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# Relationship between Exchange Rate and Capital Flows in India

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**ABSTRACT:** The study aims to understand the intricate connection and interplay among these factors and exchange rate. Employing a unit root test to assess the stationarity of time series data, the research uses the Vector Error Correction Model (VECM) to delve into the dynamic nature of the relationships between capital flows and exchange rates. Bydoing so, the study aims to discern both short-term fluctuations and long-termtrends in these variables and their influence on the Real Effective Exchange Rate (REER) index. This comprehensive analytical approach provides valuable insights for a diverse audience, including policymakers, economists, and investors. The findings promise a nuanced understanding of the intricate web of connections that shape India's economic landscape, offeringactionable information for decision-makers navigating the complexities of global capital flows and their repercussions on exchange rates.

**KEYWORDS :** Foreign Direct Investment (FDI), Foreign Institutional Investment (FII), external debt, trade deficit, Real Effective Exchange Rate (REER) INDEX, time series analysis.

## I. INTRODUCTION

This research delves into the intricate interplay between foreign investments, specifically Foreign Direct Investment (FDI) and Foreign Institutional Investment (FII), external debt and trade deficit, and their profound impact on the Indian economy. Foreign institutional investment (FII) is one of India's most critical factors of short-term capital inflow, characterised by its volatile impacts. FII additionally and intricately affects the REER; the REER-FII connection is dynamic. Contrary to foreign institutional investment (FII), foreign direct investment (FDI) is a calmer and longer-lasting form of investment in foreign capital inflow. The interaction between FDI and the REER index is complex and challenging to unravel, and the movement of exchange gains is not limited to FDI's immediate impact. External Indian debt is essential for determining the extent of the financial obligation to foreign creditors. The debt servicing and creditworthiness factors are also considered when understanding the external debt-REER relation. The trade deficit of India, meaning the difference between imports and exports higher, equally affects the index of REER. If there is a balance of payments deficit, the demand for foreign currency will be high, and the country can be in danger of the depreciation of its currency.

## II. REVIEW OF LITERATURE

In the study conducted by **Bhatia and Kishor in 2013**, the Granger Causality Test was employed to examine the causal relationship between Net Foreign Institutional Investor (FII) flows, Stock Price Movements, and Foreign Exchange Reserves (FERs) using monthly data over 20 years. The results revealed a significant bi-directional Granger Causality between Foreign Exchange Reserves and FII Flows. This implies a dynamic and reciprocal influence between these two key variables, providing insights into the interplay between FII flows and the management of foreign exchange reserves in the context of stock price movements over the specified period.

**Ghosh and Herwadkar's 2009** findings show an enduring connection between capital flows and exchange rate appreciation. Their short-term analysis, employing Vector Auto Regression (VAR) and Impulse Response Functions, revealed that a positive shock to net Foreign Institutional Investment (FII) inflows typically leads to exchange rate appreciation. This suggests that not only is there a long-term linkage between capital flows and exchange rates, but in the immediate context, positive shocks in FII flows contribute to the appreciation of the exchange rate.

In **Gupta's 2011** investigation, the focus was on the relationship between the Indian stock market and Foreign Institutional Investment (FII) in India. The daily study from April 1, 2006, to February 28 employed Ordinary Least Squares (OLS) and Granger causality techniques. The findings revealed a mutual influence between the Indian stock

market and FII. Notably, the study highlighted that while both entities influence each other, the timing of their impact differs, indicating a nuanced and dynamic relationship between Indian stock market movements and FII investments.

**Dua and Sen's** empirical investigation in **2013** focused on the relationship between capital flows and exchange rates. Their findings suggested that volatility plays a more significant role in less financially developed economies than developed countries. In developed capital markets, the stock of assets and other financial assets were identified as determinants of the exchange rate. The study concluded that capital inflows contribute to the appreciation of the real exchange rate. This insight underscores the nuanced impact of capital flows on exchange rates, emphasising the varying dynamics across economies with different levels of financial development.

In their **2013** study, **Bhasin and Khandelwal** focused on identifying the determinants of Foreign Institutional Investment (FII) inflows in India, specifically examining the impact of crises.Utilising monthly data from April 1994 to December 2011, their analysis highlighted several keyfactors influencing FII inflows. Notably, the returns on the MSCI Emerging Market Index, past values of FII inflows, and the growth rate of the Indian economy emerged as significant determinants. Furthermore, their findings underscored the substantial impact of the global financial crisis in 2008 on net FII inflows in the Indian market.

In **Ahmad and Masood's 2009** study, based on quarterly data from 1994 to 2007, a cointegration test revealed a long-run equilibrium relation between total capital inflows (TCI)and trade- and export-based accurate, effective exchange rates. Additionally, the cointegration test established a relationship between TCI and the export-based nominal effective exchange rate. Granger causality tests further uncovered bidirectional causality between the real effective exchange rate (export- based) and TCI, as well as between foreign exchange reserves and TCI. Moreover, a unidirectional causality existed between TCI and the natural, trade-based, effective exchange rate. These findings provide insights into the interconnected dynamics of capitalinflows and exchange rates during the specified period.

In **Kumar's 2001** examination of FII inflows' impact on the Indian stock market represented by the Sensex, spanning from January 1993 to December 1997, he concluded that FII investments are predominantly determined by fundamental factors, showing limited reaction to short-term market variations or technical conditions. Using regression analysis, the study assessed theinfluence of . Net FII Investment (NFI) on Sensex and vice versa. The results indicated a causal relationship between Sensex and NFI, highlighting the impact of market movements on FII investments and suggesting causality from FII to Sensex, emphasising a dynamic interplaybetween the two.

In the study by **Raju et al. (2010),** the Granger Causality Test and Vector Auto Regression (VAR) were employed to scrutinise the dynamic interactions between four significant exchange rates (Dollar, Euro, Pound, and Yen) and net Foreign Institutional Investment (FII) flows in India. Causality test results revealed a bi-directional relationship between the Dollar and net FII flows. Regression results further supported a positive correlation, indicating that net FII flowsare favourably associated with the appreciation of the Indian rupee against the dollar. These findings contribute to a deeper understanding of the intricate dynamics shaping exchange rates and FII flows in the Indian market.

In **Sethi's 2012** study, the Vector Auto Regression (VAR) method was employed to analyse the impact of private foreign capital inflows on various macroeconomic variables in India. The study used monthly data from April 1995 to July 2011 to examine the effects on variables such as exchange rates, inflation, money supply, and foreign exchange reserves. The findings revealed dynamic short and long-term equilibrium relationships between macroeconomic variables, including exchange rates, foreign exchange reserves, and money supply, in response to private foreign capital inflows. This research contributes valuable insights into the interconnectedness and dynamics of macroeconomic variables influenced by foreign capital inflows in the Indian context.

**Edwards' 2001** investigation examined the dynamic interplay between exchange rate regimes, capital flows, and currency crises in emerging economies. Drawing lessons from the tumultuous events of the 1990s, particularly the crises in Mexico, East Asia, Russia, and Brazil, the study delved into crucial policy controversies. Given the right conditions and policies, Edwards concludes that floating exchange rates can be practical and efficient. This insight underscores the importance of context and policy frameworks in shaping the outcomes of exchange rate systems, capital flows, and crisis management in emerging economies

The study conducted by **Mukherjee, Bose, and Coondoo in 2002** focused on exploring the cause- and-effect relationship between Foreign Institutional Investor (FII) flows and returns in theIndian equity market. Contrary to the common perception that FII activities strongly validate andinfluence the domestic stock market in India, the results from causality tests suggested a differentdynamic. The findings indicated that FII flows to and from the Indian market

tend to be initiated by returns in the domestic equity market rather than vice versa. This nuanced insight provides a deeper understanding of the interactions between FII activities and the Indian stock market.

In their **2011** study investigating the correlation between significant exchange rates and net Foreign Institutional Investments (FII) in India, **G. Raju, Kumar, Shahab, and Tavishi** revealedthat the Dollar exhibited a two-way association, while the Pound and Yen had a unilateral impacton net FII flows. The direction was determined through the Granger Causality Test, and the intensity of interaction was assessed using VAR results and Impulse Response Function at six lags. Findings suggested rapid dissipation of exchange rate shocks within two days, contrasting with the five to six days taken for net FII flows to respond.

In the **2012** study by **Chauhan and Malhotra**, the impact of foreign institutional investment (FII) on the foreign exchange rate in India was assessed. The research revealed a unidirectional causality, indicating that FII investment in equity influences the exchange rate movement in India. However, no causal relationship was identified in the case of FII debt investment affecting exchange rate movements. This nuanced finding suggests that the influence of FII on the exchange rate depends on the type of investment, emphasising the complexity of these relationships in the Indian financial landscape.

**Stanley Morgan's 2002** observation underscores the crucial role of Foreign Institutional Investors (FIIs) in bolstering India's forex reserves and enabling various economic reforms. Additionally, FIIs emerge as significant contributors to the country's economic progress, particularly amid sluggish domestic sentiment. The Morgan Stanley report highlights that FIIs strongly influence short-term market movements, especially during bear markets. However,during bull markets, the correlation between returns and FII flows diminishes as increasedparticipation from other market players dilutes the impact of FIIs. This research reveals the nuanced dynamics of FII influence in different market conditions.

**Alam and Alam's 2014** analysis evaluates foreign institutional investment performance (FIIs) in the Indian stock market. The study observes the dynamics of FII movements and assesses the impact of Foreign Institutional Investors' trading activities on the performance of the Indian capital market. The research reveals a correlation by examining the empirical relationship between stock market returns and FII flows, indicating that FII net inflows are associated with the Sensex and contribute to the movements observed in the Indian capital market. This underscores the influence of FIIs on India's stock market.

In **Batra Amit's 2003** study, an attempt was made to comprehend the dynamics of the trading behaviour of Foreign Institutional Investors (FIIs) and its correlation with returns in the Indian equity market. Analysing daily and monthly data, the research aimed to uncover the trading patterns of FIIs and the implications of their biases on stock market stability. The findings suggested that daily, substantial evidence supports the notion that FIIs exhibit positive feedback behaviour, acting as trend chasers at the aggregate level. However, this positive feedback trading behaviour is not evident every month. This insight sheds light on the nuanced and time-sensitive nature of FII trading strategies in the Indian equity market.

## III. METHODOLOGY

**PERIOD OF STUDY:**
Analysing the relationship between exchange rates and capital inflows in India from 2006 to 2023 provides valuable insights into the country's financial markets and economic trends. The data collected every quarter over this period allows for a detailed examination of how exchange rates and capital inflows have interacted, influencing each other and shaping India's economic landscape.

**DATA SOURCE:**
This research on the relationship between exchange rates and capital inflows in the Indian economy relies on a comprehensive dataset from esteemed secondary sources, including the Department of Promotion of Industry and Internal Trade, the India Statistics Database, and the Reserve Bank of India (RBI). Renowned for accuracy and transparency, these sources provide insights into various economic indicators, facilitating a nuanced analysis of how government policies and regulatory reforms influence the dynamics between exchange rates and capital inflows. Policymakers can leverage these findings to refine strategies, attract investments, and promote economic stability in the face of global uncertainties

**RESEARCH DESIGN**

The research design entails investigating the correlation between exchange rates and capital flows in India. This involves defining the research objective, conducting a literature review, formulating hypotheses, collecting relevant data from credible sources, defining variables and measurements, choosing an appropriate research design and methodology, analyzing the data using statistical or econometric techniques, interpreting the results, discussing implications, and concluding with recommendations for future research.

**DATA ANALYSIS**

**Unit root Test:**

In time series analysis, the unit root test plays a crucial role in assessing the stationarity of a given economic variable, such as the Gross Domestic Product (GDP). The Augmented Dickey- Fuller (ADF) Test is a widely employed statistical tool. Suppose the test conducted at the level yields a p-value greater than 0.05. In that case, it indicates the failure to reject the null hypothesis of a unit root, suggesting non-stationarity in the data. On the other hand, when the unit root test is performed at the 1st difference, and the p-value is less than 0.05, it provides strong evidence to reject the null hypothesis of a unit root, signifying that the data achieves stationarity after differencing. This critical evaluation helps ensure the reliability of time series models by addressing the presence of unit roots that may impact statistical inference.

**Johansen Cointegration Test:**

The Johansen Cointegration Test is a statistical tool used to determine if multiple time series variables share a typical long-term relationship, known as cointegration. Developed by Søren Johansen and Katarina Juselius, this method assesses the number of cointegrating relationships among variables by examining eigenvalues and eigenvectors. It is instrumental in econometrics for identifying and modelling long-term equilibrium relationships in economic and financial analyses.

**VECM:**

The Vector Error Correction Model (VECM) is a statistical framework commonly used in time series analysis to model the long-term relationships and short-term dynamics among multiple variables. It extends the concept of cointegration, allowing researchers to capture the equilibrium relationships and the adjustment process when deviations from these relationships occur. VECM is particularly useful in understanding the interdependencies among variables, providing insights into the speed of adjustment towards equilibrium following shocks or disruptions in the system.

**RESEARCH OUTCOMES AND FINDINGS:**

The stationarity of variables like FII, FDI, Crude Oil Price, and GDP at the 1st difference level ($p < 0.05$) signifies that their statistical properties are stable over time. This is a crucial step, as non- stationary variables can lead to spurious regression results, affecting the reliability of the analysis.

Co-integration analysis is a technique used to identify long-term relationships between variables. Establishing that all variables are stationary at the 1st difference ensures that the relationships observed are genuine and not merely short-term fluctuations.

The retest for co-integration reveals which variables have a lasting impact on the REER Index. In this context, FII and FDI exhibit values exceeding 1.96, indicating a significant and sustained connection over an extended period.

The choice of the VECM model is justified when long-term relationships are identified. VECM allows for modelling both short-term dynamics and long-term equilibrium relationships among variables. The values exceeding 1.96 for FII and FDI suggest their significant role in influencing the REER Index.

**RECOMMENDATION:**

To fortify the impact of Foreign Direct Investment (FDI) and Foreign Institutional Investment (FII) on the Real Effective Exchange Rate (REER) Index, policymakers must prioritise the creation of an enabling environment, incorporating regulatory reforms and tax incentives to attract and sustain foreign investments. Simultaneously, addressing the short-term influence of the Trade deficit on the REER Index necessitates nuanced trade strategies, including diversification of trade partnerships, promotion of exports, and efficient import management. While the study indicates a limited long-term impact of external debt on the REER Index, prudent monitoring and management of external debt levels are advised to mitigate risks during global economic uncertainties. Periodic reviews of financial indicators such as FDI, FII, Trade deficit, and external debt are essential for policymakers to make timely adjustments, ensuring alignment with the dynamic nature of global capital flows.

## IV. CONCLUSION

The transformation of the Indian financial markets over the past seventeen years has been remarkable, primarily fueled by foreign capital inflows through equity, bonds, and external debt. This infusion of foreign investment has enhanced the efficiency and competitiveness of Indian industries, positively influencing the country's economic development.

This research specifically delves into the intricate relationship between foreign capital flows and exchange rates, employing econometric models for analysis. Notably, a surge in foreign investment in India tends to result in the appreciation of the rupee, leading to an increase in the exchange rate and vice versa.

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