

MONETARY POLICY BEHAVIOUR IN INDIA

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The monetary policy of any country strives to achieve a balance between its goals of price stability and higher growth by using various monetary policy tools. In light of this, the aim of the study is to examine the monetary policy of the Reserve Bank of India for achieving these objectives using interest rate as a tool, in terms of Taylor equation for the period 1996Q1 to 2013Q3. The Autoregressive Distributed Lag bounds testing approach to cointegration is used for studying the monetary policy behavior. The paper also broadens the Taylor equation to incorporate the fiscal and open economy parameters as factors affecting monetary policy behaviour. The result suggests that the growth criterion is the most significant factor affecting the interest rate policy of the bank. It also finds inflation control and open economy volatility as important factors in the policy decision making but with lesser weightage. The fiscal parameter turns out to be insignificant. The findings suggest that the monetary policy decision making is growth enhancing.

Keywords: Monetary Policy, Inflation, Interest Rate

JEL classification: E31, E52, E43

1. Introduction

Often, the Monetary Policy (MP) is studied in the light of an optimal monetary policy. Its optimality is analysed in the context of maximisation of welfare, the ultimate goal. In other words, the goal is stabilising inflation at low level and maintaining growth rate. Different schools of thought like Keynesian, Monetarists, New-Classical and New-Keynesian have contributed to the study of optimal monetary policy. The New Keynesian models have focused on interest rate rules, especially Taylor rules. These rules specify how the central bank should adjust the nominal interest rate in response to changes in inflation gap and output gap. The Taylor rule compared the Federal Reserve's actual path of interest rate to the rule-based interest rate for the period 1987 to 1992 and since then, it has been used as a MP feedback rule.

In simple words, the Taylor rule explains the changes by the monetary authority to any deviations in its objectives from the trend and therefore, used to study the responsiveness of

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MP in order to track the correct rate of interest so as to rectify the deviations in the policy goals. The Taylor rule also forms the basis for following inflation targeting in many countries because maintaining perfectly stable inflation also stabilizes output and employment to the maximum desirable degree.

An analysis of an ideal MP feedback rule provides a valuable insight into Indian monetary policy behaviour as it has experienced significant shift in the policy instrument from the reserve requirements to interest rate. In light of the above rule-based criterion, the objectives of the present study are

- To broaden the Taylor equation by incorporating the fiscal policy and open economy parameters and check its applicability in India.
- To find out the interest rate responsiveness behaviour of the Reserve Bank of India (RBI) in terms of extended Taylor equation with respect to call rate for the period 1996Q1-2013Q3.
- To account for the most important factor affecting interest rate.

2. Review of Literature

A vast literature exists for analyzing the monetary policy behaviour of various countries. The MP of any country sets its objectives and chooses some MP tool for achieving these. In the post-reform period in India, the interest rate as MP tool has grown in importance. Many theoretical studies such as Taylor (1993, 2001), Clarida *et al.* (1999, 2000), Woodford (2001) and Giannoni and Woodford (2002, 2003) derive optimal monetary policy rules .

There are some multi-country studies on MP behaviour based on panel/cross-section data such as Mohanty and Klau (2004), Hu (2006), Fraga *et al.* (2003) while others such as Singh (2010), Banerjee and Bhattacharya (2008), Mishra and Mishra (2009, 2012), Banerjee and Bhattacharya (2008), Singh and Kalirajan (2006), Chand and Singh (2006), Patra and Kapur (2010), Bhattacharya and Patnaik (2014) focus on a single country like India.

There are a few studies which are based on closed economy such as Singh (2010), Banerjee and Bhattacharya (2008), Mohandas (2012), Chand and Singh (2006), RBI (2002), Ranjan *et al.* (2007) while Mohanty and Klau (2004), Singh and Kalirajan (2006), Jha (2008) etc. have focused on open economy.

The Woodford (2001) version of Taylor rule emphasized that the equation must be extended to include the impact of exchange rate changes on the interest rate. However, temporary changes in exchange rate must not prompt the monetary authority to adjust

interest rate. But Ball (2002) emphasized that if such changes are from the financial side, then adjustments must be made. On this ground, some studies introduced the exchange rate as a variable affecting the interest rate policy of the central bank. Mohanty and Klau (2004), Singh and Kalirajan (2006), Jha (2008), Bhattacharya and Patnaik (2014), Clarida *et al.*(2000), Hutchison *et al.*(2013) found exchange rate to be a significant factor in explaining the monetary policy behaviour. These open economy models differ from their closed counterparts as the task of monetary management is complicated since the real exchange rate affects both aggregate demand and inflation.

There have been further contributions in terms of extension of the Taylor equation. Zoli (2012) contended that the fiscal deficit can also influence interest rate as a policy variable of the monetary policy and hence, recommended to broaden the Taylor equation in this sense. Studies of Hu (2006), Chand and Singh (2006), Mishra and Mishra (2012), Zoli (2012) etc. have made use of the fiscal counterpart by including budget or fiscal deficit as a factor affecting interest rate. Some of the studies such as Mishra and Mishra (2009), Hu (2006) have empirically analysed the preconditions of introducing inflation targeting in the country and then made suggestions.

Studies vary in terms of the results of responsiveness of the interest rate to different macroeconomic variables. The interest rate responds to the output gap rather than the current inflation in studies of Chand and Singh (2006), R. Jha (2008), Banerjee and Bhattacharya (2008), Ranjan *et al.*(2007). Singh (2010) found output gap to be more relevant before the reform while inflation gap to be more relevant during the post-reform period.

Most of the above studies consider the Taylor equation, either to study the responsiveness of the interest rate as a MP tool or to study inflation targeting, hence showing the importance of the rule in the MP decision making process. The conflicting results can be explained by differences in the choice of variables, methodology and the sample period.

3. Theoretical Background

The interest rate responsiveness of the monetary policy is studied with the help of Taylor equation (1993), where interest rate responds to inflation gap and output gap as explained in the equation (1):

$$i_t = i_{t-1} + \beta_1(\pi - \pi^*) + \beta_2(y - y^*) \quad (1)$$

where, i_t is the short term interest rate in time period t ; $(\pi - \pi^*)$ is the inflation gap; $(y - y^*)$ is the output gap.

The Taylor rule as a rule of thumb proposes the values of both the coefficients of inflation gap and output gap to be positive. The rule recommends a relatively high interest rate or a tight monetary policy when inflation is above its target or when output is above its full-employment level in order to reduce inflationary pressure and a loose monetary policy in the opposite case.

4. The Model

The present study is based on Extended Taylor equation which incorporates both open market volatility and fiscal counterpart. The equation is explained below:

$$i_t = i_{t-1} + \beta_1(\pi - \pi^*) + \beta_2(y - y^*) + \beta_3 FD + \beta_4 FPR \quad (2)$$

where, FD is the Fiscal Deficit to GDP ratio and FPR is the Foreign Exchange Premium.

According to the chosen variables, the Taylor equation can be written in the form of following equation:

$$CR_t = CR_{t-1} + \beta_1 WPIg + \beta_2 GDPg + \beta_3 FD + \beta_4 FPR \quad (3)$$

where, CR is the call money interest rate; $WPIg$ is inflation gap; $GDPg$ is output gap; FD is the Fiscal Deficit to GDP ratio and FPR is the Foreign Exchange Premium.

In the above equation, all the exogenous variables are expected to positively influence the interest rate. An increase in the inflation gap ($WPIg$) or when the present inflation exceeds the target inflation level, the monetary authority is expected to raise the interest rate in order to reduce the divergence between the two. Similarly, an increase in the output gap ($GDPg$), that is, when the output level in the present period exceeds its potential level, the interest rate is expected to increase. This reduces the investment demand, reducing the production and thus the output gap. The impact of FD is explained by using the macroeconomic paradigms of the Keynesian arguments, where an increase in fiscal deficit puts pressure on interest rate and also leads to crowding out of private investment. FPR is the premium earned on foreign exchange when the spot futures exchange rate, with respect to the domestic currency, is trading at a higher spot exchange rate than it is currently. The higher domestic interest rate is then due to the opportunity cost of holding domestic currency against the foreign currency.

The present study differs from existing literature in the following novel ways. Firstly, it examines the Taylor equation in an extended form, incorporating some unconventional factors affecting interest rate in India. Secondly, the study uses most recent high frequency quarterly data for the Indian economy to analyse the MP behaviour in terms

of interest rate. Thirdly, it tests the data for any structural breaks, using multiple breaks technique, which has not been much explored in the literature on MP behaviour. Finally, it uses Autoregressive Distributed Lag (ARDL) model, which seems to be a methodological addition to existing literature in Indian context.

5. The Methodology

The present study uses the Autoregressive Distributed Lag (ARDL) co-integration technique to analyse the MP behaviour in India. This approach was proposed by Pesaran and Shin (1999) and further extended by Pesaran *et al.*(2001). It has an advantage of being applied to the variables of different order, i.e. a mix of I(0) and I(1) and also avoids loss of data due to use of differenced variables. Another advantage of ARDL is that, it gives both long-run and short-run relationship between the dependent and independent variables.

Before application of the ARDL model, the data is adjusted for seasonality using the ARIMA-model-based methodology of programs TRAMO and SEATS. The Breusch-Godfrey test is applied for checking the presence of both serial correlation and heteroscedasticity.

There are certain steps involved in using the ARDL model. The first step is to check for stationarity in order to ensure absence of I(2) variables(since in their presence, this technique is not applicable). However, it is also important to check and adjust the data for any structural breaks, which if not done, gives biased results in reporting stationarity. In this paper, the Bai- Perron (1998) technique of multiple structural breaks is used. In case any breaks are found, dummy variables are added in order to incorporate the impact of breaks.

After testing and adjusting for the structural breaks, stationarity test is applied for further empirical analysis. The Standard Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) tests are used to check the order of integration of variables.

The second stage checks for a long-run relationship among the variables using the Bounds test. The existence of co-integration is tested by the F - statistic test of the joint significance of the long-run coefficients. If the F -statistic value is above the upper bound I (1) critical value, then there is evidence of long run cointegration between the variables.

If long-run relationship is established among the variables according to the Bound test, then the next step taken is the construction of an optimal ARDL specification of the models . The Akaike Information Criteria (AIC) is used to select the optimal lag length so that no serial

correlation is left in the data.

Specification of ARDL Model

$$\Delta CR_t = \alpha + \gamma T + \beta_1 CR_{t-1} + \beta_2 LWPIg_{t-1} + \beta_3 LGDPg_{t-1} + \beta_4 FD_{t-1} + \beta_5 FPR_{t-1} + \sum_{i=1}^m \partial_1 \Delta CR_{t-i} + \sum_{i=0}^n \partial_2 \Delta LWPIg_{t-i} + \sum_{i=1}^o \partial_3 \Delta LGDPg_{t-i} + \sum_{i=1}^p \partial_4 \Delta FD_{t-i} + \sum_{i=1}^q \partial_5 \Delta FPR_{t-i} + \mu_t \quad (4)$$

where, *LWPIg* and *LGDPg* refer to the log values of WPIg and GDPg; T is the trend; Δ is the first difference operator; γ , β_i 's, ∂_i (i=1 to 5) are coefficients; Δ is the constant term and μ_t is the error term.

After estimating equation (4), the null and the alternative hypothesis in the Bounds test are given as below:

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 \quad (\text{no long-run relationship});$$

$$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \quad (\text{a long-run relationship}).$$

The computed *F*-statistic value is evaluated with the critical values given by Pesaran *et al.* (2001).

According to them, critical values of the lower bounds explain that the variables are integrated of the order I(0), while the upper bounds assumes that the variables are integrated of the order I(1). If the computed *F*-statistic value is smaller than the lower bound, then the null hypothesis of no cointegration cannot be rejected. Conversely, if the computed *F*-statistic value is greater than the upper bound value, then the null hypothesis of no cointegration is rejected. However, if the value falls between the lower and upper bound values, then the results are inconclusive.

Once we identify the long-run relationship, the long-run coefficient from the above equations is estimated with the help of equation (5).

$$CR_t = \alpha + \sum_{i=1}^m \beta_1 CR_{t-i} + \sum_{i=0}^n \beta_2 LWPIg_{t-i} + \sum_{i=1}^o \beta_3 LGDPg_{t-i} + \sum_{i=1}^p \beta_4 FD_{t-i} + \sum_{i=1}^q \beta_5 FPR_{t-i} + \mu_t \quad (5)$$

With the acceptance of long-run coefficients of prices equation, short-run coefficients are estimated. Arising from this, there is the need to develop an Error Correction Model (ECM). An ECM has two important parts. First, it estimates the short-run coefficients and second, the error correction term (ECT) that provides the feedback or the speed of adjustment whereby short-run dynamics converge to the long-run equilibrium path in model.

It is explained with the help of equation (6).

$$\Delta CR_t = \alpha + \sum_{i=1}^m \partial_1 \Delta CR_{t-i} + \sum_{i=0}^n \partial_2 \Delta LWPI_{t-i} + \sum_{i=1}^o \partial_3 \Delta LGDP_{t-i} + \sum_{i=1}^p \partial_4 \Delta FD_{t-i} + \sum_{i=1}^Q \partial_5 \Delta FPR_{t-i} + \omega ECM_{t-1} + \mu_t \quad (6)$$

where, Q is the coefficient of speed of adjustment which is expected to have a negative sign.

6. Data Source

The data set used for the study is quarterly time series data covering the period from 1996Q1 to 2013Q3. The choice of the period follows from availability of data on quarterly GDP since 1996. The data on domestic Call rate (CR), GDP at factor cost (GDP), Wholesale Price Index (WPI), Fiscal Deficit (FD), Foreign Exchange Premium (FPR) is collected from the Handbook of Statistics on the Indian Economy, Data Base on Indian Economy from the RBI, National Accounts Statistics of the Central Statistical Organization (CSO) and the various issues of Monthly Bulletin of the RBI.

The inflation rate is calculated from the wholesale price index and the output is valued as GDP at factor cost. Both these variables are taken as log values. Their trend values are calculated by employing a widely accepted method of filtering the output series using estimation of its Hodrick-Prescott (HP) filter. Output and inflation gaps are then calculated by subtracting the trend value from the actual value. Starting from 1996Q1, the chain link is used to convert the GDP series and WPI series to 2004-05 prices.

The open economy affect is analysed with help of Foreign Exchange Premium (FPR), the data for which is available on quarterly basis.

Monthly price indices have been converted into quarterly indices using the average for the period. However, Quarterly interest rate is obtained by taking the value corresponding to the last month of the quarter, since policy rates for the next quarter are generally declared in the last month of the previous quarter and do not contain much of month-wise variation.

7. Results and Empirical Analysis

(a) Structural Breaks

The data was checked for the structural breaks (Table 1) and according to the Bai-Perron test, no structural breaks were found in the data set according to both Global Information criterion which is used when no serial correlation is present in the data and Sequential ($L+1$ vs L) which is the most preferred criterion according to Bai-Perron.

Table 1: Values of Statistics for identification of Structural Breaks

Criterion	Relevant Statistic	Statistic Value /Critical Value	No. of Breaks	Years of Breaks
Global Information	Schwarz crt	1.134648	0	---
	LWZ crt	1.306324	0	---
Global L vs. none	UD max stat/critical	23.8/16.37	4	2001Q3, 2004Q3, 2007Q1, 2010Q3
	WD max	35.7/17.83		
L+1 vs. L sequentially	Sequential F-stat	15.30/16.19	0	---

(b) Testing for Unit Roots (ADF and PP)

The results of both the ADF and PP unit root test as shown in Table 2 reveal that the model follows a mixture of I(0) and I(1) variables and none of variables are I(2). Hence, the present study employs the Autoregressive Distributed Lag Model (ARDL) bounds testing approach to the cointegration analysis.

Table 2: ADF and PP Test Results

Variables	Level				First Difference			
	Constant		Constant & Trend		Constant		Constant & Trend	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP
CR	-3.3828 (0.0149)	-4.7818 (0.0002)	-3.3037 (0.0742)	-4.7123 (0.0016)	-8.1635 (0.0000)	-14.491 (0.0001)	-8.1408 (0.0000)	-14.6019 (0.0001)
LWPIg	-5.3598 (0.0000)	-4.9406 (0.0001)	-5.33515 (0.0002)	-4.9066 (0.0008)	-6.5958 (0.0000)	-17.406 (0.0001)	-6.5413 (0.0000)	-17.2686 (0.0001)
LGDPg	-3.5048 (0.0110)	-3.5494 (0.0094)	-3.3019 (0.0744)	-3.5220 (0.0447)	-5.6286 (0.0000)	-15.640 (0.0001)	-5.5778 (0.0001)	-39.0124 (0.0001)
FD	-0.6888 (0.8419)	-1.7542 (0.4000)	-1.5999 (0.7824)	-3.0678 (0.1221)	-5.5344 (0.0000)	-10.515 (0.0001)	-5.5629 (0.0001)	-10.4561 (0.0000)
FPR	-1.7648 (0.3946)	-3.8936 (0.0034)	-0.8170 (0.9585)	-3.7682 (0.0242)	-5.2193 (0.0000)	-15.640 (0.0001)	-7.0220 (0.0000)	-39.0124 (0.0001)

Note: *Brackets show NacKinnon (1996) one sided P-values

(c) Bound Testing Approach to Cointegration

The F -statistics presented in Table 3 shows that all the statistics cross the upper band of the critical values as tabulated by Pesaran *et al.* (2001), thereby rejecting the null hypothesis of no cointegration. This implies that there exists a long-run relationship among the variables in the present model.

Table 3: Results of Bound Test

ARDL Model		
$CR = f(LWPIg, LGDPg, FD, FPR)$		
Variable	Lag Chosen	F Statistic
CR (1996Q2-2013Q4)	0	9.425410*
Critical Values	Lower Bound I(0)	Upper Bound I(1)
10% Level	3.03	4.06
5% Level	3.47	4.57
1% Level	4.4	5.72

Note: * denotes one per cent level of significance

(d) Results for the Estimated Long-run Coefficients of ARDL Model

Since the long-run relation is evident from the results of Bounds Test, Table 4 presents the long-run results.

Table 4: Estimated Long-run Results using the ARDL Approach

Dependent Variable is CR, ARDL (1, 0, 3, 0, 3) selection based on Akaike Information Criterion				
Regressor	Coefficient	Standard Error	t-Ratio	Probability
<i>LWPIg</i>	5.527627	2.238871	2.468935	0.0167
<i>LGDPg</i>	97.316017	22.841828	4.260430	0.0001
<i>FD</i>	-0.274208	0.499482	-0.548984	0.5852
<i>FPR</i>	0.347911	0.145341	2.393762	0.0201
<i>C</i>	0.266697	1.426713	0.186931	0.8524
<i>@TREND</i>	-0.001036	0.018276	-0.056664	0.9550
LM Version		F Version		
Serial Correlation (Breusch-Godfrey)		Serial Correlation (Breusch-Godfrey)		
= 2.458 [0.2926]		= 0.9938 [0.3769]		
Heteroscedasticity (Breusch-Pagan-Godfrey)		Heteroscedasticity (Breusch-Pagan-Godfrey)		
= 18.804 [0.0934]		= 1.7519 [0.0805]		

The results in Table 4 show that the output gap, inflation gap and foreign exchange premium exhibit a positive and significant impact on interest rate as expected. However, the coefficient of fiscal deficit to the GDP ratio is negative but insignificant.

The magnitude of the impact of output gap (97.3) implies that one per cent increase/decrease in the output gap leads to on an average increase/decrease of 0.97 units. The coefficient of foreign exchange premium (0.34 approx.) explains that a one unit increase in it, on an average, increases the interest rate by 0.34 units. Similarly, one per cent increase in the inflation gap in the present quarter increases the interest rate by 0.055. The fiscal parameter is weak and insignificant implying lesser influence of the fiscal counterpart in the monetary policy decision making.

The overall conclusion is that in the post-reform period, the changes in the monetary policy framework with respect to interest rate have been mostly centered around stabilizing the output or the growth rate. It is also indicative of the fact that RBI has not been chasing the inflation primarily.

(e) Estimated Short-run Coefficients using the ARDL approach

The short-run results are presented in the Table 5.

Table 5: Error Correction Representation of the Selected ARDL model

Dependent Variable CR, ARDL (1, 0, 3, 0, 3) selection based on Akaike Information Criterion				
Regressors	Coefficient	Standard Error	t-Ratio	Probability
D(LWPIG)	5.166082	2.025792	2.550154	0.0136
D(LGDPG)	37.912668	21.838300	1.736063	0.0882
D(LGDPG(-1))	-42.986503	28.124175	-1.528454	0.1321
D(LGDPG(-2))	-24.011884	23.015766	-1.043280	0.3014
D(FD)	-0.256273	0.457391	-0.560292	0.5776
D(FPR)	0.385669	0.112671	3.422973	0.0012
D(FPR(-1))	0.049830	0.124873	0.399047	0.6914
D(FPR(-2))	-0.107564	0.100689	-1.068278	0.2901
D(@TREND())	-0.000968	0.017119	-0.056537	0.9551
CoIntEq(-1)	-0.934593	0.134143	-6.967116	0.0000

For the study period, the Error Correction Coefficient shown in the Table 5 is estimated to be 0.93(approx.). It is negative and significant at one per cent level. The magnitude implies 93% of disequilibrium from the previous period converges back to the

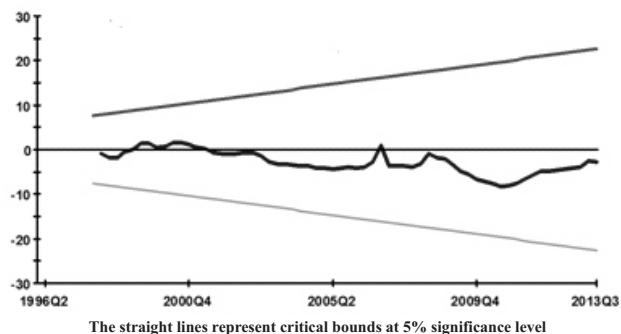
long-run equilibrium in the current quarter.

(f) Diagnostic Tests of the ARDL Models

The robustness of the estimated model has been carried out by several diagnostic tests such as Serial correlation, Ramsey RESET specification test, Heteroscedasticity test. The model passes all these tests. The model also passed the plot of the stability test (CUSUM) as shown in Figure 1. Since the plot of CUSUM statistic stays within 5% significance level, the estimated coefficients are said to be stable.

Figure 1: CUSUM of interest rate

Plot of Cumulative Sum of Recursive Residuals



5. Conclusion and Policy Implications

The paper analyses the interest rate responsiveness behaviour of the monetary policy. The emphasis is to find the dominant variable which affects the interest rate policy decision making of the Reserve Bank of India. The findings suggest that, for the post-reform period, the output gap is the most important factor behind the policy decision making in the long-run. The results also suggest that the inflation gap and foreign exchange volatility, positively and significantly affect the interest rate, but the weightage is less as compared to the output gap. Contrary to expectations, the coefficient of fiscal deficit to the GDP ratio is negative but is insignificant and thus can be ignored. In this context, we can also state that during the period of study, the fiscal considerations were not as important objectives as the objectives of growth, inflation and the open economy volatility. For an emerging economy like India, the results are completely supportive of the growth inclined monetary policy framework. The RBI in the recent past (post US crisis) had increased the interest rate several times in order to control inflation. However, the results are not supportive of this action and find the growth perspective to be the most dominant factor.

References

- Bai, J. and P. Perron (1998), "Estimating and Testing Linear Models with Multiple Structural Changes", *Econometrica*, Vol. 66, pp. 47-78.
- Ball, L. (2002), "Policy Rules and External Shocks", in Norman Loayza and Klaus Schmidt-Hebbel (eds.), *Monetary Policy: Rules and Transmission Mechanisms, Central Bank of Chile*, pp. 47-63.
- Banerjee, R. and S. Bhattacharya (2008), "The RBI's Monetary Policy Reaction Function: Does Monetary Policy in India Follow an Inflation Targeting Rule?", *Annual Conference on Money and Finance*, Indira Gandhi Institute of Development Research.
- Chand, S. K. and K. Singh (2006), "How Applicable is the Inflation Targeting Framework (ITF) for India?", *The India Policy Forum, NCAER Journal*, Volume 2.
- Clarida, R., J. Gali, and M. Gertler (1999), "The Science of Monetary Policy: A New Keynesian Perspective", *NBER Working Paper*, No. 7147, National Bureau of Economic Research.
- Clarida, R., J. Gali, and M. Gertler (2000), "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory", *Quarterly Journal of Economics*, Vol. 115, No. 1, pp. 147-180.
- Fraga, A., I. Goldfajn and A. Minella (2003), "Inflation Targeting in Emerging Market Economies", *NBER Macroeconomics Annual 2003*, No. 18, pp. 365-415.
- Giannoni, M. P. and M. Woodford (2002), "Optimal Interest Rate Rules", *Working Paper, Department of Economics, Princeton University*.
- Giannoni, M. P. and M. Woodford (2003), "How Forward-Looking is Optimal Monetary Policy?", *Journal of Money Credit and Banking*, Vol. 35, No. 6, pp. 1425-69.
- Hu, Y. (2006), "The Choice of Inflation Targeting-An Empirical Investigation", *International Journal of Economics and Economic Policy Springer*, Vol. 3, No. 1, pp. 27-42.J
- Hutchison, M., R. Sengupta and N. Singh (2013), "Dove or Hawk? Characterizing Monetary Policy Regime Switches in India", *Emerging Markets Review*, No. 16, pp. 183-202.
- Jha, R. (2008), "Inflation Targeting in India: Issues and Prospects", *International Review of Applied Economics*, Vol. 22, No. 2, pp. 259-270.
- Mohandas, V. (2012), "Inflation Targeting in India", *International Journal of Economic Research*, May-June, Vol. 3, No. 3, pp. 178-185.
- Mohanty, M. S. and M. Klau (2004), "Monetary Policy Rules in Emerging Market Economies: Issues and Evidence", *Bank for International Settlements Working Papers*, No. 149.
- Patra, M. D. and M. Kapur (2010), "A Monetary Policy Model Without Money for India", *Macroeconomics and Finance in Emerging Market Economies*, Vol. 5, No. 1, pp. 16-39.
- Pesaran, M. H. and Shin (1999), "An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis", *Econometrics and Economic Theory in 20th Century: The Ragnar Frisch Centennial Symposium*, Chapter 11, Cambridge University Press, Cambridge.

- Pesaran, M. H., Y. Shin and R. J. Smith (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", *Journal of Applied Econometrics*, Vol. 16, pp. 289-326.
- Ranjan, R., R. Jain and S. C. Dhal (2007), "India's Potential Economic Growth: Measurement Issues and Policy Implications", *Economic and Political Weekly*, Vol. 42, No. 17, pp. 1563-72.
- Reserve Bank of India (2002), *Report on Currency and Finance*, Reserve Bank of India, Mumbai.
- Singh, B. (2010), "Monetary Policy Behavior in India: Evidence from Taylor-Type Policy Frameworks", *Staff Studies, SS (DEAP) 2/2010*, Reserve Bank of India, Mumbai.
- Singh, K. and K. P. Kalirajan, (2006), "Monetary Policy in India: Objectives, Reaction and Policy Effectiveness", *Review of Applied Economics*, Vol. 2, pp. 181-99.
- Taylor, J. B. (1993), "Discretion versus Policy Rules in Practice", *Carnegie-Rochester Conference Series on Public Policy*, Vol. 39, pp. 195-214.
- Taylor, J. B. (2001), "The Role of the Exchange Rate in Monetary-Policy Rules", *American Economic Review Papers and Proceedings*, Vol. 91, pp. 263-67.
- Woodford, M. (2001), "The Taylor Rule and Optimal Monetary Policy", *American Economic Review*, Vol. 91, No. 2, pp. 232-237.
- Zoli, E. (2005), "How Does Fiscal Policy Affect Monetary Policy in Emerging Market Countries?", *BIS Working Papers*, No. 174, April.