Empirically Assessing the Impact of Institutional Quality on Monetary Policy in Pakistan

Muhammad Shahid* and Abdul Qayyum†

Abstract

This study uses the bound testing approach using time series data from 1980 to 2015. The objective is to investigate the impact of institutional qualityon the design and execution of monetary policy by the central bank in Pakistan. We incorporate the quality of institutions in the Taylor interest rate rules. The findings of this paper reveals that state bank of Pakistan least consider the Taylor rules in the formulation and operation of monetary policy in Pakistan. Our findings further report that quality of institutions has contemporaneous effects in the short run while monetary policy is not responsive to the institutional quality in the long run. Furthermore, monetary policy is highly responsive to inflation in the country. The discount rate reduces to increasing output gap in the short run but there is a pro-cyclical behavior of monetary policy in relation to output gap in the long run. State Bank of Pakistan does not follow the interest rate rules.

Keywords: Monetary policy, Taylor rules, quality of institutions, Pakistan

Introduction

Central banks are primarily concerned to controlling inflation. Extensive literature is available on the debate on the rules versus discretion in the process of monetary policy making. The debate is not conclusive due to the heterogeneous findings of the two kinds of policies in different countries. Considerable degree of agreement has been established on the use of some predetermined rules for optimal and more effective monetary policy. On the other hand, Sargent and Wallace (1975) term the adoption of interest rate rule undesirable due the problem of indeterminacy. Argument against the use of interest rate rules in the formulation is also discusses the uncertain behavior of price level and output gap. Woodford (1994)examines the issue and finds that stabilization of

*Dr. Muhammad Shahid, Assistant Professor, Institute of Management, Peshawar, E mail: shahidpide@gmail.com.
†Dr. Abdul Qayyum, Pakistan Institute of Development Economics. Islamabad.

prices and reducing output fluctuation are core goals of monetary policy. He argues that real disturbances in the economy in the form of negative and positive shocks reduce the worth of rule based policies. The presence of shock or high degree of volatility allows the central bankers to adopt discretionary policy. The absence of transparency and accountability encourage corruption and causes bad governance. The objective of this research is to assess the bad governance and its implications for the formulation and operation of monetary policy. Weak institutions not only retard growth but create problems for the interest rate setting committee as well. The literature on institutions reveals that the effectiveness of macroeconomic policies in general and fiscal and monetary policy in particular depends on the quality of institution in the country. The conventional Taylor rule does not allow the monetary policy reaction function to account for the quality of institutions. The objective this paper is to assess the impact of good governance on the formulation and execution of monetary policy in Pakistan. For this purpose we modify the interest rate rule to include and assess the impact of good governance on monetary policy.

Literature Review

Extensive literature is available on the formulation and conduct of monetary policy under rules as well as under discretion. Good governance and effective institutions provide conducive environment to investors to invest and spur growth. Bad governance creates uncertainty that discourages investment and retard growth. Central banks are also vulnerable to political pressure and the form of governance. Political polarization and plurality of opinions in a country create problems for monetary managers. Differences in opinions and political ideologies affect the monetary policy deliberations. Huang and Wei (2005) reveal that bad governance reduces the ability of the government to collect taxes. The reduction in taxes increases the chances of budget deficit and ultimately seigniorage. Poor governance in the form of bad institutions thus affects the operation of monetary policy. The impact of institutions on monetary policy has both direct and indirect effects. Hielscher and Markwardt (2011) investigated the issue and find that fiscal dominancy threatens the autonomy of the central banks and so their ability to freely shape

and execute monetary policy. Delis (2012) examines the issue and finds that active fiscal policy hurts the stabilization objective of the central bank. Literature reveals that inflationary pressure is usually observed in those countries where the quality of institution is poor. Huang and Wie (2006) find that institutional decay allow the treasury to run budget deficit and constantly borrow from the central bank. The lack of central bank independency allows the treasury to twist the arms of the central bank and forced to print more and more currency.Dimakou (2006) finds that absence of quality institutions and the presence of corruption reduces the chances of generating government revenue through taxes. This increases budget deficit and government borrowing from the central bank causing inflationary pressure in the economy. This has considerable implication for the formulation and execution of monetary policy distorting the policy choices of the central bank. Keeping in perspective the potential role of institution and its impact on monetary policy, researchers around the world modeled monetary policy while incorporating institutional quality in the objective function. Strand of literature reveals that researchers use the loss function, production function as well as Taylor types rules for the inclusion of institutional quality. Choudhary*et al*(2010) examine the problem in detail and uses the production function to assess the impact of institutions on monetary policy. Calderon *et al.* (2010) find that inclusion of institutions in the objective function of the central bank increases the effectiveness of monetary policy.Duncan (2011) reveals that Taylor type rules can give more robust results if we include the institutional quality in the objective function of the central bank. Acemoglu *et al.* (2004) find that countries with quality institutions usually experience macroeconomic stability. Shleifer and Vishey(1993) reveal that policy effectiveness increases with increased bureaucratic efficiency and quality institutions. Barseghyan and DiCecio (2010) examine the issue and find that poor quality of institutions causes fluctuations in the economy thus reducing the effectiveness of macroeconomic policies.Dimakou (2006) finds that fiscal dominancy threatens the autonomy of the central bank and reduces the effectiveness of monetary policy. The conservative central bank that is averse of inflation cannot freely formulate and execute monetary policy in the presence of fiscal dominancy which is

resulted by poor institutions. The conservative central bank is also forces to adopt expansionary monetary policy when the ability of the state institutions is weak to collect taxes or when the corruption is high in tax collection departments. Blackburn *et al.* (2008) find that tax evasion, seigniorage and inflation are positively related. Frankel(2010) examine the pro-cyclicality of monetary policy along with the level of tax evasion and its implications for monetary policy choices. Calderon *et al.* (2010) examine the issue and reveal that poor institutional quality or fiscal profligacy threatens the credibility of the central bank and the free operation of monetary policy. Central bank cannot pursue rule based monetary policy in the presence of weak institutions. The poor institutional quality allows the central bank to operate monetary policy discretionary. Malik and Ahmed (2007) investigated the monetary policy reaction function for Pakistan and find that state bank of Pakistan is not following Taylor rule in the formulation and execution of monetary policy. Malik (2007) finds that macroeconomic performance could be increase with the adoption of Taylor type rule. Here we have modified the Taylor type interest rate rules while incorporating the quality of institutions. Considerable literature also reveals that central banks in developing or third world countries have other consideration along with inflation and output gap. Khan (2003) reported that central banks are introducing monetary reaction function incorporating institutions besides output gap and inflation. The phenomenon of bad governance and institutional decay is highly visible in poor or underdeveloped economies. Weak institutional quality has a serious repercussion for monetary policy operation and distort the choices of the central banks. Huang and Wei (2006) find that poor institutions discourage revenue through taxes as corruption pave the way for tax theft and tax evasion. These kind of leakages shrink fiscal space and causes budget deficit. Central bank finance budget deficit with domestically created money which generate inflation and problem for monetary policy. Weak institutions also retard growth thus affecting monetary policy through output gap.

Estimating Techniques

We use Autoregressive Distributive Lag (ARDL) for estimating our model. We have very genuine reasons to employ ARDL

model. The variable of our interest are not integrated of the same order. The conventional method of Engel Granger (1987) and Johansen (1991,1995) co-integration are not any more appropriate because the basic assumption of the same order of integration is violated.

We use the following generalized form of ARDL.

$$\Delta r_i = \beta_0 + \beta_1 T + \lambda_1 r_{t-1} + \lambda_2 Gap_{t-1} + \lambda_3 Inf_{t-1} + \lambda_4 INQ_{t-1} + \sum_{i=1}^{p} \gamma_1 \Delta r_{t-i} + \sum_{i=1}^{p} \gamma_2 \Delta Gap_{t-i} + \sum_{i=1}^{p} \gamma_3 \Delta Inf_{t-i} + \sum_{i=1}^{p} \gamma_4 \Delta INQ_{t-i} + \varepsilon_t^r \quad \ldots(A)$$

Where β_0 is the intercept and β_1 indicates the trend. The parameters λ_1, λ_2, λ_3, and λ_4 capture the sensitivity of variables like past interest rate, output gap, inflation and the quality of institutions respectively in the long run. Similarly γ_1, γ_2, and γ_3 explain the impact of these variable on interest rate in the short run. Theory suggests that the expected signs of inflation is positive implies that interest rate increases with an increase in price level. The expected sign for output gap is also positive meaning that interest rate increasewith actual output from the potential or target output. The expected sign of institutional quality is not conclusive. This may be positive as well as negative. Schwarz Bayesian Criterion is used for selecting the maximum lag. Bound test suggested by Pesaran *et al.* (2001) is used to find the cointegrating relationship.

The following hypothesis is tested using bound testing procedure in ARDL to assess the existence of long relationship.

H_0: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$

The rejection of the null hypothesis validates the existence of long run association among the variables of our interests. In the next step we estimate the Error Correction Model where we assess the short run and long run elasticity.We also carry out to estimate the coefficient from the above equation once the long run association is established among the variables.

$$\lambda_1 r_{t-1} + \lambda_2 Gap_{t-1} + \lambda_3 Inf_{t-1} + \lambda_4 INQ_{t-1} = 0 \quad \ldots\ldots\ldots \text{(B)}$$

$$\lambda_1 r_{t-1} = -\lambda_2 Gap_{t-1} - \lambda_3 Inf_{t-1} - \lambda_4 INQ_{t-1}$$

$$r_{t-1} = -\frac{\lambda_2}{\lambda_1} Gap_{t-1} - \frac{\lambda_3}{\lambda_1} Inf_{t-1} - \frac{\lambda_4}{\lambda_3} INQ_{t-1}$$

$$r_{t-1} = \alpha_1 Gap_{t-1} + \alpha_2 Inf_{t-1} + \alpha_3 INQ_{t-1}$$

Where

$$\alpha_1 = -\frac{\lambda_2}{\lambda_1} \quad , \quad \alpha_2 = -\frac{\lambda_3}{\lambda_1} \quad \text{and} \quad \alpha_3 = -\frac{\lambda_4}{\lambda_1}$$

Dynamic Short Run Relationship and Error Correction Model

To assess the short run dynamic relationship ,equation (A) is changed and error correction term of equation (B) is replaced, We get the following dynamic equation with error correction model,

$$\Delta r_i = \beta_0 + \beta_1 T + \kappa ECM_{t-1} + \sum_{i=1}^{p} \gamma_1 \Delta r_{t-i} + \sum_{i=1}^{p} \gamma_2 \Delta Gap_{t-i} + \sum_{i=1}^{p} \gamma_3 \Delta Inf_{t-i} + \varepsilon_t^r \text{.....(C)}$$

Keeping in perspective the above equation, the speed of adjustment is captured by the term κ. The imply that any deviation from the steady state and its convergence back to the initial or current period. We use the annual time series data for Pakistan from state bank of Pakistan from 1980 to 2015. We have also estimated the data for output gap using Hodrick-Prescott (HP) filter. In order to capture the impact of inflation, we use GDP deflator. We use discount rate as a policy instrument for monetary policy. The quality of institutions is captured by using the data set design and formulated by the International Country Risk Guide (ICRG).

We also conduct unit root test according to the standard practice in the research to check time series data for the problem of stationarity. We use Augmented Dickey-Fuller (ADF) tests and Phillips-Perron **(**PP) Tests for assessing the problem of unit root problem. The possible shapes of ADF test are given by the following equations.

$$\Delta y_t = \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \mu_t \qquad (1)$$

$$\Delta y_t = \alpha_0 + \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \mu_t \qquad (2)$$

$$\Delta y_t = \alpha_0 + \alpha_2 t + \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \mu_t \qquad (3)$$

Here null hypothesis means that variable has a unit root problem against the alternative hypothesis of stationarity.

Result and Discussion

This section briefly explains the behavior of our variables and then we report the results. First we will report the descriptive statistics of the variables of interests.

Table 1: Descriptive statistics

Variable	Mean	Median	Max	Min	Std. Dev.	Jarque-Bera	Prob
CMR	7.60	9.03	11.2	2.57	2.63	1.02	0.43
Output Gap	-0.011	-0.83	8.25	-6.60	3.11	1.33	0.56
Inflation	3.02	3.88	7.97	2.09	2.11	1.87	0.61
Institutional Quality	43.12	42.52	75.2	12.53	16.98	0.87	0.71

This is visible from the above table of descriptive statistics that variable shows considerable variation and seems normally distributed. In the next table we report the findings of ADP and PP test of stationarity.

Table 2: Findings of ADF and PP Tests

Variable	ADF		PP		Order of Integration
	Level	First Difference	Level	First Difference	
Discount Rate	-2.7324*	-4.62***	-2.2727*	-4.542***	I(1)
Output Gap	-3.2376*	-6.9921***	-2.5567*	-7.1187***	I(0)
Inflation	-3.2132**	-7.3321***	-2.1515**	-9.3112***	I(0)
Institutional Quality	-6.0821*	-7.3154***	-3.4463*	-5.7580***	I(1)

** Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level*

The above table 2 shows that our variables are either integrated of order zero, I(0) or integrated of order one, I(1). This provides the justification for using ARDL techniques rather than the conventional techniques to assess the relationship among these variables. Next we report the results of our estimation. These findings are reported are in Table 3.The high value of R-square implies that model show a significant explanatory power. Now we move the most important results of our interest. We used the bound

testing approach to find the existence of long run association or co-integrating relationship.

Table 4: Findings of Bound Test Approach

Calculated F-Static	Lower Critical F-Static	Upper Critical F-Static	Result
11.2215	5% = 3.17	5% = 3.942	Co-integration

The findings of the bound test approach reveal that there exists a long run relationship among these variables. This is visible from the computed F value of 11.2215 which is greater than the upper limit of 3.942. We also estimate and report in the following table the findings of Breusch-Godfrey Serial correlation LM test for assessing the autocorrelation.

Table 5: Breusch-Godfrey Serial Correlation LM test

Lag	F-statistic	Chi-Square
3	0.211	1.418
	(0.751)	(0.588)

Furthermore, we use Ramsey RSET to determine whether our model is correctly specified or not. The findings in the following table, Table 6, show that there is no problem in our model and it is correctly specified.

Table 6: Ramsey RSET Test

	Value	
F-statistic	0.0046	(0.94)

Now we have set the stage and are in a position to explain the co-integrating relationship among discount rate, inflation and the quality of institutions beside output gap. We also report and explain the short run dynamics of our model. The long run relationship and short run dynamics are reported and explained in the table 7 and table 8 respectively.

Table 7: Long run or co-integrating Association

Variables	Coefficients
GAP	-0.41 (0.22)***
INF	1.58 (0.29) ***
INQ	0.03 (0.06)
Intercept	1.27 (3.56)

*Values in brackets explain indicate standard error; ***, indicates significance at 1%.*

We have seen in literature that institutional quality is very important for the formulation and execution of monetary policy but here our result does not support those particular findings. The monetary policy instrument, discount rate, is not responsive to any improvement in institutional quality or institutional decay. Our findings further indicate that state bank of Pakistan adopt expansionary monetary policy by reducing discount rate in response to increasing output gap in the short run. Monetary policy is responsive to inflationary pressure in the economy and state bank increases interest rate in response to higher prices in the economy. The short run dynamics are described in the following table 7.

Table 7: Short Run Dynamics

Variables	Coefficient
Δ GAP	-0.22 (0.17)
Δ GAP (-1)	0.59 (0.15) ***
Δ INF	1.13 (0.29) ***
Δ INF (-1)	-0.58 (0.17) ***

Δ INQ	-0.08 (0.08) *
Δ INQ (-1)	0.13 (0.07) ***
Δ INQ (-2)	0.19 (0.06) ***
Δ INTERCEPT	0.90 (1.54)
ECM(-1)	-0.78 (0.13) ***
R-Square	0.89
SBC	-41.54
Standard Error of Regression	0.81
F-statistic[Probability]	16.07 [0.00]

*Values in brackets explainS.E ; ***, * show significance at 1% and 10% respectively.*

The above table indicates that institutional quality in the short run has negative but insignificant impact. The data further reveals that the impact of institutional quality in the long run is positive. This is very much difficult from findings to extract the exact impact of institutional quality on monetary policy. So we can say that result in this case is largely inconclusive. Our results reported an increasing interest rate in response to inflation in the economy. But this tight monetary policy response does continue in the long run. The contemporaneous effects of output gap are insignificant. In the long run, state bank design a pro-cyclical monetary policy in response to output movement. As the output gap increases, interest rate also increases which is not a good sing for economies with sluggish growth for many years in a row. This phenomenon of procyclicality is highly visible in third world or developing countries. The coefficient of ECM reveals that state bank of Pakistantry hard to design and operate interest rate smoothening policy. This implies that state bank of Pakistan alter interest rate cautiously to achieve the objectives of monetary policy.

Conclusion

This paper is primarily concerned with investigating the relationship between quality of institutions and monetary policy in Pakistan. In the short run, the impact of institutional quality is significant and affects the policy choices of the state bank of Pakistan. But in the long run, our results are largely inconclusive in

this regard because we find very insignificant impact of institutions on monetary policy. This implies that any change, Positive as well as negative in institution does not affect the policy choices of monetary authority in Pakistan. We can deduce a policy lesson for the central bank to give some weight to institutions in the formulations of monetary policy. The response of discount rate to inflation in economy is positive and shows the distaste of state bank for inflation. The response of discount rate is not according to the essence of Taylor rules. This means that state bank is not following interest rate rules or Taylor rules in the formulation and execution of monetary policy.

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