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CASH RESERVE RATIO IMPACT ON STOCK MARKET (INDIA) IN LONG RUN

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ABSTRACT
The following paper 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.

KEY WORDS: Inflation, Cash reserve ratio, Domestic institutional investment, foreign institutional investment, Bank nifty, nifty prices.

INTRODUCTION
Cash reserve ratio is regulated by Reserve Bank of India, cash reserve ratio is the percentage of funds that a commercial and schedule banks excluding regional and rural banks have to keep with RBI. The main reason to maintain the CRR is to keep a bank liquid at any point of time. Whenever banks keep low CRR it increases the availability of the money with the bank for credit in the system. This eases the pressure on interest rates and interest rates goes down. And also when the money is available with the bank and if it is ready to give the loan to the different industries at lower interest rate it directly adds fuel to the economy growth. Whenever the RBI increases CRR the amount at the banks comes down automatically.

Generally CRR is maintained by RBI to control the liquidity in the market and to control the inflation. If there is any increase is CRR it slows down the growth of the economy.

Impact of cash reserve ratio on Indian economy:

Impact on interest rates: Interest rates are cost of the loan. If there is hike in the CRR the banks must deposit more amount of cash with RBI, or if there is any decrease in CRR the banks will deposit less amount of cash with RBI. Due to CRR banks may have more or less cash for lending and rate.

Impact on investment: Firms operating in the economy needs money for expansion and for various purpose. If interest rates are high due to increase in CRR, all firms may not get money from the banks. Due to this growth of the economy slows down.

Impact on common public: Public might take loan for availing some services. Due to high interest rates public may consume less. If CRR is increased the public will consume less and will have direct impact GDP.

Impact on Exports and Imports: If interest rates are high firms will consume less amount and they reduced their expansion plans, it makes the production of goods and services low, since the production has decreased, People will purchase from foreign markets to get their desired products. Imports will increase and exports decreases, ultimately put downward pressure on GDP by reducing Exports.

CRR IMPACT ON STOCK MARKETS

Hikes in CRR leading to raise interest rates have several implications including. Slowing down the overall growth in the economy; this effectively means that demand for goods and services, and investment activity, gets adversely impacted. Apart from the fact that overall growth is impacted, companies take a hit on account of higher interest costs that they have to bear on their outstanding loans (to the extent their cost of funds is not locked in). Since some investors tend to leverage and invest in the stock markets, higher interest rates increase expectation of returns from the stock markets; this has the impact of lowering current stock prices. An overall decline in stock prices has a cascading effect as leveraged positions are unwound (on account of meeting margin requirements), leading to still lower stock prices.

In Indian equity markets there are three levels of macro risk; a high P/E, a relatively overvalued rupee and interest rates that have stayed relatively low considering the level of economic growth, and we associate these things with growth. The P/E multiples are high because growth is strong, the rupee has been firm because strong growth has attracted capital and that capital has helped keep interest rates low. With CRR hike RBI is about to end the growth party and if growth begins to slow down then you are likely to see a lower P/E, a low rupee and a potentially higher interest rates.

A cut in CRR would lead to a fall in interest rate. A cut in interest rates would make savings in banks unattractive. Thus, depositors may move to the stock market at a time when the revival of the bourses is crucial for regenerating Indian industry. Thus a reduction in CRR would boost the securities prices and players are also expecting the Government to align the savings rate to the same structural levels.

REVIEW OF LITERATURE

S. Vanitha, P. Nageswari & P. Srinivasan: Monetary policy is the process by which the Central Bank or Monetary authority of a country controls the supply of money, often targeting a rate of interest. Every year Reserve Bank of India changes the cash reserve ratio

(CRR), statutory liquidity ratio *(SLR)*, prime lending rates *(PLR)*, Repo Rate etc, to control the money supply of the country. This paper aim to discuss about the impact of reverse repo rate and cash reverse ratio in the share price of banking companies listed in National Stock Exchange. The analysis of the study showed that the security prices reacted to the announcements of reverse repo rate and cash reserve ratio.

Arijit Ghosh, Gautam Bandyopadhyay & Kripasindhu Choudhuri: The following paper tries to investigate and predict optimal condition of the primary factors responsible for affecting Bombay Stock Exchange (BSE) in India. We considered the following determinants Oil prices, Gold price, Cash Reserve Ratio, Food Price Inflation, Call Money Rate, Dollar Price, F D I, Foreign Portfolio Investment and Foreign Exchange Reserve (Forex). We have taken into consideration the Multicollinearity problem among different macroeconomic variables and attempted to eliminate it. To do this analysis we have taken monthly basis database of different economical variables. Then we applied Factor Analysis to find out Factors affecting BSE Sense. We found that Dollar Price along with "Factor 1"i.e; "External Reserve" and "Factor score 2"i.e; "Inflation Inertia" are significantly affecting BSE Sensex. Then with the help of Linear Programming Problem the optimality conditions of the primary factors are traced out to ascertain the optimal value of BSE Sensex.

T. Mallikarjunappa & Afsal: This paper studies the volatility implications of the introduction of derivatives on stock market volatility in India using the S&P CNX Nifty Index as a benchmark. To account for non-constant error variance in the return series, a GARCH model is fitted by incorporating futures and options dummy variables in the conditional variance equation. We find clustering and persistence of volatility before and after derivatives, while listing seems to have no stabilization or destabilization effects on market volatility. The post-derivatives period shows that the sensitivity of the index returns to market returns and any day-of-the-week effects have disappeared. That is, the nature of the volatility patterns has altered during the post-derivatives period.

Pankaj Kumar and Pratik Mitra: In the recent past India has experienced high and persistent inflation. In response the Reserve Bank of India cumulatively raised the cash reserve ratio by 100 basis points and the policy rate (repo rate) by 375 basis points between January 2010 and October 2011. Despite these policy actions, the inflation rate however continues to remain stubbornly high. What explains our current inflation predicament? This paper finds that large contemporary government deficits unaccompanied by concrete prospects for future government surpluses promote realistic doubts about whether monetary restraint must be abandoned sooner or later to help finance the deficit. The result will be a rise in inflationary expectations in spite of current money-supply restraint- a bout of unpleasant monetarist arithmetic. In sum, it is insufficient to announce and maintain restrictive monetary policies unless accompanied by a coordinated reduction in the budget deficits. Prudent anti-inflation policy includes containment of the deficit.

Ali Falahati1, Farzad Nouri, Alireza Rostami: The stock market is one of the important financial sectors of the economy that affect it by various forms. Form the view of many experts, the importance of financial sector development emanates from the point that, an efficient financial sector has a key role in mobilizing financial resources for investment, encouraging the entry of foreign investment and optimizing resource allocation mechanism. This study investigates the relationship between inflation and stock market development in Iran during the spring of 1999 up to in late summer of 2008. According to characteristics of

the Iranian economy, the used model was based on Boyd, Levine and Smith (2001) models. We first used a linear model to control other economic factors that may have correlations with the performance of financial market. Then the threshold regression has been used to show the nonlinear relationship between inflation and financial market development. In this model, different thresholds have been considered for inflation. With attention to considered variables, the conditional least squares method (CLS) was used to estimate the model, which, by minimizing squares of errors, is a good criterion for selecting the optimal inflationary threshold. The results showed that, in the studied period, first, there is a positive relationship between inflation and indicators of stock market development and second, there is no threshold for effect of inflation on stock market.

Objectives of the study:

1. To find the effect of CRR on interest rates.
2. To find the inflation effect on CRR.
3. To know the impact of CRR on BANK Nifty & NIFTY PRICES.
4. To measure the CRR influence on IIP.

Database & Methodology:
The study is performed on a monthly data for a period of Jan 2005 to April 2013 totaling 100 months for each variable. Data obtained is subject to the correlation and regression analysis for the study.

Pearson's Correlation Coefficient
There is a measure of linear correlation. The population parameter is denoted by the greek letter rho and the sample statistic is denoted by the roman letter r.
Here are some properties of r

- r only measures the strength of a linear relationship. There are other kinds of . relationships besides linear
- r is always between -1 and 1 inclusive. -1 means perfect negative linear correlation and +1 means perfect positive linear correlation
- r has the same sign as the slope of the regression (best fit) line
- r does not change if the independent (x) and dependent (y) variables are interchanged
- r does not change if the scale on either variable is changed. You may multiply, divide, add, or subtract a value to/from all the x-values or y-values without changing the value of r.
- r has a Student's t distribution.

Here is the formula for r

$$r = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{\sqrt{\left(n\sum x^2 - \left(\sum x\right)^2\right)\left(n\sum y^2 - \left(\sum y\right)^2\right)}}$$

Formula for Skewness

The term Skewness in Probability theory or Statistics, can be derived from the formula

$$Skewness = \frac{\sum(y_i - y)^3}{(n-1)^3}$$

Regression Definition:

A regression is a statistical analysis assessing the association between two variables. It is used to find the relationship between two variables.

Regression Formula:
Regression Equation(y) = a + bx
Slope (b) = (NΣXY - (ΣX)(ΣY)) / (NΣX2 - (ΣX)2)
Intercept (a) = (ΣY - b(ΣX)) / N

Where

x and y are the variables.
b = The slope of the regression line
a = The intercept point of the regression line and the y axis.
N = Number of values or elements
X = First Score
Y = Second Score
ΣXY = Sum of the product of first and Second Scores
ΣX = Sum of First Scores
ΣY = Sum of Second Scores
ΣX2 = Sum of square First Scores

Table 1: This table shows correlation slabs.

Correlation slabs	Effects	Skewness,kurtosis and Regression on basis of correlation value
0.1 to 0.3	Slightly Correlated	
0.3 to 0.7	Moderately Correlated	Skewness
0.7 to 1	Strongly Correlated	Regression

Here if the correlation of any two variables is between 0.1 and 0.3 then it is slightly correlated. Suppose if the variables correlation is between 0.3 and 0.7 then it is moderately correlated and here we will find out skewness for the variables. And if the variables correlation is between 0.7 and 1 then we will find regression for the variables.

The various variables which we have considered for the study are Inflation, Cash reserve ratio, Cash balance commercial and scheduled banks with RBI, Repo rate, Reverse repo rate,

Index of industrial products, Domestic institutional investment, Foreign institutional investment, Bank nifty & Nifty prices.
Monthly average of inflation is extracted from inflation.eu website.
Monthly averages of cash reserve ratio, cash balance of scheduled and commercial banks, repo rate and reverse repo rate is collected from RBI website.
Monthly average of domestic institutional investment is collected from Bombay stock exchange website.
Monthly averages of foreign institutional investment, bank nifty and nifty prices are collected from national stock exchange of India website.

CRR impact on market returns is calculated as monthly percentage change using the formula {=100/Po * (P1-Po) } where Po=CRR & P1=CRR impact on market returns.

Table 2: This table shows CRR impact on market returns percentage.

DATES	C.R.R	CRR impact on market returns	30-08-2008	9.00	-0.26032
9-02-2013	4	-0.095705937	19-07-2008	8.75	1.64335
3-11-2012	4.25	0.11408112	5-07-2008	8.50	0.348606
22-09-2012	4.5	-0.378658092	24-05-2008	8.25	-1.44545
10-03-2012	4.75	0.487480196	10-05-2008	8.00	0.603099
28-01-2012	5.5	-2.255653544	26-04-2008	7.75	-0.43136
24-04-2010	6	0.345958787	10-11-2007	7.50	-0.8149
27-02-2010	5.75	1.923897365	4-08-2007	7.00	-1.40973
13-02-2010	5.50	-0.515864384	28-04-2007	6.50	0.107751
17-01-2009	5	0.627552193	14-04-2007	6.25	2.450636
8-11-2008	5.5	5.894719139	3-03-2007	6.00	-4.03166
25-10-2008	6	-2.314241486	17-02-2007	5.75	0.442574
11-10-2008	6.50	6.425402826	6-01-2007	5.50	-1.25521
			23-12-2006	5.25	1.791457

Interpretation: It may be observed from Table 2 that the stock market returns are influenced by cash reserve ratio. The rate of CRR has been changed by RBI mostly in the year 2007 and 2008 in order to control the inflation. When the rates of CRR has increased during the period April, May, August, 2008 there was negative impact on stock market returns, But there was also positive impact on stock market returns in the year 2008 when RBI has increased CRR. And also if we observe in the year 2012 when the RBI has decreased the CRR there was a positive impact on stock market returns.

Empirical investigation: Various variables are represented with numbers as follows.

1. Inflation. 2. Cash reserve ratio. 3. Cash balance of scheduled and commercial banks with RBI. 4. Repo rate. 5. Reverse repo rate. 6. Index of industrial product. 7. Domestic institutional investment. 8. Foreign institutional investment. 9. Bank nifty. 10. Nifty prices.

Table 3: This table shows overall correlation of various variables.

	1	2	3	4	5	6	7	8	9	10
1	1	0.31775	-0.04495	-0.18698	0.26942	0.86338	0.52809	0.453697	0.80291	0.80948
2		1	0.562651	-0.00495	-0.40956	0.13439	-0.3112	0.090836	0.05993	0.2652
3			1	-0.28217	-0.62515	-0.2925	-0.42628	0.504374	-0.483	-0.2644
4				1	0.16903	0.27644	0.35055	-0.16626	0.28707	0.33421
5					1	0.36968	0.43905	0.154006	0.40461	0.21327
6						1	0.78229	0.339602	0.95819	0.9626
7							1	0.140626	0.69792	0.63861
8								1	0.51099	0.3628
9									1	0.95757
10										1

Interpretation: From table 3 it is observed that Index of industrial products and Bank nifty have maximum positive correlation that is (0.95819) and also Bank nifty and Nifty prices have maximum positive correlation that is (0.95757).And Cash balance of scheduled and commercial banks and Reverse repo rate have maximum negative correlation (-0.62515).

Table 4: This table shows overall skewness of various variables.

Inflation	Cash Reserve Ratio	-0.11754
Inflation	D.I.I	0.264747
Inflation	F.I.I	1.342026
Cash Reserve Ratio	Cash Balance	1.181168
Cash Reserve Ratio	Repo Rate	-1.48813
Cash Balance	I.I.P	1.197606
Reverse Repo Rate	I.I.P	0.226407
Reverse Repo Rate	D.I.I	0.184328
Repo Rate	D.I.I	-0.01809
I.I.P	F.I.I	1.34481
Reverse Repo Rate	Bank Nifty	0.555125
D.I.I	Bank Nifty	0.554474
F.I.I	Bank Nifty	-0.21334
Repo Rate	Nifty Prices	0.298558
D.I.I	Nifty Prices	0.297688
F.I.I	Nifty Prices	0.774994

Interpretation: From table 4 it is observed that inflation is influencing D.I.I, inflation is influencing F.I.I, cash reserve ratio is influencing cash balance, cash balance is influencing I.I.P, reverse repo rate is influencing I.I.P, reverse repo rate is influencing D.I.I, I.I.P is influencing F.I.I, reverse repo rate is influencing bank nifty, D.I.I is influencing bank nifty, repo rate is influencing nifty prices, D.I.I is influencing nifty prices, F.I.I is influencing nifty prices because the skewness values of all the variables is greater than zero and it is right skewed. Inflation and cash reserve ratio, cash reserve ratio and repo rate, repo rate and D.I.I, and F.I.I and bank nifty are not influencing because the skewness of these variables is less than zero and it is left skewed distribution.

Table 5: This table shows various variables significance of F.

Variables	Significance of F
Inflation & I.I.P	0.02286994
Inflation & Nifty prices	0.064088876
Inflation & Bank nifty	0.047605491
Bank nifty & Nifty prices	4.38624E-05
I.I.P & Nifty prices	0.000555455
I.I.P & D.I.I	0.000313085
I.I.P & Bank nifty	0.018024847

Interpretation: From table 5 it is observed that the analysis of variance (ANNOVA) for inflation and I.I.P, inflation and bank nifty, I.I.P and nifty prices, I.I.P and D.I.I & I.I.P and bank nifty significance value is < 0.05 so there is significance difference among mean so we will reject the null hypothesis and accept the alternative hypothesis. And analysis of variance for inflation and nifty prices & bank nifty and nifty prices significance value is > 0.05 so there is no significance difference among mean so we will accept the null hypothesis and reject the alternative hypothesis.

Table 6: This table shows P Value of various variables.

Variables	P Value
Inflation & I.I.P	0.639807423
Inflation & Nifty prices	0.883699779
Inflation & Bank nifty	0.149045791
Bank nifty & Nifty prices	0.007512945
I.I.P & Nifty prices	0.264060938
I.I.P & D.I.I	1.74284E-06
I.I.P & Bank nifty	0.000508748

Interpretation: From table 6 it is observed that p value of inflation and I.I.P, inflation and nifty prices, inflation and bank nifty, bank nifty and nifty prices, I.I.P and nifty prices, I.I.P and D.I.I and I.I.P and bank nifty is < 0.05 so we reject the null hypothesis and we conclude that all this indices are linearly related.

Findings & Conclusion:

1. It has been observed that effect of CRR on nifty movement is more than the other economical factors in India. The volatility of the nifty is more when ever RBI changes the CRR up to 50 basis points.
2. RBI liquidity control tool CRR had played vital role in influencing the interest rates and flow of liquidity from the deposit holders into the banks.
3. IIP is heavily depending on the interest rates and the CRR. It has been observed that whenever inflation is moving upside due to the excess liquidity, increase of CRR is fueling the repo-rate and reverse repo-rates to go up side: which is affecting the borrowing cost for the industries.

4. Monitory policy changes impact is more on the banknifty than the nifty. Correlation with crr and banknifty is strongly correlated than the crr with nifty, which moderately correlated.
5. It has been observed that crr had a negative correlation with domestic institutional investors and positive correlation with foreign institutional investors. FII's are keener on RBI policy changes than the domestic investors.
6. When deposit interest rates are going upside cash balances flow into the banking system also going upside along with it.
7. In India there is need to introduce duel CRR for the banks and RBI need think on interest on crr to the commercial banks.

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Introduction: