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EXTERNAL DEBT AND ECONOMIC GROWTH IN BANGLADESH: AN ERROR CORRECTION APPROACH

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Abstract

The study examines the effect of external debt on economic growth in Bangladesh. In our model, we use GDPG as a dependent variable and External Debt Stock, Total Debt Service, Gross Capital Formation, Terms of Trade, and Exchange Rate as explanatory variables. Diagnostic tests were conducted using Augmented Dick Fuller and Phillips-Parron Unit Root Tests. The model has been estimated with Error Correction Technique. Result shows that external debt has positive effect on the economy in the short run but negative effect in the long run. Empirical evidence shows that in the long run, GDP will be decreased by 0.14 percent, if external debt increased by 1 percent. Negative sign of the error correction term implies that any disequilibrium in the short run will be converging to long-run equilibrium. The magnitude of the ECM term shows the speed of adjustment of a shock in the short run. More clearly, in our model an exogenous shock in the GDP growth will be adjusted in approximately 3 years.

Keywords:

Economic Growth, External debt, Unit Root, Co-integration, VECM.

JEL: F34, F43

1. Introduction

Economic growth, traditionally measured in terms of gross domestic product (GDP) or gross national product (GNP) is an increase in the production of economic goods and services over a period of time caused by an increase in aggregate demand and supply of an economy. In economic growth spectrum, external debt plays an important role by either accelerating or decelerating its path. According to the IMF, in 2018 Bangladesh was the second fastest growing economy among the South Asian countries, with a rate of 7.86 percent GDP growth. Different types of mega projects are ongoing in Bangladesh for further economic expansion. As a middle-income country, it is not possible for Bangladesh to meet all development expenses only from the domestic sources. That's why Government of Bangladesh (GoB) has to maintain a deficit budget in every year. In this aspect, to meet the deficit in internal resources, GoB has to borrow from external sources on a regular basis. External debt has nearly doubled in last decade. According to the World Bank, in 2018, from different external sources, Bangladesh has taken around 52.12 billion USD which was around 23.40 billion USD in 2008. Among the international organizations, World Bank, Asian Development Bank, International Monetary Fund, etc. and among the developed countries, China, Japan, USA, etc. are the major sources of external debt for Bangladesh. Though World Bank, Asian Development Bank and government of Japan provides concessional and flexible loan to Bangladesh, some other lenders follows expensive and rigid credit policies. Though Bangladesh has started to construct Padma Bridge mega plan by its

internal resources which will make additional GDP growth of 1.2 percent to 2 percent in near future. With the progress in mass communication and infrastructures, Bangladesh has also made remarkable progress in reducing poverty. In parallel, life expectancy, literacy rates and per capita food production have increased significantly. Progress in key industrial sectors including pharmaceuticals, shipbuilding, ceramics, leather goods and electronics along with Readymade Garments played a vital role in this aspect. There are many forward effects of external debt. Generally, liquidity injected led by external debt in the economy accelerates the inflation. In this context, the engagement in the study of external debt and growth nature is very crucial for debt management policy makers in Bangladesh to know the optimal debt for capital accumulation as a developing economy. There are a very limited recent studies about external debt and its impact on the economy. So this paper will be an endeavor to mitigate the limitations of the previous studies and include the recent events of External debt.

1.1 Objectives of the study

The main objective of this study is to examine the relationship between external debt and economic growth in Bangladesh during the period 1980-2017. The specific objectives of the study are as follows

- a. Scrutinize the trend of economic growth and external debt.
- b. Examine the effect of external debt on economic growth in Bangladesh.

2. Literature Review

By using a sample of 70 developing countries over a period of 1976-2011, Shabbir (2013) identified that increase in external debt stock reduces the fiscal space to service external debt liabilities and thus dampens the economic growth. Moreover, it reduces the level of private fixed capital formation.

Udofia & Akpanah (2016); Obademi & Okubanjo (2013); and Ezeabasili, Isu, & Mojekwu, (2011) investigated the impact of external debt on the Nigeria economy. Their studies revealed that external-debt has negative relationship with economic growth in Nigeria.

Using the data of Malaysia over the period 1991 to 2013, Lee & Ng (2015) indicates that public debt (which consists of both external and domestic debts) over time has a negative impact on GDP. In addition, the study found that the budget deficit, government consumption and external debt service are a decreasing function of GDP.

Nwanne & Eze (2015) studied the relationship between external public debt servicing and receipt and exchange rate fluctuations in Nigeria from 1981 to 2013. The findings of the study showed that external debt receipts and external debt servicing have positive short and long-run relationships with exchange rate fluctuations. The study concluded that whereas external public debt receipts affect exchange rate positively, external public debt servicing affects exchange rate negatively.

Butts (2009) investigated the direction of the causality relationship between economic growth and short-term external debt for 27 Latin American and Caribbean countries over the period 1970–2003. The results suggest the existence of bidirectional causality relationships between the two variables for several countries, which means that the performance of both variables is interrelated.

Kharusi & Ada (2018) revealed a negative and significant influence of external debt on economic growth in Oman. Furthermore, gross fixed capital was found to be positively significant in determining growth performance in Oman. Using multivariate dynamic Markov-switching model and analysing the data set for the period of 1974 to 2009 of Turkey, Doğan & Bilgili (2014) identified public and/or private external borrowing has negative impact on growth both in regime at zero and regime at one. The study also found that the negative impact of public borrowing on economic growth and development is higher than that of private borrowing on economic growth and development.

Malik, Hayat & Hayat (2010) revealed that External Debt is negatively and significantly related with economic growth in Pakistan. Their evidence suggests that increase in external debt will lead to decline in economic growth. The study also suggests debt servicing has also significant and negative impact on GDP growth.

In another study, Zaman & Arslan (2014) identified that gross capital formation (GCF) and external debt stock has significant positive effect on Pakistan GDP while gross domestic saving does not have significant impact on GDP of Pakistan.

Safdari & Mehrizi (2011) showed that the external debt had a negative effect on gross domestic product and private investment in Iran. Were (2001) also indicated that external debt accumulation has a negative impact on economic growth and private investment in Kenya. On the other hand, debt servicing does not appear to affect growth adversely but has some crowding-out effects on private investment.

Kasidi & Said (2013) revealed that there is significant impact of the external debt and debt service on GDP growth in Tanzania. The total external debt stock has a positive effect of about 0.36939 and debt service payment has a negative effect of about 28.517. Long run relationship the cointegration test shows that there is no long run relationship of the external debt and GDP.

In another study, Adesola (2009) found that debt payment to Nigerian creditors affect the economic growth both positively and negatively, a mixed outcome. The study also revealed that their exist a statistically significant relationship between gross fixed capital formation and debt payment to creditors and External debt services have a statistically significant impact on the economic growth (GDP) of Nigeria.

Using data from highly indebted poor countries (HIPC) over the period 1970-2007, Siddique, Selvanathan & Selvanathan (2015) identified that in the short-run as well as in the long-run, a reduction in debt stock would have significantly increased the growth performance of the indebted nations.

Babu, et al. (2014) suggest that external debt has a negative significant effect on per capita GDP growth rate in the East Africa community (EAC). They also suggested reducing the external debt burden so as to promote rapid economic growth of the EAC member countries.

3. Data and Methodology

The analysis has been done on both qualitatively and quantitatively. To interpret the processed data, descriptive as well as empirical analysis has been conducted. The research is mainly based on secondary data of the period of 1980-2017 of Bangladesh. World Development Indicators (WDI) published by World Bank, the Statistical Year Book published by Bangladesh Bureau of Statistics, Monthly Economic Trends published by Bangladesh Bank, etc. are the main data sources.

The following econometric model has been used in order to evaluate the effects of external debt on economic growth.

$$GDPG = \beta_0 + \beta_1 ED + \beta_2 TOT + \beta_3 EX + \beta_4 TDSP + \beta_5 GCFGDP + U_i$$

Where,

GDPG=GDP growth rate (percentage change in Real GDP) used as a proxy for Economic Growth,

ED=External Debt stock (country's debt that was borrowed from foreign lenders) to real GDP

TDSP=Total debt services (the sum of principal repayments and interest actually paid in currency, goods or services on long term debt) in percentage

TOT=Terms of trade (the ratio of an index of a country's export prices to an index of its import prices)

EX=Exchange rate (Taka per USD)

GCFGDP=Ratio of gross capital formation (total physical capital stock increased during a specific time period) to real GDP

B_0 is intercept of the model, β_1 , β_2 , β_3 , β_4 , and β_5 are partial slope coefficients of the model and U_i is error term.

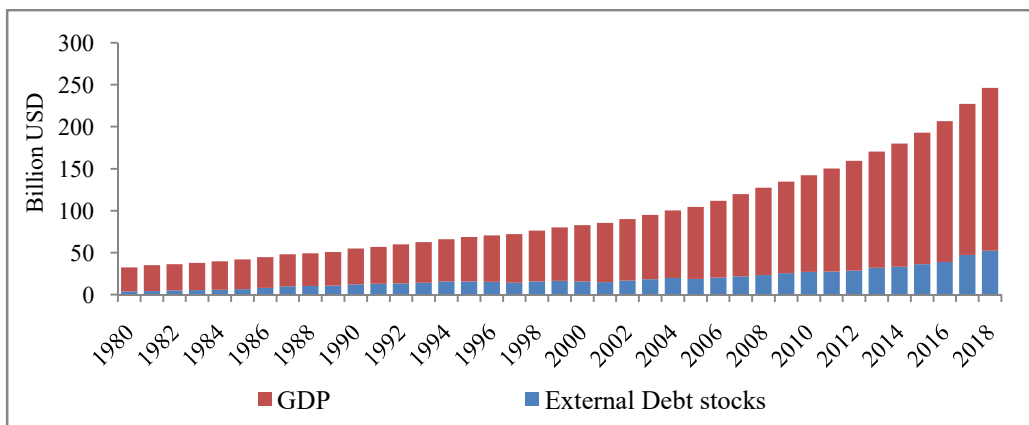
To examine the relationship among the variables some econometric techniques such as unit root tests for stationarity, Johansen cointegration test for long run relationship, Vector Error Correction Model (VECM) to justify

the speed of adjustment, Breusch-Godfrey (LM) test for Serial Correlation and Breusch-Pagan-Godfrey test for Heteroskedasticity.

4. Economic growth and external debt profile of Bangladesh

Bangladesh, like other developing countries, has benefitted from external borrowing to finance its developmental goals since its independence. For instance, the country’s external debt was USD 52.12 billion in 2018, having increased three times from USD 15.60 billion recorded in the year 2000. At the same time, Bangladesh’s GDP also increased almost three times from USD 67.01 billion recorded in the year 2000 to USD 194.14 billion in 2018 (Chart 1).

Chart-1: Trend of GDP and external debt stocks of Bangladesh



5. Empirical Analysis

Unit Root test has been conducted to find out the stationarity of the time series. If a time series is non-stationary but becomes stationary after first differencing, then it is said to be integrated of the order one i.e. I (1). When the variables are found to have the same order of integration, then co-integration test is used to identify the number of co-integrating vectors and co-integrating equation among the variables.

Table-1: Unit root test

variables	Level				First difference			
	ADF		PP		ADF		PP	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intercept & Trend
GDGP	-0.2655	-2.6114	-5.2222	-8.5480*	-5.1691*	-5.2066*	-21.780*	-23.512*
EX	-0.5429	0.4750	-2.1255	-1.8344	-5.5788*	-4.7816*	-5.0997*	-5.6412*
ED	-0.4223	-3.4472	-1.0573	-3.1967	-5.3971*	-5.8075*	-4.2005*	-4.3420*
TOT	-0.8158	-3.2543	-0.7018	-2.9772	-7.6121*	-7.5007*	-7.6121*	-7.5007*
TDSP	-0.8252	-2.7416	-1.5821	-2.5463	-2.978**	-2.5117	-7.9604*	-8.2744*
GCFGDP	0.1426	-3.8847	-0.0231	-1.7799	-3.8017*	-4.0556*	-5.8259*	-6.0806*

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* indicates significant at 1% level and ** indicates significant at 5% level

According to the findings from the Augmented Dickey Fuller Test (ADF) and Phillips-Perron Test, most of the variables are non stationary at level with and without trend. After taking first difference all series turn into stationary with trend and without trend. Here all data series are integrated of the order one I(1).

Table-2: Correlation Analysis

	GDPG	ED	TDSP	EX	TOT	GCFGDP
GDPG	1.00					
ED	-0.47	1.00				
TDSP	-0.49	0.82	1.00			
EX	0.71	-0.58	-0.61	1.00		
TOT	-0.71	0.63	0.63	-0.96	1.00	
GCFGDP	0.73	-0.70	-0.74	0.97	-0.94	1.00

Table-2 interprets the correlation among the variables. GDP growth is negatively correlated with external debt, total debt service and terms of trade. The coefficients of correlation are -0.475, -0.49 and -0.715 and all coefficients are statistically significant. Again, GDP growth is positively correlated with exchange rate and gross capital formation with the degree of association 0.71 and 0.73. The coefficients are also statistically significant.

Table-3: Johanshen cointegration test

Unrestricted Cointegration Rank Test (Trace)							
Hypothesized		Trace			Max-Eigen		0.05
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	Statistic	Critical Value	Prob.**
None *	0.884043	205.8076	107.3466	0.0000	66.79065	43.41977	0.0000
At most 1 *	0.830693	139.0170	79.34145	0.0000	55.05730	37.16359	0.0002
At most 2 *	0.710758	83.95967	55.24578	0.0000	38.45523	30.81507	0.0048
At most 3 *	0.602988	45.50444	35.01090	0.0027	28.63743	24.25202	0.0123
At most 4	0.404885	16.86700	18.39771	0.0808	16.08900	17.14769	0.0708
At most 5	0.024785	0.778004	3.841466	0.3778	0.778004	3.841466	0.3778

Trace test and Max-eigenvalue test both indicate 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table-3 shows that there is a long run relationship between the GDP growth and external debt.

Table-4: Vector Error Correction Estimates

Cointegrating Eq: GDPG(-1)				CointEq1 1.000000		
ED(-1) Standard errors t statistics				0.142105 (0.04712) [3.01568]		
C				-9.164197		
Error Correction:	D(GDPG)	Standard errors	t statistics	D(ED)	Standard errors	t statistics
CointEq1	-0.363274	(0.20146)	[-1.80324]	-1.284730	(0.44778)	[-2.86909]
C	-0.513897	(5.45831)	[-0.09415]	8.446178	(12.1323)	[0.69617]
D(GDPG(-1))	-0.240681	(0.22555)	[-1.06707]	0.981416	(0.50134)	[1.95757]
D(GDPG(-2))	-0.124580	(0.13628)	[-0.91416]	0.450429	(0.30291)	[1.48702]
D(ED(-1))	0.017022	(0.06231)	[0.27319]	0.300313	(0.13850)	[2.16836]
D(ED(-2))	-0.012461	(0.06437)	[-0.19359]	-0.488531	(0.14307)	[-3.41462]
TDSP	1.353186	(0.87360)	[1.54898]	-2.044239	(1.94177)	[-1.05277]
EX	-0.088306	(0.05643)	[-1.56481]	0.358463	(0.12543)	[2.85778]
TOT	-0.027961	(0.02193)	[-1.27491]	0.054137	(0.04875)	[1.11053]
GCFGDP	0.277878	(0.20343)	[1.36594]	-1.339062	(0.45218)	[-2.96136]
<i>R-squared</i>		0.494038		<i>R-squared</i>		0.617165
<i>Adj. R-squared</i>		0.311892		<i>Adj. R-squared</i>		0.479344
<i>Sum sq. resids</i>		18.70780		<i>Sum sq. resids</i>		92.42611
<i>S.E. equation</i>		0.865050		<i>S.E. equation</i>		1.922770
<i>F-statistic</i>		2.712316		<i>F-statistic</i>		4.478031
<i>Log likelihood</i>		-38.70072		<i>Log likelihood</i>		-66.65642
<i>Akaike AIC</i>		2.782898		<i>Akaike AIC</i>		4.380367
<i>Schwarz SC</i>		3.227283		<i>Schwarz SC</i>		4.824752
<i>Mean dependent</i>		0.147139		<i>Mean dependent</i>		-0.231652
<i>S.D. dependent</i>		1.042829		<i>S.D. dependent</i>		2.664723

Table-4 shows that in the long run, 1 percent increase in external debt reduces GDP growth by 0.14 percent which is statistically significant at 1 percent level. The error correction term has correction sign which is negative. It implies that any disequilibrium in the short run will be converging to long run equilibrium. The magnitude of ECM term shows the speed of adjustment of a shock in the short run, which will be adjusted in the long run. More clearly -0.36 means that any exogenous shock in the GDP growth will be adjusted in approximately 3 years.

VEC Residual Serial Correlation LM Tests output indicates that there is no serial correlation in the residuals at different lags at 5% level of significance. VEC Residual Heteroskedasticity Tests illustrate that the residual of the model is homoskedastic residual.

6. Conclusion

External debts are essential to meet the deficit in internal resources, and stimulate the economy. However, to avoid serious consequences it should be use carefully so that we can ensure the optimal utilization with highest return. To sum, Gross capital formation has positive impact on GDP growth. External debt and Debt service payment have negative and significant effect on GDP growth of Bangladesh. There is a unidirectional causality relationship between external debt and economic growth. From the findings and conclusion above, this study recommendations external debt should be used for the purpose for which it was borrowed. There should be a debt management policy to reduce the negative effect of debt service. This study will help the policymakers in Bangladesh to form their

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policy on external debt management. Moreover, diversifying the economy, export-led-growth strategy and investment in human capital will reduce the burden of external debt.

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