



Research Article

Impact of External Debt on GDP of Bangladesh

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ARTICLE INFO

ABSTRACT

Keywords:

External Debt, GDP, Granger Causality, Johansen Co-integration, Bangladesh.

JEL Classification:

C22, E49, F29, F34, O47

Article History:

Received: 26-08-2024

Accepted: 10-11-2024

Published: 16-11-2024

This study is to explore the external debt's impact on GDP in Bangladesh. Since the independence external debt (ED) is increasing every. This objective of this paper is to investigate the link between external debt and GDP considering the data set for the period of 1972 to 2021 using time series econometric technique. The findings indicate a positive, statistically significant impact of external debt on GDP. The Johansen co-integration analysis implying that the GDP and ED have a long-term equilibrium association. Moreover, Granger causality test suggests that there is a bidirectional causality exist between GDP and ED in Bangladesh. Policy suggestions from this study revealed that as a developing country Bangladesh government may borrow foreign debts for the massive economic development. But government should use it properly for the development of the country especially for productive purposes.

Cite this article:

Islam, M. A., & Hossain, F. (2024). Impact of External Debt on GDP of Bangladesh. *Sprin Journal of Arts, Humanities and Social Sciences*, 3(11), 47–50. <https://doi.org/10.55559/sjahss.v3i11.390>

1. Introduction

Since the independence, Bangladesh has always depended on loans and grants to fulfill its necessities and thus deficit budgets have become the usual phenomenon here. Much debated issue is there in academic circle that whether external borrowing has a positive or negative relation with the economic growth of a country. Moreover, debt problem got more attention these days. For instance, crisis of Sri Lanka in 2022 where government borrowed much loans from foreign countries. Because of reserve shortages government's debt goes beyond its payment capacity leads to loss of monetary capacity to import anything from abroad. Moreover, high inflation broke the record rise to 54.6 percent. Economy totally collapsed (Athas et al., 2022). The government of Bangladesh is also having much in debt these days (No Name, 2023). Therefore, investigation on the debt impact on the economy is required.

The objective of this research is to examine the impact of External Debt (ED) on the economic performance measured in gross domestic product (GDP) of Bangladesh. There are five sections of this paper. Next section is literature review discussed relevant literature related to this research. Section three discussed the data and methodology to achieve the objective of this research. Results and estimates are reported and discussed in section five. Finally, concluding remarks and some policy suggestions based on the findings of this research are in the last section.

2. Literature Review

Sharaf (2022) examines the asymmetric and threshold impact of external debt on economic growth in Egypt during the period 1980–2019. This study uses a vector error-correction model and a nonlinear autoregressive distributed lag (NARDL) bounds testing approach. The results show both positive and negative external debt-induced shocks on economic growth. However, the magnitude of negative shocks is greater than that of positive shocks. Interestingly it is also found that the short and long-term effects of external debt on growth are equal. Moreover, existence of nonlinearity hypothesis is supported where negative impact of external debt on growth is found when external debt-to-GDP ratio is equal to or greater than 96.7 percent.

Dawood et al. (2021) investigates the determinants of external debt in 32 Asian economies using data for the period 1995–2019. The generalized method of moments (GMM) is used for the estimation. The findings show that in both short and long-run exchange rates, trade, and government spending raise external debt. On the contrary, it is also found that economic growth and investment reduce external debt.

Nikolova (2019) reviewed the external debt in European economies and focuses especially on Bulgaria and Romania. The paper analyses the external debt situation of the EU member countries and also challenges for the external debt management for Bulgaria and Romania. It is found that both Bulgaria and Romania are having low levels of external debt. It is argued that for these economies low levels of debt are the crucial buffer for

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<https://doi.org/10.55559/sjahss.v3i11.390>

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overcoming global crisis and they are less vulnerable to the external changes. However, Romania is in better position than Bulgaria as having low levels of debt condition.

Navarro-Ortiz and Sapena (2020) investigated the sustainability of government debt using probabilistic model for 38 countries (11 developed and 27 developing) of the world. It is concluded here that a significant number of countries current debt situation is not sustainable. In these countries, debt interest is lower than GDP growth which is related to dynamic inefficiency.

Zafar et al. (2015) investigates the impact of external debt on economic growth in counties of South Asia, East Asia and Middle East regions as per divided by the World Bank. The analysis is done here with the help of panel regression using data for the period 1980 to 2012. The findings show that external debt has a significant and negative impact on economic growth. It is therefore argued that debt is an obligation and ultimate burden on an economy.

Ntshakala (2015) analyzes the relationship between public debt (both external and domestic debt) and economic growth in Swaziland. Taking time series data from 1988 to 2013 this study discovered that there is no significant relationship between external debt and economic growth. However, domestic debt was discovered to have a significant positive relationship with economic growth.

Reinhart and Rogoff (2010) investigated economic growth at various degrees of internal and external debt considering on forty-four countries (wide range of political systems, institutions, exchange rate and monetary arrangements and historic circumstances) spanning two centuries consisting of over 3700 observations. Several interesting findings they got in this research. First, there is a little correlation between government debt and real GDP growth at 'normal' debt levels. However, for emerging economies when external debt reaches 60 percent of GDP, annual growth declined by about 2 percent. Moreover, inflation also rises sharply as debt increases in these economies.

Shah and Pervin (2012) investigate the relevance of the external public debt on Bangladesh economy considering data from 1974 to 2010 using co-integration analysis and error correction mechanism This paper not only analyze the effect of stock of debt on growth, but also the effect of burden (debt servicing) on growth. It is found that the stock of external public

debt has a positive impact on GDP growth. On the contrary the debt service has a significant negative impact on economic growth. The findings of this study contradict each other because rising debt stocks necessitate higher service payments which create a ground for further research related to this for Bangladesh.

Dey and Tareque (2020) investigate the impact of external debt on growth in Bangladesh using the data for the period of 1980-2017. Using the autoregressive distributed lag (ARDL) bounds testing approach to co-integration it is found the negative impact of external debt on GDP growth.

3. Data and Methodology

For the empirical analysis of this research, annual data from year 1972-2021 is used. The data related to external debt and GDP of Bangladesh were collected from World Bank data sources (WB, no date).

3.1 Model Specification

The main objective of this research is to analyze the effect of external debt on economic growth in the case of Bangladesh. Following standard econometric model to establish a relationship between two variables, the following bivariate model is specified as follows:

$$Y_t = \alpha + \beta D_t + u_t \tag{1}$$

Where, Y_t is gross domestic product (GDP), D_t is external debt (ED) and u_t is error term.

After logarithmic transformation of equation (1) we get:

$$\ln Y_t = \alpha_0 + \beta \ln D_t + u_t \tag{2}$$

Here \ln represents Logarithm.

For our analysis regarding the impact of ED on GDP the model showed in equation 2 is used.

3.2 Stationarity Test

We know that in empirical research when we use time series data then it should be stationary, otherwise we might have a spurious regression (Gujarati et al., 2012). Table 1 shows the unit root test results for the variables used here. There are several unit roots tests available to test stationarity of time series data. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are used here.

Table 1: Unit Root Test of the Variables

Variables	ADF			PP		
	Constant	Constant and Trend	Decision	Constant	Constant and Trend	Decision
$\ln G_t$	1.802 (4)	0.682 (4)	UR	-0.030	-12.844	UR
$\ln D_t$	-0.603 (2)	-1.645 (2)	UR	-6.608	-17.629	UR
$\Delta \ln G_t$	-8.168*** (2)	-9.790*** (2)	S	-37.473***	36.965***	S
$\Delta \ln D_t$	-9.882*** (1)	-9.356*** (1)	S	20.951***	-20.419**	S

Note: ** and *** indicate 5% and 1% level of significance respectively; the optimum lag order is shown in parentheses; UR and S indicate unit root and stationery respectively. The AIC determines the lag length in the ADF tests.

The empirical evidence indicates here that both the variables are non-stationary at the level. However, both ADF and PP test result indicates that they are stationary at 1st difference. Therefore, this implies that series are here I(1). We may conclude that variables are non-stationary at their level but become stationary after taking the first difference. We know that using stationary time series, causality between two variables can be checked through Granger causality model (Granger, 1969).

If the variables are I(1), Granger (1988) assert that causality must exist in, at least, one direction. The Granger causality test is then augmented with an error correction term (ECT) as discussed below.

3.3 Granger Causality Model

Through the Granger causality model, we will first check the causal relationship between our two variables GDP and external debt. As here the pair of our time series variables are I(1), there must be causation in at least one direction (Granger, 1988). Following simple two-variable causal model of Granger (1969), the equations for our model become:

$$\ln Y_t = \beta_0 + \sum \beta_{1i} \ln Y_{t-i} + \sum \beta_{2i} \ln D_{t-i} + u_{1t} \tag{3}$$

$$\ln D_t = \delta_0 + \sum \delta_{1i} \ln D_{t-i} + \sum \delta_{2i} \ln Y_{t-i} + u_{2t} \tag{4}$$

Where u_{1t} and u_{2t} are the two uncorrelated white-noise error term.

If we accept $H_0: \beta_{21} = \beta_{22} = \dots = \beta_{2q} = 0$ then it implies that external debt does not granger cause GDP. Similarly, if we

accept $H_0: \delta_{21} = \delta_{22} = \dots = \delta_{2r} = 0$ indicates that GDP does not granger cause external debt.

The Granger causality testis then augmented with an error correction term (ECT) as shown below (Engle & Granger,1987):

$$\Delta \ln Y_t = \beta_0 + \sum \beta_{1i} \Delta \ln Y_{t-i} + \sum \beta_{2i} \Delta \ln D_{t-i} + \alpha_1 Z_{t-i} + \varepsilon_{1t} \tag{5}$$

$$\Delta \ln D_t = \delta_0 + \sum \delta_{1i} \Delta \ln D_{t-i} + \sum \delta_{2i} \Delta \ln Y_{t-i} + \lambda_1 Z_{t-i} + \varepsilon_{2t} \tag{6}$$

Here Z_{t-i} is the ECT from the long run co-integrating relationship between GDP and external debt. The above error correction model (ECM) shown in equations (5) & (6) indicates the possible sources of causality. Equation (5) states that, external debt Granger causes real GDP, if the null of either $\sum_{i=1}^q \beta_{2i} = 0$ or $\alpha_1 = 0$ is rejected. On the contrary, equation (6) states that GDP Granger causes external debt, if λ_1 is significant or $\sum_{i=1}^r \delta_{2i}$ are jointly significant. GDP and external debt granger cause each other (i.e., presence of bidirectional causality), if causality exists in both directions.

4. Results and Discussion

The regression results of the GDP and external debt are shown in the Table 2. Regression results show that the estimated value of the coefficient is positive (0.2368844) and t statistics are significant at a 5% level of significance. This is indicating that external debt has a significance positive influence on GDP in Bangladesh. Our result is in line with the findings of research done by Shah and Pervin (2012).

Table 2: Output of Regression

Dependent Variable: $\ln Y_t$				
Method: Least Square				
Observations:46				
Dependent Variable: GDP				
Variable	Coefficient	Std. Error	t-Statistic	P-value
Constant	0.0544487	0.0242252	2.25	0.029
$\ln D_t$	0.2368844	0.0973336	2.43	0.019
Model Summary				
R-squared	0.1119			
Adjusted R-squared	0.0930			
F-statistics	5.92			
Prob.>F	0.0188			

Note: Y_t and D_t are GDP and ED.

As our variables are $I(1)$, our next step to test for the existence of any co-integration relation between them. The Johansen (1991) likelihood ratio test of Co-integration is applied and result are showed in Table 3. The Appropriate VAR lag length is selected using AIC. The λ -trace statistic rejects the null of $r \leq 0$ but cannot reject $r \leq 1$ and also, the λ -max statistic rejects the null of $r \leq 0$

but fails to reject $r \leq 1$ at both 5% and 1% level. These Eigen value tests based on stochastic matrix indicate existence of the co-integrating relationship between GDP and external debt. So, the Granger causality tests will be modeled using ECM as explained in equations (5) and (6).

Table 3: Results of Johansen Co-Integration Test

Null	Eigen value	Trace Test			Max. Eigen value Test		
		$\lambda - trace$			$\lambda - max$		
		Value	Critical Value		Value	Critical Value	
			5%	1%		5%	1%
$r \leq 0$	0.36825	23.22	12.53	16.31	20.66	11.44	15.69
$r \leq 1$	0.05531	2.56	3.84	6.51	2.56	3.84	6.51

Granger causality tests results are shown in Table 4. Under the null hypothesis of no causality the F-statistic and probability values are shown. It is evident that we are not able to reject the

nulls and therefore concluded that there is a bi-lateral causal relationship exist between the variables. That is both way causality runs through GDP to ED and ED to GDP.

Table 4: Granger Causality Test Results

Pairwise Granger Causality Tests			
Lags: 4			
Null Hypothesis:	Observations	F-Statistic	Probability
GDP does not Granger Cause ED	46	1.169	0.3407
ED does not Granger Cause GDP		2.250	0.0829

Overall, our empirical results suggest the existence of long-run relationship between GDP and ED. Moreover, the results of Granger causality test implies that there is bi-directional causality runs through GDP to ED as well as ED to GDP. Therefore, we may say that external debt is not bad and so not be a burden to the country. It may be beneficial for the development of a country like Bangladesh.

5. Conclusion

The paper tries to examine empirically the relationship between external debt and GDP of Bangladesh. The link between the variables is examined here using time series econometric tools. Empirical result suggests that there is a positive and significance impact of external debt on GDP. The co-integration analysis also suggests that there is a long-run equilibrium relation between GDP and external debt. Moreover, it is also found that there is a bi-directional causality exist between GDP and ED. Being a developing country Bangladeshi need to take debt to meet up the fund shortage for its development work. Present study found no harm in consequence of this decision on the economy. However, the careful utilization of these fund must be ensured, corruption and misuse of funds must be eliminated. Although this research found a positive significant impact of ED on GDP, threshold analysis could be future direction of research to identify the level of ED up-to when this positive relationship exists.

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