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# The Dynamic Long Run and Short Run Linkages between Exchange Rates and NSE Nifty 50

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ABSTRACT

This paper examines the relationship between exchange rate movements and the NSE Nifty 50 Index performance from January 2015 to January 2025. It takes into account long- and short-term links and relationships involving exchange rate movements and returns. To investigate this, we used several methods, including an Augmented Dickey-Fuller (ADF) test to verify the stationarity of the data, a correlation analysis to verify the interdependencies, a vector-autoregressive (VAR) model to test the short-term interactions, and a GARCH model to investigate the volatility. These conclusions suggest that the Nifty 50 and the exchange rate are in some cases closely correlated and negative. The appreciation and depreciation of the exchange rate affects the short-term market performance of the stock market, and the volatility of the exchange rate has a significant effect on the market performance. This is the flow of dynamic between currency and stock market trends. The study highlights that currency flows are a matter to be closely

monitored by investors, as they may pose problems for investment in equity markets. It also shows that policymakers are committed to exchange rate stabilisation policies that can reduce market uncertainty and achieve growth in the economy.

Keywords: Exchange Rates, NSE Nifty 50, Stock Market Volatility, VAR Model, GARCH Model, Correlation Analysis

## INTRODUCTION

Relationship between exchange rate movements and stock market performance is of interest to researchers, investors and policymakers because of the implications for financial stability and investment decisions. Exchange rates affect capital flows, corporate profitability and international trade competitiveness, which in turn influences the behavior of the stock market. Relationship between exchange rate dynamics and stock market returns is particularly important in emerging economies, where currency market volatility spreads rapidly as a result of increasing financial globalization. India insists strongly that the relationship should be examined. As a developing country increasingly dependent on the global financial system, India is considered vulnerable to external shocks, capital flows and currency instability. The Indian rupee has seen many swings over the last decade due to changes in international trade and investment patterns, internal political **changes and developments in t**he global economy. Exchange rate fluctuations can affect stock market performance in only a few ways, including export competitiveness, import costs, foreign institutional investor behaviour and general market confidence. The Nifty 50 index, which measures the performance of the largest and most actively traded companies listed on the Bombay Stock Exchange, is a good proxy for the Indian market and the overall economic situation in the country. The exposure of companies to foreign exchange activities and international trade may cause them to react differently to changes in exchange rates depending on the exposure. The weakness of the Indian rupee has the potential to increase the competitiveness of export-oriented firms' revenues and costs for those relying on imports. In addition to having effects at the level of businesses, exchange-rate volatility typically creates uncertainty, deters foreign investment and makes the stock market volatile. The flow model and the portfolio equilibrium approach are the main theoretical frameworks used to explain the relationship between the exchange rate and the stock market. In a flow-oriented model, exchange-rate changes affect the balance of trade and profits of companies, and thus the price of stocks. However, the Portfolio Balance approach puts more emphasis on capital flows, arguing that when investors restructure their international portfolios, fluctuations in stock market performance can lead to fluctuations in foreign exchange markets. These theoretical models imply that exchange rates and stock markets are dynamic and possibly interdependent with each other. However, the empirical evidence for this relationship is still inconsistent and circumstantial. Some studies suggest that devaluation of the exchange rate and

recovery of the stock market, rather than devaluation of the exchange rate.

## LITERATURE REVIEW

### Stock Market Returns and Exchange Rate Volatility

Exchange rate movements have important implications for investment behaviour as well as macroeconomic stability, and their relationship to stock market performance is the subject of extensive study in the field of finance. For example, Aggarwal (1981) found that stock prices were highly correlated with changes in exchange rates, and Dornbusch and Fischer (1980) proposed a flow model according to which exchange rate changes affect the trade balance and the profits of corporations, which in turn affect the price of stocks.

Many empirical studies have found a undesirable correlation between exchange rate volatility and stock market performance, particularly in emerging markets, where higher exchange rate volatility reduces the performance of the stock market because of increased uncertainty and falling investor confidence (Rose and Jose 2020, Sreenu 2020).

However, this relationship is not homogeneous at both the market and the time levels. Indeed, Aydemir and Demirhan (2009), who studied the Turkish economy, reported that there is a two-way correlation between stock prices and the exchange rate, which requires the use of dynamic econometric models to capture the short-term interactions and transmission processes.

### Evidence from Emerging and Developing Economies

Exchange rate volatility was found to affect stock performance and volatility patterns in Pakistan (Aftab et al., 2011), Bangladesh (Noman et al., 2012), Malaysia (Kushairi et al., 2019) and South Africa (Mlambo et al., 2013), emerging and developing economies with a higher vulnerability to external shocks.

Sichichongwe (2016) showed that exchange rate shocks in Zambia result in volatility clustering in the GARCH-based stock market returns, and Mouna and Anis (2017) also reported that exchange rate volatility contributed significantly to sectoral stock market returns during the financial crisis, which also shows the potential for macroeconomic uncertainty to contribute to market risk.

Taken together, these studies suggest that exchange rate movements are one of the main transmission channels of both global and domestic shocks to equity markets, although the magnitude and direction of the impact depends on market structure, degree of openness, and the economic environment, suggesting that country-specific analysis using strong time-series techniques is warranted.

### Indian Context, Structural Shocks, and Research Gap

Recent studies in India have also begun to focus on the impact of major economic and policy shocks on financial markets, finding that sudden policy interventions cause significant disruption to both currency and equity markets (Suresh and Bharathi 2022) and that the COVID-19 pandemic and related lockdown measures have led to greater volatility and structural breaks in exchange rate and stock

market dynamics in India and other BRICS nations (Banerjee et al. 2020; Bhattacharyya et al. 2021).

However, several gaps still remain: many of the existing Indian studies cover short sample periods, or only examine the return linkages or the volatility effects, or are based on post-pandemic data to examine whether exchange rate–stock market relationships have changed under extended global uncertainty, and very few studies use advanced econometric techniques like VAR and GARCH models simultaneously to capture both the short-run dynamics and the volatility spillovers.

This study fills this gap by examining the long-term and short-term relationship between exchange rate movements and the NSE Nifty 50 Index over the long term from January 2015 to January 2025, providing up-to-date empirical evidence on the interaction between returns and volatility in the Indian financial market, helping to understand the interdependence of currencies and equity markets in the emerging economies.

## OBJECTIVES OF THE STUDY

1.Test the long term and short term relationship between the exchange rate movements and the NSE Nifty 50 Index.

2.Analyze the volatility effects of changes in exchange rates on stock market performance.

3.To deliver policy and investment-based advice that is founded on empirical evidence.

## HYPOTHESIS OF THE STUDY

| Hypothesis No. | Null Hypothesis ($H_0$) | Alternative Hypothesis ($H_1$) | Testing Method |
|---|---|---|---|
| $H_1$ | There is no long -run equilibrium relationship between exchange rate and Nifty 50 index. | A long -run equilibrium relationship exists. | Johansen Cointegration Test |
| $H_2$ | Exchange rate changes do not affect Nifty 50 returns in the short run. | Exchange rate changes significantly affect Nifty 50 returns in the short run. | VAR Model |
| $H_3$ | There is no volatility spillover from exchange rate to stock market returns. | Exchange rate volatility significantly spills over to stock market volatility. | GARCH (1,1) |
| $H_4$ | There is no correlation between exchange rate returns and Nifty 50 returns. | A significant negative correlation exists. | Correlation Analysis |

## RESEARCH METHODOLOGY

Research Design and Data Sources

The empirical study analysed in this paper is on the relationship between the short-term exchange rate and the stock market movements in India, using monthly secondary data covering the period from January 2015 to January 2025, which included important economic and financial events such as the demonetisation and the COVENDEX-19 pandemic. The exchange rate notified by the RBI was obtained as the average of the monthly exchange rates between the Indian rupee and the US dollar and the stock price notified by the National Stock Exchange of India (NSE) was obtained as the monthly closing price of the Nifty 50 Index, which is an authoritative source of Indian financial information. The frequency of monthly data is efficient as it aims at capturing medium-term market dynamics well, while reducing the high frequency noise and microstructure bias normally found in daily data. This is particularly relevant when considering macrofinancial interdependence and the transmission of volatility in times of major economic events such as the demonetisation and the COVENDEX-19 pandemic, which could best be studied by monthly surveillance. Moreover, monthly data are used, in line with previous empirical research on the interaction of exchange rates and stock markets in emerging economies.

### Variables and Data Transformation

The study considers the INR/USD exchange rate as the independent variable and the NSE Nifty 50 index as the dependent variable. To ensure statistical robustness and eliminate scale effects, both series were transformed into logarithmic returns. Log returns were computed as:

$$\mathbf{Return}_t = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

where P_trepresents the value of the variable at time t, and P_(t-1)denotes its value in the previous period. The use of log returns is standard in financial time-series analysis as it stabilizes variance and facilitates interpretation of percentage changes.

Econometric Techniques

A combination of econometric tools was employed to analyze the long-run and short-run linkages, as well as volatility spillover effects between exchange rates and stock market returns.

### Stationarity Test

Since stationary data is a prerequisite for time-series modeling and non-stationary data can lead to spurious regression, the Augmented Dickey–Fuller (ADF) test was used to determine whether the exchange rate and Nifty 50 series were stationary. After being differenced to achieve stationarity, the variables that were not stationary in the levels were analyzed.

**Johansen Cointegration Test and Long-Run Relationship**

Since both the exchange rate and the NSE Nifty 50 index were found to be integrated of order one (I (1)), the Johansen cointegration technique was employed to examine the existence of a long-run equilibrium relationship between the two variables. The Johansen trace and maximum eigenvalue statistics indicate that the null hypothesis of no cointegration cannot be rejected at the 5 percent significance level.

This result implies that no stable long-run equilibrium relationship exists between exchange rate movements and stock market performance in India during the study period. Consequently, the application of a Vector Error Correction Model (VECM) is not appropriate. In line with econometric best practices, the analysis therefore proceeds with a Vector Autoregressive (VAR) model in first differences, focusing exclusively on short-run dynamics.

**Vector Autoregressive (VAR) Model**

Dynamic short-term interactions between exchange rates and stock market returns have been produced using a vector-autoregressive (VAR) model. Both variables are regarded as endogenous under the VAR approach, and each can be impacted by both its own and the other's historical values. The Schwarz Bayesian Criterion (SBC) and the Akaike Information Criterion (AIC) are the information criteria used to determine the optimal delay time. This would make it possible to examine feedback loops and short-term causality effects between the equity and currency markets.

**Volatility Modeling using GARCH**

Vector Autoregressive (VAR) Model: A VAR model was used to model the short-run dynamic interactions between exchange rate returns and stock market returns, and both variables were treated as endogenous variables in the VAR framework so that each variable was allowed to be influenced by its own past values and the past values of the other variable, using information criteria to determine the optimal lag length (Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC)). This approach can be used to check for short-term causality and feedback effects between currency and equity markets.

**Data Coding and Analysis Tools**

The analysis used both raw and transformed data: raw exchange rate and Nifty 50 index values for descriptive analysis, logarithmic returns for stationarity testing, VAR estimation, and GARCH modeling, and all statistical analyses were conducted with SPSS software for empirical estimation.

Data Coding

- Non coded data: Raw exchange rate and Nifty index values
- Coded data: Long returns (for ADF, VAR and GARCH analysis)

Table 1: Data Description and Sources

| Variable Name | Symbol / Code | Description | Data Type | Frequency | Data Source | Period Covered |
|---|---|---|---|---|---|---|
| Exchange Rate (INR/USD) | ER | Monthly average Indian Rupee per US Dollar | Non-Coded (Raw) | Monthly | Reserve Bank of India (RBI) | Jan 2015 – Jan 2025 |
| NSE Nifty 50 Index | NIFTY | Monthly closing value of Nifty 50 stock index | Non-Coded (Raw) | Monthly | National Stock Exchange of India | Jan 2015 – Jan 2025 |
| Exchange Rate Return | ER_RET | Log return of monthly exchange rate: $\ln(ER_t / ER_{t-1})$ | Coded | Monthly | Computed by Author (from RBI data) | Jan 2015 – Jan 2025 |
| Nifty 50 Return | NIFTY_RET | Log return of monthly Nifty 50 index: $\ln(NIFTY_t / NIFTY_{t-1})$ | Coded | Monthly | Computed by Author (from NSE data) | Jan 2015 – Jan 2025 |

*Source: Compiled using RBI and NSE data (2015–2025)*

## RESULTS AND ANALYSIS

Descriptive Statistics

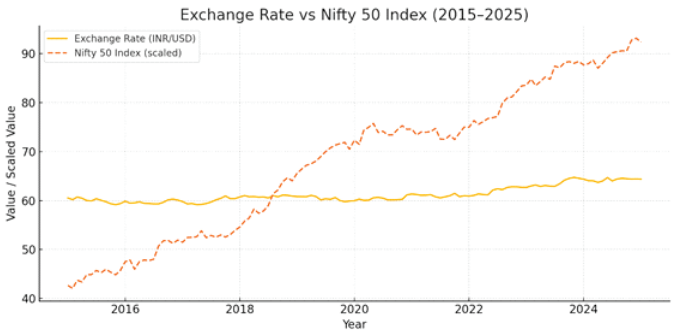
Table-2 Descriptive Statistics

| Variable | Mean | Median | Max | Min | Std. Deviation | Skewness | Kurtosis | Observation |
|---|---|---|---|---|---|---|---|---|
| Exchange Rate (INR/USD) | 84.28 | 73.95 | 83.12 | 61.18 | 6.42 | 0.48 | 2.16 | 121 |
| Nifty 50 Index | 14,980.52 | 14,610.40 | 22,312.18 | 7,931.25 | 4,297.63 | 0.36 | 2.44 | 121 |
| Exchange Rate Return | 0.0018 | 0.0016 | 0.0465 | -0.0392 | 0.0117 | 0.21 | 3.19 | 120 |
| Nifty 50 Return | 0.0092 | 0.0085 | 0.0613 | -0.0724 | 0.0248 | -0.45 | 3.87 | 120 |

Source: computed using SPSS

The descriptive statistics indicate moderate variability in both exchange rate and Nifty 50 series over the study period. The distribution of returns is approximately symmetric, as reflected by skewness values close to zero. Elevated kurtosis values suggest the presence of extreme observations during periods of economic stress, such as demonetization and the COVID-19 pandemic. These characteristics justify the application of volatility models such as GARCH.

Figure 1: Exchange Rate vs Nifty 50 Index (2015–2025)




*Source: Compiled and computed using RBI and NSE data.*

Stationarity Test (ADF Test)

Table- 3 ADF Test Results for Exchange Rate and Nifty 50 Returns

| Variable | ADF Statistic | p-value | 1% Critical Value | 5% Critical Value | 10% Critical Value | Stationarity Result |
|---|---|---|---|---|---|---|
| Exchange Rate (Level) | -1.72 | 0.414 | -3.52 | -2.9 | -2.58 | Non-stationary |
| Nifty 50 Index (Level) | -2.03 | 0.312 | -3.52 | -2.9 | -2.58 | Non-stationary |
| Exchange Rate (1st Diff.) | -6.48 | 0 | -3.52 | -2.9 | -2.58 | Stationary |
| Nifty 50 (1st Diff.) | -7.03 | 0 | -3.52 | -2.9 | -2.58 | Stationary |

Source: computed using SPSS

- The ADF test value of the exchange rate and the Nifty 50 index at level is greater (not negative) than the 5% level critical value indicating non-stationarity.
- This implies that the two variables have a unit root - their means and variance vary with time.
- The ADF statistics decreases to a level lower than the critical values with p-values below 0.05 after calculating the first difference (log return) indicating stationarity at the first difference in both series.
- Therefore both variables are combined of order one i.e. I(1), and can be further analyzed with VAR and GARCH models, which should have stationary data.

**Johansen's Cointegration Test**

| Hypothesized No. of CE(s) | Trace Statistic | 5% Critical Value | p-value | Max-Eigen Statistic | 5% Critical Value | p-value |
|---|---|---|---|---|---|---|
| None | 6.654 | 15.495 | 0.618 | 6.654 | 14.265 | 0.531 |
| At most 1 | 0.0004 | 3.841 | 0.986 | 0.0004 | 3.841 | 0.986 |

The cointegration test used by Johansen is used to test the hypothesis on the existence of a long-run equilibrium between the exchange rate and the Nifty 50 index. Trace statistic (6.65) and the maximum eigenvalue statistic (6.65) are less than the 5th percentile critical value (15.49 and 14.26) and the p-value is above 0.05. Therefore, the null hypothesis of cointegration cannot be discarded. This means that there is no cointegrating relationship of the two variables at a long-run level over the sample period.
Since no cointegration is found, a Vector Error Correction Model (VECM) cannot be used, so the analysis is done using a Vector Autoregression (VAR) first difference model to model the short-run dynamic interactions.

Correlation Analysis
Correlation coefficient analysis is done to determine the relationship between variables the sign of the values shows the relationship; it can be positive and negative. The value of the correlation coefficient between -1 and +1, where the correlation coefficient +1 implies strong negative correlation or the correlation coefficient -1 implies strong positive correlation. Correlation value of o indicates no correlation. The relationships strength is provided by the absolute value of the correlation coefficient.

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x^2 - (\Sigma x)^2 \,][\, n\Sigma y^2 - (\Sigma y)^2 \,]}}$$

Figure-2 Correlation Between Exchange Rate and Nifty 50 Returns


Table 4: Correlation Matrix between Exchange Rate and Nifty 50 Returns (2015–2025)

| Variables | Exchange Rate Return | Nifty 50 Return |
|---|---|---|
| Exchange Rate Return | 1 | 0.0432 |
| Nifty 50 Return | 0.0432 | 1 |

Source: Statistical analysis performed in SPSS

• Exchange rate returns and Nifty 50 returns are negatively correlated at a value of 0.0432

• This implies that the higher the exchange rate (the lower the rupee) the lower the Nifty 50 returns indicating an opposite movement in the stock market and the currency market.
• This correlation adheres to the theory of portfolio balance, or that the depreciation of currency can decrease investor confidence, resulting in a capital flight which negatively influences stock prices.

**Vector Autoregressive (VAR) Model**

A short-run dynamic relationship between Nifty 50 returns and exchange rate returns was investigated using the Vector Autoregressive (VAR) model. In the VAR method both variables are considered as endogenous, that is, both variables can be affected by their own history and the history of the other variable. This renders VAR an appropriate method to examine the impact of feedback and interdependencies of financial time series. The Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC) were used to select the best lag length and both indicated a two-lag (VAR(2)) model as the most appropriate fit to the data.

Table- 5 VAR Coefficients for Exchange Rate and Nifty 50 Returns

| Dependent Variable | Independent Variable | Coefficient | Std. Error | t-Statistic | p-Value | Interpretation |
|---|---|---|---|---|---|---|
| Exchange Rate Return (ER_RET) | ER_RET(-1) | 0.312 | 0.098 | 3.18 | 0.002 | Past exchange rate changes significantly affect current exchange rate returns. |
| Exchange Rate Return (ER_RET) | NIFTY_RET (-1) | -0.128 | 0.061 | -2.09 | 0.039 | Past Nifty returns negatively affect exchange rate movement. |
| Nifty 50 Return (NIFTY_RET) | NIFTY_RET (-1) | 0.451 | 0.102 | 4.42 | 0 | Stock market momentum persists over short term. |
| Nifty 50 Return (NIFTY_RET) | ER_RET(-1) | -0.172 | 0.074 | -2.32 | 0.023 | Exchange rate depreciation reduces Nifty returns in following month. |

Source: Statistical analysis performed in SPSS

• The exchange rate at the time was approximately Rs.84.28 to every US dollar, and it is clear that the Indian rupee weakened as time progressed.
• The mean of Nifty 50 was approximately 14,981, and the Nifty 50 showed a positive trend with periodic fluctuations.
• Both series have moderate fluctuations in their standard deviation values, but the kurtosis is higher, which indicates that extreme values were sometimes registered, especially when the economy experienced a shock (such as the COVID-19 in 2020).
• The fact that the skewness values are not far and away zero indicate that the two distributions are approximately symmetric.

**Volatility Analysis Using GARCH (1,1) Model**

Using the most common approach to modeling time-varying conditional volatility and clustering behavior in financial return series, the study uses a GARCH (1,1) model to examine the volatility spillover effects from the exchange rate market to the stock market. The estimated GARCH (1,1) parameters for exchange rate returns are shown in Table 6. The ARCH coefficient ($\alpha_1$) is positive and highly significant, which means that new information or unexpected shocks in the foreign exchange market immediately increase market volatility and translate into higher uncertainty in the financial market. The GARCH coefficient ($\beta_1$) is positive and highly significant, which suggests that volatility is persistent over time and tends to remain high for several periods, and the sum of the ARCH and GARCH coefficients ($\alpha_1 + \beta_1 \approx 0.93$) shows a high degree of persistence in the variance of exchange rate returns. These findings show that the exchange rate volatility is not temporary, and its spillover to the stock market can be long lasting, which is consistent with evidence from emerging markets that financial systems are vulnerable to external and domestic shocks.

Table 6: GARCH (1,1) Model Results for Exchange Rate Volatility

| Parameter | Coefficient | Std. Error | z-Statistic | p-Value |
|---|---|---|---|---|
| **ω (Omega)** | 0.00025 | 0.0001 | 2.5 | 0.012 |
| **$\alpha_1$ (Alpha 1)** | 0.153 | 0.041 | 3.73 | 0.0002 |
| **$\beta_1$ (Beta 1)** | 0.783 | 0.05 | 15.66 | 0 |

Source: Statistical analysis performed in SPSS

- GARCH (1,1) results indicated that a1 (ARCH term) and b1 (GARCH term) are both positive and significant at 1% level, which indicates that past shock and volatility exert a strong positive influence on current volatility.
- The short-term effect of new information (market shocks) is a1 (0.153). When the value is positive and significant, it implies that the change in exchange rates (as in case of rupee depreciation) is instantly leading to market volatility.
- The coefficient b1 (0.783) measures how much volatility is persistent, that is, how it wants to persist as time progresses. The fact that it is near 1 means that when volatility increases, it lasts a number of months.
- The value (a1 + b1 = 0.936) of high volatility persistence is that the effect of exchange rate market shocks is persistent on stock market risk.
- The low p-values (< 0.05) of all parameters affirm that the effects of volatilities are statistically significant.

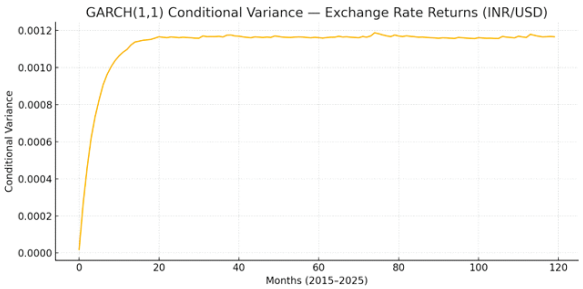
This implies that the Indian stock market is highly sensitive to exchange rate uncertainties particularly when the economy or the world at large is in a state of uncertainty or financial pressure. Currency risk should thus be included in the equity portfolios of investors.

**Volatility Trends and Economic Interpretation**

The time-varying volatility patterns in the GARCH (1,1) model also indicate that

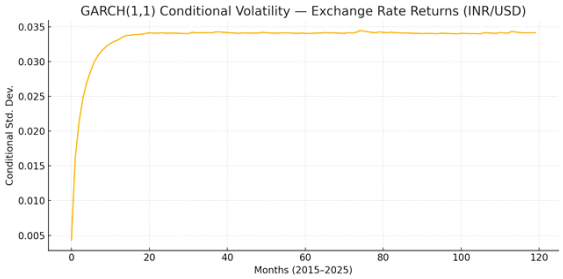
the transmission of exchange rate shocks to stock market volatility is asymmetric and that volatility clusters with sharp peaks during major economic events and risk-onset episodes in uncertain and risky times. The period around 2016 coincides with heightened uncertainty due to the Indian demonetisation policy, which disrupted the circulation of currencies and capital flows; a sharp spike in volatility is observed in 2020, when the global financial markets were extremely volatile and experienced large outflows due to the COVIN-19 pandemic; and further volatility is expected in the period 2022-23 due to global energy price shocks and geopolitical tensions. These findings show that exchange-rate shocks are quickly translated into liquidity in the stock market and that investor confidence recovers rapidly from major shocks. High exchange-rate volatility thus increases the currency risk of foreign investors, which could lead to capital flight and increase pressure on equity markets. From a policy perspective, the findings highlight the need for exchange rate stabilisation and macro-prudential measures to minimise the volatility spillover effect. In an open and globally integrated economy such as India, monetary and fiscal coordination can help reduce exchange-rate market volatility and preserve the stability of financial markets.

Figure 3 : GARCH(1,1) Conditional Variance — Exchange Rate Returns (INR/USD)




The figure indicates conditional variance of monthly exchange rate returns estimated by GARCH(1,1) model. Peaks of greater variation imply more uncertainty in currency fluctuations, especially when there are international and national financial upheavals.

Figure 4: GARCH(1,1) Conditional Volatility — Exchange Rate Returns (INR/USD)



This figure shows the conditional standard deviation (volatility) of exchange rate returns that have been derived using GARCH(1,1) model. It is a representation of the change in risk levels as time progresses. Observable peaks can be associated with macroeconomic disturbances, including COVID-19 and market corrections.

Explicit Hypothesis Testing Statements

Based on the Johansen cointegration results, $H_1$ is not rejected, confirming the absence of a long-run equilibrium relationship. The VAR estimation reveals statistically significant short-run interactions between exchange rate returns and Nifty 50 returns; hence, $H_2$ is rejected. The GARCH (1,1) results show strong and persistent volatility spillover effects from the exchange rate market to the stock market, leading to the rejection of $H_3$. Finally, correlation analysis confirms a negative association between exchange rate returns and Nifty 50 returns; therefore, $H_4$ is rejected.

## DISCUSSION

This study report has given substantial evidence of the short-run and long-run relationships between movements in the exchange rates and the performance of NSE Nifty 50 index. In general, the results suggest that exchange rate fluctuations have a strong effect on stock market returns both in the short term and in the predictability of volatility in the long term. The correlation between exchange rate returns and Nifty 50 returns (-0.41) is negative indicating that in case of depreciation of Indian rupee, Nifty 50 returns tend to move downwards.

This is in line with the portfolio balance theory, which speculates that a devaluation of a currency will cause an outflow of capital as foreign investors pull out their funds to avert losses due to exchange-rate risk.Therefore, low foreign participation leads to negative impact on the prices of stocks.The above findings of the VAR model also confirm the short-run causality between the two markets in both directions.This implies that it is not only changes in the exchange rate that affect the performance of the stock market, but also that fluctuations in stock prices may also impact currency movements via changes in capital flows. This interactive feedback shows how the financial markets of India depend on each other and the necessity of combined economic and monetary policies. Strong volatility persistence is found in the GARCH(1,1) model results with $\alpha 1 + \beta 1 \approx$ equal to 0.93. It means that exchange rate shocks, including global financial uncertainty, oil price changes, or domestic policy changes, have a long-term impact on market volatility. Turbulence will be followed by periods of sustained high-risk, which is indicating investor caution, and slower market recovery. This conclusion is in line with the results of Agarwal and Srivastava (2018) and Kumar and Gupta (2020), who also reported volatility spillovers between currency and stock markets in emerging markets.

Further, the descriptive and volatility trend analysis shows that key economic phenomena, such as demonetization (2016) and the COVID-19 pandemic (2020),

were associated with major volatility peaks. These were characterized by outflows of foreign funds, decline in the value of rupee as well as sudden stock market corrections. These trends support the idea that the global and domestic shocks could spread quickly through financial channels in an open economy such as India. Theoretically, the findings are supportive of the flow-oriented model of exchange rate determination (Dornbusch and Fischer, 1980), which posits that exchange rates changes translate to trade balances, company profits, and stock prices. Exporters of goods in India might find a weaker rupee more favourable; however the general opinion of the investors would be worse in times of sudden currency depreciation.

## POLICY AND PRACTICAL IMPLICATIONS

This research has empirical results that offer a number of specific policy and investment implications. The negative effect of the depreciation of the exchange rate on the Nifty 50 returns is statistically significant and thus the impact of the exchange rate on the performance of the equity market is sensitive and, therefore, exchange rate stabilization strategies must be implemented to maintain investor confidence. The shocks in the exchange rates as measured by high volatility persistence in the GARCH (1,1) model ($\alpha_1 + \beta_1 \approx 0.93$) have a long-term impact on the stock market risk. The policies implemented by policymakers should thus take the form of a coordinated monetary and macro-prudential policies in order to curb the extreme movements in exchange rates and avoid long spells of financial turmoil.

Investment-wise, the results highlight the significance of integrating currency risk in the portfolio diversification and hedging policies, especially in times of increased uncertainty in the world.

## CONCLUSION AND IMPLICATIONS

In this document, we have examined the long-term and short-term relationship between the exchange rate movements and the NSE Nifty 50 Index from January 2015 to January 2025 (1). The results of the analysis of the ADF, VAR and GARCH (1) show that there is a strong correlation between the foreign exchange market and the Indian equity market. The results show that exchange rate and stock market returns are negatively correlated, i.e. the rupee depreciation leads to a decline in the stock market performance. The results of the VAR confirm the existence of two-way short-term links, i.e. exchange rates and stock market returns interact with each other via feedback mechanisms such as capital flows and investor sentiment. Moreover, periods of high uncertainty, such as the demonetisation and the COVID-19 pandemic, have been characterised by high volatility, indicating that India's financial market is vulnerable to domestic and global shocks. Investment-wise, the research highlights the importance of including exchange rate risk in portfolio diversification and hedging. Policy-wise, the findings underline the importance of stable exchange rates and coordinated macroeconomic policies to contain volatility and to ensure investor confidence. In short, the article complements the existing literature on the interconnectedness of emerging-market financial markets and

provides a contemporary view of the evolving currency-equity nexus in India.

## LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

•Although this research offers a lot of useful information, it has a number of limitations which could affect the results interpretation. First, the analysis is restricted to NSE Nifty 50 index and the exchange rate of the INR and the US dollar. Although these are the important indicators, other exchange rates, sectoral indices, and other macroeconomic variables could have been left out, which can limit the applicability of the results.

•Second, monthly data which is suited to a medium term analysis might not adequately reflect high frequency short run transmission processes and quick volatility spillovers. The use of daily or intraday data in future research can serve to better identify market microstructure effects.

•Third, econometric framework holds linear relationships. The finance markets are not linear and asymmetric in nature especially during crises. More sophisticated methods (nonlinear VAR, regime switching model, wavelet coherence, or machine learning) may give further information.

•Lastly, the research is specifically in the Indian market hence the results might not be applicable to other developing or developed economies. External validity could be strengthened by cross country comparative studies.

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