

Macroeconomic policies and Business cycle: The Role of Institutions in SAARC Countries

Samina Sabir and Khushbakht Zahid¹

Abstract

Based on the sample of SAARC countries over the period 1984-2009, we assess two stylized facts regarding interaction between monetary, fiscal policies and institutions. First, monetary policy conducted in SAARC countries to control inflation and to smooth output gap is pro-cyclical because of poor quality institutions. Second, fiscal policy is pro-cyclical in SAARC low income countries. We introduce interaction term between GDP gap and institution quality measured by ICRG index. We find that policies conducted in SAARC countries are pro-cyclical due to poor quality institutions. Therefore, these policies cause further distortion in business cyclical fluctuation.

¹ Authors are PHD scholars at PIDE

1. Introduction:

Fiscal and monetary policies are used to smooth the cyclical fluctuations in output. In developed countries, counter cyclical policies are used in principle for this purpose - see the study of Gali and Perotti, 2002; Sack and Wieland, 2007. OECD countries used loose monetary and fiscal policies to cope up with financial crisis of 2007 (IMF, 2008). However situation is reverse in developing countries, they are using the pro-cyclical policies to stabilize business cycle fluctuations that results in higher output volatility (Hausmann and Stein, 1996; and Kaminsky, Reinhart, and Vegh, 2004).

Theoretically, countries persuade pro-cyclical monetary and fiscal policies due to weak institutions – Lack of enforcement of property rights, corruption, dominance of political institution that do not restrict politician, and repudiation of contracts (Acemoglu, Johnson, Robinson and Thaicharoen, 2003). Fiscal policies are pro-cyclical in the countries, where political system is subject to multiple fiscal veto points that results in higher output fluctuation (Stein et al., 1999; Braun, 2001).

Similarly, rent seeking government conducts pro-cyclical policies. Talvi and Vegh (2005) find the positive correlation between government expenditure and gross domestic product (GDP) in 36 developing countries. Now pro-cyclical fiscal policy is considered part of convention wisdom in developing countries (Ilzetzki and Vegh, 2007). Poor macroeconomic policies results in high inflation, excessive government expenditures and overvalued exchange rate in developing or emerging market economies. In these countries, it is believed that macroeconomic instability is caused by poor macroeconomic policies due to weak institutions (Acemoglu, Johnson, Robinson and Thaicharoen, 2003).

Pro-cyclical policies are conducted by government that ease the monetary policy by lowering interest rate, expanding expenditure and cutting down taxes in boom and contract the policies in recession because of automatic stabilizers, respectively. Reason is that there exists distortions in their political economies and they have limited access to credit for the conduct of counter cyclical policies. Gavin and Perotti (1997) are the pioneers who noticed that fiscal policy in Latin America is pro-cyclical. Later on it is found that fiscal policy conducted in developing

countries are pro-cyclical and counter cyclical in OECD countries (Talvi and Vegh, 2005; Braun, 2001; Alesina et al., 2008).

Regarding monetary policy, there exists a negative relation between nominal interest rate and GDP gap, which shows that the monetary authorities adopt pro-cyclical stance due to presence of weak institutions (Duncan, 2012). There are several factors that are responsible for conduct of pro-cyclical policies in developing countries, of which institutional framework is important. A poor institution is a key factor that is responsible for pro-cyclical policies in emerging market economies. Countries, where institutions are strong, conduct contractionary policies in boom and expansionary policies in recession (Acemoglu, Johnson, Robinson and Thaicharoen, 2003; Calderon and Schmidt-Hebbel, 2008). Countries with weak institutions show the strong negative relation between output and interest rate while countries with strong institutions have positive link between output and interest rate (Duncan, 2012). No one has yet studied the impact of institution on macroeconomic policies in SAARC countries. In this paper, we assess the impact of institutional quality on macroeconomic policies conducted in SAARC countries.

Therefore, we find out the link between macroeconomic policies i.e, monetary and fiscal policy reaction functions and institutions. We use monetary policy rule defined by Taylor (1993a) and fiscal policy rule defined by Braun (2001) for this analysis. We incorporate the interaction term between output gap and institution quality.

Paper is organized into five sections. In section two, we provide theoretical rational of cyclical properties of macroeconomic policies. In section three, we present the methodology and data. Section four discusses results of the paper. Section five concludes the findings.

2. Theoretical framework of Macroeconomic Policies and Business Cycle:

In this section, we discuss the theoretical framework to provide strength to our empirical findings. Particularly, we look at the cyclical properties of monetary policy and fiscal policy. Theory says that in counter cyclical stances, there is a budget deficit in recession and surplus in boom or good times. Therefore, it indicates the positive correlation between changes in output and changes in the fiscal balances. It may possible that cyclical behavior of output dominates the

cyclical behavior of fiscal balances. Similarly, positive relation exists between nominal interest rate and output gap in boom and negative relation is found in recession. In developing countries fiscal and monetary authorities use expansionary policies in boom and contractionary policies in recession. Due to this controversy, we define the countercyclical, pro-cyclical and acyclical policies.

2.1. Monetary policy:

It is more difficult to define conceptual framework for monetary policy due to two reasons; 1) monetary policy instruments depend on existing exchange rate regime whether it is fixed, floating or flexible; 2) outcomes of monetary policy depends on some implicit models to determine the behavior of endogenous variables. Usually two types of exchange rate regimes exists as we defined earlier; Fixed exchange rate and flexible exchange rate.

Short term interest rate is used as policy instrument under both regimes. In case of SAARC countries call money rates and overnight interbank rates are used as policy instrument to achieve central banks main goals of inflation targeting, economic growth and output fluctuations. In flexible exchange rate regime, changes in money supply directly affect the short term interest rate. However in fixed exchange rate regime, short term interest rate is used as policy instrument by assuming imperfect substitution between domestic and foreign assets.

In principle, we observe the correlation between short run interest rate and output gap to assess that monetary policy is counter cyclical, pro-cyclical or acyclical to depict output cyclicity. Counter cyclical policy indicates that in boom, interest rate is increased whereas it is reduced in recession. Therefore, it implies the positive relation. In pro-cyclical policy, interest rate is raised in boom and it is reduced in recession. Indeed, we observe negative correlation between business cycle and short term interest rate. In acyclical situation, interest rate is not used systematically, so we observe zero correlation. We summarize all this discussion in table 1.

In interest rate policy, interest rate increases in good time, which has positive impact on real balance in the form of M1 and M2, whereas in bad times monetary aggregates decline. Therefore we observe positive correlation between interest rate and output cyclical. In pro-cyclical policy, interest rate reduces in good times and increases in bad times, which increases real balances, which shows negative correlation between business cycle and interest rate.

However we can say that higher interest rate leads to lower money balances or even interest rate exceeds the bench mark level, then zero activity is observed in good times.

Table 1: Monetary policy

Policies adopted	Short term interest rate	Monetary Aggregates (M1 and M2)	Growth of central bank domestic credit
Counter cyclical	+	-/+/0	-
Procyclical	-	+	+
acyclical	0	+	0

(Kaminsky, Reinhart and Vegh, 2004)

Interest rate usually used contains longer maturity, which also include endogenous variables. In fact, inflation has small but positive correlation with business cycle in developed economies while reverse is true for developing economies. We usually draw prejudice conclusion that monetary policy in developed countries are counter cyclical but it is pro-cyclical in developing countries. To minimize this bias, we use interbank rate as policy instrument.

Second policy instrument used is the growth of domestic credit under any exchange rate regime. In fixed exchange rate regime, according to monetary base approach to balance of payment, changes in domestic credit brings opposite changes in reserves due to perfect substitution between domestic and foreign assets. Indeed, imperfect substitution between domestic and foreign assets implies that changes in domestic credits have some impact on monetary base. Similar situation happens during dirty floating regime.

In good times, growth of domestic credit declines and it increases in bad time. This implies that growth of domestic credit in good times has positive impact on short term interest rate. Similarly, bad times imply that domestic credit raises and it reduces in bad times. Acyclical policy would not imply any systematic variation in domestic interest rate over business cycle.

In order to capture the movement of the monetary policy over the business cycle, we use Taylor rule (1993a), we specify the following equations

$$\tilde{i}_t = \beta_0 + \beta_1 \tilde{\pi}_t + \beta_2 \tilde{y}_t + u_t \dots \dots \dots (1)$$

Where \tilde{i}_t is the short term nominal interest rate, $\tilde{\pi}_t$ is the deviation of actual inflation from potential inflation measured with HP filter and \tilde{y}_t is the output gap to capture business cycle. Coefficient of output gap captures the stance of monetary policy. In counter cyclical policy β_2 is positive and significant, in pro-cyclical policy, it is negative and significant and insignificant in acyclical policy. It is a very useful reaction function to analyze the relationship between nominal interest rate and output gap by controlling the implicit inflation target of central bank. It is not necessary that central banks of SAARC countries are using the same reaction function to realize their policy objectives.

Number of the studies estimates the Taylor equation for developed countries such as Clarida, Gali and Gertler (1997) estimate it for United States, Japan and Germany and they find that Japan and Germany are pursuing counter cyclical policy while US is using acyclical policy. Moron and Castro (2000) estimate the reaction function for Peru by using monetary base as dependent variable and also include exchange rate deviation from trend as an additional control variable and observe counter cyclical monetary policy. Similarly, Corbo (2000) estimate reaction function for Chile and find acyclical policy. Malik and Ahmed (2009) estimate the same reaction function for Pakistan by controlling inflation targeting. They find that central bank of Pakistan is pursuing pro-cyclical policy in response to output fluctuations.

2.2. Fiscal policy:

Now we define cyclical behavior of fiscal policy in term of government expenditures and tax rate. In good times, government decreases their expenditures and increases tax rate. Therefore, contractionary fiscal policy is conducted in good times to stabilize business cycle fluctuations. Furthermore expansionary policy, higher government expenditures and lower tax rates, is adopted in bad times. This is all about counter cyclical fiscal policy.

But if fiscal policy is pro-cyclical, then government increases their expenditures and cut down tax rate in good time and reverse is true for bad times. It is believe that this type of policy reinforce business cycle. In case of acyclical policy, government expenditures and tax rate remain constant, so nothing happens to business cycle. All this is summarized in table 2.

Theoretically best indicators of fiscal policy are government expenditures and tax rate but data on tax rate is usually not available, so we use government expenditures as an indicator of fiscal policy.

Table 2: Fiscal policy

	Govt expenditures	Tax rates	Tax revenue	G/GDP
Countercyclical	-	+	+	-
Pro-cyclical	+	-	-/+ / 0	+/- / 0
Acyclical	0	0	+	-

(Kaminsky, Reinhart and Vegh, 2004)

We use HP filter to decompose series into cyclical components. After decomposition of GDP into cyclical fluctuations, we can find the correlation between real GDP gap, monetary indicator and fiscal policy indicators.

3. Methodology and Data:

In this section, we empirically test the cyclical properties of macroeconomic policies in Pakistan over the period 1980-2009. Monetary policy rule introduced by Taylor (1993a) is used to capture the fluctuation in output due to changes nominal interest rate. Similarly fiscal policy reaction function by Braun (2001) is used to capture changes in output due to government spending. We introduce the interaction between output gap and institution quality in both monetary and fiscal policy reaction functions.

In democratic regime, institutions are strong and it is expected that the behavior of fiscal and monetary policies are counter cyclical and vice versa is true for poor institutions. To capture cyclical stance, we specify monetary and fiscal policy reaction functions as

$$\tilde{i}_{i,t} = \beta_i + \beta_1 \tilde{i}_{i,t-1} + \beta_2 \tilde{\pi}_{i,t} + \beta_3 \tilde{y}_{i,t} + \beta_4 \tilde{y}_{i,t} Q_{i,t} + u_{i,t} \dots \dots \dots (2)$$

$$\tilde{g}_{i,t} = \gamma_i + \gamma_1 \tilde{g}_{i,t-1} + \gamma_3 \tilde{y}_{i,t} + \gamma_4 \tilde{y}_{i,t} Q_{i,t} + v_{i,t} \dots \dots \dots (3)$$

$$i = 1, 2, \dots, N$$

$$t = 1, 2, \dots, T$$

Where ‘i’ is the number of number of countries or cross section units and -‘t’ is the time period, β_i and γ_i are unobserved country effects. $\tilde{i}_{i,t}$ is the deviation of nominal interest rate from trend, $\tilde{\pi}_{i,t}$ is the deviation of actual inflation from trend path, $\tilde{y}_{i,t}$ is the real GDP gap to capture business cycle fluctuations, $Q_{i,t}$ is the proxy of institutional quality known as ICRG index, $\tilde{g}_{i,t}$ is the government expenditures gap measured as deviation of expenditures from trend path. u and v are white noise terms or random error which have normal distribution with zero mean and constant variance respectively i.e., $u_{i,t} \sim iid(0, \delta_u^2)$ and $v_{i,t} \sim iid(0, \delta_v^2)$

We expect that coefficients of lagged nominal interest rate (β_1) and government expenditure (γ_1) lie between 0 and 1. Coefficient of inflation gap would be positive and greater than 1. β_3 and β_4 are expected to be negative and positive. High (low) value of ICRG index implies high (low) level of institutional quality and central bank conducts counter cyclical (pro-cyclical) policy to stabilize business cycle fluctuations. In fiscal policy reaction function, coefficient of output gap (γ_3) would be positive and coefficient of product of ICRG index and output gap would be negative. High quality institution setup implies the conduct of counter cycle policy to smooth business cycle fluctuations.

We can derive the degree of cyclicity by using equation 2 and 3. For this purpose, differentiate equation 2 w.r.t \tilde{y}_t and equate to zero.

$$\frac{\partial \tilde{i}_{i,t}}{\partial \tilde{y}_t} = \beta_3 + \beta_4 Q_{i,t} = 0 \dots \dots \dots (4)$$

This implies that

$$Q_{i,t}^* = -\frac{\beta_3}{\beta_4} \dots \dots \dots (5)$$

Equation 5 implies the threshold level of institution quality. Nevertheless, it is cleared that conduct of monetary policy depends on the observed level of institutional quality. If

$$Q > Q^* = -\frac{\beta_3}{\beta_4} \Rightarrow \frac{\partial \tilde{i}_{i,t}}{\partial \tilde{y}_{i,t}} > 0, \Rightarrow \text{counter cyclical policy for business cycle stablization}$$

$$Q < Q^* = -\frac{\beta_3}{\beta_4} \Rightarrow \frac{\partial \tilde{i}_{i,t}}{\partial \tilde{y}_{i,t}} < 0, \Rightarrow \text{pro - cyclical policy for business cycle stablization}$$

$$Q = Q^* = -\frac{\beta_3}{\beta_4} \Rightarrow \frac{\partial \tilde{i}_{i,t}}{\partial \tilde{y}_{i,t}} = 0, \Rightarrow \text{acyclical policy for business cycle stabilization}$$

Similarly, we can derive threshold level of institutional quality from eq. (3). We use OLS method to estimate equation 2 and 3, if basic time series properties are satisfied. If we use OLS method to capture the impact of GDP gap on fiscal policy instrument, then it results in biased estimator that might capture the influence of size of fiscal multiplier rather than reaction functions (Alesina et al., 2008). We use GMM fixed effect model to control endogeneity problem caused by regressors to avoid biased and inconsistent results. We measure deviation in dependent variables from trend path by using Hedrick Prescott (HP) filter method. We use alternative instruments for the estimation of monetary and fiscal policy reaction functions through GMM.

We use annual data from 1984-2009 on call money rates (short term interest rate) for India, Pakistan and Sri Lanka and discount rate for Bangladesh, inflation, real GDP and government expenditures. We take data on these variables from International finance Statistics (IFS) for SAARC countries (Bangladesh, India, Pakistan and Sri Lanka). Data of Bhutan, Maldives and Nepal is not available. Therefore we exclude these countries from this analysis. Data on institutional quality is taken from International Country Risk Guide (ICRG) compiled by PRS group. We take the sum of twelve components to obtain institutional quality index such as government stability, socio-economic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy quality. Index ranges from 0 to 100; 0 shows lower quality of institutions and 100 indicates higher quality of institutions. Inflation is calculated from percentage growth from annual GDP deflator. Data on consumption expenditures are taken for this analysis instead of aggregate government expenditures. Output gap is estimated by taking deviation of real GDP from time trend by using HP filter. Similarly, we estimate inflation gap, government expenditure gap and nominal interest rate gap respectively.

4. Results:

We present the estimated results of monetary and fiscal policy reaction functions for SAARC countries over the period 1984-2009. Basic purpose of this empirical exercise is to test

whether conduct of macroeconomic policies depend on quality of institutions. Before proceeding for estimation, descriptive statistic of key variables used in monetary and fiscal reaction functions is presented in table 3.

Table 3 Descriptive Statistics

	Interest rate	Government Expenditure	GDP	Inflation	ICRG(Q)
Mean	10.82	7.16	10.13	7.93	3.64
Maximum	23.17	13.60	14.92	13.32	4.09
Minimum	4.68	3.19	7.45	4.42	3.24
Std. Dev.	5.16	2.82	2.61	2.16	0.26
Observations	104	104	104	104	104

4.1. Monetary policy and institutional quality

First we estimate the Taylor rule by using simple ordinary least square method on panel regression. Column 1 of table 4 shows that there exist positive relation between inflation and nominal interest rate. GDP gap has negative impact on nominal interest rate. This implies that monetary policy in SAARC countries is pro-cyclical.

Theoretically, monetary authorities cut down the nominal interest rate either there is a positive change in inflation targeting or output growth targeting due to pro-cyclical response (Malik and Ahmed, 2009). Although coefficient of inflation is very small as compare to Taylor (1993). To see the impact of institutions on macroeconomic policies, first we estimate monetary reaction function given in eq (2) by using least square dummy variable method on fixed effect method and GMM fixed effect method. We could not use random effect model for this analysis because number of variables used is greater than the number of countries. The results with fixed effect model are presented in table 4.

Coefficient of lagged nominal interest rate has positive effect on nominal interest rate. Inflation rate de-trended by HP filter has also positive and significant impact on nominal interest rate with coefficients ranging from 0.077 to 0.08. This implies that an increase in short term interest rate drags the prices in upward direction.

In developing countries, monetary authorities use policy instrument to curb inflation rather than to control output gap. There exists a positive relation between product of output gap and monetary policy instrument. This shows that an increase in nominal interest rate leads to increase the output gap. Opposite results are obtained if monetary authorities reduce interest rate.

Table 4: Monetary Policy Reaction Function

Variables	OLS	OLS	GMM
constant	4.9072**	6.875**	-7.182**
	(0.011)	(0.000)	(0.000)
i(-1)	0.8889**	0.933**	0.916**
	(0.000)	(0.000)	(0.000)
inflation	0.1302***	0.08***	0.077***
	(0.0016)	(0.003)	(0.007)
GDP gap	-0.473***	-2.702**	-2.824**
	(0.0085)	(0.000)	(0.000)
GDP gap*Q		-0.046**	-0.057**
		(0.000)	(0.000)
R²	0.993	0.996	0.995
Q*		58.739	49.544
F-stat	2095.649**	2744.123**	
	(0.0000)	0.000	
Sargent test			7.646
TN	100	100	96
Countries	4	4	4

***, ** shows the significance level at 10% and 5%. We use $i(t-2)$, $infl(t-1)$, $GDP(-1)$, $GDP(-2)$, $Q(-1)$ and $Q(-2)$ as instrument for GMM.

Table 4 also reveals that coefficient of product of GDP gap and Q is negatively associated with nominal interest rate in both column 2 and 3. We use Sargent test to check the validity of instruments used in GMM technique.

All this analysis shows that the monetary authorities conduct pro-cyclical monetary policy in selected SAARC countries. This implies that monetary policy instrument increases the distortions in output gap rather to reduce it. Overall findings of this section are consistent with the study of Kaminsky et al., (2004) for low income countries.

4.2. Fiscal policy and Institutional Quality:

Now we estimate fiscal policy reaction function by using ordinary least square method and GMM technique and results are reported in table 5.

Table 5: Fiscal Policy Reaction Function

Variables	OLS	OLS	GMM
constant	0.695**	0.690**	0.581**
	(0.000)	(0.000)	(0.000)
g(-1)	1.033**	1.045**	1.043**
	(0.000)	(0.000)	(0.000)
GDP gap	-0.079**	-0.041***	-0.029
	(0.000)	(0.086)	(0.247)
GDP gap*Q		-0.012**	-0.012**
		(0.007)	(0.019)
R²	1.000	1.000	1.000
F-stat	380601.3**	339530.6**	
	(0.000)	(0.000)	
Sargent test			15.907
TN	100	100	96
Countries	4	4	4

***, ** shows the significance level at 10% and 5%. We use g(t-2), GDP(-1), GDP(-2), Q(-1) and Q(-2) as instrument for GMM. P-values are reported in parenthesis.

In column 1 of table 5, we estimate the impact of fiscal policy instrument i.e., government consumption expenditures on GDP gap measure of business cycle. We estimate

panel fixed effect regression by using LDVM. The coefficient of government consumption expenditure (g) turns out to be negative and significant at 5% that implies the pro-cyclicality of fiscal policy in SAARC countries. This also predicts that weak institutions prevail in SAARC region.

In fact we are not interested to check the impact of fiscal policy instrument on GDP gap but rather in interaction term, namely, how institutions impacts the level of pro-cyclicality. In this perspective, government consumption spending is a valid instrument to test model predictions. As compare to social planner, government with weak institution should conduct more pro-cyclical policies. Coefficient of lagged dependent variable reveals that lagged government consumption expenditures have positive and one to one relation with current expenditures. Column 2 of Table 5 shows that the coefficient of GDP gap has negative and significant impact on government consumption expenditures. This implies that fiscal authorities conduct pro-cyclical fiscal policy in SAARC countries to stabilize output gap. Hence, government spending goes down with GDP gap, corresponding to a more pro-cyclical fiscal policy.

However, coefficient of interaction term between GDP gap and ICRG index has negative impact on government expenditures. This finding is consistent with our prediction that weak institution is the cause of pro-cyclicality of fiscal policy in low income countries of SAARC countries. Results of this section are consistent with the study of Alesina et al., 2008 on OECD and non-OECD countries.

To control endogeneity problem created by output gap, we use GMM technique and results are displayed in column 3 of table 5. Coefficient of lagged consumption expenditure is positive and significant. However, coefficient of GDP gap is negative and insignificant. But the interaction term shows the negative and significant impact on ' g '. To sum up, government consumption expenditure increases due to weak institutions. This implies the pro-cyclicality of fiscal policy in low income countries.

In summary, OLS and GMM regression confirms that government spending is pro-cyclical in Pakistan, which depicts the presence of weak institutions. But question is why authorities whether monetary or fiscal, conduct pro-cyclical policies to stabilize output gap,

which create macroeconomic instability? It may be due to fact that in recessions, developing countries cannot borrow at very high interest rate and therefore cannot run deficit. Indeed, government cuts down its spending in bad times. However, in boom government can easily make borrowing at lower interest rate and hence as a result increases its expenditures. All this happens due to insufficient supply of credit (Alesina et al., 2008).

5. Conclusion:

In this paper, we empirically examined the impact of institutions on macroeconomic policies in SAARC countries. We observed that monetary and fiscal policies are pro-cyclical in response to weak institutions. During good time of economic activities, monetary authorities increase the interest rate to reduce monetary base while in bad times interest rate reduces. We estimated the Taylor equation by using ordinary least square method on panel regression. But this method estimates monetary multiplier effect rather than reaction function. Therefore we use GMM method to estimate Taylor equation in the form of panel regression. We found a positive relation between inflation and de-trended nominal interest rate. However we found a negative relation between GDP gap and policy instrument. This verified the conduct of pro-cyclical policy in SAARC countries. Moreover we also found the negative relation between the coefficient of product of GDP gap and institutional quality. This implied that the countries with strong institution use contractionary policy during boom and expansionary policy during recession to crab business cycle fluctuations. Hence SAARC countries have poor quality institutions, so pro-cyclical monetary policy is conducted there.

To measure the impact of institution on fiscal policy reaction function, we estimated it by OLS and GMM techniques. According to both estimation methods, we found negative relation between GDP gap and government consumption expenditure. This implied the conduct of pro-cyclical fiscal policy due to weak institutions. However, we also got negative relation of interaction term between GDP gap and institutions and government expenditure.

All this analysis revealed that pro-cyclical policies are conducted in SAARC countries, which increase the distortion in output fluctuation and instability. This problem cannot resolve

until and unless we improve the quality of our institutions. All the efforts made by fiscal and monetary authorities to curb output fluctuation is in vain in the presence of poor institutions.

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