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STUDY ON IMPACT OF INTEREST RATES ON THE STOCK MARKET

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Abstract

This study set out to investigate and focus on the effect of interest rates on stock markets, namely the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), with the aim of increasing knowledge. All of the secondary data included in this study came from reliable exchanges and was collected over a five-year period between 2019 and 2023. The Reserve Bank of India [RBI], which collects daily and monthly prices of several stock indexes, was another source of interest data. The Unit Root test, Johansen's Co-integration test, and ARCH models were examined using the statistical program EViews 12, were employed to calculate the outcomes and determine whether there was a long-term positive or negative association between the variables. For this study, interest rates such as bank rate, repo rate, and reverse repo rate are measured as independent variables, and stock prices such as BSE Bank, and NSE Bank are measured as dependent variables. This study will be useful to investors, financial managers, and other experts in the field of finance.

Keywords: ARCH, cointegration, stock prices and interest rates.

INTRODUCTION

Introduction

Stock markets play a vital role in the economy of many countries. Thanks to the adoption of more flexible exchange rate arrangements in emerging and transitioning economies, the creation of new capital markets, the adoption of free and open economic policies, and the progressive removal of restrictions on capital inflows and foreign exchange, investors can now easily access

stock markets around the world. Along with an increase in the variety of investment alternatives and interest rate and exchange currency volatility, the aforementioned changes have led to a significant increase in risk associated with portfolio diversification and overall investment selections. Stock market indices, which emphasize the significance of the stock market, define the state of an economy. Interest rates and the stock market normally have a negative connection. Interest rates rise in proportion to share prices. Bonds become more and more appealing. A company's ability to borrow money could be hampered by rising interest rates, which would also limit its capacity to stabilize cash flow and reinvest in the company—two factors that would typically rise share prices. When interest rates drop, the opposite is true for everything said above.

The interest rate is the amount of interest due on a loan, deposit, or borrowing amount stated as a percentage of the principal amount. The total interest on the amount borrowed or lent is influenced by various factors such as the principal amount, interest rate, frequency of compounding, and length of loan, deposit, or borrowing. The cost of using someone else's money is interest. Landowners are well aware of this circumstance. When the bank's money are used as a mortgage to buy a home or a piece of land, they are meant to cover this privilege. Credit card customers must pay interest on short-term loans they take out to cover the cost of goods and services. This percentage, which is usually stated annually, is the percentage of the loan amount that the lender charges the borrower in interest. It's the interest rate that a bank or other lending institution charges on a loan, or the rate that a bank offers to its clients who keep money in their accounts.

REVIEW OF LITERATURE

Jeongism Kim [2023] Using data from Korean firms, examines how a developing stock market reacts to increases in US interest rates in his study "Stock Market Reaction to United States Interest Rate Hike: Evidence from an Emerging Market." Models including OLS, Cross-sectional Regression, and Correlation were employed. They discovered that the Fed's sharp rate hike prompts investors to flee to emerging markets, and that determined companies with higher

market capitalization, more export sales, and foreign ownership outperform during US interest rate hikes. They also discovered that financial flexibility is especially important for small cap companies during US interest rate hikes.

In their 2022 publication, "Interest rates and their Impact on the Stock Market: Evidence from Sweden," Felicia Anderson and Ribin Fogelberg examined the connection between short- and long-term interest rates. The Granger Casualty Test (GCR), OLS models, and Vector Autoregressive (VAR) were utilized in the analysis over the course of the 20-year study. The results indicated that there was no direct correlation between the long-term interest rate and the Swedish stock market and that the short-term interest rate had no effect on the market, while the OLS indicated a negative relationship between interest and the stock market.

Agyemang, Cai li, and Abredu Pearl [2021] investigated the impact of interest rates on the performance of the Ghana Stock Exchange [GSE] over a 20-year period. The GSE composite index served as the dependent variable, and the control variables were the interest rate, inflation rate, exchange rate, and money supply. The study tested the long-term relationship between interest rate and GSE index using Johnson's cointegration test. The results showed that long-term cointegration between the dependent and independent variables exists, and that interest rates have a significant impact on the GSE index (a 1% increase in interest rates would cause a 14.63% drag in the index).

In their research on the "Time Varying influence of Interest rates on Stock Market returns," Guangton Gu, Wenjie Zhu, and Chengjun Wang [2021] found that: Using data from China, a novel Bayesian time- varying regression model was used to analyze the relationship and effect of interest rates on stock market returns over time in that country. They found that while average interest rates typically have an abnormally positive effect on the market and have a negative impact on price returns, an increase in interest rates tends to stifle the growth in stock prices.

[2020] The effect of interest rates, inflation, and exchange rates on the Indian stock market For the study, Mahima and Tushar Jejani examined the effects of microeconomic variables on the Indian stock exchanges, Sensex 30 and Nifty 50, over a 29-year period. These variables included interest rates, inflation, and foreign exchange rates. The relationship between interest rates,

inflation rates, and the stock market was found to be weak and inverse using ANOA and regression tests.

RESEARCH GAPS

Much study has been done on the connection between interest rates and stock prices. Numerous researchers applied a variety of models, including correlation, regression, and ANOVA, when using the SPSS software for their studies. Consequently, the tools and techniques used by various researchers also vary. After looking through all of this information, it was found that the previous statistical methods did not yield definitive evidence about the relationship between interest rates and stock markets. It was also found that there were differences in interest rates and stock market performance. E-views are utilized as a method in this study to provide evidence of a relationship between the independent factors and dependent variables taken into consideration, particularly in the Indian setting. The volatility has been examined using the ARCH Model, which has not been taken into consideration in prior research, and the unit root and Johnson's cointegration tests have been applied.

Objectives of the Study:

1. To study the long run relationship between stock prices and interest rates.
2. To analyse the volatility in stock prices.

METHODOLOGY

The data used for the present research work is principally secondary data. The data on stock prices are collected from BSE, NSE and the data on interest rates are collected from Reserve Bank of India (RBI), International Monetary Fund [IMF]. The study being quantitative in nature makes use of certain statistical tools for analysing the data. Some of the tools and models which are used for this study are Unit root test, Johansen’s Cointegration test and Autoregressive Conditional Heteroscedasticity (ARCH) Model are used wherever necessary to illustrate the theory and findings

Sampling: The Nifty Bank and BSE Bank stock market indices are examined To compare the outcomes over the long term it has been researched for 5 years Since they collectively reflect the behavior of Indian stock markets and both CNX Bank and BSE Bank are studied from 2019 to 2023, Monthly Stock prices are observed for estimating long-run relationship and daily prices for Estimating ARCH effect. The data for the Bank Rates and Repo Rates has been collected from the database of the RBI.

.Hypothesis

- H1: There is a stationarity in the given time series
- H2: There is a long run relationship between stock prices and interest rates
- H3: There is an ARCH effect

DATA ANALYSIS

The data collected on stock prices from BSE, NSE and the data on interest rates are collected from Reserve Bank of India (RBI), International Monetary Fund [IMF] employed the percentage method and a combination of descriptive methods and econometric analysis to draw conclusions.

Table 1: ADF unit root Test on First Difference of BSE_Bank

	t-Statistic Prob.*
Augmented Dickey-Fuller test statistic	-8.394650 0.0000
Test critical values: 1% level	-2.605442
5% level	-1.946549
10% level	-1.613181

*MacKinnon (1996) one-sided p-values

Null Hypothesis: D(LN_BSE_BANK) has a unit root-Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=10)

The ADF test for the series BSE_Bank in the first Difference shows that there are no unit roots which means the series is stationary as the probability value is 0.000 and the test calculated value (8.394650) is more than the tabulated value (1.946549) at 5% level of significance. Therefore, the order of integration of the log BSE_Bank series is 1

Table 2: ADF unit root Test on First Difference of CNX_Bank

Augmented Dickey-Fuller test statistic	t-Statistic	Prob.*
	-8.387502	0.0000
Test critical values:	1% level	-2.605442
	5% level	-1.946549
	10% level	-1.613181

*MacKinnon (1996) one-sided p-values

Null Hypothesis: D(LN_NSE_BANK) has a unit root -Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=10)

The ADF test for the series CNX Bank in the first Difference shows that there are no unit roots which means the series is stationary as the probability value is 0.000 and the test calculated value (8.387502) is more than the tabulated value (1.946549) at 5% level of significance. Therefore, the order of integration of the log CNX Bank series is 1.

Table 3a: Johansen's Co-integration Test for BSE Bank and Interest - Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.523295	71.40364	47.85613	0.0001
At most 1	0.234438	29.17473	29.79707	0.0589
At most 2	0.201161	13.94748	15.49471	0.0844
At most 3	0.019896	1.145529	3.841465	0.2845

Trace test indicates 1 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 3b: Johansen's Co-integration Test for BSE Bank and Interest - Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.523295	42.22891	27.58434	0.0003
At most 1	0.234438	15.22725	21.13162	0.2733
At most 2	0.201161	12.80196	14.26460	0.0840

At most 3	0.019896	1.145529	3.841465	0.2845

Max-eigenvalue test indicates 1 co-integrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The Max Eigenvalue statistic and the Trace statistic are two significant statistics that were revealed bythe Johansen's cointegration test results in EViews. We are interested in the values of the Max Eigen and Trace statistics as well as the estimated number of the Cointegration equation in the above table. As the value of the Trace statistic (71.40364) for the None* null hypothesis is higher than the critical value at the 5% level of significance (47.85613), we can reject the null hypothesis. The output table contains three CEs, namely At most 1, At most 2, and None*. The null hypothesis is rejected and the alternative hypothesis is accepted because the probability value (0.0001) of none* is less than 0.05. Thisleads us to the conclusion that the series are cointegrated, related, and show a long run relationship. Asa result, the null hypothesis is rejected and the alternative is accepted. We draw the conclusion that there is cointegration between the interest rates and BSE_Bank and that these cointegration show long- term relationships. While bank rates and reverse repo had a long-term, positive, and significant impacton BSE Bank prices, a percentage increase in these rates will result in a increase in BSE bank prices. Conversely, for repo, there was a negative and significant relationship; an decrease in repo rates will result in a decrease in BSE bank prices and vice-versa.

Table 4a: Johansen's Cointegration Test for CNX Bank and Interest Rates -Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob*
None *	0.526094	71.95008	47.85613	0.0001
At most 1	0.239328	29.38552	29.79707	0.0557
At most 2	0.199848	13.79297	15.49471	0.0888

At most 3	0.018848	1.084584	3.841465	0.2977

Trace test indicates 1 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 4b: Johansen's Cointegration Test for CNX Bank and Interest Rates -Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.526094	42.56456	27.58434	0.0003
At most 1	0.239328	15.59255	21.13162	0.2495
At most 2	0.199848	12.70839	14.26460	0.0868
At most 3	0.018848	1.084584	3.841465	0.2977

Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The Max Eigenvalue statistic and the Trace statistic are two significant statistics that were revealed by the Johansen's Co Integration Test results in EViews. We are interested in the values of the Max Eigen and Trace statistics as well as the estimated number of the Cointegration equation in the above table. As the value of the Trace statistic (71.95008) for the None* null hypothesis is higher than the critical value at the 5% level of significance (47.85613), we can reject the null hypothesis. The output table contains three CEs, namely At most 1, At most 2, and None*. The null hypothesis is rejected and the alternative hypothesis is accepted because the probability value (0.0001) of none* is less than 0.05. This leads us to the conclusion that the series are cointegrated, related, and show a long run relationship. As a result, the null hypothesis is rejected and the alternative is accepted. We draw the conclusion that there are is cointegration between the interest rates and CNX_ Bank and that these cointegrations show long- term relationships. While bank rates and reverse repo had a long-

term, positive, and significant impacton BSE Bank prices, a percentage increase in these rates will result in a increase in BSE bank prices. Conversely, for repo, there was a negative and significant relationship; an decrease in repo rates will result in a decrease in CNX bank prices and vice-versa.

Table 5: ARCH Estimation of BSE Bank

F-statistic	14.88216	Prob. F(1,1235)	0.0001
Obs*R-squared	14.72878	Prob. Chi-Square(1)	0.0001
Variable	Coefficient	Std. Error t-Statistic	Prob.
C	255642.7	23312.30 10.96600	0.0000
RESID^2(-1)	0.109118	0.028285 3.857741	0.0001
R-squared	0.011907	Mean dependent var	286953.2
Adjusted R-squared	0.011107	S.D. dependent var	772925.2
S.E. of regression	768620.9	Akaike info criterion	29.94420
Sum squared resid	7.30E+14	Schwarz criterion	29.95248
Log likelihood	-18518.49	Hannan-Quinn criter.	29.94731
F-statistic	14.88216	Durbin-Watson stat	2.040330
Prob(F-statistic)	0.000120		

The observed R-squared value is 14.72878, and the probability Chi-Square (1) is 0.0001. The alternative hypothesis—that there are ARCH Effects in the series—is accepted and the null hypothesis—that there are no ARCH Effects—is rejected because the p-value of 0.0001 is less than 0.05 at the 5% level of significance. Therefore, it is safe to say that the BSE_Bank closing prices are volatile and that the given series exhibits ARCH Effects. Additionally, the Table shows that, at the 5% level of significance, the value of b1 = 0.10912 is statistically significant.

Table 6: ARCH model's variance – BSE_BANK

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	3.363482	59.07167	0.056939	0.9546
BSE_BANK(-1)	1.000377	0.001624	616.0516	0.0000
Variance Equation				
C	246282.4	6669.392	36.92727	0.0000

RESID(-1)^2	0.144318	0.028677	5.032467	0.0000
R-squared	0.995736	Mean dependent var.		38783.44
Adjusted R-squared	0.995732	S.D. dependent var.		8205.844
S.E. of regression	536.0824	Akaike info criterion		15.38228
Sum squared residual	3.55E+08	Schwarz criterion		15.39882
Log likelihood	-9517.630	Hannan-Quinn criter.		15.38850
Durbin-Watson stat	1.903454			

Two parts make up the above table. The ARCH model's variance equation was the subject of the lowersection, while the mean equation was the main emphasis of the upper part. The beta coefficients of theconstant c and the one-period lag of the BSE bank are found in the upper part of the mean equation. The beta coefficient of 0.028677 yields the mean value of BSE-Bank. Given that the value of b0 is positive and b1 is between 0 and 1, with a probability value of 0.000 for both b0 and b1, the ARCH model is statistically significant and the given series is stationary.

Table 7: ARCH model's variance- CNX_BANK

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	6.229590	53.48117	0.116482	0.9073
CNX_BANK(-1)	1.000301	0.001655	604.4204	0.0000
Variance Equation				
C	192986.0	4979.056	38.75956	0.0000
RESID(-1)^2	0.132929	0.028084	4.733203	0.0000
R-squared	0.995769	Mean dependent var		34156.63
Adjusted R-squared	0.995766	S.D. dependent var		7251.669
S.E. of regression	471.8685	Akaike info criterion		15.12933
Sum squared resid	2.73E+08	Schwarz criterion		15.14599
Log likelihood	-9285.409	Hannan-Quinn criter.		15.13560
Durbin-Watson stat	1.892749			

Two parts make up the above table. The ARCH model's variance equation was the subject of the lowersection, while the mean equation was the main emphasis of the upper part. The beta

coefficients of theconstant c and the one-period lag of CNX BANK are found in the upper part of the mean equation. The beta coefficient of 0.028084 provides the mean value of CNX_BANK. Given that both b0 and b1 havevalues between 0 and 1, and that the probability value for each parameter is 0.000, the ARCH model is statistically significant and the given series is stationary.

FINDINGS

The findings of this investigation support the goals of this paper. We found that interest rates (bank, repo, and reverse repo rates) and stock prices (BSE Bankand CNX Bank) have a long-term link, or cointegration. A stable and equilibrium relationship is discovered when cointegration is present, indicating that interest rates and stock prices move together over time. This implies that there will be pressures pulling the variables back toward their long-term equilibrium connection if they deviate from it. This indicates that any deviations from the long-run relationship between interest rates and stock market performance are likely to be transient, with the variables eventually reverting to their equilibrium levels, where both a positive and a negative relationship, as well as the presence of the ARCH effect, were found.. We would suggest for further analysis as we found out long- term relations a further Models need to be employed to find its short term relations and what are the behavioural factors of the investor for which , why there is fluctuations in stock market due to change in interest rates.

CONCLUSION

The complex and nuanced relationship between interest rates and the stock market has been extensively studied and examined many aspects of this relationship in this research study such as its theoretical underpinnings, empirical support, and practical ramifications were found. Investors and participants must use extreme caution when there is a policy change, adjusting their portfolios to align with their financial objectives, hedging, and mitigating risk.

REFERENCES:

1. Kim, J. (2023). Stock market reaction to US interest rate hike: Evidence from an emerging market. Heliyon, 9 (5), e15758.
2. Baranidharan, S., & Dhivya, N. (2020). Causal influence of macroeconomics factors shock on Indian stock market: evidence from BSE index. *Asian Journal of Economics, Finance and Management*, 96-105.
3. Conrad, C. (2021). The effects of money supply and interest rates on stock prices, evidence from two behavioral experiments. *Applied Economics and Finance*, *8*(2).
4. Sampene, A. K., Li, C., Cui, H., Pearl, A., Fredrick, O. A., Robert, B., & Ayisi, A. L. (2021). The Effects of Interest Rate on Stock Market; Empirical Evidence From the Ghana Stock Exchange. *EPRA International Journal of Economic and Business Review, no. April*, 27-37.
5. Andersson, F., & Fogelberg, R. (2023). Interest rates and their impact on the stock market: Evidence from Sweden.
6. Gu, G., Zhu, W., & Wang, C. (2022). Time-varying influence of interest rates on stock returns: evidence from China. *Economic research-Ekonomska istraživanja*, *35*(1), 2510-2529.
7. Srivastava, V., Kaur, B., Chakraborty, P., Mishra, A., Kujur, A., Dhoundiyal, M., ... & Chawla, H. K. (2021). The ramifications of Covid-19 on the Mental Health of the Indian elderly. *International Journal of Policy Sciences and Law*, *1*(04), 1839-1870.
8. Bernanke, B. S., & Kuttner, K. N. (2005). What explains the stock market's reaction to Federal Reserve policy?. *The Journal of finance*, *60*(3), 1221-1257.