

A Study of Monetary Policy Impact on Stock Market Returns

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ABSTRACT:

The study of monetary policy impact on market volatility has been done by considering 15 years data. Monetary policy is the fixed event where market will wait to take fix direction based on the policy rates changes. CRR and SLR are the two key liquid rates playing vital role in controlling of liquidity in India. This analysis had proven that IIP influenced by changes of CRR. Interest rates found to be non-significant when it comes to be NIFTY volatility. Augmented Dickey Fuller Test (ADF) has been applied for the stationary of the data which were averaged yearly. Arch model had proven that NIFTY volatility is getting influenced whenever monetary policy announced. This analysis is useful for the traders, investors, pension funds, mutual funds, portfolio managers and investment bankers.

Keywords:- BCI, CRR, GDP, IIP, NIFTY, Repo rate, Reverse repo rate, SLR and WPI.

INTRODUCTION:

Monetary policy concerned with changes in the supply of money. India's monetary policy is about financing of economic growth. In 1980's the Indian economy was suffering from a big economic crisis, and to meet the crisis India approached World Bank and International Monetary Fund (IMF) for loan and World Bank granted the loan. Afterwards India introduced the new economic policy in July, 1991. The policy introduced with the aim to slowing down monetary expansions and to controlling inflation.

Monetary policy is formulated by the central bank (RBI) to facilitate economic growth and to control the supply of money. Every year Reserve Bank of India changes the cash reserve ratio (CRR), statutory liquidity ratio (SLR), repo rate, reverse repo rate to control the money supply of the country. This analysis is aim to discuss about the impact of monetary policy on stock market return. Stock prices are closely monitored asset prices in the economy and it is regarded as highly sensitive to economic conditions. The stock prices depend on the key interest rates of RBI. If RBI increases CRR the interest rates of the bank will increase. Hence all firm may not borrow money from banks which results reduction in the production of goods and services. Due to this imports will increase and exports will decrease, which causes the reduction of Gross Domestic Product of the country.

In stock market a cut in interest rates will cause the positive impact. If CRR rates will decrease the bank savings will be unattractive. Thus, depositors may move to the stock market, which results boost in the security prices.

The liquidity in the stock market is generated by the central bank with monetary policy. Stock market volatility is depends on the monetary policy rates. Hence NIFTY volatility is influenced by the CRR of RBI. Recently India has experienced high inflation because, the RBI revised the Cash reserve ratio and policy rate (Repo rate). So, any fluctuation in the monetary policy will be having direct impact on stock market returns and overall economy of the nation.

OBJECTIVES:

- ❖ To know the monetary policy key rates relation with NIFTY and Bank NIFTY.
- ❖ To measure the inflation influence on key interest rates.
- ❖ To find relation and influence of CRR and Liquidity rates with Index of industrial production (IIP).
- ❖ To measure the monetary policy rates influence on select economic indicators.
- ❖ To find the CRR impact on stock market volatility.

SCOPE: The analysis has been emphasized from the year 2000 to 2014 *i.e.*, 15 years period. For this analysis NIFTY has been considered as the Benchmark for the market. The aim of the analysis is to find monetary policy impact on NIFTY, for this analysis few key rates has been considered along with the select economic factor.

Empirical study:

CRR (Cash Reserve Ratio), SLR (Statutory Liquidity Ratio), Repo Rate, Reverse Repo Rate IIP (Index of Industrial Production), GDP (Gross Domestic Product), WPI, BCI (Business Confidence Index), NIFTY, Bank NIFTY, Bank Liquidity.

NEED OF THE STUDY: There is close relationship between monetary policy and Stock market. This analysis is a perfect guideline for investors and bankers. This will show the right way to take decisions regarding investment in stock market. The analysis enable the government of the country to determine, how best to stimulate the stock market using monetary policy tools. This will be useful to restore investor's confidence. When monetary policy and stock market relationship are established, investors will use the trend to make their own investment decision, instead of relying mostly on stock brokers. This analysis will guide the companies regarding borrowing measures. The study is mainly emphasized on how stock market is related to monetary policy rates and how monetary policy is influencing stock market prices.

LITERATURE REVIEW:

Punita Rao, K. J. Somaiya: This purpose of this study is to investigate the impact of monetary policy on the profitability of banks in the context of financial sector reforms in India. We discuss the financial sector reforms and the implication of the banks, the various instruments of monetary policy in India, and the impact of monetary policy on the profitability of banks.

B L Pandit , Pankaj Vashisht: Impact of changes in policy rate of interest on demand for bank credit is examined for seven emerging market economies including India for the period 2002 to 2010. Panel data techniques are used after ruling out the presence of unit roots. The results show that when other determinants, like domestic demand pressure, export demand and impact of stock market signals are controlled for, change in policy rate of interest is an important determinant of firms' demand for bank credit. The results confirm that monetary policy is an important countercyclical tool for setting the pace of economic activity.

Prasanna V., Salian1, Gopakumar. K: This paper seeks to examine the relationship between inflation and GDP growth in India. Empirical evidence is obtained from the cointegration and error correction models using annual data collected from the Reserve Bank of India. The result shows that there is a long-run negative relationship between inflation and GDP growth rate in India. Inflation is harmful rather than helpful to growth. These results

have important policy implications.

Jeevan Kumar Khundrakpam: Using a structural VAR model on quarterly data from 2000Q1 to 2011Q1, this paper estimated the impact of monetary policy on aggregate demand in India. The overall impact on aggregate demand is then decomposed to observe the differential impact among the various components. It finds that an interest rate hike has a significant negative impact on the growth of aggregate demand. However, the maximum impact is borne by investment demand growth and imports growth. Impact on private consumption growth and exports growth are relatively far more subdued, while there is hardly any cumulative impact on government consumption growth as it increases after some marginal fall initially. Variance decomposition analysis indicates that interest rate accounts for a significant percentage of the fluctuation in the growth of all the components of aggregate demand, except government consumption. Further, interest rate channel completely dominates exchange rate channel in monetary transmission, though the latter channel has non-negligible impact on investment and imports.

Amaresh Samantaraya: Empirical evidences on the transmission mechanism by which monetary policy affects the economy, particularly general prices and real activity, are essential, both for effective policy making and understanding the alternate macroeconomic theories. A consensus has largely been established on the influence of monetary policy on the economy through its impact on the spending decisions on consumption and investment. Banks play a central role in monetary transmission as monetary policy impulses through bank credit affect consumption and investment decisions of the individuals and thus affect the aggregate demand, which in turn transmits the impact to the final objectives of price and output stabilization. The present study attempts to empirically examine the nature and strength of monetary policy influence on inflation and real activity in India, with special emphasis on the role of banking channel in the transmission process. Considering the fact that the Reserve Bank of India adopted 'multiple indicator approach' in the conduct of monetary policy since April 1998, the present paper uses a Monetary Policy Indicator (MPI) to capture the policy stance appropriately. The empirical evidences reiterated monetary policy influence on inflation and real activity. The lag effect of monetary policy on inflation (about 18 months) was found to be longer as compared to real activity (about a year), implying the impact of policy shocks being realized initially in aggregate demand subsequently gets transmitted to prices. Monetary policy shocks were observed to have desired influence on interest rates and bank investments, while the effect on bank credit was observed with a lag of around one year. The empirical evidences revealed high importance of bank investment in the monetary transmission process, which seems plausible given the relevance and size of bank investment portfolio in the Indian context.

Saibal Ghosh: The study exploits 2-digit level industry data for the period 1981-2004 to ascertain the inter-linkage between a monetary policy shock and industry value added. Accordingly, we first estimate a Vector Auto Regression (VAR) model to ascertain the magnitude of a monetary policy shock on industrial output. Subsequently, we try to explain the observed heterogeneity in terms of industry characteristics. The findings indicate that (a) industries exhibit differential response to a monetary tightening and (b) both interest rate and financial accelerator variables tend to be important in explaining the differential response.

Mehmet Ivrendi and Zekeriya Yildirim: This paper investigates both the effects of domestic monetary policy and external shocks on fundamental macroeconomic variables in six fast growing emerging economies: Brazil, Russia, India, China, South Africa and

Turkey—denoted hereafter as BRICS_T. The authors adopt a structural VAR model with a block exogeneity procedure to identify domestic monetary policy shocks and external shocks. Their research reveals that a contractionary monetary policy in most countries appreciates the domestic currency, increases interest rates, effectively controls inflation rates and reduces output. They do not find any evidence of the price, output, exchange rates and trade puzzles that are usually found in VAR studies. Their findings imply that the exchange rate is the main transmission mechanism in BRICS_T economies. The authors also find that there are inverse J-curves in five of the six fast growing emerging economies and there are deviations from UIP (Uncovered Interest Parity) in response to a contractionary monetary policy in those countries. Moreover, world output shocks are not a dominant source of fluctuations in those economies.

Sushanta Mallick: This paper investigates the macroeconomic impact of nominal exchange rate and monetary shocks in a structural vector-autoregressive (SVAR) model using quarterly Indian data spanning 1996:Q2 – 2009:Q4, along with examining the impact of term-premium and fiscal policy shocks. A theoretical setting has been developed and the model predictions have been estimated, identifying structural shocks via recursive and non-recursive procedures. Given the regular intervention by the Central Bank in the FX market and high inflation, these two sources contribute significantly to a depreciating currency. Supply shocks are found to be dominant sources of inflation than exchange rate and demand shocks, while monetary policy shocks play a limited role in stabilizing inflation although they (also fiscal shocks) significantly affect output dynamics. To further validate these results, we identify monetary and exchange rate shocks jointly within a sign-restriction based SVAR to demonstrate the case of exchange rate targeting (in an asymmetric fashion) by restricting it not to appreciate, which in part explains the persistent inflation at high single-digit levels in India.

J K Sachdeva: Indian economy also passed through these stages during the year 2008. The economic growth rate, which was above 8% for consecutive period of three years since 2006, suddenly plunged to an average of 5.5%. Developed world is under the fear that recession may not turn out to be continuous process resulting into great depression. Generally recessions are for two quarters, but depression is a severe economic downturn that lasts several years. Earlier India was affected less by external world depressions as it relied more on internal consumption, saving and import substitutions. However, after 1991 India opened up its economy to global players, share of exports, both goods and services, in GDP grew significantly. This paper is an attempt to analyze the variables responsible for India's recent growth, impact of world recession on these variables and their significance. It needs to validate whether India's economy has shifted away from consumption and saving to external sector dependence.

RESEARCH METHODOLOGY:

Monetary policy key rates has been averaged yearly from 2000-2014 all the selected economic variables has been averaged yearly. On the collected yearly data descriptive statistical tools has been applied namely:

- Partial correlation

$$r_{12.3} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{1 - r_{13}^2} \sqrt{1 - r_{23}^2}}$$

- Skewness and Kurtosis

$$skewness = \frac{\sum_{i=1}^N (Y_i - \bar{Y})^3}{(N - 1)s^3} \quad kurtosis = \frac{\sum_{i=1}^N (Y_i - \bar{Y})^4}{(N - 1)s^4}$$

- Bi-variate correlation and Phillips-Perron NG Test

$$r = \frac{\sum f_{uv} - \frac{(\sum f_u)(\sum f_v)}{n}}{\sqrt{\sum f_u^2 - \frac{(\sum f_u)^2}{n}} \times \sqrt{\sum f_v^2 - \frac{(\sum f_v)^2}{n}}}$$

- Phillips-Perron NG Test:

$$\begin{aligned} \Delta y_t &= \beta' \mathbf{D}_t + \pi y_{t-1} + u_t \\ Z_t &= \left(\frac{\hat{\sigma}^2}{\hat{\lambda}^2} \right)^{1/2} \cdot t_{\pi=0} - \frac{1}{2} \left(\frac{\hat{\lambda}^2 - \hat{\sigma}^2}{\hat{\lambda}^2} \right) \cdot \left(\frac{T \cdot SE(\hat{\pi})}{\hat{\sigma}^2} \right) \\ Z_{\pi} &= T\hat{\pi} - \frac{1}{2} \frac{T^2 \cdot SE(\hat{\pi})}{\hat{\sigma}^2} (\hat{\lambda}^2 - \hat{\sigma}^2) \\ \sigma^2 &= \lim_{T \rightarrow \infty} T^{-1} \sum_{t=1}^T E[u_t^2] \\ \lambda^2 &= \lim_{T \rightarrow \infty} \sum_{t=1}^T E[T^{-1} S_T^2] \end{aligned}$$

- T-Test:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$$

- Granger causality test:

Granger causality test is performed by two methods as follows:

1. Mathematical statement:

$$y_t = a_0 + a_1 y_{t-1} + a_2 y_{t-2} + \dots + a_m y_{t-m} + \text{residual}_t.$$

Multivariate analysis:

$$X(t) = \sum_{\tau=1}^L A_{\tau} X(t - \tau) + \varepsilon(t),$$

LIMITATIONS:

- Inflation data is not available for the year 2000.
- In this analysis WPI has been considered for the inflation.
- BCI data is not available for July 2010, January 2010 and July 2009.
- GDP value for the year 2013 and 2014 was not considered for the analysis.
- All the variables were averaged yearly and converted the data to stationary.

DATA ANALYSIS

Variables considered for analysis are as under:

Years	Repo Rate	Reverse Repo Rate	Cash Reserve Ratio	Statutory Liquidity Ratio	Bank Liquidity	Bank NIFTY	NIFTY	WPI	GDP	IIP	BCI
2000	7.75	6.75	0	22.5	Not Available	987.1205319	1346.33	Not Available	4660.57	143.3	Not Available
2001	7.8125	6.8125	3.854166667	22.75	2336.355385	984.3794355	1121.55	161.3166667	4931.5125	148.6	Not Available
2002	7.25	6.25	5.5	23.14285714	2606.99717	1054.681474	1056.02	166.7666667	5120.725	152.5	Not Available
2003	5.708333333	4.416666667	5.666666667	24	2956.267692	1718.829094	1233.71	175.9	5556.9	159.9	Not Available
2004	4.95	3.45	5.65	24.4	3378.597547	2644.566181	1755.87	187.275	7428.6575	168.6	Not Available
2005	5	3.5	5.25	25	3837.700577	3862.000199	2268.91	104.4666667	8132.685	177.9	65.7
2006	6.7	4.8	5.4	24.4	4484.330385	4735.4734	3357.09	111.35	8910.91	108.6	68.25
2007	8.38888889	5	8.111111111	24	5175.648462	6887.505622	4571.29	116.625	9741.585	122.6	67.85
2008	7.65	5.116666667	6.216666667	24	6136.798462	6564.79939	4339.11	126.0166667	10396.6875	141.7	63.65
2009	6.3	5.05	5.2	24	7130.030192	6771.394856	4113.96	130.8166667	11290.17887	145.2	57.5
2010	6.48	4.675	4.625	24	8457.888302	10359.09246	5461.12	143.325	12296.32776	152.9	66.85
2011	7.71428571	5.678571429	4.964285714	24	9824.216731	10297.86781	5335.91	156.1333333	13118.82	165.5	62.25
2012	8.46428571	6.321428571	6.5	24	11036.14673	10509.24004	5343.77	167.6166667	13705.28	170.3	51.95
2013	9	6.75	8.1875	24	12175.16358	11414.9694	5915.91	177.6416667	14354.475	172.2	49.52
2014	9	6.75	8.5	24	13266.62167	11124.93254	6280.58	181.7	0	172.0	52.4

Partial Correlation Table No. 1

Control Variables	NIFTY	BANKNIFTY	CRR	SLR	REPORATE	REVERSEREPORATE		
GDP	NIFTY	Correlation	1	0.68	-0.063	-0.374	0.522	0.235
		Significance (2-tailed)	.	0.011	0.839	0.208	0.068	0.44
		df	0	11	11	11	11	11
	BANKNIFTY	Correlation	0.68	1	-0.191	-0.458	0.432	0.333
		Significance (2-tailed)	0.011	.	0.532	0.115	0.14	0.267
		df	11	0	11	11	11	11
	CRR	Correlation	-0.063	-0.191	1	0.448	-0.02	-0.273
		Significance (2-tailed)	0.839	0.532	.	0.124	0.948	0.366
		df	11	11	0	11	11	11
	SLR	Correlation	-0.374	-0.458	0.448	1	-0.794	-0.91
		Significance (2-tailed)	0.208	0.115	0.124	.	0.001	0
		df	11	11	11	0	11	11
	REPORATE	Correlation	0.522	0.432	-0.02	-0.794	1	0.89
		Significance (2-tailed)	0.068	0.14	0.948	0.001	.	0
		df	11	11	11	11	0	11
	REVERSERE	Correlation	0.235	0.333	-0.273	-0.91	0.89	1
		Significance (2-tailed)	0.44	0.267	0.366	0	0	.
		df	11	11	11	11	11	0

Correlations

		CRR	IIP	BANKLIQUIDITY
CRR	Pearson C	1	0.195	.567*
	Sig. (2-tailed)		0.486	0.034
	N	15	15	14
IIP	Pearson C	0.195	1	0.361
	Sig. (2-tail)	0.486		0.204
	N	15	15	14
BANKLIQUIDITY	Pearson C	.567*	0.361	1
	Sig. (2-tail)	0.034	0.204	
	N	14	14	14

The above table depicts the picture of relationship between market indices that is NIFTY and Bank NIFTY with monetary policy key rates. CRR and SLR found to be negatively correlated with the indices, but at the same time Repo and Reverse Repo Rates are found to be positively correlated with market indices.

Table No. 2

	Skewness	Kurtosis
WPI vs CRR	0.257170851	-1.858532948
WPI vs SLR	0.307291159	-1.786598666
WPI vs Repo Rate	0.261631198	-1.853639653
WPI vs Reverse Repo Rate	0.257658147	-1.85990741

The above analysis have been done to inflation with monetary policy rates, Skewness has been applied and all the calculated values are found to be less than 1 that is left skewed, and the data is normally distributed.

Kurtosis has been applied for the inflation and monetary policy rates, all the values are fallen in negative region which is less than base value 3 it means leptokurtic which indicates that the inflation is influencing the monetary policy rates in both scenarios.

Table No. 3

Null Hypothesis: CRR has a unit root

Exogenous: Constant

Lag length: 0 (Spectral GLS-detrended AR based on SIC, MAXLAG=3)

Sample: 1 15

Included observations: 15

	MZa	MZt	MSB	MPT	
Ng-Perron test statistics	-1.6213	-0.6333	0.3906	10.777	
Asymptotic critical values*:					
	1%	-13.80C	-2.580C	0.174C	1.780C
	5%	-8.100C	-1.980C	0.233C	3.170C

	10%	-5.7000	-1.6200	0.2750	4.4500
*Ng-Perron (2001, Table 1)					
HAC corrected variance (Spectral GLS-detrended AR)					1.711847
Null Hypothesis: LIQUIDITY has a unit root					
Exogenous: Constant					
Lag length: 1 (Spectral GLS-detrended AR based on SIC, MAXLAG=2)					
Sample (adjusted): 2 15					
Included observations: 14 after adjustments					
	MZa	MZt	MSB	MPT	
Ng-Perron test statistics	0.84770	0.51959	0.61294		29.0496
Asymptotic critical values*:					
	1%	-13.8000	-2.58000	0.17400	1.78000
	5%	-8.10000	-1.98000	0.23300	3.17000
	10%	-5.70000	-1.62000	0.27500	4.45000
*Ng-Perron (2001, Table 1)					

HAC corrected variance (Spectral GLS-detrended AR)	2142552.
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The above analysis shows that CRR and bank liquidity are found to be slightly to moderately co-related with index of industrial production.

Ng-Perron test has been applied to find the affect on IIP. The data has been assumed stationary and all the critical values in 3 different alpha level (1%, 5%, 10%) are found to be increasing trend. Hence, we reject the alternative hypothesis and accept the null hypothesis which indicates CRR is not influencing IIP.

Table No. 5

Variable	t-test	table value	Significance
CRR Vs IIP	1.4778E-22	2.145	Significant
CRR Vs WPI	1.0762E-17	2.145	Significant
CRR Vs GDP	4.6097E-11	2.145	Non-Significant

From the above table we can see that CRR is influencing both IIP and WPI and not influencing GDP.

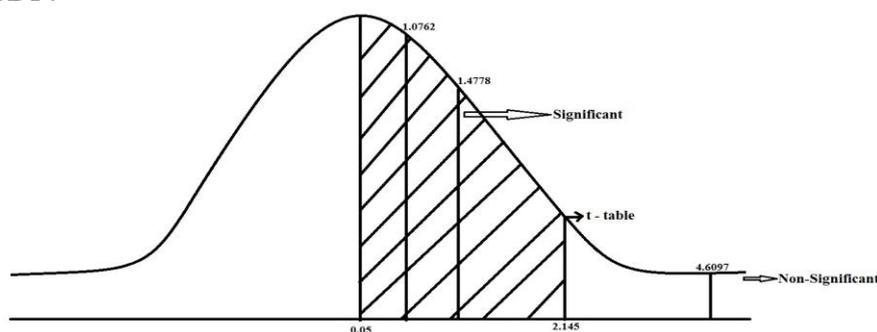


Table No. 6

Variable	t-test	table value	Significance
SLR Vs IIP	4.5953E-21	2.145	Non-Significant
SLR Vs WPI	2.9991E-16	2.145	Non-Significant
SLR Vs GDP	4.8139E-11	2.145	Non-Significant

In the above table we can observe that SLR is not influencing all the three IIP, GDP and WPI.

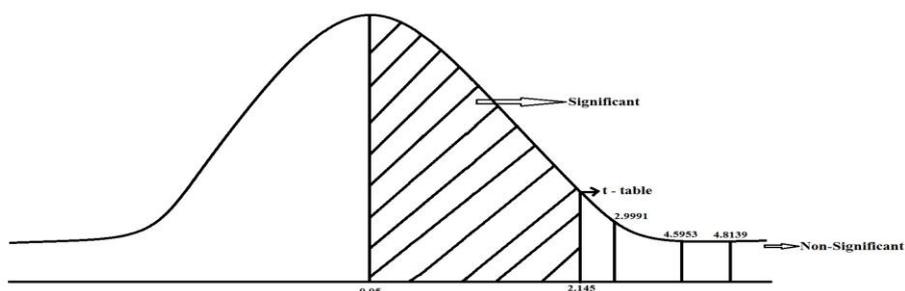


Table No. 7

Variable	t-test	table value	Significance
REPO Vs IIP	1.8313E-22	2.145	Significant
REPO Vs WPI	1.3755E-17	2.145	Significant
REPO Vs GDP	4.6276E-11	2.145	Non-Significant

In the above table we can see that Repo rate is influencing both IIP and WPI but not influencing GDP.

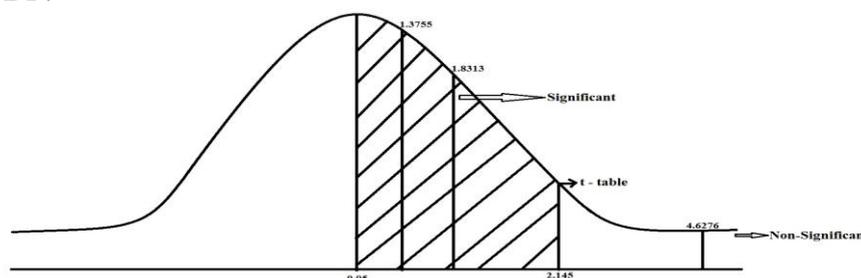
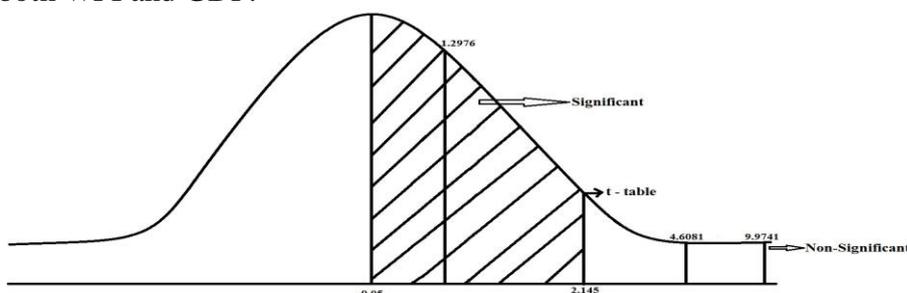


Table No. 8

Variable	t-test	table value	Significance
RR Vs IIP	1.2976E-22	2.145	Significant
RR Vs WPI	9.9741E-18	2.145	Non-Significant
RR Vs GDP	4.6081E-11	2.145	Non-Significant

In the above table we can observe that Reverse Repo is influencing only IIP and not influencing both WPI and GDP.



Hypothesis:

H₀ - Null hypothesis; If the calculated value is less than table value accept the hypothesis and consider as significance.

H₁ - Alternative hypothesis.

If the calculated value is more than table value accept the alternative hypothesis reject null hypothesis and it is not considered significance.

Table No. 9

Pairwise Granger Causality Tests

Date: 07/28/14 Time: 17:24

Sample: 1 15

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
REPO does not Granger Cause NIFTY	13	1.70313	0.2420
NIFTY does not Granger Cause REPO		3.21511	0.0945

Pairwise Granger Causality Tests

Date: 07/28/14 Time: 17:25

Sample: 1 15

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
CRR does not Granger Cause NIFTY	13	0.63022	0.5570
NIFTY does not Granger Cause CRR		0.65503	0.5452

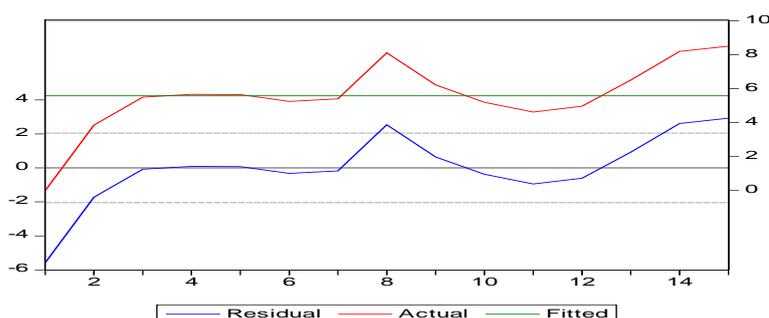
Null Hypothesis: CRR Nifty has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic based on SIC, MAXLAG=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.837817	0.3479
Test critical values: 1% level	-4.057910	
5% level	-3.119910	
10% level	-2.701103	

Augmented Dickey-Fuller test has been applied to find the stationarity, and the probability value is found to be significant that is 0.34 which is < 0.5. Hence, the data is stationary.



The residual values were fluctuating and crossed fitted line which indicates that NIFTY is trading volatile. Hence, ARCH model can be applied to find the influence of CRR on NIFTY.

Table No. 10

Heteroskedasticity Test: ARCH

F-statistic	0.718845	Prob. F(1,12)	0.4131
Obs*R-squared	0.791254	Prob. Chi-Square(1)	0.3737

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.104017	0.600125	3.505962	0.0043
RESID^2(-1)	-0.084315	0.099446	-0.847847	0.4131

Mean dependent var	1.853226
S.D. dependent var	1.932514
Akaike info criterion	4.308949
Schwarz criterion	4.400243
Hannan-Quinn criter.	4.300498
Durbin-Watson stat	1.678691

The above table depicts the analysis to find the influence of CRR on NIFTY volatility arch has been applied and CRR and NIFTY the probability value is found to be significant because it is less than 0.5 and AIC (Aikkaika info criterion) 0.30 and SIC 4.40.

Table No. 11

Sample: 1 15				
Included observations: 15				
Convergence achieved after 64 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	5.359587	1.948807	2.750189	0.0060
NIFTY	0.000115	0.000299	0.385896	0.6996
Variance Equation				
C	0.221697	0.169441	1.308403	0.1907
RESID(-1)^2	-0.385471	0.192066	-2.006971	0.0448
GARCH(-1)	1.304725	0.410787	3.176156	0.0015
Mean dependent var				5.575026
S.D. dependent var				2.047540
Akaike info criterion				3.682254
Schwarz criterion				3.918271
Hannan-Quinn criter.				3.679740
Durbin-Watson stat				0.662004

GARCH model has been applied and the probability value is found to be significant that is 0.0060 which is < 0.5. Hence, CRR is influencing the NIFTY volatility with the AIC 3.68 and SIC 3.91. The best model is found to be GARCH than the ARCH because AIC and SIC values are found to be lower in GARCH.

FINDINGS:

- It has been observed that CRR and SLR are negatively correlated with the market indices that are NIFTY and Bank NIFTY, while, Repo rate and Reverse Repo rate are positively correlated with the market indices.
- Skewness and Kurtosis has been applied to inflation and monetary policy rates to know whether inflation is influencing monetary policy rates or not and it is found that monetary policy rates are influenced by inflation.
- The relation of CRR and Bank liquidity with IIP is slightly too moderately correlated. According to Ng-Perron test it is found that CRR and Bank liquidity is not influencing IIP.
- T-test Hypothesis - H₀ (Null hypothesis); If the calculated value is less than table value accept the hypothesis and considered as significance.

H₁ - Alternative hypothesis; If the calculated value is more than table value accept the alternative hypothesis and reject null hypothesis and it is not considered significance.

The t-test has been applied on above economic variable to find significant and non-significant without considering the stationery of the data.

CRR:- t-test has been applied to IIP, GDP and WPI and it is observed that it is not influencing GDP and influencing both IIP and WPI.

SLR:- It's not at all influencing IIP, GDP and WPI.

Repo rate:- It is influencing IIP and WPI but not influencing GDP.

Reverse Repo:- It is influencing IIP but not influencing WPI and GDP.

- In this analysis we applied Augmented-Dickey Fuller test to know the stationary of the data and it is found that data is stationary. Then we applied ARCH model to know whether CRR is influencing the NIFTY volatility or not and it is found that CRR is influencing the nifty volatility.

CONCLUSION:

I conclude the analysis of monetary policy impact on stock market volatility and return. Both the reserve ratios CRR and SLR are negatively correlated with market indices but interest rate were moving in the same direction along with the market. Augmented Dickey Fuller Test (ADF) has been applied on the NIFTY yearly averages along with the CRR and SLR and data found to be stationary. Arch model shows that CRR influencing NIFTY volatility whenever the monetary policy announced by the RBI governor. Hence, there is a further scope to do research on monetary policy changes impact on market benchmark behaviour.

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