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Linkage Between Indian Stock Markets and Foreign Investors

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Abstract: There is a great deal of dependency between the Indian stock market and foreign institutional investors (FIIs). Due to the fact that their investment choices frequently impact market performance, FIIs have emerged as key players in determining market trends. By using the Augmented Dickey-Fuller (ADF) test, the Vector Auto Regression (VAR), Johansen's Co-Integration Test, and the Granger Causality Test. Investors and exchange rates in India need to understand the relationship between the exchange rate of India and foreign investor participation to make investment decisions and gain insights into portfolio diversification techniques.

Keyword: Indian stock, foreign investor, domestic investors, market liquidity, exchange rate

1. INTRODUCTION

Foreign Institutional Investors (FIIs) play a pivotal role in shaping the dynamics of India's stock markets. Their investment activities significantly influence market liquidity, volatility, and overall performance. When FIIs inject capital into Indian equities, it often leads to market rallies, reflecting increased investor confidence. Conversely, substantial withdrawals by FIIs can result in market downturns, as observed in January 2025, when foreign investors sold approximately \$9 billion in Indian stocks, marking the second-highest monthly outflow on record. The impact of FIIs extends beyond immediate market movements. Their investment decisions are influenced by various factors, including global economic conditions, domestic corporate earnings, and geopolitical developments. For instance, concerns over U.S. tariff policies and disappointing domestic earnings have previously led to declines in Indian shares, underscoring the sensitivity of the market to both international and local factors. Despite episodes of significant foreign outflows, the Indian stock market has demonstrated resilience, partly due to robust participation from domestic investors. The growing popularity of Systematic Investment Plans (SIPs) among Indian households has provided a buffer against foreign sell-offs, helping to stabilize the market during volatile periods. In summary, the interplay between foreign investment and the Indian stock market is complex and multifaceted. While FIIs contribute to market depth and liquidity, their actions can also introduce volatility. Understanding this relationship is crucial for investors aiming to navigate the intricacies of India's financial markets effectively.

2. REVIEW OF LITERATURE

Rajeev Matha, Geetha E., Satish Kumar, Raghavendra Dynamic relationship between equity, bond, commodity, forex and foreign institutional investments: Evidence from India. *Investment Management & Financial Innovations* Vol. 19, Iss. 4, (2022): 65-82. Regardless of whether one market is heading higher or lower, investors can find a wealth of trading possibilities due to the interrelationships between moves in stocks, bonds, commodities, and currency. Therefore, this study looks at the long-term and causal relationship between forex, G-sec bonds, oil prices, gold rates, foreign institutional investment (FII) flows, and equity market and sectoral index returns in order to comprehend how markets are interconnected. For empirical study, daily time-series data from August 2012 to August 2021 were taken into consideration. According to Johansen's cointegration test, G-bond returns, oil and gold prices, and foreign exchanges such as the USD, EUR, GBP, and Yen.

Dawlat Khan Amarkhil, Jehad Hussain, Muji bullah Ayoubi Effect of Exchange Rate on Stock Return: Journal NX A Multidisciplinary Peer Reviewed Journal; ISSN No:2581 - 4230 VOLUME 7, ISSUE 1, Jan.-2021 The exchange rate and stock market are two essential financial markets globally. These markets play a vital role in international business across the globe. Understanding the relationship between them is crucial for investors to minimize risks and make informed investment decisions. This paper examines the causal connection between the exchange rate and the stock market in Pakistan. The PSE-100 index serves as a proxy for stock prices, while the exchange rate of the Pakistani Rupee against the US Dollar (PKR/US\$) is utilized to assess exchange rate exposure. The data analysed is on a daily basis, covering the period from January 2015 to December 2019. The research findings suggest a positive correlation between stock prices and the exchange rate, indicating that both variables are interdependent

[Arjunan Vadivel](#) Dynamics of exchange rate and stock price volatility: Evidence from India: Journal of PUBLIC AFFAIRS an international journal; [Volume21, Issue1](#) February 2021 e2144 This article investigates the causal relationship between fluctuations in exchange rates and stock price volatility. We analyse daily data spanning from February 2, 2015, to August 30, 2019, to estimate the variables utilized in ARCH/GARCH models and cross-correlation. The findings indicate an interaction between the conditional mean and the variance of exchange rate movements and stock price volatility. The stock market has attracted greater capital inflows, causing the rupee to appreciate, while capital exiting the monetary system leads to a depreciation of the rupee. The Reserve Bank of India has implemented a policy aimed at encouraging significant capital inflows rather than outflows.

[Arjun A.](#); [Anandu krishnan H.](#); [Durga lashmi C. V.](#) Impact of Foreign Institutional Investors on Indian Stock Market during Covid Induced Lockdown Period. [Turkish Online Journal of Qualitative Inquiry, 2021, Vol 12, Issue 6, p1160](#) People all throughout the world have been traumatized by the COVID-19 pandemic. The infectious pandemic put the world in a precarious position and profoundly affected many different industries. The state of the economy as a whole became chaotic. This study focuses on how COVID-19 impacted capital market volatility and the impact of FII on it during the shutdown. The pandemic's worldwide expansion put institutional investors in a precarious position from which they are unable to recover. The world markets were melted by the investors' abrupt money departure. However, when international institutional investors flooded the Indian market with capital, the market was able to overcome this economic downturn. According to reports, the nation's GDP increased by 15% annually to Rs. 29,400 crores.

Jasmeet Kaur, Dr Namita Rajput, Dr Parminder Kaur Bajaj and Dr Anjali Bhatnagar Analysis of Dynamic linkages between the Stock Markets of Emerging Market Economies (EME)s.: [Linguistica Antverpiensia; 2021 Issue-1 www.hivt.be ISSN: 0304-2294, Pages: 2973 – 2986](#) This research aims to assess the interconnectedness among the equity markets of emerging economies, specifically Brazil, China, India, Korea, and Taiwan, to determine whether investors can create a cross-country portfolio. The study also seeks to analyse the transmission of shocks between the Indian stock market and the other markets in question, thereby impacting the returns. To evaluate the degree of mutual dependence over the long term, the dataset is examined using the Johansen cointegration test. Additionally, the causal relationships among the variables are explored through the Granger causality test. The fluctuations in equity markets, illustrating how a dependent variable responds to its own shocks or the shocks of other variables, are described using variance decomposition and impulse response functions. The time-series data utilized spans from April 2010 to March 2020. This research reveals that long-term co-integration among the emerging stock markets is not present, and the markets analysed are affected primarily by fluctuations in their own lagged values. As the causal relationships between different pairs of markets are examined, investors can evaluate the economic viability of asset allocation in diverse stock markets to build an equity portfolio.

3. SCOPE OF THE STUDY

Understanding the effects of foreign investments, such as foreign direct investments (FDIs) and foreign institutional investors (FIIs), on the Indian stock market would be the main goal of this study. It will investigate how foreign investments affect stock prices, market performance, and overall market stability over the short and long terms. The study will also examine variables including world events and governmental policies that affect

judgments about overseas investment. Understanding how foreign investments affect the Indian stock market and offering advice on how to manage them for steady growth are the objectives.

Objectives of the study

- We can determine the items' non-stationarity with the use of ADF tests.
- The short as well as long-term relationship among the variables have been identified with the assistance of VAR and Johansen Co integration tests.

4. RESEARCH METHODOLOGY

Research design: The general framework for the study is known as the research design. The research design serves as a guide for the entire study procedure. Conclusive research design and exploratory research design are the two types of research designs. Exploratory research is done when previous studies are scarce or non-existent. The goal of exploratory research is to identify concepts that will serve as the basis for further investigation. This is usually qualitative in nature. On the other hand, conclusive research seeks to investigate several theories and derive particular conclusions. They have a quantitative nature. This study used a conclusive research design.

Period and Nature of the data: The study looked at data from April 17, 2020, to December 20, 2024. Researchers have gained a better understanding of the linkage between foreign investors and the Indian stock market by examining this link. On 17 April 2020, India changed its [foreign direct investment](#) (FDI) policy to protect Indian companies from "opportunistic takeovers/acquisitions of Indian companies due to the current [COVID-19 pandemic](#)".

The secondary data served as the foundation for the current investigation. The official website of the NSE stock market provided the study's data for both Indian stocks and overseas investors. Books, research papers, and websites are consulted for references. The purpose of collecting the daily data from the stock exchanges indicated above is to examine the cointegration of the foreign investors' stock markets.

5. DATA ANALYSIS

Augmented Dickey Fuller (Adf) Test:

The Augmented Dickey Fuller test, or ADF test, is a well-liked statistical test that assesses whether a time series is stationary or not. It is one of the most often used statistical tests for analysing a series' stationary state.

Johansen's Co Integration Test:

A statistical technique for assessing the existence of a long-term equilibrium relationship between two or more non-stationary time series variables is the Johansen Co-integration Test. Time series are said to be co-integrated when a particular combination of them is stationary but the individual time series are not. The Johansen test is more sophisticated than other straightforward tests (such as the Engle-Granger test) because it can detect several co-integrating relationships and handle multiple variables at once. This test is frequently used in finance and economics to examine long-term correlations between variables like interest rates, GDP, and inflation. The Johansen test helps researchers and policymakers understand how various economic indicators move together over time and modify economic models accordingly by recognizing these linkages.

Vector Auto Regression (Var):

A statistical model called the Vector Autoregression approach is used to examine the relationship between several time-dependent variables and how they affect one another over time. By representing each variable according to its own historical values as well as the historical values of other variables in the system, the VAR model considers all variables equally, in contrast to traditional models that make a distinction between dependent and independent variables. Because of this, VAR is especially helpful in capturing intricate dynamic interactions in systems with several variables. Studying the long-term effects of variables like GDP, inflation, and interest rates is a common practice in economics and finance. Furthermore, VAR models are useful for predicting and examining the potential effects of shocks to one variable on others, offering insights into the interrelated patterns of financial or economic indicators.

General VAR Model Structure:

For two variables, X_t and Y_t , a VAR model with lag order 1 (VAR (1)) is:

- $X_t = a_1 + b_{11}X_{t-1} + b_{12}Y_{t-1} + \epsilon_{1t}$ (1)
- $Y_t = a_2 + b_{21}X_{t-1} + b_{22}Y_{t-1} + \epsilon_{2t}$ (1)

Granger Casuality Testing:

A statistical technique for figuring out whether one time series may predict another is the Granger Causality Test. Developed by Clive Granger in 1969, this test assesses if past values of one variable contain information that helps forecast future values of another variable. It's important to note that Granger causality does not imply a true cause-and-effect relationship but rather indicates a predictive association between variables.

Hypotheses in Granger Casuality Testing:

- **Null Hypothesis (H₀):** The time series X does not Granger-cause time series Y, meaning past values of X do not provide significant information about future values of Y.
- **Alternative Hypothesis (H₁):** The time series X Granger-causes time series Y, indicating that past values of X contain information useful for predicting future values of Y.
- **Model Specification:** Fit a Vector Autoregressive (VAR) model to the time series data, incorporating appropriate lagged values based on criteria like the Akaike Information Criterion (AIC) or the Schwarz Information Criterion (SIC).
- **Hypothesis Testing:** Perform statistical tests (e.g., F-tests) to evaluate whether the coefficients of the lagged values of X are significantly different from zero in the equation predicting Y.
- **Decision Making:** If the test indicates statistical significance, reject the null hypothesis, suggesting that X Granger-causes Y.
- **Stationarity:** Ensure that the time series data are stationary. Non-stationary data can lead to misleading results. Transformations like differencing may be necessary to achieve stationarity.
- **Lag Selection:** Choosing the appropriate number of lags is crucial, as too few or too many can affect the test's validity.

6. ANALYSIS

TABLE 1. Test To Measure Stationary (Augumented Dickey-Fuller Test)

	Exchange Rate Of India		ABB		Linde India Limited		Maruti Suzuki India limited		NESTLE S.A		SIEMENS AG	
	T Statics	P Value	T Statics	P Value	T Statics	P Value	T Static	P Value	T Static	P Value	T Statics	P Value
1 %	-3.044503	0.0315	-3.435782	0.2784	-3.435782	0.5195	-3.435782	0.4417	-3.435782	0.6970	-3.435782	0.1187
5 %	-2.865796		-2.863827		-2.863827		-2.863827		-2.863827		-2.863827	
10 %	-2.569094		-2.568038		-2.568038		-2.568038		-2.568038		-2.568038	

Particulars	Exchange Rate Of India	ABB	Linde India Limited	Maruti Suzuki India limited	Nestle s.a	Siemens ag
R-squared	0.014189	0.003517	0.002014	0.002433	0.001146	0.005325
Adjusted R-squared	0.012658	0.002655	0.001151	0.001570	0.000281	0.004465
S.E. of regression	0.171620	244.0960	228.4229	357.9294	751.2395	242.4229
Sum Squared resid	18.96805	68877769	60316632	1.48E+08	6.52E+08	67936816

Particulars	Exchange Rate Of India	ABB	Linde India Limited	Maruti Suzuki India limited	Nestle s.a	Siemens ag
Log likelihood	222.9238	-8008.306	-7931.458	-8451.559	-9310.087	-8000.342
F- statistic	9.269001	4.079642	2.333166	2.819336	1.325780	6.188913
Mean dependent Var	0.013511	0.797858	-0.491458	-4.753050	-14.95969	1.033391
S.D. dependent var	0.172717	244.4206	228.5545	358.2107	751.3452	242.9659
Akaike info criterion	-0.683974	13.83473	13.70200	14.60027	16.08305	13.82097
Schwarz criterion	-0.670133	13.84346	13.71073	14.60900	16.09178	13.82970
Hannan – Quinn criter	-0.678604	13.83802	13.70529	14.60357	16.08635	13.82426
Durbin–Watson stat	2.142278	1.132203	1.213150	1.145401	2.027750	1.075241
Prob (F- statistic)	0.002426	0.043633	0.126918	0.093405	0.249795	0.012995

Hypothesis: There is evidence to suggest that the time series is non-stationary.

Unrestricted Co integration Rank Test

Hypothesis: There is evidence to reject the null hypothesis, indicating the presence of co-integration.

TABLE 2. Johansen’s Co Integration Test

Company’s Name	Eigen Value	Trace Statistics	Critical Value	Probability
Exchange rate of India	0.014071	9.097662	3.841465	0.0026
ABB ltd	0.002161	2.496808	3.841465	0.1141
Linde India limited	0.002166	2.502304	3.841465	0.1137
Maruti Suzuki India limited	0.002542	2.937488	3.841465	0.865
Nestle s.a	0.001054	1.216951	3.841465	0.2700
Siemens ag	0.005537	6.407275	3.841465	0.0114

TABLE 3. Vector Auto Regression

Particulars	Exchange Rate Of India	ABB	Linde India	Maruti Suzuki	NESTLE	SIEMENS
R-squared	0.991435	0.998353	0.990811	0.968610	0.988372	0.998342
Adj-R-Square	0.991408	0.998350	0.990795	0.968556	0.988352	0.998339
Sum sq.resids	18.86988	9339908.	60271674	1.48E+08	6.52E+08	6287792.
S.E. Equation	0.171442	89.96393	228.5355	358.1920	751.7053	73.81526
F-Statistic	37155.16	349722.2	62215.85	17804.61	49045.76	347438.6
Log likelihood	223.7524	-6846.026	-7924.677	-8444.607	-9302.262	-6617.121
Akaike info	-0.684504	11.83928	13.70385	14.60260	16.08516	11.44360
Schwarz sc	-0.663716	11.85239	13.71695	14.61571	16.09826	11.45670
Mean dependent Var	82.24268	3322.427	3710.356	8783.403	15705.85	3207.425
S.D. dependent var	1.849553	2214.747	2382.017	2019.965	6965.048	1811.263

TABLE 4. Granger Causality Test

Company's name	Null Hypothesis	Observations	F-Statistic	Probability
ABB	EXRATE does not Granger Cause ABB	1160	0.46180	0.6304
	ABB does not Granger Cause EXRATE		0.11137	0.8946
Linde India	EXRATE does not Granger Cause LINDE INDIA	1160	0.13928	0.8700
	LINDE INDIA does not Granger Cause EXRATE		0.22557	0.7981
Maruti Suzuki	EXRATE does not Granger Cause MARUTI SUZUKI	1160	2.50078	0.0828
	MARUTI SUZUKI does not Granger Cause EXRATE		0.22423	0.7992
Nestle	EXRATE does not Granger Cause NESTLE	1160	0.79762	0.4508
	NESTLE does not Granger Cause EXRATE		0.02107	0.9792
Siemens	EXRATE does not Granger Cause SIEMENS	1160	0.61140	0.5429
	SIEMENS does not Granger Cause EXRATE		0.09464	0.9097

7. FINDINGS

- From the above table 4.1, inferred that the ADF test is used to find out the exchange rate of India and to determine the existence of the unit root, and it is found that there is an existence of the unit root. The P value is 0.0315 which is less than the significant value of 0.05 hence, there is evidence to suggest that the time series is stationary. Also, the ADF test is used to find the existence of the unit root in foreign investors of stock market prices, and it is found that there is the existence of the unit root. The P value is 0.2784, 0.5195, 0.4417, 0.6970, 0.1187 which is greater than the significant value of 0.05.
- From the above table 4.2, for Exchange rate of India, the eigenvalue is 0.014071, and the trace statistic is 9.097662 with a probability of 0.0026 which is less than the P VALUE. Therefore, we reject the null hypothesis and conclude that there is a cointegrating relationship. For Linde India, Maruti Suzuki, nestle the probabilities are 0.1137, 0.865, 0.2700 is greater than 0.05. Thus, we fail to reject the null hypothesis, indicating no evidence of cointegration. However, for siemens ag, with a probability of 0.0114, is less than 0.05. Therefore, we reject the null hypothesis and conclude that there is a cointegrating relationship. Therefore, the inference is that there appears to be co-integration among the variables for siemens, while for the other companies, there isn't sufficient evidence to conclude the presence of co-integration.
- From the above table 4.3 shows that the VAR test is used to indicates the values provides R-Squared values, which indicates the goodness of fit for the regression models. The high R-Squared values ranging from approximately 0.968610 to 0.998353 suggest that the models explain a significant portion of the variability in the data. The F-Statistics values are quite large, ranging from approximately 17,804.61 to 349,722, indicating that the regression model is statistically significant in explaining the variations in the dependent variables.
- The above table 4.4 exhibits that the results of Granger Casualty Test between the selected foreign investor and exchange rate of India. The test shows the relationship between the selected foreign investor and exchange rate of India.
- We can determine the items' non-stationarity with the use of ADF tests.
- The short as well as long-term relationship among the variables have been identified with the assistance of VAR and Johansen Co integration tests.

Suggestion:

The relationship between international investors and Indian stock markets is vital in determining the financial environment of the nation. By contributing cash, influencing liquidity, and influencing stock prices, foreign institutional investors (FIIs) and foreign portfolio investors (FPIs) have a major impact on market movements. The amount of foreign investment in Indian stocks is determined by a number of factors, including interest rate

differences, domestic regulations, geopolitical stability, and worldwide economic conditions. Strong economic development prospects, investor-friendly reforms, and a stable regulatory framework all draw in foreign capital, which improves market depth and efficiency. India must manage foreign investment inflows while maintaining economic stability since abrupt capital withdrawals brought on by international uncertainty might cause market instability.

8. CONCLUSION

The relationship between foreign institutional investors (FIIs) and the Indian stock market is characterized by significant interdependence. FIIs have become pivotal in shaping market trends, with their investment decisions often influencing market performance. The National Stock Exchange (NSE) of India provides daily reports on FII and domestic institutional investor (DII) trading activities, offering insights into their market participation. These reports are essential for understanding the dynamics of market liquidity and investor sentiment. Studies have shown that FII inflows enhance market liquidity and efficiency, while their outflows can lead to increased volatility and downward pressure on stock price

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