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"Impact of monetary policy on Nifty 50 and sectoral Indices (NSE) – A Study from Indian Stock Market"

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Abstract: Monetary policy is an essential tool for managing the economy. Monetary policy uses various tools like like Cash Reserve Ratio (CRR), Statutory Liquidity Ratio (SLR), Repo Rate, Reverse Repo Rate and Bank rate to control the money supply of the country. Stock market is related to monetary policy. So, to know how stock market will move with the changes in different policy rates, this study is conducted. To understand the impact of monetary policy on different sectoral indices, nifty index this research is done. Nifty 50 & Sectoral indices fluctuation is influenced by the monetary policy of RBI. Any changes in the monetary policy has an impact on stock market returns and overall economy of the nation. For understanding the impact, multiple regression analysis and Johansen co-integration test has been done. Time series data has been collected where the opening and closing price of the stocks has been collected and averaged on the particular date. According to multiple regression tools and using Johansen co-integration test it is found the monetary-policy tool impact on Indian Securities market.

Keywords: RBI Monetary policies, bank rate, repo rate, reverse repo rate, statutory liquidity ratio, MSF

I. INTRODUCTION

Monetary policy refers an application related to monetary tools underneath the central bank to control magnitudes like rate of interest, money supply and credit accessibility for reaching the ultimate objective of economic policy. It is an essential tool for managing the economy. Monetary policy uses various tools like like Cash Reserve Ratio (CRR), Statutory Liquidity Ratio (SLR), Repo Rate, Reverse Repo Rate and Bank rate to control the money supply of the country. The foremost aim of this policy is to keep price stable. For long term growth and development price stability is a necessary. The study is conducted to know the relationship between monetary-policy tools and Nifty 50 and other sectoral indices. Nifty 50 is a diversified fifty stock index accounting for thirteen different economic sectors. It is applied for numerous tasks like portfolios benchmarking, index-based derivatives and index funds benchmarking. It is a market capitalization based index that tracks the performance of the topmost fifty blue-chip companies. Even though the Nifty index only includes 50 of the 1600 companies that are involved in trade on the NSE. It is found that announcement of monetary policy impact on Nifty 50 and sectoral indices.

II. REVIEW OF LITERATURE

Pooja Talreja (2014) , in the research article titled "Policy rate changes and the movement of stock market" published in Asian journal of Management Research states that the effect of CRR and SLR on Nifty is negative. It is found that the increase in these ratios have adverse effect on securities market. And further it is found that the effect of repo rate and reverse repo rate on nifty is +ve. The factors like CRR, SLR, Repo rate and reverse repo rate are taken into consideration to analyze the movement of stock market. The researcher has used data like CRR rate, SLR rate, Repo Rate, Reverse Repo Rate and Nifty during the period April 2006 to March 2014 and ANNOVA has been used.

Aswathi R. Nair, B. Anand (2020), in the paper entitled "Monetary-policy and financial stability" published in Central Bank Review. Researchers try to find the relation between monetary-policy and financial stability. It is found that monetary-policy have implications for the financial market. Financial stability is considered along with various factors such as rate of interest, ex-rates and prices of equity. Standard and augmented Taylor rule, Linear and non-linear least-squares regression tools are used for analyzing data. Database on Indian Economy (RBI), Ministry of Statistics and Planning (MOSPI), Office of the Economic Advisor, Historical Index Data (NSE) are the source for data used.

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Narayan Parab, Ramashanti Naik, Y. V. Reddy (2020), in the paper titled "The impact of economic events on stock market return" published in AESS Publication. Returns on Stock market are expected to be affected by not only domestic events but also world's economic events. The objective of this study to know the impact of economic events on India's stock market. According to regression analysis it is found that in comparison of expected events unexpected events dramatically affect the stock market.

DR. Simrina Singh, Nipun Agrawal (2017**)**, in the paper titled "Change in money supply and its effect on sensex and nifty" published in Research Gate. The purpose of this study is to analyze the change in supply of money and how it affects sensex and nifty. For collecting data the official website of RBI, BSE and NSE. S&P BSE SENSEX & NIFTY 50 are taken using correlation. This study concludes that the money supply has an effect on the SENSEX but the correlation is very low whether negative or positive.

Dr. Bhuvaneshwari D, (2021), in the paper entitled "An Analytical Study of Nifty 50 and Financial Sector Indices" published in ICCAP. The objective of this study is to determine the responses of 'Nifty50' in. Bi-directional causality between 'Nifty 50' and 'Nifty Financial Services' exist. This study assists the policy makers and the investors by giving information for decision-making taking. Normal Least Square Regression tool has been used to analyze.

Vikalp Ravi Jain, Manisha Gupta, Raj Mohan Singh (2018), in the paper titled "Analysis and Predictionof Individual Stock Prices of Financial Sector Companies in NIFTY50" published in Information Engineering and Electronic Business. The purpose of this analysis is to analyze NIFTY 50 on the basis of macroeconomic variables. This study concludes that different macroeconomic variables as well as physical factors affect the prices of shares of the different stock taken from financial sectors from NIFTY 50. Mean, Standard Deviation, Kurtosis, Pearson Relation tools is used to analyze the data.

Prof. Mrityunjaya B Chavannavar, Dr. S. C. Patil, Ms. Melita Simoes (2016) , in the paper titled "Monetary Policy Effect on Nifty 50 and Sectoral Indices – A Study from Indian Stock Markets" published in International Journal of Latest Technology in Engineering, Management &Applied Science. The objective of this study is to find influence of changes in the monetary-policy tools on Nifty. The Nifty 50 index and sectoral indices research is carried from 2011 to 2016. Regression analysis and T-test is done for measuring the validity of the study. This study found that changes in monetary-policy have a direct impact on stock market returns and economy of the nation.

Aakriti Mathur, Rajeswari Sengupta (2019), paper entitled "Analyzing monetary policy statements of the Reserve Bank of India" published in SSRN. This study analyze the equity market based on monetary-policy set by RBI. This study states that monetary policy influence on financial market. Regression statistical tool is used for analyzing the volatility in equity market.

Edwin Prabu A, Indranil Bhattacharyya, Partha Ray (2019), in the paper entitled "Impact of Monetary Policy on the Indian Stock Market" published in Indian Economic Review. The objective of this research is to understand the monetary-policy impact on Indian stock market. It is found that the impact of monetary policy on sectoral stocks can be analyzed by cash flows, firm size, credit ratings, debt to capital ratios, price-earnings levels. Regression analysis tool is used to analyze the data.

Ezekiel K. Duramany-Lakkoh (2020), in the paper entitled "The effect of fiscal policy on financial sector development in Sierra Leone" published in International journal of development and economic sustainability. The main purpose of this research is to know the relationship between fiscal variables and financial sector development in Sierra Leone for the period from 1980 to 2015. And the data has been analyzed using Vector Auto-Regressive (VAR) methodology and the Error Correction Model (ECM) and co-integration test.

III. SAMPLE AND RESEARCH METHODOLOGY

On the basis of the objectives of the study, the secondary sources are employed in research study from 2014 to 2021 for multiple regression analysis and 2006 to 2021 for Johansen co-integration have been taken into consideration. Secondary data are taken for analysis from the RBI website and NSE website. Time series data has been collected where the opening and closing price of the stocks has been collected and averaged on the particular date of announcement of monetary policy.

Objectives:

- To analyze the impact of monetary policy on Nifty sectoral index
- To understand the impact of monetary policy in nifty 50, midcap nifty 50, small Cap nifty 50

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Hypothesis

In case of regression analysis with the level of significance of 0.05 that is 95%confidence level is used.

- F < 0.05 reject the null hypothesis
- F > 0.05 accept the null hypothesis

Hypothesis 1

- H01: There is no impact of monetary- policy on different NSE sectoral index
- H11: There is impact of monetary- policy on different NSE sectoral index

Hypothesis 2

- H02: There is no impact of monetary policy on NSE nifty 50, midcap50, small cap 50
- H12: There is impact of monetary policy on NSE nifty 50, midcap50, small cap 50

Limitations

- Previous day's index is taken if trading does not take place on the event day
- The study is limited to the extent of information in the article collected from the secondary source, the secondary data which are collected from different official websites like NSE, RBI only.

IV. EMPIRICAL RESULTS AND DISCUSSIONS

To analyze the impact of independent variables like bank rate, repo rate, reverse repo rate, statutory liquidity ratio, Marginal standing facility on the dependent variable NSE sectoral index on the announcement of policy rates from 2014 to 2021 has been taken. In case of only closing price, previous days' closing price has been taken as opening price for next day. Multiple regression tools have been applied on 15 observations that is NSE sectoral index on the announcement of policy rates from 2014 to 2021.

Table 1Shows result of Multiple regression analysis

Sectors	SignificanceF (f)	Acceptance/Rejection
Banking Sector	0.035198416	H0 rejected
Financial service sector	0.009578203	H0 rejected
IT sector	0.018742101	H0 rejected
FMCG sector	0.00010077	H0 rejected
Media sector	0.032498405	H0 rejected
Pharma sector	0.0021673	H0 rejected
Financial services ex-bank sector	0.01991129	H0 rejected
Private bank sector	0.0233879	H0 rejected
Consumer durable sector	0.0005285	H0 rejected
Automobile sector	0.376530128	H0 accepted
Metal sector	0.1558655	H0 accepted
Realty sector	0.20033932	H0 accepted
Nifty 50	0.0241346	H0 rejected
Nifty midcap 50	0.0717808	H0 accepted
Nifty small cap 50	0.44153976	H0 accepted

Interpretation: From the above table 1.1 among 15 Sectoral index 10 sectoral index shows that there is impact of monetary- policy on different NSE sectoral index. Only 5 of the result is opposite. So, we can state that there is impact of monetary policy on sectoral index. When Significance F (f) is less than 5% level of significant we have rejected H0.

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Unit root test

Augmented Dickey fuller test is done to check whether the variables are stationary or not. So, the unit root test is particularly used to check the stationarity of the time series with the help of this test we can detect whether the time series of the variable is a stationary or non-stationary. Under this test, the variables taken are monetary policy rates and NSE sectoral index.

ADF stated three equations as below they are:

$\Delta Yt = B1 + ZYt\text{-}1 + ai + et \rightarrow$ Equation 1 $\rightarrow$Intercept only.

$\Delta Yt = B1 + B2t + ZYt\text{-}1 + ai + et \rightarrow$ Equation 2 $\rightarrow$ Trend & Intercept.

$\Delta Yt = ZYt\text{-}1 + ai + et \rightarrow$ Equation 3 $\rightarrow$ No trend, No intercept.

Hypothesis for unit root test:

Null Hypothesis (Ho): There is a unit root

Alternative Hypothesis (H1): There is no unit root

At 1st difference- Equation 1 & 2 (Intercept and trend & intercept):

Null Hypothesis (H_0): Bank rate has a unit root

Null Hypothesis (H_0): Repo rate has a unit root

Null Hypothesis (H_0): Reverse repo rate has a unit root

Null Hypothesis (H_0): Auto sector has a unit root

Null Hypothesis (H_0): Banking Sector has a unit root

Null Hypothesis (H0): Financial Sector has a unit root

Null Hypothesis (H0): FMCG sector has a unit root

Null Hypothesis (H0): NIFTY 50 has a unit root

Null Hypothesis (H0): Pharma sector has a unit root

Null Hypothesis (H0): Private bank has a unit root

Null Hypothesis (H0): Small cap 50 has a unit root

Null Hypothesis (H0): Midcap 50 has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

Augmented Dickey-Fuller test statistic	**t-Statistic**	**Prob.***	**1% level**	**5%level**	**10%level**
Bank rate	-3.369669	0.0285	-3.920350	-3.065585	-2.673460
Repo rate	-4.148703	0.0070	-3.959148	-3.081002	-2.681330
Reverse repo rate	-3.871933	0.0118	-3.959148	-3.081002	2.681330
Auto sector	-4.304707	0.0053	-3.959148	-3.081002	-2.681330
Banking Sector	-4.940349	0.0080	-4.800080	-3.791172	-3.342253
Financial Sector	-3.757343	0.0137	-3.920350	-3.065585	-2.673460
FMCG sector	-4.337450	0.0192	-4.728363	-3.759743	-3.324976
NIFTY 50	-3.414760	0.00262	-3.920350	-3.065585	-2.673460
Pharma sector	-4.019223	0.0097	-4.004425	-3.098896	-2.690439
Private bank	-5.665844	0.0004	-3.920350	-3.065585	-2.673460
Small cap 50	-3.683638	0.0191	-4.057910	-3.119910	-2.701103
Midcap 50	-3.284999	0.0347	-3.959148	-3.081002	-2.681330

Interpretation:

Unit root test: "We can reject the null hypothesis and accept the alternative hypothesis if the absolute test statistics are greater than the absolute crucial value @5%. The test statistic level value in the above mentioned equations 1 and 2 is greater than 5%. Therefore, the alternative hypothesis is accepted and the null hypothesis is rejected. Consequently, the values are static.

Now, Johansen co-integration test can be done.

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The Johansen cointegration test is used to determine the long-run cointegrating relationship between the monetary policy rates and NSE sectoral index. Table 2 displays the outcomes of the trace test and the maximum eigenvalue test. Both of these tests identified a single cointegrating equation at the 5% level of significance.

The Johansen's cointegration test (Johansen and Juselius, 1990) has been used in the second stage to determine whether the variables have a long-run equilibrium relationship. Calculating the trace test statistic and maximum eigenvalue test statistic is how the Johansen cointegration test is run. The trace test statistic is calculated by using maximum likelihood ratio as per the following formula:

Trace (r, k) = -T $\sum_{i=r+1}^{k} In(1-\lambda i)$ ... (4)

where T denotes the number of observations, λi denotes the maximum eigenvalue of the cointegrating vectors. The trace statistic takes into account whether the trace is boosted by including additional eigenvalues in addition to the r eigenvalue. The null hypothesis that there are no more cointegrating vectors than there are cointegrating vectors is examined by the trace test (r). The process of locating the typical root forms the foundation of the maximum eigenvalue test. The exact existence of r cointegrating vectors is the null hypothesis for this test, and the alternative hypothesis is the existence of r+1 cointegrating vectors. The formula for calculating maximum eigenvalue is as follows:

λ_{max} (r, r+1) + =T $In(1-\lambda_{r+1})$

Table 2: showing result of Johansen Co-integration

Sectors	Probability	Trace Statistic	Max-Eigen statistics	Acceptance/Rejection
Automobile sector	0.0019	60.82841i.e greater than critical value 47.85613	28.91927 i.e greater than critical value 27.58434	H0 rejected
Banking sector	0.0002	67.86845 i.e greater than critical value	40.48518 i.e greater than critical value	H0 rejected
Financial sector	0.0007	64.56163 i.e greater than critical value 47.85613	34.42291 i.e greater than critical value 27.58434	H0 rejected
FMCG sector	0.00000	47.85613 i.e greater than critical value 47.85613	40.68408 i.e greater than critical value 27.58434	H0 rejected
Pharma sector	0.00000	80.88075 i.e greater than critical value 47.85613	45.02596 i.e greater than critical value 27.58434	H0 rejected
private bank sector	0.0002	67.81130 i.e greater than critical value 47.85613	38.74040 i.e greater than critical value 27.58434	H0 rejected
Nifty 50	0.0008	63.76263 i.e greater than critical value 47.85613	35.48402 i.e greater than critical value 27.58434	H0 rejected
Mid cap 50	0.0003	67.25258 i.e greater than critical value 47.85613	40.29599 i.e greater than critical value 27.58434	H0 rejected
Small cap 50	0.0019	60.85056 i.e greater than critical value 47.85613	30.76177 i.e greater than critical value 27.58434	H0 rejected
Note: Trace test and Max.-eigenvalue test indicate 1 cointegrating equation(s) at 0.05 level.				

Summary and conclusion

- Changes in monetary policy tools have a strong linkage with the Nifty bank, Nifty financial services, Nifty media, Nifty IT sector, Nifty FMCG, Nifty media, Nifty pharma, Nifty financial services ex-bank sector, Nifty private bank, Nifty consumer durable.

- Changes in monetary-policy tools like bank rate, repo rate, reverse repo rate and Nifty 50 and sectoral indices movement for the past 15 years. Changes in monetary policy tools have a strong linkage with auto, banking, financial, FMCG, pharma, private bank, nifty 50, midcap 50 and small cap 50 (Johansen co-integration)

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