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The Impact of Institutional Quality on Monetary Policy in Pakistan

By Kifayat Ullah, Abdul Wajid & Fazal Ali Khan

Karakoram International University, Pakistan

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The Impact of Institutional Quality on Monetary Policy in Pakistan

Kifayat Ullah [α], Abdul Wajid [σ] & Fazal Ali Khan [ρ]

Abstract- **This study seeks to examine whether the monetary management in Pakistan is conducted under the framework advocated by the Taylor rule. We investigate this question after modifying the Taylor rule to control for the influence of institutional quality on monetary policy. Even after controlling for institutional quality, we find no evidence that the central bank makes use of the Taylor framework in devising monetary policy. Our results also suggest that by and large the focus of the monetary policy has been on containing inflation.**

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I. Introduction

A growing body of literature now maintains that sound institutions[1] are essential for sustainable economic growth. Institutional quality can effect overall economic growth by providing the underlying environment for economic activity to flourish. Recent developments in institutional economics suggest that besides affecting the overall economic activity, institutions can also affect the conduct, transmission, as well as the cyclical properties of monetary policy[2]. The primary goal of the monetary policy is to stabilize prices and to promote sustainable growth. There is debate in literature whether the monetary policy should be conducted based on some predetermined rule or should the policy maker enjoy discretion in the conduct of monetary policy. Though the debate is not fully settled but literature seems to favor rules over discretion[3]. Barring some exception, the monetary policy has not been able to rein in inflation or stabilize output in Pakistan (Qayyum, 2008). This makes it important to thoroughly examine how the monetary policy is conducted, whether the authority follows a rule or the discretion is allowed to influence the monetary policy. This type of investigation has been conducted for Pakistan using the standard Taylor rule framework[4], however the standard Taylor rule does not account for the influence of institutions on monetary policy. This study examines the conduct of monetary policy by augmenting the Taylor rule to account for the influence of institutional quality on monetary policy. This has not been done so far in case of Pakistan.

a) Objectives of the Study

The objectives of this study are:

1. To estimate the monetary policy reaction function for Pakistan by incorporating institutional quality variable in the Taylor rule framework.
2. To examine whether the monetary policy is pro-cyclical or counter cyclical by incorporating institutional quality in the traditional framework.

II. Review of Literature

The neo-institutional economist[5] stress that institutional factors play an important role in the process of economic growth. Using state activism, property rights and corporate governance as a measure of institutional quality, Huang *et al.* (2004) examine the relationship between institutional quality and growth by disaggregating foreign direct investment into investment that supports local entrepreneurship and investment that replaces local entrepreneurship. They find that institutional quality influence foreign direct investment. They further find that foreign direct investment that supports local entrepreneurship translates into sustainable growth.

a) Institutional Quality and Monetary Policy

Traditionally, monetary policy and institutional quality have been treated as independent disciplines. Initially, studies were conducted in a principal agent framework to assess the potential negative impact of corruption among government officials, who secured bribes from private citizens interested in government produced goods, on the development of a nation. These studies pointed at identifying the motivating factors among the agents to be honest– the honest the official, the higher the payoff for the nation. Huang and Wei (2006) model the role of institutions in the effectiveness of monetary policy. Using corruption as a proxy of institutional quality they show that institutional quality has implications for the conduct and transmission of

Author α σ ρ: Karakoram International University Gilgit, Pakistan.
e-mails: kifayat@kiu.edu.pk, wajidiiie@gmail.com, fazal@rspn.org.pk

[1] North (1990) defines institutions as "*the humanly devised constraints that shape human interaction*". These constraints are further divided into formal rules (constitutions, laws, rules etc.) and informal constraints (norms, conventions, self-imposed code of conducts etc.).
[2] See for example Huang and Wei (2006), Calderon *et al.* (2010), Choudhary *et al.* (2010), Duncan (2011) etc.
[3] See for example taylor (1993, 1997, 2007), Clarida *et al.* (1999), Barro and Gordon (1983), Sevenson (1996) etc.
[4] Studies include Malik and Ahmed (2007), Malik (2007), Iqbal (2009), Malik and Ahmed (2011) etc.
[5] Like Douglass North, Darron Acemoglu and Dani Rodrik etc.

monetary policy. They argue that weak Institutions can directly affect monetary policy by weakening the monetary authority in terms of autonomy and by eroding the credibility of the central bank.

b) Institutional Quality and Cyclicality of Monetary Policy

Pro-cyclicality of macroeconomic policy is often described as a problem faced by developing countries (Frankel, 2010). Pro-cyclical monetary policy is harmful because it reinforces the business cycle (Kaminsky*et al.*, 2005). Pro-cyclical monetary policy harms the economic activity because during the periods of rapid economic growth (booms) expansionary monetary policy is pursued leading to overheating of the economy and thereby exerting inflationary pressure while during periods of slower economic growth (busts) contractionary monetary policy is pursued further pushing the economy towards recession.

c) Taylor Rules: Studies for Pakistan

Studies that have estimated Taylor rule for Pakistan include (Malik and Ahmed, 2007; Malik, 2007; Islam, 2009; Iqbal, 2009; Sulaiman *et al.*, 2011; Malik and Ahmed, 2011). All these studies find that the central bank has not been following Taylor rule for the conduct of monetary policy. Malik (2007) and Islam (2009) using counter factual simulations argue that economic performance could have been improved, had the central bank followed Taylor rule. Malik and Ahmed (2007) argue that the reason for non-observance of the rule could be that besides the stability of output and inflation the central bank follows other objectives as well e.g. exchange rate stability. They further argue Taylor rule does not hold for Pakistan even after adjusting upwards the parameters of inflation and output gap.

All of these studies have failed to find classical Taylor type relationship in the conduct of monetary policy of Pakistan. After failing to observe the classical relationship, they have modified the Taylor type rule by augmenting the Taylor rule with other objectives that the monetary authority may take into consideration. These objectives may include interest rate smoothening, exchange rate management, reduction of trade deficits, government borrowings etc. Most of the studies find that the central bank follows policy of interest rate smoothening while some studies find exchange rate stabilization also significant.

III. Theoretical Framework and Empirical Strategy

a) Theoretical Framework

We seek to examine the effect of institutional quality on monetary policy. Based on recent literature, our premise is that institutional quality affects the outcomes of monetary policy. One way to characterize the monetary policy of a country is through the Taylor type rule. The Taylor rule[6] recommends increasing the policy rate of interest when inflation is above target and lowering interest rate when recession appears to be more of a threat. The Taylor rule works on the assumption that the interest rate channel of monetary policy is very effective (Taylor, 1993). Recently, there has been a surge in the literature to incorporate institutional quality into monetary policy framework[7]. Few studies which have examined Taylor rule for Pakistan conclude that the central bank does not follow the Taylor rule[8]. Given the view that institutions influence the conduct of monetary policy, it is important to revisit the Taylor rule for Pakistan while controlling for institutional quality.

b) Empirical Strategy

We use the Autoregressive Distributive Lag (ARDL) method for estimation of our model. The reasons for using this model are manifold. First, we suspect that the variables used in the analysis are integrated, potentially of different order of integration. Second, if the variables are integrated of different order then the traditional co-integration methods like Engel Granger (1987) and Johansen (1991, 1995) co-integration techniques are not applicable. Third, as pointed out by Ruth (2004) and others[9], Taylor rule can be better characterized by accounting for the interest rate smoothening. This can be done in a co-integration framework using the error correction term. Taking into consideration all the above mentioned benefits of ARDL, we consider it the appropriate technique for estimating our model. The ARDL estimation technique is described below.

i. *ARDL Method to Co-integration*

In our case, the general form of the ARDL equation can be written as follows:

[6] Taylor (1993) defined the rule over inflation and output gap as: $i_t = r^* + 0.5y_t + 1.5\pi_t$, where i_t =federal funds rate, π_t =inflation, r^* = real rate of interest, and y_t =output gap.

[7] See for example Huang and Wei (2006), Dimakou (2006), Wu (2008), Calderon *et al.* (2010), Chaudhary *et al.* (2010) Duncan (2011).

[8] For example Malik (2007), Malik and Ahmed (2007), Islam (2009), Malik and Ahmed (2011) etc.

[9] For example Judd and Rudebusch (1998), Gerlach-Kristen (2003).

$$\Delta i_t = \alpha_0 + \alpha_1 T + \beta_1 i_{t-1} + \beta_2 Gap_{t-1} + \beta_3 inf_{t-1} + \beta_4 IQ_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta i_{t-i} + \sum_{i=0}^{p} \theta_i \Delta Gap_{t-i} + \sum_{i=0}^{p} \varphi_i \Delta infl_{t-i} + \sum_{i=0}^{p} \delta_i \Delta IQ_{t-i} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5.7)$$

Where i=1,2,3…, $\alpha_0$is the intercept, T is the trend, c_0,α,β_1,β_2,θ,γ are parameters.i is the interest rate, Gap is the output gap, inf is the inflation, IQ is the institutional quality index andΔ is the difference operator i.e. $\Delta y_t = y_t - y_{t-1}$. In this equation, the variables at levels define the long run relationship and variables in difference form define the short run dynamics. The maximum lag will be set to three years and final model will be selected on basis of Schwarz Bayesian Criterion (SBC).

ii. *Co-integration Test*

The Bound testing procedure in ARDL is used to test for existence of co-integration in the model. The bound testing can be carried out for equation 5.7 by testing the following hypothesis:

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0 \ldots\ldots\ldots\ldots\ldots\ldots (5.8)$$

If H_0 is rejected then we conclude that there is a long run relationship among the variables. According to Pesaran (1999) the asymptotic distribution of the F-Statistics are non-standard regardless of the degree of integration of the variables when the null hypothesis is of no co-integration. This depends upon whether the variables included in the ARDL model are I(0) or I(1), the number of regressors, whether the ARDL model contains an intercept and/or a trend, and the sample size. Two sets of critical F-values, representing the lower bound and the upper bound, have been suggested by Pesaran *et al.* (2001). If the statistic is higher than the upper bound, the null hypothesis of no co-integration can be rejected and the next step is to estimate the ARDL based ECM where the short-run and long-run elasticity's may be determined.

iii. *Long Run Relationship*

After confirmation of existence of long run relationship, long run coefficients from equation 5.7 can be extracted by normalizing the coefficients of the variables with respect to coefficient of dependent variable. In our case this will be done as follows.

$$\beta_1 i_{t-1} + \beta_2 Gap_{t-1} + \beta_3 inf_{t-1} + \beta_4 IQ_{t-1} = 0 \ldots\ldots\ldots\ldots\ldots (5.9)$$

$$\beta 1it-1 = -\beta 2Gapt-1 - \beta 3inft-1 - \beta 4IQt-1$$

$$i_{t-1} = -\frac{\beta_2}{\beta_1} Gap_{t-1} - \frac{\beta_3}{\beta_1} inf_{t-1} - \frac{\beta_4}{\beta_1} IQ_{t-1}$$

$$i_{t-1} = \theta_1 Gap_{t-1} + \theta_2 inf_{t-1} + \theta_3 IQ_{t-1} \ldots\ldots\ldots\ldots\ldots (5.10)$$

Where $\theta_1 = -\frac{\beta_2}{\beta_1}$, $\theta_2 = -\frac{\beta_3}{\beta_1}$, and $\theta_3 = -\frac{\beta_4}{\beta_1}$ are the long run coefficients.

iv. *Dynamic Short Run Relationship and Error Correction*

The dynamic short run relationship of equation 5.7 can be generated by replacing the long run equation 5.9 by the error correction term. The final dynamic short run equation with error correction can be can be specified as follows:

$$\Delta i_t = \alpha_0 + \alpha_1 T + \emptyset ECM_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta i_{t-i} + \sum_{i=0}^{p} \theta_i \Delta Gap_{t-i} + \sum_{i=0}^{p} \varphi_i \Delta inf_{t-i} + \sum_{i=0}^{p} \delta_i \Delta IQ_{t-i} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5.11)$$

The coefficient of error correction term (ECM_{t-1}) $\emptyset$ represents the speed of adjustment. It tells us the magnitude of the error correction accounted for in the current period.

c) Data, Variable Definition and Construction

i. *Data Span*

We have used annual time series data from 1984 to 2011, drawn from International Financial Statistics (IFS) for Pakistan. As the focus of this study is on the impact of institutions on monetary policy, therefore we use annual frequency data.

ii. *Output Gap*

Output Gap is defined as the difference between the actual output produced within the economy and the potential output. One of the techniques widely used is the Hodrick – Prescott (HP) Filter. Assumingy_t is the series for which we want to extract the long run trend component, the equation for the HP filter can be written as follows

$$\sum_{t=1}^{T}(y_t - s_t)^2 + \lambda \sum_{t=2}^{T-1}((s_{t+1} - s_t)^2 - (s_t - s_{t-1})^2) \dots\dots\dots\dots\dots\dots\dots\dots (5.1)$$

Where s is the smoothed series or long run series of yt, derived by minimizing the variance of $y_t$around s_t. $\lambda$is the smoothness parameter and it controls the smoothness of the series. For annual series $\lambda$is generally taken as 100.

iii. *Inflation*

To capture the aggregate level of prices, we have used GDP deflator. Inflation is computed as:

$$\text{Inflation} = \pi_t = \log(\text{GDP Deflator}_t) - \log(\text{GDP Deflator}_{t-1}) \dots\dots\dots (5.2)$$

Where subscript shows the current period and t−1shows the previous period. Data for GDP Deflator is also drawn from the International Financial Statistics (IFS).

iv. *Rate of Interest*

The policy interest rate indicates the stance of monetary policy. Common measures include Discount Rate, Call Money Rate, Treasury Bill (T-Bill) rate, Kibor, and Yield on Government Bonds etc.

v. *Institutional Quality*[10]

The most widely used measure of institutional quality comes from the international country risk guide (ICRG) dataset compiled by experts at Political Risk Services (PSR) Group. ICRG Political dataset consist of 12 categories i.e. Government Stability, Socioeconomic Conditions, Investment Profile, Internal Conflict, External Conflict, Corruption, Military in Politics, Religious Tensions, Law and Order, Ethnic Tensions, Democratic Accountability and Bureaucracy Quality. We have selected six indicators from ICRG data set for our analysis because these host the potential to influence monetary policy in one or the other way.

d) Principle Component Analysis

Principle Component Analysis (PCA) is a variable deducting method[11]. We use the normalized data from ICRG dataset to compute composite index of institutional quality using PCA. As in PCA, each variable can be written as linear combination of PCs, in our case this can be done using following formula as:

$$X_j = \sum_{i=1}^{n} a_{ji} P_i, \qquad (j = 1, 2, \dots, n) \dots\dots\dots\dots\dots\dots\dots (5.4)$$

Where, X_j is the variable under consideration, $P_i$is the i^{th} principal component; a_{ji} is the factor loading of the j^{th} variable on the i^{th} principal component. The principal components are given by:

$$p_i = \sum_{j=0}^{n} \frac{a_{ji} X_j}{\lambda_i} \dots\dots\dots\dots\dots\dots\dots (5.5)$$

Where λ_i is the eigen-value associated with the principle component P_i. The composite index of institutional quality can be generated using the principal components generated by equation 5.5 using the following formula as:

$$IQ = \frac{\sum_{i=1}^{n}(p_i E_i)}{\sum_{i=1}^{n} E_i} \dots\dots\dots\dots\dots\dots\dots (5.6)$$

Where, E_i are the eigen-values and is the index of institutional quality. Using annual data from ICRG dataset, institutional quality index is constructed by PCA. We have retained components with eigen-value ≥ 1.0, identified using scree plots, and which account for more than 60 % of variance in the composite index.

e) Test of Stationarity

Though, the ARDL method doesn't require to test for the order of integration of the data series, but Ouattara (2006) argues that F-statistics for bounds test provided by Pesaran *et al.* (2001) remains valid if and only if the variables used in the model are either I(0) or I(1) – any data series in the model should not be integrated of higher order, therefore we employ the Augmented Dickey Fuller and Phillips-Perron methods to test the order of integration of the data series.

[10] Definition of the components of institutional quality are from ICRG methodology document available at http://www.prsgroup.com/PDFS/icrgmethodology.pdf.

[11] Principal component analysis is based on the frame work used by Bishoi *et al.* (2009).

IV. Results and Discussions

a) Descriptive Statistics

Table 4.1 summarizes the Descriptive statistics of the variables used in the analysis.

Table 4.1 : Descriptive Statistics

Variable	Mean	Median	Max	Min	Std. Dev.	Jarque-Bera	Probability
Call Money Rate	8.57	8.53	12.47	2.13	2.74	1.04	0.59
Output Gap	-0.001	-0.95	9.28	-5.78	4.02	1.54	0.46
Inflation	3.73	3.50	8.03	1.06	1.69	1.23	0.53
Institutional Quality	45.14	43.23	77.33	13.37	17.33	0.91	0.64

Table 4.1 shows that all variable exhibit considerable fluctuation and the data is normally distributed.

b) Correlation and Graphs

Figure 6.1 shows the movement in the interest rate and inflation. It shows a positive co-movement between these two variables. The figure shows that the GDP deflator exhibits considerable volatility over the sample period. Inflation is at its lowest in 2002 and it is at its highest in 2009.

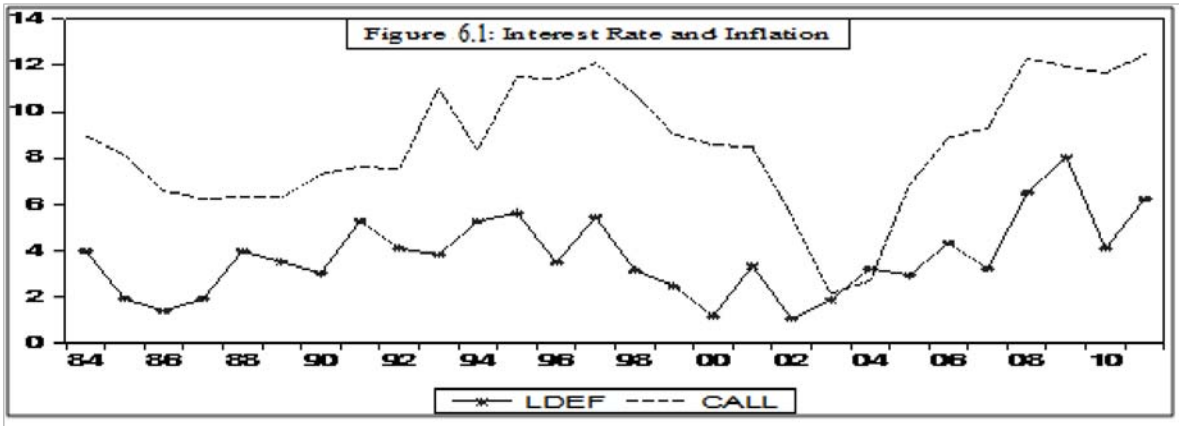


Figure 6.2 shows the movement of interest rate and output gap. The figure shows that output gap is at its lowest in 2003 and is at its highest in 2000.

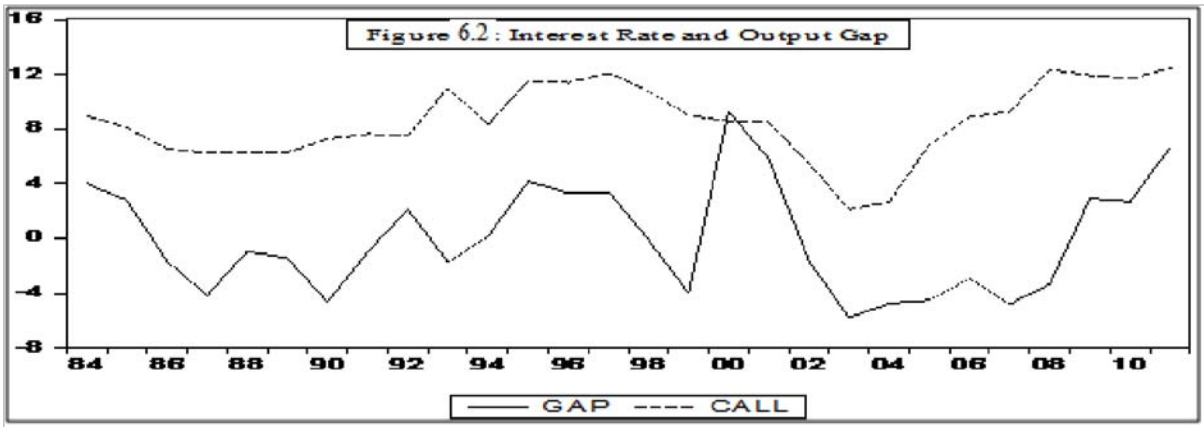
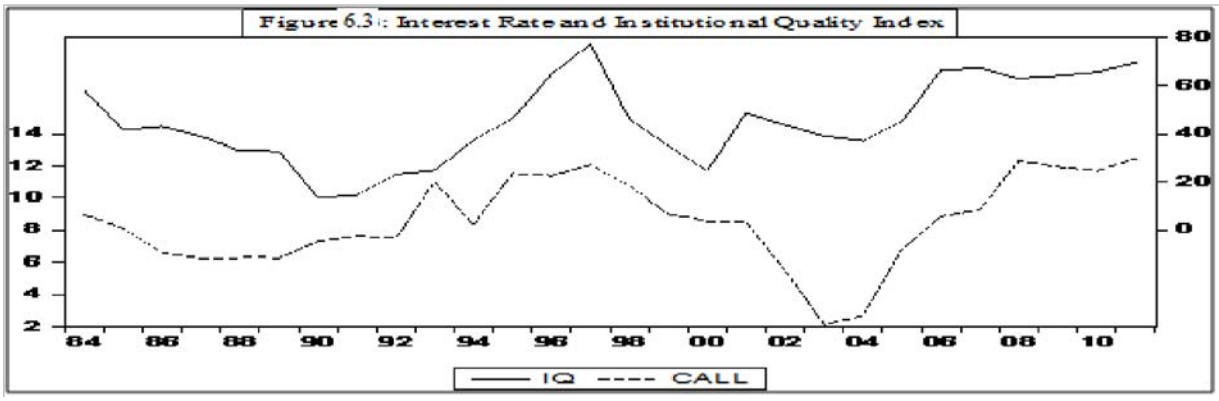


Figure 6.3 shows the movement of interest rate and institutional quality index. The two variables have moved together over time with some divergence in between. Institutional quality is at its highest in 1997 and is at its lowest in 1990.



c) *Test of Stationarity*

Table 4.2 summarizes results of unit root test.

Table 4.2 : Unit Root Tests

ADF Test							
	At Level			At First Difference			Order of Integration
Variable	No Intercept, No Trend	Intercept Only	Intercept, Trend	No Intercept, No Trend	Intercept Only	Intercept, Trend	
Call Money Rate	-0.09	-1.50	-1.71	-4.68***	-4.62***	-4.06***	I(1)
Output Gap	-3.01***	-2.95*	-2.82	-5.35***	-5.25***	-5.27***	I(0)
Inflation	-0.15	-2.87*	-3.12	-7.83***	-7.72***	-5.56***	I(0)
Institutional Quality	-0.40	-1.68	-5.40***	-4.62***	-4.55***	-4.50***	I(1)
PP Test							
	At Level			A t First Difference			Order of Integration
Variable	No Intercept, No Trend	Intercept Only	Intercept, Trend	No Intercept, No Trend	Intercept Only	Intercept, Trend	
Call Money Rate	-0.12	-1.77	-1.94	-4.68***	-4.62***	-4.60***	I(1)
Output Gap	-3.01***	-2.95*	-2.75	-7.18***	-7.00***	-7.98***	I(0)
Inflation	-0.51	-2.78*	-3.15	-8.54***	-9.36***	-9.24***	I(0)
Institutional Quality	-0.40	-1.86	-2.75	-4.62***	-4.55***	-4.49***	I(1)

*Note: ***, ** and * shows significance at 1%, 5% and 10% respectively*

As mentioned earlier, to use the ARDL model the underlying data series should at most be integrated of order one (difference stationary). Table 4.2 shows that the variables are either integrated of order zero or integrated of order one. Therefore, we can now safely proceed with estimation of our model, using the ARDL method.

d) *Estimation Results*

We have used Schwartz Bayesian criterion for selection of our model. Table 4.3 presents results of the selected equation which will be tested for existence of the long run relationship.

Table 4.3 : Test Equation Results

Dependent Variable: Call Money Rate			
Variables		**Coefficient**	
Call Money Rate (-1)		0.29 (0.14)	
Output Gap		-0.20 (0.11)**	
Output Gap (-1)		0.50 (0.15)*	
Output Gap (-2)		-0.58 (0.11) ***	
Inflation		1.10 (0.25) ***	
Inflation (-1)		-0.49 (0.28) *	
Inflation (-2)		0.51 (0.13) ***	
Institutional Quality		-0.09 (0.05) *	
Institutional Quality (-1)		0.24 (0.06) ***	
Institutional Quality (-2)		0.06 (0.07)	
Institutional Quality (-3)		-0.20 (0.05) ***	
Intercept		0.90 (1.54)	
R-Squared	0.96	S.E of Regression	0.74
Schwarz Bayesian Criterion	-39.07	F-Stats [Prob.]	31.80 [0.00]
Number of Observations: 28			

*Note: values in parenthesis indicate Standard Error; ***, ** and * shows significance at 1%, 5% and 10% respectively*

The R-Square is 0.96 which indicates that the model has high explanatory power.

i. *Co-integration Test*

We have used Bound Test to examine the existence of long run relationship. Table 4.4 summarizes Bound test results.

Table 4.4 : Bound Test

Computed F-Static	Lower Critical F-Static	Upper Critical F-Static	Result
10.10783	5%=3.05 10%=2.68	5%=3.968 10%=3.53	Co-integration

The test results indicate that a co-integrating relationship exists among the variables as the computed F-statistics lies outside the inconclusive range and is greater than the upper critical bound.

ii. *Breusch-Godfrey Serial correlation LM test*

For the results to be valid there should be no autocorrelation in the residuals of the regression equation. Table 4.5 summarizes the results of Breusch-Godfrey Serial correlation LM test.

Table 4.5 : Breusch-Godfrey Serial correlation LM test

Lag	F-statistic	Chi-Square
1	0.759 (0.401)	1.488 (0.222)
2	0.351 (0.711)	1.501 (0.472)
3	0.215 (0.884)	1.516 (0.679)

Note: values in parenthesis indicate probability

The test results indicate residuals of the regression do not exhibit serial correlation, up to 3 lags.

iii. *Ramsey RSET Test*

Ramsey RSET Test is used to examine whether the model is correctly specified. Table 4.6 presents results of Ramsey RSET Test:

Table 4.6 : Ramsey RSET Test

	Value
F-statistic	0.0046 (0.94)

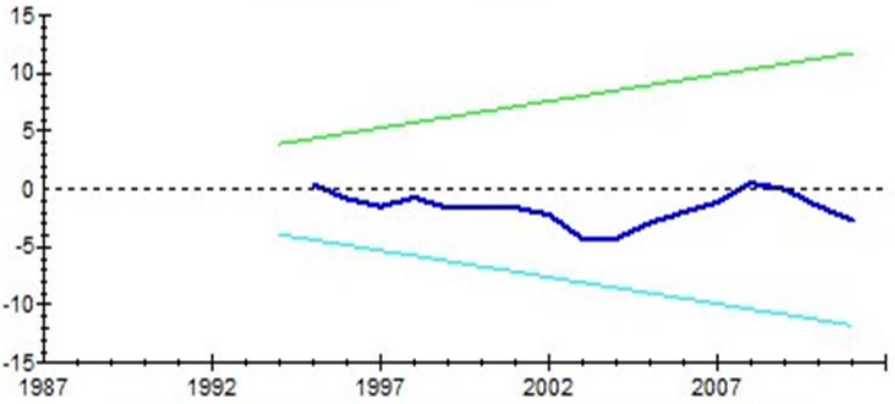
Note: values in parenthesis indicate probability

Test results indicate that the model has no specification error.

iv. *CUSUM and CUSUM Square Test*

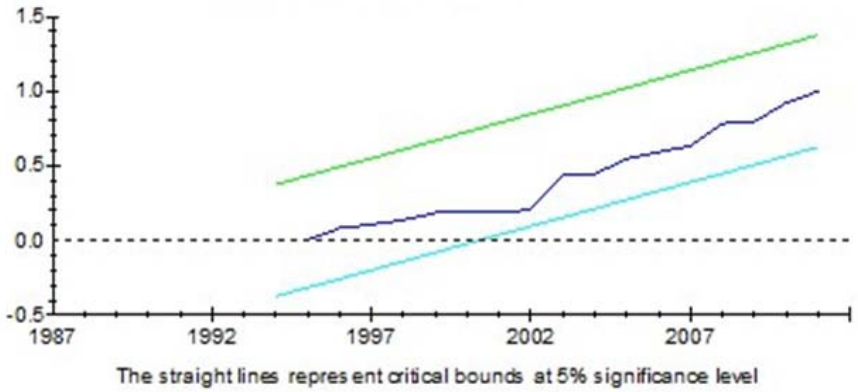
CUSUM and CUSUM Square tests are generally used to test for the stability of estimated parameters. If the model is stable then the estimated chart of the cumulative sums (CUSUM) will lie within the 5% significance band.

Figure 6.4: CUSUM Plot



CUSUM test shows that the parameters of our model lie within the 5% band and are therefore considered stable

Figure 6.5: CUSUM Square Plot



CUSUM square test also suggests that the model parameters are stable over time. Now we can proceed to discuss the results of our model as the model has passed all the diagnostic tests

e) *Long Run Relationship*

Table 4.7 summarizes the long run relationship of interest rate with inflation, output gap and institutional quality.

Table 4.7 : Long Run Relationship

Dependent Variable: Call Money Rate	
Variable	Coefficient
Output Gap	-0.39 (0.16)***
Inflation	1.60 (0.35) ***
Institutional Quality	0.01 (0.05)
Intercept	1.27 (2.22)

*Note: values in parenthesis indicate standard error; ***, indicate significance at 1%,*

The long run equation results suggest that the relationship between the institutional quality and the rate of interest is insignificant, though positive. This result indicates that in the long run, rate of interest does not respond to changes in institutional quality. Table 4.7 shows that there is a negative and highly significant relationship between rate of interest and output gap. This result indicates that when output gap increases, rate of interest is decreased by the monetary authority. This also shows that the monetary policy is pro-cyclical, often described as a problem faced by developing economies. The relationship between inflation and interest rate is positive and highly significant and more than one for one in terms of magnitude. In the long run this relationship is in accordance with the Taylor rule.

f) Dynamic Short Run Relationship

Table 4.8 summarizes the results of short run dynamic equation.

Table 4.8 : Dynamic Relationship

Dependent Variable: Δ Call Money Rate			
Variable		Coefficient	
Δ Output Gap		-0.20 (0.12)	
Δ Output Gap (-1)		0.58 (0.11) ***	
ΔInflation		1.10 (0.25) ***	
Δ Inflation (-1)		-0.51 (0.13) ***	
Δ Institutional Quality		-0.09 (0.05) *	
Δ Institutional Quality (-1)		0.15 (0.04) ***	
Δ Institutional Quality (-2)		0.20 (0.05) ***	
Δ Intercept		0.90 (1.54)	
ecm(-1)		-0.71 (0.14) ***	
R-Squared	0.91	S.E of Regression	0.74
Schwarz Bayesian Criterion	-39.07	F-Stats [Prob.]	18.15 [0.00]

*Note: values in parenthesis indicate S.E; ***, * indicate significance at 1% and 10% respectively*

High R-Square value suggests that the model has a high explanatory power. Table 4.8 shows that institutional quality effects interest rate for sufficiently longer period. Contemporaneous impact of institutional quality on interest rate is negative but is positive in the next two periods. This does not yield a clear picture regarding the nature of relationship between institutional quality and interest rate. The results further indicate that there is a positive relationship between the rate of interest and inflation in the contemporaneous period but there is a negative relationship between these two variables at a year lag. This means that initially the

monetary authority reacts to the change in inflation by increasing the rate of interest but down the road this relationship turns around. In the current period, changes in output gap do not affect interest rate as the coefficient of output gap is insignificant. However, the interest rate reacts positively to changes in the output gap at a year's lag. The coefficient of error correction term indicates that three fourth of the error is accounted for in the current period. This shows that the central bank follows a policy of interest rate smoothening, changing the policy rate gradually to achieve the price stability goal.

V. Conclusion

The results of the study indicate that effect of institutional quality on monetary policy is not clear. Institutional quality affects the monetary policy in the short run but the direction of the impact changes from lag to lag, while in the long run impact of institutional quality is insignificant. The results also suggest that the central bank has been putting more weight on inflation stabilization rather than output stabilization. It could be due to the fact that inflation during the period has, by and large remained at a relatively higher level. Moreover, during most of the period covered by the study's data span the country has been borrowing under the IMF structural adjustment programs. Almost all of these programs required containing the fiscal deficit. This again required a focus upon inflation. We found that the central bank has not been following Taylor rule in setting the policy rate of interest even after controlling for the institutional quality. This result is at variance with the findings for the developing countries in a cross country setting (Duncan, 2011). The reason could be that the institutional quality is poorer in Pakistan than typically observed in the countries included in the said study. Our results also suggest that the central bank follows an interest rates smoothening policy as the error correction term is highly significant and about three forth of the error is accounted for in the current period. Our results confirm that monetary policy of Pakistan is highly pro-cyclical as suggested in the literature. We argued that the pro-cyclicality could be due to the low institutional quality.

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