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Macroeconomic Determinants of Public Debt in Bangladesh: An Autoregressive Distributed Lag (ARDL) Approach

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Abstract: *The majority of developing nations worldwide have relied on borrowing to fund their operations and development. Studying the primary macroeconomic drivers of public debt is essential to escaping the debt burden. Using ARDL model, this paper investigates the macroeconomic factors of Bangladesh's public debt ranging the year 1975 to 2022. The macroeconomic factors that influence public debt are co-integrated, as per the estimated results of the ARDL bound test. In the short run, government spending, import and FDI significantly reduce public debt, where GDP growth insignificantly reduces public debt. In the long run, import and inflation rate significantly reduce public debt while export significantly increases public debt. Also, GDP growth insignificantly increases public debt. The study recommends that Bangladesh should always pursue responsible monetary and fiscal policies because they foster an atmosphere that is conducive to economic expansion. Establishing such a setting is a crucial precondition to using public debt effectively.*

Keywords: *Government spending, GDP growth, export, import, FDI, inflation rate and public debt.*

Introduction

Public debt describes the borrowings made by the nation's public authority to finance their operations when their own resources are insufficient to meet the demands of these operational expenses. Sovereign debt, national debt, and government debt are other terms for public debt. Public debt drives to economic development in many nations but has received little attention from empirical study (Owusu-Nantwi & Erickson, 2016). Investments in infrastructure, health, social welfare, education, and other economic areas are necessary for economic development. Due to the enormous costs associated with these projects, governments find it difficult to finance them through tax revenue, which usually results in budget deficits (Owusu-Nantwi & Erickson, 2016). Developing countries view debt as the greatest option for budgetary funding because of their lax tax laws and low incomes. Public debt makes it possible for fiscal authorities to manage the economy's business cycle, promoting growth as well as managing crises that arise in a variety of ways, like the downturn of 2007–2009, the Corona pandemic, the energy crisis and other events that caused a significant rise in national debts of many nations (Taskovski, 2023). Without public debt, economic

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development would be interrupted since public debt helps smoothing the tax burden over time.

Like the economies of most other nations in the world, Bangladesh's economy has also grown significantly during the past decades. Due to its limited natural resources and quickly growing population, Bangladesh has historically relied on credits and grants to achieve desired goals, making budget deficit a common phenomenon. Usually, ways to finance budget deficits are money printing, domestic and foreign borrowing, and depletion of foreign exchange reserves. Economists and experts claim that Bangladesh is utilizing each of the aforementioned four options (Akhter & Hassan, 2012). The following table represents the budget deficit over 6 fiscal years starting from 2017-18.

Table 1: Budget Deficit (As % of GDP)

FY	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23*
Budget Deficits (Excluding Grants)	4.0	4.7	4.7	4.0	4.6	5.1

Source: Economic Review, 2023(data based on *iBAS* ++, Finance Division, * Target)

Since the start of the pandemic, Bangladesh's economic trajectory has been turbulent. This pattern persisted in FY2024. Long-term expansion was facilitated by economic resilience, but at the moment the economy is facing challenges from high inflation, depleting foreign exchange reserves, unstable exchange rates, inadequate revenue collection, and low investment (Khatun, 2024). In addition, government's expenditure on both development and non-development projects rises annually as well. However, due to inadequate income collection (as Bangladesh's tax-to-GDP ratio remains below 10%), the government must borrow money to cover the increased costs (Shah, 2024).

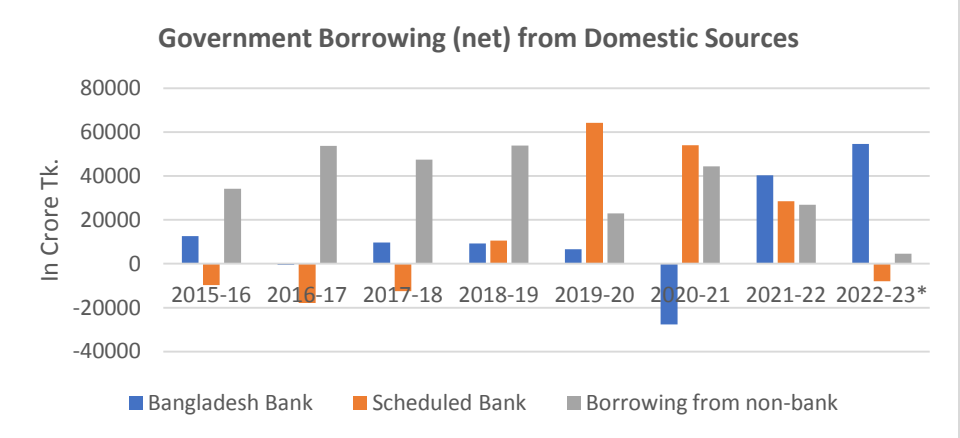

Figure 1

Source: BER, 2023

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A total of Tk. 95,583.2 crore, equivalent to 2.4 percent of GDP, was borrowed by the government domestically in FY 2021–2022. The government borrowed Tk. 26,931 crore from sources other than banks during this time, whereas it borrowed Tk. 68,652.3 crore from the banking system. As of February 2023, the total net amount of government domestic borrowing in FY 2022–2023 was Tk. 51,176.6 crore (BER, 2023). Debt-GDP ratio of Bangladesh has been rising for the couple of years. The state of Bangladesh's external debt is alarming, as indicated by a number of other relevant indicators. For example, the proportion of exports to external debt increased from 56.3% to 116.6% from FY2016 to FY2023 (Khatun, 2024).

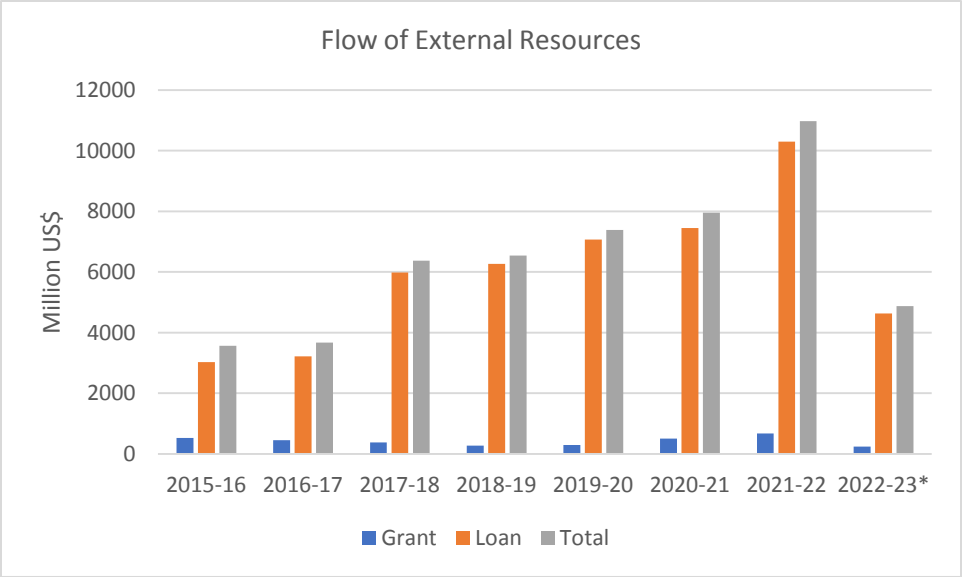

Figure 2

Source: BER, 2023

A total of US$ 10,969.29 million in external assistance was provided in FY 2021–2022, a 37.9% increase over the previous year. The amount of net foreign aid received in FY 2021–2022 was $8,155.28 million. In the fiscal year 2022–2023, as of February 2023, the total amount of external aid received was US$ 4,876.52 million, while the net amount of external help that flowed in was US$ 3,452.42 million. However, the entire amount spent on debt servicing up until February 2023 was $1,424.10 million, of which $1,021.14 million was used for principle and $402.96 million for interest (BER, 2023).

These trends indicate that Bangladesh, like most other countries, is always seeing an upturn in the amount of public debt accumulated. Long-term progress can be achieved through debt accumulation used for profitable investments. Understanding the primary macroeconomic drivers of public debt is essential for reducing a country’s debt burden. Few studies, nevertheless, have focused on the macroeconomic implications of state debt in Bangladesh. In order to improve

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macroeconomic stability and support growth, it is necessary to do an empirical examination of Bangladesh's public debt with a view to making a sound policy decision. Using ARDL method, the analysis intends to ascertain the influence of various macroeconomic variables on government debt in short and long terms.

Literature Review

This section examines which aspects, i.e., primary factors, influence its level of public debt of a nation's economy. Applying dynamic panel data model and covering the period of 1996-2019, Carrasco & Tovar-García (2024) illustrated that the main driving force of public debt were inflation, GDP growth, and nominal exchange rate. Using panel regression, Toth et al. (2022) indicated that rising in budget size, current account BOP, inflation rate, public administration investments and GDP growth lowers public debt, while an increase in annal population density change and budget expenditure raises public debt in EU countries from the period 1999 to 2019. Porumboiu & Brezeanu (2022) concluded that social assistance strongly affects the public debt. Afrin et al. (2020) referred to the fact that current account balance and actual interest rate are key factors for rising public debt in Bangladesh. Thuan (2018) highlighted that trade openness and interest rate had a positive significant effect where inflation, budget surplus, economic growth, infrastructure, FDI and financial development had a negative association with public debt of 40 lower-middle-income countries. Using the VECM model, Omrane Belguith & Omrane (2017) clarified an econometric analysis of the macroeconomic factors influencing Tunisia's governmental debt from 1986 to 2015. The entire sample analysis's findings showed that investment and inflation lower the value of public debt. Side by side, public debt is increased by real interest rates, trade openness, and budget deficits. Gargouri & Ksantini (2016) demonstrated that, military expenditures, imports and bank nonperforming loans had a positive significant effect, while bank liquid reserves and GDP growth had negative significant effect on Debt-GDP ratio of twelve European countries. Kalaja & Vokshi (2015) investigated the correlations among diverse factors, including governance, social and economic variables, and the size of Albania's public debt and identified that the primary contributors to this debt are demographics factors.

Incorporating five independent variables and using regression analysis Taskovski (2023) recognized that government debt is largely dependent on budget deficit and there were positive association between budget deficit and the government’s debt of Macedonian. Ngasamiaku & Ngong’ho (2022) mentioned that in short run, export, import and government spending had a positive significant association with public debt in Tanzania whilst inflation played a negative role in this context. However, in long run, inflation had only a significant and positive association; remaining were not statistically significant. Dirir (2022) came to the conclusion that Djiboutian debt rises in direct proportion to GDP growth and government spending. On the other hand, as inflation increases, the proportion of debt decreases. Using multiple regression, Manalo et al. (2022) declared an uplift

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in FDI significantly lowers the public debt of Philippines, but trade balance and inflation insignificantly decrease public debt. Aizenman & Marion (2011) identified that the US debt burden could cause inflation increase roughly 5% for a number of years when economic growth is stopped, which could greatly lower the debt ratio. Baskaran (2010) stated that decentralization of spending significantly lowers public debt, but decentralization of taxes and vertical fiscal imbalances had little effect and were insignificant. Bader & Magableh (2009) from Jordan referred to the influence of savings gap, budget deficit and real exchange rate on public debt as significant. Among them, the influence of actual exchange rate was most powerful.

The impact of different factors on a nation's external debt has been well studied in the literature. Using the ARDL approach, many researchers at different times revealed their findings. Okwoche & Nikolaidou (2024) pointed out that military spending, arms imports, and conflict had a significant and positive impact on external debt of Nigeria while they had no meaningful influence on domestic debt. Lubis (2020) referred to the fact that only the interest rate had negative significant impact while others had positive impact, in which inflation was sole significant in short run. Nevertheless, GDP, exchange rate and interest rate had negative effect in long run, where interest rate was found insignificant and the others were significant. Moreover, budget deficit and inflation had a significant and positive role on foreign debt of Indonesia during the period 1998 to 2017. Mulugeta (2020) confirmed that in long term GDP growth has a significant and positive role on external debt of Ethiopia. Also, budget deficit and political instability had positive significant influence both in short and long term, while openness and infrastructure development had negative significant impact during the period of 1981-2018. Sa'ad et al. (2017) concluded that CPI, interest rate, GDP and broad money supply were cointegrated in short and long term as well ranging1973-2013. Variables like CPI and interest rate had a negative association and GDP and broad money supply (M2) had a positive association with external debt. Treating term of trade, exchange rate, trade openness and GDP per capita as independent variables Al-Fawwaz (2016) acknowledged that in the long term there was positive significant effect of term of trade on external debt of Jordan and GDP per capita had a negative and significant impact on external debt over the period 1990-2014.

Besides ARDL techniques, other techniques also used by the researcher to identify the impact of different factors on a nation's external debt. By applying the JJ cointegration analysis, Lau et al. (2016) found long term association among ED and endogenous variables for Thailand and Philippine too. In case of short-term causality connection, the outcomes showed that inflation CPI and RIR were major factors contributing to determine the ED in Thailand, where such short-term linkages were absent in case of Philippine. Waheed (2017) found eight major factors that significantly affect external debt. Researcher revealed that growth in economy, forex reserves, GGR, oil price, and local investment were crucial elements for lessening foreign debt, while current account deficit, GGE and inflation were the factors that were responsible for increasing external debt of those

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countries. Employing Fully Modified Ordinary Least Square estimation, Fatukasi et al. (2020) informed that insecurity level and exchange rate were prominent factors for determining external debt of Nigeria over the period 1981-2018.

In considering macro determinants of external debt Danish et al. (2022) reported that deficit budget, negative BOP, corruption and currency depreciation were the crucial factors for rising external debt of Bangladesh, India, Pakistan and Sri Lanka over the time 1984 to 2019. Using ARDL structural break for the period 1974 to 2018, Khalif (2022) outlined that in short run, foreign aid, and domestic investment had positive significant impact but government expenditure had insignificant positive impact on foreign debt of Somalia. On the other hand, GDP and export had negative significant effect. Applying VAR model, Islami & Kurniawan (2022) uncovered that shock to GDP causes debt to respond negatively, and shock from government spending as well as from interest rate causes debt to respond positively. Moreover, variance decomposition revealed that in comparison with other variables, government expenditure acted as main contributor for variation. Mahara & Dhakal (2020) suggested that the main macroeconomic factors influencing Nepal's external debt were the country's fiscal deficit, trade openness, and foreign aid. Udoh & Rafik (2017) used VECM and outlined that exchange rate, recurrent and capital expenditure had positive effect and GDP had negative effect on external debt of Malaysia.

Besides macroeconomic factors, some economic factors like tax revenue, external trade balance, etc., and other indicators such as political stability, corruption, debt management, etc., affect public debt as well as other debts. Lisboa & Carvalho (2024) described that the only factors that matter in explaining municipalities' debt were institutional and financial-economic factors. Municipalities with higher capital revenues, lower tourist, and lower State transfers were the ones with higher levels of debt. Okwoche & Nikolaidou (2022) recognized that besides economic factors, the sub-Saharan African's changing debt burden can be explained by changes in conflict and governance. Baklouti & Boujelbene (2021) delineated that excessive corruption spelled larger amounts of public debt in 16 Arab countries using the GMM model. Furthermore, considering the importance of democracy, if levels of democracy are too low, rising levels of corruption may cause public debt to rise, but rising levels of democracy will prevent rising levels of public debt. To investigate the economic factors that influence the sovereign credit rating Afonso (2003) advocated six variables like per capita GDP, actual growth rate, inflation rate, default history, economic advancement and external debt as crucial variables.

Reviewing literature, I found few studies on the factors affecting public debt in Bangladesh except Afrin et al. (2020). Some other studies of Nath et al. (2023), Shah and Pervin (2012), and Dey and Tareque (2020) are related to external debt and economic growth in Bangladesh, whereas Islam and Biswas (2005) worked on public debt management and its durability in Bangladesh. This study is different from available studies, especially the study of Afrin et al. (2020), in view of the time frame and variables taken into consideration. Pointing the gap while going through the literature, I have become encouraged to conduct this

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study as few ones have shown the effect of macroeconomic variables (using six independent variables—government spending, GDP growth, exports, imports, FDI, and inflation rate together) of public debt, in other words, macro determinants of public debt in Bangladesh.

Data and Methodology

To investigate the macro determinants of public debt in Bangladesh, secondary data has been extracted from WDI and IMF over the period 1975 to 2022 with followings as independent variables: GDP growth, government spending, export, import, FDI inflow and inflation rate, while public debt is the dependent variable.

Unit Root Test

As a non-stationary time, series has many problems, the present study takes the matter into account testing the likelihood of unit root in the time series variables through applying popular ADF test. The Dickey -Fuller test of testing the presence of unit root is given below following AR (1) process

$\Delta y_t = \alpha + \delta\, y_{t-1} + \varepsilon_t$ ……. (1)

For higher order case equation (1) is shown below

$\Delta y_t = \alpha + \delta\, y_{t-1} + \beta\, \Delta y_{t-1} + \varepsilon_t$…… (2)

Then the ADF test is described in the following way

$\Delta y_t = \alpha + \delta\, y_{t-1} + \beta_i \sum_{i=1}^{h} \Delta y_{t-i} + \varepsilon_t$ …… (3)

Where, $\Delta y_t = y_t - y_{t-1}$ and 'y' is the variable which is in consideration. Here in the equation (3), there is an intercept term but no time trend. Where alternative hypothesis is $H_1 = \delta < 0$; stationary while null hypothesis is $H_0 = \delta = 0$; non-stationary.

ARDL model

According to the models employed by Mahara (2021) and Ngasamiaku & Ngong'ho (2022), the public debt functional form is written as follows:

DEBT = f (GDPG, GGFCE, EXPORT, IMPORT, FDI, INF)

Where, Debt = central government debt reflects public debt, GDPG = GDP growth, GGFCE = government's final consumption expenditure narrates government spending, export and import represent export and import of goods and services respectively, FDI=net inflow of FDI and INF= inflation rate (using GDP Deflator).

One way to express the empirical estimating equation is as follows

$DEBT = \alpha + \beta 1\ GDPG + \beta 2\ GGFCE + \beta 3\ EXPORT + \beta 4\ IMPORT + \beta 5\ FDI + \beta 6\ INF + \varepsilon_t$ …(4)

In equation (4) α stands for constant, $\beta 1 \ldots 6$ stand for the coefficients and ε_t is the residual disturbance term.

ARDL model is appropriate if stationarity of data is found as I(0) and I(1). ARDL method of Pesaran et al. (2001) and its ECM technique are as follows:

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Δ DEBT$_t$ = $\propto_0$ + $\sum_{i=1}^{k} a_i \Delta DEBT_{t-1}$ + $\sum_{i=0}^{k} b_i \Delta GDPG_{t-1}$ + $\sum_{i=0}^{k} c_i \Delta GGFCE_{t-1}$ + $\sum_{i=0}^{k} d_i \Delta EXPORT_{t-1}$ + $\sum_{i=0}^{k} e_i \Delta IMPORT_{t-1}$ + $\sum_{i=0}^{k} f_i \Delta FDI_{t-1}$ + $\sum_{i=0}^{k} g_i \Delta INF_{t-1}$+ $\gamma_1 \Delta DEBT_{t-1}$ + $\Delta \gamma_2 \Delta GDPG_{t-1}$+ $\gamma_3 \Delta GGFCE_{t-1}$ + $\gamma_4 \Delta EXPORT_{t-1}$ + $\gamma_5 \Delta IMPORT_{t-1}$ + $\gamma_6 \Delta FDI_{t-1}$ + $\gamma_7 \Delta INF_{t-1}$ + ε_t ……(5)

In equation (5) 'Δ' indicates the first difference operator, short-run parameters are presented by "a,b,c,d,e,f g ",and long-term association parameters are symbolized by γ1 to γ7. Also, 'ε' indicates disturbance term. If we can detect long-term connection with the selected variables by performing bound test then estimation of long-run equation can be written as :

Δ DEBT$_t$ = $\propto 0$ + $\sum_{i=1}^{k} \gamma_1 \Delta DEBT_{t-1}$ + $\sum_{i=0}^{k} \gamma_2 \Delta GDPG_{t-1}$ + $\sum_{i=0}^{k} \gamma_3 \Delta GGFCE_{t-1}$ + $\sum_{i=0}^{k} \gamma_4 \Delta EXPORT_{t-1}$ + $\sum_{i=0}^{k} \gamma_5 \Delta IMPORT_{t-1}$ + $\sum_{i=0}^{k} \gamma_6 \Delta FDI_{t-1}$ + $\sum_{i=0}^{k} \gamma_7 \Delta INF_{t-1}$ + ε_t ……. (6)

Once more, we must use error correction mechanism (ECM) to calculate short-term coefficient after calculating long-term coefficient of the variables and ECM model is given as follows:

Δ DEBT$_t$ = β_0 + δ (ECM$_{t-1}$) + $\sum_{i=1}^{k1} \beta_1 \Delta DEBT_{t-1}$ + $\sum_{i=0}^{k2} \beta_2 \Delta GDPG_{t-1}$ + $\sum_{i=0}^{k3} \beta_3 \Delta GGFCE_{t-1}$ + $\sum_{i=0}^{k4} \beta_4 \Delta EXPORT_{t-1}$ + $\sum_{i=0}^{k5} \beta_5 \Delta IMPORT_{t-1}$ + $\sum_{i=0}^{k6} \beta_6 \Delta FDI_{t-1}$ + $\sum_{i=0}^{k7} \beta_7 \Delta INF_{t-1}$ + ε_t ……. (7)

In equation (7), k1…k7 is the optimal lag length and δ reflects the speed of adjustment parameter and error correction term deduced from the model's long-term association is displayed through ECM$_{t-1}$ symbol.

Result Discussion

Augmented Dickey Fuller (ADF) test

Null hypothesis (H_0): the series has unit root

Table 2: unit root test

	Level		1st difference		
Variables	**intercept**	**Trend and intercept**	**Intercept**	**Trend and intercept**	**Order of integration**
Debt	-1.885957	-2.038777	-5.207803***	-5.094954***	**I(1)**
GDPG	-2.358398	-11.91189***	-8.836449***	-8.693752***	**I(1)**
GGFCE	-3.065684**	-3.364040*	-6.544870***	-6.461303***	**I(0)**
Export	-1.588669	-1.317454	-6.039599***	-5.993875***	**I(1)**
Import	-2.535405	-2.924064	-9.560224***	-9.342213***	**I(1)**
INF	-15.89847***	-15.68133***	-17.29584***	-16.85480***	**I(0)**
FDI	-1.779111	-2.111731	-8.022391***	-7.979923***	**I(1)**

*** indicates significance level at 1% where ** and * indicate significance level at 5% and 1% level respectively.

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Table 2 shows the result of unit root tests for variables – Debt, GDPG, GGFCE, export, import, INF and FDI. Here from the table 2, it is observed that Debt (public debt), GDPG (GDP growth), export, import and FDI are stationary at first difference both at intercept and trend & intercept case. However, variables like GGFCE (government spending) and INF (inflation) are stationary at levels. For pairing of I (1) and I (0), ARDL model is appropriate to estimate short term and long term impact of macroeconomic indicators on public debt of Bangladesh.

Result of Bounds-test

Table 3: Result of Bounds-test

			Bound Critical Values (Restricted Intercept and no Trend)	
Test statistic	**Value**	**Significant level**	**I (0)**	**I (1)**
F statistic	4.357012	10%	1.99	2.94
K	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

Here, I (0) = Lower Bound; I (1) = Upper Bound and K is the number of regressor.

Table 3 represents bounds test result for the cointegration relationship between public debt and its determinants i.e., GDP growth, government expenditure, export, import, FDI and inflation rate. As the F statistics value of 4.357012 is greater than both the upper and lower bounds critical value at all significance levels, the null hypothesis of no cointegration among the examined variables is rejected. On the basis of the result provided in table 3, it appears that there is long run association among the examined variables in this present model. Based on the model's indication of a cointegration relationship, the study uses the ARDL cointegration framework to estimate the long-run coefficients and the short-run dynamic relationship. The ARDL Bounds Test method has a maximum lag length of one (1). This paper used AIC criteria and the most relevant model is ARDL (1,1,1,0,1,1,0).

Table 4: Result of Long run model

Dependent variable: Debt

Variable	**Coefficient**	**Std.error**	**t-statistic**	**Prob.**
GDPG	1.099566	1.707633	0.643912	0.5238
GGFCE	-0.339651	2.704883	-0.125570	0.9008
EXPORT	1.675565	0.937699	1.786890	0.0826*
IMPORT	-1.854619	0.901623	-2.056979	0.0472**
FDI	-3.151938	6.910389	-0.456116	0.6511

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Variable	Coefficient	Std.error	t-statistic	Prob.
INF	-0.637019	0.315158	-2.021268	0.0510**
C	48.64045	13.80552	3.523262	0.0012***

Note: *** significant at 1%; **significant at 5%; *significant at 10%.

Source: Author's Computation from Eviews Version 12.

Holding GDPG, GGFCE, export, import, INF and FDI constant, other factors could increase government debt or public debt in Bangladesh by 48.64, but those factors are not considered in the model. The variables like GDP growth and export increase public debt, where export is significant at 10% level and the other is not significant. The table shows a 1 unit rise in export raises public debt by 1.67. Primarily GDP growth and export act as reducing public debt but opposite scenarios might happen due to unsustainable growth. Moreover, growth may lead to the expansion of public service and even welfare programs, causing a rise in public debt if the country's tax base is not strong enough to support the expenses. GDP growth increases public debt, which is supported by (Dirir, 2022). Besides, export might cause a rise in public debt when export promotion is based on debt financed raising of interest payment, giving subsidy incentives, external shock, and so on. However, variables like government spending, import, FDI and inflation decreases public debt. That FDI and inflation lessen the public debt are supported by (Nagasamiaku & Ngong'ho, 2022) and (Thuan, 2018) respectively. A one unit increase in import and inflation significantly decreases public debt by 1.85 and 0.63 units respectively while others are not significant. An increase in government expenditure increases deficit budget and thereby increases public debt. However, government expenditure also increases economic growth by the multiplier effect, enhances productivity, and others, hence reducing public debt. Importing capital goods that would be used in further production might lessen public debt. FDI inflows contribute to developing foreign exchange reserves that facilitate currency stabilization and alleviate the cost of foreign-denominated debt. Finally, inflation shortens the real value of debt, act as form of taxation, and so on, thereby helping in reducing public debt.

Table 5: Short run analysis and error correction

Dependent variable: D(Debt)

Variable	Coefficient	Std.error	t-statistic	Prob.
D(GDPG)	-0.073462	0.101240	-0.725621	0.4729
D(GGFCE)	-1.843303	0.613431	-3.004906	0.0049***
D(IMPORT)	-0.188740	0.107691	-1.752596	0.0884*
D(FDI)	-2.694294	0.976242	-2.759862	0.0091***
CointEq(-1)*	-0.211818	0.032752	-6.467404	0.0000***

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Table 5 displays the evidence of a short-term connection among public debt, GDP growth, government spending, imports, and FDI. This relationship is demonstrated by the negative coefficient of (-0.211818) or CointEq (-1) * and its standard error (0.032752). When there is short-term economic disequilibrium, the system converges to long-term equilibrium at a rate of 21.18%, as per error correction coefficient (-0.211818). This indicates that there is a 21.18% annual correction to the long-term deviation. In the short run, variables like government spending and imports significantly lessen public debt for Bangladesh which is opposite of the findings of Nagasamiaku & Ngong'ho (2022), and finally, FDI significantly decreases public debt is supported by Manalo et.al. (2022), while GDP growth also decreases public debt but is not statistically significant.

Diagnostic Tests

Normality test:

The model is normally distributed according to the result indicated by figure 3. Since the coefficient of p-value is more than 5%, the Jarque-Bera test demonstrated the same.

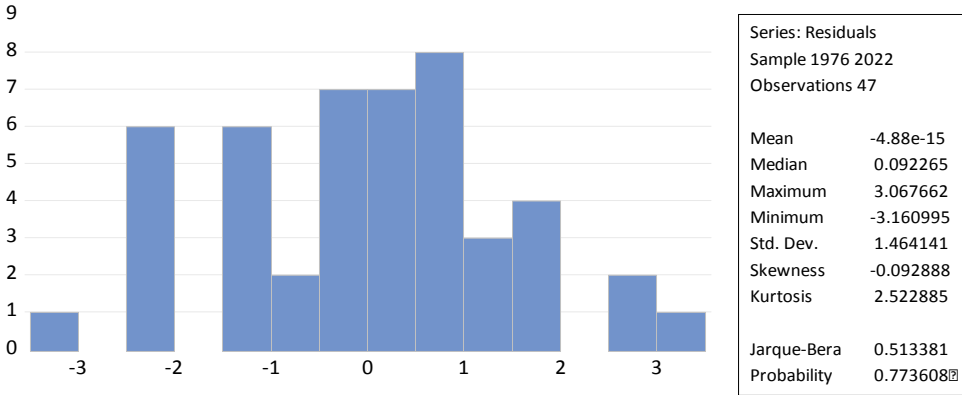

Figure 3

Breusch-Godfrey Serial Correlation LM Test: Table 6

Null: No serial Correlation up to 2 lags

F-statistic	0.275527	Prob. F(2,33)	0.7609
Obs*R-squared	0.771944	Prob. Chi-Square(2)	0.6798

Heteroskedasticity Test: Breusch-Pagan-Godfrey: Table 7

Null hypothesis: Homoskedasticity

F-statistic	0.708015	Prob. F(11,35)	0.7226
Obs*R-squared	8.554792	Prob. Chi-Square(11)	0.6629
Scaled explained SS	3.612326	Prob. Chi-Square(11)	0.9799

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Furthermore, the results of table 6 and 7 show no serial correlation or heteroscedasticity as indicated by the P-values for these variables, which are 0.6798 and 0.6629 respectively.

Variance Inflation Factors (VIF):

Sample: 1975 2022
Included observations: 48

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	39.85978	98.05576	NA
GDPG	0.216514	15.26889	2.201468
GGFCE	1.367300	84.78833	1.537334
EXPORT	0.134201	45.38130	7.835517
IMPORT	0.126753	100.2713	6.519188
FDI	9.146187	9.351278	5.394414
INF	0.004053	2.277907	1.551621

It is widely accepted that multicollinearity exists in the data set if values of the centered VIF are greater than 10. Here 2.201468 (GDPG), 1.537334 (GGFCE), 7.835517 (EXPORT), 6.5191188 (IMPORT), 5.394414 (FDI), and 1.551621 (INF) are the generated values, as indicated in the Table. It is determined that there is no multicollinearity in the model since the centered VIF of each variable is less than 10.

Stability test: In order to weigh the stability of long-term and short-term coefficients, Brown et al. (1975) created the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUM SQ) approaches.

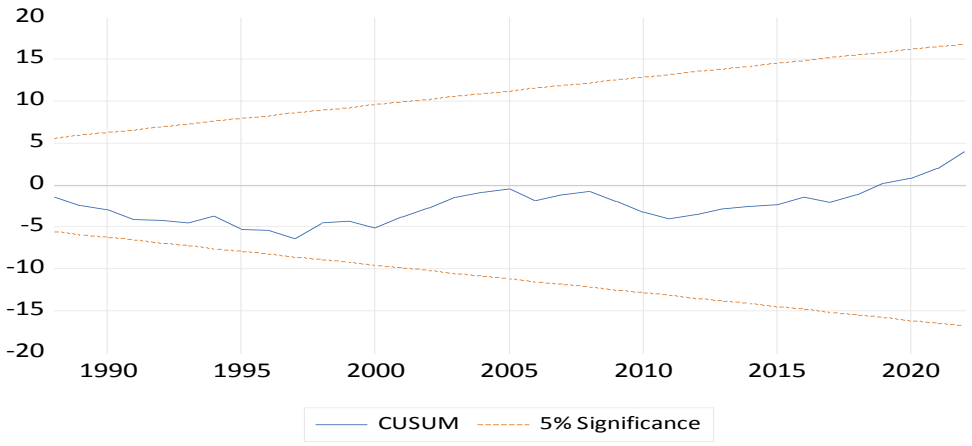

Figure 4: CUSUM Test

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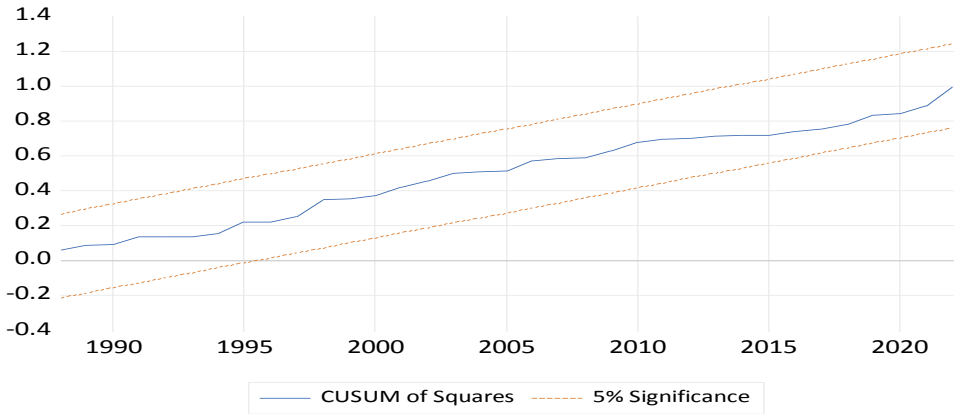

Figure 5: CUSUM of Suares Test

Overall, stability tests utilized in the CUSUM and CUSUM SQ tests revealed no structural failures in the model. The outcomes are shown in Figures 4 and 5.

Conclusion and Recommendation

This paper's primary goal is to examine how macroeconomic variables, including GDPG, GGFCE, export, import, FDI and INF impact Bangladesh's public debt. Employing the ARDL bound test, it is concluded that macro determinants that influence public debt are cointegrated in the long run. In the long run, import and inflation rate significantly reduce public debt while export significantly increases public debt. Also, GDP growth insignificantly increases public debt. Moreover, in short run, government spending, import and FDI significantly reduce public debt whereas GDP growth insignificantly reduces public debt. Robustness checks are performed in this present study and find that there is no serial correlation or heteroskedasticity problem. The study fulfilled the criteria of normality test and stability condition as well.

However, this study has some limitations- besides examined variables, there are other factors such as non- performing loan, reserves, interest rate, exchange rate, unemployment rate, governance, corruption, default history and so on that affect public debt but has not been taken into consideration here and even have not been controlled. Therefore, further research could be performed in these arenas. Moreover, political influence may have crucial impact on Bangladesh's public debt level, and this influence may not have been fully revealed by the data used as those are secondary ones.

This study emphasizes some recommendations based on the findings. Firstly, to decrease public debt significantly government should avoid imports of luxury goods and rather encourage capital machinery, raw materials, and technology that boost industrial production, enhance exports, and create job opportunities, as well as rationalize tariff policy for intermediate and capital goods that are essential for industrial growth. Secondly, the economy benefits from modest inflation, but inflation above a certain point can create uncertainty; that is why study recommend

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careful control of monetary policy. Thirdly, it's about government spending—the government's job is to ensure that the deficits are mostly used for encouraging investments that would uplift future income streams rather than for ongoing expenses. Likewise, by increasing the ability to generate revenue, the government can lower deficits and produce surpluses. The study indicates that lowering the primary deficit through ongoing budgetary adjustments is a strategy to halt the trend of debt accumulation. Fourthly, as FDI attracts capital and increases productivity, it plays a critical role in lowering the public debt. The government can increase employment, boost revenue, and lower the national debt by luring foreign direct investments. Furthermore, good infrastructure and banking system investments can boost economic development and lower the national debt.

However, Bangladesh should take on public debt to fund extremely important, well-evaluated, self-sustaining projects and initiatives that could boost the country's economy. Bangladesh should exercise caution while acquiring public debt, despite the fact that it boosts economic growth. The reason for this is that, as shown by (Checherita & Rother, 2010) and (Kumar & Woo, 2010) increased public debt may eventually have a detrimental influence on economic growth. Bangladesh should always pursue responsible monetary and fiscal policies because they foster an atmosphere that is conducive to economic expansion. Establishing such a setting is a crucial precondition to using public debt effectively.

References

Afonso, A. (2003). Understanding the determinants of sovereign debt ratings: Evidence for the two leading agencies. *Journal of Economics and Finance*, *27*(1), 56-74.

Al-Fawwaz, T. M. (2016). Determinants of external debt in Jordan: An empirical study (1990–2014). *International Business Research*, *9*(7). doi:10.5539/ibr.v9n7p116

Aizenman, J., & Marion, N. (2011). Using inflation to erode the US public debt. *Journal of Macroeconomics*, *33*(4), 524-541.

Afrin, S., Ahmed, Z. U., Islam, M. R., & Pradhan, M. A. H. (2020). Determinants of public debt in Bangladesh. *The Jahangirnagar Economic Review, 31*, 17–28.

BER (2023). Fiscal Policy and Fiscal Management (Ch-4). *Bangladesh Economic Review*, Finance Division Ministry of Finance, Government of the Peoples republic of Bangladesh, Dhaka. https://mof.portal.gov.bd/site/page/28ba57f5-59ff-4426-970a-bf014242179e/Bangladesh-Economic-Review-2023.

Baskaran, T. (2010). On the link between fiscal decentralization and public debt in OECD countries. *Public Choice*, *145*, 351-378. DOI 10.1007/s11127-009-9570-4

Baklouti, N., & Boujelbene, Y. (2021). Corruption, democracy, and public debt: A case of the Arab countries. *Journal of the Knowledge Economy*, 1-13.

Bader, M., & Magableh, I. K. (2009). An enquiry into the main determinants of public debt in Jordan: An econometric study. *Dirasat, Administrative Sciences*, *36*(1), 181-190.

Brown, R.L., Durbin, J. and Evans, J. (1975) Techniques for Testing the Constancy of Regression Relationships over Time. Journal of the Royal Statistical Society Series B, 37, 149-192.

DOI: https://doi.org/10.53461/jujbr.v25i01.85

Checherita, C. and P. Rother (2010), 'The Impact of High and Growing Government Debt on Economic Growth: An Empirical Investigation for the Euro Area', IMF Working Paper No. 10/1237.

Carrasco, C. A., & Tovar-García, E. D. (2024). Determinants of Public Debt Dynamics in Transition and Post-Transition Economies. *Eastern European Economics*, 1-22. DOI: 10.1080/00128775.2024.2375234

Dirir, S. A. (2022). Macroeconomic Determinants of the National Debt in Djibouti: An ARDL Approach. *International Journal of Economics Finance and Management Sciences*, *10*(5), 250-257. doi: 10.11648/j.ijefm.20221005.13

Danish, M. H., Jamshaid, F., & Shahzadi, S. (2022). Macroeconomic determinants of external debt in selected SAARC countries: A panel data analysis. *International Journal of Contemporary Economics and Administrative Sciences*, *12*(1), 341-357.

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.

Fatukasi, B., Kolawole, B. G., Falade, A. O. O., & Ayeomoni, I. O. (2020). Determinants of external debt in Nigeria: Insecurity as the prevalent issue. *International Journal of Management Studies and Social Science Research (IJMSSSR)*, 2(2), 1-8.

Gargouri, I., & Ksantini, M. (2016). The determinants of public debt. *The Romanian Economic Journal*, *18*(59), 111-124.

Islami, D., & Kurniawan, M. L. A. (2022). The determinant of decomposition of foreign debt in indonesia. *Jurnal REP (Riset Ekonomi Pembangunan)*, *7*(2), 295-305. DOI: 10.31002/rep.v7i2.350

Islam, M. E., & Biswas, B. P. (2005). Public debt management and debt sustainability in

Bangladesh. *The Bangladesh development studies*, *31*(1/2), 79-102.

Khalif, M. A. (2022). Macroeconomic determinants of external debt in Somalia. *IOSR Journal of Humanities and Social Science*, *27*(7), 8-16. DOI: 10.9790/0837-2707030816

Kalaja, E., & Vokshi, A. (2015). Public debt determinants in Albania. *Journal of Process Management and New Technologies*, *3*(4), 60-66.

Kumar, M. and J. Woo (2010), 'Public Debt and Growth', *IMF Working Paper 10/174.*

Lubis, S. R. (2020). Determinant analysis of Indonesian foreign debt (Error correction model approach). *International Journal of Scientific and Technology Research*, *9*(2), 2419-2424.

Lau, E., & Lee, A. S. Y. (2016). Determinants of external debt in Thailand and the Philippines. *International Journal of Economics and Financial Issues*, *6*(4), 1973-1980, available at http: www.econjournals.com

Lisboa, I. M. C., & Carvalho, A. C. P. (2024). Which determinants explain municipalities' debt? the case of portuguese municipalities from 2014 to 2017. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rev.*, *9*(6), 1-18.

Mahara, T.S., & Dhakal, S. (2020). Macroeconomic determinants of external debt in Nepal: The ARDL Approach. *Quest Journal of Management and Social Sciences*, 2(2), 275-289.

Mulugeta, E. T. (2020). Macroeconomic determinants of external debt accumulation in Ethiopia: an ardl bound testing approach. *Development*, *4*(2), 1-28. DOI: 10.52589/AJESD-5CHIK2TR.

Manalo, J. L., Villamiel, M., & Cruz, E. D. (2022). Macroeconomic determinants of public debt in the Philippines. *Journal of Economics, Finance and Accounting Studies*, *4*(1), 530-551.DOI: 10.32996/jefas

DOI: https://doi.org/10.53461/jujbr.v25i01.85

Ngasamiaku, W. M., & Ngong'ho, S. (2022). Macroeconomic determinants of public debt in Tanzania: Empirical evidence and lessons for post COVID-19 recovery. *African Journal of Economic Review, 10*(5), 64-82.

Nath, S. D., Karim, M. R., Hossain, F., & Uddin, M. M. (2023). Impact of external public

debt on economic growth: A case study of Bangladesh. *Indian Journal of Commerce and Management Studies, 14*(3), 01-08.

Okwoche, P., & Nikolaidou, E. (2024). Determinants of external, domestic, and total public debt in Nigeria: the role of conflict, arms imports, and military expenditure. *Defence and Peace Economics*, *35*(2), 227-242. https://doi.org/10.1080/ 10242694.2022.2145709

Owusu- Nantwi, V., & Erickson, C. (2016). Public debt and economic growth in Ghana. *African Development Review*, *28*(1), 116-126.

Okwoche, P. U., & Nikolaidou, E. (2022). *Determinants of government debt in sub-Saharan African countries: the role of conflict, governance, and economic factors* (No. 2022-05). School of Economics, University of Cape Town.

Omrane Belguith, S., & Omrane, H. (2017). Macroeconomic determinants of public debt growth: A case study for Tunisia. *Theoretical & Applied Economics*, *24*(4), 161-168.

Porumboiu, A. E., & Brezeanu, P. (2022). Determinants of Government Debt in the Member States of the European Union: Sources of Fiscal Risk. In *Proceedings of the 16th International Conference on Business Excellence* (Vol. 16, No. 1, pp. 707-721).

Pesaran, M. Hashem, Yongcheol Shin, & Richard L. Smith. (2001). Bounds testing approach to the analysis of the level of relationships. *Journal of Applied Econometrics, 16* (3), 289-326.

Sa'ad, S. A., Umar, A. T., Waziri, S. I., & Maniam, G. S. (2017). External debt burden and its determinants in Nigeria: An ARDL cointegration technique. *Journal of Economics and Sustainable Development, 8*(12), 31-37.

Shah, M. M. H., & Pervin, S. (2012). External public debt and economic growth:

Empirical evidence from Bangladesh, 1974 to 2010. Academic Research International, 3(2), 508–515. DOI: 10.2139/ssrn.2029277

Toth, P., Tkacova, A., Gavurova, B., & Pechova, V. (2022). Determinants of Public Debt in EU countries. *Polish Journal of Management Studies*, *25*(1), 406-424.DOI: 10.17512/pjms.2022.25.1.25

Thuan, V. D. (2018). Determinants of Public Debt in Lower-Middle Income Countries. *VNU Journal of Science: Policy and Management Studies*, *34*(3), 1-10. https://doi.org/10.25073/25881116/vnupam.4126

Taskovski, F. (2023) Key Macroeconomic Determinants of Government Debt -The Case of North Macedonia, *Economic Review – Journal of Economics and Business*, *XXI* (2). DOI: 10.51558/2303-680X.2023.21.2.35

Udoh, E., & Rafik, R.A.M. (2017). Determinants and transmission channel of external debt: Evidence from Malaysia. *Asian Journal of Economics, Business and Accounting, 4*(1), 1-10.

Waheed, A. (2017). Determinants of external debt: A panel data analysis for oil & gas exporting and importing countries. *International Journal of Economics and Financial Issues, 7*(1), 234-240.

DOI: https://doi.org/10.53461/jujbr.v25i01.85