RESEARCH ARTICLE

Inflation and Monetary Policy in India: Some Empirical Relations

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Abstract

This paper examines the effectivity of monetary policy in controlling inflation in India during 2005:04-2014:08. Repo rate (RR), Cash Reserve Ratio (CRR) and Bank Rate (BR) have been taken as policy instruments. First, it examines the interrelation of these instruments with inflation through a graphical analysis during 2005:04-2014:08 and through a tabular analysis over various sub periods. Then the Pairwise Granger Causality Tests have been done among the first difference of Price (Wholesale Price Index or WPI) and first difference of all instruments. The Granger Causality test shows that a rise in BR and a rise in CRR cause a rise in WPI and a rise in WPI causes a rise in Repo rate. Cointegration analysis has been done among CRR, BR, Repo and WPI. From the cointegration analysis, it has been found that here are two cointegrating vectors and two commond trends are present among them. From the analysis, it has been inferred that whatever little monetary policy has been used has apparently been ineffective.

Keywords: *Granger- causality, Inflation, Johansen cointegration, Monetary policy.*

Introduction

Indian economy has grappled with high and persistent inflation since 2008. Both RBI and Govt have tried their best to bring inflation to a comfortable level by changing monetary and fiscal policy instruments frequently. RBI plays an important role in inflation control by changing the parametric values of various policy instruments such as cash reserve ratio (CRR), repo rate, statutory liquidity ratio (SLR), etc. While monetary policy considerations demand that surplus liquidity should be absorbed, debt management considerations warrant supportive liquidity conditions in the economy. The Reserve Bank, therefore, has to do a fine balancing act and ensure that while absorbing excess liquidity, the government's borrowing programme is not hampered. Monetary policy rule suggests that by changing repo rate frequently during high inflation, RBI tries to control inflation. However, the responsiveness of WPI inflation to changes in interest rate (assuming interest rates generally follow repo rate) and the relationship among policy variables need to be explored as it will give indications about the effectiveness of monetary policy in controlling inflation in India.

The monetary policy instruments that are considered in this paper are Cash Reserve Ratio (CRR), Repo and Bank Rate (BR). CRR is the ratio of the amount of funds that the banks have to keep with the RBI to its total deposits. If the central bank decides to increase the CRR, the excess reserves available with the banks come down. The RBI uses the CRR to drain out excess reserves from the system. Repo rate is the rate at which the RBI lends short term money to commercial banks against securities. Whenever, banks have any shortage of funds they can borrow from the RBI. A reduction in the Repo rate helps banks get money at a cheaper rate and vice-versa. It is more applicable when there is a liquidity crunch in the market. BR is the rate of interest which a central bank charges on the loans and advances to a commercial bank. While in Repo rate loans are granted against securities, in BR there is no such security is required. In annual Policy

Statement of 2011-12, the RBI mentioned that There will henceforth be only one independently varying policy rate and that will be the repo rate. The transition to a single independently varying policy rate is expected to more accurately signal the monetary policy stance. The posture of the monetary policy of Reserve Bank is to sustain an interest rate environment that controls inflation and anchors inflation expectations.

This paper examines the effectiveness of monetary policy in controlling inflation in India during 2005 to 2014. Repo rate, CRR and BR have been taken as monetary policy instruments. After the graphical analysis, the sub-periodical analysis between inflation, CRR, BR and Repo rate has been done in order to examine the effectiveness of policy instruments in controlling inflation over various sub-periods. Then pair wise Granger Causality tests have been done between the first difference of instruments and first difference of Price or inflation. The Johansen cointegration analysis has been done among CRR, BR, Repo and WPI.

This paper has been divided into 6 sections. Section-1 is the introductory part. Section-2 includes the literature review part. Section-3 provides description about the data used in this paper and the methodology used for the estimation. Section-4 deals with the graphical analysis of the variables and their sub-periodical analysis. Section-5 includes the estimation part of the study and the analysis part has been included in section-6.

Literature Review

Kundrakpam and Das [1] have examined the relative response of food and manufactured prices to change in interest rate and money supply in India during the period 2001:Q1 to 2010:Q2. Food prices, manufactured prices, exchange rate, weighted average call rate, broad money and narrow money are the variables that have been taken into consideration. By cointegration analysis, they found that the neutrality of money doesn't exist in long run. Moreover, through Vector Error Correction Model, they found that expansionary monetary policy leads to

increase in the prices of both food and manufactured products. But, the response of food prices to change in money supply is higher than the corresponding response of manufactured prices. They also tested the short run causality among the variables through VEC Granger Causality test-Wald test. According to the estimation, in short-run, interest rate channel of monetary policy is found to be more effective on manufactured prices while quantum channel is more effective on food prices. In long run, while increase in call rate leads to fall in the prices of only manufactured products, increase in money supply leads to rise in the prices of both food and manufactured products. However, the impact of money supply on food prices is more than that of manufactured prices. On food prices, call rate has no significant impact statistically. On the other hand, on manufactured prices, money supply has no significant positive impact. But, call rate has a negative impact. While increase in both food and manufactured prices induces call rate hike, money supply shows an asymmetric response by way of increasing with the rise in food price and decreasing with the rise in manufactured prices.

Bose [2] has discussed various sources, challenges and policy options that were addressed at a one day seminar on inflation at the National Institute of Public Finance and Policy, New Delhi in November 2011. The underlying arguments, reflecting distinct views, were vastly different. Some of them explained that the monetarists held the "Baby Steps" approach which was responsible for the persistence of inflation and urged that aggressive tightening early in the inflation episode would have brought inflation under control, with a slowdown in growth being part of the trade-off. However, some of the papers presented in that seminar found that higher international prices and their transmission to domestic prices as the main culprit, causing policy, including monetary policy to be of little use in the face of imported inflation. The majority of the evidence and arguments presented in the seminar regarded demand-supply imbalances and higher food prices as the source. Based on this 'majority view' some

suggested that changing the agricultural supply side to bring forth more food through active public policy intervention would be an appropriate policy response.

According to Shetty [3], the reduction in repo rate has come very late and small. He suggested that the central bank should accept to maintain the flow of credit to the productive sectors as one of its main roles. He also explained that RBI's action have persistently depressed business sentiments and hence affected the private investment climate. Though there are a number of other causes for the industrial stagnation, credit policy impetus does inspire private investment plans, and this is so particularly amongst the large numbers of small and medium enterprises. Moreover, he suggested focusing on bank credit. According to his view, bank credit should expand at the right rate, neither more nor less. He mentioned that inflation can be controlled easily and is less harmful for the economy than growth as employment; saving and investment trade, capital inflows and the overall BOP scenario macroeconomic trends are associated with the growth.

Marjit [4] had tried to examine the interrelationship between real interest rate, inflation and growth in Indian context. He mentioned that the overall correlation between GDP growth and inflation is negative (-0.102). But in the post reform period, it is rather strongly negative (-0.347); whereas in the pre-reform period it is positive (0.352). He also found a clear negative relationship between inflation and real lending rate by plotting the rate of inflation against the real lending rate i.e. the real prime lending rate between 1980 and 2008.

Hutchison, Sengupta and Singh [5], estimated the exchange-rate-augmented Taylor rule for India over the period 1980Q1 to 2008Q4 and explored possible monetary policy shifts between the pre and post liberalisation periods. Nominal interest rate, year on year inflation rate, output gap and exchange rate changes are the variables in the estimated equation. Lagged interest rate has been introduced to capture inertia in optimal monetary policy. For short term

policy rate, overnight call or money market rate has been used. They derived the output gap using HP filter and used IIP for the measurement of output. Year-on Year inflation is measured using the annual percentage change in the WPI. They estimated their model using OLS regression with Newey-West variance-covariance matrix, in order to correct for both autocorrelation and heteroscedasticity.

Through estimation, they found that Indian monetary policy is responsive to the output gap. They further found that in line with the RBI's own public stance, exchange rate movements don't constitute a systematically important determinant of its monetary policy conduct over the entire sample period. The output gap seems to matter more than inflation. Exchange rate changes do not constitute an important policy factor and post 1998 conduct of monetary policy seems to have changed in the direction of less inertia.

Pandey and Kanagasabapathy [6] have argued that the market will remain on tenterhooks, if the RBI's current approach to the twin challenges of reining in inflation and stimulating growth continues. They have analysed the policy cycles from 2001 to 2013 on a quarterly basis. The phase 1 (2001-02 to 2004-05) and phase 3 (2008-09 to 2009-10) are monetary easing phase and phase 2 (2004-05 to 2008-09) and phase 4 (2009-10 to 2011-12) are tightening phase. The fifth and most recent easing phase (2012-13 to 2013-14) has given confusing signals of easing and tightening. The two policy announcements of the Govt represent a combination of both easing and tightening because of peculiar circumstance created by easing of the MSF rate while increasing the repo rate. They also found that rather than the usual repo rate, the effective policy rate influencing short term market rates turned out to be the MSF rate. This has resulted in a volatile movement in the policy rate in the current cycle. They also argued that the possible explanation for the sudden hike in repo rate could be to make the rate positive in real terms to encourage savings. With the recent hikes in the repo rate, the real policy rate has turned positive in WPI terms and negative in CPI terms.

This paper concerns with the period from 2001 to 2013.

According to Pattnaik and Samantaraya [7], supply shocks, both due to a setback in agricultural production and international oil prices and monetary expansion due to automatic monetisation of the fiscal deficit were the major contributing factors to higher inflation in India. Regarding the policy effectiveness, they suggested that reform initiatives since the early 1990s towards developing a broad based financial market, particularly activation of the Govt securities and forex markets coupled with improved monetary-fiscal interface enabled better monetary management since the second half of 1990s. Moreover, judicious supply management through better stocks of food grains and import of sensitive commodities containing the adverse impact of supply shocks also played an important role. They found that the modal range of inflation during the period 1951-52 to 2004-05 consists of 3%-6%. They also noted that monetary management was effective in ensuring a reduction in inflation and lowering inflation expectations.

Some studies [1] have not taken some important policy variables into consideration such as repo rate, CRR e.t.c. Moreover, they have ignored the functioning of Govt. Sector and its fiscal policy which made it an one sided analysis. If it is established that fiscal deficit and lax money policy strongly correlated then it makes sense to consider only monetary factors. But in the absence of conclusive evidence in favour of this, fiscal policy parameters have to be studied and controlled. Though, some studies [6] explained about various policy variables' volatility, but have not explained about their effectiveness i.e. to what extent, the fluctuations of policy variables have resulted in achieving the target (inflation control or output stabilization). Due to market fluctuations, it is obvious to change the policy variables. Hence, their effects are a matter of concern. Some studies concluded that inflation is less harmful and can be easily controlled as compared to unemployment. But his study lacks statistical evidence [3].

An analysis of the determinants of policy has been done by Hutchison, Sengupta and Singh [5]. Hence, the analysis of their effectiveness is needed. They used HP filter in their study whose inadequacies have already been pointed out. Repo rate can be considered as the most important instrument of monetary policy rather than call money rate.

Therefore, this paper tries to find the effectiveness of monetary policy in controlling inflation by examining the interrelationships of policy instruments viz; CRR, Repo and BR with inflation during 2005:04 to 2014:08.

Data and Methodology

In this paper, monthly Wholesale Price Index (WPI) series has been taken to measure inflation during the period from 2005 to 2014. Repo rate, CRR and BR have been taken as monetary policy variables during the same period. The data are obtained from the online database of Reserve Bank of India.

The stationarity of the variables has been tested through Augmented-Dickey Fuller test. From the stationarity test, it has been found that all the instruments are stationary at their first difference levels. After the stationarity test, Granger Causality (GC) tests have been done among the variables including WPI. Johansen cointegration analysis has been done among all the instruments and WPI.

Graphical Analysis

Fig-1 depicts the monthly Repo rate, CRR, Bank rate and WPI- inflationary trends from the period 2005-2014. During July- Aug 2008, inflation touched the peak i.e around 11% and touched the lowest point i.e -0.39% during 2009 May-June.

Bank rate (BR) and CRR have been stable during April 2005 to December 2006. But, Repo rate has fluctuated between 6 to 7.25% during the same period. However, the gap between the graphs representing the curves of CRR and Repo rate has been reduced and later they
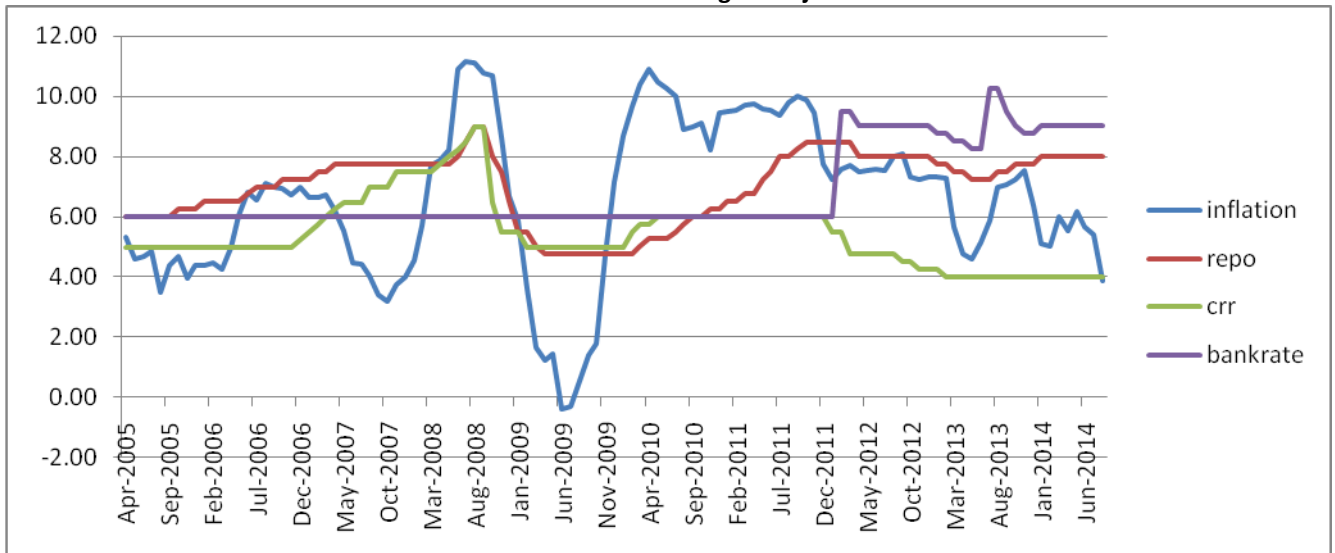
Figure 1: Inflation, Repo rate, CRR and Bank rate during 2005-14

followed the same pattern during February 2007 to October 2010. During June 2010 to December 2011, BR and CRR remained equal and stable at 6%. But, Repo rate followed an increasing trend. However, from January 2012, the gap between the graphs of BR and CRR curves widened as CRR fell below 6% and BR rose above 6%. But, Repo rate fluctuated within 6 to 8.25%. BR remained stable at 6% from April 2005 to June 2012.

By examining the relationship of policy instruments with the inflation, it is found that as the gap between the graphs representing the curves of Repo and CRR widens, inflation fluctuates around 6% and doesn't rise or fall much. During June 2006 to May 2007, inflation fluctuates around 6 to 6.25% as the gap between the graphs representing the Repo and CRR curves widens. But, inflation touched the highest and lowest peak during July-August 2008

(highest) and June-July 2009 (lowest) when the graphs of both CRR and Repo rate curves follow same pattern and are almost equal with no gap. Again, after January 2012, the gap between the graphs of CRR and Repo curves widens and inflationary trend did not show any peak, rather fluctuated around 4 to 6.75%. But, after February 2012, BR has been increased and fluctuated within the range of 8.25 to 9% with a peak at 10.25% during August-September 2013. The CRR remained stable at 4% during the same period.

Sub-Periodical Analysis

In order to get a clear picture about the relationship of these policy variables with inflation, the sub-periodical analysis has been done on the basis of high and low inflation.

Period of High Inflation: 2008

Table 1: Monthly WPI Inflation, CRR, Repo and BR in 2008

Month	WPI Inflation	Repo	CRR	BR
2008:01	4.54	7.75	7.5	6
2008:02	5.68	7.75	7.5	6
2008:03	7.71	7.75	7.5	6
2008:04	7.86	7.75	7.75	6
2008:05	8.20	7.75	8	6
2008:06	10.89	8	8.25	6
2008:07	11.15	8.5	8.5	6
2008:08	11.12	9	9	6
2008:09	10.78	9	9	6
2008:10	10.66	8	6.5	6
2008:11	8.65	7.5	5.5	6
2008:12	6.68	6.5	5.5	6

Table 1 shows WPI inflation and the response of monetary policy in the inflation episode of 2008. Inflation reached the highest peak during July 2008. At this time, Repo rate was 8.5, CRR was 8.5 and Bank rate was 6. In the following three months, inflation showed large values of 11.12, 10.78 and 10.66. During this period Repo and CRR remained at 9%. But, BR remained at 6% throughout the year.

Monetary policy tightening is visible right from the start. The repo rate has been kept at a high level of 7.75% and CRR at 7.5% for some periods, then they started rising and both touched the peak of 9% when inflation reached at 11.12%. However, it can be observed that the monetary tightening has begun at little late. Despite continuous rise in inflation from 4.54 to 8.20%, CRR and Repo have not been changed much. There were more changes in Repo and CRR only after inflation became double digit.

Period of low inflation: 2009

Table 2: Monthly WPI Inflation, CRR, Repo and BR in 2009

Month	WPI Inflation	Repo	CRR	BR
2009:01	5.87	5.5	5.5	6
2009:02	3.61	5.5	5	6
2009:03	1.65	5	5	6
2009:04	1.21	4.75	5	6
2009:05	1.45	4.75	5	6
2009:06	-0.39	4.75	5	6
2009:07	-0.31	4.75	5	6
2009:08	0.54	4.75	5	6
2009:09	1.40	4.75	5	6
2009:10	1.79	4.75	5	6
2009:11	4.73	4.75	5	6
2009:12	7.15	4.75	5	6

Table 2 shows that period of low inflation is accompanied by stagnant monetary policy. Inflation followed a downward trend during 2009 and became negative in June – July 2009. Despite this decrease in inflation, the policy variables remained stagnant. Repo rate remained at 4.75%, CRR at 5% and BR at 6%. After July 2009, though inflation started rising, monetary policy variables did not change. In December 2009, inflation rose to 7.15% with no policy change. Therefore, it is evident that during low inflation, monetary variables do not have control over inflation. The thrust of the various policy initiatives by the Reserve Bank has been on providing ample rupee liquidity, ensuring comfortable dollar liquidity and maintaining a market environment conducive for the continued flow of credit to productive sectors as mentioned in its annual policy statement 2009-10

Period of High Inflation: 2010

Table 3: Monthly WPI Inflation, CRR, Repo and BR in 2010

Month	WPI Inflation	Repo	CRR	BR
2010:01	8.68	4.75	5	6
2010:02	9.65	4.75	5.5	6
2010:03	10.36	5	5.75	6
2010:04	10.88	5.25	5.75	6
2010:05	10.48	5.25	6	6
2010:06	10.25	5.25	6	6
2010:07	9.98	5.5	6	6
2010:08	8.87	5.75	6	6
2010:09	8.98	6	6	6
2010:10	9.08	6	6	6
2010:11	8.20	6.25	6	6
2010:12	9.45	6.25	6	6

From table-3, it is clear that CRR and BR almost remained stable through out the year 2010. But, Repo rate has been changed frequently to control inflation as inflation started rising and double digit inflation appeared during the first half of the year. In the second half of the year, it remained at high with slight fall. However, Repo rate has

kept on rising causing little fall in inflation as inflation remained at a high level. But, in first four months, CRR fluctuated within 5-5.75%. In its Third Quarter Review in January 2010, the Reserve Bank had indicated that their main monetary policy instruments are at levels that are more consistent with a crisis situation than with a fast recovering economy. In the emerging scenario, lower policy rates can complicate the inflation outlook and impair inflationary expectations, particularly given the recent escalation in the prices of non-food manufactured items.

Period of High Inflation: 2011

Table 4: Monthly WPI Inflation, CRR, Repo and BR in 2011

Month	WPI Inflation	Repo	CRR	BR
2011:01	9.47	6.5	6	6
2011:02	9.54	6.5	6	6
2011:03	9.68	6.75	6	6
2011:04	9.74	6.75	6	6
2011:05	9.56	7.25	6	6
2011:06	9.51	7.5	6	6
2011:07	9.36	8	6	6
2011:08	9.78	8	6	6
2011:09	10.00	8.25	6	6
2011:10	9.87	8.5	6	6
2011:11	9.46	8.5	6	6
2011:12	7.74	8.5	6	6

During 2011, CRR and BR remained stable at 6% throughout the year. Inflation remained at a higher level of 9.25 to 10%. Table-4 depicts that inflation fluctuated around 9.25 to 10% and became 10% in September 2011. At that time, Repo rate also touched a level of 8.25% which is the highest rate during 2011. With the fall in inflation after September 2011, Repo rate became stable at 8.5%. However, first half of the year shows that it was a monetary tightening phase in terms of increased Repo rate with no change in CRR and BR. But, there is no bearing on inflation. The impact of monetary tightening already undertaken by the Reserve Bank is still unfolding. However, considering the overall inflation scenario, there is a clear need to persist with the anti-inflationary stance.

As shown in figure1, period of 2012-14 was a monetary tightening phase in terms of Repo rate and BR with moderate inflation.

From the sub-periodical analysis, it is clear that during 2005- 2014 the government has shown some willingness to use repo rate as a monetary instrument to control inflation but with little success. But BR remained almost stable at 6% till 2012. After 2012, BR started rising with significant changes in its level.

However, during period of low inflation, policy variables did not fall much and did not have much control over inflation. Therefore, it can be said that whatever little monetary policy has been use has apparently been ineffective.

Estimation

This section has been divided into three sub sections. Sub-section 1 includes the Unit root test of all the instruments. Sub-section 2 includes the Granger causality test. Sub-section 3 includes the Cointegration analysis.

Unit Root Test

By running the Augmented-Dicky Fuller (ADF), it has been found that all the policy instruments and monthly WPI series are non-stationary at their original level and stationary at their first difference level. This means all the policy instruments are integrated of order 1 or are of I (1) process.

Null Hypotheses: WPI, REPO, CRR AND BR have unit roots. The bracketed value shows the p-value of t-statistic. By running ADF test to test the stationarity of inflation, Repo, CRR and BR series,

Table 5: ADF test results

Variables	ADF Test Statistic (t-statistic)	
	Level	**First Difference**
CRR	-1.765531 [0.3958]	-7.522902 [0.0000]
Repo rate	-2.381147 [0.1494]	-4.167076 [0.0012]
Bank rate	-1.183801 [0.6797]	-10.19392 [0.0000]
WPI	0.783025 [0.9934]	-7.295621 [0.0000]

Source: author's own estimation.

we found that the test statistics are significant because their probability values are less than 0.05 which reject the null hypotheses i.e first order difference of WPI (DWPI), Repo (DREPO), CRR (DCRR) and BR (DBR) have unit roots. So, we have to accept the alternative hypotheses i.e DWPI, DREPO, DCRR and DBR are stationary.

Granger Causality Test

After testing the stationarity of the variables, the pair wise GC tests have been done among the instruments and DWPI.

First the causality test has been done between DBR and DWPI. From the test, it has been found that DBR granger causes inflation. Again, by testing the causality between CRR and inflation, it has been found that DCRR causes DWPI or inflation as the P-value turns 0.0175. By testing the causality between inflation and Repo rate, it is found that Inflation causes DREPO.

Table 6: Granger causality test result

	F-stat	**P-value**	**Lag length**
WPI causes BR	2.40774	0.0950	2
BR causes WPI (First difference)	4.94676	0.0088	
WPI causes CRR	2.26641	0.1087	2
CRR causes WPI (First difference)	4.20810	0.0175	
WPI causes Repo	5.18895	0.0071	2
Repo causes WPI	0.86867	0.4225	

(First difference)Source: Author's own calculation

From the causality test, it is clear that DCRR causes inflation, DBR causes inflation and inflation causes DREPO. The CRR is sometimes used as a tool in monetary policy, influencing the country's borrowing and interest rates by changing the amount of funds available for banks to make loans and thereby affecting inflation through changes in money supply. Moreover, inflation Granger causes Repo rate as the p-value turns significant. When inflation rises, repo rate rises in order to control the inflationary

condition of the economy. The direction of causality is depicted as under;

$$DCRR \longrightarrow DWPI\ OR\ INFLATION \xrightarrow{\quad DBR \quad} DREPO$$
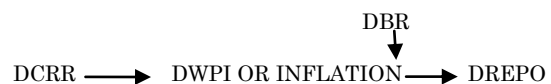
Cointegration Analysis

After running the GC test, cointegration analysis has been done among Bank rate, Repo, CRR and WPI through the Johansen cointegration methodology. It has been found that there are two significant cointegrating vectors among them.

Table 7: Johansen Cointegration Anaysis of BR, Repo, CRR and WPI

Eigenvalue	Rank	Trace	0.05 critical value	Maximum Eigenvalue	0.05 critical value
0.294953	r = 0	67.73601*	47.85613	34.94909	27.58434
0.175121	r ≤ 1	32.78692*	29.79707	19.25184	21.13162
0.126577	r ≤ 2	13.53507	15.49471	13.53356	14.26460
1.51E-05	r ≤ 3	0.001514	3.841466	0.001514	3.841466

*denotes rejection of hypothesis at the 0.05 level. Source: Author's own estimation.

Since 67.73601 exceed the 0.05 critical value of the trace statistic, it is possible to reject the null hypothesis of no cointegrating vectors and accept the alternative hypothesis of one or more cointegrating vectors. Next, we found that 32.78692 exceed the 0.05 critical value of the trace statistic. So, we reject the null hypothesis of r ≤ 1 and accept that there is more than one cointegrating vector. Again, the null hypothesis of r ≤ 2 has been tested and has been accepted as 13.53507 is less than 0.05 critical value of the trace statistic. Therefore, from the above cointegration analysis, it can be concluded that there are two cointegrating vectors among BR, Repo, CRR and WPI. Here, the number of variables in the estimation is 4 and the number of cointegrating vectors is 2. Therefore, the number of common trends present here is 2. (Number of common trend =number of variables in the estimation- number of cointegrating vectors).

Analysis

This chapter found that whatever little monetary policy has been used has apparently been ineffective. From the above sub periodical analysis, it can be found that during 2005-14, inflation has caused increase in repo rate indicating willingness of the government to use repo rate as an instrument of inflation control.

The period of 2008 is marked with higher inflation and monetary tightening phase both in terms of increased Repo rate and CRR with no change in BR. But, stringent policy action has been taken only after the appearance of double digit inflation. The restrictive policy action should be taken earlier to restrict inflation from rising above 10%. Rather, strict or monetary tightening should begin when inflation crosses the threshold level i.e 6%. But, period of 2009 is the period of low inflation with stagnant monetary policy. Inflation showed a downward trend during this year and even became negative i.e -0.39% during June 2009. But, policy variables remained stagnant during this period. At the end of 2009, though inflation rose to 7.5%, the policy instruments did not change. Therefore, it can be argued that during low inflation, policy instruments are not used to control inflation. Again, inflation showed an upward trend during 2010 and 2011. During these periods, Repo rate has changed frequently with no bearing on inflation. But, CRR and BR remained almost stable during these periods.

The GC test shows that a change in CRR causes inflation and inflation causes a change in Repo rate. It also shows that change in BR causes inflation. From the Johansen cointegration method, it is found that Repo rate, BR, CRR and WPI have long run relationship among them and there are two cointegrating vectors among them. Moreover, there are two common trends among them.

This is just a preliminary analysis where I have attempted to find the statistical relationship of the rate of inflation with various monetary policy instruments. Though the results in themselves are interesting some work requires to be done in analysing other factors that are responsible for inflation: administered and import prices, fluctuations in agricultural output, changes in agri-input subsidy, etc. The possible reasons for the failure of monetary policy in controlling inflation may be due to the omission of the most significant cause i.e. fiscal deficit leading to massive injection of money which has been restricted to the examination of the impact of monetary policy. We shall pursue this line later.

References

1. Kundrakpam JK, D Das (2011) Monetary Policy and Food Prices in India, RBI working paper series (DEPR).

2. Bose S (2012) Inflation: Sources, Challenges and Policy Options, Economic and Political Weekly, XLVII (3): 27-30.

3. Shetty SL (2013) Growth Versus Inflation: How RBI Has Missed Bus, Economic and Political Weekly. XLVIII (8): 70-72.

4. Marijit S (2008) Inflation and Public Policy: Contemporary Dilemmas, Economic and Political Weekly. pp 12-16.

5. Hutchison MM, R Sengupta , N Singh (2010) Estimating a Monetary Policy Rule for India, Economic and Political Weekly, XLV (38): 67-69.

6. Pandey, S, K Kanagasabapathy (2013) RBI's Policy Rate: A Cat on the Wall, Economic and Political Weekly, XLVIII (48):133-35.

7. Pattnaik RK, A Samantaraya (2006) Indian Experience of Inflation: A Review of the Evolving Process, Economic and Political Weekly. pp 349-56.