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Sovereign Debt Management and Monetary Policy in India: An Empirical Investigation of Conflict of Interest Argument

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Abstract

Based on the conflict of interest argument, separation of SDM from Reserve Bank of India (RBI) has often been suggested, as both these functions vest with RBI. The main thrust of this argument is that cost minimisation for government's market borrowing programme might be deterring the Reserve Bank from increasing the interest rates and in the process, it might be compromising with its core mandate of price stability. In this study, we try to verify empirically the tenability of the arguments of conflict of interest between SDM and monetary management in India, wherein both the operations are vested with the Central Bank, estimating monetary policy reaction function in a VAR framework. In this regard, we investigate whether the Government market borrowings have statistically significant influence on the monetary policy reaction function taking monthly data on the policy target rate as dependent variable and inflation, output gap and government market borrowing explanatory variables from April 2004 to December 2011. We also estimate the above relationship taking quarterly data from 2000:Q1 to 2011:Q4 to corroborate the results of estimation done with monthly data. The call rate, which is operating target for monetary policy, has been taken as proxy of policy rate. We find that level of government market borrowing does not explain the statistically significant portion of forecast error variation of the policy operating target rate. Further, the results of Impulse Response Function (IRF) demonstrate that response of policy operating target rate to one Standard Deviation (SD) innovation in the government market borrowing remains statistically insignificant and furthermore, direction of the response is opposite to the conflict of interest argument. Based on the VAR Granger Causality results, we find out that government market borrowing does not Granger cause the policy operating rate. The results of all tests in VAR, i.e., variance decomposition, IRF, and Granger Causality display that the response of the policy rate to the Government market borrowing is not statistically significant and hence, we conclude that the aforementioned conflict of interest argument is not tenable. In the above backdrop, the separation of SDM from Reserve Bank to a Public Debt Management Agency, for which the process is already underway, could be justified by other policy imperatives, if any, but not by usual conflict of interest argument.

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1. Introduction

Over the last two decades, the sovereign debt management (SDM) has been separated from the Central Bank to a specialized Debt Management Office (DMO) in many OECD countries and emerging market economies (EMEs). The separation of SDM, especially in OECD countries, such as the United Kingdom, was conditioned by a significant decline in the debt levels. Contextually, it has been advocated that the SDM should be separated from monetary management to improve the efficacy of the monetary policy in accomplishing its core objective of price stability. This argument is primarily based on the principle of one objective-one institution for better management and optimal outcome and the perceived conflict of interest between SDM and monetary policy which would impact the efficiency of central bank functions. In case of the conflict of interest argument, it is presumed that Central Bank may try achieving the cost minimisation objective of SDM over the short-term and in the process, may abandon requisite policy rate hike and thereby compromising on its primary objective of price stability.

It could be argued that operationally this perceived conflict of interest gets resolved automatically as SDM aims at cost minimisation over the medium to long term, while monetary policy operates over the short-term to anchor the inflationary expectations. Thus, it is plausible to argue that the Central Bank is equipped to achieve the main objective of SDM, *i.e.* meeting the government's financing needs and its payment obligations at the lowest possible cost over the medium to long run subject to a prudent degree of risk, without compromising on its primary objective of price stability. Furthermore, in certain circumstances where financial markets are shallow and fiscal deficit is high requiring large market borrowing, the Central Banks are better equipped for SDM along with monetary policy. In fact, there may be a confluence of interest between SDM and monetary policy, both helping each other, in such circumstances. In this context, the IMF and World Bank (2003) guidelines on SDM enunciate that there should be a separation of debt management and monetary policy objectives and accountabilities but with a condition that where the level of financial development allows such separation.

The debate on separation of SDM from the Central Bank has once again engaged attention of policy makers due to the strain on SDM during the recent global crisis especially in Euro area. Some scholars have put forward the arguments favouring SDM with the Central Bank. In this regard, Goodhart (2010) mentions that the debt levels in several countries, where SDM is separated from the Central Bank to a specialized DMO, witnessed sharp rise in the last few years and debt management is again becoming a critical element in the overall conduct of policy. Therefore, the debt management can no longer be viewed as a routine function which can be

delegated to a separate independent body[1]. Further, he argues that during the coming epoch of the Central Banking, they should be encouraged to revert to their role of managing the national debt[2].

In this study, we empirically examine whether government market borrowings influence monetary policy decisions, thereby resulting in the conflict of interest between SDM and monetary management in India wherein both the operations are vested with the Central Bank. We investigate whether the Government market borrowings have statistically significant influence in the monetary policy reaction function. The scheme of the study is as follows. Section 2 details the approach and recommendations of the various expert groups/ committees on separation of SDM from monetary management in India and also contests the validity of the underlying assumptions for recommending the separation. Section 3 gives an account of the SDM framework evolved over the years, while theoretical underpinnings on the argument of conflict of interest between debt management and monetary policy are given in Section 4. The empirical findings regarding conflict of interest between debt management and monetary policy are furnished in Section 5. Section 6 contains conclusions.

2. SDM and Monetary Management: Expert Groups/Committees

In the Indian context, various expert groups/ committees have recommended the separation of SDM from the monetary management over the last two decades. For example, the Committee on Capital Account Convertibility (1997) recommended that steps should be initiated to separate the debt management policy from monetary management and to this effect the Government should set up its own Office of Public Debt; RBI should totally eschew from participating in the primary market of Government borrowing. The Committee on Fuller Capital Account Convertibility (2006) also recommended that for an effective functional separation enabling more efficient debt management as also monetary management, the Office of Public Debt should be set up to function independently outside the RBI. The Working Group on Separation of Debt Management from Monetary Management (1997) recommended that the two functions should be separated and a company be established under the Indian Companies Act to take over the debt management functions (RBI, 2011).

The Internal Expert Group on the Need for a Middle Office for Public Debt Management (2001) set up by the Ministry of Finance, Government of India examined the need for a comprehensive strategy for public debt management

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[1] Instead, such management lies at the cross-roads between monetary policies (both inflation targets and systemic stability) and fiscal policy (Goodhart, 2010).
[2] When markets get difficult, and government bond markets are likely to do so, the need is to combine an overall fiscal strategy with high-caliber market tactics. The later is what Central Banks have as their métier.

involving an integrated approach towards both domestic and external debt. The Expert Group recommended setting up of a Middle Office in the Ministry of Finance to develop a comprehensive risk management framework at the first stage, while an autonomous Public Debt Office (PDO) be set up at the second stage. Further, it recommended that the second stage would involve a phased approach for setting up an autonomous PDO under a Public Debt Act of the Parliament and the debt management functions performed independently by different wings of the Ministry of Finance and RBI would be gradually integrated into PDO. The Expert Group's recommendation of setting up an autonomous PDO stemmed mainly from the concern regarding conflict of objectives between debt management and monetary management.

The report on the Ministry of Finance for 21st Century (Chairman: Dr. Vijay Kelkar) emphasised the need for fiscal consolidation and recommended setting up a National Treasury Management Agency (MoF, 2004).

The High Level Committee on Financial Sector Reforms (2008), headed by Raghuram Rajan, while examining the next generation of reforms in the financial sector in India, advocated changing the structure of public debt management, particularly in a way that minimises financial repression and generates a vibrant bond market. Further, the report, referring to several expert committees commenting on the undesirability of burdening RBI with the task of selling bonds for the government, mentioned that this arrangement involves a conflict of interest, since the government would benefit from lower interest rates, which the RBI has some control over. Investors in the bond market may also perceive the sale of bonds by RBI to be informed by a sense of how interest rates will evolve in the future and finally, RBI is the regulator of banks and banking supervision could be distorted by the desire to sell bonds at an attractive price. The report also flagged that establishing independent DMOs is now considered best practice internationally and DMO needed to be created as was announced in the Union Budget 2007-08. The report's argument for establishing DMO mainly dwelled upon the presumption of the conflict of interest between debt management and monetary policy.

Internal Working Group on Debt Management (2008) constituted by the Ministry of Finance, to analyse how best to move forward on establishing a DMO following the announcement in Union Budget 2007-08, weighed three key issues: *consolidation*, *conflicts of interest* and *financial repression* while working out a roadmap for separation of debt management in its report. With regard to conflict of interest, the report underlined a severe conflict of interest between setting the short term interest rate (*i.e.*, the task of monetary policy) and selling bonds for the government. The report argued that if the Central Bank tried to be an effective debt manager, it would lean towards selling bonds at high prices, *i.e.*, keeping interest rates low and this

could lead to an inflationary bias in monetary policy. Further, it is argued that where the Central Bank also regulates banks, as in India, there is a further conflict of interest. In this regard, the Central Bank tries to do a good job of discharging its responsibility of selling bonds by mandating banks to hold a large amount of government paper. Having a pool of captive buyers undermines the growth of a deep, liquid market in government securities, with vibrant trading and speculative price discovery. This, in turn, hampers the development of the corporate bond market – the absence of a benchmark sovereign yield curve makes it difficult to price the corporate bonds. Therefore, the Report recommended separation of debt management from the functions of RBI.

The majority of the members in the Committee on Financial Sector Assessment (CFSA) (2009) concurred with the proposal to set up a DMO. The Chairman (Dr. Rakesh Mohan), however, personally viewed that the time was not ripe for the complete separation of debt management at the current juncture for the following reasons: (i) the high level of fiscal deficit along with an extremely high level of overall government debt to GDP ratio; (ii) setting up the DMO under the Government may lead to a conflict of interest between the Government's role as a debt manager and its status as the owner of a substantial portion of the banking sector; iii) even after separating the debt and monetary management roles, the management of government debt, regulation of the banks and monetary policy will continue to be inter-linked; (iv) the difficulty in harmonising the operations of debt issue redemptions, Statutory Liquidity ratio (SLR) maintenance and Market Stabilisation Scheme (MSS), as is being done at present; (v) practical difficulties in setting up new government authorities; (vi) the Reserve Bank has the advantage of the large size of its staff and expertise that has been developed in managing, *inter alia*, debt management operations over the years; and (vii) it may not be appropriate for a Central Government authority to also do State Government debt management.

Notwithstanding various groups/ committees favouring separation of debt management from central bank, the unfolding of events during the recent crisis and post crisis period raised questions on SDM by an independent DMO. In this regard, Goodhart (2010) articulates that debt management is again becoming a critical element in the overall conduct of macroeconomic policy and hence, central Banks should be encouraged to revert to their role of managing the national debt. In the Indian context, Subbarao (2011) argues that the size and dynamics of the government borrowing programme has a much wider influence on interest rate movements, systemic liquidity and even credit growth and hence, the management of public debt has necessarily to be seen as part of broader macroeconomic framework involving various trade-offs. On balance, as long as there are institutionalised mechanisms to negotiate various trade-offs in a given context within

the overarching objectives of achieving monetary and financial stability, separation of debt management from the Central Bank seems to be a sub-optimal choice.

3. Evolution of SDM Framework in India

In India, the Public Debt was managed by RBI since its inception as it was the Bank's statutory responsibility under the RBI Act, 1934. The Government of India and RBI signed a Memorandum of Understanding (MoU) on April 5, 1935 detailing, *inter alia*, the functional responsibilities of the RBI in debt management.

When RBI took over the management of public debt from the Controller of the Currency in 1935, the total funded debt of the Central Government amounted to Rs. 950 crores which grew to Rs. 26 lakh crore at the end of March 2011. Several reforms have been initiated since 1991 and fiscal correction and consolidation constituted the agenda of the macroeconomic reforms. The broad-based auction system was introduced in 1992 which ensured Central Government's market borrowings at market-related rates. The Principal Agreement signed in 1935 was supplemented by two Supplemental Agreements in 1994 and 1997. The first Supplemental Agreement related to the modalities for phasing out of *ad hoc* Treasury Bills while the second Supplemental Agreement related to the replacement of *ad hoc* Treasury Bills with Ways and Means Advances (WMA). The establishment of the electronic platform for bidding in the primary market and anonymous trading in the secondary market by way of the Negotiated Dealing System- Order Matching (NDS-OM) has imparted transparency in the government securities market and has made possible dissemination of trade-related information on a real time basis. The introduction of delivery vs. payment (DvP) in the government securities market removed the settlement risk in the government securities market. Dematerialised holding of government securities in the form of Subsidiary General Ledger (SGL) in the RBI was introduced to enable holding of securities in an electronic book entry form by participants. Efforts were also made to broaden the investor base and introduce new instruments such as Zero Coupon Bonds, Capital index bonds, floating rate bonds, STRIPS etc. thereby enhancing the depth and breadth of the G-Sec market.

The Reserve Bank ceased to participate in the primary market effective April 1, 2006 under the Fiscal Responsibility and Budget Management (FRBM) Act, 2003. A system of market intermediaries in the form of primary dealers (PDs) was made functional in 1996 with the objectives of strengthening the securities market infrastructure, improving the secondary market liquidity in government securities and supporting the market borrowing programme of the Government. The PD system was revamped in 2006 to ensure more active participation of PDs replacing RBI as

the underwriter of the last resort on account of FRBM provisions. Despite the significant increase in market borrowings during the recent years in the aftermath of the global financial crisis to finance higher expenditure requirements, the Reserve Bank has been able to raise resources from the market in a non-disruptive manner.

4. Theoretical Underpinnings

Theoretically, it has been articulated that mandating single objective to an institution is the optimal arrangement in terms of final outcome. Based on the above argument, the interaction between debt management and monetary policy has been dealt at length in the extant literature from conflict of interest perspective, which essentially means that both debt management and monetary policy, if entrusted to a single institution, could cross each other's territory undermining their respective operations and desired outcome. The conflict of interest and sub-optimal outcome is premised on the argument that central bank has one instrument, *i.e.*, interest rate and achieving two objectives with one instrument will always be sub-optimal. In fact, the argument goes that the central bank, at times, may have to decide about the policy instrument (*i.e.*, interest rate) to accomplish the contesting objectives, *e.g.*, containing inflationary expectations and cost minimisation on Government borrowings. For instance, during high inflation period, the prime objective of the monetary policy to achieve price stability would necessitate the interest rate hike by the central bank, while at the same time the cost minimisation objective of the debt management would warrant the central bank not to raise the interest rates. Thus, in this process, the central bank may end up compromising its primary objective of price stability. In this regard, Togo (2007) underlines that the core objective of the monetary policy is to control inflation but if it was also responsible for debt management, it may be tempted to hold interest rates low[3]. He further argues that separation of debt management from monetary policy can help avoid such conflicts, real or perceived, and can improve policy credibility. The contrarian view regarding this could be that the perceived conflict of interest between monetary policy and debt management could be managed by entrusting these competing objectives to different departments in the same organisation (*i.e.*, central bank) and institutionalising arms length distance between them, which is largely a case in India.

Another argument put forth in the literature is debt management and monetary management policies could help each other in achieving their respective objectives. For example, Lucas and Stokey (1983), Persson and Svensson (1984), Calvo and Guidotti (1990) and Missale and Blanchard (1994) argued that debt composition can

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[3] This will help to keep debt servicing costs low, but risks the possibility of higher inflation in future. Alternatively, the monetary authority may be tempted to issue inflation indexed debt to enhance their policy credibility, but raises the risks of increasing debt service volatility.

ensure the time-consistency of anti-inflation policies when there are commitment problems. In particular, by issuing assets and liabilities that would not generate benefits for the government from surprise inflation, the government can commit to price stability.

The operations of public debt management including quantity, maturity, instruments, etc could have serious implications for monetary policy transmission. During the recent financial crisis, a unique phenomenon with debt managers increasingly shifting their borrowing strategies towards short term debt was witnessed in a number of countries in the backdrop of unprecedented rise in their borrowing needs. In this regard, Hoogduin, *et al* (2010) mentioned that the potential for interaction between public debt management and monetary policy has increased due to the increase in short term debt, but also as central banks have purchased government bonds in the secondary market as part of unconventional monetary policies.

The contrarian argument is that independent DMO often gets overboard with the cost minimisation objective over the short-term and debt management policy weighing more towards cost minimisation could hinder the monetary policy transmission (which operates at shorter end). During the recent global crisis, the debt managers across many countries had resorted to more short-term borrowings to fund the enlarged gross fiscal deficit (GFD) in the wake of increasing preference of investors for short-term debt. Blommestein and Gok (2009) underlined that tight liquidity conditions and the rapid increase in borrowing requirements coupled with the high demand for safe assets forced the debt mangers in OECD area to change their borrowing strategies towards larger issuance of short-term instruments with an original maturity of up to one year[4]. Thus, increased usage of short-term debt for Government market borrowing coupled with large purchasing of Government bonds in secondary markets by the central banks during the recent global crisis had heightened the potential interaction between debt management and monetary policy. The increasing reliance of the debt managers on short-term maturities could result in the Sovereigns becoming a major player in the money market and in turn, affecting the interest rate environment and monetary policy transmission. For example, monetary policy adopts an expansionary stance and accordingly, decreases the policy rates targeting the overnight interest rate but the debt manager's action of issuing short-term securities with maturities up to one year in large quantity in an attempt to minimise the cost simultaneously may put upward pressure on the interest rate in the money market. Hoogduin, *et al* (2010) argues that with Sovereign becoming larger player in the money market might increase and complicate the steering of interest rates by monetary authorities. Additionally, cost minimisation

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[4] The share of short-term debt in the total borrowing had jumped from 65 per cent in 2007 to nearly 70 per cent in 2008. The sharp increase in issuance of short-term instruments has resulted in lower average maturities of debt portfolios with more challenging repayment schedules.

through issuance of more short-term instruments may turn out to be costly over medium to long term; the standard debt management guidelines also recommend cost minimisation subject to prudent risk over medium to long long-run. In this regard, Piga (2001) states that although expected cost minimisation requires issuing short-term debt, reducing maturity of debt entails higher interest rate and refinancing risk[5]. Debt managers' behaviour under the extant interest rate environment, therefore, remains pivotal for monetary policy transmission, as in an environment of steep yield curve, the debt managers may tempt to opt for more short-term borrowings. Hoogduin, *et al* (2010) empirically investigated the policy response of the debt managers in the Euro area in terms of share of short-term borrowing (original maturity up to one year) to the yield curve. It was found that the share of short-term debt responds to the yield curve or the level of interest rates, in line with the objective of cost minimisation and the response has further strengthened since the onset of the recent global crisis.

Nonetheless, this theoretical argument about conflict of interest between monetary policy and debt management, when both are entrusted with the central bank, needs to be empirically tested.

5. Empirical Findings

We empirically test the aforementioned perceived conflict of interest between monetary policy and debt management by estimating the augmented monetary policy reaction function taking overnight rate (CALL), which is the operating target rate for monetary policy in India, as dependent variable and government market borrowing (GMB) as explanatory variable, along with other standard explanatory variables, *viz.*, inflation (P), and industrial output gap (OG). Essentially, we try to find out empirically whether the government market borrowing programme undertaken by RBI influences its monetary policy decisions, in turn, compromising its primary objective of price stability. In this regard, some people have been arguing that monetary policy in India may not increase the interest rate to contain the inflation/ inflationary expectations due to the cost consideration of the government market borrowing programme. In fact, this remained one of the main presumptions for various expert groups to suggest the separation of debt management from RBI. To estimate the monetary policy reaction function, we use monthly data for the aforementioned variables. As all other variables are in percentage, the GMB has been transformed in to log form. In estimation, we use the monthly data from April 2004 to September 2011, taking into account the Fiscal Responsibility and Budget

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[5] If these risks materialize, governments will be forced to bear considerable increases in debt servicing cost.

Management Act, 2003, which debarred RBI from participating in the primary auction of the Government market borrowing.

5.1 Methodology

There is a battery of unit root tests to investigate the unit root properties of the time series. However, we use Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests to find out whether the time series to be used for VAR estimation are stationary or not. ADF framework to check the stationarity of time series has been given in following equation:

$$\Delta x_t = \beta_1 + \beta_2 t + \theta x_{t-1} + \alpha_i \sum_i^n \Delta x_{t-1} + \varepsilon_t \qquad (1)$$

Where ε_t is white noise error term and this test basically determines whether the estimates of θ are equal to zero or not. However, these tests seem to over-reject the null hypotheses when it is true and accept it when it is false for small sample data set. The findings of ADF test have been corroborated with PP unit root tests.

PP unit root test differs from ADF test mainly in how they deal with serial correlation and heteroskedasticity in errors. Particularly, where the ADF tests use a parametric autoregression to approximate the ARMA structure of the errors in the test regression, the PP test ignores any serial correlation. The test regression for the PP test is:

$$\Delta y_t = \beta'^{D_t} + \pi y_{t-1} + \epsilon_t \qquad (2)$$

Where ϵ_t is I(0) and may be heteroskedastic. The PP test corrects for any serial correlation and heteroskedasticity in the errors ϵ_t of the test regression directly modifying the test statistics.

We use VAR framework, provided by Christopher Sims (1980), to estimate the monetary policy reaction function to the Government market borrowing. A VAR framework is an n-equation, n variables linear model in which each variable is explained by its owned lagged values, plus current and past values of the remaining (n-1) variables. The basic ρ-lag VAR framework could be written in the following form:

$$Y_t = c + \Pi_{t-1} + \Pi_{t-2} + \Pi_{t-3} + \cdots\cdots\cdots + \Pi_{t-p} + \varepsilon_t, \; t = 1, \ldots\ldots\ldots, T \qquad (3)$$

Where $Y_t = (y_{1t}, y_{2t}, \ldots\ldots, y_{nt})$ denotes an (n×1) vector of time series variables and Π_i are (n×n) coefficient matrices and ε_t is an (n×1) unobservable zero mean white noise vector process with time invariant covariance matrix $\sum$. Further, a bivariate VAR framework equation by equation has the following form:

$$\begin{pmatrix} y_{1t} \\ y_{2t} \end{pmatrix} = \begin{pmatrix} c_1 \\ c_2 \end{pmatrix} + \begin{pmatrix} \pi^1_{11} & \pi^1_{12} \\ \pi^1_{21} & \pi^1_{22} \end{pmatrix} \begin{pmatrix} y_{1t-1} \\ y2_{2t-1} \end{pmatrix} + \begin{pmatrix} \pi^2_{11} & \pi^2_{12} \\ \pi^2_{21} & \pi^2_{22} \end{pmatrix} \begin{pmatrix} y_{1t-1} \\ y2_{2t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix} \qquad (4)$$

Where cov(ε_{1t}, ε_{2t}) = σ_{12} for t=s; 0 otherwise. It may be noticed that each equation has the same regressors- lagged values of y_{1t} and y_{2t}. Thus, the VAR(p) model is just a seemingly unrelated regression (SUL) model with lagged variables and deterministic terms as common regressors.

5.2 Results

The results of unit root tests, reported in Appendix Table 1, exhibits that null hypothesis of unit root is rejected in case of all variables at level. After ascertaining that all variables are I(0), *i.e.*, stationary (mean reverting), we find out the lag structure using different inflation criterions before estimating VAR structure. We use three information criterions, *viz.*, Akaike information criterion (AIC), Schwarz information criterion (SIC), and Hannan-Quinn information criterion (HQ). It is found that AIC supports lag order at two, while other two SC and HQ support lag order at one (Appendix Table 2).

Based on the majority rule, we take lag order of one while estimating VAR model for the aforementioned monetary policy reaction function. The main objective of estimating the monetary policy reaction function in a VAR framework is to ascertain whether the level of government market borrowing influence the monetary policy decision about policy rate change. More specifically, we try to find out whether monetary policy decides not to increase its policy rate in order to keep cost of government borrowing low and in turn, compromise with the objective of containing inflation/inflation expectations.

The forecast error variance decomposition of the CALL, which is the operating target for the monetary policy in India, with respect to other explanatory variables have been estimated in the VAR model. The results furnished in Table 1 below show that largest forecast error variation in CALL is explained by its lagged value, followed by P. The results further show that LGMB explains an insignificant portion of forecast error variation (*i.e.*, about 1.7 per cent) in CALL. The contribution of the lagged value of CALL in its forecast error variation decreases from about 99 per cent in the 2nd period to about 80 per cent in the 15th period, while the contribution of P increases from about 0.3 per cent in the 2nd period to about 14 per cent in the 15th period. OG's contribution in forecast error variation of CALL increases from 0 per cent to about 5 per cent during this period.

Table 1: Variance Decomposition of Call

Period	S.E.	CALL	P	OG	LGMB
1	1.3	100.0	0.0	0.0	0.0
2	1.6	98.9	0.3	0.0	0.8
3	1.7	97.6	1.1	0.0	1.3
4	1.8	96.1	2.3	0.1	1.6
5	1.9	94.3	3.7	0.3	1.7
6	1.9	92.3	5.3	0.7	1.8
7	1.9	90.3	6.8	1.1	1.8
8	1.9	88.3	8.3	1.6	1.8
9	2.0	86.5	9.6	2.1	1.8
10	2.0	84.8	10.7	2.7	1.8
11	2.0	83.4	11.7	3.2	1.8
12	2.0	82.2	12.4	3.7	1.7
13	2.0	81.1	13.1	4.1	1.7
14	2.0	80.2	13.6	4.4	1.7
15	2.1	79.5	14.0	4.8	1.7

Furthermore, the impulse response of CALL to one Standard Deviation (SD) innovation (+/- 2.5) in LGMB is insignificant (Chart 1); in fact, the response of CALL is meagre and that also dissipates completely by the 10th period. It is imperative to mention here that as per the conflict of interest argument, the CALL should either not respond or respond negatively to the positive innovation in LGMB to reduce the cost of borrowing, while response of the CALL has been found other way around but that too insignificant.

We also estimate the VAR Granger Causality to find out whether LGMB causes the CALL. The results in Table 2 reject the null hypothesis of LGMB granger causing CALL, which means that LGMB has not influenced the CALL. As per the results, only P is found to be Granger causing CALL at 10 per cent level of significance.

Table 2: VAR Granger Causality/Block Exogeneity Wald Tests

(Sample: 2004M04 2011M05, Included observations: 85)

Null Hypothesis	Chi-square statistics (Statistic level of significance)	Result: Reject/ Accept the Null
1	2	3
P does not cause CALL	3.98 (0.04)	Reject
OG does not cause CALL	0.02 (0.87)	Accept
LGMB does not cause CALL	1.14 (0.28)	Accept

The results of all tests in VAR, *i.e.*, variance decomposition, impulse response function, and Granger causality demonstrate that the response of the CALL to the LGMB is not statistically significant.

Alternative Estimation

The above results show that response of CALL is not only found statistically insignificant to LGMB but also to OG. The response of CALL to OG is not consistent with recent empirical studies on monetary policy reaction function, which find that monetary policy responds to both inflation and output gap. Therefore, to verify our above results, we estimate the augmented monetary policy reaction function in VAR framework with quarterly data on call rate (CALL), inflation (P), output gap (OG), and log of Govt market borrowings (LGMB). We use GDP growth gap i.e., trend growth minus actual growth for OG in estimation, instead of industrial output gap which was used in earlier estimation to represent OG in the absence of monthly GDP data. Data has been used from 2000:Q1 to 2011:Q4.

Although all the variables are found stationary (Appendix Table 3), CALL is found weak stationary as null hypothesis of unit root is rejected at 10 per cent level of significance. Further, the lag for VAR estimation has been selected at one based on SIC (Appendix Table 4).

The results of forecast error variance decomposition of the CALL with respect to its own lagged values and other explanatory variables, furnished in Table 3 below, reveal that largest variation in CALL is explained by its lagged value, followed by P and OG. The contribution of LGMB to the forecast error variation of CALL is found negligible. The contribution of P and OG in the forecast error variance of Call increases from each about 2 per cent in period 1 to about 13 per cent and 12 per cent, respectively by 10th period. At the same time, LGMB is found explaining insignificant portion of variation in CALL (*i.e.*, about 1 per cent). The results of forecast error variance decomposition in alternative estimation are found consistent with the same in earlier estimation with respect to LGMB explaining insignificant variance in CALL, while the contribution of OG to variance of CALL is found significant contrary to the results of earlier estimation where the contribution of the same is insignificant.

Table 3: Variance Decomposition of Call

Period	S.E.	CALL	P	OG	LGMB
1	1.109656	100.0000	0.000000	0.000000	0.000000
2	1.436512	96.36888	2.038172	1.550988	0.041964
3	1.626932	91.54270	4.705771	3.712919	0.038607
4	1.748359	86.80284	7.217970	5.860960	0.118232
5	1.827972	82.73096	9.284223	7.711887	0.272926
6	1.880152	79.54209	10.83744	9.162910	0.457555
7	1.913814	77.22708	11.92159	10.21671	0.634621
8	1.935003	75.65888	12.62747	10.93049	0.783160
9	1.947954	74.66717	13.05519	11.38156	0.896079
10	1.955628	74.08444	13.29428	11.64615	0.975129

The impulse response of CALL to one Standard Deviation innovation (+/- 2.5) in LGMB is insignificant and that also dissipates completely by the 10th period (Chart 2). The results of VAR Granger Causality shows that the null hypothesis of LGMB granger causing CALL is rejected, which means that LGMB has no statistically significant influence on the CALL (Table 4). As per the results, only P is found to be Granger causing CALL at 10 per cent level of significance, like the results of VAR Granger Causality in earlier estimation.

Table 4: VAR Granger Causality/Block Exogeneity Wald Tests
(Sample: 2000Q1 2011Q4, included observations: 4)

Null Hypothesis	Chi-square statistics (Statistic level of significance)	Result: Reject/ Accept the Null
1	2	3
P does not cause CALL	3.43 (0.06)	Reject
OG does not cause CALL	1.51 (0.21)	Accept
LGMB does not cause CALL	0.04 (0.85)	Accept

In the alternative estimation also, the results of all tests in VAR, *i.e.*, variance decomposition, impulse response function, and Granger causality are found to demonstrate that the response of the CALL to the LGMB is not statistically significant.

6. Conclusion

Based on the conflict of interest argument, separation of SDM from RBI has often been suggested as both these functions vest with RBI. The main thrust of this argument is that cost minimisation for government's market borrowing programme

might be deterring the Reserve Bank from increasing the interest rates and in the process, it might be compromising with its core mandate of price stability. On the contrary, we feel that there might be a confluence of interest between SDM and monetary policy, both helping each other, especially in extraordinary circumstances such as the recent global crisis. Nonetheless, many expert groups in the past have recommended the separation of the SDM from RBI and the process in this regard has already been initiated by the Government with setting up of a Middle Office. Furthermore, the Union Budget 2011-12 announced to introduce the Public Debt Management Agency Bill.

In this study, we have attempted to verify empirically the issue of the conflict of interest between SDM and monetary management in India wherein both the operations are vested with the Central Bank. We have estimated an augmented monetary policy reaction function in a VAR framework to investigate whether the Government market borrowings have any statistically significant influence on the policy rate, taking monthly data from April 2004 to September 2011 on policy operating target rate, inflation, industrial output gap, and government market borrowing. We have found that level of government market borrowing does not explain the statistically significant variation in the policy operating target rate. Moreover, the results of Impulse Response Function demonstrate that response of the policy operating target rate to one SD innovation in the government market borrowing is found insignificant and further, direction of such response is found contrary to the conflict of interest argument (i.e., either policy operating target rate should not change or change negatively). Based on the VAR Granger Causality results, we also find out that government market does not Granger causes the policy operating target rate.

The results of all tests in VAR, *i.e.*, variance decomposition, impulse response function, and Granger causality display that the response of the policy operating target rate to the Government market borrowing is not statistically significant and hence, we conclude that the aforementioned conflict of interest argument is not tenable. In the above backdrop, we feel that the separation of SDM from Reserve Bank to a Public Debt Management Agency, for which the process is already underway, could be justified by other policy imperatives, if any, but not by usual conflict of interest argument.

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Appendix Table 1: Results of Unit Root/ Stationary Tests				
Variables	t-stat/ adj t-stat	Exact critical values		
		1% level	5% level	10% level
ADF Test				
CALL	-3.49***	-3.50	-2.90	-2.59
P	-2.68*	-3.52	-2.90	-2.59
OG				
LGMB	-7.59***	-3.51	-2.90	-2.59
PP Test				
CALL	-3.51***	-3.51	-2.90	-2.59
P	-2.60*	-3.51	-2.90	-2.59
OG				
LGMB	-7.72***	-3.51	-2.90	-2.59
Note: ***, **, and * denotes statistical significance at 1%, 5%, and 10% levels, respectively.				

Appendix Table 2: VAR Lag Order Selection			
Endogenous variables: call, p, og, and lgmb; and sample: 2004M04 to 2011M05.			
Lag	AIC	SC	HQ
0	17.64	17.76	17.69
1	14.41	15.02*	14.66*
2	14.24*	15.33	14.68
3	14.47	16.04	15.10
4	14.43	16.49	15.25
5	14.33	16.87	15.35
6	14.57	17.59	15.78
7	14.78	18.29	16.18
8	14.58	18.57	16.17

Appendix Table 3: Results of Unit Root/ Stationary Tests				
(Sample adjusted: 2001Q2 2011Q4)				
Variables	t-stat/	Exact critical values		
	adj t-stat	1% level	5% level	10% level
ADF Test				
CALL	-2.60*	-3.58	-2.93	-2.61
P	-4.95***	-3.58	-2.93	-2.61
OG	-2.86*	-3.58	-2.93	-2.61
LGMB	-4.86***	-3.58	-2.93	-2.61
DF Test				
CALL	-1.81*	-2.61	-1.95	-1.61
P	-4.99***	-2.61	-1.95	-1.61
OG	-2.05**	-2.61	-1.95	-1.61
LGMB	-2.35**	-2.61	-1.95	-1.61
Note: ***, **, and * denotes statistical significance at 1%, 5%, and 10% levels, respectively. OG: GDP growth gap.				

Appendix Table 4: VAR Lag Order Selection			
Endogenous variables: CALL, P, OG, and LGMB and sample: 2000Q1 2011Q4.			
Lag	AIC	SC	HQ
0	15.22483	15.38703	15.28498
1	13.41778	14.22877*	13.71853
2	13.01570	14.47550	13.55707*
3	12.90589*	15.01448	13.68785
4	12.92119	15.67857	13.94376

Chart1: Response of call to Cholesky One S.D. Innovations ± 2 S.E.
(Full Sample: 2004M04 to 2011M12)

Response of CALL to CALL

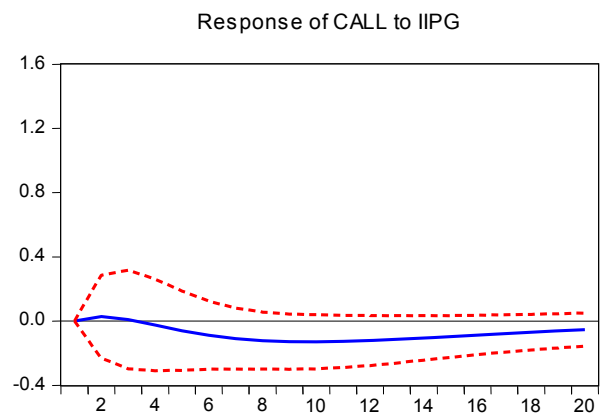Response of CALL to WPIIN

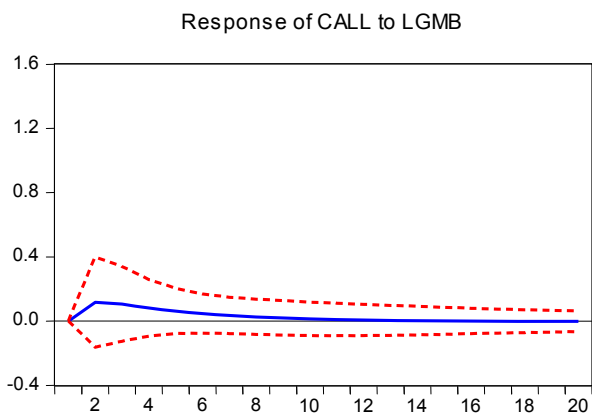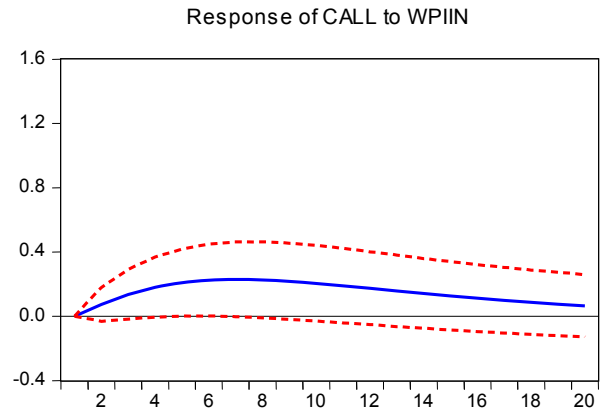Response of CALL to LGMB
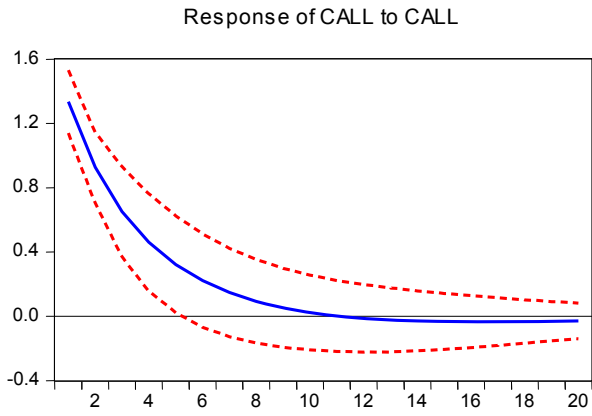
Response of CALL to IIPG

Chart 2: Response to Cholesky One S.D. Innovations ± 2 S.E.
(Full Sample: 2000Q1 to 2011Q4)