The Causal Relationship between Macroeconomic Factors and External Debt in Bangladesh: An Econometric Analysis

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Abstract: This paper investigates the causal relationship between macroeconomic factors and external debt in Bangladesh through an econometric analysis. Using annual time series data from 1986 to 2018, the study employs the FOLS model to examine the relationship between external debt and macroeconomic variables like interest rate, exchange rate, LIBOR rate, GDP growth, inflation rate, etc. The study identifies that external debt is influenced by macroeconomic variables significantly. The study's results have practical implications for regulators, assisting them in developing strategies to handle external debt and ensure sustainable economic development. This stresses the value of the research to the audience and keeps them interested in the study's findings.

Keywords: External debt, Economic growth, Fully Modified Least Squares (FMOLS), Bangladesh.

1. BACKGROUND OF THE STUDY

External debt is a financial obligation and a source of finance for investment, infrastructure development, and other projects that foster economic progress. Since its inception, external debt has been a vital element of a country's overall debt profile. Effective debt management is essential to avoid financial distress and stabilize the economy. The potential risks of high levels of external debt relative to GDP, as evidenced by debt crises in various countries, such as the Latin American debt crisis in the 1980s, underscore the importance of this study's findings for stakeholders, making them cautious and aware of the need for prudent debt management.

The intricate and interconnected relationship between external debt, interest rates, exchange rates, LIBOR rates, and GDP growth is fundamental to the global economic landscape. These variables significantly influence nations' macroeconomic stability, growth potential, monetary policies, and financial market dynamics. The complexity of these relationships underscores the urgent need for a comprehensive understanding by policymakers, economists, investors, and businesses. This understanding is crucial for them to navigate the complexities of the modern financial world, underlining the relevance of the research to their professional roles.

Both domestic and international interest rates profoundly influence borrowing costs, investment decisions, inflation rates, and economic growth. Central banks worldwide closely monitor interest rates to manage inflation and stimulate or cool down economic activity. Exchange rates, the relative value of one currency against another, are essential for international trade, investment, and capital flows. Fluctuations in exchange rates can affect a country's trade balance, inflation, and overall economic competitiveness. LIBOR (London Interbank Offered Rate) represents the average interest rate at which central global banks borrow from one another and serves as a benchmark for various financial instruments worldwide. Changes in LIBOR rates influence borrowing costs globally and can have far-reaching effects on financial markets and economies. Furthermore, the GDP growth rate is a crucial indicator of economic health, representing the pace at which a country's economy expands over time. Various factors influence it, including investment, consumption, government spending, exports, and imports.

Due to its financial stability and economic growth implications, external debt has been the subject of extensive research. Reinhart and Rogoff (2010) highlight the relationship between high levels of external debt and economic growth, emphasizing the challenges of debt accumulation. Cecchetti et al. (2011) investigate the real effects of debt, shedding light on how high debt levels can hinder economic performance. Interest rates, an essential monetary policy tool, significantly impact economic activity. Gertler and Kiyotaki (2011) discuss the credit channel of monetary policy transmission, emphasizing the role of financial intermediation in business cycle analysis. Taylor (2013) examines the effectiveness of monetary policy rules in stabilizing the economy, contributing to the ongoing debate on discretionary versus rule-based policy. Exchange rates influence trade balances, capital flows, and inflation dynamics. Lane and Milesi-Ferretti (2012) explore external adjustment and the global crisis, analyzing the role of exchange rate dynamics during economic turmoil. Obstfeld and Rogoff (2013) discuss the dilemma of the trilemma, highlighting challenges in managing exchange rates in a globalized world. LIBOR rates are

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Chart 1: Trends of External-Debt and GDP Growth from 1986 to 2018

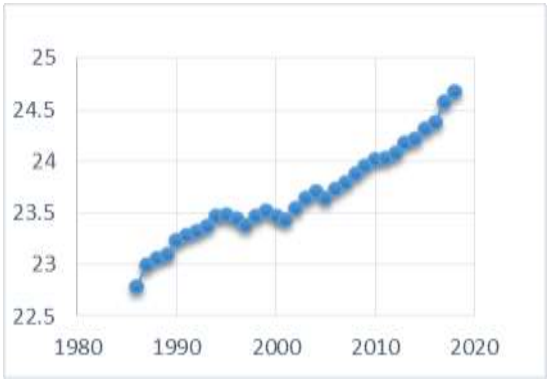


Chart 1(a): *External Debt, WDI, World Bank*

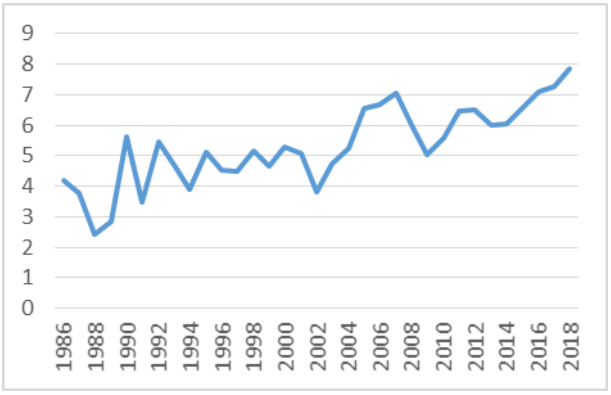


Chart 1(b): *GDP Growth rate, WDI, World Bank*

Source: WDI, World Bank.

benchmarks for various financial instruments, impacting borrowing costs and market liquidity. Duffie (2013) provides insights into credit swap valuation, discussing the significance of LIBOR in financial markets. Borio and Disyatat (2015) examine the implications of low interest rates and secular stagnation, linking LIBOR rates to broader macroeconomic trends. Gross Domestic Product (GDP) growth is a crucial indicator of economic health. Barro and Sala-i-Martin (2010) discuss factors driving economic growth, emphasizing the importance of investment and productivity. Mian and Sufi (2018) explore the credit-driven household demand channel, highlighting the role of finance in business cycle fluctuations. Recent studies have focused on understanding changes in international business cycle dynamics (Stock & Watson, 2015) and the impact of global liquidity on house prices and the macroeconomy (Cesa-Bianchi et al., 2015). Farhi and Werning (2020) discuss fiscal multipliers in liquidity traps, while Korinek and Simsek (2022) examine the implications of excessive leverage in liquidity-constrained environments.

2. OBJECTIVES OF THE STUDY

Rumor starts from the family and is spread by the neighbor. It is a loop. The geopolitical conspiracy severely affects the reputation of the targeted country. Recent financial misappropriation and country-level corruption, like Sri Lanka in the South-Asian region, indulge the country's stability. It is not the first country in the world, nor the least once. There is plenty of evidence that country-level corruption, misappropriation, manipulation, fraud, and forgery break the chain of command and destroy the country's economic system. However, based on economic downturns, it is difficult to infer that the country will behave that way. Similarly, in the case of Bangladesh, it is assumed that Bangladesh will be ruined soon and will walk in the way of insolvency due to the heavy debt burden. Therefore, the study will identify the factors affecting Bangladesh's external debt.

In summary, the study will investigate the probable cause of the external debt burden and remove the confusion arising from the negative promulgation of some evil people in the country.

3. EXTERNAL DEBT IN BANGLADESH

External debt and foreign aid were regarded as important sources of revenue for developing nations. Debt from outside sources affects growth and helps emerging nations make up their deficit. It also has a detrimental impact on growth, with donor agency restrictions serving as the leading cause of that impact (Faioz, 2010). The effect is favorable in many other nations as foreign debt stimulates capital inflow, which is then employed for investments and can boost GDP. Economic progress takes more than just capital accumulation—managing, technological, and technical specialists are also necessary. Many researchers and politicians were more concerned in 1990 about how many developing nations' significant levels of foreign debt were limiting their ability to grow. A non-linear link between growth and foreign debt is another finding made by several academics. The trends of external debt and GDP growth are presented above:

Additionally, due to this kind of study, policymakers have become more aware of the effect that debt has on growth. Developing nations borrowed much during the last war and diversified their economies from agriculture to industry. However, the industrial strategy gave them a poor return while causing a decline in farm prices and reduced tax income. The oil crisis and the price of borrowing are other factors. Developing nations have struggled with foreign debt over the past 50 years.

4. EMPIRICAL EVIDENCE

External debt has been a prevalent issue in Bangladesh, potentially creating fiscal imbalances and vulnerability to shocks and crises (Dey & Tareque, 2020). The affiliation between macroeconomic factors and external debt is crucial, as it can govern the effectiveness of fiscal and monetary policies. Also, the country's capacity to service its borrowing. Bangladesh's external debt situation has been the subject of ongoing analysis, with researchers examining the dynamic relationship between growth and external borrowing.

Recent studies have explored the causal relationship between macroeconomic factors and external debt in Bangladesh. The findings suggest a significant long-term relation-

ship between external debt, foreign direct investment, and the balance of payments. Furthermore, improvements in foreign earnings have been found to enhance Bangladesh's debt servicing capacity, a relationship reinforced by Granger causality tests. (Khan & Ahmed, 2012) These results highlight the critical role of macroeconomic factors, such as foreign earnings and foreign direct investment, in shaping the country's external debt dynamics.

The dynamics between real gross domestic product, foreign earnings, development assistance, and debt servicing in Bangladesh have been examined, with a structural break observed after 1990. The findings suggest that the structural break is significant, and all the macroeconomic variables exhibit trend stationarity. Innovation accounting indicates that an improvement in foreign earnings enhances Bangladesh's debt servicing capacity, a result further reinforced by Granger causality tests.

These studies underscore the significant long-term relationship between external debt, foreign direct investment, and the balance of payments in Bangladesh (Mostafa, 2020). Additionally, they highlight the crucial role of macroeconomic factors, such as foreign earnings and foreign direct investment, in determining the country's debt servicing capacity and the effectiveness of fiscal and monetary policies. (Khan & Ahmed, 2012)(Mostafa, 2020)(Bhattacharya & Ashraf, 2018) (Mostafa, 2020) (Khan & Ahmed, 2012) (Bhattacharya & Ashraf, 2018) (Dey & Tareque, 2020) (Khan & Ahmed, 2012) (Mostafa, 2020)

The findings suggest that Bangladesh's external debt dynamics are intricately linked to its macroeconomic performance. While Bangladesh has been able to service its increasing public debt as long as its economic growth rate remains higher than the real interest rate payable on debt, the country has also been allocating an increasing share of its revenue to external debt repayment, creating a trade-off with investment in growth-oriented sectors (Bhattacharya & Ashraf, 2018). (Dey & Tareque, 2020)

4.1. External Debt and Interest Rate

Muzna Gohar, Niaz Ahmed Bhutto, and Falahuddin Butt (2010), in their studies, demonstrated how the growth and development of low-income nations are influenced by paying down their foreign debt. They used yearly panel data covering 36 low-income countries from 1990 to 2008. Six factors were included in their least squares multiple regression analysis: growth, net exports, interest rate, savings, external debt servicing, and foreign direct investment. According to their study, repaying external debt impacts investment, which is another important component that is directly accountable for development rather than directly influencing growth. They found that repaying external debt has a detrimental effect on growth.

The link between Nigeria's external debt and sustainable development from 1980 to 2010 was examined by Ademola and Olaleye (2013). They concluded that Nigeria's failure to satisfy its debt servicing commitments presents a serious obstacle that prevents foreign resources from flowing into the nation. The state of foreign debt is further made worse by outside variables, including changes in the price of crude oil globally, an increase in real interest rates, and a decline in terms of trade. They suggested that the government should take aggressive measures to guarantee appropriate debt use and handle debt-related difficulties.

According to Ayadi (2008), outside funding is required for development when domestic savings are insufficient. His study holds for both economies, citing the crowding out and debt overhang hypotheses. He concludes that South Africa manages its foreign debt commitments more effectively than Nigeria and attributes this to its superior debt management. Additionally, Ayadi advises debtor nations to avoid short-term loans while variable interest rates are available. From the discussion above, we can hypothesize that:

Hypothesis 1: *Ceteris paribus, interest rate significantly impacts external debt in Bangladesh*.

4.2. External Debt and Exchange Rate

Research by M.C. Ekperiware and S.I. Oladeji (2011) examined the structural break link between Nigeria's economic development and external debt between 1980 and 2009. The Nigerian government's 2005 debt relief initiatives significantly reduced the country's foreign debt and debt servicing, which positively impacted the country's exchange rate, educational output, and overall economic growth. In effect, this respite released resources for economic growth. The Chow test identified a structural change that occurred during the debt relief era, but it could not locate the specific causes of this change. Nevertheless, relief from debt was proposed as a way to promote more steady growth.

Boboye and Ojo (1994) used OLS to empirically analyze secondary data in different research studies. Nigeria's incapacity to make debt service payments led to the World Bank designating it as an indebted low-income nation in 1992. The decline in commodities and oil prices, among other external variables, put pressure on foreign debt. Payments for debt servicing have gotten out of hand for private lending by 1983. Nigeria's external debt was heavily burdened by the accumulation of internal and external forces, which caused the national currency to devalue. To lessen the negative economic consequences, Boboye and Ojo recommended that steps be made to ensure that debt service payments do not exceed foreign exchange revenues.

Hypothesis 2: *Ceteris paribus, the exchange rate has no significant impact on external debt in Bangladesh*.

4.3. External Debt and LIBOR Rate:

The impact of fluctuations in LIBOR on the cost of repaying external debt has been the subject of much research. Much research indicates that rising LIBOR rates directly affect debt payment expenses, which can worsen financial hardship in nations with large levels of national debt. Studies by Van den Heuvel (2002, 2007), for example, show how banks' exposure to interest rate risk through LIBOR-linked instruments can increase lending costs' sensitivity to fluctuations in interest rates (PwC) (SP Global). Developing nations are more susceptible to changes in LIBOR because they rely on outside funding. According to research published in the Review of Finance, rising LIBOR rates can raise debt loads

and jeopardize the economy's stability. According to the theory of "original sin," which is covered in the work of Eichengreen and Hausmann (2005), nations that are unable to borrow in their currency run a greater risk when global interest rates increase (SP Global). There has been a focus on alternative reference rates like SOFR (Secured Overnight Financing Rate) due to the decreasing popularity of the LIBOR rate. Significant changes to financial contracts and processes are necessary for this shift. Scholars have observed that although SOFR offers a more stable benchmark free from the manipulation problems beset by LIBOR, lenders and borrowers used to the LIBOR structure may have difficulties without a credit risk component in SOFR (SP Global) (PwC). Historical investigations that shed light on the cyclical nature of foreign debt crises and how they relate to interest rates worldwide include those done by Reinhart and Rogoff (2010). Their research emphasizes how, historically, periods of rising global interest rates—reflected in rising LIBOR—have substantially increased borrowing costs, leading to debt problems in struggling economies (SP Global).

Hypothesis 3: *Ceteris paribus, there is a relationship between LIBOR rate and external debt in Bangladesh*.

4.4. External Debt and GDP Growth Rate

Rahman and Bashar (2012) concluded that Bangladesh's budget deficit and the shortfall in savings investment are financed by foreign debt. Their analysis used data from 1972 to 2010 to examine the relationship between GDP and external debt. Their findings showed a statistically significant strong positive correlation between GDP and debt.

Using panel data from 93 developing nations, Catherine Pattillo et al. (2011) conducted thorough research to examine the nonlinear effects of foreign debt on growth. Their research revealed a link between debt and growth that resembles a hump, especially when GDP is taken into account. Their goal was to provide policymakers with analytical insights by highlighting the stylized way in which debt affects growth. Their findings demonstrated that the debt-to-exports variable did not provide as strong evidence of this hump-shaped association as the debt-to-GDP indicator. Uzun, Karakoy, and Buran (2011) used a panel autoregressive distributed lag model to investigate the link between debt and growth in transition nations. Their research concentrated on 1991–2009 when transitional nations began moving to market-based economies and needed outside assistance. They found that GDP and foreign debt to GNI had a positive long-term relationship, suggesting that these transitioning nations were still on the positive slope of the debt-Laffer curve. In addition to examining the long-term link between debt and growth in Tanzania from 1990 to 2010, Kasidi and Makame (2013) also sought to investigate the relationship between external debt, debt payment, and economic development. They found no long-term correlation between debt and growth, even though debt had a beneficial influence on growth regarding debt payment. They advised that any future debt purchases have a rate of return greater than the rate of service payments and be extremely sustainable. They also underlined how crucial it is that governments pay attention to debt management programs.

Aminu, Ahmadu, and Salihu (2012) investigated the link between economic external debt, growth, and domestic debt in Nigeria from 1970 to 2011 using the Ordinary Least Squares (OLS) approach. Contrary to theoretical assumptions, they found that the negative coefficient of foreign debt was negligible. On the other hand, a statistically significant positive correlation between domestic debt and GDP was consistent. The researchers made a convincing case for how well-managed domestic debt may support economic expansion. They said that to support economic development, the government should encourage domestic savings and investments.

Using deficits in the government budget and current account, Dr. Majed (2005) investigates the impact of the twin deficit on external debt from 1977 to 2004. According to his findings, there is a statistically significant positive correlation between budget deficits and debt. There is a negative correlation between debt and the Current Account Index. He suggests that the Jordanian economy use efficient debt control methods, such as cutting back on wasteful government expenditure, promoting private savings, and borrowing from domestic sources, to lower its high foreign debt-to-GDP ratio.

Bangladesh's and Pakistan's economies were compared by Safaqat (2007). They used data covering 34 years to look at 13 variables that affect GDP. According to their regression study, Bangladesh appears to be in a better situation than Pakistan. Only the total debt stock and debt service exports hurt GDP in Pakistan; gross national expenditure (GNE), exports, savings, and consumer expenditure all have a positive influence. In Bangladesh, the GDP is negatively impacted by consumer spending but positively by GNE, debt stock, total imports, and exports.

Comparing the effects of domestic and external debt on economic development in Pakistan, Rabia Atique and Kamran Mallik (2012) looked at the years 1980–2010 in different analyses. They performed unit root tests, serial correlation tests, heteroscedasticity tests, and the CUSUM test, in addition to using the Ordinary Least Squares (OLS) technique to examine co-integration. Their results showed that the former dampens economic growth when comparing foreign and domestic debt. The difficulty of repaying foreign debt is the reason for this discrepancy.

Ali and Mustafa (2013) used time series data to examine external debt's short- and long-term effects on economic growth. According to their research, debt has a significant detrimental effect on long-term and short-term growth. They concluded that Pakistan's impact from foreign debt is long-term and short-term, with an overhang. They also pointed out that the short-term detrimental impact is more noticeable than the long-term one.

According to Faioz (2012), developing nations frequently can't afford to pay for all of their development expenses; thus, they have to borrow from other sources. However, this reliance on foreign debt has a lot of implications for several parts of the economy, including investment, savings, expenditure, and monetary policy. As a result, many nations, especially the least developed countries (LDCs), confront formidable obstacles. Despite this, LDCs are working harder

than ever to solve these problems and lessen their reliance on foreign borrowing. The scholar makes the case that industrialized nations should aid emerging ones in expanding their economies.

Using time series data from 24 developing nations covering 1976–2003, Safia Shabbir (2011) investigated the connection between external debt and economic development (2005). The study clarified that the buildup of foreign debt might have a crowding-out effect that is detrimental to growth. Unsustainable debt levels in emerging nations can hurt private investment and development and can have the effect of crowding out. Shabbir stressed how crucial it is to use foreign debt wisely to spur fresh investment, which may draw outside investors and aid in the growth of developing nations.

Rehana and Malik (2010) draw attention to the detrimental effects of rising foreign debt on economic development rates that have been seen in most emerging nations since the 1980s. They particularly look at the impact of mounting debt on South Asian nation's economic development. The results of their regression study indicate that there is a non-linear link between growth and several debt load measures. They stress the importance of improving economic management to reduce debt and promote development. In an article that appeared in the Journal of Economics and Sustainable Development, Uganda—a low-income, indebted nation in Sub-Saharan Africa—is the subject of a study by Barbara and Michael (1997). Their research looks at the origins of Uganda's debt and the internal and external variables that affect debt accumulation and its ability to be serviced. They get to the conclusion that to attain high growth rates, Uganda should emphasize raising domestic savings and investing in profitable areas by using the Cum Debt Model and Cohen Model.

To test a novel hypothesis of economic growth about the connection between foreign debt and economic development, Currie (2005) carried out an empirical analysis. He concluded that many nations experience a debt crisis due to the underutilization of foreign loans in productive sectors. According to Currie, examining debt levels to evaluate successes and failures may help create policies encouraging quicker economic expansion.

In 2007, Aktham, Omet, and Fadwa looked into the impact of the debt-to-growth threshold. Their research showed that a number of debt indicators influence growth by raising debt levels. They discovered a statistically significant positive association between growth and foreign debt when debt levels are below a particular threshold. However, debt's effects turn negative as debt levels exceed this cutoff. They contend that raising exports can improve a country's ability to pay back debt.

According to Safia (2012), debt and economic development in emerging nations are correlated over the long term. Safia suggested that a rise in foreign debt lowers the amount of private fixed capital creation and slows economic development using data from 70 developing nations collected between 1976 and 2011. Her study's regression results explored the debt overhang theory and revealed a long-term negative link between foreign debt and growth.

With a focus on Sri Lanka, Albert, Brian, and Palitha (2003) conducted a co-integration study between economic development and external debt repayment from 1952 to 2002. Their research revealed that, in the short term, servicing foreign debt had a detrimental impact on GNP. They could not identify any evidence to support the idea of debt overhang or a short-term link between debt service and GNP. They concluded that Sri Lanka's moderate amount of foreign debt had prevented it from experiencing significant growth barriers over the previous 50 years.

According to Medani (2007), Sudan is a heavily indebted nation that struggles to achieve debt sustainability due to domestic and global political and economic circumstances. He contends that several debt metrics highlight Sudan's challenges in reaching debt sustainability. Both overhang and crowding-out effects are present in Sudan, as evidenced by the detrimental impacts of foreign debt and debt services on development. According to Medani, Sudan might see a decrease in poverty and a rise in per capita income growth rates if resources were allocated more wisely and invested in productive industries.

Hypothesis 4: *Ceteris paribus, GDP significantly affects external debt in Bangladesh.*

4.5. External Debt and Inflation Rate

Recent papers have suggested theoretical frameworks to clarify the connection between inflation rate and external debt. Fischer (1993), for example, talks about the phenomenon known as "debt intolerance," which happens when governments use monetary financing to pay down their debts, which might result in inflationary pressures. Furthermore, Aizenman and Marion (2009) highlight how currency mismatches, particularly in emerging market economies, exacerbate the inflationary risks that come with foreign debt. Recent publications presenting empirical investigations provide light on the empirical connection between inflation rate and external debt. For instance, Cecchetti et al. (2011) study looks at how external debt affects inflation dynamics in a sample of developed and developing nations and finds evidence of a positive correlation between debt levels and inflation outcomes. Ghosh et al. (2012) examined the mechanisms by which foreign debt influences inflation, focusing on the significance of exchange rate pass-through and the credibility of monetary policy. New publications also have significant policy implications for controlling the inflation-external debt link. For example, Eichengreen and Hausmann (1999) contend that authorities should prioritize debt sustainability and exchange rate stability to reduce the inflationary risks associated with the growth of foreign debt. Furthermore, Reinhart and Rogoff's (2011) research emphasizes the significance of putting sensible debt management procedures and fiscal reforms into place to protect macroeconomic stability and the credibility of inflation.

Hypothesis 5: *Ceteris paribus, inflation significantly impacts external debt in Bangladesh.*

5. RESEARCH METHODOLOGY

The study uses annual time series data obtained from the World Bank. The World Bank provides the annual time se-

Table 1. Descriptive Statistics.

-	N	Minimum	Maximum	Mean	Std. Deviation
EXDEBT	33	23	25	23.67	.460
IR	33	-4	15	6.73	3.366
ER	33	30	83	56.43	17.719
LIBOR	33	1	9	4.08	2.646
GDPGR	33	2	8	5.31	1.304
INFLATION	33	2	11	6.36	2.295

Source: Author's Construction.

Table 2. Pearson Correlation Matrix.

Variables	1	2	3	4	5	6
EXDEBT	1	-.380*	.942**	-.780**	.814**	.059
IR	-	1	-.390*	.230	-.347*	-.218
ER	-	-	1	-.863**	.826**	.100
LIBOR	-	-	-	1	-.618**	.020
GDPGR	-	-	-	-	1	.133
INFLATION	-	-	-	-	-	1

"***"," **", and "*" indicates significant at 1%, 5%, and 10% level.

ries data used in the study. The research spans the years 1986 to 2018. The study variables include GDP, interest rate, exchange rate, inflation, and foreign debt as independent and dependent variables.

This study uses Fully Modified Least Squares (FMOLS) and Ordinary Least Square (OLS) regression to examine external debt determination. Macroeconomic indicators such as the LIBOR, interest rate (INR), exchange rate (EXC), and inflation rate (INF) are the dependent variables.

6. ANALYSIS AND FINDINGS

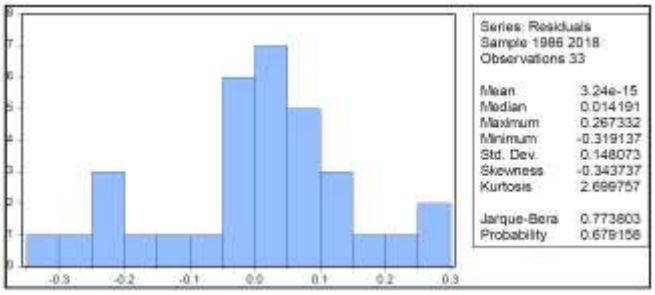
The time series data's descriptive statistics are displayed in Table 3.1.

Table **1** indicates that during the study period, both the external debt and the exchange rate displayed high variability. Bangladesh's external debt varies from a minimum of 23 to a maximum of 25. The interest rate ranges from a minimum of -4 to a maximum of 15. Table 1 also shows that inflation and GDP exhibit moderate variability during the study period.

Chart 1 above shows that the dataset is normally distributed (Jarque-Bera 0.773803 with probability 0.6792) throughout the year.

The analysis of the Pearson correlation matrix presented in Table **2** offers valuable insights into the relationships between various macroeconomic variables and external debt. The matrix reveals a strong positive correlation between external debt (EXDEBT) and the exchange rate (ER), with a coefficient of 0.942, significant at the 1% level. This suggests that the exchange rate appreciates as external debt increases, potentially indicating a dependence on foreign borrowing to maintain currency stability. (Jelilov, 2016) (Azolibe, 2020) (Dey & Tareque, 2020) (Jelilov, 2016).

Chart 2: Normality Test of Regression Residuals.



A negative correlation exists between external debt and interest rates, which is statistically significant at the 5% level. This negative relationship may imply that higher external debt levels are associated with lower interest rates, possibly due to the impact of external debt on the overall macroeconomic environment. Again, the matrix highlights a significant negative correlation between external debt and the LIBOR rate at the 1% significance level. This suggests that the LIBOR rate decreases as external debt increases, possibly reflecting the complex interplay between global financial conditions and a country's external debt profile.

Regarding the relationship between external debt and economic growth, the data indicates a positive and significant correlation, with a coefficient of 0.814 and statistical

significance. This aligns with previous studies that have found a positive association between external debt and GDP growth, particularly in developing economies (Onyekwelu et al., 2014) (Jelilov, 2016).

It is important to remember that high foreign debt can impede economic development and result in debt servicing difficulties. Therefore, the sustainability of this connection and its long-term ramifications may be more complex (Dey & Tareque, 2020). The presented Pearson correlation matrix analysis suggests a complicated web of linkages between foreign debt, interest rates, exchange rates, and other macroeconomic factors.

The Breusch-Godfrey Serial Correlation LM Test in **Table 3** is a widely used statistical tool for identifying serial correlation in regression models (Sharma & Ali, 1992). The results of the LM test show no serial correlation in the data. The high p-values for the F-statistic and the Obs*R-squared test statistic (Khan et al., 2020)(Nyamato et al., 2020) confirm the issue.

Table 3. Breusch-Godfrey Serial Correlation LM Test.

F-statistic	**0.710**	**Prob. F (2,22)**	**0.502**
Obs*R-squared	1.881	Prob. Chi-Square (2)	0.391

Source: Authors' Construction.

The current research finds the key aspects that influence a country's external debt. The Least Squares analysis (Table **4**) considers 33 observations from 1986 to 2018. The results indicate that the GDP growth rate positively impacts external debt, with a coefficient of 1.667 (Azolibe, 2020), which is significant at the 1% level. This finding is consistent with the literature, which suggests that rapid economic growth often necessitates greater external financing to support development and infrastructure projects (Azolibe, 2020)(Onyekwelu et al., 2014). In contrast, the exchange rate exhibits a significant adverse effect, with a coefficient of -0.020, which is also significant at the 1% level. This indicates that a depreciation of the domestic currency can cause a reduction in external borrowing by making it more costly to service foreign-denominated loans.

Table 4. Least Squares Method Dependent Variable: EXDEBT Sample: 1986 – 2018 Included observations: 33

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
IR	0.008	0.005	1.807	0.082
ER	-0.020	0.005	-3.784	0.001
LIBOR	0.009	0.011	0.827	0.415
GDPGR	1.667	0.173	9.650	0.000
INFLATION	-0.001	0.006	-0.205	0.839
CONSTANT	-23.700	4.745	-4.995	0.000
R-squared	0.976	Mean dependent var		23.671
Adjusted R-squared	0.972	S.D. dependent var		0.460
S.E. of regression	0.077	Akaike info criterion		-2.121
Sum squared resid	0.161	Schwarz criterion		-1.849
Log likelihood	41.000	Hannan-Quinn criter.		-2.030
F-statistic	221.378	Durbin-Watson stat		0.997
Prob(F-statistic)	0.000	-	-	-

Source: Author's Construction.

The interest rate variable has a positive but statistically insignificant coefficient. This indicates that its influence on external debt is less pronounced than the other macroeconomic factors. The LIBOR and inflation rates also show insignificant relationships with external debt. This further highlights the complexity of the external debt dynamics. The R-squared value is 0.976, and the corresponding Adjusted R-squared is 0. 972. These values suggest that the model has a strong explanatory power, accounting for a significant portion of the variation in the dependent variable. The findings in the literature further corroborate the results. This emphasizes the role of macroeconomic factors, such as GDP growth and exchange rates, in shaping a country's external debt profile.

6.1. Robustness Check

The study further checks the robustness of the model presented in Table **5**. It is found that the result of the FMOLS is consistent with Table **4**. The model gives a similar output and is robust.

Table 5. Fully Modified Least Squares (FMOLS) Dependent Variable: EXDEBT, Sample: 1986 2018 Included observations: 33

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
IR	0.004	0.011	0.303	0.764
ER	-0.026	0.006	-4.098	0.000
LIBOR	0.053	0.0292	1.812	0.082
GDPGR	0.107	0.051	2.106	0.045
INFLATION	-0.0461	0.0160	-2.884	0.008
CONSTANT	21.724	0.390	55.68557	0.000
R-squared	0.8252	Mean dependent var		23.6989
Adjusted R-squared	0.7916	S.D. dependent var		0.4386
S.E. of regression	0.2002	Sum squared resid		1.0425
Durbin-Watson stat	1.1948	Long-run variance		0.0385

Source: Authors' Construction.

7. CONCLUSIONS

For a stable economy and sustainable development, debt management is crucial. This study tries to find out the relationship between external debt and the macroeconomic variables. Among the macroeconomic variables, interest rate and GDP growth rate are positively related to external debt with statistical significance. Requirements for external borrowings increase with higher interest rates and economic devel-

opment. LIBOR rate, though positively related, lacks statistical significance.

On the other hand, inflation and exchange rates are negatively related to external debt. The exchange rate is statistically significantly connected to External debt, and inflation has no statistical significance. Currency depreciation leads to reduced external borrowing because of the increased cost of servicing foreign-denominated debt. The findings are consistent with earlier findings (Azolibe, 2020)(Fall et al., 2015)(Saengchai et al., 2019)(Omotor et al., 2020). The outcomes of this research highlight the factors that influence external debt, which is a prerequisite for developing emerging countries like Bangladesh. Results from this study may help Policymakers deal with external debt prudently so that the consequences expected from external borrowings are always positive and the negatives can quickly be taken care of.

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