The Impact of Fiscal Rule on Fiscal Policy Volatility: Empirical Evidence from India

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I. Introduction

Until the early 1980s the fiscal policy was widely regarded as a useful tool for macroeconomic stabilization. However, the active fiscal policy adopted by several advanced and emerging economics did not prevent widespread increases in unemployment, while at the same time they resulted in high fiscal deficits and raising debt level. The ineffectiveness of fiscal policy has made many economists sceptical about its usefulness as a tool for macroeconomic stabilization. In the mid 1990s, most of the countries had started to implement fiscal rule, specify numerical targets for government debt, deficits and spending, to bring down the fiscal deficit and debt under control. The proposed measures range from extreme versions of balanced budget constitutional amendments[1] to the less restrictive limits on the budget deficits in the European Monetary Union (EMU). The government of India had enacted the Fiscal Responsibility and Budget Management (FRBM) Act in 2003, which aim at bringing the fiscal situation under control by 2008-09. This act postulates among other things that fiscal deficit should decline to 0.3 percent of Gross Domestic Product (GDP) every year and its level in 2008-09 should decline to less than 0.3 percent of GDP.

A key argument for tying government hands by imposing various restrictions on fiscal policy is based on the assumption is that discretion in fiscal policy can harm macroeconomic stability. Proponents of fiscal policy restrictions argued that the negative effects of restrictions can be easily outweighed by at least two positive way: 1) limits on fiscal policy guarantee that governments will not run excessive deficits and pile up unsustainable levels of debt and 2) restrictions on policy will eliminate or at least reduce the possibility that fiscal policy itself is a source of macroeconomic volatility. Fiscal policy restrictions are also often criticized for limiting the ability of government to react to business cycle fluctuations and consequently the adoption of quantitative restrictions is viewed as inevitably leading to increased macroeconomic volatility. Fatas and Mihov (2003) found a negative relationship between fiscal policy volatility and output growth. Barlevy (2004) emphasised that if

discretionary fiscal policy lower output growth by inducing higher volatility the welfare gain from restricting fiscal policy discretion would be sizeable. Whether fiscal policy should be

[1] United States Balanced budget Act 1997.

left unrestricted or bound by fiscal rule and how such a optimal fiscal rule will design are the questions raised by policy makers. Although very few studies focused on fiscal rule and policy volatility using cross country data, no country specific studies made to assess the impact of fiscal rule on policy volatility in India. Since fiscal rules considered are rather different in their nature and with respect to possibility of legal enforcement, in-depth single country study can give answer to the question that how fiscal rule exactly altered the conduct of fiscal policy. The present study seeks to answer the following questions: 1) how harmful is discretionary fiscal policy for the economy, 2) does fiscal rule reduce policy volatility and, 3) whether fiscal rule introduced in the country over the last ten years has reduced the room for discretionary fiscal policy.

The main results of the paper can be summarized as follow: (a) fiscal policy is more persistent than responsive to economic conditions; (b) the discretionary fiscal policy has a significant and sizable effect on output volatility, implies that 1 percent reduction in policy volatility leads to 0.56 percent decline in output volatility; (c) fiscal rule implemented in India since 2004 have not reduced the room for discretionary fiscal policy.

The rest of the paper is as follow. After the introduction, a brief review of literature related to discretionary fiscal policy and its effects on macroeconomic stability are presented in section II. Data and methodology are given in section III. The section IV starts with the construction of fiscal policy and proceeds with the estimation of the effects of fiscal policy on output volatility. The effects of fiscal rule on fiscal policy volatility are presented in section V. conclusions are given in section VI.

II. Review of Literature

The significance of fiscal policy volatility for countries growth prospects has been documented by several authors namely Fatas Mihov (2003), Furceri (2007) and Afonso and Furceri (2008). The main findings from these studies is that the negative and robust correlation between fiscal policy volatility and growth. The negative correlation between policy volatility and growth can be largely explained by the impact of fiscal policy volatility on output volatility and through this effect on long-run growth (Ram and Ramey, 1995; Fatas

and Mihov, 2003). The negative correlation between policy variability and growth was also documented by among others, Aizenman and Marion (1993).

Fatas and Mihov (2003) analysed the political and institutional determinants of discretionary government spending as well as its impact on output volatility and economic growth using annual data from 1960 to 2000 for 91 countries. They found that highly volatile discretionary fiscal policy exerts a strong destabilizing effect on the economy. The fiscal policy was explained to a large extent by political and institutional variables as the characteristics of electoral and political systems and lack of political constraints. They concluded that institutional arrangements that constrain discretionary spending allow nations to achieve higher rates of economic growth and reduce macroeconomic instability. Woo (2008) found that the degree of social polarization by influencing the behaviour of optimistic policy makers is also factors that effects fiscal policy volatility. The empirical studies provide strong evidence that fiscal policy volatility, like other features of fiscal policy volatility is an outcome of optimistic behaviour of policy makers, political games and conflict. These studies implies that formal constraints imposed on fiscal policy, among them fiscal rules, by changing incentives faced by the policymakers may effects the fiscal policy volatility.

Several studies have looked at the specific mechanism through which fiscal policy can affect business cycles. Most of the studies have analysed the negative effects of government expenditure restrictions on the ability of the government to smooth economic fluctuations. Among them Poterba (1994), Alt and Lowry (1994), and Roubini and Sachs (1989) documented that how both implicit and explicit fiscal policy constraints result in slower adjustment to unexpected shocks. Similarly, Lane (2003) show that restrictions on government expenditure leads to lower government expenditure volatility results in slower adjustment of the economy to unexpected shocks. He also given a view that countries with volatile output and dispersed political power are the most likely to run pro-cyclical fiscal policies. The above mentioned studies were ignored the positive effects of fiscal policy constraints and they measure the cost of inaction caused by dispersed power and limits on fiscal policy without looking into the positive effects of constraints. In the positive effects, Alesina and Bayoumi (1996) found that explicit restrictions on fiscal policy reduce the likelihood of deficits. They explained that while the constraints limit the ability of governments to respond to business cycle fluctuations, there is an effect in the opposite

directions, as constraints on fiscal policy also limit discretionary changes in fiscal policy that induce business cycles. Fatas and Mihov (2006), using data from 48 U.S. states explored the role of fiscal rule and institutions in determining discretionary fiscal policy and look at whether the same rules and institution influence the responsiveness of fiscal policy. They found that strict budgetary restrictions lead to less policy volatility and reduce the responsiveness of fiscal policy to output shocks. These two findings should have opposite effects on output volatility. While less discretion should reduce volatility, less responsiveness of fiscal policy might amplify business cycles. These studies provide empirical support for the first effect that restrictions by reducing discretion in fiscal policy can reduce macroeconomic volatility. Similarly, Afonso.et.al, (2010) analysed the different characteristics of fiscal policy such as responsiveness, persistence and discretion and to assess which variable make these components vary across country using data from 132 countries over the period 1980 to 2007. They found that fiscal policy was more persistent than responsiveness to economic conditions implies that the fiscal authority have less leeway in short run to curb spending behaviours. The study also found that both revenue and spending persistence was negatively correlated to the discretion and responsiveness components of fiscal policy, implied that countries with greater persistence have less discretion. Further, the macroeconomic, institutional and geographic variables were also explained the cross country variations in fiscal characteristics. Recently, Brzozowski and Gorzelak (2010) examined the impact of fiscal rule in the form of explicit deficit or debt constrains on the fiscal policy volatility using data from 1980-2006 for 89 countries. The study found that fiscal rule has a significant impact on policy volatility. This result is reinforced the Badinger (2009) findings that fiscal rule introduced in most OECD countries over the 15 years had reduced the use of discretionary fiscal policy. The motivation of present study is that there is less evidence on whether fiscal rules actually supported macroeconomic stability (Fatas and Mihove, 2003; Badinger, 2009; and Gorzelak, 2010).

III. Data and Methodology

The required data for the study is collected from secondary sources. Both annual and quarterly data were employed. The annual data were collected over the period from 1972 -71 to 2012-13 and the quarterly data were collected over the period from 1996-Q1 to 2012-Q4. The Handbook of Statistics on Indian Economy published by RBI and National Accounts

Statistics (NAS) published by Central Statistical Organisation (CSO) were used as a data sources. To construct measure of discretionary fiscal policy the study considered only for the general government final consumption spending which are not related to the current state of the economy. Other control variables such as Inflation, Gross Domestic Product (GDP), and Openness of the Economy were also included in the model. Monthly Wholesale Price Index (WPI) was used to calculate quarterly inflation series. Except inflation series all the data are used in real terms at 2004-05 prices. To estimate the fiscal rule function, the Ordinary Least Square (OLS) methods has been employed. The estimation of discretionary fiscal policy involves two steps. In the first step, we estimate fiscal reaction function by using set of fiscal and control variables and the Standard deviation of the error term of the functions was captured in the second step. Three-yearly moving standard deviation (SD) of the residuals from the fiscal rule function has been used as a measure of discretionary fiscal policy volatility.

IV. Measuring discretionary Fiscal Policy

There is no consensus in the literature on how to construct a measure of a government's fiscal stance. As in Fatas and Mihov (2003), we use the term discretionary fiscal policy to refer to changes in fiscal policy that do not represent reaction to economic conditions. Since most of the fluctuations on the revenue side of the budget come from automatic reactions of tax revenue to the state of economy, we ignore the revenue side effects and focus only for government spending. To construct the measure of discretionary fiscal policy the following equation has been estimated using annual data.

$$\Delta \ln GC_t = \alpha + \beta_1 \Delta \ln Y_t + \phi_2 \Delta \ln GC_{t-1} + W_{tn} + \varepsilon_t \text{ -------------------------- (1)}$$

Where GC is logarithmic of general government final consumption spending and Y is logarithmic of real gross domestic product (GDP) and W is the set of controls including inflation, inflation squared and a time trend. We interpret the volatility of ε_t as a quantitative estimate of discretionary policy. We calculate the volatility as the standard deviation (SD) of the residuals of the equation (1). The β_1 and ϕ_2 in specification (1) represent the measure of responsiveness and persistence of fiscal policy.

Fiscal policy persistence, responsiveness and discretion

Table 1 presents the estimated results of fiscal policy responsiveness and persistence which are based on the equation (1). The coefficient of output is positive and insignificant indicates that the fiscal policy does not respond to output. By contrast, the government spending responds positively to its lagged spending indicates the persistence of fiscal policy. This result is consistent with the Antonio, et.al (2010) predictions that fiscal policy is more persistent than responsive to economic conditions, which implies that the authorities may have less leeway in the short-run notably to curb spending behaviour.

Table: 1. OLS Results for the fiscal reaction function

Dependent variable: $\Delta \ln GC_t$	
Regressors	**Co-efficient**
Intercept	0.055** (0.019) [2.860]
$\Delta \ln Y_{t-1}$	0.124 (0.214) [0.580]
$\Delta \ln GC_{t-1}$	0.299** (0.150) [1.987]
INF_t	-0.004 (0.003 [-1.330]
$INF_{t\,2}$	0.000 (0.000) [0.295]
Trend	0.000 (0.001) [0.300]
R-Squared	0.33
N	41

Note: ***,** and * denotes 1,5 &10 percent level of statistical significance. The OLS estimates used annual data from 1972-73 to 2012-13. Parenthesis indicates Standard error and square packets are t-values.

It is clear from the analysis that the insignificant coefficient associated with output growth (fiscal policy responsiveness) and lower (0.30 percent) and significant values associated with lagged government spending are the larger the discretionary component of fiscal policy.

The Effects of Fiscal Policy on Output Volatility

Having obtained a measure of fiscal policy volatility, Standard deviations of error term of equation (1), we now go on to provide an assessment of the effects of volatility of discretionary fiscal policy on output volatility. Followed by Fatas and Mihov (2003), the present study estimates the baseline model of output volatility. They are:

$$\Delta \ln \sigma^{Y} = \alpha + \beta_1 \Delta \ln \sigma_t^{GC} + \phi_3 GSIZE_t + \varphi_{4t} OPEN_t + \varepsilon_t \quad \text{------------------} \quad (2)$$

The output volatility, defined as Standard Deviation (SD) of the growth rate of output ($\sigma_t^{\ln Y}$), is regressed on the standard Deviation of the measure of fiscal policy ($\sigma_t^{\ln GC}$) and other control variables. The controls are added: government size (GSIZE) to accounts for the government's potential stabilizing role emphasized by Gali (1994). Openness of the trade (OPEN) also added as a control variable for volatility of growth.
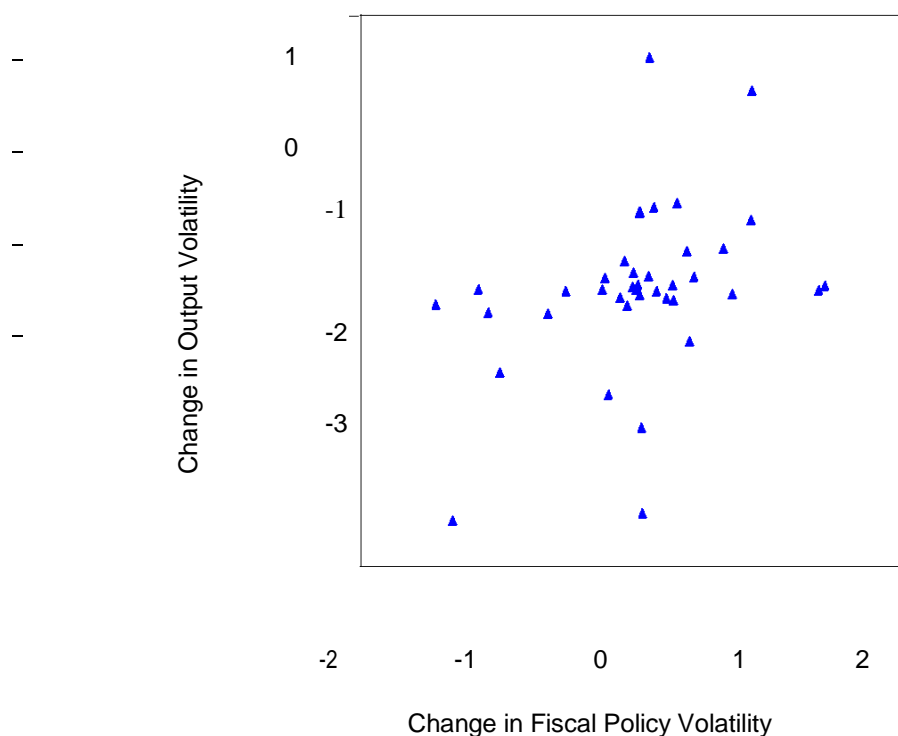

Figure:1.Change in Fiscal Policy Volatility and change in Output

volatility

To study the link between discretionary fiscal policy and output volatility, we use scatter diagram and regression analysis. The figure 1 shows the positive relationship between output volatility and the estimated variability in discretionary fiscal policy. The horizontal axis reports the logarithmic of measure of changes in fiscal policy volatility obtained by the estimating equation (1). Along the vertical axis we have plotted the logarithmic of three year moving standard deviation (SD) of output growth rate. The correlation between change in output volatility and change in discretionary fiscal policy is positive.

The regression results are presented in table 2. The results conform the positive association between change in output volatility and change in discretionary fiscal policy. The result found that 1 percent reduction in fiscal policy volatility leads to 0.56 percent decline in output volatility. The estimated elasticity is less than Fatas and Mihov (2003) and others' estimates which ranges from 0.8 percent to 1.2 percent. The regression result provides the answer for the question that the aggressive use of fiscal policy is harmful for macroeconomic stability in India.

Table: 2. OLS Results for Fiscal Policy and Output Volatility

Dependent Variable : $\Delta\sigma^{\ln Y}_t$	
Regressors	Coefficient
Intercept	-0.320 (0.239) -0.175
Volatility of fiscal policy	0.560** (0.230) [2.425]
Government Size	0.020 (0.155) [0.131]
Openness of trade	0.003 (0.010) [0.301]
R-Squared	0.15
N	38

Note: ***,** and * denotes 1,5 &10 percent level of statistical significance. The OLS estimates used annual data from 1974-75 to 2011-12. Parenthesis indicates Standard error and square packets are t-values.

V. Fiscal Rule and Room for Fiscal Policy Volatility

After identifying the positive relationship between output volatility and fiscal policy volatily, it is important to know that whether the existing fiscal rule is effective. From the previous section it is clear that limiting the use of discretionary fiscal policy is a channel via which fiscal rules could be potentially reduces output volatility. It is unclear however, whether the fiscal rule introduced have actually achieved a reduction in the use of discretionary fiscal policy. This issue has been recently analysed by Badinger (2009) in OECD countries and found that many of the fiscal rule introduced since 1990 had reduced the use of discretionary fiscal policy. Similarly, Brzozowski et.al (2010) have analysed the impact of explicit and explicit debt rule on fiscal policy volatility and found that fiscal rule had significant fiscal policy volatility and the increase and decrease in policy volatility is based on the target of debt or fiscal balances.

To empirically verify the hypothesis that fiscal policy volatility is influenced by fiscal rule we use quarterly data. We use a proxy for institutional frame work: a dummy denoting the presence of fiscal rule containing revenue deficit equal to zero. The estimated equation is of the form:

$$\sigma_t^{GC} = \alpha + \beta_1 Y_t + \delta_2 \sigma_t^Y + \phi_3 F\_RULE_t + \gamma_4 G\_SIZE_t + \varpi_5 OPEN_t + \varepsilon_t \text{ -------- (3)}$$

Where σ_t^{GC} volatility of fiscal policy is measured by the standard deviation of residuals of equation (1) and σ_t^Y is output volatility. Government size (G_SIZE) and openness of trade (OPEN) are used as the control variables. We use quarterly data from 1996-Q4 to 2012 –Q4. In India, the Fiscal Responsibility and Budget Management (FRBM) Act 2003, was effective from July, 1 2004. The Dummy variable is equal to zero for prior to implementing fiscal rule (from 1996-q4 to 2004-q1) and 1 for the period after 2004-q2 to 2012-q4. The control variable includes growth rate of output (GDP at Factor cost), logarithm of volatility of output (Standard deviation of growth rate of GDP, Government Size and Openness of trade. The time period chosen is arbitrary, but long enough to have meaningful result. Since the fiscal rule in India is a recent fiscal policy initiative, the use of quarterly data allows us to pursue a more formal approach to test the effectiveness of fiscal rule on volatility of discretionary fiscal policy.

Table: 3. OLS Results of Fiscal Rule and Fiscal Policy Volatility

Dependant Variable : **Volatility of Government Consumption Spending**	
Regressors	Co-Efficient
Growth Rate of Output	0.0124 (0.014) [0.896]
Volatility of Output	-0.021 (0.023) [-0.896]
Fiscal Rule	-0.093 (0.0634) [-1.466]
Government Size	0.0054 (0.0054) [0.987]
Openness of Trade	-0.002 (0.002) [0.998]
Intercept	0.327*** (0.104) [3.158]
R-Squared	0.35
D.W.	1.62
Second Order Serial Correlation	F (2, 56) 0.859 (0.430)
Ramsay RESET	F(1, 57) 0.202 (655)
ARCH	F(5, 55) 1.182 (329)
N	64

Note: ***,** and * denotes 1,5 &10 percent level of statistical significance. The OLS estimates used quarterly data from 1997-Q1 to 2012-Q4. Parenthesis indicates Standard error and square packets are t-values.

The estimated results for the relationship between fiscal policy volatility and fiscal rule are presented in table.3. From the theoretical perspective the sign of the relationship between fiscal rule and volatility of output can go either way. The results show that the volatility of fiscal policy did not responded significantly to fiscal rule. An inference from the result is that the aggressive use of fiscal policy is not constrained by fiscal rule in India. None of other control variables are significant to fiscal policy volatility. The diagnostic test statistics are also presented in the table. It shows that there is no first order and second order

serial correlation in the residuals and the Ramsay RESET test statistic indicates that the model is correctly specified. There is no ARCH effect in the error term.

VI. Conclusions

The paper provides an empirical evidence on the effects of fiscal rule (fiscal constraint) on fiscal policy volatility. We demonstrate that the fiscal policy is more persistent rather than responsive to economic conditions. As expected, we find a destabilising macroeconomic effect of aggressive use of discretionary fiscal policy. Empirically, we found that a 1 percent reduction in fiscal policy volatility leads to 0.56 percent decline in output volatility. We did not find any evidence in favour of the findings of Badinger (2009) and Brzozowski (2010) that fiscal rule can have potential benefits in reducing aggressive use of discretionary fiscal policy. The study found evidence that the use of discretionary fiscal policy has not significantly reduced since the introduction of fiscal rule in India.

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