

Impact of Monetary Policy on Gross Domestic Product (GDP)

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ABSTRACT— *This article explores the impact of monetary policy on gross domestic product (GDP) of the state. There is an immense effect of monetary policy on GDP of the country. In this regard variables have been studied to prove the hypothesis. The data of past 10 years from 2005 to 2014 has been used for driving the result. To determine the relationship between two exist regression and correlation technique has been used. The study proves that money supply, interest rate and inflation greatly affect the GDP. There are various unknown factor that impact on GDP. Now for some years monetary policy of Pakistan is very supportive and promoting the objective of price stability and economic growth and it is achieving its objective by targeting monetary aggregates in accordance with GDP growth and inflation target set by the Government.*

Keywords— Inflation rate, gross domestic product, interest rate, money supply

1. INTRODUCTION

Monetary policy is the process by which the regulatory authorities, government and central bank of a country controls the rate of inflation, supply of money, availability of money and rate of interest in order to achieve a set of objectives that is beneficial for the strength, stability and growth of the economy (Irfan Hameed, 2010). Being developing country Pakistan usually faces unemployment and unstable prices in its monetary policy. Monetary policy describes the relationship between interest rate in an economy and the total supply of money and both of these factors are controlled by different tools to control the outcome of economic growth, the rate of interest, inflation rate, unemployment and exchange rate with other currency (Saleem Anjum, 2011)

The formulation process of monetary policy in Pakistan has experienced changes with evolving economic dynamics within the country and across the world improved the theoretical and empirical understanding of the monetary policy. One of the most important variables of monetary policy is money supply. Firstly, money supply growth effects the GDP and then hit the inflation in Pakistan. The state bank of Pakistan has been using M2 aggregate that includes currency, time deposits and demand deposits or the policy purpose that the demand for M2 function is stable in Pakistan. (Qayyum, 2006). Now for some years monetary policy of Pakistan is very supportive and promoting the objective of price stability and economic growth and it is achieving its objective by targeting monetary aggregates in accordance with GDP growth and inflation target set by the Government (Shamshad, 2006).

High inflation mostly caused by high interest rates. The best view for low interest rate is the low inflation in the stable environment. Current focus of state bank of Pakistan on anti-inflation policy which will definitely ensure the steady growth in the long run (Shamshad, 2007).

1.1 Variables:

Under this study description of variables are as follows:

1.1.1 Inflation rate:

Inflation is defined as the constant increase in the general level of prices for goods and services. Inflation is considered as the important component of macroeconomic indicator. Distribution of wealth and income both are affected by the inflation. In Pakistan excess money supply increase inflation both are positively associated with each other and the finding is that excess growth in money supply is the main contributor to rise in inflation (Qayyum 2006).

1.1.2 Money supply M2:

The total amount of circulation of money or existence in a country. The more the money supply in the economy the greater the inflation rate in a country. Money supply in Pakistan recorded, reported and analyze by the State Bank of Pakistan (Saleem Anjum 2013)

1.1.3 Interest rate:

The rate which is paid at which interest is paid by the borrower (debtors) that they borrow from the creditors. It is normally expressed in percentage and issued on yearly, semiannually and quarterly basis.

1.1.4 GDP:

Gross domestic product (GDP) is one of the indicators which are used to determine the health of the country's economy. It is the total market value of all the finished goods and services produced within the country.

1.2 Problem statement:

GDP is no doubt effected by monetary policy of a country. Different variables related to monetary policy has been studied in order to determine the impact of inflation, money supply and interest rate on GDP of the state.

1.3 Research questions:

1. How growths in money supply impact on GDP of the country?
2. What is the behavior of high inflation and its effects on gross domestic product?
3. How much the state bank of Pakistan and government policies are successful in order to maintain the interest rate that is beneficial for the growth of economy?

1.4 Objective of the study:

To determine the formulation of monetary policy in Pakistan that has undergone changes with the developing economic dynamics within the country.

1. To analyze the impact of monetary policy on gross domestic product (GDP).
2. To determine the fluctuation of inflation rate and its impact on economic growth.
3. To derive the relationship between money supply and GDP.

1.5 Scope of the study:

Present research will investigate the changes in monetary policy that influence on GDP, economic growth and inflation. Many of the researches have conducted on inflation in this modern era (Qayyum, 2006) and it has a very serious implication on income distribution and growth and excess money supply is the main reason of inflation. The topic clearly highlight that the monetary policy has a direct link with inflation. This paper also analyzes how GDP in Pakistan will response to change in a money supply, interest rate, inflation rate in an economy.

1.6 Limitations:

The research is related to Pakistan point of view. In this study all the factors would discuss that are dealing with the scenario of Pakistan.

2. LITERATURE REVIEW

(Irfan Hameed, 2010) GDP is immensely affected by the monetary policy of the state. By applying regression technique the relationship between two variables monetary policy and GDP has been observed. For motivating the results past 30 years data has been used which results that GDP is greatly affected by monetary policy. This paper proves that there are various unknown factors that affect the GDP but the monetary policy or growth in money supply has a huge effect.

(Hameed Gul, Dr. Khalid Mughal, Dr Sabit Rahim, 2012) The monetary instruments and the decisions of monetary authorities influence the macro variables which include GDP, money supply, interest rate, exchange rates and inflation. The objective of the research is to identify the interdependence between monetary policy and economic growth and the influence of monetary instruments in the economy like Pakistan. The method of least square OLS has been used to conclude the result. The main objective of economic policies is to enhance the welfare of the public and the monetary policy supports this wide objective by focusing its efforts to promote the price stability

(Evas Agalega, Samuel Antwi, 2012) The prime objective of study is to understand the effects in the interest rate and inflation and that have brought change on the Gross Domestic Product on the region of Ghana. The results have been

derived from multiple linear regression to establish the result that there is strong correlation between interest rate, GDP and inflation. The bank of Ghana and Government should work together and develop those policies that aim to reduce stabilizing both macro and micro indicator.

(Iqra Ehsaan, Saleem Anjum 2011) state that higher the money supply by state bank of Pakistan (SBP) entails the high rate of inflation. The relationship between monetary policy and GDP has been observed by applying regression model. For driving the result past 12 years data has taken into consideration. The research proves that the interest rate has an immense effect with GDP and it is necessary to maintain interest rate in order to bring the inflation rate up to 5% to 6%.

(Besnik Fetaj, Izat Zeqiri, 2010) The study investigates the benefits and relative cost associated with active monetary and regime of different exchange rate in the Republic of Macedonia. Econometric model for testing has been used to show the result that different strategy of exchange rate regime and active monetary policy incur more cost than benefit.

(Imran Sharif, Yasmeen Qamber, Fatima Farooq, 2012) the paper investigates the relationship of long run and short run of monetary policy, inflation and economic growth in Pakistan. The data has been collected through the period 1972 to 2010 and the result has been explore by using co-integration and causality method result analyzed the effectiveness of monetary policy in controlling inflation in Pakistan and the real exchange rate also causing the financial depth and budget deficit.

(Babak Mohammad Pour, Navid Behravan, Shahriar 2012)The research investigates the relationship between GDP and monetary policy in Malaysia. The data has been collected from 1991 to 2011. The unit root test, co-integration and Vector error correction model are applied to derive the relationship between real GDP and real interest rate. The findings of research indicate that increase in money supply would increase the real GDP.

(Wong Hong Chau, Babak Mohammad Pour 2014) The study aims the relationship between the monetary policy and Gross Domestic Product (GDP) in Malaysia. The Johansson co-integration analysis and Vector error correction model has applied in study. The data has been collected from 1991 to 2011. The research shows that there is a possibility of existence of long run equilibrium relationship between GDP and real interest rate and also there is also positive relationship between GDP and money supply in Malaysia.

(Mohsin S Khan, 2010) the study investigate the major changes in conducting and designing of monetary policy and provide an overview of current debate of monetary policy and its target, instruments and analysis of monetary transaction processes. The research underlines the relationship between the growth of GDP and different monetary aggregates in 20 Sub-Saharan African economies.

(Dr Fazli Rabbi, 2011) The study propose the relationship among money, price and GDP which has an enormous importance for formulation of monetary policy in a developing countries like Pakistan. Time series techniques such as Unit roots, ARDL and ECM are applied for the year 1972 to 2005. Results clearly suggest that there is a relationship between GDP, money supply and CPI.

(Eric Muraya Mathenge, 2011) The research establishes the relationship between monetary policy and Gross Domestic Product (GDP). GDP is greatly affected by monetary policy of the state. By using regression method the study conclude that growth in money supply has high influence on GDP of an economy and there are various unknown factors that affect the GDP.

(Andrew K. Rose, 2005) the research has described three quantitative goals; exchange rate, money growth rate and inflation rate and empirical analyze the effects on inflation on both the quantitative target. The empirical work uses the data on annual basis and covers 42 countries. The research concludes that successful achieving a quantitative monetary is also associated with less volatile output.

(Abdul Qayyum, 2006) The study examines the linkage between money supply growth and inflation in Pakistan. The correlation analysis indicates that there is positive relationship between money growth and inflation. The key finding of this research is that excessive money supply has been a vital contributor to raise inflation in an economy and the inflation in Pakistan can be treated by sufficient monetary policy

(Martin Feldstein, 2012)The study investigates and measures the strength and stability of the linkage between monetary aggregate and nominal GDP

(Shafqat Mehmood, 2012)This study investigates the relation and affects the selected factor on Gross Domestic Product (GDP) in economy of Bangladesh and Pakistan for the purpose of finding the better position. The data series method and regression model has been used over the period for the last thirty four year. The study conclude that external debt and export service has negative impact on Gross Domestic Product (GDP)

3. METHODOLOGY

This research is based on impact of monetary policy on gross domestic product (GDP). In Pakistan monetary policy and its process of formulation has undergone changes with the developing dynamics within the country and the improved theoretical and empirical understanding of monetary policy across the world. Present study effort to consider how changes in monetary policy effects the macroeconomic factors and GDP in Pakistan would respond to change in money supply, interest rate and inflation.

In this regard co-relation technique and regression has been used in order to observe the relationship between monetary policy and GDP. For driving the result past 10 years data has been used.

3.1 Hypothesis:

H₁= There is an impact of interest rate on GDP.

H₀= There is no impact of interest rate on GDP.

H₂= There is an impact of money supply on GDP of the country.

H₀= There is no impact of money supply on GDP of the country.

H₃= There is an impact of inflation rate on GDP of the country.

H₀= There is no impact of inflation rate on GDP of the country.

3.2 Data:

The data is collected from the secondary source. In this regard data from past 10 years has been collected from the official websites of state bank of Pakistan and World Bank. Moreover in this regard, official website of ministry of Finance and federal statistical bureau has also been visited.

3.3 Data collection technique:

The data has been collected from the official website of state bank of Pakistan, ministry of Finance and federal statistical bureau. The collected data is analyzed by the correlation and regression technique used to investigate the impact of monetary policy on GDP.

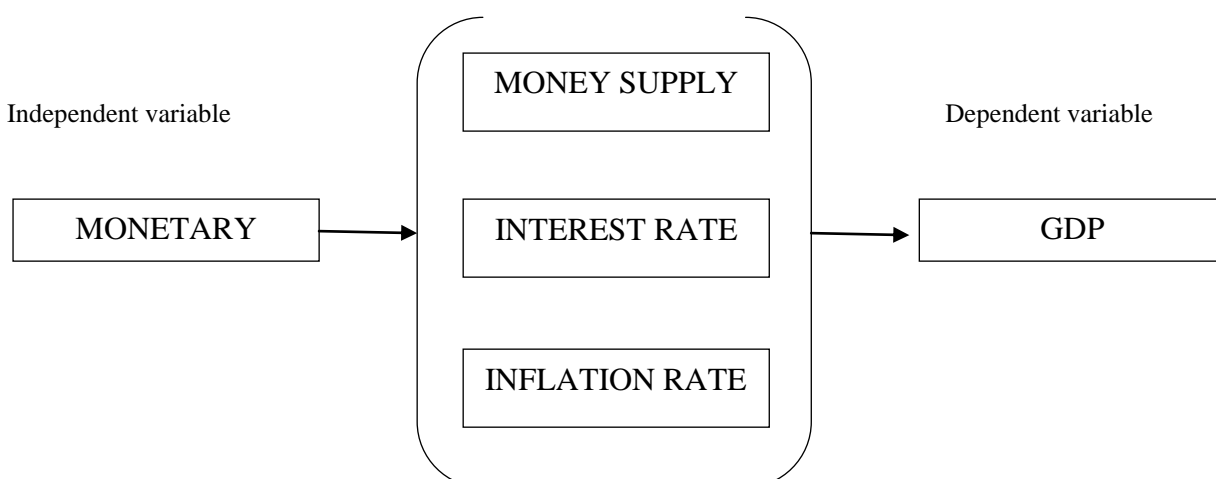
3.4 Data source:

<http://www.sbp.org.pk/>

www.pbs.gov.pk

<http://data.worldbank.org/>

3.5 Theoretical framework:



4 DATA ANALYSIS

4.1 Descriptive Statistics:

Descriptive statistics shows that the data is either normally distributive or not. If selected variable skewness is between 1 to -1 than the data is normally distributed and if it more than 1 to -1 the data is not normally distributed. The selected data having skewness more than -1 so as show in the table. This suggests that the selected data is not normally distributed and spearman correlation analysis is best fit on this data.

Table :1 Descriptive Statistics of Data

	N	Range	Min	Max	Mean		Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error
ANNUAL GDP (%)	10	8.60	.36	8.96	4.3390	.71240	2.25280	5.075	.421	.687
MONEY SUPPLY (M2 in %)	10	11.7	37.5	49.2	42.460	1.1579	3.6616	13.407	.767	.687
INTEREST RATE (%)	10	10.3	4.2	14.5	11.730	.9926	3.1390	9.853	-1.735	.687
INFLATION RATE (%)	10	13.1	7.2	20.3	10.890	1.3087	4.1386	17.128	1.428	.687
Valid N (list wise)	10									

The result from the correlation shows that the relationship between two exist variables that is (dependent: GDP, independent: money supply) are positively correlated with each other it means that if there is growth in money supply so

Table: 2 Correlation (dependent = GDP, Independent = Money supply M₂)

			ANNUAL GDP (%)	MONEY SUPPLY (M2 in %)
Spearman's rho	ANNUAL GDP (%)	Correlation Coefficient	1.000	.697 ^{**}
		Sig. (2-tailed)	.	.025
		N	10	10
	MONEY SUPPLY (M2 in %)	Correlation Coefficient	.697 [*]	1.000
		Sig. (2-tailed)	.025	.
		N	10	10

GDP of the country also increases.

Table: 2.1 Linear Regression :(dependent = GDP, Independent = Money supply M₂)

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.788	.621	.574	1.47075

From the result of SPSS regression model, it has been observed that R is 0.788 the strength of relationship between two exist variables are strong and the coefficient of determination is 0.621 it means that 62.1 percent of the model explaining the variables and the relationship between these two variables exist.

Table: 2.2 Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-16.250	5.704		-2.849	.022
	MONEY SUPPLY (M2 in %)	.485	.134	.788	3.622	.007

Regression Equation:

$$GDP = -16.25 + 0.485 \text{ money supply}$$

From the above equation, the coefficient for money supply is 0.48 percent which indicates that increase in money supply expected to increase 0.48 percent GDP. The constant is negative it tells that when money supply would be zero so the GDP decrease. The level of significant shows that there is a significant relationship between GDP and money supply. The result from this analysis failed to accept null hypothesis.

Table:3 Correlation (dependent = GDP, Independent = interest rate)

			ANNUAL GDP (%)	INTEREST RATE (%)
Spearman's rho	ANNUAL GDP (%)	Correlation Coefficient	1.000	-.891**
		Sig. (2-tailed)	.	.001
		N	10	10
	INTEREST RATE (%)	Correlation Coefficient	-.891**	1.000
		Sig. (2-tailed)	.001	.
		N	10	10

The result from the correlation shows that the relationship between two exist variables that is (dependent: GDP, independent: interest rate) are negatively correlated with each other it means that if there is an increase in interest rate so GDP of the country decrease.

Table: 3.1 Linear Regression (dependent = GDP, Independent = interest rate)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.621 ^a	.385	.309	1.87325

From the result of SPSS regression model, it has been observed that R is 0.621 the strength of relationship between two exist variables are strong and the coefficient of determination is 0.385 it means that 38.5 percent of the model explaining the variables and the relationship between these two variables exist.

Table: 3.2 Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.565	2.407		3.973	.004
	INTEREST RATE (%)	-.446	.199	-.621	-2.240	.055

Regression Equation:

GDP= 9.565-0.446 interest rate

From the above equation, the coefficient for interest rate is -0.446 percent which indicates that decrease in interest rate expected to increase 0.446 percent GDP. The constant is positive it tells that when interest rate would be zero so the GDP increase. The level of significant show that there is a significant relationship between GDP and money supply. The result from this analysis failed to accept null hypothesis.

Table:4 Correlation (dependent = GDP, Independent = inflation rate)

			ANNUAL GDP (%)	INFLATION RATE (%)
Spearman's rho	ANNUAL GDP (%)	Correlation Coefficient	1.000	-.527
		Sig. (2-tailed)	.	.117
		N	10	10
	INFLATION RATE (%)	Correlation Coefficient	-.527	1.000
		Sig. (2-tailed)	.117	.
		N	10	10

The result from the correlation shows that the relationship between two exist variables that is (dependent: GDP, independent: inflation rate) are negatively correlated with each other it means that if there is an increase in inflation rate so GDP of the country decrease.

From the result of SPSS regression model, it has been observed that R is 0.625 the strength of relationship between two exist variables are strong and the coefficient of determination is 0.390 it means that 39 percent of the model explaining the variables and the relationship between these two variables exist.

Table: 4.2 Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.987	2.138		4.204	.003
	INFLATION RATE (%)	-.446	.197	-.625	-2.262	.054

Coefficient:

GDP= 8.987-0.446 interest rate

From the above equation, the coefficient for inflation rate is -0.446 percent which indicates that decrease in inflation rate expected to increase 0.446 percent GDP. The constant is positive it tells that when inflation rate would be zero so the GDP increase. The level of significant shows that there is a significant relationship between GDP and money supply. The result from this analysis failed to accept null hypothesis.

5 CONCLUSION

Monetary policy plays a key role for the economic growth in any country. ”. Monetary policy of Pakistan now for some years has been largely supportive of the dual objective of promoting economic growth and price stability. It achieves this goal by aim monetary aggregates (broad money supply growth as an intermediate target and reserve money as an operational target) in accordance with real GDP growth and inflation targets set by the Government (Shamshad, 2006). Current study shows GDP is greatly affected by money supply, interest rate and inflation rate.

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