Impact of External Debt on Exchange Rate in Post Reform India: A Co-integration Approach

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Abstract

The objective of this work is to analyze the effect of external debt on the exchange rate in India from the period of 1991 to 2019. To find out the relationship between the variables the ARDL model is employed. Other than the external debt the study used economic growth and fiscal deficit as a control variable. The findings of the study show that external debt and economic growth have positive and negative significant effects on the exchange rate respectively. While the fiscal deficit has a positive insignificant impact on the exchange rate in India. The main recommendation goes to the Indian government, it should adopt a budgetary policy, in such a way to reorient its debt towards economic sectors that can boost economic growth and reinforce the strategies that contribute to re-equilibrate industrial activities.

Keywords: Exchange Rate, External Debt, Co-integration

1. Introduction

External debt can greatly contribute to the economic growth of a nation. It is utilized to finance investment projects and it is expected to outturn an adequate rate of return since it can provide a level of economic welfare that couldn't in any case be achieved. Foreign borrowing is important in any economy especially undeveloped and developing countries like India.

Foreign borrowing can bridge the gap between government expenditure and revenue, between domestic savings and investment, and between exports and imports of goods and services. It is useful in developing countries like India because they do not have enough savings to raise capital for development and thus they fund their internal budget with the money borrowed from foreign sources in the form of loans. Unfortunately, most developing countries, Including India have confronted intense external debt problems.

The debt problems in any nation come from the inefficient use of borrowed funds, low rate of returns to investments, inadequate policy framework for debt management and interest rate development at the international level, terms of trade and trade policies, etc. The debt problem has been made exacerbated by the failure of these countries to plan on how to repay these borrowed funds. Developing countries resort to foreign financing to foster internal growth and increase resources available for investment. Most of these countries do

not borrow in their currencies in the international capital markets, but instead, borrow in one of the major currencies and thus affect the exchange rate.

In the past decades, India has experienced changes in exchange rates, interest rates, and commodity prices. Excessive exchange rate variability makes it hard for economic agents and decision-makers to predict future exchange rate prices and therefore pricing of goods and services becomes difficult. This can result in enormous losses or profit for importers, exporters, and foreign market participants. Therefore, it is crucial to investigate whether the foreign currency composition of the external public debt affects the exchange rate volatility. This will help policy-makers to come up with policies on external public debt management

That will ensure stability in exchange rates thereby spur economic growth in the country. India has faced a rising trend in external public debt and experienced changes in exchange rates in the past decades. The changes in the exchange rate have been seen to exhibit an appreciating and volatile trend which is detrimental to an economy as it affects economic growth.

Indeed, the external debt-to-GDP ratio decreased from 19.30% in 1991 to 20.52% of GDP in 2014. But these debts are contracted in foreign currencies whose exchange rates highly fluctuate. Moreover, the exchange rate for India increased from 22 Rs in terms of Dollar in 1991 to 70 Rs. in 2019. In such a context, it's important to question the link between indebtedness and exchange rates. Therefore; this study main question will be: is there a link between external debts and exchange rates in India?

The study is organized as follows: following the introduction, section II presents a review of literature, section III contains Data Source and research methodology, section IV establishes empirical results and section V concludes the study.

2. Literature Review

Several studies have been conducted to empirically investigate the relationships between external debts with exchange rate policy regimes.

Stambuli (1998) examines the responsible causes of the Third World debt crisis. According to him high-interest rates, appreciation of the US $, oil price shocks, low export receipts, and terms of trade imbalances are responsible for foreign indebtedness.

Ishfaq and Chaudhry (1999) analyses that fiscal deficit over the years has led to the foreign indebtedness accompanied by the burden of debt servicing. They contended that both fiscal deficit and foreign debt served as cause and effect for each other. Higher deficits lead to higher loan requirements which further enhance the debt burden of a country.

Tiruneh (2004) utilizes the panel data to find the main primary causes of foreign indebtedness of developing nations during the 1980s and 1990s. The analysis shows that poverty, debt servicing, income instability, sluggish economic growth, foreign exchange gap, and past debt service payment are the main causes of foreign indebtedness.

Ezirim and Muoghalu (2006) explored the connection between exchange rates, foreign investment crises, and the external debt burden of less developed economies using Nigerian data. The results demonstrated that the current exchange rate crisis has a positive and significant influence on the previous exchange rate, the foreign investment crisis, and international oil prices but the negative function of external debt burden and international oil prices of Nigeria.

Neaime (2009) analysed the sustainability of the Middle East and North Africa's (Egypt, Jordon, Morocco, Tunisia, and Turkey) using time series econometric models and set up the connections between foreign debt and exchange rate policies. The result obtained indicated a positive relationship between external public debt with the budget deficit, current account deficit, and exchange rate depreciation.

Alam and Taib (2013) by using the data of debt trap and non-debt trap countries investigated the relationship between external public debt (EPD) with budget deficit (BD), current account deficit (CAD), and exchange rate depreciation for a period 1971 to 2000. The analysis showed that external public debt was positively related to the budget deficit, current account deficit, and exchange rate depreciation in the panels of six DTC and eight NDTC.

It can be noted from the above reviews of literature that the effect of external debt on exchange rates has been looked at by various researchers for different countries. The issue of the impact of external public debt on exchange rate volatility has not yet been resolved. However, it is more relevant to study the relationship between exchange rate volatility and macroeconomic fundamentals, rather than the determinant of exchange rate levels as most previous researches have done. This study will analyze the effect of external public debt on exchange rate volatility. The results from the study are intended to influence policy decisions in the management of external public debt. After reviewing the existing literature it can be concluded that there are many factors responsible for the accumulation of foreign debt of developing countries like India. These factors vary with the changing economic and political conditions of the developing countries. There is a need to identify the factors responsible for the high indebtedness of the country.

3. Objectives of the Study

The objectives of the present study are as follows:

1. To analyze the effect of external public debt on exchange rate volatility in India.

2. To suggest policy measures in debt management in line with the findings of the study.

4. Database and Estimating Methodology

4.1 Data

The study considers the Indian economy. Data come from the World Bank's database (World Development Indicators 2019) and the International Monetary Fund (IMF) database. The study period is from 1991 to 2019.

4.2 Model:

Based on the above mentioned data set, the present study used the following mathematical equation to estimate the variables:

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

Where, ER stands for the exchange rate in terms of US dollar, ED stands for external debt in terms of GDP, GR stands for GDP growth rate and FD is the fiscal deficit in terms of GDP, t for time, and u_t showed the error term.

4.3 Unit Root Test

For the assessment of the stated model in this study, the first step is to check the unit root of the included variables to check if the series is stationary. To do this, we used the augmented dickey- fuller (ADF) test, Philips Perron (PP) test of a unit root. In the case of ADF and PP test, the null hypothesis keeps the variables are non-stationary.

4.4 Co-integration Methodology

In traditional work, Engle and Granger (1987) and Johansen & Juseliu's (1990) tests of co-integration have been used widely in empirical research to examine the long-term relationship of variables especially in bivariate or multivariate framework. One of the weaknesses of conventional co-integration is that it is not appropriate when variables are integrated at different orders like I (0), and I (1). To reduce this problem, we employ the ARDL bounds test technique for co-integration which is suggested by Pesaran et al. (2001). However, the ARDL (Autoregressive Distributed Lag Model) model is better to use when variables are integrated at different orders.

4.5 Test for Co-integration Based on ARDL Bound Test

The ARDL model employs the lagged values of the dependent variable and the lagged and contemporaneous values of the exogenous variables in estimation. Short-run coefficients are estimated directly, and the long-run equilibrium nexus are examined indirectly as the ARDL technique comprises an error correction term. The model is written as follows.

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

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

Where, α_0 is the intercept and u_t 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: $\theta_1 = \theta_2 = \theta_3 = \theta_4 = 0$, against the alternative hypothesis

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

To investigate the presence of long-run relationships among variables, the bound testing procedure is applied upon the null hypothesis (H_0) of no co-integration which is tested against the alternative hypothesis (H_1) of the existence of co-integration. Moreover, This ARDL bound test is constructed on the Wald test (F-statistic), where two critical values are recommended by Pesaran et al. If the calculated F-statistic is more than the upper bound critical value, the null hypothesis is rejected. On the other hand, the null hypothesis is accepted, if the F-statistic is less than the lower bound critical value. When the computed F-statistic falls between the two critical bound values, the result is inconclusive. After all, if the long-run relationship is found then we go for the error correction model (ECM).

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

Where, Z speed of adjustment and u_t is the error correction term.

5. Data Analysis and Discussion

The foremost work in time series analysis to check the variables is stationary at the level or first difference. The result of the unit root test is shown in table 1. The study used augmented dickey fuller (ADF) and PP (Philips-Perron) tests for the unit root of the variables. The tests of the unit root show that all the variables are stationary at the first difference at a 1 % level of significance except fiscal deficit which is stationary at a level too in the case of the Phillips-Perron (PP) test. Hence most of the variables are integrated at the first difference, so we apply the co-integration test (ARDL) for estimation.

Table 1
Unit Root Results

Variables	ADF Test		PP Test (Phillips-Perron)	
	Level	First difference	Level	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*

Source: Author's calculation.
Note: *, **, *** denote statistical significance at 1%, 5%, and 10% level respectively.

The results of the co-integration relationship are depicted in table2. The bound test provides a long-run relationship among the variables, F-statistics value (19.19) is greater than the value of upper and lower bound, see table 2. After, we found the long-run relationship the study went for long-run coefficients which are represented in table3. In the case of long-run coefficients-external debt and growth rate of GDP have a significant impact on the exchange rate in India while the fiscal deficit has a statistically insignificant impact on the exchange rate. If external debt changes by 1 percentage point the exchange rate change by 4.49 units. The growth rate showing a negative impact on the exchange rate i.e if the growth rate increases by 1 percentage point exchange rate decreases by 1.63 units.

Table 2
ARDL Co-integration Bound Test Result.

ARDL Function	Optimal Lag Length (2 4 3 4)	F Statistics (19.19)
	Critical Bound F-Values	
Significance Level	Lower	Upper
1%	5.17	6.36
5%	4.01	5.07
10%	3.47	4.47
	Diagnostics test	
R-squared	.99	
Adjusted R-squared	.98	
F statistic(Prob. values)	4.72 (0.00)	
White's Heteroscedasticity test	0.21	

Source: Author's calculation.

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

Variables Long-run coefficients	Coefficient	P-value
ED	4.49*	0.001
FD	0.27	0.77
GR	-1.63**	0.07

Source: Author's calculation.

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

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

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

Source: Author's calculation.

Note: *, denotes statistical significance at a 1% level.

The short-run coefficients are shown in table 4. The main variable of the study – external debt has a positive significant impact on the exchange rate in the short-run, whereas economic growth has a negative impact on the exchange rate. The speed of adjustment term shown in table 4 reveals that disequilibrium in the short-run will be corrected in the long-run with a speed of 81 percent as the value of Z is 0.81, depicted in table 4.

6. Conclusion

The exchange rate considered as the most significant macroeconomic variables in emerging and transition nations. It affects exports, imports, and economic activity. The ability to manage the exchange rate volatility by the monetary authority can greatly benefit an economy as exchange rate volatility affects economic growth by increasing uncertainty and risks and thus discourages trade and investment. This study empirically analysed the relationship between exchange rate volatility and external government debt. The findings of the study indicate that there is a long-run association between the exchange rate and external debt in India with a period of 1991 to 2019. The long-run and short-run coefficients of external public debt had a positive and significant effect on the exchange rate. The findings of this study have significant policy implications in the management of external public debt. Lack of prudent debt management strategies as evidenced in this study will partly lead to increase exchange rate volatility. Policy-makers need to ensure that both the level and rate of growth of external public debt is sustainable, that is, the debt sustainability indicator external debt to GDP ratio is at low levels and pursues strategies that will reduce excessive accumulation of external public debt. Also, policy-makers should ensure that borrowed funds are put in projects/ investments with a higher rate of returns. Debt management needs to be linked to a clear macroeconomic framework, under which the Indian Government will seek to ensure the external public debt is sustainable.

REFERENCES

Alam, N. (2013). an Investigation of the Relationship of External Public Debt With Budget Deficit, Current Account Deficit, and Exchange Rate Depreciation in Debt Trap and Non-Debt Trap Countries. *European Scientific Journal*, *9*(22), 144–158.

Ahuja, H. L. (2013). *Modern Economics, 10*(4), 545.New Delhi: S. Chard & Company Pvt. Ltd.

Ishfaq, M., & Chaudhary, M. A. (1999). Fiscal Deficits and Debt Dimensions of Pakistan. *The Pakistan Development Review*, *38*(4II), 1067–1080. https://doi.org/10.30541/v38i4iipp.1067-1080

Muoghalu, M. I., Ezirim, C. B., & Elike, U. (2007). Foreign investment burden, exchange rates, and external debt crises in Nigeria: An empirical extension. *Banks and Bank Systems*, *2*(3), 82–90.

Musgrave, R. A.,& Musgrave, P. B. (2004). *Public finance in theory and practice* (5th Ed.). Tata New Delhi: McGraw-Hill Publishing Company Limited.

Neaime, S. (2009). Sustainability of Exchange Rate Policies and External Public Debt in the Mena Region. *Journal of Economics and International Finance*, *1*(July), 59–71.

Stambuli, K. (2002). Causes and consequences of the 1982 Third World Debt Crisis. *International Finance*, (October), 1–35.

Tiruneh, M. W. (2004). An Empirical Investigation Into the Determinants of External Indebtedness. *Prague Economic Papers*, *13*(3), 261–277. https://doi.org/10.18267/j.pep.242