The Effect of External Debt on Exchange Rates in Post Reform India: A Co-Integration Approach

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Abstract

This study examines how foreign debt affects India's exchange rate from 1991 and 2024. To determine the link between the variables, the ARDL model is used. In addition to foreign debt, the analysis controlled for economic growth and fiscal deficit. The research found that foreign debt and economic growth had considerable positive and negative influences on exchange rates, respectively. The budget deficit has a favourable but modest influence on India's currency rate. The Indian government should implement a fiscal strategy that reorients debt towards economic sectors to stimulate development and rebalance industrial operations.

Keywords: Foreign Debt, Exchange Rate, and Co-integration

1. Introduction

One of the biggest factors in a country's economic development is its external debt. It is used to fund investment initiatives, and as it may give a degree of economic benefit that would be impossible to attain otherwise, it is anticipated to provide a sufficient rate of return. In every economy, but particularly in emerging and underdeveloped nations like India, borrowing from outside is crucial.

The difference between government spending and income, domestic savings and investment, and exports and imports of goods and services may all be closed by borrowing money from abroad. It is helpful in emerging nations like India since they lack the savings to create capital for growth and must instead borrow money in the form of loans from outside sources to pay their internal budgets. Regretfully, the majority of emerging nations—including India—have severe issues with their foreign debt.

Any country's debt issues stem from a variety of factors, including inefficient use of borrowed money, poor investment returns, an insufficient framework for managing debt, changes in interest rates internationally, terms of trade and trade policies, etc. These nations' inability to prepare a repayment strategy for the borrowed money has made the debt crisis worse. Developing nations turn to international funding in order to boost domestic economic development and expand investment opportunities. The majority of these nations borrow in one of the main currencies, which influences the exchange rate, rather than in their own currencies on the global financial markets.

India has seen fluctuations in interest rates, commodity prices, and currency values throughout the last several decades.

Overly fluctuating exchange rates make it difficult for decision-makers and economic actors to forecast future exchange rate values, which makes it challenging to determine the prices of products and services. Foreign market players, importers, and exporters may experience significant profits or losses as a consequence of this. It is important to ascertain if the foreign currency composition of the external public debt influences the volatility of exchange rates. This will assist decision-makers in developing strategies for managing the external public debt.

This will guarantee exchange rate stability and promote national economic progress. Over the last several decades, India has had to deal with an increase in its foreign public debt as well as fluctuations in currency rates. Exchange rate fluctuations have been shown to have an appreciating and fluctuating pattern, which is harmful to an economy as it has an impact on economic growth.

In fact, the ratio of foreign debt to GDP dropped from 19.30% in 1991 to 20.52% in 2024. However, the foreign currencies used to negotiate these obligations have very variable exchange rates. Furthermore, in terms of dollars, the exchange rate for India went from 22 to 83 rupees in 1991 to 2024. It's crucial to consider the relationship between debt and exchange rates in such a setting. Thus, the central inquiry of this research will be: Is there a connection between India's exchange rates and foreign debt?

The study is set out like this: After the introduction, the study is divided into five sections: section II reviews the literature; section III includes the research methods and data source; section IV establishes the empirical findings; and section V closes the investigation.

2. Literature Review

A number of empirical investigations have been carried out to examine the connections between exchange rate policy regimes and foreign indebtedness.

Examining the root reasons of the Third World debt dilemma is Stambuli (1998). He claims that the causes of foreign indebtedness include high interest rates, the US dollar's gain, shocks to the oil price, poor export revenues, and imbalances in the terms of trade.

According to Ishfaq and Chaudhry's (1999) analysis, the fiscal imbalance over time has resulted in foreign debt and the associated cost of debt payment. They argued that there was a cause-and-effect relationship between foreign debt and fiscal deficit. Increased deficits result in increased borrowing obligations, which increase a nation's debt load even more.

Tiruneh (2004) used panel data analysis to identify the main factors contributing to developing countries' foreign debt in the 1980s and 1990s. The study reveals that the primary drivers of international indebtedness are previous loan service payments, income volatility, poverty, foreign exchange deficit, and slow economic development.

Using data from Nigeria, Ezirim and Muoghalu (2006) investigated the relationship between currency rates, crises involving foreign direct investment, and the external debt load of less developed nations. The findings showed that although Nigeria's external debt load and international oil prices have a negative

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relationship, the present exchange rate crisis has a positive and substantial impact on the previous exchange rate, the foreign investment crisis, and international oil prices.

Neaime (2009) established the relationships between foreign debt and exchange rate policies by using time series econometric models to evaluate the sustainability of the Middle East and North Africa (Egypt, Jordan, Morocco, Tunisia, and Turkey). The outcome showed a positive correlation between the depreciation of the currency rate, the current account deficit, and the budget deficit with the foreign public debt.

Alam and Taib (2013) examined the link between external public debt (EPD), budget deficit (BD), current account deficit (CAD), and exchange rate depreciation for the years 1971 to 2000 using data from debt trap and non-debt trap nations. In the panels of six DTC and eight NDTC, the study revealed a positive relationship between foreign public debt and the budget deficit, current account deficit, and exchange rate depreciation.

The literature evaluations mentioned above make clear that different academics have examined the impact of foreign debt on exchange rates for diverse nations. The question of how foreign public debt affects exchange rate volatility remains unanswered. Instead than focusing on the factor that determines exchange rate levels, as most earlier studies have done, it is more pertinent to examine the link between exchange rate volatility and macroeconomic fundamentals. The impact of foreign public debt on exchange rate volatility will be examined in this research. The study's findings are meant to have an impact on how external public debt is managed via policy choices. After examining the body of research, it is clear that a variety of variables contribute to emerging nations like India's growing foreign debt. The shifting political and economic landscapes of the developing world affect these variables. It is essential to determine the underlying causes of the nation's high level of debt.

3. Objectives of the Study

The following are the study's objectives:

1. To examine how India's foreign public debt affects the country's exchange rate volatility.

2. To provide policy recommendations for debt management that are consistent with the study's conclusions.

4. Database and Methods of Estimation

4.1 Data

The Indian economy is taken into consideration. Information is sourced from the International Monetary Fund (IMF) database and the World Bank's World Development Indicators 2019 database. The years of study are 1991–2024.

4.2 Model:

The current research estimated the variables using the following mathematical equation using the

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aforementioned data set:

$$ER_t = \beta o + \beta_1 ED_t + \beta_2 GR_t + \beta_2 FD_t + u_t \ldots\ldots\ldots\ldots\ldots (1)$$

Here, GR denotes the GDP growth rate, ER denotes the exchange rate in terms of US dollars, FD is the fiscal deficit in terms of GDP, t stands for time, and ut indicates the error term.

4.3 Test of the Unit Root

The first step in evaluating the model presented in this research is to determine if the series is stationary by taking the unit root of the variables that are included. We used the Philips Perron (PP) test of a unit root and the augmented dickey-fuller (ADF) test to achieve this. The null hypothesis maintains the nonstationary nature of the variables in the ADF and PP test cases.

4.4 Cointegration Approach

The co-integration tests of Johansen & Juseliu (1990) and Engle and Granger (1987) have been extensively used in empirical research to investigate the long-term association of variables, particularly in bivariate or multivariate frameworks. The insuitability of traditional co-integration for variables integrated at different orders, such as I (0) and I (1), is one of its drawbacks. We use the ARDL bounds test method for co-integration, which is recommended by Pesaran et al. (2001), to lessen this issue. When variables are integrated at multiple orders, it is preferable to use the ARDL (Autoregressive Distributed Lag Model) model.

4.5 ARDL Bound Test-Based Cointegration Test

For the purpose of estimation, the ARDL model uses contemporaneous and lagged values of the exogenous variables in addition to the lagged values of the dependent variable. Since the ARDL approach includes an error correction element, the long-run equilibrium nexus is analysed indirectly while the short-run coefficients are determined directly. The following is the model's writing.

$$ER_t = \alpha_0 + \sum_{i=1}^{n} \beta_{1i}\Delta ER_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta ED_{t-i} + \sum_{i=0}^{n} \beta_{3i}\Delta GR + \sum_{i=0}^{n} \beta_{4i}\Delta FD_{t-i} + \theta_1 ER_{t-1} +$$

$$\theta_2 ED_{-1} + \theta_3 GR_{t-1} + \theta_4 FD_{-1} + u_t \quad \ldots\ldots\ldots\ldots (2)$$

Where, α0 is the intercept and ut is the error term. F-statistics is applied to check out the co-integration among the variables.

The null hypothesis of no co-integration is written as

$$H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = 0, \text{ against the alternative hypothesis}$$

$$H_1: \theta_1 = \theta_2 = \theta_3 = \theta_4 \neq 0$$

The bound testing approach is used on the null hypothesis (H0) of no co-integration, which is tested against

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the alternative hypothesis (H1) of co-integration's existence, in order to look into the existence of long-run correlations among variables. Additionally, The Wald test (F-statistic), upon which the ARDL bound test is based, suggests two essential values, according to Pesaran et al. The null hypothesis is rejected if the computed F-statistic is greater than the upper limit critical value. Conversely, in the event that the F-statistic is smaller than the lower limit critical value, the null hypothesis is accepted. An inconclusive result is obtained when the estimated F-statistic is between the two critical bound values. Ultimately, we use the error correction model (ECM) if the long-run link is discovered.

$$\Delta ER_t = \alpha_0 + \sum \beta_{1i} \; n \; i=1 \; \Delta ER_{t-i} + \sum \beta_{2i} \; n \; i=0 \; \Delta ED_{t-i} + \sum \beta_{3i} \; n \; i=0 \; \Delta GR + \sum \beta_{4i} \; n \; i=0 \; \Delta FD_{t-i} +$$

$$ZECT_{t-1} + U_t \; \ldots \ldots \ldots \; (3)$$

where u_t is the error correction term and Z is the pace of adjustment.

5. Analysis and Discussion of the Data

The primary task in time series analysis is to determine if the variables are first difference or stationary at the level. Table 1 displays the outcome of the unit root test. For the unit root of the variables, the research used the augmented dickey fuller (ADF) and Philips-Perron (PP) tests. With the exception of the fiscal deficit, which is also stationary at a level in the Phillips-Perron (PP) test, all the variables are shown to be stationary at the first difference at a 1% level of significance by the unit root tests. We use the co-integration test (ARDL) for estimate since most of the variables are integrated at the initial difference.

Table 1 Unit Root Results

Variable	ADF Test (Level)	ADF Test (First Difference)	PP Test (Level)	PP Test (First Difference)
ED	-0.49	-11*	-0.49	-10.03*
ER	-0.67	-4.59*	-0.73	-4.56
FD	-3.24**	-6.19*	-3.29*	-11.95
GR	1.3	-5.60**	-0.90	-8.67*

Note: *, **, *** denote statistical significance at 1%, 5%, and 10% level respectively.

Table 2 shows the co-integration relationship's outcomes. The long-term link between the variables is provided by the bound test; table 2 shows that the F-statistics value (19.19) is higher than the upper and lower limit values. Following the discovery of the long-run connection, the research focused on long-run coefficients, which are shown in table 3. According to long-run coefficients, the GDP growth rate and foreign debt have a major influence on the Indian currency rate, while the budget deficit has a statistically negligible effect. The currency rate varies by 4.49 units for every percentage point change in foreign debt. The growth rate is having a negative effect on the exchange rate; that is, for every 1% rise in the growth rate, the exchange rate falls by 1.63 units.

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Table 2 ARDL Co-integration Bound Test Result.

ARDL Model Results

Model Specification	F Statistic	Optimal Lag Length
ARDL Function	19.19	(2, 4, 3, 4)

Critical Bound F-Values

Significance Level	Lower Bound	Upper Bound
1%	5.17	6.36
5%	4.01	5.07
10%	3.47	4.47

Diagnostics Test Results

Test	Statistic	Prob. Value
R-squared	0.99	-
Adjusted R-squared	0.98	-
F Statistic (Prob. Value)	4.72	0.00
White's Heteroscedasticity Test	0.21	-

Table 3 Long-Run Coefficient with the Exchange Rate as a Dependent Variable

Variable	Coefficient	P-value
ED	4.49*	0.001
FD	0.27	0.77
GR	-1.63**	0.07

Note: *, **, denote statistical significant at 1%, 5% level respectively.

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Table 4 Short-Run Coefficients with the Exchange Rate as a Dependent Variable

Variable	Coefficient	P-value
D (ED)	7.29*	0.001
D (FD)	-0.59*	0.77
D (GR)	-0.51	0.07
Z	-0.81*	0.00

Table 4 displays the coefficients for the short term. The study's primary variable, foreign debt, has a short-term, positive, and large influence on the exchange rate, whereas economic growth has the opposite effect. Given that the value of Z in table 4 is 0.81, the speed of adjustment term indicates that disequilibrium in the short run will be remedied in the long run at a rate of 81 percent.

6. Conclusion

One of the most important macroeconomic factors in developing and transitioning countries is the exchange rate. It has an impact on economic activity, imports, and exports. An economy may gain a great deal from the monetary authority's power to control exchange rate volatility since it hinders economic development by raising risks and uncertainties, which deters investment and trade. The connection between exchange rate volatility and foreign government debt was examined empirically in this research. The study's conclusions show that, over the years 1991 to 2024, there has been a long-term relationship between India's foreign debt and exchange rate. The exchange rate was positively and significantly impacted by the foreign public debt's long- and short-term coefficients. The results of this research have important policy ramifications on how the public debt is managed externally. The study's findings about the lack of responsible debt management techniques will contribute to higher exchange rate volatility. It is essential for policymakers to guarantee the sustainability of both the amount and growth rate of foreign public debt. This may be achieved by pursuing methods that would curtail the excessive accumulation of external public debt, such as lowering the external debt to GDP ratio. It is essential for policymakers to guarantee that monies borrowed are allocated to projects or investments that provide greater rates of return. A well-defined macroeconomic framework is essential for debt management, as it guides the Indian government's efforts to guarantee the sustainability of the country's foreign public debt.

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