrowing. This increase in money supply will also ends on high inflation. According to Ali and Khalid (2010) inflation has long run association with fiscal deficit's financing sources. Their study states that borrowing from domestic sources, borrowing from banking sector and especially borrowings of government from central bank positively affect the inflation.

The relationship between the level of money supply in the economy and inflation is also supported by fisher's Quantity theory of money. As Quantity theory of money in the tradition of Milton Friedman also accepts that the inflation occurs when the rate of growth of the money supply exceeds the growth rate of the real aggregate output in the economy. According to the monetarists, the Quantity theory of money implies that inflation is always, everywhere and solely a monetary and demand-side phenomenon. Thus, by keeping this in mind this study will

[1] State Bank of Pakistan , Financial Stability Review 2009-10

empirically investigate the difference in the level of inflation created by government borrowing by central bank and government borrowing by commercial bank by using the monthly time series data from Jun 1998 to Jun 2017. This study will be beneficial for the policy makers.

1.2 OBJECTIVES OF STUDY

This study pursues the following objectives:

- To analyze the impact of 'borrowings of government from central bank' on inflation in Pakistan.
- To analyze the impact of 'borrowings of government from commercial bank' on inflation in Pakistan.
- To analyze the impact of 'borrowings of government from central bank' vs. 'borrowings of government from commercial banks' on inflation in Pakistan.

1.3 RESEARCH HYPOTHESIS

"Borrowings of government from central bank creates more inflation than borrowings of government from commercial banks'' is the research hypothesis of a study.

1.4 SIGNIFICANCE OF STUDY

Achieving high growth rate at a stable low inflation rate is always remains a critical issue for the Policy makers in an economy like Pakistan, which is suffering from high debts and low resources. The borrowing of government is increasing day by day both from external and internal sources. These borrowings ultimately end on high inflation therefore it is necessary to take serious measures by the policy makers to achieve a stable inflation rate by using less inflationary

sources of deficit financing. This study is focusing on measuring the impact borrowing of government from central bank vs. commercial banks on inflation in Pakistan.

To the best of my knowledge this study will be an add up in the literature as neither the impact of 'borrowings of government from commercial banks' on inflation is empirical estimated in literature nor the difference of impact i.e. created from 'borrowings of government from central bank' vs. 'borrowings of government from commercial banks' on inflation is empirically assessed. It will be beneficial for the policy makers to keep the inflation at desirable level. That will ultimately lead us to achieve high economic growth at a stable low inflation.

1.5 SCHEME OF STUDY

The rest of the study is comprises of 5 chapters. Chapter 2 describes literature review, in which both international and national literature is discussed. Chapter 3 describes the overview of government borrowing and inflation in Pakistan, in which the upward and down trends of both borrowings of government from central bank (SBB) and commercial banks is analyzed graphically. Chapter 4 is comprises of methodology and data sources. Chapter 5 includes the estimations and result discussion. Lastly, chapter 6 clarifies the conclusion and policy suggestions of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In literature the association among budget deficits, money growth and inflation remained a critical issue always. As public spending is not fully backed through revenues of the government create a disparity between spending and revenues. This forces the government to finance these shortfalls to other channels such as printing money, borrowing domestically and internationally. As a consequence, to this there will be a higher inflation in the economy. In this contest both international and national literature is studied.

2.2 INTERNATIONAL LITERATURE

According to Keynes (1923) an escalation in government's budget deficit would increases the real interest rate. Which ultimately tends to increases the prices level and crowding out of private investment in an economy. Whenever the 'printing money' becomes the financing sources of government's budget deficit, the aggregate demand will increases in an economy.

The nexus of budget deficits and inflation is examined from various angles. According to Sergent and Wallace (1981) impact of budget deficit is inflationary. The study states that the governments those are suffering from a persistent budget deficit, in the end would use the print money as a source of budgetary support financing. But in long run this financing would ultimately leads to high inflation.

From the monetarist view, Hamburger and Zwick (1981) argue that budget deficits of government would lead to inflation, but only to the extent that they are monetized. The interrelationship among monetary and fiscal policy is examined by the study. Specifically, it seeks to determine whether government budget deficits influence monetary growth or not. Using a money supply model, the study investigates that deficits have a significant impact on the money growth of the U.S. economy since 1961. Such relationship does not prevail always. On the other hand it depends on whether government budget deficit puts an upward pressure on rates of interest or for stabilizing the interest rates the central bank monetizes the budget deficit.

Similarly, as stated by Lucas (1981), in order to cover the gap between government's revenues and its expenditures, the continuations of monetary expansions are always remain there as a consequence of deficit's monetization. This channel is leading in high inflation rate in an economy. Miller (1985) further explains that budget deficits lead to inflation as the central bank may finance a budget deficit by printing new money or by private monetization. This leads to a higher interest rates and it tends to crowd out private investments and reducing the growth rate of real output as well as increase in inflation.

On the other hand, in order to develop a significant statistically association among budget deficit and inflation, few studies gain little a success empirically. As there is no significant relationship is found among these two variables in a study conducted by King and Plosser (1985) for United States of America and twelve other economies. However, the studies regarding developing countries show positive relationships between fiscal deficit and inflation. For instance, Haan and Zelhorst (1990) investigate this relationship for 17 developing countries. The estimation technique is Vector auto-regression (VAR). They consider money growth as depended variable

and fiscal deficit as independent variable. The study finds a positive association between fiscal deficit and money growth for few developing countries including Pakistan. It is suggested that in many developing countries the central banks come under direct control of the minister of finance.

Moreover a rational-expectation on macro model of inflation is also premeditated under this scenario by Chaudhary and Parai (1991). The study finds the expected effect of governments' fiscal deficit on inflation rates in Peruvian economy from 1973 to 1988. The Ordinary least square (OLS) technique is used to estimate the results. This study concludes the high money growth because of huge government's budget deficit financing creates the inflationary environment in an economy.

Another study by Cukierman *et al.,* (1992) states the significance of printing money as compare to other sources of deficit financing of government which differs distinctly across states. The study tries to describe this consistency by assessing a political model of tax transformations. This model explains that those states which have more unstable and polarized political structure will have more ineffective tax management and hence it will depends more severely on printing money. Their findings suggest that due to low independence of central banks, the use of printing money for budgetary support will leads to high inflation and instability in the economies.

Likewise, many researchers like Demopoulos *et al.,* (1987), Cardoso (1991) and Sowa (1994) speculate that borrowings from domestic market and printing of new money as source of deficit financing are positively correlated with inflation. In the same way Akcay *et al.,* (1996) investigates inflation determinants for Turkish economy by using the yearly time series data

from 1948 to 1994 while quarterly data is also used from 1987 to 1995. The result indicates that inflation is effected by the budget deficit during the period of pre-bond financing.

Moreover, factors causing inflation are also investigated by Metin (1998), employing the yearly data from 1950 to 1987 for Turkish economy. In this study the multivariate cointegration analysis is done. The findings state that the inflation is significantly affected by the debt monetization of budget deficit. For the conditional model, it is observed that inflation immediately rises due to an increase in the budget deficit. Whereas at a second lag, it is notice that deficit financing by printing new money affects inflation. The growth of real income has also a negative immediate effect and positive second-lag effect on inflation.

Favero and Spinelli (1999) however scrutinize empirically the model of "fiscal supremacy" of the monetary history for Italian economy. They estimated the model of linear econometric for the period 1862-1994 by using M2 as a proxy for money supply. The study argues that is a more stable relation of inflation with extensive monetary aggregates like the 'broad money'. The results further confirmed the existence of a link among fiscal deficit, growth of money supply and inflation in a long run. On the same lines Akcay *et al.,* (2001) also observes a significant relationship among budget deficit and inflation. Outcomes of this study further reveal that deficit financing by printing of new money and borrowing from both internal and external sources is inflationary in long run.

Fischer *et al.,* (2002) clearly mentions that in high-inflation countries the linkage between fiscal deficit and printing money is stronger as compare to low-inflation countries. In this study the sample of ninety four economies is classified as high and low inflation economies. The study analyzes the association among budget deficit, money printing and inflation by employing OLS

Method. The results states that in high inflation countries most of the government's debt is finance through printing money by central banks.

Similar results are also attained by Catao and Terrones (2003) that the relationship among budget deficits and inflation between developing and high inflation economies is positive. On the other hand this relationship is insignificant for developed and low-inflation economics. This study employs the sample of 107 economies from 1960 to 2001. However, unlike the previous studies, the inflation model is nonlinearly associated with budget deficits via inflation tax base. Hence by employing the panel techniques, the study finds that this relationship is basically dynamic and the effects of fiscal deficits between short run and long run is different.

On the same lines Solomon and Wet (2004) also demonstrate a significant relationship between fiscal deficit and inflation. This study examines this relationship in the Tanzania for 1967-2001. By co-integration analysis they developed a linkage that starts from budget deficit and ends on inflation. In order to estimate the effect of a change in the gross domestic product and budget deficit on inflation, the dynamic simulations are done over time. The results states that due to increase in budget deficit and as well as its monetization had significant effect on inflation.

The theoretical approach is adopted by Sill (2005) in which he examines various studies including the study of Fischer *et al.,* (2002). The results show by comparing low inflation and high inflation economies' printing money that is constituted as a fraction of GDP averaged about 4 percent in high inflation economies against an average of 1.5 percent in low inflation economies. Moreover, the standard techniques are used to indicate that budget deficit leads to high inflation whenever the government finances its deficit by printing money.

Sill (2005) also examined the study of Catao and Terrones (2003) in which the authors capture a strong linkage among budget deficit and inflation in developing economies whereas in developed economies this bond is weaker. In this regard he states that fiscal and monetary policies are interrelated as the money supply, in the form printing money facilitate government's fiscal unit with excess revenues. This is a determining factor in the effect of Fiscal deficit on inflation. So, if monetary policy is dependent then the association between fiscal deficit and inflation will be stronger and vice versa.

Many researchers also scrutinize the association between budget deficit and inflation, separately in long and short run and find the significant results. Alavirad and Athawale (2005) explore the factors causing inflation for Iranian economy from 1963 to 1999. The study finds the inflation is positively effect in the long run than in short run for an increase in budget deficits.

While in Zimbabwe Makochekanwa (2011) analyzes the impact of budget deficit on inflation over the period 1980 to 2005. The study used Johansen (1991, 1995) co-integration technique for estimating results. The study reveals that because of current and non-developmental government's expenditures, budget deficit exists which is covered by central bank borrowing which leads to inflation.

Oladipo, *et al.,* (2011) explores the nature of linkage between the fiscal deficit and inflation for Nigerian economy. The annual data is employed from 1970 to 2005. Their results indicate that in Nigerian economy, causality only starts from fiscal deficit and ends on inflation but not the other way round.

On the same lines, the impact of fiscal deficit and sources deficit financing on inflation is investigated by Devapriya and Ichihashi (2012) for Sri Lanka. The VAR model is applied on annual data series from 1950 to 2010. The result indicates significant relationship among inflation and budget deficit. Furthermore a bi-directional causality pattern is shown among fiscal deficit and inflation for Sri Lankan economy by doing causality analysis. This study also suggests the existence of three bi-directional causalities pattern among budget deficit, money growth and inflation.

Similarly, Zuze (2015) investigates the linkage among budget deficit, money growth and inflation for Zimbabwe from 1980 to 2007.Granger Causality and VAR techniques are applied for estimation. The results are similar to the empirical results of Favero and Spinelli (1999); Nhavira (2009) and Hoang (2014) that growth in the money supply has significantly positive impact on inflation in Zimbabwe. On the other hand the empirical results reveal that shocks to growth of fiscal deficit does not affect inflation, despite the fact that Solomon and de Wet (2004); Catao and Terrones (2005) and Makochekanwa (2008) finds that in developing and high inflation economies the relationship among fiscal deficits and inflation is positive and more strong. The findings however, shared a conclusion with Barnhart and Darrat (1988) and Chukwu (2013) in which budget deficits only affect inflation when they are financed through printing money.

2.3 NATIONAL LITERATURE

There is huge literature is available even in National level to access the relationship of budget deficit and inflation resulting from the printing of new money for instance a model is developed by Chaudhary and Ahmed (1995) in order to examine the association between budget deficit,

growth of money and inflation. This model is estimated by using annual from1973 to 1992, 1973 to 1982, and 1982 to 1992. The use of 2SLS is required as their basic model is simultaneous. However, OLS technique is also used since in line with De Silva (1977), the results from OLS technique are unevenly comparable to those which are gain from 2SLS technique. Their outcomes reveal that deficit financing through domestic sources specifically from banking sector influence inflation in long run in great magnitude.

Similarly, a positive and significant relation also observed among budget deficit and inflation by Hossain (2005) in Indonesian economy from 1954-2002.Whereas in Pakistan Agha and Khan (2006) analyze the 'fiscal indicators and inflation' relationship both in long and short run. The study employs the annual data from 1973 to 2003. The results specify that in long run inflation is effect by both fiscal indicators and sources of deficit financing. Whereas, VECM model is used for the analysis of this relationship in short run. The study further concludes that in Pakistan inflation is mainly attributable to untenable fiscal deficit. It deduces that printing of new money from banking sector for financing of deficit affects inflation.

Arby (2006) explores the trend of seigniorage revenue of State bank of Pakistan and commercial banks. The study finds that with passage of time seigniorage revenue of the SBP is declining implies the autonomy of the central bank as well as government's less dependency on SBP's for budgetary support. On the other hand, overall a positive relationship among seigniorage earnings and inflation is observed in Pakistan. Though, an opposite relation is observed at the two extremes of very high inflation or very low inflation.

By the same token Khan *et al.,* (2007) investigate the factors causes the recent inflationary environment in Pakistan. The main focus of the study is to to identify key determining factor of

recent inflation pattern by employing the data set from 1972-73 to 2005-06. The OLS method is used to estimate the result. This study is also of the view that deficit financing through printing of new money leads to high inflation in an economy.

An escalation in borrowings of government from central bank may have severe consequences for Pakistan economy. For instance, Adnan and Khan (2008) examine the effect of volatility in borrowings of government from central bank (SBP) on inflation in Pakistan. This study employs the monthly time series data from July 1992 to June 2007. The two techniques are used by this study. Firstly, the GARCH model is used in order to estimate the volatility in borrowing of government. Secondly, the ARDL model is used to capture the long run relationship between volatility in borrowing of government and inflation. The results reveal that in long run inflation is linked with volatility in borrowings of government from central bank. Moreover, by applying error correction model (ECM) it is observed inflation is also influence by the volatility in borrowings of government from central bank in the short run.

Another work by Serfraz and Anwar (2009) explores the relation among fiscal imbalances and inflation as well as the effects of deficit financing on inflation for Pakistan economy. In order to examine this relationship, the data set from FY76 to FY07 is employed. The major objective of this study is to investigate the influence of increasing in money growth on inflation. This study applies VAR model for estimations. The results indicate that money growth and both internal and external borrowings causes the inflationary pressure in an economy. Thus the study concludes that deficit financing through monetization is inflationary in Pakistan.

It is also suggested that in long run the linkage between volatility in borrowings of government from central bank and inflation is very strong. This is empirically examined by Mughal, *et al.,*

(2011) with wide data set and adopted a model which includes theoretic key features. By employs the data set of Pakistan from 1960 to 2010, the study finds the impact of budget deficit on inflation. For the long run relationship analysis the co-integration technique is used. Whereas for the short run analysis Error correction model is used. The results reveal that Fiscal deficit is one of the leading cause of inflation both in long and short run though this relation is more strong in long run.

On the same token, Habibullah, *et al.,* (2011) also evaluates the relation between budget deficit and inflation. The study adopted the data set of 13 Asian developing countries including Indian, Malaysian, Indonesian, Bangladeshi and Pakistani economy. The study uses the time series data from 1950 to 1999. By applying Error Correction model, the study finds a causality pattern between fiscal deficit and inflation.

Ahmad *et al.,* (2012) analyzes the impact of domestic borrowing on inflation for Pakistan economy. The study examines this relationship by using the time series data from 1972 to 2009. By using OLS technique, the study reveals that domestic borrowing rises level of prices in Pakistan. On the other hand, the study does not prove empirically the difference between the levels of inflation created by different deficit-financing sources but it is generally discussed in the study that the borrowings of government from the central bank is more inflationary. However, the 'borrowings of government from the commercial bank' will be less inflationary if the central bank is not involved indirectly in this mechanism.

Likewise, Yasmin, *et al.,*(2013) investigate the nexus between money supply, borrowing of government and inflation in Pakistan. This study explores the empirical relationship of borrowings of government from the central bank and money supply with inflation. Causality

analysis and VAR model is used for this study. The study employs the monthly time series data from January 2008 to February 2013, in order to check their interdependence. Fully Modified Ordinary Least Square (FMOLS) technique has been used for empirical analysis. The results indicate that in long run the effect of government borrowing and money supply has a strong influence on inflation. Moreover, this study also finds that dual causality exists between inflation and money supply. This study suggests that if Pakistani government desires to control inflation then it must put limitations on its money supply and borrowing from the central bank.

Hence fiscal deficits lead to inflation only when they are monetized. It is also proved in context of Pakistan by Ishaq and Mohsin (2015). The panel data set is used for this study taken from 1981 to 2010 for 11 Asian countries including Pakistan as well. The study used GMM technique for estimation. The findings indicate the strong bond between inflation and deficit in those Asian countries where the fiscal deficit is mainly financed through printing of money by central bank. The study further suggests that monetary authority compromises their one of main objective that is price stability under the political pressure. So whenever deficit financing is done through monetization it will eventually lead to inflation. A more recent study by Rashid, *et al.,* (2017) using Structural Vector Autoregressive (SVAR) model also indicates that borrowings of government from central bank asserts inflationary pressure on the economy of Pakistan.

Vast literature is available in order to explain that the budget deficit has its inflationary impact in an economy. The both sides of coin are twisted and tossed by the literature and different results appeared. Most of the studies are conducted for emerging and developing economies and their findings indicate that potential culprit of inflationary pressure is budget deficit. On the other

hand, in developed economics the evidence of ‘budget deficit’ being accountable for price hikes appeared to be less significant.

To sum up, both international and national literature is available to assess the relationship of budget deficit and inflation resulting from printing of new money. However the present literature did not explore the difference in the level of inflation created from different sources of deficit financing empirically. Such as difference of inflation hike that is created by ‘borrowings of government from central bank’ and ‘borrowings of government from commercial banks’. These differences hold great significance for policy makers and this study tries to fill this gap.

CHAPTER 3

OVERVIEW OF GOVERNMENT BORROWING AND INFLATION IN PAKISTAN

3.1 INTRODUCTION

It has been examined from literature that whenever the government spending's are greater than the government revenue collected then economy will be in state of 'budget deficit'. In order to finance this 'budget deficit' without an increase in the taxes the government finds the most viable option that is 'borrowing'. Whereas the national debt or the public sector debt is known as the total amount that government has borrowed. The governments' most feasible option for borrowing is banking sector[2]. In Pakistan's total debt and liabilities are comprised of public debt and private debt[3].

This chapter is divided into two parts, in first section a brief overview of borrowings of government from both central bank and commercial banks graphically is given from 1998 to 2017. Whereas in the second section in context of monetary policy management, a detailed analysis of government borrowing and inflation and is done in the form of chronology, which is extracted from the SBP's annual and quarterly reports, which clarifies that due to high dependency of government borrowing on central bank (SBP) hinders the monetary authorities' to maintain inflation at its desirable level. On the other hand the borrowings of government from

[2] SBP report.
[3] Analysis of Pakistan's Debt Situation: 2000-2017 by Ishrat Husain.

commercial banks has less impact on inflation but if the government borrows from commercial banks then due to the lack of resources the commercial bank borrows from SBP to lend it to the government. Which ultimately also ends on high inflation and this indirect channel is also mentioned in SBP's report.

3.2 BRIEF OVERVIEW OF BORROWINGS OF GOVERNMENT FROM CENTRAL BANK AND COMMERCIAL BANKS

3.2.1 Borrowings of Government from Central Bank

The borrowings of government from Central bank (SBP) are increase considerably over the last ten years (see figure 3.1). For instance it increased to Rs.1018901 million rupees at the end of FY10, from Rs.493062 million rupees at the end of FY07. After FY10 there is a gradual increase in borrowing till FY12 but by the end of FY13 a hug increase is observe that is of Rs.2668905 million rupees. It is a record breaking increase in the whole period. By the start of FY14 it start decreasing and reaches to Rs.1689019 million rupees by the mid of FY15. However, by the end of FY15 again an increase is observed which gradually reaches to Rs.2608459 million rupees by the Mid of FY17.

3.2.2 Borrowings of Government from Commercial Banks

The borrowings of government from commercial banks are also increases considerably over the last ten years (see figure 3.2). For instance it increased to Rs.3033477 million rupees by the mid of FY13, from Rs.318353 million rupees at the end of FY08.After that it decreases for FY14 but again gradual and steep increase is observe which reaches to its highest point i.e. Rs.5932554 million rupees by the end of FY17.

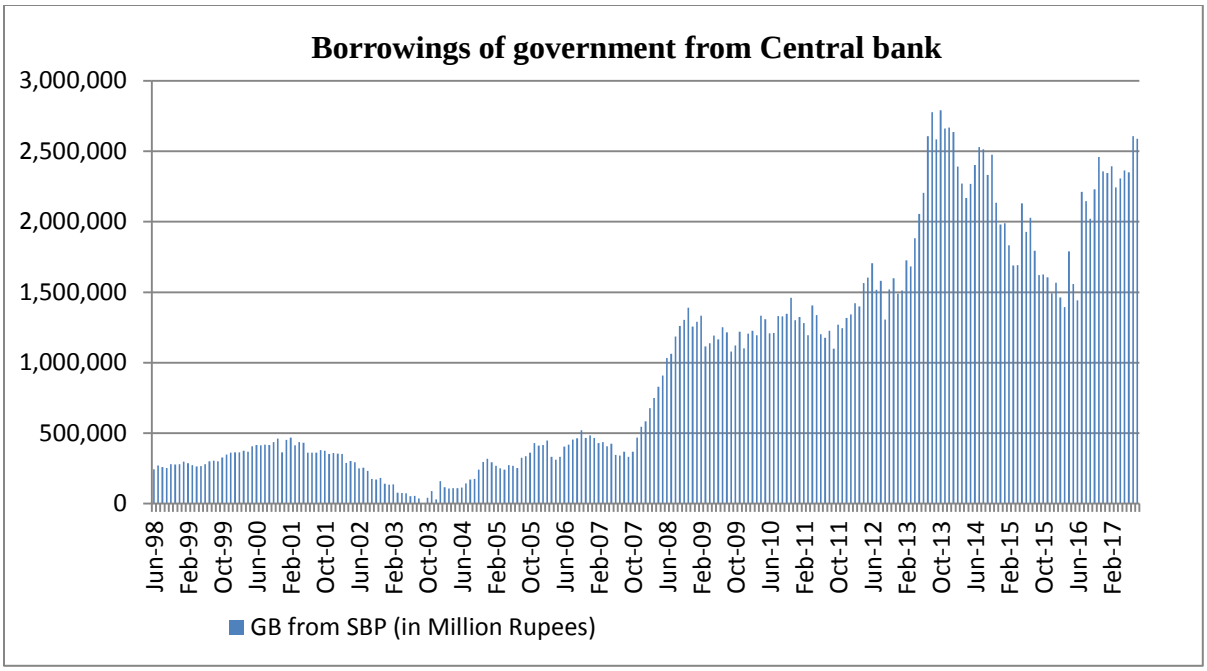


Figure 3.1: Borrowings of government from Central bank

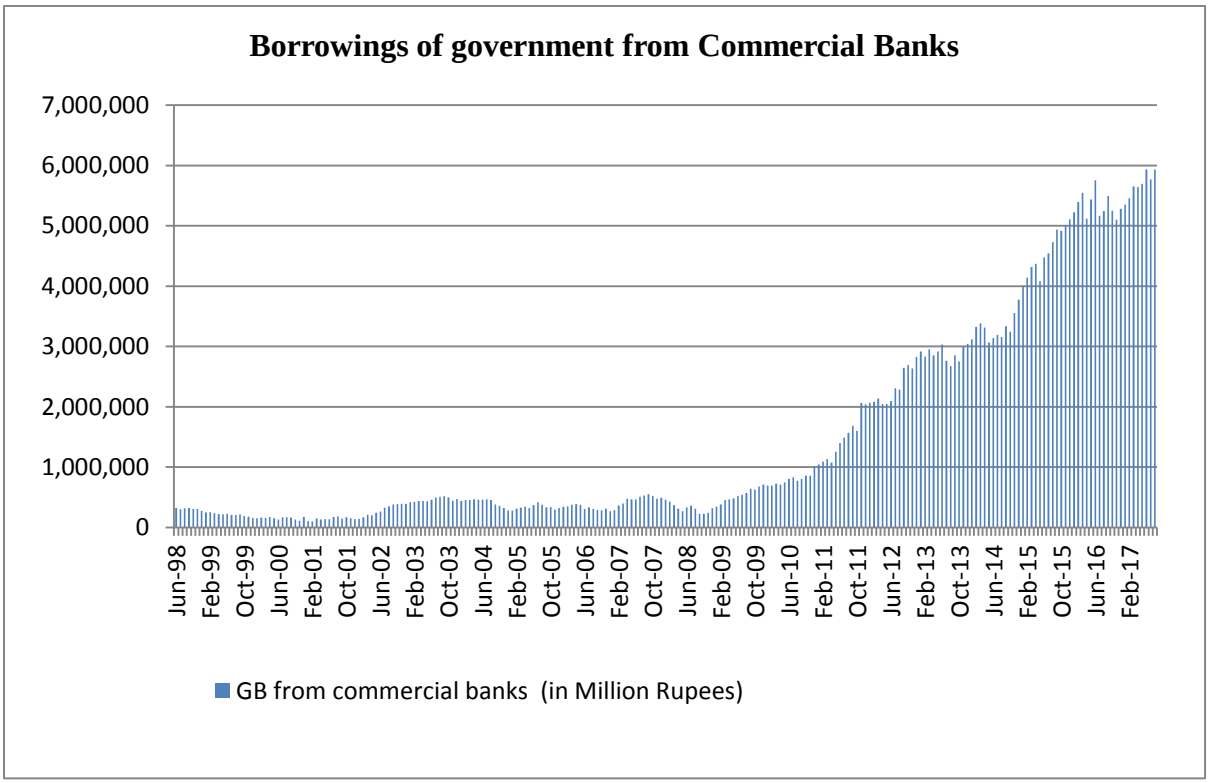


Figure 3.2: Borrowings of government from Commercial Banks

3.3 CHRONOLOGY OF GOVERNMENT BORROWING AND INFLATION; IN LINED WITH MONETARY POLICY MANAGEMENT

3.3.1 Government borrowing from 2006 to 2009

SBP Annual report 2006-207 describes that government budgetary borrowing from the banking system during fiscal year FY06 is significantly higher, although during FY07 this borrowing remained comfortably within the target. In July 2006, increase in the discount rate and reserve requirements has widened the interest rate differential between private and government sector. Therefore by December 2006, commercial banks were hesitant to provide loans to the government.

As a result, burden of financing budgetary requirements fell on the SBP. This had two consequences. Initially, the escalation in the growth of reserve money resulted in increase of board money and inflation acceleration risk. Afterwards, the holdings of the T-bills in commercial banks have dropped significantly, which require a significant upgrade. Then, throughout the second half of the FY07, commercial banks started huge investment in government paper.

According to SBP Annual report 2007-2008, during the financial year 2008, the environment of monetary policy was very difficult. The consumer price index surged to its highest level in three decades in June 2008, and has since continued to rise. The weaker domestic production was caused by both, adverse shocks. The external imbalance worsened due to the demand inducement for the unusual rise in borrowings of government from the SBP, terminating the influence of the previous tight monetary policies.

During FY08 heavy monetization of fiscal deficit has been done, the utmost inflationary source of deficit financing. In this period, the government acquired Rs.688.7 billion in the form of borrowing from SBP to cover its budget deficit. Whereas, for fiscal year 2008 it was overall 90 percent of the total financial needs of the government.

However the severe escalation in government borrowings was due to massive fiscal slippages, this huge dependency of government borrowing on SBP is also because of less contribution of commercial banks in government budgetary support, as the commercial banks has less participation in the auction of government securities. This investment behavior by the commercial banks had further increased government borrowings from SBP. Though different policy measures were taken in which the discount rate was also raised but still Government's high dependency on borrowing from SBP continued.

There were also certain consequences of large budget deficit; as it limits the efficiency of monetary policy in order to control inflation. If central bank tries to ease fiscal authorities rather than monitoring inflation then the real stock of government debt will fall, but it will cause a dynamic timing issue for central bank. Whereas, next time the economists will expect that central bank will diverge from its goal i.e. inflation targeting rather it will assist the government in budgetary borrowing. Meanwhile, the SBP requested the government to include provisions in the fiscal obligation and 2005 debt Limitation Act, to eliminate its dependency on SBP loans for a certain period.

According to SBP Annual report 2008-2009, the monetary policy department of central bank decided to increases its policy rate to 13 percent by 100 bps in its July-December 2008 statement. As there were expecting the worse inflation condition and risks associated with

increase in budget deficit and external current account. Furthermore, the Central Board of Directors of SBP by reviewing the worse impact of borrowings of government from central bank (SBP) decided that in each quarter of fiscal year 2009 Rs.21 billion should be retire by government.

3.3.2 Government borrowing from 2009 to 2012

Despite SBP's strict monetary policy management, again in the second half of FY11 the inflation rate turned to be double digit. According to SBP's annual report 2010-2011, this time supply side factors including floods at the beginning of the year, high global price of oil and agricultures goods also became the cause of inflation hike. On the demand side, huge borrowings of government from SBP also assert pressure on the inflation expectation especially in the first quarter of the year. However the government shifts its borrowing from SBP to commercial banks after November 2010. As in late 2010 SBP and Ministry of finance decided to retain the government borrowing low then September 2010 levels. This was a good decision for managing inflationary expectations.

According to SBP annual report 2011-2012, noticeable improvement have been seen in economic activities in fiscal year 2012 as for the first time in the last five years the actual estimated inflation was lower than the annual target. Despite of all these development still the economy was not able to move away from high inflation and low growth situation. All these conditions make the environment challenging for SBP. In all these circumstance the increasing borrowings of government from SBP for each proceeding year makes the situation more difficult for monetary policy authority, although an accommodative monetary policy have been implemented by the SBP for FY12. Whereas due to huge government borrowing needs the

commercial banks also lend loans to government but it has been notice that in order to meet the large demand of government borrowing, commercial banks were taking the liquidity from SBP for further lending to the government.

Moreover, the government has also amended the SBP Act 1956 to limit the stock and flow of borrowings of government from the central bank. In this manner the fiscal authorities showed great commitment towards limiting its borrowing from central bank, it will not only assist its credibility but also help central bank in management of inflationary expectations. Hence, the necessity to limit the government borrowing from central bank during the first quarter of fiscal year 2013 tends to progressive development.

3.3.3 Government borrowing from 2012 to 2017

The quarterly report 2012-2013 of SBP refers to progressive lending of commercial banks to the government, which is constantly mounting since 2008. However, the major concern to inflationary stance is the dependency of government on bank system for budgetary support.

At ample level, during Jul-Mar FY13 the broad money supply (M2) was raised to 9.0 percent as compared to the same period last year by 8.1 percent. The major reason behind this monetary growth was due to huge government budgetary borrowing from the banking system and later it has its inflationary influence on the economy.

In case of Pakistan, the total debt and liabilities are comprised of public debt and private debt. The analysis report of the former governor of State bank of Pakistan, Ishrat Husain[4], states that on June 30, 2017 the total stock of liabilities and outstanding debt rose at 79 percent of the total

[4] Analysis of Pakistan's Debt Situation: 2000-2017 by Ishrat Husain.

GDP. From this, 85 percent is Gross Public Debt of the total 67.2 percent of GDP and the rest 15 percent is the private debt commonly to debtors outside the economy. In order to cover this gap, there is no fiscal obligation done by government rather the central bank (SBP) is accountable to provide the foreign exchange to facilitate this debit.

Despite the fact, the balance was due by the public initiatives but then the government guaranteed it. The government's share was mainly 92 percent within the gross public debt. All the borrowing from IMF is a liability to the central bank (SBP) which is incorporated in public debt. The aggregate liabilities and debt consists of borrowings in Rupees from SBP, Sukuk, National Savings program, scheduled banks, prize bonds, etc. and borrowings in foreign money from bilateral organizations such as Asian Development Bank, the World Bank. In lined with SBP annual report *2016-2017*, the inflationary impact in the economy is due to borrowing of government from central bank. Though, in recent years, the reserve money growth does not pose any major threat for the already low inflationary situation in Pakistan.

3.4 CONCLUSION

From here it is clarify that the borrowings of government from central and borrowings of government from commercial banks has its significant impact on inflation. It is very clear that the high monetization of government debt will ends on high inflation. Whereas, the considerably high borrowing from central bank distracting the monitories authority from its major objective. Which will ultimately leads to the instability in the overall economy of Pakistan.

CHAPTER 4

METHODOLOGY

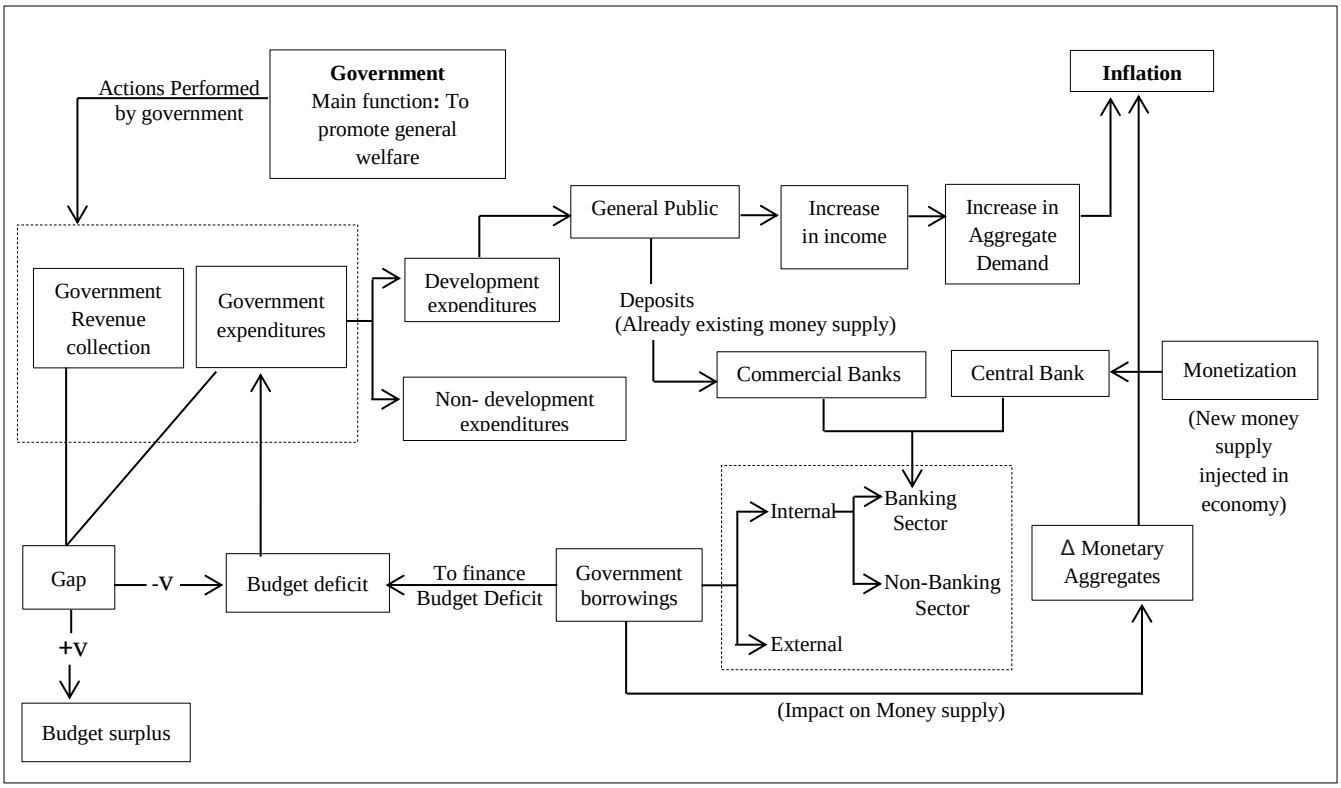
4.1 THEORETICAL FRAMEWORK

In order to investigate the research hypothesis it is required to understand the functional channel of impact of 'borrowing of government from banking system' on inflation in an economy. It is given in Flow Chart 4.1. As the government's main function is to promote the general welfare. It performs certain actions to achieve its main goal, which include revenue collection and expenditures. If the negative gap exists between revenue and expenditures, it causes budget deficit. In order to finance this deficit government borrows from both internal and external sources. In internal sources it has two categories i.e. banking sector and non-banking sector. This study will only remind focus to the banking sector for deficit financing. The banking sector is further allocated as central bank (SBP in case of Pakistan) and commercial banks. The central bank finances the 'borrowings of government' through monetization (new money supply is injected in economy). On the other hand, commercial banks finance the government borrowings through deposits (already existing money supply holding by general public). Once the government borrows the money to finance its budget deficit it will spend this to cover its expenditures. There are two types of government expenditures i.e. development and non-development. When the government spends on development expenditures it raises the income of general public and by increase in income aggregate demand will increase (demand pull inflation

theory). That will end on increase in inflation. Similarly, if it is analyze under the theoretical background of Quantity theory of money then increase in money supply (by government borrowing) will cause inflation.

In theoretical context, inflationary pressures are weakly cause by budget deficit; rather it is strongly affected by the monetary aggregates and expectations of the public, which ends by creating high volatility in the prices. As the government finances its budget deficit through different financing sources, therefore it is necessary to analysis its dynamics first which generate volatility in the money supply and ends on inflation. For this, the theoretical model proposed by Sachs and Larrain (1993) is adopted.

Flow Chart 4.1: Functional Channel of Impact of 'Borrowing of Government' on Inflation



The Sachs and Larrain (1993) proposed the public sector government's budget constraint, it is expressed as below:

$$BD = \Delta Gdt = Gdt - Gdt_{-1} = Cp(g + i + t) + i.Gdt_{-1} \quad (4.1)$$

Where:

- $Gdt - Gdt_{-1}$, is for the difference in government debt among the current and previous periods.
- Cp, is the level of price.
- $g + i$, is expenditures of government.
- t, is the taxes.
- $i.Gdt_{-1}$, is interest payments on earlier issued debt.

The government debt is held by two entities, firstly by the central bank and secondly by the public (both the nationals and foreigners) in the form of bonds or credit. Now, for the present research let's assume that Central Banks's credit to the banking system remain same over time. Whereas, the stock of 'debt of government' held by the central bank $Gdt_c - Gdt_{c-1}$ Plus the change in reserves of foreign exchange $E.(B_c^* - B_{c-1}^*)$ [5]is equivalent to the change in the monetary base ΔMB. From here following equation is obtain:

$$\Delta Gdt = \Delta MB + \left(Gdt_p - Gdt_{p-1}\right) - E.(B_c^* - B_{c-1}^*) \quad (4.2)$$

From the above equation (4.2), it is infer that in order to finance the budget deficit, that there are three ways; firstly by "monetization"[6]of the deficit, secondly by increasing 'public[7] holdings' of debt and thirdly by decreasing the 'reserves of foreign exchange' with central bank.

[5] Nominal exchange rate is denoted by E.
[6] Increase the monetary base or increase printing of new money.

As the aim of present study is finding 'volatility in borrowings of government from central bank' on inflation, therefore the study simplify the model by taking an assumption that for budgetary support government is borrowing from central bank only, Now equation (4.2) turn as:

$$\Delta Gdt = \Delta MB \tag{4.3}$$

Where;

$Gdt_c - Gdt_{c-1} = 0$ and $E.(B_c^* - B_{c-1}^*) = 0$

Let's;

$\Delta Gdt = GB_g$ and $\Delta MB = M_g$

Where:

- GB_g, growth in the borrowings of government.
- M_g, growth in money.

Such deficit finance is known as 'monetizing'. As this phenomenon increases the money supply and monetary therefore generally it is also known as 'printing money'. It can be notice from equation (4.3), that the source of deficit financing is 'growth in the high-powered money'.

The general functional form can also define as:

$$Mg = f(GB)$$

Or

$$volt(M_g) = f(volt\ (GB_g)) \tag{4.4}$$

It can observe from the above equation (4.4); by the channel of monetization the volatility in borrowing of government directly affect the money growth. Further, the 'Quantity theory of

[7] Both foreign and domestic.

money' clarifies that volatility in the growth of money will influence the prices in an economy[8]. Therefore, form here the following link can also develop:

$$\pi_t = f(volt\ (MB_g)) \tag{4.5}$$

Where;

$\pi_t \rightarrow$ Inflation

So, another relationship can also be resolved from equation (4.4) and (4.5), that inflation is effected by the volatility in 'borrowing of government'.

As below;

$$\pi_t = f(volt\ (GB_g)) \tag{4.6}$$

Similarly, same model will be used for estimating the impact of borrowings of government from commercial banks on inflation.

Now, the volatility defined in equation (4.6) will be estimated by using the ARCH/GARCH model introduced by Engle (1982) and Bollerslev (1986). Before modeling the dynamics of volatility in 'borrowings of government from central bank' it is required to find the appropriate type of ARCH/GARCH model. In order to determine the 'asymmetric effects of shocks on volatility' and 'behavior of time varying volatility' the LM test established by Engle (1982) will be applied.

After considering the information set of 'borrowings of government from central bank', the jointly estimated standard ARCH/GARCH model is given as:

$$GB_t = \mu + \varepsilon_t \tag{4.7}$$

Where; $\varepsilon_t = \sigma_t z_t$ and $z_t \sim iid\ (0,1)$

[8] Sources: Romer (2006) and Walsh (2003).

$$\sigma_t^2 = \omega + \varphi\varepsilon_{t-1}^2 + \phi\sigma_{t-1}^2$$

By using the specifications of model defined in equation (4.6) and (4.7), the final and complete econometric model is achieved as follows;

$$\left.\begin{aligned} \pi_t &= \alpha + \beta vol(GB_t) + \xi_t \\ GB &= \mu + \varepsilon_t \\ \sigma_t^2 &= \omega + \varphi\varepsilon_{t-1}^2 + \phi\sigma_{t-1}^2 \end{aligned}\right\} \quad (4.8)$$

Where; $\varepsilon_t = \sigma_t z_t$ and $\xi_t z_t \sim iid\,(0,1)$

GARCH/ARCH model capture the symmetric behavior. However in order to capture the asymmetric behavior the Threshold General Autoregressive Conditional Heteroskedasticity (TGARCH) developed by Zakoian (1994) will be used. It is expressed as follows;

$$\text{ʒ}_{r^2} = \varpi + \sum_{l=1}^{q} \alpha_l \left(|\varepsilon_{r-l}| - \partial_l \varepsilon_{r-l}\right) + \sum_{n=1}^{p} \beta_n \text{ʒ}_{r-n} \quad (4.9)$$

The dependent variable, ʒ_{r^2} in the given TGARACH model shows variance. Whereas α_l, is shows the value of ARCH and β_n, is shows the value of GARCH. The parameter ∂_l, captures the leverage effect. This effect talks about good and bad shocks. If the standard leverage effect is present then ∂_l, become positive and previous negative shock causes greater impact on current volatility than the previous positive shock of same magnitude.

The two main shortcomings of symmetric GARCH model are overcome by the exponential GARCH (EGARCH) model developed by Nelson (1991). This model relaxes the non-negativity constraint and detects the leverage effect specifically. This model is expressed as below;

$$ln\,\sigma^2{}_r = \omega_0 + \sum_{l=1}^{q} \rho_l \left[\frac{|\varepsilon_{r-l}|}{\sqrt{\sigma_{r-l}}} - \sqrt{\frac{2}{\pi}}\right] + \sum_{m=1}^{p} \partial_m\, ln\,\sigma^2{}_{r-m} + \sum_{n=1}^{f} \vartheta_n \frac{\varepsilon_{r-n}}{\sqrt{\sigma_{r-n}}} \quad (4.10)$$

The model of EGARCH shows that the conditional variance is an exponential function, so even if the parameters are negative, σ^2_r will be positive. Hence imposing non-negativity constraints on the model parameters is not required. In the given model, $\varepsilon_{r-l} > 0$ is the sign of good news, whereas, $\varepsilon_{r-l} < 0$ is sign of bad news. If $\vartheta_n > 0$, then the negative shock will tends increases volatility. If $\vartheta_n = 0$, the impact of shock will be symmetric likewise if $\vartheta_n < 0$, then positive shock will tends to decreases volatility as good news. ϑ_n , is capturing the asymmetric effect, which is usually negative i.e. positive shocks generate less volatility than negative shocks.

Now, the Autoregressive Distributed lag Model (ARDL) model developed by Pesaran, Shin and Smith (1999) will be used for the estimation of long run dynamics (cointegration) among volatility in borrowing of government and inflation. The technique for this test is appropriate regardless of repressors either they are I(0), I(1) or jointly cointegrated. The underlying VAR model, re-parameterized as an error correction model (ECM) is used a base for the estimation of this test.

The VAR (p) model is as follows;

$$v_r = a + br + \sum_{l=1}^{q} \Phi_l v_{r-1} + \varepsilon_r \tag{4.11}$$

Where, the vector variables are denoted by $\boldsymbol{v}$. By assuming that the specific components of $\boldsymbol{v}$ are at I(1) or the explosive roots are not acquired by them. Then as simple (ECM) Vector, the equation (4.11) can be defined as;

$$\Delta v_r = a + br + \prod v_{r-1} \sum_{l-1}^{q-1} \Gamma_l \Delta v_{r-1} + \varepsilon_r \tag{4.12}$$

Where;

$\prod = -\left(L_{m+1} - \sum_{l-1}^{q} \varphi_l\right)$ and $\Gamma_l = -\sum_{n-l+1}^{q} \varphi_n, l = 1, \ldots q-1$ are the $(m+1) * (m+1)$ matrices of the short run dynamic coefficients and long run multipliers. Now by taking another assumption that the within variable, only one long run relationship exists. From equation (4.12), $\boldsymbol{v_r}$ is divided into a dependent variable x_r and a group of forcing variables **z** by Pesaran *et al.*, (1995). The matrices of **a, b,** Γ **,** Π and long run multiplier can also be divided conformably by splitting the $\boldsymbol{v}$.

$$\prod = \begin{bmatrix} \pi_{11} & \pi_{12} \\ \pi_{21} & \pi_{22} \end{bmatrix} \text{a=} \begin{bmatrix} a_1 \\ a_2 \end{bmatrix} \; b = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix} \; \Gamma_i = \begin{bmatrix} \vartheta_{11,i} & \vartheta_{12,i} \\ \vartheta_{21,i} & \vartheta_{22,i} \end{bmatrix}$$

From assumption (**z** is long run forcing for x) it is infers that the vector $\vartheta_{21} = 0$, it means that there is no response from the level of x on Δz. Hence the conditional model for Δx and Δz can be expressed as follows;

$$\Delta x_r = a_1 + b_1 r + \pi_{12} z_{r-1} + \sum_{l=1}^{q-1} \vartheta_{11,l} \, \Delta x_{r-l} + \sum_{l=0}^{q-1} \vartheta_{12,l} \, \Delta z_{r-l} + \varepsilon_{1r} \qquad (4.13)$$

$$\Delta z_r = a_2 + b_2 r + \prod_{22} z_{r-1} + \sum_{l=1}^{q-1} \vartheta_{21,l} \, \Delta x_{r-l} + \sum_{l=1}^{q-1} \Gamma_{22,l} \, \Delta z_{r-l} + \varepsilon_{2r} \qquad (4.14)$$

With the assumptions in equation (4.13) and (4.14) related to error terms, the equation (4.13) is re-write by Pesaran *et.al* (1995), expressed as below;

$$\Delta x_r = \rho_0 + \rho_1 r + \varphi x_{r-1} + \wr z_{r-1} + \sum_{l=1}^{q-1} v_l \, \Delta x_{r-l} + \sum_{l=0}^{q-1} \Phi_l \, \Delta z_{r-l} + \omega_r \qquad (4.15)$$

By them this is known as 'unrestricted error correction' model. Observe from equation (4.15), that there will be an existence of long run relationship between the levels variables but the

condition is in which case the two parameters φ and ƨ both are non-zero. For the long run estimation done in equation (4.15) the following expression is achieved;

$$x_r = -\frac{\rho_0}{\varphi} - \frac{\rho_1}{\varphi} - \frac{\eth}{\varphi} z_r \qquad (4.16)$$

In context of equation (4.15), the testing of hypothesis that '**x** and **z** has no long run relationship' is chosen by Pesaran *et al.,* by estimating the mutual hypothesis that $\boldsymbol{\varphi = \eth = 0}$. They adopted the bounds testing technique. Whereas the lower and upper bounds are estimated on a condition that variables in **z** are I(0) and I(1) respectively. Form the large set of stochastic simulations under different assumptions concerning the correct addition of deterministic variables in the ECM, the critical values for this bounds testing is provided by Pesaran *et al.,* (1995). For concluding test results, if the calculated test statistic lies beyond the upper bound, then it can be infer that there is existence of long run relationship among the concerned variables. If the calculated test statistic lies below the lower bound then this implies that there is no long run relationship exists among the concerned variables. On the other hand if the calculated test statistic lies within the bounds, then no inference can be drained unless having the information of the time series properties of the given variables. In such case, the researcher has to apply the standard methods of testing.

There are many determinates of inflation. In this regard many researchers for instance Hasan et al., (1995), Bokil and Schimmmel pfenning (2005) and Jalil, et al., (2014) for Pakistan, Callen and Chang (1999) for India, Leigh and Rossi (2002) for Turkey, Chauvet(2000) for Brazil, Sun (2004) for Thailand, Simone (2000) for Chile and Boujelbene and Boujelbene (2010) for Tunisia, speculates both demand and supply side factors along with the policy variables that effects inflation. However the present study specify the regression by considering the

determinants which are recognized by the literature with giving special emphasis to the impact of government borrowing on inflation in Pakistan.

$$\pi_t = \beta_0 + \beta_1 GB_t + \beta_2 demandpressure_t + \beta_3 oil_t + \beta_4 z_t \mu_t \quad (4.17)$$

In equation (4.17), π is consumer price index used to measure inflation, GB is government borrowing, Growth is growth rate, oil is the oil prices and Z covers the various other control variables like exchange rate, wheat price, oil price and trade opnenss that are specifically associated with the dynamics inflation in Pakistan like, fiscal deficit, government expenditures and exchange rate.

4.2 DESCRIPTION OF DATA

In order to investigate the given research hypothesis, this study will employ Pakistan's monthly time series data from June 1998 to June 2017 taken from SBP and IFS.

Table 4.2: Table of variables

Variable	Symbols	Time period	Frequency of Data	Sources of Data	Units
Borrowings of government from Central bank	SBB	1998 - 2017	June 98 - June 17	State Bank of Pakistan	Million Rupees
Borrowings of government from Commercial banks	CBB	1998 - 2017	June 98 - June 17	State Bank of Pakistan	Million Rupees
Inflation	Π	1998 - 2017	June 98 - June 17	State Bank of Pakistan	---

Note: Table 4.2 includes all selected variables that are in incorporated in this research.

4.2.1 CONSTRUCTION OF VARIABLE:

Following variables are constructed in order to empirically investigate the research questions raised in this study.

4.2.1.1. INFLATION

In a layman language inflation is said to be increase in prices but in technical language it states a persistent rise in the general price level in the country. It is not a sudden shock restricted to the prices of specific items. Rather, inflation is a continuous and general process. Inflation plays a significant role in economy. One of the main objectives in most of the countries worldwide is to achieve high economic development by keeping inflation low and stable. While determining the growth of economy the stabilizing price level plays a critical role in it; therefore in many countries monetary authorities keep the inflation at necessary level by implementation of their firm monetary policies. There are many determinants of inflation but this study will remain specific to budget deficit for the purpose of current research.

Federal Bureau of Statistics (FBS) of Pakistan calculates inflation rate by using three altered indices[9]. However, here inflation is computed through Consumer Price Index (CPI).

For the calculation of general inflation, CPI is most commonly used worldwide. It calculates the change in the price of purchasing a representative certain 'services and goods' basket and the inflation rate that generally indicates in the economy. Its formula is as follows;

$$\mathrm{Cpi}_n = \frac{\Sigma \left(\frac{\mathrm{C}_n}{\mathrm{C}_o}\right) \mathrm{x}\, wt_i}{\Sigma\, wt_i} \mathrm{x}\, 100$$

[9] Details are given in appendix-B.

Where;

Cpi_n = nth period's CPI

C_n = Price of good in the nth period

C_o = Price of good in the base period

wt_i = weight of ith good in the base period = Q_o x p_o Σ Q_o x p_o

Σwt_i = Total weight of all goods

4.2.1.2 BORROWINGS OF GOVERNMENT FROM BANKING SECTOR

The government borrows from the banking sector[10] in three forms; firstly, for governments' budgetary support federal government borrows from both central bank and commercial banks. Secondly, due to the gap between receipts and payments the provincial governments borrows from the central bank. Lastly, for quasi-budget deficit's financing i.e. borrowings by public sector enterprises (PSEs) and autonomous bodies, commodity operations and subsidies extended to various government-sponsored special credit schemes[11] both federal and provincial governments borrows from the banking system.

The net government borrowing data is collected by State bank of Pakistan. Its components are as fallows[12];

Net Government Borrowings: (A+B+C)

A. Borrowings for Budgetary Support

[10] The mechanism of government's borrowing from banking sector is given in appendix-C.
[11] Source: State Bank of Pakistan (2010).
[12] Source: State Bank of Pakistan (2018).

(i) Borrowings of Government from Central Bank

It includes four sub-divisions; Federal government, Provincial government, AJK government and Gilgit-Baltistan. Whereas provincial government has it's further four components, i.e. Punjab, Sindh, Balochistan and Khyber Pakhtunkhwa government.

(ii) Borrowings of Government from Commercial Banks

It includes further two sub-divisions; federal government of which deposits with banks and provincial government of which deposits with banks.

B. Commodity Operations

C. Others

However the borrowings of government from central bank (SBP) and government from commercial banks are only considered here.

4.2.1.3 VOLATILITY OF SBB AND CBB

Volatility means the rate of change over a given period. It is often expressed as a percentage. Volatility here will be measure as variable. It can be measure either by using the GARCH model or by taking the Standard deviation. However, because of the existence of ARCH effect in given model as well as non-normal distribution of concern data, the GARCH-type modeling will be used for measuring volatility. As the GARCH model is best to measure the volatility[13]. See the appendix-D (section c and d) for the results.

Other variables are Exchange Rate, Aggregate demand to Aggregate supply ratio for the demand pressure, oil price, wheat price and trade openness.

[13] The specification of GARCH model is already discussed in start of this chapter.

CHAPTER 5

ESTIMATION AND RESULTS DISCUSSION

5.1 GRAPHICAL ANALYSIS

The graphical analysis is done by taking the actual series, return series and squared return series of the concerned variables. Figures 5.1 show plots of original monthly series of borrowings of government from central bank (SBB), the borrowings of government from commercial banks (CBB), and net borrowings of government from (SBB+CBB) and lastly the inflation rate. Plots in figure 5.1 reveal general increasing trend for the certain time period.

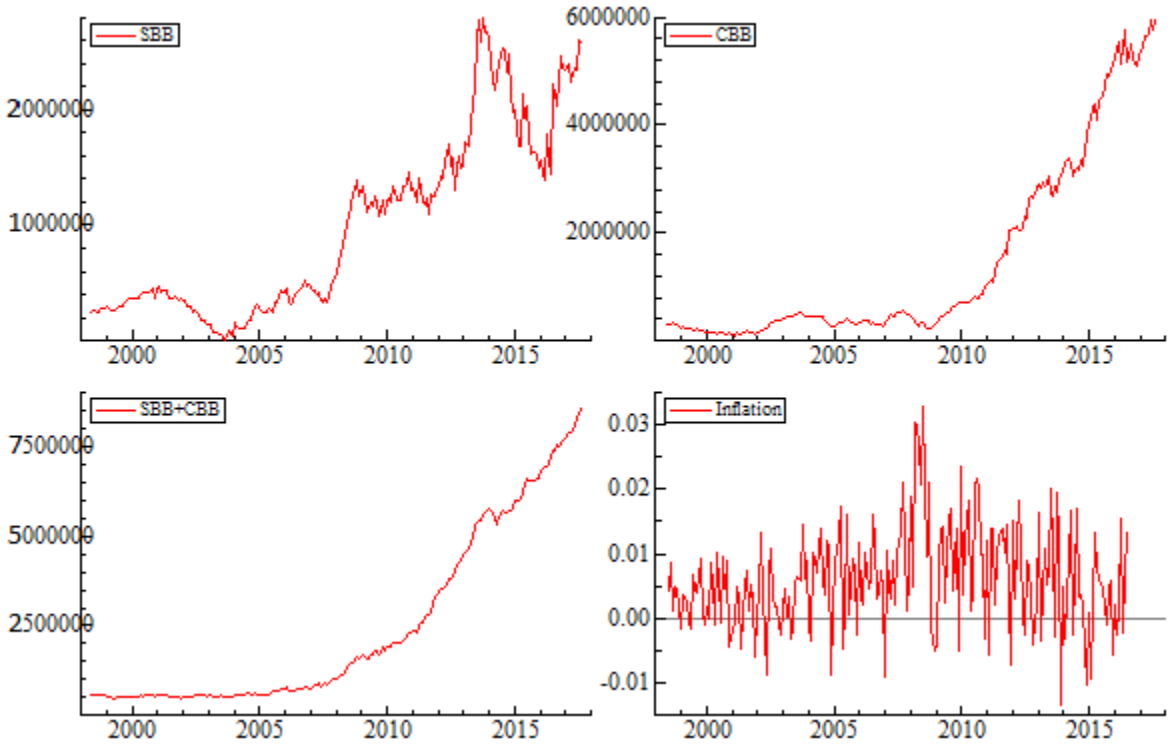


Figure 5.1: Actual series of the variables

The figure 5.2 shows plots of monthly return. The pattern of these plots shows volatility in the data over time. The high fluctuations are display by the return series of SBB, CBB and (SBB+CBB) and slowly they return back to their mean. It is clearly shown that the variance of return series is not fixed over time. Whereas the presence of volatility clustering[14] showing the ARCH effect.

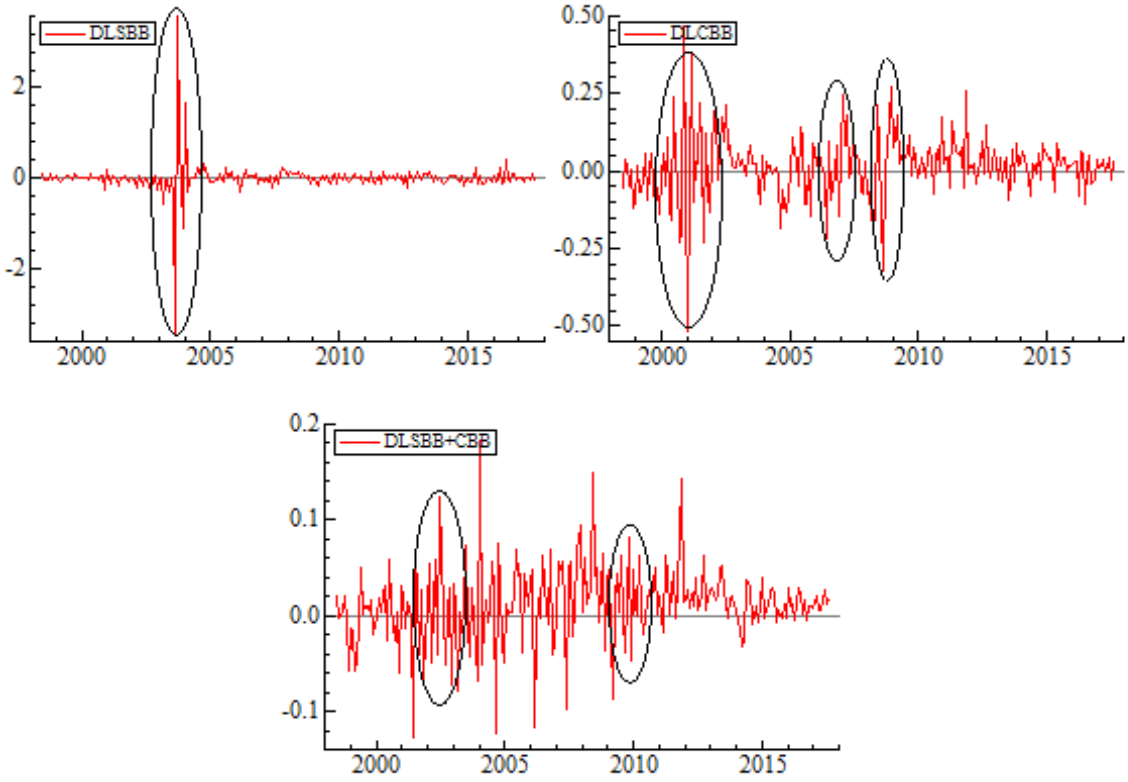


Figure 5.2: Return series of the variables

In figure 5.3, the presences of volatility clustering is also visible in the squared returns of given series. However the squared returns, clearly indicates the high volatility period. From the graphical analysis of these plots, the high order serial correlation is also observed. It reveals that the existing returns are affecting the volatility in greater magnitude.

[14] Big and small circles are showing the clusters in figure 5.2

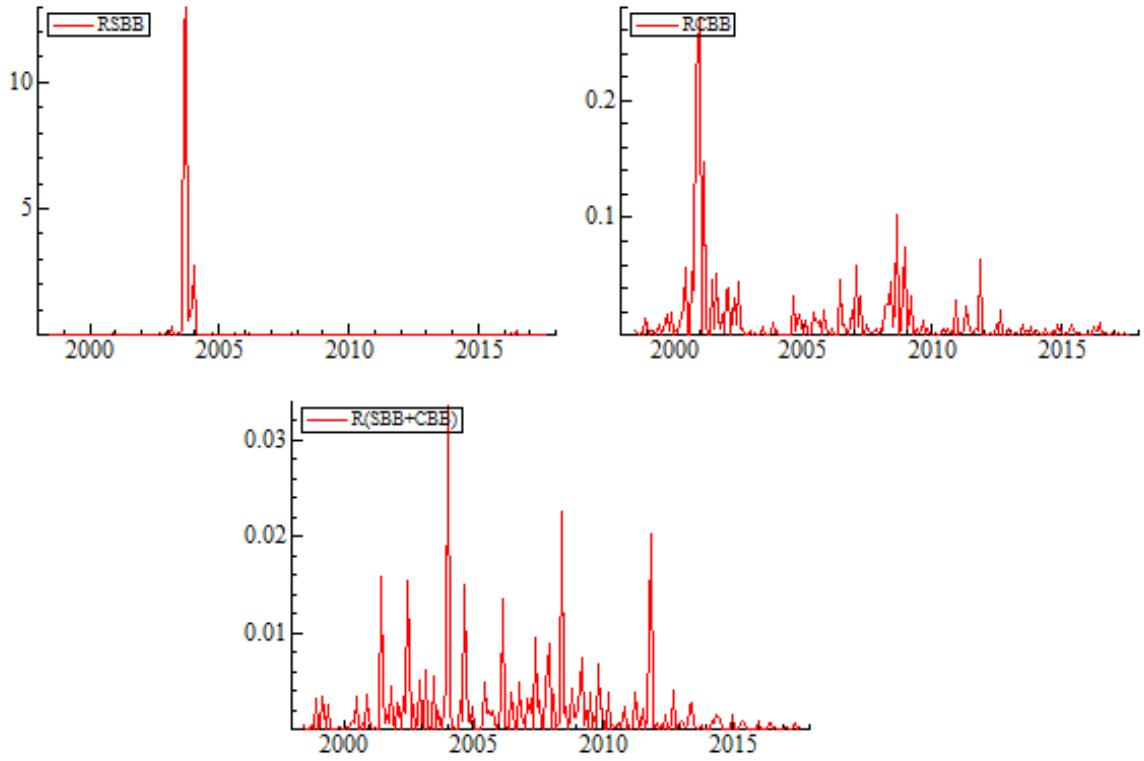


Figure 5.3: Squared return series of the variables

In figure 5.4, the distribution of data and histogram is shown by the density function of concerned return series of variables graphically. It indicates that mean and median of return series are not different significantly over time which also anticipates that the trend is slightly increasing in nature. The high peaks and flat tails show that our data processes a non-normal distribution. Moreover, the features of leptokurtosis and skewness are also shown by the given distribution. The actual distribution of series is denoted by the red line in the given series which indicates that our data processes a non-normal distribution as it is more peaked than the normal reference (green line).

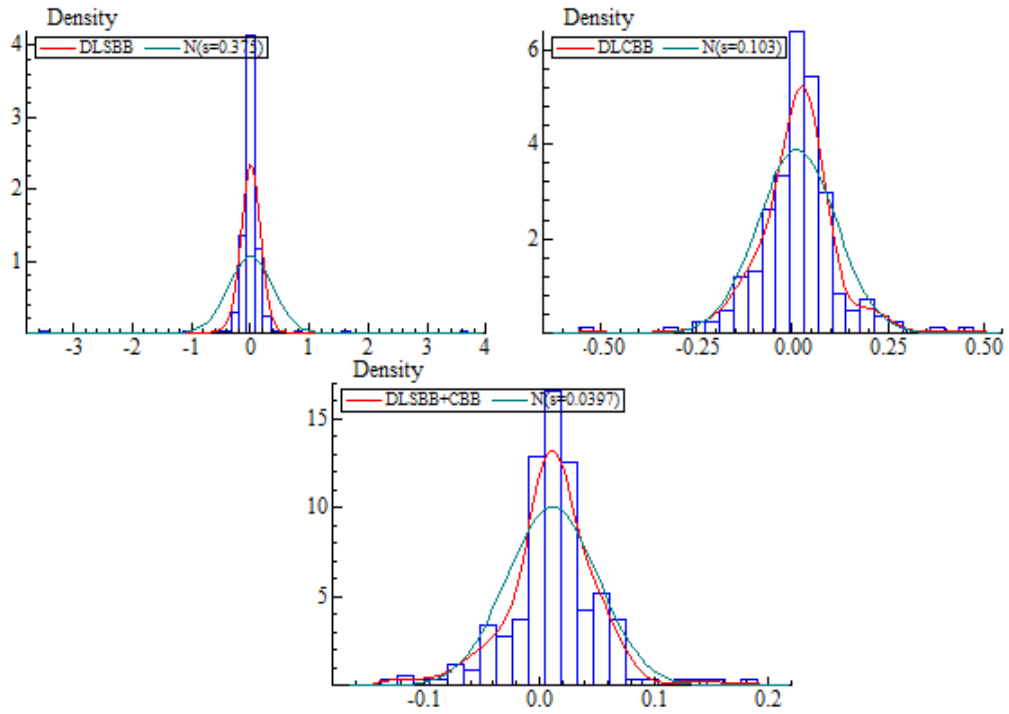


Figure 5.4: Histogram of return series of the variables

5.2 DESCRIPTIVE STATISTICS

For the selection of best model for analysis of this study, it is important to investigate the nature of given series. So, for this purpose the descriptive statistics of concern variables are taken.

Table 5. 1: Descriptive statistics of variables

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera (JB)	JB (proba-bility)
Inflation	0.00613	0.00495	0.0333	-0.0132	0.0078	0.5346	3.5243	13.5346	0.001151
LNCBB	13.4866	13.04992	15.5959	11.5017	1.1967	0.4354	1.8230	20.6312	0.000038
LNSBB	13.3641	13.27868	14.8417	7.0379	1.0949	-1.1746	6.7248	186.6621	0.000000

The summary of descriptive statistics of inflation and log series of 'borrowings of government from central bank (SBB)' and 'borrowings of government from commercial banks (CBB)' is given table 5.1. The standard deviation of the concerned variables depicts that given series are less volatile, as their means are greater than their standard deviations. Further, the descriptive statistics shows the characteristics of high frequency data, as all the concerned series possess excess kurtosis and skewness. In statistics, if the value of sknewness is near to zero then the given series are known as normally distributed. Whereas in current case, the value skewness shows the non-normal distribution, further its value for respective variables tells that inflation and CBB are positively skewed on the other hand SBB is negatively skewed.

The peaks of the given concerned series are analyzed by the value of kurtosis. If the value of kurtosis is 3 then the distribution is said to normal. In this context if the value of kurtosis observed for SBB in table 5.1, it shows that SBB has positive excess kurtosis i.e. greater than 3 it is also known as leptokurtic. This type of kurtosis has the possibility that given distribution may have the presences of high value in it. The value of kurtosis for inflation is also greater than 3 which also indict that the inflation series is non- normal. For CBB the value of kurtosis is less than 3 i.e. there is less chances of existence extreme values in given distribution. This distribution is also known as platykurtic.

Another test for normality is Jarque Bera test (JB). The null hypothesis for JB is i.e. the series are normally distributed. P-values of JB for all the concern variables are less than 0.05 therefore the null hypothesis is rejected and state that the series is non-normally distributed. Overall, according to distractive statistics given in table 5.1 the given distribution is skewed, leptokurtic and platykurtic, which indicates that given distribution is non-normal in nature.

5.3 UNIT ROOT TEST

ADF for unit root test analysis requires the pre specifications of trend and intercept, because if the miss-specification of ADF equation is done then our decisions on 'rejection' and 'do not rejection' of the null-hypothesis will be questioned. So, through the visual inspection[15] of each series the study is able to capture the presence of trend or drift or both in the series. Inflation rate is stationarity at level whereas the log series of SBB and CBB are stationarity at its first difference.

Table 5.2: Unit Root Test

	ADF	K	ADF	K
CBB	0.0670	1	-5.8461	1
SBB	0.1888	1	-6.4986	1
Inflation rate	-5.4899	0	NA	---
Interest rate	3.4241	1	NA	---
trade Openness	0.9505	0	-4.0558	1
Exchnage Rate	0.1299	1	-6.4742	0
Fiscal Deficit	0.3842	1	-5.0881	1
Oil price	0.3177	1	-4.5881	1
Real Demand to Real Supply	0.5882	1	-4.3685	1
Price index of Import	0.8028	0	-7.6397	1
Oil price	0.1080	1	-4.4527	1
wheat Price	0.6811	1	-3.3342	1

5.4 BREAKPOINT UNIT ROOT TEST

There is possibility of existence of break point in given variable. As in the presence of any break point the stationarity property of any variable may changes. Therefore the study is taking the breakpoint unit root test for Inflation rate, by taking both break types i.e. innovational outlier and

[15] Graphs of each variable for visual inspection are given in section (a) of appendix-D.

additive outlier respectively[16]. The results are given in the following tables, which states that the stationarity property didn't change even in the presence break points[17].

Table 5.3: Break point unit root test, break type: innovational outlier

Series name	Trend & Drift specification	Break type	Break date	At level			
				C.V At 5 percent	Cal. ADF	Prob.	Conclusion
Inflation rate	No Trend & Drift	Innovational outlier	2003M06	-4.4436	-6.0724	< 0.01	I (0)

Table 5.4: Break point unit root test, break type: additive outlier

Series name	Trend & Drift specification	Break type	Break date	At level			
				C.V At 5 percent	Cal. ADF	Prob.	Conclusion
Inflation rate	No Trend & Drift	Additive outlier	2004M02	-4.4436	-12.454	< 0.01	I (0)

[16] Graphs of statistics are given in section (b) of appendix-D.
[17] Mentioned in table 5.3and 5.4.

5.5 MODEL ESTIMATIONS

5.5.1 Long Run Determinants of Inflation

Now, the long run dynamics (cointegration) between volatility in borrowing of government and inflation is estimated by applying the ARDL model developed by Pesaran *et al.*, (1999). The test is started with a maximum lag of 4. In order to guide our lag selection this test is using the information criteria and sequential *F tests* along with residual autocorrelation tests. As the study is using the monthly data series and also wanted to preserve as many degrees of freedom as possible, therefore for the given model it seems to be a suitable maximum lag order.

Table 5.5: Bounds Tests for the Existence of Relationship in Long run

	F-statistic		**1 percent Critical bounds**		**5 percent Critical bounds**		**10 percent Critical bounds**	
			I(0)	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
Dependent variable is Inflation								
Lag 4	4.42365		3.93	5.23	3.12	4.25	2.75	3.79
Lag 3	5.48066		3.93	5.23	3.12	4.25	2.75	3.79
Lag 2	5.61636		3.93	5.23	3.12	4.25	2.75	3.79
Lag 1	7.4083		3.93	5.23	3.12	4.25	2.75	3.79
source of critical values: Pesaran *et al.*, (2001)								

Now, in order to consider inclusion of deterministic trend and constant terms, a test is run based on the model with an unrestricted constant, whereas no evidence is found regarding significant deterministic trend in the association. The decision is firstly based on lag order of the observation of information criteria. Secondly, it is based on F test of the reduction (from 4 lags to 1 lag) and

thirdly, it is based on test of autocorrelation. The tests for the null hypothesis i.e. 'no long run relationship' is run by using F test of the null that $\alpha i = \beta i = 0$.

By considering the results mentioned in table 5.5, a strong long run relationship exists between inflation and volatility in 'borrowing of government from Commercial banks'. Moreover, the value of F-statistic indicates the significance of the rejection of null hypothesis of no cointegration as suggested in Pesaran, Shin and Smith (1999).

Table 5.6 presents the long run determination of the inflation in the case of Pakistan. The major focus is on the commercial bank borrowing and central banks borrowing. It is evident from Table 5.6 that the central bank borrowing in more inflationary than the commercial bank borrowing. The study estimated 10 different models to test the robustness of the impact of central bank and commercial bank borrowing. Model 1 depicts that the central bank borrowing is 7 percent inflation as compare to commercial bank borrowing which is around 6 percent inflationary. This is true for all the regression. However, the size of magnitudes differs from model to model but highly significant in almost all the cases. We are in line with Ahmad *et al.,* (2012). As Ahmad, *et al.,* (2012), consider that borrowing of government from the central bank carries very serious consequences for inflation due to excess aggregate demand caused by an increase in money supply. So, if the central bank finances the government borrowing through monetization, it will have inflationary impact in economy. Moreover, if the government fails to collect revenues through tax or non-tax sources i.e. current revenues and cannot service the debt, the money stock may increase excessively, involving inflationary issuing of money. Further, Ahmad *et al.,* (2012), added that in order to lend government, if the commercial banks obtain cash from fresh deposits for investing in government securities then through this channel, the

acquisition of additional funds from depositors and loans to the government happens without lessening the bank's existing investment in government securities and existing volume of loans. Thus, this mechanism of providing debt to government is theoretically inflationary. On the other hand, there would be no inflationary risk in the case where government borrows directly from commercial banks. But when the central bank is involved indirectly in this mechanism, inflation can result.

These results were obvious as the vast literature and empirical work is available worldwide, which proves that the central bank borrowing of government is inflationary. But there is gap in the literature i.e. neither the impact of government borrowing from commercial banks on inflation is accessed empirically nor the comparison between impact created by these two borrowing on inflation is checked. Therefore, this study estimated the impact of government borrowing from commercial banks on inflation in detail and made the comparison also.

The study also considers other detriments in the inflation regression. The important outcome is that the sign and significance of the commercial banks borrowings and central bank borrowing remain robust in almost all the cases. However, the size varies from case to case. Other variables remain also in line with the theory. For example, interest rate shows a positive impact on the inflation rate. As mentioned earlier, we are using lending rate as a proxy rate therefore; it will reflect the cost of borrowing. Consequently, shows a positive impact on the inflation in the case of Pakistan. Some other important variables are also added. For example, Trade Openness, exchange rate, oil price, real demand to real supply, price index of import and wheat price index. All variable enters in the regression according to a priori expectations.

The value of the coefficient of error correction term given in table 5.6, shows that a change in volatility of 'borrowings of government from commercial banks' brings about 4.3 percent change in inflation in Pakistan in the span of 12 months. However if these results are compared with Adnan and Khan (2008) for central bank borrowing than their error correction term indicated that a change in volatility in 'borrowing of government from central bank' brings about a 77 percent change in inflation in Pakistan in the span of 12 months. Moreover, ECM also passes a range of diagnostic tests. Thus, ECM estimates indicate that, inflation is also affected by volatility in 'borrowings of government from commercial banks' in the short run as well but it is less inflationary as compare to inflation affected by central bank borrowings of government in Pakistan.

5.5.2 Conclusion

Both borrowings i.e. 'borrowing of government from Central bank' (SBB) and 'borrowing of government from commercial banks' (CBB) has positive and significant impact on inflation in Pakistan. However, CBB is empirically proved to be less inflationary than SBB. Therefore we accept our research hypothesis i.e. 'borrowings of government from central bank create more inflation than borrowings of government from commercial banks' in Pakistan.

Table 5.6: Long Run Impact of SBB and CBB on Inflation: ARDL Estimates

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
CBB	0.0611***	0.0601***	0.0633***	0.0692***	0.0652***	0.0647***	0.0533***	0.0700***	0.0683***	0.0605***
	(0.0124)	(0.0098)	(0.0080)	(0.0050)	(0.0088)	(0.0082)	(0.0098)	(0.0056)	(0.0073)	(0.0111)
SBB	0.0702***	0.0822***	0.0852***	0.0863***	0.0815***	0.0825***	0.0835***	0.0820***	0.0824***	0.0711***
	(0.0069)	(0.0015)	(0.0075)	(0.0097)	(0.0090)	(0.0092)	(0.0046)	(0.0086)	(0.0094)	(0.0077)
Interest rate	0.6855**	0.3519**	0.6278*	0.5214*	0.6863**	0.7744**	0.6863**	0.8318**	0.8558*	0.6995***
	(0.1677)	(0.1526)	(0.2211)	(0.1416)	(0.1661)	(0.2457)	(0.2019)	(0.3772)	(0.4054)	(0.0675)
trade Openness	0.4669***	0.1532***	0.6113*	0.0471**	0.3922*	0.6058**	0.6554**	0.8735**	0.1432**	0.3261**
	(0.0660)	(0.0539)	(0.3766)	(0.0043)	(0.1220)	(0.1506)	(0.2460)	(0.2506)	(0.0558)	(0.1716)
Exchange Rate	--	0.4538**								
		(0.1447)								
Fiscal Deficit			0.3277*							
			(0.1562)							
Oil price				0.3911**						
				(0.1228)						
Real Demand to Real Supply					0.9610***					
					(0.3961)					
Price index of Import						0.4794***				
						(0.1296)				
Oil Price							0.7238**			
							(0.3282)			
Wheat Price								0.8755**		
								(0.4130)		
Lagged of CPI	0.8136**	0.7098***	0.6171**	0.4166**	0.4695**	0.2181**	0.5993	0.2656	0.7902**	0.2442
	(0.3514)	(0.2810)	(0.1889)	(0.1189)	(0.1825)	(0.0649)	(0.6531)	(0.2928)	(0.1938)	(0.1462)
constant term	0.8669***	0.7043***	0.3883**	0.1343**	0.2778*	0.5114*	0.7119**	0.7165***	0.4581**	0.7597**
	(0.1754)	(0.1778)	(0.0998)	(0.0356)	(0.1970)	(0.2065)	(0.2289)	(0.0911)	(0.0604)	(0.0865)
ECM_{t-1}	-0.0491*	-0.0407**	-0.0632**	-0.0533**	-0.0332**	-0.0833**	-0.1079**	-0.0518**	-0.0599**	-0.0786**
	(0.0242)	(0.0089)	(0.0377)	(0.0094)	(0.0096)	(0.0051)	(0.0341)	(0.0105)	(0.0044)	(0.0345)
Diagnostics Test										
Functional Form	0.7537	0.8456	0.5006	0.5793	0.3237	0.1852	0.3924	0.8615	0.5648	0.9961
Residual Normality	0.2009	0.7653	0.6925	0.6074	0.0612	0.3063	0.5392	0.7201	0.9367	0.8822
Heteroscidasticity	0.7663	0.4210	0.2477	0.5725	0.2247	0.5816	0.1163	0.1512	0.4292	0.0820
Serial Correlation	0.7302	0.2596	0.7163	0.4622	0.9682	0.8955	0.8067	0.9684	0.5111	0.9710

CHAPTER 6

CONCLUSION AND POLICY SUGGESTIONS

6.1 Conclusion

In this study the impact of borrowing of government from central bank and borrowing of commercial banks on inflation is studied in context of Pakistan economy over the time period of June 1998 to June 2017. The high and instable Inflation is considered to be very important macroeconomic problem for the most economies worldwide. All the economies in the world desire to achieve high economic growth at a stable low inflation. But there are certain determinants of inflation in which budget deficit is also included. According to Fischer *et al.*, (2002) budget deficit is consider to be one of main determinants of high inflation. For purpose of present research, the study remained specific for budget deficit that's ends on high inflation through government's banking sector borrowing in Pakistan.

For the welfare maximization of general public and economic growth of any country, governments create the more employments opportunities and sustain the socio-economic stability in an economy. For this the government invests more on education, health and infrastructure from their budget. But in the resource constraint developing economies when the government adopts such behavior, the budget deficit also occurs as an outcome of this as well. Because of insufficient tax revenues, most of the governments avail the option of borrowing from both internal (banking and non-banking) and external sources. As the external sources are more erratic in nature the government prefers to borrow for its internal sources. In internal sources, the non-

banking sector is reserved or limited; therefore the nature of receipts and repayments is highly volatile. As a result, banking sector (central bank and commercial banks) is considered to be most feasible option by the government for its budgetary support borrowing.

The present literature also explains the disadvantages of borrowings of government from the central bank with reference to theories and empirical evidence. As the government borrowing diverts the central bank from its primary function i.e. keeping the price stability. Since borrowing from central bank is done in form of monetization (money printing) and as a consequence the money supply will increase in economy and it will ultimately ends on inflation with reference to demand pull inflation theory and quantity theory of money supply. Many studies have been done in order to analysis this phenomena and states that central bank borrowing of government is inflationary in nature. As far as the commercial bank borrowing is concern it is also inflationary but theoretically it is said that its impact is less than the central bank borrowing as it also sucks the money supply from the economy in form deposits of general public, so the level of money supply doesn't increase so high in the economy. However, this inflationary difference is not empirically proved in the literature.

So in order to full fill this gap, this study explores the level of difference created by 'borrowing of government from central bank' and 'borrowing of government from commercial banks' on inflation. The GARCH model is used to estimate the volatility of government borrowing from central bank and commercial banks. Whereas, the ARDL model is used in order to investigate the long run relation between 'borrowing of government from central bank' and 'borrowing of government from commercial banks' with inflation. ECM is also used for the investigation of their short run relationship. The results state that central bank borrowing is more inflationary

than the commercial bank borrowing. Furthermore, both of these borrowing have strong long run relationship with inflation in Pakistan.

6.2 Policy Suggestions

By considering the results, following policy suggestions can be inferred from the present study:

1. The fiscal authorities should not rely too much on the banking sector borrowing for the government budgetary support as this dependency hinders the monetary policy authorities to control inflation. Rather, a systematic reform agenda is required from fiscal establishments and if it will be pursued with sincerity and transparency, it can increase the tax revenues and reduces the dependency of fiscal sector on banking sector borrowing.
2. Further, the central bank should ensure that the amount i.e. lend by commercial banks to government is generated by their own, no indirect channel should be involved from the central bank, otherwise the inflationary impact will be more and same as it is created by government's central bank borrowing.
3. The central bank should introduce such reforms and policy implications for the commercial banks that their capacity of generating their own reserves should increase, which should be further used for government borrowing as and when required. In this way the money supply will also remain stable in the economy which helps the monetary authorities to maintain inflation at its desirable level. It will ultimately leads to the high economic growth at a stable low inflation.

6.3 Further Scope of Research

In this study the 'impact of borrowing of government from central bank vs. commercial banks on inflation' in case of Pakistan economy has been studied. However, for the more analysis of this same phenomena this study can be extended to other Asian and developing economies.

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APPENDIX-A

SUMMARY OF LITERATURE REVIEW

Table A.1: Summary of International Literature

Sr. No	Author	Year	Title	Findings
1.	Keynes, J. M.	(1923)	A Tract on Monetary Reform, Recipient Royal Economic Society London, 1971.	When the government budget deficit is financed by the printing of money it increases the aggregate demand.
2.	Sergent and Wallace	(1981)	Some unpleasant monetarist arithmetic	The study states that those governments that are running a persistent deficit have to sooner or later finance those deficits with printing of new money which lead to inflation in long run.
3.	Hamburger and Zwick	(1981)	Deficits, money and inflation	The findings state that the budget deficits can lead to inflation, but only to the extent that they are monetized.
4.	Robert E. Lucas Jr	(1981)	Deficit Finance and Inflation. Economic Scene	The continuations of monetary expansions are always there as a consequence of printing new money to cover the gap between government expenditure and government revenues resulting in high inflation rate.
5.	Miller	(1985)	The relationship between government deficits, money growth and inflation	That budget deficits lead to inflation as the central bank may finance a budget deficit by money creation or by private monetization.

Sr. No	Author	Year	Title	Findings
6.	King and Plosser	(1985)	Money, deficits, and inflation	They find no general and significant relation between fiscal deficits and inflation.
7.	Demopoulos, G. D., Katsimbris, G. M., & Miller, S. M.	(1987)	Monetary policy and central-bank financing of government budget deficits: a cross-country comparison	The study finds that money printing and domestic market borrowings are positively related to inflation.
8.	Barnhart, W.S., and Darrat, F.A.	(1988)	Budget deficits, money growth and causality: Further OECD evidence	The findings state that budget deficits only affect inflation when they are financed through printing money.
9.	Haan and Zelhorst	(1990)	he impact of government deficits on money growth in developing countries	The study finds a positive association between fiscal deficit and money growth for few developing countries including Pakistan
10.	Chaudhary and Parai	(1991)	Budget deficit and inflation	This study concludes that the country's huge budget deficit as well as high rates of growth of money has a significant impact on the inflation
11.	Cardoso, E. A.	(1991)	Deficit finance and monetary dynamics in Brazil and Mexico	The study finds that money printing and domestic market borrowings are positively related to inflation.
12.	Cukierman, A., Edwards, S., & Tabellini, G.	(1992)	Seigniorage and Political Instability	Due to low independence of central banks, the use of printing money to finance the budget deficit is high, which leads to high inflation and instability in the economies.

Sr. No	Author	Year	Title	Findings
13.	Sowa, N. K.	(1994)	Fiscal deficits, output growth and inflation targets in Ghana.	Money printing and domestic market borrowings are positively related to inflation
14.	Akcay, O. C., Alper, C. E., & Ozmucur, S.	(1996)	Budget deficit, money supply and inflation: Evidence from low and high frequency data for Turkey	The result indicates a greater impact of deficit on inflation during pre-bond financing period
15.	Metin, K.	(1998)	The relationship between inflation and the budget deficit in Turkey	The major finding is that budget deficits (as well as real income growth and debt monetization) significantly affect inflation.
16.	Favero, C. A., & Spinelli, F.	(1999)	Deficits, money growth and inflation in Italy.	The study confirms the existence of a link between budget deficit, money growth and inflation in a long run.
17.	Akçay, O. C., Alper, C. E., & Özmucur, S.	(2001)	Budget deficit, inflation and debt sustainability: Evidence from Turkey	The study observes a significant relation between fiscal deficit and inflation. The results of this study further reveal that deficit financing through money printing, internal or external borrowings is inflationary in long run.
18.	Fischer, S., Sahay, R., Ve´gh, C.	(2002)	Modern hyper-and high inflations	The results states that in high inflation countries most of the government's debt is finance through printing money by central banks

Sr. No	Author	Year	Title	Findings
19.	Catao, M. L., & Terrones, M. M.	(2003)	Fiscal deficits and inflation	It is found that the relationship between inflation and fiscal deficit is intrinsically dynamic, using panel techniques that explicitly differentiate between short-run and long-run effects of fiscal deficits.
20.	Solomon, M., & De Wet, W. A.	(2004)	The effect of a budget deficit on inflation: The case of Tanzania.	The study finds that due to monetization of the budget deficit, significant inflationary effects are found for increases in the budget deficit.
21.	Sill, K.	(2005)	Do budget deficits cause inflation	The study finds that fiscal deficits lead to high inflation when the government finances its deficit by printing money.
22.	Alavirad, A. and Athawale, S.	(2005)	The impact of the budget deficit on inflation in the Islamic Republic of Iran	The study finds that the budget deficits have a significant impact on inflation in the long run than in short run.
23.	Nhavira, J. D.	(2009)	Does Money-growth Still Granger Cause Inflation and Economic Growth in Zimbabwe	The study finds that money growth has positive impact on inflation in Zimbabwe
24.	Makochekanwa, A.	(2011)	Impact of budget deficit on inflation in Zimbabwe	The study reveals that due to current and non-development expenditures of government, there is persistent fiscal deficit that is covered by central bank borrowing which leads to inflation.

Sr. No	Author	Year	Title	Findings
25.	Oladipo, S. O., & Akinbobola, T. O.	(2011)	Budget deficit and inflation in Nigeria: A causal relationship	Their results indicate that in case of Nigeria, causality runs only from budget deficit to inflation but not the other way round.
26.	Devapriya, K. P. N. T. N., & Ichihashi, M.	(2012)	How does the budget deficit affect inflation in Sri Lanka	The result indicates that there is a significant association between inflation and domestic deficit exist while the causality analysis showed a bi-directional casual structure between budget deficit and inflation in Sri Lanka.
27.	Chukwu, J. O.	(2013)	Budget Deficits, Money Growth and Price Level in Nigeria	The study finds that budget deficits only affect inflation when they are financed through printing money.
28.	Hoang, V. K. H.	(2014)	Budget deficit, money growth and inflation: Empirical evidence from Vietnam	The study reveals that money growth has positive impact on inflation in Zimbabwe.
29.	Zuze, M.	(2015)	The relationship between fiscal deficit, money growth and inflation: The case of Zimbabwe.	The results stats that money growth has positive impact on inflation in Zimbabwe. Whereas the empirical results reveal that shocks to budget deficit growth have no effect on inflation
30.	Makochekanwa, A.	(2008)	The impact of a budget deficit on inflation in Zimbabwe	The study finds a strong positive relationship between fiscal deficits and inflation among high inflation and developing countries, (due to the monetization of fiscal deficit).

Table A.2: Summary of National Literature

Sr. No	Author	Year	Title	Findings
31.	Chaudhary, M. A., Ahmad, N., & Siddiqui, R.	(1995)	Money Supply, Deficit, and Inflation in Pakistan	Their results reveal that domestic financing of fiscal deficits, particularly from the banking system leads to inflation in long run.
32.	Hossain, A.	(2005)	The Granger-causality between money growth, inflation, currency devaluation and economic growth in Indonesia: 1954-2002.	The study finds a positive relation between fiscal deficit and inflation in Indonesia's economy.
33.	Agha, A.I. and M.S. Khan,	(2006)	An Empirical Analysis of Fiscal Imbalances and Inflation in Pakistan	The study finds that inflation in Pakistan is mainly attributable to unsustainable fiscal deficit. It deduces that financing of deficit through the banking system from printing of new money affects the inflation.
34.	Arby, M. F.	(2006)	Seigniorage Earnings of Commercial Banks and State Bank of Pakistan.	The study finds that seigniorage revenue of the SBP is declining overtime which indicates autonomy of the central bank as well as less reliance of the government on SBP's resources for budget financing. In general, a direct relationship is observed between seigniorage and inflation in Pakistan.
35.	Khan, A. A., Ahmed, Q. M., & Hyder, K.	(2007)	Determinants of recent inflation in Pakistan.	This study finds that financing of fiscal deficit through money creation adds to inflationary pressure.

Sr. No	Author	Year	Title	Findings
36.	Adnan, S., Bukhari, S., & Khan, S. U.	(2008)	Does Volatility in Government borrowing leads to higher inflation? Evidence from Pakistan	The study finds the inflation in Pakistan is related with volatility in borrowings of government from central bank in the long run. Furthermore, estimations show that in the short run, inflation is also affected by volatility in borrowings of government from central bank.
37.	Serfraz, A., & Anwar, M.	(2009)	Fiscal Imbalances and Inflation: A Case Study of Pakistan	The study finds that the inflation is highly affected by money supply, external borrowing and internal borrowing. So a positive relationship exists between fiscal deficit and inflation. This concludes that financing fiscal deficit through money creation and borrowings are inflationary in Pakistan.
38.	Mughal, K., Khan, M. A., & Aslam, M.	(2011)	Fiscal deficit and its impact on inflation, Causality and Co-integration: The Experience of Pakistan (1960-2010).	The study finds that there is a strong long run association between volatility in borrowings of government from central bank and inflation. The results further reveal that Fiscal deficit is one of the major determinants of inflation in Pakistan.
39.	Habibullah, M. S., Cheah, C. K., & Baharom, A. H.	(2011)	Budget deficits and inflation in thirteen Asian developing countries.	The study finds a casual association among budget deficit and inflation in the time period of 1950 to 1999 in developing countries.

Sr. No	Author	Year	Title	Findings
40.	Ahmad, M. J., Sheikh, M. R., & Tariq, K.	(2012)	Domestic debt and inflationary effects: An evidence from Pakistan	The study does not prove empirically the difference between the levels of inflation created by different deficit-financing sources but it is generally discussed in the study that the borrowings of government from the central bank is more inflationary. Whereas, the borrowings of government from the commercial bank will be less inflationary if the central bank is not involved indirectly in this mechanism.
41.	Yasmin, F., & Waqar, R.	(2013)	Money supply, government borrowing and inflation nexus: Case of Pakistan	The results indicate that in case of Pakistan, government borrowing and money supply has a strong effect on inflation in the long-run. Moreover, this study also finds that dual causality exists between inflation and money supply.
42.	Ishaq, T., & Mohsin, H. M.	(2015)	Deficits and inflation; Are monetary and financial institutions worthy to consider or not?	The findings indicate the strong bond between inflation and deficit in those Asian countries where the fiscal deficit is mainly financed through printing of money by central bank.
43.	Rashid, M., Farooq, M. A., & Nawaz, S. M. N.	(2017)	Government borrowing and macroeconomic dynamics of Pakistan	The study finds that borrowings of government from central bank assert inflationary pressure on the economy of Pakistan.

APPENDIX-B

INFLATION MEASUREMENT

The Federal Bureau of Statistics (FBS) of the Government of Pakistan computes inflation using three different indices namely:

i. Consumer Price Index (CPI)
ii. Sensitive Price Indicator (SPI)
iii. Wholesale Price Index (WPI)

The first prices index is CPI that is also known as 'headline inflation' and it is the main measure of price changes at the retail level. It is used to measure changes in the cost of buying a representative fixed basket of goods and services and indicates the general 'rate of inflation' in the country. CPI was computed for the first time in the cities of Karachi, Lahore and Sialkot. It is the most widely used measure of inflation in the world.

The second prices index is sensitive SPI. It is computed on weekly basis to assess the price movement of essential commodities at short interval so as to review the price situation in the county. In short sensitive price index means that 80 percent of medical costs are paid for by the affordable-health.info company, leaving the other 20 percent to be paid by you. SPI is based on the prices prevailing in 17 major cities. The SPI is being computed for the 5 income quintiles. There are 53 items are included in SPI with base 2007-08.

The last price index is WPI is designed to measure the directional movement of prices for a set of selected items in the primary and wholesale markets. Items covered in the series are those which could be precisely defined and are offered in lots by producers/manufacturers. Prices used

are generally those, which conform to the primary sellers' realization at ex-madi, ex-factory or are an organized Wholesale level. Wholesale prices of 463 items included in WPI are being collected from 21 cities as per procedure explained under CPI.

However, CPI is used as an indicator to determine the economy's position therefore the study uses CPI as a measure of inflation here. Its specification is as follows;

Consumer Price Index (CPI) is considered the most common measure of general inflation. It measure changes in the cost of buying a representative fixed basket of goods and services and generally indicates inflation rate in the country.

The current CPI series cover 40 urban centers of Pakistan. Depending upon the size of the city, 1 to 13 markets have been selected from where the prices are collected. The markets have been chosen keeping in view the volume of sales, assuming that majority of the consumers buy goods from these markets. Table B.1 covers the number of markets covered in 40 cities i.e. 76.

As the consumption pattern of individuals depends on their income level, the population under observation is therefore, categorized under various income quintiles. Table B.2 shows the income quintiles used in CPI with base 2007-08. The current CPI covers 487 items in the basket of goods and services, which represent the taste, habits and customs of the people. This basket has been developed in the light of results generated through the Family Budget Survey conducted in 2007-08. The basket of goods and services comprises of 12 major groups. Table B.3 displays the weights of commodity groups.

Table B.1: Number of markets covered in CPI index

S.No	Name of City	Number of Markets	S.No.	Name of City	Number of Markets
1	Rawalpindi	06	21	Karachi	13
2	Islamabad	04	22	Hyderabad	04
3	Attock	01	23	Nawab Shah	01
4	Jhelum	01	24	Mirpur Khas	01
5	Lahore	07	25	Mithi	01
6	Sahiwal	01	26	Sukkur	02
7	Gujranwala	01	27	Larakana	01
8	Wazirabad	01	28	Dadu	01
9	Sialkot	01	29	Peshawar	02
10	Faislabad	02	30	Mardan	01
11	Jhang	01	31	Abbottabad	01
12	Multan	03	31	Bannu	01
13	Muzarffargrah	01	33	D.I.Khan	01
14	D.G.Khan	01	34	Mingora	01
15	Vehari	01	35	Quetta	02
16	Sargodha	01	36	Turbat	01
17	Mianwali	01	37	Gawadar	01
18	Bahawalpur	01	38	Loralai	01
19	Bahawalnagar	01	39	Khuzdar	01
20	R.Y.Khan	01	40	Dera Murad	01
				Total Number of Markets	76

Consumer prices for computation of CPI are being collected form retail stores and service establishments. These are the prices at which CPI items are sold to the consumers. In other words, PBS collects prices actually prevailing in the market, rather than list or tag prices fixed by the manufacturers or various price-monitoring agencies.

PBS staff located in 34 Regional/Field offices collects CPI data regularly on monthly basis. They personally visit shops, stores, and establishments according to a predetermined time schedule and collect the prices of the selected items. Prices are reported in schedules specifically developed for the purpose.

Table B.2: Income Quintiles used in CPI index

Quintile	Income
Q-1	Upto Rs. 8000/-
Q-2	Rs. 8001/- to Rs. 12000/-
Q-3	Rs. 12001/- to Rs.18000/-
Q-4	Rs. 18001/- to Rs. 35000/-
Q-5	Above 35000/-

Table B.3: Weights of commodity groups in CPI index

Group No.	Commodity Groups	Average Weights
1	Food & Non-Alcoholic Beverages	34.84
2	Alcoholic Beverages, Tobacco	1.41
3	Clothing & Footwear	7.57
4	Housing, Water, Electricity, Gas & other Fuels	29.41
5	Furnishing & Household Equipment Maintenance	4.21
6	Health	2.19
7	Transport	7.20
8	Communication	3.22
9	Recreation & Culture	2.03
10	Education	3.94
11	Restaurants & Hotels	1.23
12	Miscellaneous Goods & Services	2.76
	Total	100

The contents of the schedules include name of the city, item, its specification and unit price quoted by four different shopkeepers in a market. Table B.4 shows the time schedule for collection of CPI prices.

One Statistical Officer in every Regional/Field office has been made responsible for the technical supervision of work done by the price collectors. He is required to ensure that technical aspects of price collection are clearly understood and instructions laid down in this regard are followed

by the price collectors. For this purpose, he is required to visit the markets for random checking of the prices.

Table B.4: Time schedule for collection of CPI prices.

Name of Schedule	Frequency of data	Data of collection
Part-I Food & Non-Alcoholic Beverages, Alcoholic Beverages & Tobacco	Monthly	11-14 of each month
Part-II Clothing & Footwear, Housing, Water, Electricity, Gas & other Fuels	Monthly	1-3 of each month
Part-III Furnishing, Household Equipment & Routine Household maintenance, Health & Medicine etc.	Monthly	4-6 of each month
Part-IV Transport, Communication, Recreation & Culture, Education & Miscellaneous goods and services.	Monthly	7-10 of each month

The Chief Statistical Officers of Regional offices also undertake field checking of price data collected by the price collectors. Senior Officers from Head Office also carryout surprise field inspections/visits to ensure authenticity of data.

Computer software for data entry has been developed and installed at 34 Regional/Field Offices. This software has special features like comparison with previous month, computation of average, computation of center average etc.

Price data are checked and scrutinized at the headquarters to ensure its accuracy. In the event of any doubt or abnormal variations, clarifications are immediately obtained from the concerned price reporting center.

For each item, four quotations from different shops in a market are obtained. Average of these four quotations is taken as a representative price for that market. The city average price for each item is computed by averaging its prices in all the selected markets of the city. The National average price of an item is thus obtained by taking the average of all the 40 cities covered under CPI.

Data collected through Family Budget Survey provide the details of commodity wise expenditure of households of different income groups. The results of Family Budget Survey provide the average percentage expenditure of households on different commodities for each income group in each city. These average percentage expenditure on commodities and commodity groups are called weights and used in the computation of the CPI. These weights are different for different income groups.

APPENDIX-C
MECHANISM OF GOVERNMENT'S BORROWING FROM BANKING SECTOR

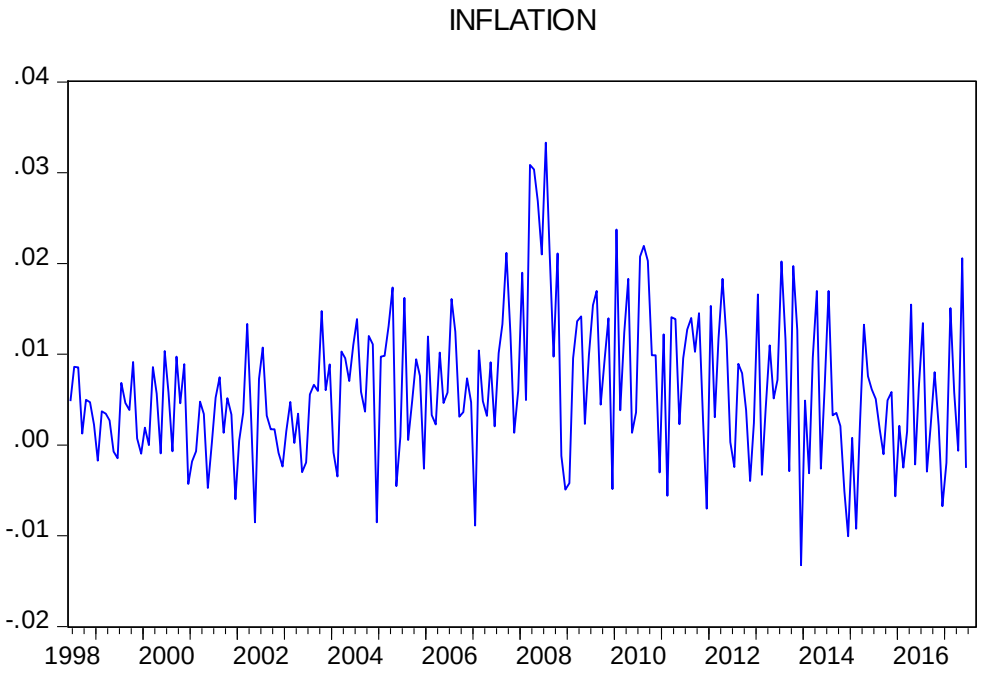
According to SBP the mechanism of government's borrowing from banking sector is describes as fallows; firstly, borrowings from commercial banks is mainly through fortnightly auctioning of Market Treasury Bills (MTBs) of 3, 6 and 12-month maturities. Government of Pakistan also borrows long-term by quarterly auctioning of Pakistan Investment Bonds (PIBs)/Sukuk of 3, 5, 10, 15, 20 and 30 years maturities.

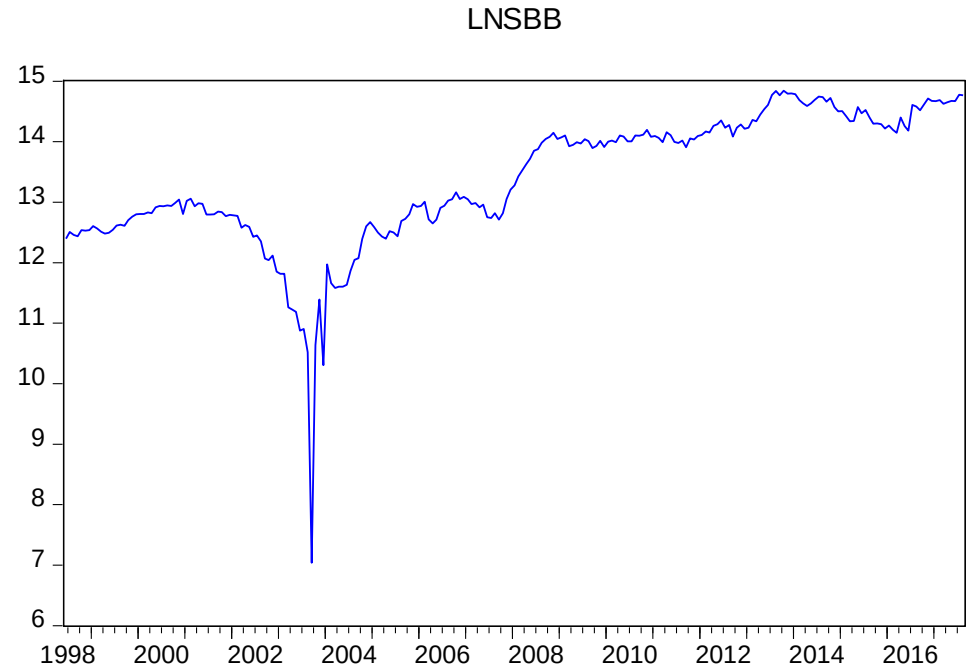
Secondly, federal Government may also borrow directly from SBP either through ways and means advance or purchase (by SBP) of Market Related Treasury Bills (MRTBs). The Ways and Means Advance is extended for government borrowings up to Rs.100 million at an interest rate of 4 percent per annum whereas higher amounts are borrowed through SBP purchase of 6-month MRTBs at the weighted average yield of 6-month MTB determined in the most recent fortnightly auction of treasury bills. The weighted average yield on 6-month MTB was 6.83 percent as a result of the auction conducted on 6th June 2018.

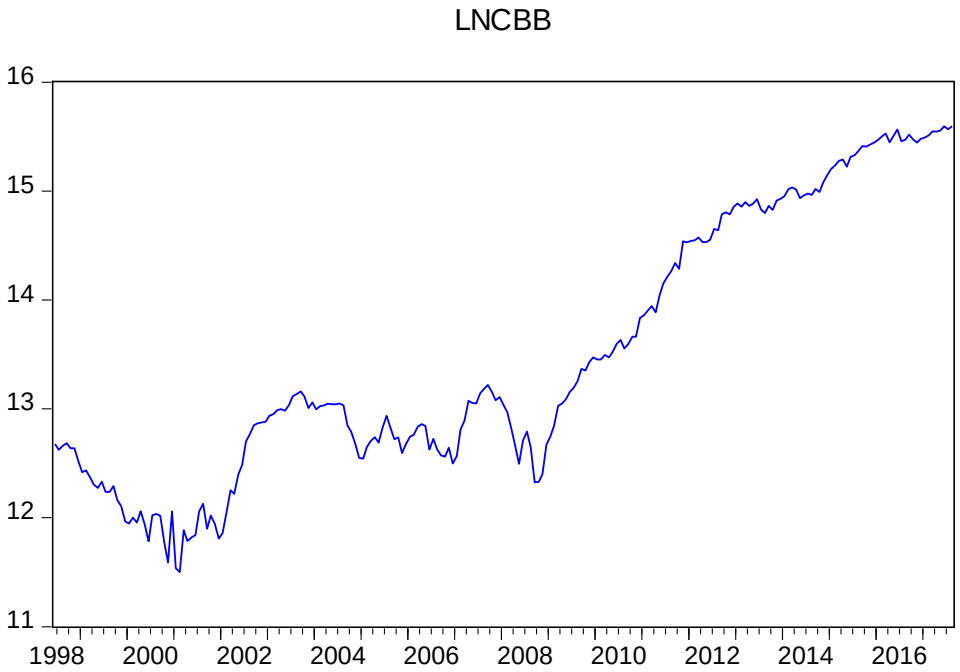
Thirdly, provincial governments and the government of Azad Jammu & Kashmir may also borrow directly from SBP through rising of their debtor balances (over drafts) within limits defined for them. An interest rate is charged on the borrowings which is weighted average of the weighted average yields of 6-month MTBs over the preceding three months. In case, the Provincial Governments or the Government of Azad Jammu & Kashmir borrows over and above the overdraft limit, they are penalized by charging an incremental rate of 4 percent per annum.

APPENDIX-D

a) UNIT ROOT TEST

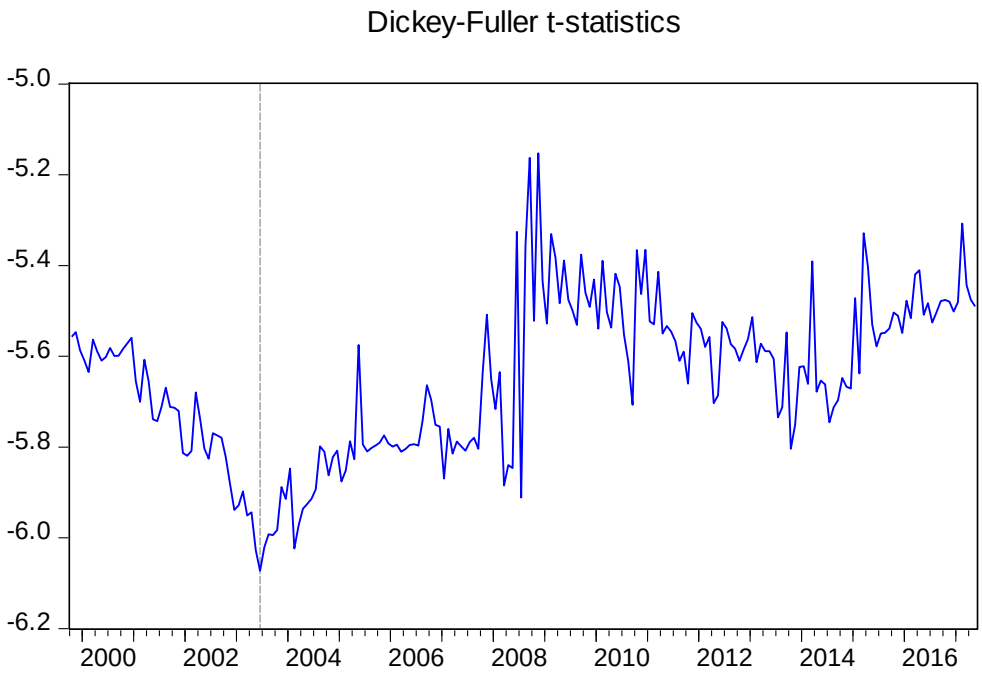


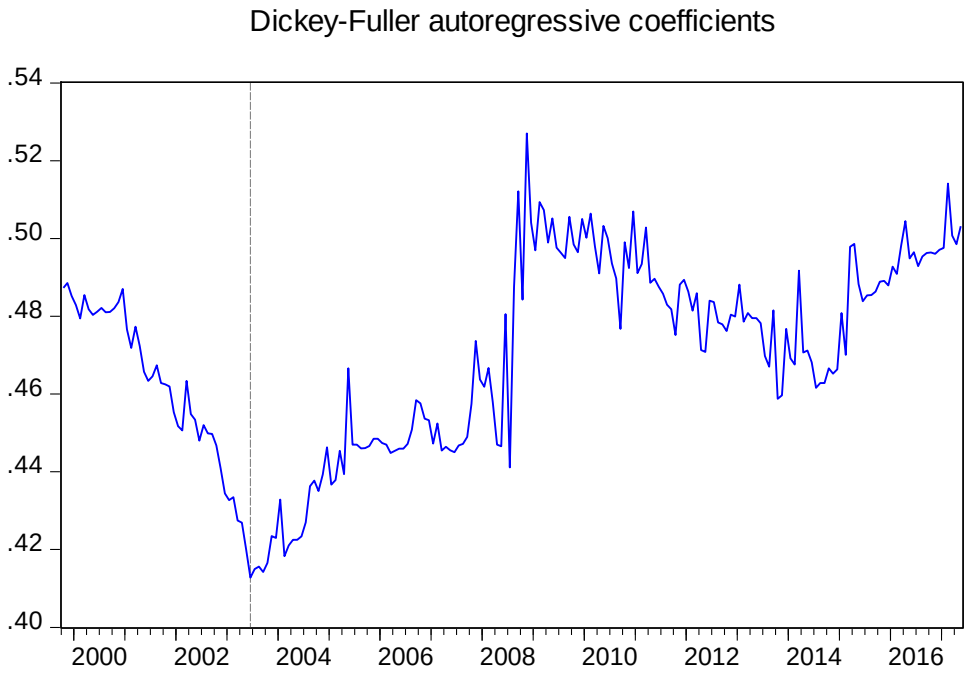




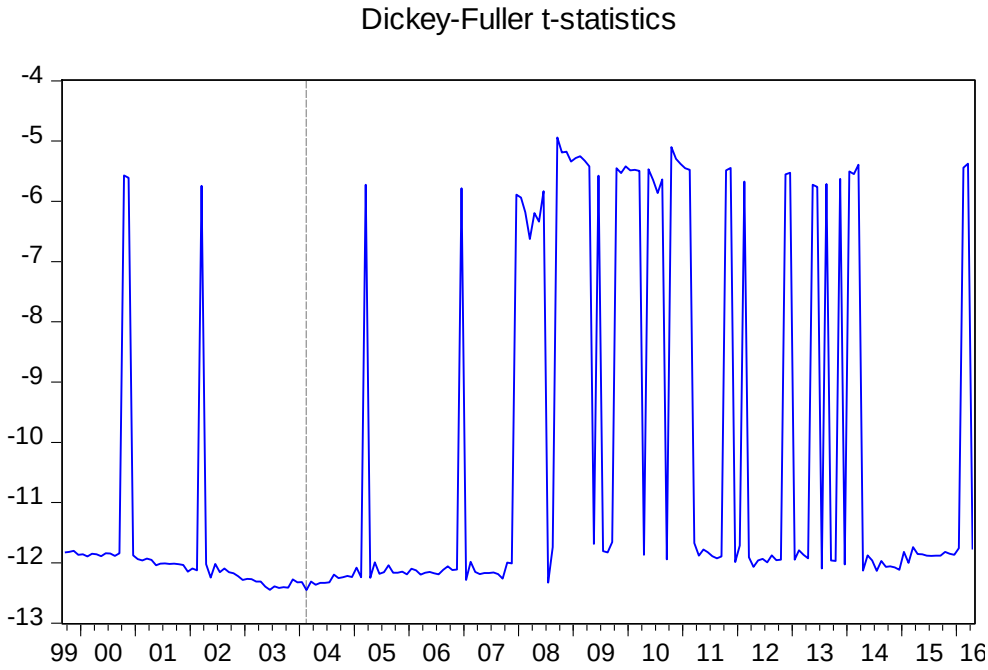
b) BREAK POINT UNIT ROOT TEST

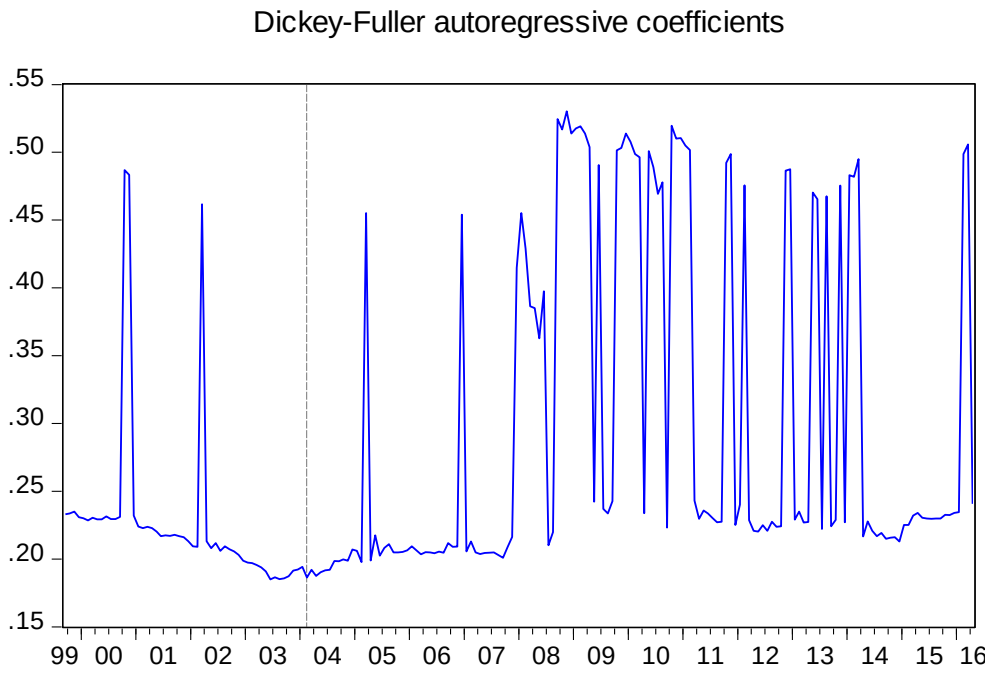
i) Break type: Innovational outlier





ii) Break type: Additive outlier





c) Estimations for Borrowing of Government from Central Bank- GARCH Analysis

We will estimate three models namely ARCH, GARCH and TGARCH for borrowing of government from Central bank. Estimated mean and variance equation are given in table D.1. LM-ARCH test is used to test the presence of ARCH effect in the model. The results are strongly significant for ARCH effect. Hence in the presence of ARCH effect, conditions mean equations' estimation is useless rather the interpretation of results on the basis of these outcomes will not be valid. In this regard if the GARCH-type modeling (Proposed by Engel 1982, & generalized by Bollerslev, 1986) is used then the interpretation of results on the basis of its estimation will be more valid. As it also estimate the conditional variance equation along with its conditional mean equation. Therefore, the study applied the GARCH model.

Furthermore, the sum of ARCH and GARCH term is not exceeding the unity. This indicates that the model which the study has run is stable model. GARCH captures the

symmetric behavior but it may happen that given variables may show the a-symmetric behavior as well, therefore in order to capture that a-symmetric behavior the TGARCH model is applied. The results of TGARCH model is based on assumption that the distribution of generalized error is skewed. The coefficient of independent parameter SBB is positive and strongly significant. ARCH and GARCH coefficient are strongly significant at 1 percent level. Further, the TGARH coefficient is significant that shows the distribution of the skewed. Thus the skewed distribution fits the estimated modal perfectly at 1 percent level of significance. `

Table D.1: Estimation Results of ARCH/GARCH Model: Impact of GB volatility on inflation in the case of Central bank

	ARCH	**GARCH**	**TGARCH**
Mean Equation			
Coefficients			
Constant	0.9952***	0.3693***	0.5260***
	(0.0879)	(0.1358)	(0.1554)
SBB	0.0814***	0.0591***	0.0594***
	(0.0337)	(0.0088)	(0.0087)
Variance Equation			
Constant	0.1601**	0.5549**	0.0502*
	(0.0815)	(0.2601)	(0.0273)
ARCH	0.6042***	0.9881***	0.2873***
	(0.2155)	(0.2224)	(0.0737)
GARCH	*NA*	0.0187***	0.7391***
	NA	(0.0024)	(0.1365)
TGARCH	*NA*	*NA*	0.5764***
	NA	*NA*	(0.1868)
Note: Note1: *, **, and *** show the 10 percent , 5 percent and 1 percent level of significance			
Note: Values in parentheses shows standard error			

d) Estimations for Borrowing of Government from Commercial Banks

Similarly the same models namely ARCH, GARCH and TGARCH are run for borrowing of government from commercial banks also. Estimated mean and variance equation are given in table D.2, ARCH effect is present as the LM-ARCH test results are strongly significant. Therefore, the GARCH model is applied.

Table D.2: Estimation Results of ARCH/GARCH Model: Impact of GB volatility on inflation in case of Commercial banks

	ARCH	GARCH	TGARCH
Mean Equation			
Coefficients			
Constant	0.7641***	0.3316***	0.4888***
	(0.2898)	(0.0239)	(0.1528)
CBB	0.0794***	0.0407***	0.0409***
	(0.0072)	(0.0125)	(0.0074)
Variance Equation			
Constant	0.1048**	0.4271*	0.0419***
	(0.0451)	(0.2571)	(0.0139)
ARCH	0.5846***	0.9041***	0.2912***
	(0.0487)	(0.2587)	(0.0945)
GARCH	*NA*	0.0540***	0.8402***
	NA	(0.0060)	(0.0478)
TGARCH	*NA*	*NA*	0.6692***
	NA	*NA*	(0.1345)
Information Criteria			
AIC	0.9715	0.6930	0.6799
BIC	0.6264	0.5945	0.5731
Hanan-Quanterion	0.4746	0.8278	0.4399
Note: Note1: *, **, and *** show the 10 percent , 5 percent and 1 percent level of significance Note: Values in parentheses shows standard error			

However the magnitude of CBB affecting inflation is less than the SBB i.e. 8.14 percent. Moreover, the sum of ARCH and GARCH term is not exceeding the unity. It refers to a stable model. Now in order to capture that a-symmetric behavior the TGARCH model is applied. The results of TGARCH suggest that the coefficient of independent parameter CBB is positive and

strongly significant. ARCH and GARCH coefficient are also strongly significant at 1 percent level. The distribution of the skewed as the TGARH coefficient is significant. Hence the skewed distribution fits the estimated modal perfectly at 1 percent level of significance.