



Original Article

**DETERMINANTS OF FOREIGN EXCHANGE RATE AND ITS IMPACT
ON PERFORMANCE OF THE NATIONAL STOCK EXCHANGE**

Leyah Raichel John¹ & Dr. M. Jegadeeshwaran²

¹M.Com. (Finance & Accounting), Department of Commerce, Bharathiar University, Coimbatore

²Associate Professor, Department of Commerce, Bharathiar University, Coimbatore

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Corresponding Author:
Leyah Raichel John

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Abstract:

This study aims to investigate the impact of the foreign exchange rate on the National Stock Exchange indices. The NSE indices used for the study are Nifty 50, Nifty 500, Nifty Midcap 100, Nifty IT, Nifty Metal, and Nifty Pharma, and the exchange rate of Indian Rupees against the US Dollar is being studied. The study is based on secondary data from 2014 to 2024. Descriptive statistics, Regression, and Correlation analysis are used in the study. The data is taken monthly. The study shows that the Forex Reserve has the greatest impact on the USD/INR Exchange rate, followed by FDI inflows and the Crude Oil price. There is also a positive correlation between the USD/INR exchange rate and the Nifty 50, Nifty Midcap 100, Nifty 500, Nifty IT, Nifty Metal, and Nifty Pharma.

Keywords: Exchange Rate, NSE Indices, Macroeconomic Variables.

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Introduction:

The reform in the 1990s has resulted in a drastic change in India's economic landscape. Over the years, Globalisation has become a major force in shaping India's economy. It has paved the way for the free movement of foreign goods and capital. It has also led to the development of cross-border trade in terms of the stock market. The stock market, which is a major indicator of a nation's economic development, has consistently contributed to capital mobilisation, investment and saving, economic diversification, and wealth creation. The performance of the stock market has been measured using indices that depend on a host of macroeconomic factors. The National Stock Exchange, founded in 1992, is one of the nation's major stock exchanges. The performance of the top fifty firms among the thirteen sectors concerned has been included in the Nifty 50, the major index of the National Stock Exchange. The performance of the National Stock Exchange has been impacted by a host of factors, including the nation's inflation rate, interest rates, currency exchange rates, government policies, foreign direct investment, corporate profits, geopolitical issues, Gross Domestic Product, the price of Crude Oil, and so on. The exchange rate has been taken into consideration as a major factor impacting on the performance of the indices concerned. The exchange rate is the value of a currency in terms of units of another currency. A host of factors affect fluctuations in the exchange rate concerned. These include the level of interest rate, Inflation Rate, FDI flow, price

of Crude Oil, Forex Reserves, Gross Domestic Product, and political and economic stability. Fluctuations in the exchange rate significantly affect the performance of the stock market index. The study aims at analysing the impact of the USD/INR Exchange rate on Nifty 50, Nifty 500, Nifty Midcap100, Nifty IT, Nifty Metal, Nifty Pharma, and the factors impacting the exchange rate movements.

Review of Literature:

Patel D, Kaglawala N (2013) studied the effects of exchange rates on stock markets in India, namely BSE and NSE. The study aims to establish the relation between the exchange rate and stock market indices. This study covered the period from January 2005 to December 2012. This study concluded that there was a minimal relation between the exchange rate and Nifty-Sensex indices.

Kumar R (2015) examined the impact of fluctuations in foreign exchange rates in terms of the NSE. The study was based on a 10-year analysis, spanning 2005 and 2015. The tests used in the study are unit root test, cointegration tests using Johansen, and the chi-square tests. The results indicated there is no co-integration between the exchange rate and the Nifty stock market index.

Najaf R, Najaf K (2016) carried out a study to examine the exchange rate movement and stock market volatility from 2008 to 2010. The study employed a wide range of analytical techniques, such as the Unit Root test and the Granger Causality test. The study concluded that the relationship



between the exchange rate and Nifty returns is negative.

Theivanyaki M, Ganeshwari M, Keerthana G (2018) examined the effect of currency fluctuations on sectoral indices in the Indian capital market. The study covers the period from 2013 to 2017, and for this period, the data includes the monthly average prices for Nifty sectors and daily INR/USD values to calculate the exchange rate. The NSE indices selected for this study were: Nifty Bank, Auto, Pharma, Realty, FMCG, and Media. All sectors, except Nifty Realty, are positively correlated with the USD/INR exchange rate, concluded the study.

Good G S, Jain M K, Kaur G (2018) analysed the behaviour of exchange variations and their impact on the stock market indices in India. The study aims to establish the relationship between the values of two exchange rates, which include USD/INR and GBP/INR, and the other two indices: SENSEX and Nifty50. Correlation analysis, regression analysis are the methodologies employed in this paper. The paper will cover eight years from January 1, 2010, to December 31, 2017. From the study, it is evident that both SENSEX and Nifty50 indices have a positive relationship with USD/INR; on the other hand, GBP/INR has a moderate relationship with both indices.

Jejani M, Jejani T (2019) studied the impact of exchange rate, interest rate, and inflation on the Indian stock market. It examined two indices, the Sensex and the Nifty 50, over 29 years from 1991 to 2019. The researchers used statistical tools like the

coefficient, regression, and ANOVA. The study found a weak relation between the stock market and the inflation rate. It also showed an inverse relationship between the stock market and interest rate, along with a strong, direct connection between the US Dollar and the stock market indices.

Mohapatra A K, Mohanty D, Sardana V, Shrivastava A (2024) examined the volatility of exchange rates on Indian sectoral indices. It looked at five exchange rates: USD/INR, EURO/INR, GBP/INR, CNY/INR, and JPY/INR across seven sectors: automobile, banking, FMCG, infrastructure, information technology, and pharmaceuticals. An autoregressive conditional heteroscedastic model was used to analyse volatility. The research found that, in the long term, there was a surge among the above sectors due to exchange rate changes. However, the IT, FMCG, and infrastructure sectors were not impacted due to volatility.

Statement of the Problem:

Various factors impact the performance of stock market indices. Despite numerous studies analysing macroeconomic factors affecting stock market indices, few examine sectoral differences of the National Stock Exchange in response to the USD/INR Exchange rate. The Indian Rupee is experiencing rapid fluctuations in its exchange rate against the US Dollar. According to Forbes India, during the 21st century, the USD/INR exchange rate ranged from approximately 47 INR to 76 INR in 2023. Given wide fluctuations in the Indian Rupee-US Dollar



exchange rate, it is important to understand the underlying factors driving these changes. The study focuses on identifying the various factors that affect exchange rate fluctuations. Also, investors invest in the stock market to earn a profitable return. Since exchange rate fluctuations affect major sectors of the economy, they may ultimately affect the stock market. It is necessary to understand how exchange rate fluctuations affect stock market indices. Hence, the study focuses on the factors that affect the USD/INR exchange rate and on how the exchange rate affects various sectoral stock market indices.

Objectives of the Study:

1. To measure the volatility of the USD/INR Exchange rate and the NSE Indices.
2. To identify the factors influencing the USD/INR exchange rate.
3. To assess the impact of USD/INR exchange rate on NSE Indices.

Hypotheses:

1. There is no significant impact of macroeconomic variables on the exchange rate.
2. There is no significant impact of the USD/INR exchange rate on NSE Indices.

Research Methodology:

This study is analytical in nature.

Sources of Data:

The study is based on secondary data. The data is collected from the official website of the National Stock Exchange, Reserve Bank of India, Department for Promotion of Industry and International Trade, and Ministry of Petroleum and Natural Gas.

Period of the Study:

The period used in the study is from January 2015 to December 2024.

Tools for analysis

For data analysis, descriptive statistics, correlation, and regression are used.

Analysis and interpretation:

Table 1: Descriptive statistics of USD/INR Exchange rate and NSE Indices

Variables	Mean	Std. Deviation	Coefficient of Variation	CAGR
USD/ INR	72.84	6.89	9.46	0.0327
Nifty 50	13545.50	5002.35	36.93	0.1038
Nifty 500	11701.90	4752.18	40.61	0.1206
Nifty MidCap100	24480.37	12591.42	51.43	0.1586
Nifty IT	21047.65	10198.02	48.45	0.1387
Nifty Metal	4262.09	2241.44	52.59	0.1316
Nifty Pharma	12247.05	3587.92	29.3	0.0719

Source: Computed using secondary data by SPSS and MS Excel



The above table shows the descriptive statistics of USD/INR, Nifty 50, Nifty 500, Nifty Midcap 10, Nifty IT, Nifty Metal, and Nifty Pharma for the past ten

years. Nifty Metal has the highest volatility followed by Nifty Midcap 100. The volatility of USD/INR is comparatively low.

Table 2: Descriptive statistics of Macroeconomic factors

Macro-economic Factors	Mean	Std. Deviation	Coefficient of Variation	CAGR
Interest Rate	5.81	1.08	18.54	-0.0174
Inflation Rate	4.98	1.39	27.82	0.0006
Forex Reserve	487.79	112.09	22.98	0.0718
Crude Oil Price	65.25	18.88	28.94	0.0464
FDI Inflows	29365.71	15031.03	51.19	0.0292

Source: Computed using secondary data by SPSS and MS Excel

The above table depicts the descriptive statistics of macroeconomic factors affecting the USD/INR exchange rate. FDI Inflow has the highest Mean and inflation rate has the lowest Mean. FDI

Inflow has the highest volatility, and Interest rate has the lowest volatility. Coefficient of variation is the highest for FDI inflows, indicating high fluctuation, which is followed by Forex Reserve.

Table 3: Analysis of the relationship between macroeconomic factors and the Exchange rate

Correlations						
	USD/INR	Interest Rate	Inflation Rate	Forex Reserve	Crude Oil Price	FDI Inflow
USD/INR exchange rate	1					
Interest Rate	-0.182	1				
Inflation Rate	0.403**	-0.365**	1			
Forex Reserve	0.874**	0.474**	0.429**	1		
Crude Oil Price	0.619**	-0.081	0.226	0.626**	1	
FDI Inflows	0.235**	-0.292**	0.182	0.340**	0.142	1
**. Correlation is significant at the 0.01 level (2-tailed).						

Source: Computed using SPSS Software



The above table shows the correlation between the USD/INR Exchange rate and macroeconomic factors. There exists a positive correlation between the Inflation rate, Forex Reserve, Crude oil

Price, FDI Inflow, and the USD/INR Exchange rate. There is also a negative correlation between the Interest rate and the USD/INR Exchange rate, with a value of - 0.182.

Table 4: Regression analysis between exchange rate and macroeconomic variables

Index	R	R Square	Adjusted R Square	F	Sig.
Interest Rate	0.1820	0.0331	0.0249	4.04	0.047
Inflation rate	0.4028	0.1622	0.1551	22.85	0.000
Forex Reserve	0.8738	0.7636	0.7616	381.12	0.000
Crude Oil Price	0.6189	0.3830	0.3778	73.25	0.000
FDI Inflow	0.2352	0.0553	0.0473	6.91	0.010

a. Dependent Variable: USD/INR Exchange Rate

b. Predictors: Interest Rate, inflation Rate, Forex reserve, Crude oil price, FDI Inflow

Table 4 shows the regression analysis of factors on the USD/INR exchange rate. Forex Reserve has the highest

impact on the USD/INR Exchange rate, which is followed by FDI inflow and Crude Oil price. The significance value of the Inflation rate, Forex Reserve, and Crude oil price is 0.00, indicating that these macroeconomic variables significantly impact the USD/INR Exchange rate

Table 5: Impact of USD/INR Exchange rate on Nifty 50

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.902 ^a	.813	.812	2171.613	.813	513.438	.000 ^b

a. Dependent Variable: Nifty 50

b. Predictors: (Constant), USD/INR

Table 5 shows the regression analysis of the USD/INR on the Nifty 50. The R value of 0.902 indicates that the USD/INR Exchange rate and the Nifty 50 are positively correlated. Further, 81.3

percent variation in the Nifty 50 is explained by USD/INR. Thus, the USD/INR exchange rate movement has a strong and significant impact on the Nifty 50 index. The significance value is less than 0.05, indicating a significant impact of the USD/INR Exchange rate on Nifty 50.



Table 6: Impact of USD/INR Exchange rate on Nifty 500

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics		
					R Square Change	F Change	Sig. F Change
1.	.881 ^a	.776	.774	2257.705	.776	409.228	.000 ^b

a. Dependent Variable: Nifty 500

b. Predictors: (Constant), USD/INR

Table 6 shows the regression analysis of the USD/INR on the Nifty 500. The R value of 0.881 indicates that Nifty 50 and the USD/INR Exchange rate are positively correlated. Further, 77.6 percent

variation in the Nifty 50 is explained by USD/INR. Thus, the USD/INR exchange rate movement has a strong and significant impact on the Nifty 500 index. The significance value is less than 0.05, hence there is a significant impact of the USD/INR Exchange rate on Nifty 500.

Table 7: Impact of USD/INR Exchange rate on Nifty Midcap 100

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics		
					R Square Change	F Change	Sig. F Change
1.	.835 ^a	.697	.694	6961.678	.697	271.286	.000 ^b

a. Dependent Variable: Nifty Midcap 100

b. Predictors: (Constant), USD/INR

Table 7 shows the regression analysis of the USD/INR on the Nifty Midcap 100. The R value of 0.835 shows that the USD/INR Exchange rate and the Nifty Midcap 100 are positively correlated. Further, 69.7 percent variation in the Nifty

Midcap 100 is explained by USD/INR. Thus, movements in the USD/INR exchange rate have a significant impact on the Nifty 500 index. The significance value is less than 0.05, indicating a significant impact of the USD/INR Exchange rate on Nifty Midcap 100.

Table 8: Impact of USD/INR Exchange rate on Nifty IT

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics		
					R Square Change	F Change	Sig. F Change
1.	.876 ^a	.767	.765	4947.353	.767	387.630	.000 ^b



- a. Dependent Variable: Nifty IT
 b. Predictors: (Constant), USD/INR

Table 8 shows the regression analysis of the USD/INR on the Nifty IT. R value of 0.876 indicates that Nifty IT and USD/INR Exchange rate are positively correlated. Further, 76.7 percent variation in

the Nifty Midcap 100 is explained by USD/INR. Thus, the USD/INR exchange rate movements have a strong and significant impact on the Nifty IT index. The significance value is less than 0.05, hence there is a significant impact of the USD/INR Exchange rate on Nifty IT.

Table 9: Impact of USD/INR Exchange rate on Nifty Metal

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.814 ^a	.662	.659	1308.690	.662	231.083	.000 ^b

- a. Dependent Variable: Nifty Metal
 b. Predictors: (Constant), USD/INR

Table 9 shows the regression analysis of the USD/INR on the Nifty Metal. R value of 0.814 indicates that Nifty Metal and USD/INR Exchange rate are positively correlated. Further, 66.2 percent variation in

the Nifty Midcap 100 is explained by USD/INR. Thus, USD/INR exchange rate movements have a strong and significant impact on the Nifty IT index. The significance value is less than 0.05, hence there is a significant impact of the USD/INR Exchange rate on Nifty Metal.

Table 10: Impact of USD/INR Exchange rate on Nifty Pharma

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.674 ^a	.454	.450	2661.545	.454	98.255	.000 ^b

- a. Dependent Variable: Nifty Pharma
 b. Predictors: (Constant), USD/INR
 Table 10 shows the regression analysis of the USD/INR on the Nifty Pharma. R value of 0.674 indicates that the USD/INR Exchange rate and the Nifty Pharma are positively correlated. Further, 45.4 percent variation in the Nifty Midcap 100 is explained by USD/INR. The significant

value of 0.000 indicates that the USD/INR exchange rate has a significant impact on Nifty IT.

Findings:

- USD/INR has low volatility, and Nifty Midcap 100 has the highest volatility.



- FDI Inflows have the highest volatility, and interest rates have the lowest volatility.
- Macroeconomic variables such as the inflation rate, interest rate, Forex reserves, Crude oil price, and FDI inflows significantly impact the USD/INR Exchange rate. Forex Reserve has the highest impact on the exchange rate, followed by FDI Inflow and Crude Oil Price.
- The USD/INR Exchange rate has a significant impact on Nifty 50, Nifty 500, Nifty Midcap 100, Nifty IT, Nifty Metal, and Nifty Pharma.

Conclusion:

The exchange rate plays a significant role in the performance of the National Stock exchanges. The volatility of NSE Sectoral indices and the midcap 100 have been high in the past ten years. Although various factors influence the performance of the indices, the exchange rate exert a great influence on them. Macroeconomic variables such as Forex reserve, Crude oil prices, Interest rates, Inflation rates, and FDI Inflows are indispensable in shaping exchange rates. Among these, the strongest influencer is the Forex reserve, followed by the Crude oil prices and FDI Inflows. In addition, the exchange rate between USD and INR significantly impacts the performance of export-oriented sectors such as Nifty IT, Metal, and Pharma, as well as other indices such as Nifty-50, Nifty Midcap 100 and Nifty Pharma. Therefore, it is necessary to

monitor fluctuations in exchange rates against the US dollar.

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