Measuring the Effects of Pakistan's Fiscal Policy over Inflation: An Analysis for the Period of 1980-2014

Zia Ur Rehman[*], Atta Ullah Khan[**] & Fazal Wahid[***]

Abstract

The impact of inflation is very devastating on the economy of a country. The inflation can be both through increases in the prices as well as through unsure increase in prices. This research paper interrogates the effect of Pakistan fiscal policy over inflation. This paper also focused on investigating the growth rate of government expenditure, taxes, budget deficit, GDP, employment rate and interest rate and its relationship with the inflation rate. For analyzing the data for the period of 1980-2014 various techniques such as Multiple Regression, Ramsey RESET test, ARCH test, the ADF unit root test and white test are utilized. In case if there is 1% increase in the growth rate of government expenditure, growth rate of GDP, interest rate and employment rate then they result in 0.1537, 0.1144, 1.2842 and 3.6592 Percent increase in inflation rate respectively. This research paper concluded that four independent variables (growth rate of government expenditure, growth rate of GDP, interest rate and employment rate) are significant while the remaining two independent variables (growth rate of taxes and budget deficit) are insignificant. So, the impact of fiscal policy is great over inflation.

Keywords: Discretionary Fiscal Policy, CPI, Economic Stability and Fiscal Sustainability

Introduction

The dearth of stability in price level exerts dangerous effects on the economy. Price level uncertainly increases due to high inflation volatility over time. With nominal contract this induce danger premia for arrangement in long term, increase the cost for prevarication against the danger of inflation and leads to unexpected redistribution of wealth. As a result, inflation volatility can slow down growth even if inflation remains controlled on average (Rother, 2004).

The Consumer Price Index (CPI) is used as determinants by both the fiscal and monetary authorities to check out the economic policies.

[*] Zia Ur Rehman, PhD Scholar , Department of Economics, Preston University, Islamabad Campus. Email: ziamarwat1980@gmail.com
[**] Dr. Atta Ullah Khan, Assistant Professor, Department of Economics, Preston University, Islamabad Campus.
[***] Dr. Fazal Wahid, Assistant Professor of Economics, Higher Education Department, Government of Khyber Pakhtunkhwa

To estimate the expenditure of living for public programs, salary, increment, agreement and negotiations for employees, CPI and adjustment are used by the government. The Consumer Price Index is misused due to various reasons by the central bank of many countries. Assumptions like a bundle of services and goods does not change over time are moved by CPI and resultantly fail to regulate for substitution effects. The prices of certain commodities have declined/fix instead of increase due to improvement in technology. Due to these reasons monetary authorities also compute the core inflation (future inflation).Before making routine decisions the individual or organization must keep the forecast upcoming inflation under consideration (Abel, Bernanke & Croushore, 2011).

The current status of Pakistan's economy is very critical. The already gigantic barricades in the economic growth of Pakistan are accelerating which results in high inflation rate, unemployment rate, energy crises, cases of violence and low local and foreign investment. This study focuses on inflation rate as it is the most serious threat to economy. Figure#1 illustrated the perpetual increase in the inflation rate and is fluctuating year by year. In Pakistan, in the fiscal year 1981-82 the inflation rate was 11.9% while 5.9% in fiscal year 1982-83. In fiscal year 1986-87 the inflation rate declined to 3.51% but in the fiscal year 1988-89 it reached to 8.82%. The inflation rate ascended to double digit in the fiscal year 1991-92 and reached to 13.02% in fiscal year 1994-95. There is no great change seen in the inflation rate of the period 1981-90 up to the fiscal year 2006-07. In the last universal crises in 2008-09 Pakistan is placed at a very weak position. The high inflation rate was accelerated and external and fiscal deficit enhanced due to the negative exogenous external and domestic shocks. In fiscal year 2007-08 the inflation rate was 15.3% which was the highest inflation rate in Pakistan. The inflation rate declined in the coming year and dropped up to 7.7% in the fiscal year 2012-13. Both the demand pull and cost push inflation has trapped the economy of Pakistan.

Figure 1: Inflation Rate
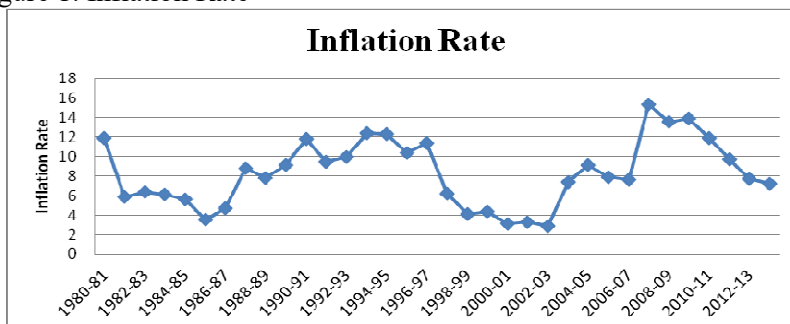
Policy makers and researchers give substantial importance to the influence of economic activity by fiscal policy. In the short run, the fiscal policy is capable to encourage economic activity through government expenditure at the cost of higher inflation and public deficits and lower output. In the short run the fiscal policy seems capable to achieve its target by increasing the tax burden but the policy might decelerate the economic activity in the long run (Surjaningsih, Utari & Trisnanto, 2012).

The main objectives of Pakistan monetary policy are control inflation and output growth.

But due to huge budget deficit the monetary policy cannot achieve both the objective completely. The fiscal policy plays a substantial role in lowering in inflation rate. The State Bank of Pakistan finances a great part of aggregate government expenditure which leads to demand pull inflation. Thus, Inflation is monetary Phenomenon which derived by Fiscal measures (Shaheen & Turner, 2009).

Literature Review
The effect of fiscal policy over inflation is possible by perusing the relationship among monetary policy, fiscal policy and its impact over inflation as has been suggested by empirical studies. It affects inflation though aggregate demand and supply side which is changed by fiscal policy, monetary policy and macroeconomics policies. Fiscal policy is divided into three groups; (a) Discretionary fiscal policy as a reaction to economic situation (b) automatic stabilizers (c) discretionary policy conducted for reasons other than the present economic situation. Business cycle and the discretionary fiscal policy move in the opposite direction (Mankiw, 2009).

Solomon and Wet (2004) after studying the economy of Tanzania, finds that there is a close connection between budget deficit and inflation. They suggest that fiscal policy is more efficient to control inflation. Mukhtar and Zakiria (2010) analyze the economy of Pakistan for the time period 1960-2007 and find that there is no relationship between inflation and budget deficit in the long run. Their study reveals that main reason of inflation in Pakistan is due to the creation of money supply.

The study conducted by Yasmin and Umaima (2010) examines the effects of public expenditure on the whole economic activity for the period 1971-2008 of Pakistan. Their results show that as public debt leads to fiscal expansion there is a greater danger of raised inflation which further leads to higher interest rate.

De Castro and Hernandez De Cos (2006) found a positive relationship among output and public spending in the long term, medium term and also in short run expansionary public expenditure shocks only

tends to lower output and higher inflation by using data for Spain. Rehman et al. (2010) examine the relationship among interest rates, exchange rate and inflation for the period 1994-2009 in Pakistan and United Kingdom, by taking inflation differential, interest rate differential and exchange rate as a variables, using time series data. Result suggests that inflation rate has a positive relationship with interest rate and exchange rate in both countries, while interest rate and exchange rate have negative relation among them.

Aurangzeb and Haq (2012) analyze the "*determination of inflation in Pakistan*" for the period of 1981 to 2010by using yearly data. The study employs the multiple regression technique to examine the relationship among inflation (dependent variable) and fiscal deficit, interest rate, GDP, exchange rate and unemployment (independent variables). It concludes that all the independent variables have impact on the inflation significantly. The GDP has negative relationship with inflation while unemployment, interest rate, fiscal deficit and exchange rate are positive relation with inflation. The study also recommends that the policies are able to control the inflation.

Statement of the Research Problem

The Pakistan economy faces many problems, in which, inflation is considered a serious problem. Inflation has been one of the significant factors impeding economic stability in Pakistan. The present study attempts to measure the impact of Fiscal Policy on inflation in Pakistan.

Objectives of the Research
- To find out the determinants of inflation in Pakistan from the period 1980-2014.
- To find out the remedies of how to control or reduce inflation.
- To minimize the harmful effects of inflation on the economy of Pakistan.
- To measure the impact of fiscal policy on inflation volatility.

Theoretical Framework

The main objective of the study is to examine the effect of Pakistan's fiscal policy over inflation. It employs the variable consumer price index (CPI) as an inflation level, growth rate of government expenditure, growth rate of taxes both direct and indirect taxes, growth rate of public deficit, growth rate of GDP, employment rate and interest rate for the time period 1980-2014.

Figure 2: Theoretical Framework
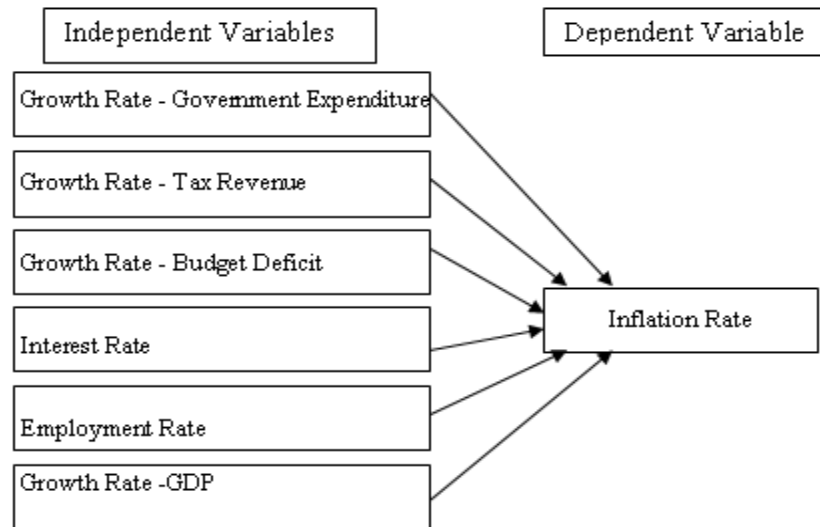
Hypotheses of the Study

H_1: There is significant relationship between growth rate of government expenditure and Inflation rate.

H_2: There is significant relationship between growth rate of budget deficit and inflation.

H_3: There is significant relationship between employment rate and inflation rate.

H_4: There is significant relationship between growth rate of tax revenue and inflation rate.

H_5: There is significant relationship between interest rate and inflation rate.

H_6: There is significant relationship between growth rate of GDP and inflation rate.

Significance of the Study

This study is beneficial for both government and the people of Pakistan. Pakistan's financial position can be developed by the rules of fiscal policy. In order to achieve the required target a strategy for fiscal policy should be adopted. To promote macroeconomics stability and fiscal sustainability, Fiscal Policy can be used as tool.

Methodology of Study

This Study uses annually secondary data of last 34 years data. The data was collected from Economic Survey of Pakistan, Federal Bureau of

Statistics (FBS), Federal Bureau of Revenue (FBR) and State Bank of Pakistan (SBP).

Modal for Data Analysis
The log-log model will be used in this study.
$Log|\Pi_t| = \alpha_1 + \alpha_2 log |G_t| + \alpha_3 log|T_t| + \alpha_4 log |PD_t| + \alpha_5 log|I_t| + \alpha_6 log |E_t|$
$\qquad\qquad + \alpha_7 log |GDP_t| + \mu_t \ldots\ldots\ldots\ldots\ldots$ (Equation-1)

Where α_1, α_2, α_3, α_4, α_5, α_6 and α_7 are parameters and μ_t is random error term.

Π_t = Inflation Rate
G_t = Growth Rate of Government Expenditure
GDP = Growth Rate of Gross Domestic Product
T_t = Growth Rate of Tax Revenue
BD_t = Growth Rate of Budget Deficit
I_t = Interest Rate
E_t = Employment Rate

This study uses Augmented Dickey-Fuller (ADF) Test for the Unite Root Estimation and use Ordinary Least Squares (OLS) method to find out the effect of each variable on inflation. To check the heteroscedasticity in the data means that the variance of error term are constant or no constant. For this purpose this study use '*White's Heteroscedasticity test*' to detect the heteroscedasticity in the data. This study uses ARCH (Autoregressive Conditional Heteroscedasticity) test, to measure the volatility of the inflation rate. This study also uses the Ramsey RESET (Regression Specification Error Test) test to detect the specification error in the model.

Data Analysis and Finding
The time series data is required to be stationary, so, the entire included variable in the model must be stationary, if any variable is found non-stationary containing a unit root, then it will be made stationary by taking differences. The Ordinary Least Squares (OLS) estimates are most efficient, if the entire variables are stationary. To check the stationarity of each variable, this study employs Augmented Dickey-Fuller (ADF) Test**.** The ADF test results are given in Table-1. On the basis of ADF unit root test results shows that the Growth rate of Government Expenditure, Growth rate of Taxes, Growth rate of Budget Deficit, Growth rate of GDP are stationary at level and interest rate, employment rate, inflation rate stationary at first difference by taking intercept and trend.

Table 1: Unit Root Estimation

Variables	Level	$Z(t)^*$	Critical Values			p-value for $Z(t)$
			1%	5%	10%	
Inflation Rate	At 1st Difference	-6.0712	-4.2732	-3.5577	-3.2124	0.00
Growth Rate of Government Expenditure	At level	-6.9584	-4.2627	-3.5530	-3.2096	0.00
Growth Rate of Taxes	At level	-6.2915	-4.2627	-3.5530	-3.2096	0.00
Growth Rate of Budget Deficit	At level	-6.8855	-4.2627	-3.5530	-3.2096	0.00
Employment Rate	At 1st Difference	-10.8712	-4.2732	-3.5577	-3.2124	0.00
Interest Rate	At 1st Difference	-4.4108	-4.2732	-3.5577	-3.2124	0.00
Growth Rate of GDP	At level	-5.4398	-4.2627	-3.5530	-3.2096	0.0005

*Z(t) has t-distribution
Augmented Dickey-Fuller (ADF) Test
Time Variable: Years, 1980 to 2014
Delta: 1 year
Number of Observations   =   33
Exogenous: Constant, Linear Trend

Table 2, shows the OLS results, in which this study found growth rate of government expenditure, interest rate, employment rate and growth rate of GDP, which have significant effect and growth rate of taxes and budget deficit have insignificant effect over inflation rate. This shows that growth rate of government expenditure, interest rate, employment rate and growth rate of GDP have long run relationship with inflation rate but   growth rate of taxes and budget deficit have no long run relationship with inflation rate. The F-statistics is also significant at 5% level because the computed F-statistics is greater than tabulated F-statistic value state that overall model is significant. The p-value of F-statistics is also very small which states that the chance of committing a Type I error is too small. The R^2 value is also significant which state that 67.6% variation in the log |inflation rate| is explained by the dependent variables included in the model and the adjusted R^2 value is 0.6040 in the model based on equation 1.

Table 2: Estimated Model Based on Equation 1

Variables	Coefficient	Standard Error	t-statistics	P-values
$\log |G_t|$	0.1537	0.0493	3.12	0.004
$\log |T_t|$	0.1697	0.0935	1.82	0.081
$\log |BD_t|$	0.0613	0.0481	1.27	0.214
$\log |I_t|$	1.2842	0.2247	5.27	0.000
$\log |E_t|$	3.6592	1.5291	2.39	0.024

log $|GDP_t|$	0.1144	0.0537	2.13	0.042
Constant Term	-18.8584	7.0306	-2.68	0.012

Dependent Variable: $Log|\Pi_t|$
Goodness of Fit:
R-Squared= 0.6760; Adjusted R-Squared= 0.6040; F-Statistics (6, 27) = 9.39 [p-value= 0.000]

This study rejects the null hypothesis of H_1, H_3, H_5 and H_6 and concludes that growth rate of government expenditure, employment rate, interest rate and growth rate of GDP have significant long run relationship with inflation rate. While it does not reject the null hypothesis of H_2 and H_4 and concludes that there is no long run relationship between the growth rate of taxes and budget deficit and inflation rate.

The white test suggests that there is no heteroscedasticity in the data which means the variance of the error term is constant because, the probability of F-statistics and the probability of Chi-Square were found insignificant at 5% level of significance.

The ARCH test is also statistically insignificant because the p-value is equal to 0.6887, which is greater than the 5% level of significance. Which suggest that the lagged squared error term is statistically insignificant which means that there is no correlation in the variances of error terms of the model. The ARCH test further suggests that there is no heteroscedasticity in the data and the volatility of the inflation rate is not dangerous.

The result of Ramsey RESET Test indicates that the model is correctly specified. The F-test value in the Ramsey RESET test is insignificant at 5% level of significant because its p-value is equal to 0.4244. This study found that all included variables growth rate of government expenditure, growth rate of public deficit, growth rate of taxes, growth rate of GDP, employment rate and interest rate are relevant and the functional form of the model was correct. Further, there is no correlation between the independent variable and error term.

Table 3: White, ARCH & Ramsey RESET Test

White's General Heteroscedasticity Test			
F-statistic	1.641468	Prob. F(27,6)	0.2792
Obs*R-squared	29.94592	Prob. Chi-Square(27)	0.3166
ARCH Test			
F-statistic	0.163570	Prob. F(1,31)	0.6887
Obs*R-squared	0.173209	Prob. Chi-Square(1)	0.6773
Ramsey RESET Test			
F-statistic	0.658569	Prob. F(1,26)	0.4244

Log likelihood ratio	0.850480	Prob. Chi-Square(1)	0.3564

Conclusion

This study examined measuring the effect of Pakistan fiscal policy over inflation for the period from 1980 to 2014. This study uses ADF unit root test, white test, ARCH Test, Ramsey RESET test and the multiple regression analysis to analyze the relationship between dependent variable and independent variables. This study concluded that four independent variables (growth rate of government expenditure, growth rate of GDP, interest rate and employment rate) are found significant and the remaining two independent variables (growth rate of budget deficit and growth rate of taxes) are found insignificant. The result indicated that if there is 1% increase growth rate of government expenditure, growth rate of GDP, interest rate and employment rate to make 0.1537, 0.1144, 1.2842 and 3.6592 percent increase in inflation rate respectively.

This study also concluded that over all model is significant due to computed value of F-statistics is greater tabulated value of F-statistics at the level of significance 0.05. The R^2 value is 0.6760 is also more then 0.50, which shows the significance of the overall model. Thus, this study concluded that the 67.60% variation in the inflation rate due to the independent variables (growth rate of government expenditure, growth rate of taxes, growth rate of budget deficit, growth rate of GDP, interest rates and employment rate).

This study concluded that there was fluctuation in inflation rate yearly, but this fluctuation has not created much uncertainty in the future price level. The volatility in inflation rate is not too dangerous and the fiscal policy has positive impact over inflation volatility. With nominal contract, this induces danger premier for arrangement in long run; increase the cost of preservation against the danger of inflation and leads to unexpected redistribution of wealth. As a result, inflation volatility can slow down growth still if inflation remains controlled on average.

As the budget deficit increases the government take loan to finance this deficit and repay these loan with interest by collecting these through taxes which leads to higher inflation in future in the country. As the taxes increases the price level also rises e.g. as the sales tax increases the prices of goods and services automatically increases in the price level. This study concluded that growth rate of budget deficit and growth rate of taxes have an insignificance relation with inflation rate, which indicate the growth rate of budget deficit and growth rate of taxes have no long run effect to vary the inflation rate.

Recommendations

This study recommends that in order to control inflation the government should use discretionary fiscal policy. To control inflation the government should minimize the government expenditure and should spend only on those projects which increase in the production and minimize the cost of production. People should be encourage by the government to do more saving which will make greater the amount available for investment which increase GDP, employment rate and reduce the interest rate in long run and help in maintaining the inflation rate.

In Pakistan, there is no contribution of public deficit to raise the inflation rate. The government should finance the development projects by borrowing more and more from the various sources. The interest rate has positive relation with the inflation rate. The government can reduce the inflation by increasing the investment and lowering the interest rate. The government cannot decrease employment rate because employment is of paramount importance to run the economy, but the government try to control the inflation rate by other means like decreasing the government expenditure and increase in taxes.

References

Abel, A. B., Bernanke, B. S. & Croushore, D. (2011) *Macroeconomics* 7thed. Boston: Pearson International

Aurangzeb &Haq, A. U. (2012) Determinants of Inflation in Pakistan, *Universal Journal of Management and Social Sciences* 2(4). pp. 89-96

Dickey , D. A. & Fuller, W. A. (1979) Distribution of the Estimators for Autoregressive Time Series with a Unit Root, *Journal of the American Statistical Association* 74. pp. 427-431.

De Casttro, F. & Hernandez De Cos, P. (2006) The economic effects of exogenous fiscal shocks in Spain: *a SVAR approach, ECB Working.* p. 647.

Economic Survey of Pakistan. Finance Division, Economic, Advisor's Wing, Islamabad, Pakistan.

FBR. Federal Board of Revenue. Revenue Division, Islamabad, Pakistan. [Online] Available from: www.fbr.govt.pk

Mankiw, G. N. (2009) *Macroeconomics*. 7th edition. New York: Worth Publishers.

Mukhtar, T. & Zakaria, M. (2010) Budget Deficit, Money Supply and Inflation: The case of Pakistan. *Privredna Kretanja Ekonmska Polotika.* 122. pp. 53-67.

PBS. *Pakistan Bureau of Statistics*. Islamabad. [Online] Available from: www.pbs.govt.pk

Rehman, R. U., Rehman, M. A. & Raoof, A. (2010) Causal Relationship between Macroeconomic. *International Research Journal of Finance and Economics.* 1. pp. 58-62

Rother, Philipp C. (2004) Fiscal Policy and Inflation Volatility. *European Central Bank Working Paper*. 317.

SBP. *State Bank of Pakistan Annual Report*. [Online] Available from: http://www.sbp.org.pk/report

Shaheen, R. & Turner, P. (2009) *Measuring the Dynamic Effects of Fiscal Policy Shocks in Pakistan*. [Online] Available from: http://www.pide.org.pk/psde/25/pdf/Day3/Rozina%20Shaheen.pdf

Solomon, M. & Wet, A. (2004) The Effect of a Budget Deficit on Inflation: The Case of Tanzania, *SAJEMS NS*. 7 (1). pp. 100-116.

Surjaningsih, Nadari, Utari,G. A., Diah, Trisnanto, Budi. (2012) The Impact of Fiscal Policy on Output and Inflation. *Bulletin Monetary Economics and Banking.* pp. 367-396.

Yasmin, A. &Umaima, A. (2004) Dynamic Effects of Changes in Government Spending in Pakistan's Economy. *25th AGMC Pakistan Society of Development Economist*. [Online] Available

from:
www.pide.org.pk/psde/25/pdf/Day3/AttiyaYasminJavid.pdf