Monetary Policy & the Behavior of Foreign Exchange Reserves of India

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Abstract

This paper sheds light on the actual impact of monetary policy on Foreign Exchange Reserves and thereby addresses its role as a determinant of commonality in liquidity. To capture effects of change in CRR, SLR, Repo rate and Reverse Repo rate on Foreign Exchange reserves, we applied Regression Analysis. Our results suggest that an increase in CRR and Repo Rate will lead to increase in Total Reserves and Increase in SLR will lead to decrease in Total Reserves. These findings are related during the period of April 2006- March 2013.

Keywords: Cash Reserve Ratio, Statutory Liquidity Ratio, Repurchase Rate, Reverse Repurchase Rate, Foreign Exchange Reserve.

1. Introduction

The monetary policy of any country refers to the regulatory policy, whereby the monetary authority maintains its control over the supply of money for the realization of general economic objectives. Monetary policy can be broadly defined as "the deliberate effort by the Central Bank to influence economic activity by variations in the money supply, in availability of credit or in the interest rates consistent with specific national objective." In the context of developing economies like India, monetary policy acquires a wider role and it has to be designed to meet the particular requirements of the economy. It stimulates or discourages spending on goods and services and, thus, influences economic activities and prices by regulating the supply of money, and the cost and availability of credit to producers and consumers in the economy. Households and business units make spending and investment decisions based upon current and expected future monetary policy actions. The various sectors of the economy respond in different ways, depending on the extent to which they are borrowers or lenders and the importance and relative availability of credit to the sector. By affecting the demand side of the economy, monetary policy tries to damp or perhaps even eliminate business fluctuations - economy-wide recessions and booms arising from fluctuations in aggregate demand. In India, the three major objectives of economic policy are growth, social justice (equitable distribution of income and wealth) and price stability. The monetary policy of an economy operates through three important instruments, viz. the regulation of money supply, control over aggregate credit and the interest rate policy. In prereform period, given the largely underdeveloped state of financial system, regulated nature of financial markets and plan priorities, the RBI often resorted to the direct instruments of monetary policy like CRR, SLR and interest rate for allocating credit and regulating money supply in the economy. Gradual liberalization and globalization of the economy, strengthening and development of the financial system, restrictions on the automatic monetization of fiscal deficit and various other changes in the economy had made it possible for the RBI to operate with the indirect instruments of monetary policy such as bank rate, repo rate and OMOs (open market operations). Accordingly, there has been a distinct shift in the monetary policy framework and operating procedures from direct instruments of monetary control to market based indirect instruments in the recent years. The monetary authorities are striving hard to maintain optimal level of Forex reserves by adopting several monetary policy measures, the important amongst which are changes in CRR, SLR, repo and reverse repo rate, which directly influence the money supply from outside country with immediate effect in the economy. Hence the efforts are made in this paper to make the econometric study of impact of changes in CRR, SLR, repo rate and reverse repo rate adopted by the monetary authorities on economy's forex reserves.

CRR, SLR, Repo rate and reverse repo rate are the key policy rates which stipulate the interest rate in the economy. All these policy rates have a direct impact on the lending rate which is now benchmarked to the base rate replacing the erstwhile BPLR. To understand the impact of the policy rates, let us look into all these rates at a glance.

CRR is the percentage of cash deposits which banks maintain with RBI on an everyday basis. Increase in CRR will result in increase in interest rate loans.

At the close of business every day, every bank is required to maintain a minimum proportion of its net demand and time liabilities as liquid assets in the form of cash, gold, and un-encumbered approved securities. The ratio of liquid assets to demand and time liabilities is known as Statutory Liquidity Ratio (SLR).

Repo rate is the short term interest rate at which the RBI lends money to banks. When the repo rate increases, the interest rates on loans also moves up as bank has to fund these loans at a higher cost

Reverse Repo Rate is the rate at which RBI borrows fund from banks. It has similar impact on the interest rates

on loan. Now since the RBI has narrowed down the spread between repo and reverse repo by 25 basis points and has announced that it will double the frequency of reviewing the monetary policy, the short term volatility in overnight rates will be reduced. This will bring stability in financial market.

All these rates collectively impact the financial market liquidity which in turn influences the interest rates of your loan.

2. Conceptual Framework

2.1 Cash Reserve Ratio

The Reserve Bank of India (Amendment) Bill, 2006, has been enacted and has come into force with its gazette notification. Consequent to the amendment to sub-Section 42(1), the Reserve Bank, having regard to the needs of securing the monetary stability in the country, can prescribe Cash Reserve Ratio (CRR) for scheduled banks without any floor rate or ceiling rate. [Before the enactment of this amendment, in terms of Section 42(1) of the RBI Act, the Reserve Bank could prescribe CRR for scheduled banks between 3 percent and 20 percent of their total demand and time liabilities].

CRR is the percentage of money that the banks keep with the RBI for security. How does it impact the banks' profitability? For example, if bank A collects Rs 10,000 deposit from you, then out of the Rs 10,000, it has to keep Rs 500 with the RBI. The net amount left with the bank will be Rs 9,500. If CRR is getting hiked, then the RBI will suck the money from the system in order to meet the trade deficit. Same time, the bank will have money supply deficit to meet all the loan demand. Once the money supply will be reduced then the loan rates or lending rates will increase.

Thus we can say, RBI uses CRR either to drain excess liquidity or to release funds needed for the economy from time to time. Increase in CRR means that banks have fewer funds available and money is sucked out of circulation. Thus, we can say that this serves duel purposes; i.e., it not only ensures that a portion of bank deposits is totally risk-free, but also enables the RBI to control liquidity in the system, and thereby inflation, by tying the hands of the banks in lending money.

Then 80% of banks lending will be short-term trade loan, which settle on fourth night basis.

The increase in interest rate will directly impact the banking industry, housing industry, automobile industry, etc. in the short term. Continuous increase in CRR may impact the quarterly profitability of the above sectors

2.2 Statutory Liquidity Ratio

At the close of business every day, every bank is required to maintain a minimum proportion of its net demand and time liabilities as liquid assets in the form of cash, gold, and un-encumbered approved securities. The ratio of liquid assets to demand and time liabilities is known as Statutory Liquidity Ratio (SLR). Present SLR is 24% (reduced from earlier 25% on 8/11/2008). The RBI is empowered to increase this ratio up to 40%.

2.3 Repo Rate

Repo (repurchase) rate is the rate at which the RBI lends shot-term money to the banks. When the repo rate increases, borrowing from the RBI becomes more expensive. Therefore, we can say that in case RBI wants to make it more expensive for the banks to borrow money, it increases the repo rate; similarly, if it wants to make it cheaper for banks to borrow money, it reduces the repo rate.

Repo rate is used by the central bank to repurchase government securities from the commercial banks, depending on the level of money supply it decides to maintain in the country's monetary system. To temporarily expand the money supply, the central bank decreases repo rates (so that banks can swap their holdings of government securities for cash), to contract the money supply it increases the repo rates. Alternatively, the central bank decides on a desired level of money supply and lets the market determine the appropriate repo rate.

The central bank has the power to lower the repo rates while expanding the money supply in the country. This enables the banks to exchange their government security holdings for cash. In contrast, when the central bank decides to reduce the money supply, it implements a rise in the repo rates.

2.4 Reverse Repo Rate

Reverse repo rate is the rate at which banks park their short-term excess liquidity with the RBI. The RBI uses this tool when it feels there is too much money floating in the banking system. An increase in the reverse repo rate means that the RBI will borrow money from the banks at a higher rate of interest. As a result, banks would prefer to keep their money with the RBI.

The reverse repo rate or reverse repurchase rate is applicable when a country's reserve borrows money from banks. If reverse repo rate rises, it means that banks will provide more funds to the reserve. This is a safe proposition as lending money to most reserves is an extremely safe financial transaction. In cases of reserves borrowing money from banks, excess money left with the particular bank is channeled into the reserve. This causes money to be taken out of the economic system. Reverse repo rates come into play when there is a fund shortage being faced by the reserve.

The central bank manages short-term shortfalls and surpluses in the banking system through its liquidity adjustment facility (LAF), whereby it borrows and lends money at fixed rates under the repo and reverses repo

facilities. Since the RBI technically has an unlimited capacity to lend and borrow money, the repo and reverse repo rates act as a ceiling and a floor for the interest rates.

By reducing the reverse repo rate, the RBI has made it less attractive for banks to park money in the LAF window. So, banks would be forced to lend to corporates. Reducing the reverse repo rate will inject liquidity in the economy through corporate lending.

Thus, the repo rate signifies the rate at which liquidity is injected in the banking system by RBI, whereas the reverse repo rate signifies the rate at which the central bank absorbs liquidity from the banks.

2.5 Foreign Reserve Exchange

Foreign-exchange   reserves (also   called forex   reserves or FX   reserves   or official   international reserves or international reserves), the foreign currency deposits and bonds held by central banks and monetary authorities. Its commonly includes foreign exchange and gold, special drawing rights,(SDRs) and International Monetary Fund(IMF) reserve positions.

Foreign exchange reserves are important indicators of ability to repay foreign debt and for currency defense, and are used to determine credit ratings of nations.

In our research, we have taken total Foreign Currency Reserves which includes:
1. Foreign Currency Assets
2. Gold
3. SDRs
4. Reserve Position in the IMF

3. Review Of Literature

Martin Eichenbaum, et al presents new empirical evidence on the effects of monetary policy shocks on U.S. exchange rates, both nominal and real. Three measures of monetary policy shocks are considered: orthogonalized shocks to the Federal Funds rate, the ratio of Non Borrowed to Total Reserves and the Romer and Romer (1989) index. Using data from the flexible exchange rate era, we find that expansionary shocks to U.S. monetary policy lead to sharp. persistent depreciations in U.S. nominal and real exchange rates as well as to sharp. persistent increases in the spread between various foreign and U.S. interest rates. The temporal pattern of the depreciation in U.S. nominal exchange rates following a positive monetary policy shock is inconsistent with simple overshooting models of the type considered by Dornbusch (1976). We also find that U.S. monetary policy was less volatile under fixed exchange rates than under floating exchange rates. Finally, we find less evidence that monetary policy shocks had a significant impact on U.S. real exchange rates under the Bretton Woods agreement.

Sarbapriya Ray, Dept. of Commerce, Shyampur Siddheswari Mahavidyalaya, University of Calcutta, West Bengal, India tries to assess relationship between foreign exchange reserves of India and BSE market capitalization on the basis of annual data from the year 1990-91 to2010-11. This study uses simple linear regression model, unit root test, granger causality test to measure the relationship between foreign exchange reserves of India and BSE market capitalization. The results depicts that foreign exchange reserves of India has positive impact on BSE Stock Market capitalization. The granger causality test suggests that stock market capitalization (SMC) does not Granger cause foreign exchange reserve (FOREXR) at all where as foreign exchange reserve (FOREXR) Granger causes stock market capitalization (SMC). That means the Granger Causality Test shows that causality is unidirectional and it runs from foreign exchange reserve to stock market capitalization but not vice versa. This study sheds lights and provides significant information that will guide the stock brokers, agents, planners, government policy makers to make decision about the stocks and stock markets of India especially about BSE by looking at the trend of foreign exchange reserves of India.

K.RAVI TEJA, et al tries to examine cash reserve ratio effect on stock market returns in India. Also this paper attempts to investigate relative other factors which influence stock market returns in India. The following are the different determinants which we have considered Inflation, Cash balance of scheduled and commercial banks with RBI, Repo rate, Reverse repo rate, Index of industrial product, Domestic institutional investment, Foreign institutional investment, Bank nifty and Nifty prices. In India cash reserve ratio decision is taken by Reserve Bank of India which is also known as central bank of India. And also Reserve Bank of India takes decisions on repo rate, reverse repo rate & statutory liquidity ratio. Any fluctuations in cash reserve ratio will be having direct impact on stock market and on overall economy of the nation. During this analysis we have taken yearly basis database of different determinants which effects directly or indirectly on stock market returns. Cash reserve ratio is generally changed by RBI to control the Inflation

Vikram K. Joshi studied on the thrust of the monetary policy of India was on reducing the annual inflation rate. During the year 2009 to 2011, the inflation in India has crossed historical records and reached to unprecedented levels, and lying in the range of 9 ñ 14 %. The monetary authorities are striving hard to curb the inflation by adopting several monetary policy measures, the important amongst which are changes in CRR, repo and reverse repo rate, which directly influence the money supply in the market with immediate effect without creating any

distortions in the economy. In this paper the econometric study of impact of changes in CRR, repo rate and reverse repo rate adopted by the monetary authorities in curbing inflation is carried out and the model is formulated to evaluate the various alternatives to suggest the suitable policy based on the existing market scenario which can be implemented to curb the existing level of inflation.

Harish Arjun paper's assessed the difference in monetary policy effects for each operating procedure between the flexible and fixed depositrate cases considering the differences in the secondary monetary policy instruments such as discount rate and the required reserve ratio in different regimes. It also considers the implications of flexibility of the deposit rate for the feasibility of the current monetary policy strategy of using a short-run operating target to attain target ranges of growth in a selected monetary aggregate. The paper is based on the need that a comparison of the effects of monetary policy in fixed versus flexible deposit rates will provide minor idea about the changes that can be expected as the financial sector moves from a system of sticky average implicit interest payments on transactions balances to a system with much more flexible explicit marginal interest rates on such accounts .It is noticed that the effect of any policy instrument may also differ depending on whether the Federal funds rate is allowed to be fixed or variable. The results imply that when the rate is the short-run operating target then neither the discount rate nor the level of required reserve ratio cause any effect.

4. Research Methodology

Research methodology deals with a systematic and scientific methods that can be adopted to solve research problems. Methodology is a crucial step in any research because it directly influences the whole research and its findings.

The research study carried out is casual research study. The data collected for the study is secondary in nature. The objective of the study is to carry out an econometric study of the impact of changes in CRR, SLR, Repo rate and reverse repo rate on foreign Exchange reserves. The following hypotheses are set for the study:

Hypothesis:

Hypothesis 1: CRR is positively correlated to Foreign Exchange Reserves.

Hypothesis 2: SLR and Foreign Exchange Reserves are positively correlated.

Hypothesis 3: Repo Rate and Foreign Exchange Reserves are positively correlated.

Hypothesis 4: Reverse Repo Rate and Foreign Exchange Reserves are positively correlated.

An econometric study of impact of changes in CRR, SLR, Repo and Reverse repo rate on Foreign Exchange Reserves is carried out during the period April 2006 to March 2013.

5. Data Analysis And Interpretations

To test the above hypothesis, the data for CRR rate, SLR rate, Repo Rate, Reverse Repo Rate and Foreign exchange reserves is taken during the period during April 2006 to March 2013.

Table 1. Computation of Statistics for CRR, SLR, Repo rate and Reverse Repo Rate on Foreign Exchange Reserves

	Mean	Std. Deviation	N
Total Reserves	2.6591E5	46571.24882	365
Statutory Liquidity Ratio	24.4411	.65462	365
Repo Rate	6.9801	1.28031	365
Reverse Repo Rate	5.6116	1.31508	365
Cash Reserve Ratio	5.7986	1.10391	365

Table 2. Correlations

		Total Reserves	Statutory Liquidity Ratio	Repo Rate	Reverse Repo Rate	Cash Reserve Ratio
Pearson Correlation	Total Reserves	1.000	-.425	.114	.105	.225
	Statutory Liquidity Ratio	-.425	1.000	-.124	-.282	.557
	Repo Rate	.114	-.124	1.000	.939	.357
	Reverse Repo Rate	.105	-.282	.939	1.000	.099
	Cash Reserve Ratio	.225	.557	.357	.099	1.000
Sig. (1-tailed)	Total Reserves	.	.000	.015	.023	.000
	Statutory Liquidity Ratio	.000	.	.009	.000	.000
	Repo Rate	.015	.009	.	.000	.000
	Reverse Repo Rate	.023	.000	.000	.	.029
	Cash Reserve Ratio	.000	.000	.000	.029	.

Table 3. Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.773[a]	.597	.592	29735.87653	.597	133.211	4	360	.000

a. Predictors: (Constant), Cash Reserve Ratio, Reverse Repo Rate, Statutory Liquidity Ratio, Repo Rate

Table 4. ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4.712E11	4	1.178E11	133.211	.000[a]
	Residual	3.183E11	360	8.842E8		
	Total	7.895E11	364			

a. Predictors: (Constant), Cash Reserve Ratio, Reverse Repo Rate, Statutory Liquidity Ratio, Repo Rate

b. Dependent Variable: Total Reserves

Table 5. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.766E6	74450.581		23.718	.000		
	Statutory Liquidity Ratio	-66811.942	3152.088	-.939	-21.196	.000	.571	1.753
	Repo Rate	-42516.255	5569.028	-1.169	-7.634	.000	.048	20.928
	Reverse Repo Rate	29398.571	5067.360	.830	5.802	.000	.055	18.281
	Cash Reserve Ratio	45678.433	2559.874	1.083	17.844	.000	.304	3.287

Regression after dropping Reverse Repo Rate due to high collinearity

Table 6. Computation of Statistics for CRR, SLR, Repo rate on Foreign Exchange Reserves

	Mean	Std. Deviation	N
Total Reserves	2.6591E5	46571.24882	365
Statutory Liquidity Ratio	24.4411	.65462	365
Repo Rate	6.9801	1.28031	365
Cash Reserve Ratio	5.7986	1.10391	365

Table 7. Correlations

		Total Reserves	Statutory Liquidity Ratio	Repo Rate	Cash Reserve Ratio
Pearson Correlation	Total Reserves	1.000	-.425	.114	.225
	Statutory Liquidity Ratio	-.425	1.000	-.124	.557
	Repo Rate	.114	-.124	1.000	.357
	Cash Reserve Ratio	.225	.557	.357	1.000
Sig. (1-tailed)	Total Reserves	.	.000	.015	.000
	Statutory Liquidity Ratio	.000	.	.009	.000
	Repo Rate	.015	.009	.	.000
	Cash Reserve Ratio	.000	.000	.000	.
N	Total Reserves	365	365	365	365
	Statutory Liquidity Ratio	365	365	365	365
	Repo Rate	365	365	365	365
	Cash Reserve Ratio	365	365	365	365

Due to high correlation between Repo & Reverse Repo Rate (.939), collinearity problem produced, so it is dropped for further analysis.

The correlation between CRR & Total Reserves is highly significant (.225, p=.000) indicating that both are positively correlated, increase in CRR causes increase in Total Reserves. Thus, Hypothesis 1 is accepted.

The correlation between SLR & Total Reserves is highly significant (-.425, p=.000) indicating that both are negatively correlated, increase in SLR causes reduction in Total Reserves. Thus, Hypothesis 2 is rejected.

The correlation between Repo Rate & Total Reserves is not significant at 1 % but significant at 5 % (.114, p=.015) indicating that both are positively correlated, increase in Repo Rate causes increase in Total Reserves. Thus Hypothesis 3 is accepted.

Table 8. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.748[a]	.559	.555	31051.79495	.559	152.591	3	361	.000

a. Predictors: (Constant), Cash Reserve Ratio, Repo Rate, Statutory Liquidity Ratio

The above model shows Adjusted R Square is 55.5 % i.e. more than 50% of the variance is explained by the variables taken which indicates good fit for the model.

Table 9. ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4.414E11	3	1.471E11	152.591	.000[a]
	Residual	3.481E11	361	9.642E8		
	Total	7.895E11	364			

a. Predictors: (Constant), Cash Reserve Ratio, Repo Rate, Statutory Liquidity Ratio

b. Dependent Variable: Total Reserves

The ANOVA shows the Model is fit for regression (F=152.591, p=.000)

Table 10. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	1.774E6	77732.447		22.817	.000		
	Statutory Liquidity Ratio	-67075.869	3291.236	-.943	-20.380	.000	.571	1.752
	Repo Rate	-11295.778	1496.831	-.311	-7.546	.000	.721	1.386
	Cash Reserve Ratio	36306.030	2073.605	.861	17.509	.000	.506	1.978

a. Dependent Variable: Total Reserves

Highly significant negative beta value[β=-.943 (t=-20.380, p=.000)] shows increase in 1 standard deviation of SLR will cause reduction of .943 in Total Reserves.

Highly significant negative beta value [β=-.311 (t=-7.546, p=.000)] shows increase in 1 standard deviation of Repo will cause reduction of .311 in Total Reserves.

Highly significant positive beta value [β=.861 (t=17.509, p=.000)] shows increase in 1 standard deviation of CRR will cause increase of .861 in Total Reserves.

6. Conclusion

Increase in CRR will increase Bank Lending Rates which will decrease liquidity from the market and results in Rupee appreciation which will make import cheaper and give rise to foreign exchange reserves. It means increase in CRR will also increase foreign exchange reserves. But increase in SLR will have negative impact on foreign exchange reserves because SLR rate is not having much impact on Bank lending rates & therefore liquidity is not getting affected. Like wise Increase in Repo Rate also causes increase in Total Reserves.

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Biography

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