

Influence of Key Aggregates of External Debt on the Economic Growth & Development of Bangladesh: An Econometric Analysis

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Abstract

As a developing country, Bangladesh is largely dependent on external debt for its infrastructural development projects which certainly signify the overall indicator for the development in effect accelerating the economic growth. Therefore, the purpose of this study is to investigate the effect of key aggregates involved in external debt, such as debt service payments, external reserves, and interest rates, on the gross domestic product (GDP) of Bangladesh. The study involves time series data on the selected variables from 1992 to 2023 and applies the ordinary least square (OLS) model with the variables to be tested through the Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity. Also, for testing the multicollinearity, the Variance Inflation Factor (VIF) and Pearson Correlation Matrix (PCM) test are used. The analyses show that GDP has a strong positive relationship with Debt Service Payment and External Reserves while a negative relationship with the interest rate, each at a 5% significance level. Finally, it is recommended that, to cultivate the positive impact of foreign debt, channeling the borrowed fund into export-promotional ventures or profitability of the invested venture to lessen the negative effect of debt service payments, the optimal debt level shall be determined up to the good risk position of external reserves maintaining a stable foreign exchange ratio and capital formation in the domestic debt market encouraging private investments at lower interest rate ensuring an efficient debt management policy within the country shall be implemented.

Keywords: External Debt; GDP, Economic Growth; External Reserves; Interest Rate.

1. Introduction

It's never a new story on the paradigm of Bangladesh's economy that a significant portion of its development relies on the utilization of external debt which comes with inherent implications on other related aggregates like debt service payment, external reserve, and interest rate on that debt. As external debt

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for any economy is an endogenous variable, the discussion of its effect naturally brings about these three inseparable aggregates for the ultimate demonstration of the relationship (Espinoza & Winant, 2014). The Keynesian thought of economics firmly believes that the development of any least developing country is solely dependent on the spending on its infrastructural development involving projects being financed by either by private or external sector (Udeh et al.,2016). In the current scenario of global economic crisis, the development of an infrastructural base and investment cycle based on external debt can be associated with invoking a faster economic structure. Gross Domestic Product (GDP) can be best used as a macroeconomic aggregator (Davcev & Hourvoulides, 2014).

According to the latest report of the World Bank, external debt of Bangladesh reached 93.2 billion USD in March 2022, compared with 90.8 billion USD in 2021. The reason behind rising external borrowing was set to boost economic growth and macroeconomic factors like higher investment, higher consumption, education, health, and other factors (Poly, 2014). Each of these economic activities ultimately aimed at increasing capital inflow followed by expedited investment and economic growth. To sum up the aggregate impact of economic growth and activities, gross domestic product (GDP) can be used as the best indicator of overall development as well (Dyan & Sheinar, 2018).

However, the reality of external debt emerges with the cost of servicing the payment on a pre-required condition basis. If the cost of debt service is relatively low compared to the returns on investment and the foreign exchange rate is not depreciating the bulk of profits earned only then external debt can accelerate economic growth. However, if the cost is high in relation to both aspects, rather than promoting growth, it will depress the economy (Ajayi & Oke,2012). While studying other transition countries like Bangladesh, although the relationship between external debt and economic growth manifested as positive (Uzun, 2022), the International Monetary Fund scrutinized those factors in highly indebted countries and found, in reverse, a negative effect of debt on growth due to poor state of debt servicing payments (IMF in IJDEE, 2014).

The choice of external debt is jointly taken with external reserves for any developing nation because the capital flow through debt is a linear function of welfare losses due to external shocks which eventually requires a good international reserve base to deal with any potential crisis (Espinoza & Winant, 2014). As each additional external reserve, by its distinct contribution will reduce welfare losses, it also attracts capital flows as optimal external debt level through establishing a positive relationship. On the contrary, a negative net effect might

also arise due to optimal external debt if it costs the improved sovereign ratings earned by the accumulation of external reserves of the developing nations (Mohd et al., 2011).

Finally, yet importantly, the linkage between utilizing interest rates as explaining the external debt of any country is more of a straightforward approach. For any developing nation, including Pakistan, the interest rate has been represented as the cost of financing the domestic debt (Naeem et al., 2016). If the required debt is available at a lower interest rate in the domestic economy compared to the cost of financing through external sources, it is noticeable that the dependency on the external debt would be lower, and the perceived relationship is thus negative. However, according to significant studies, this approach is also endogenous to the foreign exchange rate as a lower interest rate is often offsetting to a greater extent making it way more expensive.

2. Literature Review

Although economic growth and development for any emerging economy are highly researched in literature, the composition of determinants to correspond to the nurtured focus of the topic is completely novel. It has never been studied before in the context of Bangladesh.

2.1 Relationship between External Debt and Economic Growth & Development

As far as any financial donation is concerned, the potential contribution can be easily traced but the same is not true when such financial assistance comes in the form of an external debt. This concrete standing encouraged loads of studies so far considering multiple gradients and perspectives to exert the maximum growth or minimize the possible downfalls. A co-integrational conducted by Rahman projected a strong positive correlation between debt and the growth represented by the gross domestic product of Bangladesh (Rahman et al., 2022). The opposite effect has been traced by another study in Tanzania where no long-term association had been found between the good effects of debt on growth suggesting more government focus on its debt management strategy (Kasidi and Makame, 2023). A similar conclusion has been made for Pakistan, the neighboring economy of Bangladesh, where time series data examined the long- and short-term effects of external debt on economic development and demonstrated that debt has a detrimental influence on growth and that it will continue to be a problem for the economy (Ali & Mustafa, 2023).

Furthermore, scholars put their similar intrusiveness for extremely debt-burdened economies also where foreign debt is more of a necessity over the choice. One such finding depicted the impact of foreign debt on sustainable growth in Nigeria

and concluded that Nigeria's debt service obligations rather play a major barrier to the entrance of outside funding (Ademola and Olaleye, 2023). On this similar ground for necessity, a study depicted that when foreign debt is to be used to cover the budget deficit in Bangladesh, it posited a positive influence on GDP (Rahman & Bashar, 2022). But the other conclusion appeared for the neighboring country Pakistan where external debt seemed to slow the economic development more than domestic debt (Rabia Atique & Kamran Mallik, 2022). This possible negative effect has also been observed in highly debt-burdened Kenya where rising foreign debt slows economic expansion and lowers the rate of private fixed capital development (Kasili, 2020). Even for South Asian nation's economic growth, mounting debt loads showed a non-linear interrelatedness between growth and every other measure of debt load (Rehana & Malik, 2020).

2.2 Key Aggregates of External Debt & Their Influences on GDP

2.2.1 Debt Service Payment

Debt service payment is directly interlinked to explain foreign debt for developing nations through declining economic growth via investment. If the debt service payment is too high for the repaying capabilities of a highly indebted nation, it will dim the growth path of many private investments and domestic/foreign creditors. To crystalize the impact of external debt on growth, a significant study incorporated debt service payment to be compared to the development aid and revealed that if debt service payments and development aid are cut equally, growth is unaffected; but, if development aid is maintained at the same level, growth may be negatively impacted (Karagol, 2022). This certainly specifies the legitimate grounds for incorporating debt service payment to better explain the influence of external debt. Another study on 36 low-income nations also incorporated the debt servicing payment aggregate along with five other variables and reflected convincing conclusion as repaying foreign debt had a detrimental effect on growth but not directly. It affects investment detrimentally which surely signifies a new perspective on the inclusion of debt servicing payment as one of the aggregates of external debt (Gohar et al., 2020).

Empirical studies on developing nations elucidated the similar impact of foreign debt on monetary policy, savings, investment, consumption, and expenditure (Duarte, 2019). A comparative study of two such developing nations, Bangladesh and Pakistan, revealed that debt service payments to exports hurt Pakistan's GDP. In contrast, except for consumer spending, each of those has a positive impact on the GDP of Bangladesh. This signifies the importance of a good debt service payment for initiating an opposite impression for two equivalent economies

(Safaqat, 2017). Another heavily indebted nation Sudan demonstrated the key debt indicators, debt service payment being one, detriments growth if not properly invested in the allocated funds in the form of external debt. Therefore, it was highly suggested to nurture the investment in the profitable and productive sector, enough not to be offset by the devaluation for poverty to be decreased and per capita income growth to be increased (Medani, 2017). Furthermore, poverty reduction, a country in a debt crisis also requires investment to be utilized in the productive sector as much as possible to recoup the huge debt service payment, only then it might accelerate economic growth (Currie, 2015). The notion behind such economic annual growth relates to the higher portion of the debt being stimulated for public investment and reduced payment for servicing the debt.

The case of Sri Lanka which suddenly nurtured an excessive debt policy to accelerate their economic growth, had been studied for the payment of such external debt service through a cointegration analysis. The outputs revealed considering debt service payment as a crucial contribution to consider for taking such excessive debt because in the long run, the servicing of debt negatively impacted GNP (Albert et al., 2013). A similar cruciality of this variable had also been observed in the Nigerian economy where foreign debt without thinking about debt servicing led to the ultimate failure of paying off taken debts which in turn makes the debt service obligation for private financing unaffordable (Ajaye & Oke, 2012). Even the country's ability to service its debt had been found significant for Uganda in terms of both internal as well as external forces (Barbara & Michael, 1997).

2.2.2 External or Foreign Reserve

The second aggregate taken for a better explanation of external debt is foreign reserve which directly links with the budget deficit of a country and hence determines the required amount of external debt needed for the economy to do all the macro-economic adjustments. One such major investigation on the Jordan government budget deficit including the current account deficit suggested that budget deficit has a beneficial impact on debt in the context that, the greater the budget deficit, the lesser foreign reserves could alone back up the funding hence the larger external debt needed to be installed (Majed, 2017).

In Nigeria, the similar co-integration between external debt and foreign reserves produced a sizeable positive influence on GDP when the acute budget deficit is concerned followed by domestic debt with a good debt management strategy (Iya, et al., 2015). The similar implication of foreign reserves relative to the crowding out effect which is a common undeniable phenomenon for the budget deficit in developing countries has also been investigated. The results revealed

that the crowding-out effect resulted from an equal decrease in private investment into the economy for utilizing only foreign debt excessively to mitigate the budget deficit led to negative impacts on the economic growth of developing nations (Shabbir, 2013).

2.2.3 Interest Rate

The third aggregate of external debt, the interest rate is crucial not only as the cost of capital flows in the form of external debt but also determines the accessibility to the international credit system. A too-high interest rate on external debt puts excessive pressure on the domestic debt by lifting the real interest rate in the economy and therefore impairing the overall economic activities in the long run. As a significant representer of external debt, interest rates have also been studied for highly debt countries like South Africa for handling commitments more efficiently and recommendations given to debtor nations steer clear of short-term borrowing while variable interest rates are present (Schoeman, 2018). The role of interest rates as foreign debt indicators and their subsequent link with growth, investment, and exports in the Turkish economy was also highlighted and revealed that real GDP could only be realized if interest rates on domestic debt were utilized enough (Sahinoz, 2015).

Ultimately, though external debt has been a well-illustrated topic in literature for almost all highly indebted nations, for Bangladesh it has been also studied in terms of poverty alleviation, economic growth, FDI, or macro-economic policies. Now that Bangladesh is facing historical public reforms of 2024, the intensity of research for huge corruption and unplanned foreign projects involving external debt is one of the most critically time-binding topics. No recent research as well as study involving all the stated aggregate justifying the overall implications of foreign debt has been done in the context of Bangladesh. In these challenging economic times for Bangladesh, this research will highly contribute to the debt sustainability goals backed by scientifically explorative policy implications.

Based on the literature reviewed, for developing nations, it is convincible that debt service payment, foreign reserve, and interest rates can nurture the real impact of external debt on GDP as the indicator of the economic growth of Bangladesh. Moreover, as for the direction is concerned, it's evident from the literature that where the external debt is unavoidable and persistent, a good debt service payment management shall be inevitably there to add significantly and positively to export-orienting activities and economic development. So, it can be hypothesized to have a positive impact on GDP.

The second hypothesis can be formed with the foreign reserve as directional to creditworthiness of a debt-burdened nation into the international platform. This in turn would ensure the optimal external debt with good negotiation over the cost of debt to further the majority of investment returns for economic growth. Therefore, the perceived hypothesis would suggest the positive impression of external reserves on GDP.

Unlike the previous two aggregates, interest rates as the cost of capital in the international market put higher pressure on the real rate of domestic debt. This not only increases the debt service burden if external debt is utilized but also decreases the private investment and economic activities with a much higher interest rate in the domestic market too. Thus, higher interest rates on external debt ultimately impede domestic borrowers and business owners from making export-orienting activities and GDP lower. Consequently, the impact is negative for this third hypothesis. Accordingly, the following hypotheses can be developed for this study in the context of Bangladesh:

H1_A: Debt Service Payment has a significant positive effect on GDP.

H2_A: External Reserves have a significant positive effect on GDP.

H3_A: Interest Rate has a significant negative effect on GDP.

3. Conceptual Framework

A straightforward open macroeconomic debt growth model (Ajayi and Oke 2012) has been used to assess the relationship between foreign debt and the development of the Bangladeshi economy. The functional and econometric relationship between the dependent variable and the independent variables are seen in the equation below: $GDP = f(EDS, EXTR, INTR)$ (1)

$LGDP = \beta_0 + \beta_1LEDS + \beta_2LTR + \beta_3LINTR + U$ (2)

Where:

Dependent Variable	GDP = Gross Domestic Product
Independent Variable	DSP = Debt Service Payment
Control Variables	INTR = Interest Rate
	EXTR = External Reserves
	B ₀ = Constant
	β ₁ – β ₅ = Regression coefficients
	U = Error term

Incorporating all the variables, the following diagram can be developed for conceptual establishment:

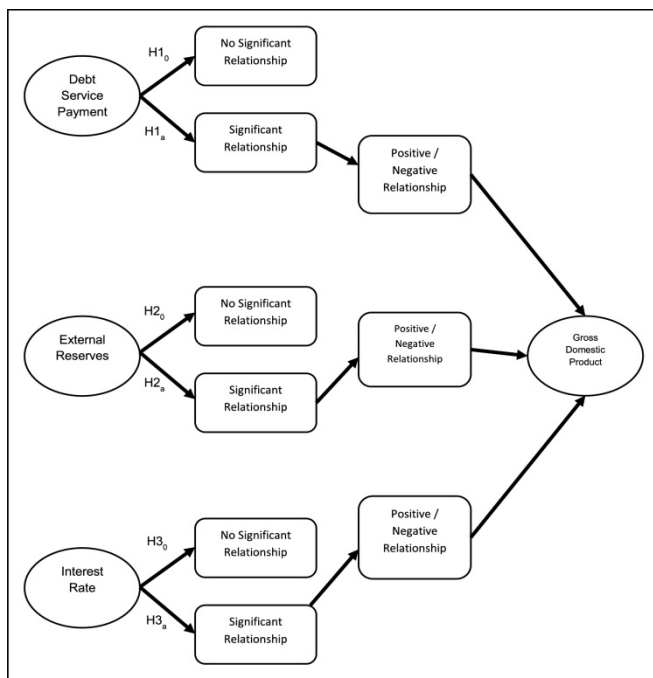


Figure 1: Diagram representing the conceptual framework.

GDP: GDP at purchaser's prices is calculated as the total of all domestic producers' gross value added, plus any applicable product taxes, but any subsidies not reflected in the price of the goods. It is estimated without taking into account the deterioration and depletion of resources or the depreciation of manufactured assets. Data are presented in current US dollars and established as the only dependent variable as the proxy of economic growth and development. Here GDP is the dependent variable representing economic development due to the fact that a major portion of the foreign debt has been used for infrastructural development projects leading to greater economic activity (Davcev & Hourvouliaades, 2014). Moreover, most of the developing nations including Bangladesh focus on sustainable development goals involving capital spending in infrastructural development for which GDP has been put as per priority over other economic indicators to measure the overall economic health of the economy (Adrangi & Kerr, 2022). For the model of the study, the log of GDP is used (Golinelli & Parigi, 2007).

Debt Service Payment: The total of principal repayments, interest on short-term debt, and repayments for external long-term debt that have been made in money, products, or services is known as Debt Service Payment. This debt service in current U.S. dollars is taken only against the external debt excluding the domestic debt for the country. Here, Debt Service Payment or DSP has been used as the first independent aggregate to better explain the independent variable external debt. For the designated model of this study, the log of Easy Debt Service or EDS is used while expecting a negative relationship with GDP (Orjinta & Nwadiolor, 2016). The rationale behind a negative relationship comes from the fact that in almost every highly debt nation or developing one, the external debt is generally occupied to navigate to the highly profitable ventures generating enough monetary return to make the debt service payment even duly adjusting the devaluations of the exchange rate. If this navigation to invest into highly gainful ventures and ensure debt service obligation in no way surpassing the foreign exchange adjustments cannot be achieved, it burdens the economy with industrial strikes as well as worker retrenchment in Nigeria (Ajayi & Oke, 2012).

External Reserves: External reserves refer to the holding of assets in foreign currency by a country's central monetary authority. The central bank used the external reserves to back liabilities and implement monetary policy to alter its budget deficit. Foreign banknotes, deposits, bonds, treasury bills, and other foreign government securities are included as External reserves, and the reasonableness of incorporating foreign reserves as the aggregate of external debt lies in the fact that it directly decides the magnitude of debt to be needed by any country to cover up its budget deficit. As nurturing foreign debt as an endogenous variable, external reserves have a similar positive impact on the GDP of the economy as they complement the debt for the overall economic operations of a fiscal year. This positive relationship of foreign reserves with foreign debt has been observed in highly indebted nations like Nigeria (Ndubuisi, 2017). Also, for developing nations like India, the foreign debt up to a certain level has only been realized as a positive influence on GDP but beyond that point brought a negative effect (Saxena & Shanker, 2018). Hence supplementing that specific level of foreign debt with the custom of foreign reserves is crucial to navigate the positive impact of debt on the GDP of the economy.

Interest Rate: The stated interest rate on a loan or investment that has been adjusted for inflation using the GDP deflator is known as the real interest rate. However, the terms and conditions that come with loan rates are defined by the country and limited according to their comparability. Therefore, the rationality of opting for external debt hugely depends on the interest rate to be endured if domestic debt can be utilized for the same purpose. The comparability of

utilizing domestic debt must be viewed in the light of the ongoing inflation rate by signifying the real amount extra to be paid with the interest rate charged on the foreign debt being outlooked in light of currency devaluation. Naturally, if the adjustments show the interest rate charged on external debt as a more economical option to fund the developmental projects, it still posits the universal picture for the cost of financing through external debt furthering its negative impact on economic growth. The interest rate on external loans is an extra high cost to be borne for economic growth, establishing a negative expected relationship with GDP. Because of the given foreign exchange scenario of highly indebted countries, interest rates had always appeared as an impediment to fully realizing the growth that government spending through external borrowing could be possible in 48 Sub-Saharan Africa by altering a larger portion of profits to currency exchanges and distorting the possible developmental support (Hussain et al., 2015). For the pattern of the model of the study, the log of Interest Rate is used like other aggregates (Dey & Tareque, 2020).

4. Research Methodology

To achieve the purpose of the study, this research is designed as a quantitative causal study that is usually done to investigate the influence of one variable on another, making it congruent with the purpose of this study. Here, the process of gathering information, analyzing it, and interpreting it for informational purposes is significant. It is the solution to the research study because it addresses a wide range of issues relating to the types and sources of data used, especially relevant, to the method of estimation. The relationships of economic theory, which are identified by the parameter with one or another econometric technique are causal, i.e., they are related in which some variables are affected by the transformations in other variables. Therefore, this study adopts the econometric method of analysis to determine the impact of external debt on economic growth and development in Bangladesh.

To do the research, relevant data is collected from the authentic database archive of two reliable sources named the World Bank and Bangladesh Bank- the central bank of Bangladesh for the mentioned variables from 1992 to 2023, i.e., 32 years' data set. To find out the effect of aggregates of external debt on the economic growth of Bangladesh, the study used the "Ordinary Least Square" method (Gohar et al., 2020). Similar research on the variables has been done in the Nigerian economy using OLS to do an empirical analysis of secondary data (Ajayi & Oke, 2012).

STATA 15 has been used to do diagnostic tests like tests for detecting Heteroscedasticity, VIF test to detect multi-collinearity, and Pairwise Correlation

Matrix tests have been utilized beside OLS regression. The econometric analysis incorporates the use of statistical methods based on historical datasets to test the hypotheses and tends to compare the test results to the empirical economic phenomena to better understand the dynamics of the economy being researched (Greene, 2003). This research proceeds to do statistical diagnostic tests followed by hypotheses testing and arbitrating the findings with the practicality and empirical ground.

5. Analysis and Interpretations

5.1 Descriptive Statistics

Table 1: Descriptive Statistics Result

Variable	Observations	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
LGDP	32	25.287	.831	24.156	26.755	0.097	2.23
LDSP	32	20.846	.675	20.063	22.476	0.017	1.97
LINT	32	1.84	.359	1.124	2.62	0.031	-2.85
LEXTR	32	22.574	1.256	20.99	24.556	-0.185	1.89

Descriptive Statistics summarizes and organizes the data and gives a brief overview of the overall dataset by showing the value of the mean, standard deviation, min, and max values of the variables. Through the standard deviation, the researcher can understand how scattered the data is, in relation to the meaning. From Table 1, the variability of the interest rate appears as 0.359 (lowest), external Reserves with a height of 1.25, and GDP and Debt Service Payments as 0.831 and 0.675 respectively all of which fall within the range of low variability. So, it can be concluded that any prediction based on this sample data leads to information about the overall population consistently. Skewness values signify the data asymmetry where the most appropriate range for it is -1 to =1. Table 1 shows that each variable holds the skewness within the range certifying there is no substantial non-normality over the 32-year dataset. Kurtosis measures the tailedness of the observation in comparison to a normal distribution while revealing the happening of outliers in the dataset. In this output, all the kurtosis values for variables lie within the range of -2 to +2 which is considered acceptable for normal distribution univariately. Both skewness and kurtosis signifying the normality of data observation distribution can clearly be described to relate to natural phenomena.

5.2 Pairwise Correlations

Through the Pearson correlation, the strength of the linear relationship between two variables is measured and the acceptable value can be ranged between -1 to +1, with a value of -1 meaning a total negative linear correlation, 0 being no correlation, and +1 meaning a total positive correlation.

Table 2: Correlations test result

Variables	(1)	(2)	(3)	(4)
LGDP	1.000			
LDSP	0.959* (0.000)	1.000		
LINTR	-0.812* (0.000)	-0.718* (0.000)	1.000	
LEXTR	0.958* (0.000)	0.924* (0.000)	-0.773* (0.000)	1.000
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$				

The Pairwise correlations table shows that all the variables are significantly correlated with each other. Specifically, the first aggregate namely debt service payment is strongly positively correlated with the GDP of Bangladesh signifying the natural phenomena of successfully distributing the fund into profitable ventures only where the overall payment return is much higher than the fiscal debt service payment. A similar strong positive relation with GDP exists for the second aggregate, the foreign reserve of Bangladesh too clearly denoting the parallel contribution towards GDP supplementing the amount of external debt as an endogenous variable against the budget deficit. Except for that, only, the interest rate is significantly negatively correlated with other variables which again illustrates the landscape of making external funds too costly limiting the doors of viable investment opportunities leading to lower economic growth. As for foreign reserve is concerned, being an endogenous variable the desperateness of taking external debt depends on the intensity of the budget deficit for a developing nation like Bangladesh, not being fulfilled. Hence in such cases, a higher interest rate rarely matters, imposing high burdens on external debt compared to lower foreign reserve levels leading to an ultimate negative effect on GDP.

5.3 Variance Inflation Factor (VIF)

Table 3: Variance inflation factor (VIF) test result

	VIF	1/VIF
LEXTR	8.557	.117
LDSP	7.107	.141
LINT	2.482	.403
Mean VIF	6.049	

The variance inflation factor (VIF) test is used for measuring the data set to find out if there is any multicollinearity problem because such an underlying issue can undermine the onward statistical significance of predictor variables, for this study it being the three aggregates of external debt. Table 3 displays the collinearity statistics where the general rule that any variable with a tolerance level less than 0.01 has the collinearity effect can be used to support the lack of any multicollinearity issues. However, in this instance, the multicollinearity issue between the independent variables is ignored because the tolerance levels of each variable deviate noticeably from the 0.01 level. On a similar point, putting on the rules of thumb, any VIF value less than 10 testifies there is no collinearity issue among the variables. Hence it can be concluded that the individual effect of debt service payment, foreign reserves, and interest rate can be exerted on GDP making least square analysis (OLS) adequate for this research.

5.4 Breusch-Pagan / Cook-Weisberg Test for Heteroskedasticity

For the study, the Breusch-Pagan test has been conducted to identify heteroskedasticity which is a major pre-condition for OLS regression. Where the variance across the data set is not constant, there arises a heteroskedasticity problem.

Table 4: Heteroskedasticity test result

H0: Constant variance	
Variables: fitted values of LGDP	
chi2(1)	2.09
Prob > chi2	0.1483

Here, H0 means there is constant variance of data, and the data is homoscedastic. Since the P-value is greater than 0.05, the null hypothesis cannot be rejected at a 5% significance level leading to the conclusion that there is constant variance in the data set. Indeed, there is no heteroskedasticity Problem in data. So, the model is homoscedastic.

5.5 OLS Regression

Ordinary Least Squares Regression is used to find out the relationship between dependent and independent variables and also measuring such relationship on the ground of statistical significance. In the particular analysis, there is GDP, which is the dependent variable and there are three independent variables (Atique and Mallik, 2022). Through the Ordinary Least Squares Regression as the best estimator for the same reason, the significant relationship can be defined through a model.

Table 5: ANOVA Test

Mean dependent var	25.277
R-squared	0.969
Adjusted R- squared	0.9651
F-test	267.941
Akaike crit. (AIC)	-23.186
SD dependent var	0.827
Number of obs	30
Prob > F	0.00
Bayesian crit. (BIC)	-17.581
*** p<.01, ** p<.05, * p<.1	

Table 5 shows that the R square for the model is 0.969, signifying that 96.9% of the total variance of the dependent variable can be explained by the predictor variables. The too-high value of R squared can be countered with the adjusted R-squared value, which is also 96.51%, suggesting each input variable to be highly value-adding to the model. Even the F statistics of the model are significant as well interpreting all the independent variables together significantly affects the dependent variable.

Table 6: OLS Regression result

LGDP	Coefficient	Standard Error	t-value	p-value	[95% Conf	Interval]	Sig
LDSP	.666	.112	5.97	0	.436	.895	***
LINT	-.421	.126	-3.34	.003	-.68	-.161	***
LEXTR	.201	.068	2.98	.006	.062	.34	***
Constant	7.636	1.453	5.26	0	4.649	10.623	***

According to Table 6, it can be seen that the t value of debt service payment has a positive relationship with GDP at a 1% significance level meaning that if Debt Service Payment increases by 1%, the GDP increases by 5.97% statistically. This notation goes with the perceived positive causal-effect relationship between GDP and debt service payment for this research. Practically it is due to the excessive expansionary fiscal policy taken by the Bangladesh government and a prudent debt management policy has been implemented always so that the debt funds can be directed to the highly profitable ventures ensuring the service payments don't outweigh the total monetary gain from the investments. Again, the coefficient of external reserves has a positive relationship with GDP which was also perceived in the hypothesis for this research. So, if the external reserves increase by 1%, the GDP increases by 2.98% at a 1% significance level. This is particularly true for Bangladesh for the judicious strategies have been taken by the economists to maintain a competitive exchange rate. In this way, the foreign reserves can not only face the foreign currency shock more positively, but also the endogenously calculated external debt can reap the benefits of developmental returns.

Finally, the only negative relationship with GDP comes with the third aggregate, interest rate from the perspective of Bangladesh in a capacity that if the interest rate increases by 1% the GDP is decreased by 3.34%. at 1% significance degree. Like any other economy, this effect is applied to Bangladesh's economy as higher interest rates from external debt ultimately raise the cost of doing business as well and the foreign currency adjustments might keep the majority of profits from barely qualified invested businesses slowing the GDP as the outcome.

Furthermore, in the interpretations of the coefficients, the p-value signifies the measure of evidence for each variable against the null effect. In Table 6, the classical margin of each variable's significant test appeared stringent to 1% from the threshold value of 5% significance. Even among them, the debt service payment remained the stringent most while foreign reserve had less rigor in the rigorous domain of 1%. It goes with the reasonableness of any developing nation to be mostly sensitive to the debt service payments compared to its sensibility of effect towards foreign reserve when it comes to utilization of external debt.

Expectedly, the relevance of results and outcomes by OLS regression is highly feasible in this study from the causal-effect paradigm of predictors. Still, as the topic belongs to macro-economic studies, the core assumption of exogenous independent variables for OLS regression could be compromised with the endogeneity of dependent variable GDP turning to affect the debt service

payment which has been solved with the inclusion of interest rate as an instrumental variable that directly impacts debt service payment but doesn't posit that direct influence on GDP. Finally, a significant constant value of 7.636 for this macroeconomic model where no predictors are zero barely offers any meaningful insight other than navigating coefficients free of biases.

6. Discussion and Findings

After finding the result of the analysis, the econometric relationship between the dependent variable and the independent variables in the mode; can be interpreted with the equation, i.e.,

$$LGDP = \beta_0 + \beta_1 LDSP + \beta_2 LEXTR + \beta_3 LINTR + U$$

$$LGDP = 7.636 + 0.67 LDSP + 0.20 LEXTR + (-0.42) LINTR + 1.453$$

The F-statistics confirm that all the variables used in the model significantly explain the effect of external debt on the economic growth of Bangladesh by solving the potential endogeneity problem with the inclusion of an instrumental variable, interest rate into the model while external debt has a significant effect on the economic growth and development of Bangladesh with a good outcome if certain policy conditions are to be made. This positive association between external debt and GDP is relatable to the research findings, also established on Bangladesh's economy dangling on foreign debt not only to cover its budget deficit but also to balance the investment gap (Rahman et al.,2012).

Like Bangladesh, other transition countries' relationship between external debt and economic growth has also postured a positive relationship between debt and growth which manifests a positive infrastructure to this sector (Uzun, 2022). So, those countries are in the transition period and the developing stage in that scenario mostly has a significantly positive impact on external debt and economic growth (Yeasmin and Hossain,2015). A contrary result or reverse negative relationship has been found when only the International Monetary Fund (IMF) scrutinized similar factors in highly indebted countries (IMF in IJDEE, 2014). Besides highly indebted countries, low-income countries also found a negative impact on growth and debt (Gohar et al., 2018). Bangladesh, a highly indebted also low-income country, therefore, is at high potential risk of altering the findings of this research depicting the negative relationship between external debt and economic growth or GDP only if few policy implications can be surfaced.

As the output from this study suggests that mitigating the negative aspect of debt service payment is crucial to safeguarding the positivity of external debt on

economic growth, the policyholders should be cautious enough to invest the borrowed funds in the most profitable ventures. Over time, for most of the Asian countries indulged in excessive foreign debt, using such funds to add export promotion has been recommended (Ahmed et al., 2000). This goes with the macroeconomic theory of export injection for low-income nations as an irreplaceable major development strategy.

The next aftermath of aggregate foreign reserve reveals to maintain its positive momentum to induce optimal constructive contribution of external debt to the GDP, accumulation of enough foreign currency reserve shall be ensured. It goes with the macroeconomic theory of foreign currency accumulation in the international market to safeguard the devaluation of home currency. A similar reflection is already obtained from a direct approach analysis of only foreign reserves on economic growth in Bangladesh (Alam et al., 2021).

Finally, the inclusion of the third aggregate, the interest rate as an instrumental variable which does indirectly post a negative impact on the GDP while directly influencing the choice between financing options based on the cost of capital between external debt and domestic debt. This negative influence of interest rate offsets the potential causality effect of GDP on the other two variables: debt service payment and foreign reserves. Solving this endogeneity problem is the real art of econometrics. Nevertheless, capital formation in the domestic market with institutional quality development and higher lending rates can lessen the pressure on debt service payments on taken external debt and help it maintain a certain limit which necessarily continues to have a positive impact on GDP. A similar commendation has been made to the Kenya economy where capital formulation leads to domestic debt available to lower interest rates making external debt to finance fiscal deficit more costly (Kariuki, 2013).

7. Conclusion & Recommendations

For a fiscal deficit economy and a lower loanable fund zone like Bangladesh, external debt plays a vital determinant in Bangladesh's economic growth and development. Some of the studies are found based on previous data and the economic and external debt situation of Bangladesh which demonstrates a rapidly changing factor, since Bangladesh is moving on with her infrastructural development and utilization of capital spending very fast, especially based on external debt. Therefore, it is a relatively concurrent topic to find out the aggregates of external debt that might impact the GDP positively on the economic growth and development of Bangladesh. However, development based on external debt in turn mandates the policy implication in a way that ensures proper debt management and efficiency in the use of that facility in every

aspect. Otherwise, the proper utilization of external debt will be outweighed by the havoc of burdensome loans to the economy.

To capture the optimal level of external debt that benefits economic growth, a solid debt management policy navigating the fund towards export-orienting as well as high-profit generating sectors shall be implemented. Furthermore, it also needs to be recognized that there must be an optimal level to maintain when taking external debt so that the debt servicing would remain within the capacity of the economy of Bangladesh. That shall be a composite approach through export promotion and maintaining a good foreign reserve base. This will help in two ways: to attract further foreign direct investment serving the optimal level authentication of external debt needed to carry on developmental projects and also a good foreign reserve will hold the strong currency valuation so that debt service payments on those external debts will not weigh all of the profits generated by the developmental projects.

Decisively, a high lending rate shall be introduced to form capital in the domestic market which eventually promotes private investment at a lower interest rate compared to the external debt. Such bridging for investment gap for a developing nation like Bangladesh will not only generate economic growth but also reduce debt service payments and higher foreign reserves will keep inflation at a desired level for accelerating the economic growth of Bangladesh. Therefore, undeniably this research being a macro-economic study encompasses a large archetype of economic theories and patterns from which easily many further explorations can be done. This study is therefore limited by the other key issues like debt covenants and foreign direct investments on the economy, as well as external beneficial effects like the upgradation of more employment into the economy also remain unconsidered. Further studies could be done by analyzing the nudging effect of possible policy implications like debt management, debt transparency, and restructurings on the augmented contribution of external debts on economic growth and more developmental projects of an emerging economy like Bangladesh.

References

- Adrang, B., & Kerr, L. (2022). Sustainable development indicators and their relationship to GDP: Evidence from emerging economies. *Sustainability*, 14(2), 658.
- Ahmed, M. M. (2017). External debts, growth and peace in the Sudan: Some serious challenges facing the country in the post-conflict era. *Growth and Peace in the*

Sudan: Some Serious Challenges Facing the Country in the Post-Conflict Era (August 1, 2017).

- Ahmed, Q. M., Butt, M. S., Alam, S., & Kazmi, A. A. (2000). Economic growth, export, and external debt causality: The case of Asian countries [with comments]. *The Pakistan development review*, 591-608.
- Alam, J., Hasan, M. M., & Hoque, M. T. (2021). Impact of foreign reserve in economic growth: An empirical study on Bangladesh. *European Journal of Business and Management*, 13(8), 100-109.
- Ali, R., & Mustafa, U. (2023). External debt accumulation and its impact on economic growth in Pakistan. *The Pakistan Development Review*, 79-95.
- Ademola, I. S., Olaleye, S. O., Olusuyi, A. E., & Edun, F. (2023). Government expenditure on agricultural sector and economic growth in Nigeria (1981–2010). *IOSR Journal of Humanities and Social Science*, 8(4), 62-67.
- Ajayi, L. B., & Oke, M. O. (2012). Effect of external debt on economic growth and development of Nigeria. *International journal of business and social science*, 3(12), 297-304.
- Atique, R., & Malik, K. (2022). Impact of domestic and external debt on the economic growth of Pakistan. *World Applied Sciences Journal*, 20(1), 120-129.
- Currie, C. V. (2015). An Empirical Test of a New Theory of Economic Growth-the Relationship between External Debt and Economic Development. *Available at SSRN 831344*.
- Davcev, L., & Hourvoulides, N. (2014). The structure of GDP as an indicator for economic development: a note on the economy of FYROM. *International Journal of Research in Business Management*, 2(2), 33-42.
- Dey, S. R., & Tareque, M. (2020). External debt and growth: role of stable macroeconomic policies. *Journal of Economics, Finance and Administrative Science*, 25(50), 185-204.
- Duarte, C. B. (2019). Corporate Debt Expansion in Emerging Countries after 2008: Profile, Determinants and Policy Implications. *Finance, Growth and Inequality: Post-Keynesian Perspectives*, 179.
- Dynan, K., & Sheiner, L. (2018). *GDP as a measure of economic well-being* (Vol. 43, No. 1, pp. 1-52). Hutchins Center Working Paper.
- Espinoza, R., & Winant, P. (2014). A model of external debt and international reserves. *Cerdi. org*, 1-29.
- Gohar, M., Bhutto, N. A., & Butt, F. (2020). The impact of external debt servicing on the growth of low-income countries. *Sukkur Institute of Business Administration*.

- Golinelli, R., & Parigi, G. (2007). The use of monthly indicators to forecast quarterly GDP in the short run: an application to the G7 countries. *Journal of Forecasting*, 26(2), 77-94.
- Greene, W. H. (2003). *Econometric analysis*. Pearson Education India.
- Hussain Javed, Z., & Sahinoz, A. (2015). External debt: Some experience from Turkish economy. *Journal of Applied Sciences*, 5(2), 363-367.
- Hussain, M. E., Haque, M., & Igwike, R. S. (2015). Relationship between economic growth and debt: An empirical analysis for Sub-Saharan Africa. *Journal of Economics and Political Economy*, 2(2), 262-275.
- Iya, I. B., & Aminu, U. (2015). An investigation into the impact of domestic investment and foreign direct investment on economic growth in Nigeria. *International Journal of Humanities Social Sciences and Education*, 2(7), 40-50.
- Jalles, J. T. (2011). The impact of democracy and corruption on the debt-growth relationship in developing countries. *Journal of economic development*, 36(4), 41.
- Karagol, E. (2022). The causality analysis of external debt service and GNP: The case of Turkey. *Central Bank Review*, 2(1), 39-64.
- Kariuki, G. K. (2013). *Relationship between domestic debt and interest rate in Kenya* (Doctoral dissertation, University of Nairobi).
- Kasidi, F., & Said, A. M. (2023). Impact of external debt on economic growth: A case study of Tanzania. *Advances in Management and Applied Economics*, 3(4), 59.
- Kasili, D. W. (2020). *Relationship Between External Debt And Economic Growth Of Kenya* (Doctoral dissertation, Kca University).
- Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*, 2004.
- Majeed, M. T., & Ahmad, E. (2017). FDI and exports in developing countries: theory and evidence. *The Pakistan development review*, 735-750.
- MBIRE, B., & ATINGI, M. (1997). THE UGANDAN EXPERIENCE.
- Mohd Daud, S. N., & Podivinsky, J. M. (2011). An accumulation of international reserves and external debt: evidence from developing countries. *Global Economic Review*, 40(3), 229-249.
- Ndubuisi, P. (2017). Analysis of the impact of external debt on economic growth in an emerging economy: Evidence from Nigeria. *African research review*, 11(4), 156-173.
- Orjinta, H. I., & Nwadiakor, E. O. (2016). Effect of debt servicing on economic growth: Evidence from Nigeria. *International Journal of Academia*, 2(1), 2505-0540.

- Poly, N. (2014). Impact of foreign debt on growth in Bangladesh: *An International Journal of Developing and Emerging Economies*.
- Rahman, M. M., Bashar, M. A., & Dey, S. (2012). External Debt and Gross Domestic Product in Bangladesh: A Co-Integration Analysis. *Management Research & Practice*, 4(4).
- Saxena, S. P., & Shanker, I. (2018). External debt and economic growth in India. *Social Science Asia*, 4(1), 15-25.
- Schoeman, J. P. (2018). *The dynamics and economic impact of foreign debt in South Africa*. University of Johannesburg (South Africa).
- Shabbir, S. (2013). *Does external debt affect economic growth: evidence from developing countries* (No. 63). State Bank of Pakistan, Research Department.
- Shafqat, H., Asim, J. B., & Muhammad, J. T. (2017). The factors causing failure of foreign enterprises resource planning (ERP) systems in Pakistan. *African Journal of Business Management*, 6(3), 946-955.
- Udeh, S. N., UGWU, J. I., & Onwuka, I. O. (2016). External debt and economic growth: The Nigeria experience. *European Journal of Accounting Auditing and Finance Research*, 4(2), 33-48.
- Uzun, A., Karakoy, C., Kabadayi, B., & Emsen, O. S. (2022). The impacts of external debt on economic growth in transition economies. *Chinese business review*, 11(5).
- Wijeweera, A., Dollery, B., & Pathberiya, P. (2013). Economic growth and external debt servicing: a cointegration analysis of Sri Lanka. *University of New England working paper series in economics*, 8.
- Yeasmin, F., Chowdhury, M. N. M., & Hossain, M. A. (2015). External public debt and economic growth in Bangladesh: a co-integration analysis. *civilization*, 6(23).

