

# **The Role of Money Supply in the Economic Growth of Pakistan**

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## **Abstract**

*The study investigates the role of money supply in the economic growth of Pakistan by using data over the period 1980 to 2014. Econometric techniques such as ordinary least squares method, granger causality test and vector auto regression has been used for estimating the results. It is found out that money supply put positive impact on the economic growth of Pakistan. Similarly, Granger Causality test has been applied for examining the causal relationship between the money supply and economic growth. The results show that money supply granger cause economic growth. Similarly, the VAR results also supported these results.*

*On the basis of the findings the study it is concluded that monetary policy of the State Bank of Pakistan is playing a significant role in the determination of the economic growth of Pakistan. However, this expansionary effect of the money supply is conditional on the inflation which in turn can hinders the economic growth.*

**Keywords:** Money Supply, Economic Growth, Vector Auto regression

## **1. Background of the Study**

Money supply is the total amount of monetary assets available in an economy at a specific time. The circulation of money can play a significant role in the determination of key macroeconomic variables in a country. The central bank channelizes money in the economy by adopting either expansionary or

contractionary monetary policy. Both direct and indirect instruments like interest rate, open market operation, required reserve ratio and liquidity ratio are used by monetary authorities for controlling money circulation. The main objectives of the formulation of a balanced monetary policy are to achieve full employment, price stability, GDP growth and correction of balance of payment situation (Economic survey of Pakistan, 2014).

Different schools of thoughts consider money supply as an essential component of economic growth. According to Mercantilist approach led by Thomas Munn, the stocks of precious metal including both gold and silver positively influence the output of a country. They suggested that gold in bulks promotes the quantity of money and hence, progress in economic activity occurs (Howey, 1982; Eichengreen, 1992). In contrast the Classical economists linked the stock of money in circulation with the general price level in the economy through equation of exchange. They stated that an increase in money supply leads directly to an increase in spending and, at full employment, the general price level is proportional to the quantity of money in circulation.

John Maynard Keynes stated that the economy is neither self-adjusting nor it remains always at full employment (Cameron, 2003). Schematically defined by the traditional Keynesian view, monetary transmission can be illustrated as a monetary expansion (Mishkin, 2004).

In 1963 Milton Friedman along with Anna Schwartz published a book titled at "*A Monetary History of the United States*" where they mentioned that "inflation is always and everywhere a monetary phenomenon". They stated that the 1930s Great Depression was just a financial shock whose duration and seriousness were greatly increased by the subsequent contraction of the money supply caused by the misguided policies of the directors of Federal Reserve.

Every school of thought presents a different view while dealing with certain macroeconomic variables in an economy. But all are agreed upon the fact that money supply has an impact on the total output.

There are several channels (i.e. interest rate channel, credit channel, balance of payment channel etc.) through which changes in money supply affect the output. Due to this complexity, monetary transmission has also been referred to as 'black box', because there is more than one channel through which monetary policy simultaneously operates in economies (Bernanke and Blinder, 1995). Shabir (2012) mentioned that the transmission channels through which money flows into the economy should be safe and sound. Degree of effectiveness of various channels of monetary transmission, not only ensures the level of success of monetary policy but also implicitly reflects the level of asymmetries in the market that help in understanding the behavior of various economic agents in the economy.

Over the years the State bank of Pakistan adopted different strategies for the implementation of its monetary policy. The SBP adopted 'selective credit / credit ceiling' from the second quarter of fiscal year 1973 to August 1992; 'credit to deposit ratio' from September 1992 to September 1995; and 'MS' target September 1995 to date (Saqib and Omer, 2008), respectively.

Although, the main purpose behind these different monetary policy strategies of SBP was the stabilization of macroeconomic conditions of the country. However, in spite of all these efforts the major macroeconomic variables mostly remained unsatisfactory in the country. Pakistani economy grew at adequately imposing rate of 6% per annum through the first four decades of the nation's existence. In spite of rapid population growth during that period, per capita income doubled, inflation continuously low and poverty decreased from 46% to 18% by late 1980 (Qayum, 2000). During 1990s, economic growth dropped to 3%, poverty rose to 33%, inflation has risen to double to digits and the foreign debt amounted to nearly the entire GDP. Pakistan's total public debt as percentage of GDP was the highest in overall South Asia 99.3% of its GDP and 629% of its gross revenue. Internal Debt of Pakistan in 1999 was 45.6% of GDP and 289.1% of its gross revenue. During 2007-2008, Pakistan became one of the four fastest growing economies in the Asian with its growth average of 7.0 per cent annually for most of this period (Saqib and Umar, 2008).

These clues were confessed in a Memorandum of Economic and Financial Policies (MEFP) for 2008/2009, 2009/2010, while signing agreement with the IMF on November 20, 2008. The document clearly admitted that "Pakistan's economy perceive a major economic revolution in the last decade. The country's real GDP increased from \$60 billion to \$170 billion with per capita income rising from under \$500 to over \$1000 during (2000-2007) (MEFP, 2008)

### **1.1 Objectives of the study**

The following are the main objectives of the study.

- To examine the impact of money supply on the economic growth of Pakistan.
- To investigate the relationship between money supply and economic growth.

## **2. Literature Review**

A rich literature on the relation between money supply and economic growth has been provided by numerous researchers. They resulted that along with other school of thoughts, Keynesian economics has explained the issues of total output and aggregate demand in the ages of economic darkness. Keynes advocate the intervention of government can stimulate aggregate demand and real output through maximum government spending specially in the case of recession (liquidity trap). The threat of being unemployed creates increase in the saving of people, hence, creating "glut" in savings. The decline in aggregate spending will decline the

aggregate demand in the economy which ultimately affects the gross domestic product and its growth. Keynesian framework is witness that the total output of a country depends on the aggregate demand for that output. The quantity of output is the sum of Consumer Expenditure (C), Planned Investment Spending (I), Government Spending (G) and Net exports (NX) and may be given by the equation  $Y^d = C + I + G + NX$ .

The equilibrium position may be achieved when the total output demanded is equal to the total output supplied at constant prices (Minkiw, 2009)

Mishkin (2001) mentioned in his book “money, banking and financial markets” that consumer expenditure of an economy depends of the disposable income which is the income available for a country to make expenditure. The consumption function showing the relationship between these two variables is given by the equation

$$C = a + (mpc \times Y_D)$$

Where “a” is the autonomous consumer expenditure and doesn’t depend on the disposable income “mpc” represents the marginal propensity to consume ( $\Delta C / \Delta Y_D$ ).

Money supply effects the GDP growth either directly or indirectly through its four constituents. Muhammad Aijaz Rasheed (2010) conducted a detailed study to explore the relationship between money supply and real variables over a long period of time (1972-2008) in different monetary policy regimes in Pakistan. To show the co-integration and stationarity of the variables, unit root and Johansen co-integration tests were employed. To test whether there is unidirectional or bidirectional causality in the long and short run between the variables, standard Granger causality test was used. The result indicated that in different regime various economic and monetary policies were adopted. The post Keynesian claims were accepted in the credit planning regime where private credit causes M0 (reserve money); income causes money supply (MS); inflation causes money supply (M0 and MS) and interest rate causes income. From 1991, when market-oriented monetary policy was adopted by the government due to which various financial sectors reforms such as privatization, deregulation and liberalization occurred, the findings of the study supported traditional neoclassical views. In addition with the reserve money causes private credit, interest rate, broad money (MS) and changes in price level.

A balanced monetary policy is more important than a fiscal policy. Syed Tehseen Jawaid and Imtiaz Arif and Syed Muhammad Naeemullah (2010) investigated that whether fiscal or monetary policy has more impact on the economic growth in Pakistan. The researchers analyzed annual time series data from 1981-2009 through co-integration technique. The outcome of the study indicated that both policies have a significant and positive effect on economic growth. However, economic growth is more inclined towards monetary policy as compared to fiscal

policy because the coefficient of monetary policy was much greater than fiscal policy. Fiscal policy can boost up the economic growth of the country by eliminating corruption, leakages and inappropriate use of resources while monetary policy may do the same through balanced money supply in the country.

Irfan hameed and Ume-Amen (2011) while working on the impact of monetary policy on the gross domestic product, observed that there is a relationship exists among the two. By applying regression analysis technique to past 30 years data, it is proved that the relationship between GDP and interest rate is minor as compared to the relationship between growth in money supply and GDP growth of an economy.

Hafeez ur rehman and Imtiaz Ahmad (2002) used the behavior of money multiplier as a tool to ascertain the monetary policy of Pakistan in controlling the total monetary assets. The outcomes of the study indicated that monetary stock (MS) depends on the monetary base of the country and to control and regulate the monetary assets in Pakistan, the primary instrument is the monetary policy of the country which should be kept balanced as to achieve the projected growth rate of GDP.

Iqra Ihsan & Saleem Anjum (2013) analyzed the 12 years data (200-2011) through regression model to show the impact of money supply on the GDP growth of Pakistan. They pointed out that excessive money supply (MS) by State Bank of Pakistan will leads to high rate of inflation rather than GDP growth in the country, if the indicators i-e CPI, interest rate are not controlled within the prescribed limits. The economic disease of inflation may be controlled if the excess money supply is used to improve production the real sectors of the economy such as industry, agriculture, education and health etc. The study ended with the result that CPI and interest rate have a significant impact on GDP and inflation rate has insignificant impact on GDP.

M. S. Ogunmuyiwa and A. Francis Ekone (2010) conducted a study to show the impact of money supply on the economic growth in Nigeria between 1980 and 2006. The research was employed through econometric technique O.L.S.E, causality test and E.C.M to time series data. The result concluded a positive relationship between the money supply and the economic growth in Nigeria. However, the result confused the researchers on the choice to suggest contractionary or expansionary money supply in the country as the GDP growth rates were insignificant.

Liang and Huang (2011) make a research on “the relationship between money supply and the GDP of United States”. They stated that US economy use the instrument of Open Market Operation to control the money supply as this tool has a crystal clear observable effect on the financial market and holds relatively low cost of operation. The Fed uses this policy to target the federal funds rate to control the supply of money in the economy in the recent era. The study concluded that lagged changes in GDP play a vital role in estimating the changes in money supply (MS).

Ge Zhou (2011) examined the relationship between money and long-run growth when the firm's liquidity demand is explicitly modeled. By using a set of sensitivity analysis, he resulted that the relationship between the two variables may be negative, positive or displayed a hump shape. The level of financial development and size of average liquidity demand is responsible for the relationship between money and long-run growth.

Syed Kanwar Abbas (2009) stated that the mismanagement of money supply by the concerned authorities caused the worst economic destruction in the form of 1929's Great Depression, 1970's Stagflation and 2008's Economic depression in the global economy. He conducted a study to examine whether oil money or oil and crop productivity shocks caused inflation in Pakistan or not? The empirical results of the research broadly uphold the monetary explanation of inflation in the economy of Pakistan. Both monetary and productivity management are the core targets to control inflationary pressure in the economy. The important finding of the study was that in Pakistani economy, food inflation is also a monetary phenomenon.

Abdul Qayum (2006) supported the view that inflation is a monetary phenomenon. He studied the relationship between excess money supply and inflation in Pakistan by using correlation analysis and find out a positive linkage between the two. Initially, an increase in the stock of money by adopting loose monetary policy by the state bank of Pakistan affects the GDP growth in the country and at the second round it affects inflation in Pakistan. The study resulted that the basic accelerator of rise in inflation in Pakistan is the excess money supply. The policy makers should adopt tight monetary policy to fight against inflation and while formulating the monetary policy, the development in the real and financial sectors of the economy must be focused.

Mbewe Kalikeka (2013) investigated the role of interest rate channel in the monetary transmission mechanism in Zambia from 1980-2011. The econometric technique of Granger causality test performed in the study point out the bidirectional causality between interest rate and inflation exists while from gross domestic product to interest rate, there is unidirectional causality. The output of the economy responded negatively to the monetary policy of the central bank, and the rate of inflation had an inverse relationship to the interest rate has been indicated by impulse response function. The forecast error variance decomposition resulted that the consumer price index in Zambian economy was attributed to itself, while the gross domestic product of the country was more attributed to itself with a significant to CPI and no involvement of the interest rate.

For a developing country like Pakistan the formulation of monetary policy requires to focus on the long run relationship among three basic macroeconomic variables money, price level and GDP. Waliullah and Dr. Fazli Rabbi (2011) applied Autoregressive Distributive Lag Model (ARDL) along with unit roots and ECM to quarterly data for year 1972: 1 to 2005: IV to analyze the long run relationship

among the mentioned variables. The findings clearly mentioned that money supply (M1), GDP and CPI in Pakistan holds a stable long run relationship and in the past decades the suggested changes in the monetary policy has significantly affected the macro economy of the country.

The Central Government of a country is responsible to fix the target growth rate and target inflation rate. In case of Pakistan, when the Federal government do so, the State Bank of Pakistan just combine those targets and obtained target rate of growth of money supply. The velocity of money is assumed to be constant while the concerned authorities when calculate the target value of money supply. However recent research has resulted that the velocity of circulation of money is not constant in Pakistan and showing a decreasing trend since 1973 (Qayyum, 2006)

Abdul Aleem Khan, Syed Kalim Hyder Bukhari and Qazi Masood Ahmed (2007) blamed the central bank of Pakistan (State Bank of Pakistan, SBP) that on one side if the SBP is adopting expansionary monetary policies to promote the economic performance of the economy, on the other hand it also contributes to raise the consumer price index (CPI) of the country. Hence a study was conducted to analyze the determinants of inflation in Pakistan. Data from 1972-73 to 2005-06 period was applied by OLS method verifying results through Breusch-Godfrey Serial Correlation LM and Augmented Dickey-Fuller tests, it was concluded that adaptive expectations, private sector credit and rising import prices were the primary determinants of inflation in Pakistan while the fiscal policy has a minimal contribution.

### 3. Data and Methodology

The present study shows information about the data and methodology of the study. The details are as follows:

#### 3.1 Data and Definition of the Variables of the Study

The main objective of the study is to investigate the impact of money supply on the economic growth (GDP growth) of Pakistan. For this purpose time series annual data over the period of 1980 to 2014 has been used for the analysis. All the variables alongwith its definition and symbols are given in table 1 as follows.

**Table 1: Definition of Variables of the Study**

<b>Variables</b>	<b>Definition</b>	<b>Symbols</b>
Money supply (M2)	Narrow Money + Checkable Deposits + Money Market Instruments in Million Rupees in Pakistan	Ms <sup>C</sup>
Gross Domestic Product	Pakistan Annual Gross Domestic product in Million Rupees	GDP
Gross Domestic Product Growth Rate	Pakistan Annual Gross Domestic Product Growth Rate in Percentage	GDPGr <sup>C</sup>
Remittances	Pakistan Annual Inflow of Money by Immigrants	Rt <sup>C</sup>

	Labor in Rupees	
Foreign Exchange Reserves	Pakistan Annual Assets held by State Bank of Pakistan And Monetary Authorities in various reserve currencies (i-e US dollar, Pound Sterling etc)	Forex <sup>C</sup>
Inflation Rate	Pakistan Annual Inflation Rate in Percentage	Inf <sup>C</sup>
Exchange Rate	Pakistan Exchange Rate in Terms of US Dollar	Ex <sup>C</sup>
Foreign Direct Investment	Pakistan Annual Foreign Direct Investment in Million Rupees	Fdi <sup>C</sup>

In table 1, information about all the variables has been given. The superscript “C” on the symbols of variables indicates the deviated form. For converting the data into deviation form and extracting only the cyclical component, Hodrick Prescott (HP) filter method will be used. The purpose of the application of the HP filter method to data is to remove trend from data and making it stationary. Eviews software will be used for the computation of the results.

Time series annual data has been used for the computation of the study results. All the data has been collected from different sources including Economic Surveys, Government of Pakistan Various Issues, State Bank of Pakistan Annual Reports, International Financial Statistics, IMF and Federal Bureau of Statistics of Pakistan.

### 3.3 Theoretical Framework

Keynesian framework is witness for the strong influence of economic output by aggregate demand. The latter does not necessarily equal to the productive capacity of the economy as there are numerous factors interrupting such as inflation, unemployment etc. Keynesians used IS LM curve to show the relationship between the interest rate (money market fluctuations) and output (GDP) in the goods and services market and in the money market as well. This model was developed by John Hicks in 1973 while later it was extended by a Keynesian mathematician Alvin Hansen.

According to the approach, increase in money supply will decrease the interest rate and increase output in short run. In the long run it has no effect on the interest rate or output, but results in inflations and vice versa.

Figure 1 depicts the relationship between money supply and economic growth. It shows that when there is an increase in money supply from MS1 to MS2 with a constant price level P1 which leads to a decrease in interest rate from r1 to r2, LM curve shifts downward from LM1 to LMS. In IS-LM model, the downward-shifted LM curve intersects with IS curve at equilibrium with an increased output, Y2. In AD-AS model, the new output level shifts AD curve up from AD1 to AD2. In short run, as we assume that the price is sticky, the upward-shifted AD curve intersects SRAS at a new equilibrium at the higher output level Y2. However, in the long term, since the price is flexible and the output will ultimately return to the assumed-full-employment level Y1, the upward-shifted AD curve will intersect with LRAS curve at Y1, but at a higher price level P2. Due to the return in the output, and

the rise in price, LM curve will then shift back to the initial position LM1, and the interest rate reduces back to the original level  $r_1$ .

**Figure 1: AD-AS/IS-LM Framework**

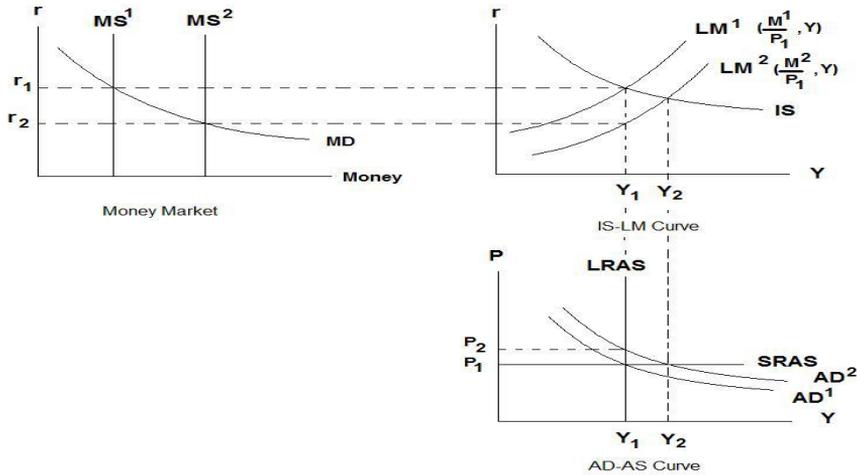
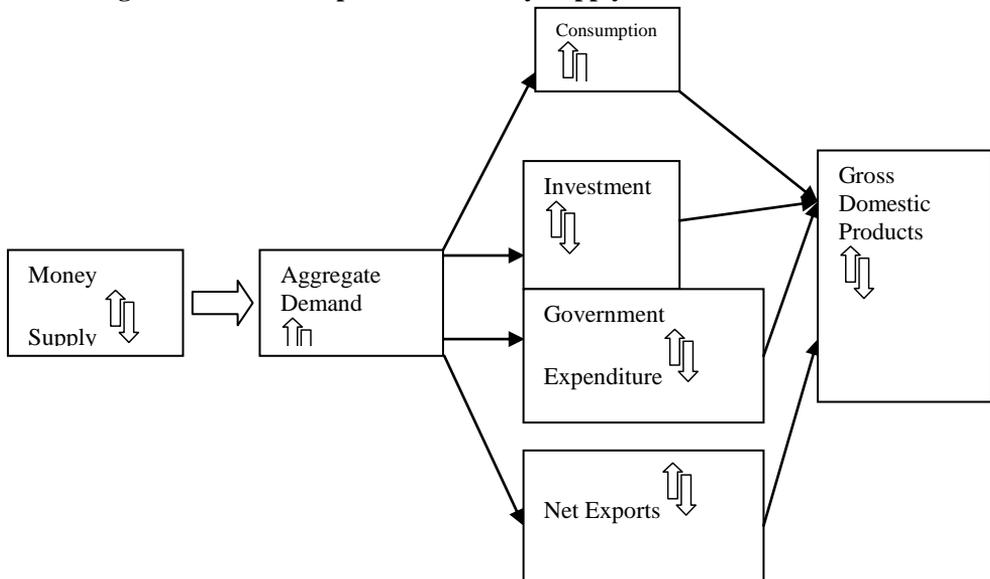


Figure 1 show that money supply influence aggregate demand i.e consumption, investment, government expenditure and net exports which ultimately affect economic growth. On the basis of the Keynesian approach, we have developed our own theoretical framework showing the relationship between money supply and economic growth. This theoretical framework is showing by figure 2 as below.

**Figure 2: Relationship between Money Supply and Economic Growth**





### 3.4 Empirical Model

To investigate the relationship between money supply and economic growth the following model showing by equation 3.1 has been developed.

$$GDPGr^C = \beta_0 + \beta_1 Ms^C + \beta_2 Ex^C + \beta_3 Forex^C + \beta_4 Fdi^C + \beta_5 Rt^C + \beta_6 Inf^C + \varepsilon_1 \quad (1)$$

Equation (1) shows the impact of money supply on GDP growth where  $GDPGr^C$  is the dependent variable while  $Ms^C, Ex^C, Forex^C, Fdi^C, Rt^C, Inf^C$  are the independent variables. Moreover,  $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  are the relevant coefficients and  $\varepsilon_1$  is the error term.

For the computation of the results of the study different econometric techniques has been used. First Hodric Prescott Filter method has been used for making the data stationary. Then Ordinary Least Squares method has been applied for computing the regression results for both the aggregated and disaggregated models of the study. Then Granger Causality Test has been used for checking the interrelationship between the study variables. Then VAR test has been applied for checking the relationship between the variables through a system analysis.

## 4. Results and Discussion

The present chapter shows the results of the study. First, section 4.1 shows the results of the study. First section 4.1 shows the regression results of the study. Then section 4.2 shows the Granger Causality test results. Finally section 4.3 shows the Vector Auto Regression results.

### 4.1 Regression Results for Money Supply and GDP Growth

Table 2 shows the regression results of the money supply and economic growth.

**Table 2:** Regression Results of money supply and economic growth

Dependent Variable:  $GDPGr^C$

Method: Ordinary Least Squares

Newey- West HAC Standard Error Covariance

$GDPGr^C = \beta_0 + \beta_1 Ms^C + \beta_2 Ex^C + \beta_3 Forex^C + \beta_4 Fdi^C + \beta_5 Rt^C + \beta_6 Inf^C + \varepsilon_1$		
Independent variables	Coefficient	St. Error
$Ms^C$	9.63E-08**	4.22E-07
$Ex^C$	-0.206687**	0.076597
$Forex^C$	4.38E-08*	3.23E-08
$Fdi^C$	8.22E-06***	4.18E-06
$Rt^C$	1.29E-08	1.12E-07
$Inf^C$	-0.100339**	0.079419
Intercept	-1.07E-13	0.169034
R- Square : 0.642445		
Adj. R- Square : 0.589398		
DW Statistics : 1.82		

- Asterisk \*, \*\* and \*\*\* shows 1%, 5% and 10% level of significance.

Table 2 shows the regression results of the study. The results show that almost all the variables of the study turned significant. The coefficient of money supply turned significant at 5% level of significance with the expected sign, showing the positive impact of money supply on economic growth. Similarly, exchange rate also became significant. However, its sign is negative showing that when there is an increase in the rupee exchange rate (i.e. depreciation) it will decrease the economic growth. Moreover, the foreign exchange reserves also showed a positive and significant relationship with the economic growth. Foreign direct investment also turned significant and showed a positive relationship with the economic growth. However, the coefficient of remittances turned insignificant with the unexpected negative sign. And the inflation turned significant showing that it puts negative impact on the economic growth of Pakistan. Furthermore the intercept turned insignificant. Finally, the R-square value is 0.64 which shows that the explanatory variables of the model show 64% variation in the dependent variables. Also the Durbin Watson statistic value is 1.82 which shows that there is no autocorrelation problem in the data.

#### 4.2 Results of Granger Causality Test Results

The following section shows the granger causality test results. The details are as follows.

**Table 3: Granger Causality Test Results**

Null Hypothesis	Observation	F-Statistic	Probability
$MS^c$ does not Granger Cause $GDPGr^c$	33	0.60938	0.0432
$GDPGr^c$ does not Granger Cause $MS^c$		0.31758	0.7305
$Rt^c$ does not Granger Cause $GDPGr^c$	33	0.71139	0.4996
$GDPGr^c$ does not Granger Cause $Rt^c$		7.48064	0.0025
$Ex^c$ does not Granger Cause $GDPGr^c$	33	0.45794	0.0372
$GDPGr^c$ does not Granger Cause $Ex^c$		0.65548	0.5270
$Fdi^c$ does not Granger Cause $GDPGr^c$	33	4.24238	0.1246
$GDPGr^c$ does not Granger Cause $Fdi^c$		5.76688	0.0080
$Forex^c$ does not Granger Cause $GDPGr^c$	33	0.77797	0.0290
$GDPGr^c$ does not Granger Cause $Forex^c$		5.86903	0.7774
$Inf^c$ does not Granger Cause $GDPGr^c$	33	1.67951	0.0047
$GDPGr^c$ does not Granger Cause $Inf^c$		0.10493	0.9007
$Rt^c$ does not Granger Cause $MS^c$	33	5.33573	0.0109
$MS^c$ does not Granger Cause $Rt^c$		7.23830	0.0029
$Ex^c$ does not Granger Cause $MS^c$	33	0.17157	0.8432
$MS^c$ does not Granger Cause $Ex^c$		1.64481	0.2112
$Fdi^c$ does not Granger Cause $MS^c$	33	4.05798	0.0283
$MS^c$ does not Granger Cause $Fdi^c$		4.21268	0.0252
$Forex^c$ does not Granger Cause $MS^c$	33	3.14663	0.0585
$MS^c$ does not Granger Cause $Forex^c$		20.7067	3.E-06
$Inf^c$ does not Granger Cause $MS^c$	33	0.39114	0.6799
$MS^c$ does not Granger Cause $Inf^c$		0.12315	0.8846
$Ex^c$ does not Granger Cause $Rt^c$	33	27.1170	3.E-07
$Rt^c$ does not Granger Cause $Ex^c$		0.52372	0.5980
$Fdi^c$ does not Granger Cause $Rt^c$	33	16.7159	2.E-05
$Rt^c$ does not Granger Cause $Fdi^c$		9.47916	0.0007
$Forex^c$ does not Granger Cause $Rt^c$	33	16.9224	2.E-05
$Rt^c$ does not Granger Cause $Forex^c$		63.7945	4.E-11

$Inf^C$ does not Granger Cause $Rt^C$ $Rt^C$ does not Granger Cause $Inf^C$	33	0.55800 3.52797	0.5786 0.0430
$Fdi^C$ does not Granger Cause $Ex^C$ $Ex^C$ does not Granger Cause $Fdi^C$	33	6.99850 9.71648	0.0430 0.0006
$Forex^C$ does not Granger Cause $Ex^C$ $Ex^C$ does not Granger Cause $Forex^C$	33	0.48578 20.8845	0.6203 3.E-06
$Inf^C$ does not Granger Cause $Ex^C$ $Ex^C$ does not Granger Cause $Inf^C$	33	0.31556 6.11154	0.7319 0.0063
$Forex^C$ does not Granger Cause $Fdi^C$ $Fdi^C$ does not Granger Cause $Forex^C$	33	7.23031 23.3807	0.0029 1.E-06
$Inf^C$ does not Granger Cause $Fdi^C$ $Fdi^C$ does not Granger Cause $Inf^C$	33	0.61668 2.49322	0.5469 0.1008
$Inf^C$ does not Granger Cause $Forex^C$ $Forex^C$ does not Granger Cause $Inf^C$	33	0.44667 3.24802	0.6442 0.0539
$MS^C$ does not Granger Cause $GDPGr^C$ $GDPGr^C$ does not Granger Cause $MS^C$	33	0.60938 0.31758	0.0432 0.7305
$Rt^C$ does not Granger Cause $GDPGr^C$ $GDPGr^C$ does not Granger Cause $Rt^C$	33	0.71139 7.48064	0.4996 0.0025
$Ex^C$ does not Granger Cause $GDPGr^C$ $GDPGr^C$ does not Granger Cause $Ex^C$	33	0.45794 0.65548	0.0372 0.5270
$Fdi^C$ does not Granger Cause $GDPGr^C$ $GDPGr^C$ does not Granger Cause $Fdi^C$	33	4.24238 5.76688	0.0246 0.0080
$Forex^C$ does not Granger Cause $GDPGr^C$ $GDPGr^C$ does not Granger Cause $Forex^C$	33	0.77797 5.86903	0.4690 0.0074
$Inf^C$ does not Granger Cause $GDPGr^C$ $GDPGr^C$ does not Granger Cause $Inf^C$	33	1.67951 0.10493	0.2047 0.9007
$Rt^C$ does not Granger Cause $MS^C$ $MS^C$ does not Granger Cause $Rt^C$	33	5.33573 7.23830	0.0109 0.0029

Similarly, table 3 shows the granger causality test results for the aggregated model with MS. The results shows that uni-directional relationship existed from  $MS^C$  to  $GDPGr^C$ ,  $GDPGr^C$  to  $Rt^C$ ,  $Ex^C$  to  $GDPGr^C$ ,  $GDPGr^C$  to  $Fdi^C$ ,  $Forex^C$  to  $GDPGr^C$ ,  $Inf^C$  to  $GDPGr^C$ ,  $Forex^C$  to  $MS^C$ ,  $Rt^C$  to  $Fdi^C$ ,  $Rt^C$  to  $Inf^C$ ,  $Ex^C$  to  $Inf^C$ ,  $Forex^C$  to  $Fdi^C$ ,  $Forex^C$  to  $Inf^C$ ,  $MS^C$  to  $GDPGr^C$ ,  $GDPGr^C$  to  $Rt^C$ ,  $Ex^C$  to  $GDPGr^C$  and  $GDPGr^C$  to  $Forex^C$ .

However, bi-directional relationship has been found between  $MS^C$  and  $Fdi^C$ ,  $Ex^C$  and  $Fdi^C$ ,  $GDPGr^C$  and  $Fdi^C$  and  $MS^C$  and  $Rt^C$ . Moreover, the P-value turned to be insignificant for the other relationships between the variables.

### 4.3: VAR Results

Results of VAR has been shown in this section. First the individual significance of the variables for each model of the whole system equation has been checked. After that the joint significance of all the variables of different models has been computed through Wald test. Finally the Cholesky decomposition test is used for the computation of impulse response functions.

#### 4.3.1 Individual Significance of the Variables of VAR Model

For showing the individual significance of the variables VAR test has been applied. The results are given in table 4. In the table the individual significance of the

explanatory variables has been checked for the seven models of the system i.e. GDP growth rate model, Money supply (MS) model, Remittances model, Exchange rate model, Foreign direct investment model, Foreign exchange reserves model and inflation model.

**Table 4: Results of VAR model**

Vector Auto regression Estimates Sample (adjusted): 1982 2014 Included observations: 33 after adjustments Standard errors in ( ) & t-statistics in [ ]							
	<i>GDPGr<sup>c</sup></i>	<i>MS<sup>c</sup></i>	<i>Rt<sup>c</sup></i>	<i>Ex<sup>c</sup></i>	<i>Fdi<sup>c</sup></i>	<i>Forex<sup>c</sup></i>	<i>Inf<sup>c</sup></i>
GDPGRC(-1)	0.444041** (0.18795) [2.36259]	80936.88 (35196.9) [ 2.29955]	128651.2** (76674.9) [1.67788]	0.138900 (0.23705) [0.58596]	7444.648** (3262.56) [ 2.28184]	369607.8 (415644.) [0.88924]	0.168636** (0.33793) [0.49902]
GDPGRC(-2)	0.464437** (0.22330) [2.07992]	15702.23* * (41816.7) [ 0.37550]	129137.2** (91095.9) [1.41760]	0.424953 (0.28163) [1.50889]	6052.157** (3876.18) [ 1.56137]	806206.3 (493819.) [1.63260]	0.266273 (0.40149) [0.66321]
MSC(-1)	2.05E-06** (1.3E-06) [1.54879]	1.676567** (0.24832) [6.75166]	1.373250 (0.54095) [2.53858]	9.14E-06** (1.7E-06) [ 5.46556]	0.030878 (0.02302) [1.34147]	2.538734 (2.93243) [0.86574]	6.02E-07** (2.4E-06) [0.25259]
MSC(-2)	5.28E-06** (3.8E-06) [1.37353]	3.415662** (0.72044) [4.74108]	5.037664 (1.56945) [ 3.20983]	1.43E-05 (4.9E-06) [ 2.95353]	0.060851 (0.06678) [ 0.91120]	8.411279 (8.50777) [ 0.98866]	1.50E-06 (6.9E-06) [0.21656]
RTC(-1)	2.90E-06** (1.3E-06) [2.23491]	1.060287 (0.24288) [4.36540]	2.489298 (0.52911) [ 4.70467]	4.31E-06 (1.6E-06) [ 2.63392]	0.000881 (0.02251) [0.03915]	8.286179 ** (2.86825) [ 2.88893]	5.75E-07 (0.40149) [0.24638]
RTC(-2)	2.23E-07 (5.5E-07) [ 0.40215]	0.127875* * (0.10380) [ 1.23190]	0.166607* * (0.22613) [ 0.73677]	6.35E-07 (7.0E-07) [0.90901]	0.011264 (0.00962) [1.17065]	3.499603 ** (1.22582) [ 2.85491]	4.32E-07 (1.0E-06) [0.43332]
EXC(-1)	0.118757** (0.18218) [0.65187]	810.9113 (34117.1) [ 0.02377]	19811.30 (74322.7) [ 0.26656]	0.914193* * (0.22978) [ 3.97862]	5446.267 (3162.47) [1.72215]	423978.3 ** (402893.) [1.05233]	0.266079 (0.32757) [0.81229]
EXC(-2)	0.533947 (0.24016) [2.22326]	51823.09 (44975.7) [1.15225]	12118.47 (97977.6) [ 0.12369]	0.250016** (0.30291) [0.82538]	525.7798 (4169.01) [ 0.12612]	68156.16 (531124.) [0.12832]	0.439388 (0.43182) [1.01752]
FDIC(-1)	2.38E-05** (9.1E-06) [ 2.63205]	11.42326 (1.69640) [ 6.73383]	0.250993 (3.69553) [0.06792]	3.57E-05 (1.1E-05) [3.12727]	0.841809** (0.15725) [ 5.35342]	48.07676 (20.0330) [ 2.39988]	3.53E-06 (1.6E-05) [0.21665]
FDIC(-2)	3.08E-05** (1.8E-05) [1.74986]	12.01059 (3.29093) [ 3.64960]	18.53898 (7.16915) [2.58594]	5.25E-05 (2.2E-05) [2.36957]	0.922457** (0.30505) [3.02394]	89.05880 (38.8630) [2.29161]	4.00E-06 (3.2E-05) [ 0.12670]
FOREXC(-1)	6.01E-07** (2.4E-07) [ 2.50711]	0.110423* * (0.04493) [ 2.45783]	0.368144 (0.09787) [3.76150]	3.99E-07 (3.0E-07) [1.32025]	0.002307 (0.00416) [ 0.55407]	1.685729 ** (0.53055) [3.17733]	1.61E-07 (4.3E-07) [ 0.37353]
FOREXC(-2)	1.19E-07 (1.1E-07) [1.11326]	0.006193 (0.02000) [ 0.30960]	0.039633 (0.04357) [0.90958]	6.26E-08** (1.3E-07) [ 0.46476]	0.002219 (0.00185) [ 1.19674]	0.501746 (0.23620) [2.12425]	2.68E-08 (1.9E-07) [ 0.13963]
INFC(-1)	0.016898 (0.12849) [ 0.13151]	17025.21 (24062.7) [0.70753]	18714.54 (52419.7) [ 0.35701]	0.180464 (0.16206) [1.11356]	1675.452 (2230.49) [ 0.75116]	66061.77 (284160.) [0.23248]	0.081205** (0.23103) [ 0.35149]
INFC(-2)	0.190005** (0.13677) [1.38920]	10149.66 (25613.5) [0.39626]	10183.12 (55798.0) [ 0.18250]	0.296537 (0.17251) [ 1.71900]	819.0211 (2374.24) [0.34496]	17757.31 (302474.) [ 0.05871]	0.088114 (0.24592) [ 0.35830]
C	0.012734 (0.22642) [0.05624]	7001.484 (42402.3) [0.16512]	76567.84 (92371.6) [0.82891]	0.139104 (0.28558) [ 0.48710]	1895.703 (3930.47) [ 0.48231]	447943.2 (500734.) [0.89457]	0.216161 (0.40711) [0.53096]
R-squared	0.712593	0.656832	0.390115	0.540075	0.487138	0.450646	0.578367
Adj. R-squared	0.709054	0.647701	0.382427	0.536799	0.479357	0.445593	0.560430
Sum sq. resids	26.95415	9.45E+11	4.49E+12	42.87783	8.12E+09	1.32E+14	87.14019
S.E.	1.223705	229164.3	499224.6	1.543406	21242.30	2706230.	2.200255

equation							
F-statistic	3.187779	19.06808	128.7871	9.435238	10.10621	65.14680	1.763655

First the GDP growth rate model shows that almost all variables turned significant. The results show that lag values of the GDP growth rate, money supply (MS), remittances, exchange rate, foreign direct investment and foreign direct investment turned significant. Whereas, lag values of the inflation remained insignificant. The R-square value is 0.71 showing the fitness of good of the model. Similarly, in the money supply model lag values of the GDP growth rate, remittances, exchange rate and foreign exchange reserves turned significant. After that the in the remittances model lag values of the GDP growth rate and remittances became significant. Similarly, in the exchange rate model, lags of money supply, exchange rate and foreign exchange reserves became significant. In the foreign direct investment model lags of GDP growth rate and foreign direct investment turned significant. In the foreign exchange reserves model only lags of remittances, exchange rate and foreign exchange reserves stood significant. Finally, in the inflation model lags of GDP growth rate, money supply and inflation turned significant.

**4.3.2: Joint Significance of the Variables of VAR Model**

The joint significance of the variables has been checked by using the Wald test. The overall significance of all the five models has been estimated. The results computed are given in table 5. By applying the Wald test for showing the joint significance of the explanatory variables in all the five models we have put zero restriction on the explanatory variables with the hypothesis that these all these explanatory variables doesn't influence the dependent variables. However, all of these hypotheses have been rejected and it is confirmed that all the explanatory variables in all the models does influence the explained variables.

From the GDP growth model it is clear that money supply (MS) does play role in the determination of the GDP growth rate..

**Table 5: Wald Test Results for Joint significance VAR model**

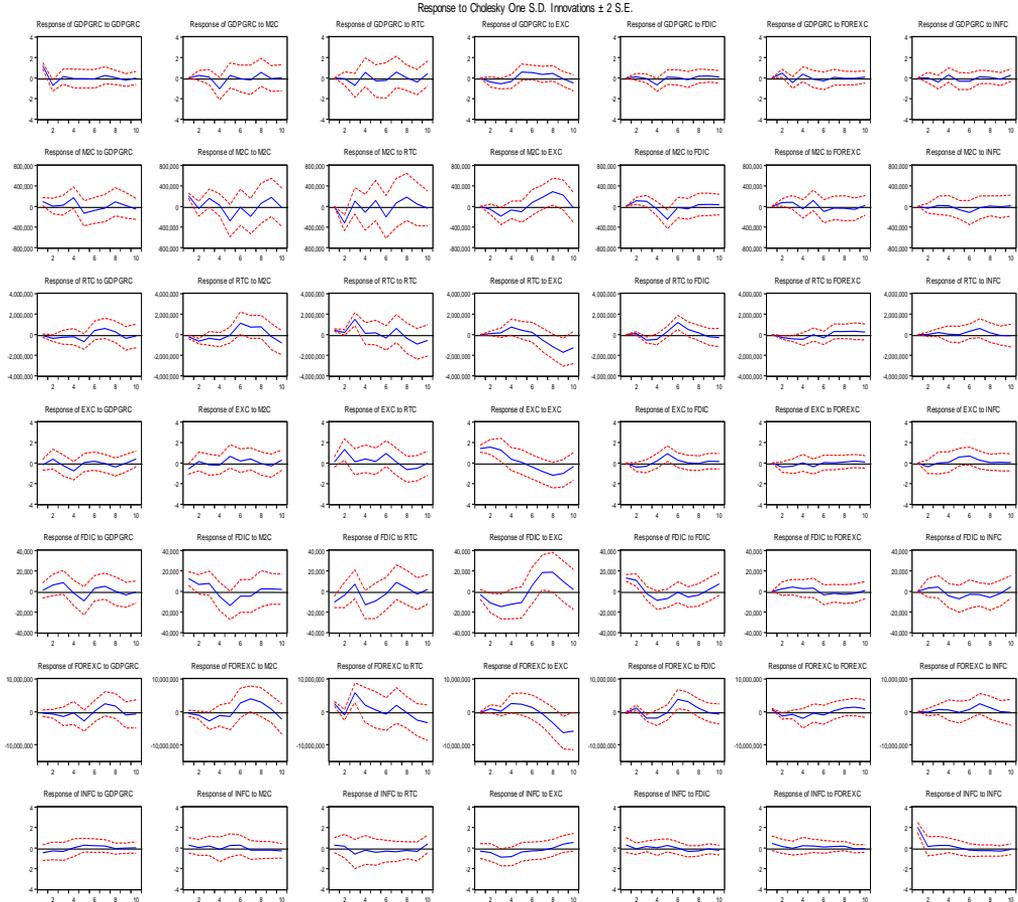
<b>GDP Growth Model</b>			
Null Hypothesis: C(1)=C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=C(8)=C(9)=C(10)=C(11)=C(12)=C(13)=C(14)=C(15)=0			
Test Statistic	Value	Df	Probability
Chi- Square	53.2315	15	0.0213
<b>Money Supply (MS) Model</b>			
Null Hypothesis: C(16)=C(17)=C(18)=C(19)=C(20)=C(21)=C(22)=C(23)=C(24)=C(25)=C(26)=C(27)=C(28)=C(29)=C(30)=0			
Test Statistic	Value	Df	Probability
Chi- Square	58.0325	15	0.0326
<b>Remittances' Model</b>			
Null Hypothesis: C(31)=C(31)=C(33)=C(34)=C(35)=C(36)=C(37)=C(38)=C(39)=C(40)=C(41)=C(42)=C(43)=C(44)			

)=C(45)=0			
Test Statistic	Value	Df	Probability
Chi- Square	480.5126	15	0.0012
<b>Exchange Rate Model</b>			
Null Hypothesis: C(46)=C(47)=C(48)=C(49)=C(50)=C(51)=C(52)=C(53)=C(54)=C(55)=C(56)=C(57)=C(58)=C(59)=C(60)=0			
Test Statistic	Value	Df	Probability
Chi- Square	39.8564	15	0.0123
<b>Foreign Direct Investment Model</b>			
Null Hypothesis: C(61)=C(62)=C(63)=C(64)=C(65)=C(66)=C(67)=C(68)=C(69)=C(70)=C(71)=C(72)=C(73)=C(74)=C(75)=0			
Test Statistic	Value	Df	Probability
Chi- Square	156.2358	15	0.01121
<b>Foreign Exchange Reserves Model</b>			
Null Hypothesis: C(76)=C(77)=C(78)=C(79)=C(80)=C(81)=C(82)=C(83)=C(84)=C(85)=C(86)=C(87)=C(88)=C(89)=C(90)=0			
Test Statistic	Value	Df	Probability
Chi- Square	845.6897	15	0.0035
<b>Inflation Model</b>			
Null Hypothesis: (91)=C(92)=C(93)=C(94)=C(95)=C(96)=C(97)=C(98)=C(99)=C(100)=C(101)=C(102)=C(103)=C(104)=C(105)=0			
Test Statistic	Value	Df	Probability
Chi- Square	833.4853	15	0.0000

**4.3.3: Impulse Response Function Results of VAR Model**

Cholesky decomposition is used for examining the response of the dependent variables to independent variables in all the seven models. The results are given in figure 3 as follows.

**Figure 3: Impulse Response function Results of VAR Model for MS.**



The results show that GDP growth rate in the first model is affected by shocks from all the explanatory variables. Similarly, the models of Money supply (MS), Remittances, Exchange rate, Foreign direct investment, Foreign exchange reserves and inflation also shows the affect of the shocks on the dependent variables from the independent variables.

## Conclusion

The main purpose of the present study is to investigate the role of money supply in the economic growth of Pakistan during the period 1980 to 2014. Different techniques including Ordinary Least Squares Method, Granger Causality Test and VAR has been used to analyze the data. The results show that money supply put positive impact on the economic growth of Pakistan. Similarly, Granger Causality test has been applied for examining the causal relationship between the money supply and economic growth. The results show that money supply granger cause

economic growth. Similarly, the VAR results computed for aggregated model also supported these results. On the basis of the findings the study concluded that monetary policy of the State Bank of Pakistan is playing a significant role in the determination of the economic growth of Pakistan. However, it is recommended that State Bank of Pakistan should increase and decrease the size of the money supply according to prevailing macroeconomic conditions because excess of money supply can also lead to inflation which in turn hinders the economic growth.

## References

- Abbas, Kalbe and Qasim Ali Muhammed (1993), "An analysis of monetary policy in controlling the monetary assets in Pakistan: A money multiplier approach (1971-72 to 1989-90)". *The Pakistan Development Review*, Volume 32, No. 4 (Part II), pp. 1043-1054.
- Adefeso. H.A and Mobolaji, H.I. (2010), "The Fiscal-Monetary Policy and Economic Growth in Nigeria: Further Empirical Evidence", *Pakistan Journal of Social Sciences*, 7(2):137-142.
- Afxentiou, Panos C. and Serletis, Apostolos (1992) "Modeling the Relationship between Output and Government Expenditures in Canada," *Keio Economic Studies*, Vol 29(1), pp. 17-43.
- Bannerjee, A., Dolado, J. and Mestre, R. (1998). Error-correction mechanism tests for cointegration in single equation framework. *Journal of Time Series Analysis*, 19, 267-83.
- Banerjee, A. and Newman, A. (1993). Occupational choice and the process of development. *Journal of Political Economy*, 101(2), 274-298.
- Biswas, B. and Saunders, P. J. (1988). Money income causality: further empirical evidence. *Atlantic Economic Journal*, 15, 65-75.
- Becker, G.S (1993) Noble Lecture: The Economic way of looking at Behaviour , *Journal of political Economy* Vol. 101,(3) pp 385-409.
- Canagarajah, S.T & Thomas S. (1995) "The Evolution of poverty and Welfare in Nigeria", *Population and Human Resource Division , West Africa Department , The world Bank , Washington D.C.*
- Cunado, Juncal. and Fernando, Perez De Gracia. (2004), "Oil Prices, Economic Activity and Inflation: Evidence for Some Asian Countries", *Universidad De Navarra, Working Paper No.06/04.*
- Davis, M. and Tanner, E. (1997). Money and economic activity revisited. *International Journal of Money and Finance*, 16(6), 955-968.
- Dewan and Hussein (2001). Determinants of economic growth. *Reserve Bank of Fiji, Working Paper No. 312,05-08.*
- Faria and Carneiro (2001). Does high inflation affect growth in the long & short run, *Journal of Applied Economics*, 5(3), 89-105.

- Friedman and Schwartz (1963), "A Monetary History of the United States". Princeton University.
- Ghani, E and M. Din (2006), "The Impact of Public Investment on Economic Growth in Pakistan" *The Pakistan Development Review*, Vol.45, No.1, 87-98.
- Hamdani, S. M. and Mazahir Hussain (1976), "Money multiplier as a determinant of money supply: The case of Pakistan. *The Pakistan Development Review*, Volume 15, No. 2.
- Hossain, Akhtar. (1990), "The Monetarist versus the Neo-Keynesian View on the Acceleration of Inflation: Some Evidences from South Asian Countries", *The Pakistan Development Review*, 2:1, PP.19-32.
- Hussain, F. (2008), "Pakistan's economic growth may pick up to 6.5 Percent next year: ADB" *Business Recorder*. (April 03 2008).
- Khan, and Siddiqui A (1990). Money, prices and economic activity in pakistan: A test of causal relation, *Pakistan Economic and Social Review*,8(11),121–136.
- Khan, M. and S. Senhadji (2001). Threshold effects in the relationship between inflation and growth, *IMF Staff Papers*,48(1)122-124.
- Khan, M. H and F. Hussain (2005). Monetary aggregates in pakistan: theoretical and empirical Underpinnings, State Bank of Pakistan, Working Papers,7,73-90.
- Khawaja, M. I. and Musleh ud Din (2007) "Banking: Interest Rate Spread, Inelastic Deposit Supply and Mergers" *The Pakistan Development Review*, Vol. 45, No. 4, pp. 1055-1070
- Mallik (2001). Inflation & economic growth: evidence from four south asian countries, *Asia Pacific Development Journal*,3(64),80-111.
- Mallik (2001). Inflation & economic growth: evidence from four south asian countries, *Asia Pacific Development Journal*, 34(9), 125-156.
- Mankiew, Gregory. and Reize, Ricardo. (2001), "Sticky Information Versus Sticky Prices: A Proposal to Replace The New Keynesian Phillips Curve", NBER Working Paper No: 8290.
- Mohsin (2005). Inflation in pakistan: money or wheat, paper presented in SBP conference.
- Naqvi, S.N., Ashfaq H. Khan, A.M. Ahmed and Rehana Siddiqui. (1994), "Inflation in Pakistan: Causes and Remedies", Islamabad: Pakistan Institute of Development Economics.
- Olaloye, A. O. and Ikhide, S. I. (1995), "Economic Sustainability and the Role of Fiscal and Monetary Policies in A Depressed Economy: The Case Study of Nigeria", Sustainable

Development 3:89–100.

Pakistan, Government of (34), *Years of Pakistan in Statistics:(1980–2014)*.Islamabad: Federal Bureau of Statistics.

Qayyum (2002). Monetary conditions index: A composite measure of monetary policy in

Pakistan, *Pakistan Development Review*,543(6),551-566.

Qayyum (2006). Money, inflation & growth in Pakistan, *Pakistan Development Review*,48(1),122-124.

Ramirez, M.D. and N. Nazmi (2003), “Public Investment and Economic Growth in Latin America: an Empirical Test” *Review of Development Economics*, Vol.7, No.1, 115-126.

Taylor, J B (1995): „The monetary transmission mechanism: An empirical framework“ *Journal of Economic Perspectives*, 9(4), 11-26.