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Policy Implications of Restructuring Public Debt Portfolio in Bangladesh

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Abstract

Judicious public debt management is a *sine qua non* for a robust economy. The recent catastrophic consequences of debt management failures of some countries are a wake-up call for Bangladesh. As part of precautionary measures, Bangladesh must review its debt portfolio in order to decide whether to rely more on domestic debt than external debt. It should also decide which debt would be economically viable and less risky for Bangladesh. This decision would entail restructuring its debt portfolio between domestic and external debt, among development partners and debt instruments. In this article, such restructuring is done with the help of regression analysis and portfolio analysis. The results are quite striking and have profound implications for policy making.

Keywords: Public debt portfolio, public finance, regression analysis, portfolio analysis, portfolio restructuring, policy implications

3.1 Introduction

As some economists have forewarned that the debt situation of Bangladesh may slip to the yellow zone that may entail 'another Sri Lanka in the making,' it is high time for the Government of Bangladesh (GoB) to carefully review its debt portfolio with a view to restructuring it so that any catastrophic consequences can be avoided. Restructuring allows for minimizing risk on debt portfolios. Experts in Bangladesh call for structural reforms with respect to public debt for the betterment of the economy (Khatun, 2024). Poor management of public debt restructured results in malicious effects on the economy, such as declines in the growth

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of GDP, investment, bank credit to the private sector and capital flows, to name a few (Asonuma et al., 2024).

As is evident from the Economic Relations Division (ERD) Handbook (ERD, 2023), the present decision-making process on debt portfolio restructuring is quite subjective, which often suffers from numerous biases. As a result, Bangladesh is more prone and susceptible to becoming a vulnerable economy due to poor public debt restructuring decisions. In order to streamline the debt restructuring decision-making process, it is imperative that the Government of Bangladesh (GoB) uses a data-driven decision-making approach. While the data are already available in a suitable form, the only thing that is absent is the use of an appropriate tool to facilitate the decision-making for restructuring the public debt portfolio.

This article demonstrates two innovative approaches of debt restructuring that have not been utilized by the GoB so far. One is the regression analysis, and the other is the portfolio analysis. With the help of the former tool, policymakers will be able to understand the extent of influence of domestic and external debt on Bangladesh's economy and how the macroeconomic situation dictates the amount of external and domestic debt in Bangladesh. With the help of the latter tool, the policy makers will be able to obtain the optimal portfolio structure with respect to both domestic and external debt.

Such types of analysis would help answer several burning questions of the policy makers, such as whether the country should borrow more domestically than externally, how much to borrow from which country in the case of external debt, and how to restructure the domestic debt portfolio according to major instruments. However, ascertaining how much to borrow domestically or externally requires further research and is beyond the scope of this article.

The results of both types of analysis are quite striking and have profound implications for policy making. Such analysis should be conducted periodically, as debt management is a highly dynamic discipline.

3.2 Review of literature

The literature review is conducted with a view to achieving two purposes. First, it would justify the use of regression analysis and portfolio analysis as appropriate tools for restructuring the public debt portfolio in Bangladesh. Second, it would justify the use of Bangladesh as the unit of analysis for this research.

This paper uses regression analysis and portfolio analysis as appropriate tools for restructuring the public debt portfolio in Bangladesh because they seem to be the most appropriate tools given the current economic features of Bangladesh. Buchheit et al. (2019) argue that no public debt restructuring mechanism is quite like another. Buchheit et al. (2019) show how Greece, Mexico and Uruguay have restructured their public debt, where each country has followed their unique approach given their country's economic conditions and characteristics. Adesola (2015) shows how Nigeria's public debt restructuring was different from that of other countries. It follows that each country's approach would be unique given its economic conditions and features (Chouraqui, Jones & Montador, 1986). The economic conditions and features of Bangladesh are quite different from those of other countries, where budget deficit, current account deficit, and exchange rate depreciation are posing constant challenges in public debt management (Alam & Taib, 2013). As such, it is expected that Bangladesh should also follow a unique restructuring mechanism with respect to its public debt.

Now, in order to decide on which tool to use to restructure the public debt portfolio in Bangladesh, it is imperative that other available methods be reviewed first. Destais, Eidam & Heinemann (2019) argue that there is no single optimal debt restructuring mechanism for public debt, and any design decision on such a mechanism requires judgements on the underlying trade-offs and related assumptions on relative costs. The existing public debt portfolio restructuring mechanisms that use judgment include the practices of intervention (Backus & Kehoe, 1989), coordination (Bi, Chamon & Zettelmeyer, 2016), contractual arrangements (Guzman & Stiglitz, 2016) and negotiation (Kastrop & Ebert, 2012). However, if such judgments are unwarranted and are not based on appropriate economic analysis, debt restructuring efforts may fail and may have disastrous consequences on an economy (Buchheit et al., 2019). The failures of the Stability and Growth Pact (SGP) and the European Stability Mechanism (ESM) are concrete examples of the absence of appropriate economic analyses in restructuring the European public debt portfolios. That is why Nicholas (2014) underscores the need for a credible macroeconomic framework for effective public debt portfolio restructuring. The existing approaches to economic analyses include the cost-at-risk approach (Hahm & Kim, 2003), value-at-risk approach (Adinugrahan & Ridwan, 2015), net present value approach (Beaugrand et al., 2002) and portfolio balance approach (Backus & Kehoe, 1989). Both the cost-at-risk approach and value-at-risk approach are aimed at optimizing the risk on the public

debt portfolio. The cost-at-risk (CaR) approach uses a target benchmark portfolio to optimize the portfolio risk (Hahm & Kim, 2003), whereas the value-at-risk approach uses the probability of default concept to optimize the portfolio risk (Coimbra, 2020). However, both of them are devoid of the basic principles of risk optimization, which requires a portfolio approach as has been suggested by Markowitz (Adinugrahan & Ridwan, 2015). The International Monetary Fund conducted a study in 2002 that delineated the method of choosing between external and domestic debt, which deploys the Net Present Value method (Beaugrand et al., 2002). Although the Net Present Value method is a suitable method for investment decision making, such analysis has little practical usefulness for such restructuring decisions (Emmanuel et al., 2010). The portfolio balance approach uses portfolio theory. However, it ignores the inevitable consequences of government budget constraints (Backus & Kehoe, 1989), which render it a flawed tool for restructuring the public debt portfolio.

Based on the above literature review on the available tools for restructuring public debt portfolios, it can be said that due to the limitations of the above tools, alternative tools should be used for analyzing the public debt portfolio with a view to restructuring it. Portfolio analysis is such an alternative tool that has been used in this study to restructure the public debt portfolio. Elberry, Naert & Goeminne (2023) argue that such portfolio analysis is critical during a debt crisis because it deals with the composition of public debt portfolios. Another tool used in this paper is the regression analysis, which essentially works as a deterministic as well as a heuristic method for understanding the relationship and nature of dependence between debt and macroeconomic variables (Rafindadi & Musa, 2019).

At this stage of the literature review, let us focus on why Bangladesh has been selected as the unit of analysis in the study. Previous studies on public debt management, such as those of the Economic Relations Division, Finance Division and Bangladesh Bank, are mainly descriptive in nature and provide debt-related statistical data of Bangladesh. There are some academic studies on public debt analysis in Bangladesh, which are very superficial in nature and do not conduct any significant, in-depth analysis. For example, Aktar (2023) tried to analyze the impact of external debt on the economy. However, she provided only descriptive statistics. Thus, analytical studies are grossly absent with respect to Bangladesh's debt portfolio. Some studies provide in-depth quantitative analysis of the impact of external debt on a single economic factor. For example, Rahman et al. (2012) analyzed the impact of external debt on GDP only. However,

there is no evidence of previous studies that investigates the influence of the macroeconomic variables on debt. Thus, there exists a considerable knowledge gap with respect to the appropriate method of analysis of Bangladesh's debt portfolio that would assist policymakers in restructuring decisions regarding Bangladesh's debt portfolio. Thus, it may be concluded that the gaps identified from the above literature review justify a study on the debt portfolio of Bangladesh that would examine the impact of the macroeconomic variables on debt and at the same time would allow the application of an appropriate method for restructuring its debt portfolio.

3.3 Methodology

Regression analysis was done in previous studies to show the impact of debt on an economy. For example, Kabwoya et al. (2024) used regression analysis to examine the relationship between debt levels and economic growth indicators such as GDP. However, it did not study the impact of other economic variables, such as unemployment rate, inflation rate, government's tax and non-tax revenue collection, foreign currency reserve, national export and national import. There is no evidence of a study that uses regression analysis to enable policymakers to dictate how much to borrow domestically and externally, given the performance of the economic indicators. For example, how much can domestic borrowing be if the inflation rate falls by 1%? Portfolio analysis was also done in previous studies. However, those studies used the Structural Vector Auto Regressive model and other empirical analysis, which did not use portfolio theory as the guiding principle for such analyses (Afonso et al., 2024). Thus, these studies are flawed from the viewpoint of portfolio management science. Moreover, these studies were conducted in the context of other countries. Thus, in order to provide a comprehensive restructuring analysis for the public debt portfolio of Bangladesh considering its present economic features, this study uses an innovative approach to regression analysis encompassing all the relevant economic variables and an innovative approach to portfolio analysis incorporating the portfolio theory.

In order to decide if the country should borrow more domestically than externally, the impact of the debt on the economy is ascertained using a multiple regression analysis. This analysis comprises a debt-related variable as the independent variable and the economy-related variables as the dependent variable. In order to ascertain how much to borrow from which country, the article conducts a portfolio analysis on the existing share of the bilateral and multilateral loans according to sources and restructures the external debt portfolio. In order to ascertain how much

to borrow from which instruments in the case of domestic debt, a similar portfolio analysis was also conducted.

3.3.1 Regression analysis

The regression analysis was done on the external debt and the domestic debt with the aim of determining the most preferred source of financing. In order to conduct the regression analysis, time series data were used on the debt-related and economy-related variables. The most relevant economic variables were selected for inclusion in the analysis. The selected economic variables are gross domestic product (GDP), unemployment rate (UR), inflation rate (IR), government's tax and non-tax revenue collection (RC), foreign currency reserve (FCR), national export (NE) and national import (NI). The other economic variables, such as money supply, interest rate, exchange rate, fiscal policy, monetary policy, wage earner's remittance, foreign direct investment, cost of living index, and stock market indices are also relevant, but to a less extent than the selected economic factors (Aktar, 2023; Junaedi et al., 2022). The relevance is determined by the purpose of borrowing, i.e., why the government borrows domestically and externally. The debt-related variables were the principal amount of the domestic and external debt. Detailed data are given in Appendix 2.

The justifications for including the selected economic variables as the most relevant are given below:

3.3.1.1 GDP

A government borrows with a view to increasing the GDP (Rahman et al., 2012). Thus, the debt will be deemed to have a positive impact on the economy if GDP increases over time.

3.3.1.2 Unemployment rate

A government borrows with a view to decreasing the unemployment rate (Cahyadin & Ratwianingsih, 2020). Thus, the debt will be deemed to have a positive impact on the economy if the unemployment rate decreases over time.

3.3.1.3 Inflation rate

A government borrows with a view to reducing the inflation rate (Karakaplan, 2009). Thus, the debt will be deemed to have a positive impact on the economy if the inflation rate decreases over time.

3.3.1.4 Revenue collection

A government borrows with a view to increasing its revenue (Mahdavi, 2004). Thus, debt will be deemed to have a positive impact on the economy if the government's revenue collection increases over time.

3.3.1.5 Foreign currency reserve

A government borrows with a view to increasing the foreign currency reserve (Ayunku & Markjackson, 2020). Thus, the debt will be deemed to have a positive impact on the economy if the foreign currency reserve of the country increases over time.

3.3.1.6 National export

A government borrows with a view to increasing the national export (Ahmed et al., 2000). Thus, the debt will be deemed to have a positive impact on the economy if the national export of the country increases over time.

3.3.1.7 National import

A government borrows with a view to decreasing the national import (Looney, 1989). Thus, the debt will be deemed to have a positive impact on the economy if the national import of the country decreases over time.

3.3.1.8 Data sources

The data for the regression analysis were taken from the Bangladesh Economic Review 2023 of the Ministry of Finance of the Government of Bangladesh and the World Bank. The past twelve years' data on the debt and economy-related variables from 2011–12 to 2022–23 were used in the regression analysis. Details of the data are provided in Appendix 2.

3.3.1.9 Analysis technique

Two sorts of analysis were conducted. The first analysis involved the examination of the impact of both external and domestic debt on the economy (through the selected economic variables). The second analysis involved examining the macroeconomic drivers of external and domestic debt. As the first step of the analysis, the debt and economy-related variables were transformed to z-scores to equate the variables in the measurement scales using R software. Then, regression analysis was performed using the same software and the regression data were generated.

3.3.2 Portfolio analysis

Here, both external and domestic debts are analyzed. External debts are analyzed according to countries in order to determine how much to borrow from which country. On the other hand, domestic debts are analyzed according to instruments in order to determine how much to borrow from which instrument.

3.3.2.1 Data sources

The data for the portfolio analysis were taken from the Flow of External Resources into Bangladesh 2020-2021, Golden Jubilee Special Edition and from a newspaper article published in The Business Standard on 28 May, 2023 (Kashem & Abdullah, 2023). For external debt, debt disbursement and interest payment related data were used for twenty-eight countries and institutions. For domestic debt, interest-related data on five types of debt instruments were used. Details of the data are provided in Appendix 2.

3.3.2.2 Analysis technique

The portfolio analysis is conducted using the procedures as delineated by Goetzmann et al. (2014). In order to perform the analysis, the following notations are used:

Table 3.1: Notations used in the portfolio analysis

Sl.	Notations	For External Debt	For Domestic Debt
1.	R_i	Interest paid to each country, detailed data are given in Appendix 1.	Interest paid for each instrument, detailed data are given in Appendix 1.
2.	R_F	Interest on relatively risk-free instrument, i.e., the treasury bonds, which is USD 2,745.98 million or BDT 25,193 crore as on 30 June, 2023 (Kashem & Abdullah, 2023; Ministry of Finance, 2022).	
3.	β_i	The portion of the systematic risk of R_i, which is estimated as 88% as per the risk measurement literature of the Economic Relations Division (ERD) of the Ministry of Finance (ERD, 2022).	
4.	σ^2_i	The portion of the unsystematic risk of Ri, which is the variance of all the R_i	
5.	C_i	Cutoff rate, which is calculated using the following formula: $$C_i = \frac{{\sigma_m}^2 \sum_{i=1}^{n} \frac{(\overline{R_i} - R_F)\beta_i}{{\sigma_i}^2}}{1 + {\sigma_m}^2 \sum_{i=1}^{n} \left(\frac{{\beta_i}^2}{{\sigma_i}^2} \right)}$$	
6.	Z_i	The relative portion of each country/instrument in the portfolio is calculated using the following formula: $$\frac{{\beta_i}^2}{{\sigma_i}^2} \left(\frac{(\overline{R_i} - R_F)}{\beta_i} - C_i \right)$$	

3.3.3 Limitations of the Methodology

The regression analysis and portfolio analysis are conducive to take restructuring decisions on the current year's economic conditions only. It should not be taken for granted to work for future economic conditions, given the volatility of the economy of the debtor country and the creditor countries and institutions. These analyses could provide a completely different result during economic crises and during economic prosperity. To avoid such limitations, it is recommended that the concerned government officials periodically conduct such analyses in order to determine the optimal composition of the debt portfolio.

3.4 Result and discussion on the regression analysis

3.4.1 Regression analysis – 1: Impact of debt on economy

In respect of examining the impact of both external and domestic debt on the economy (through the selected economic variables), two models were used, as can be seen in Figure 3.1. The first model examined the impact of external debt on the economy, and the second model examined the impact of domestic debt on the economy. The regression results are summarized in Table 3.2, which are described below.

Table 3.2: Impact of external and domestic debt on selected economic variables

Predictors	**Model 1**	**Model 2**
	Estimates	***Estimates***
(Intercept)	0.000	0.000
	(0.396)	(0.462)
External debt (ed_z)	5.151***	
	(0.414)	
Domestic debt (dd_z)		5.090***
		(0.483)
Observations	12	12
R^2/ R^2 adjusted	0.939 / 0.933	0.917 / 0.909

**p<0.05 **p<0.01 ***p<0.001*

3.4.1.1 Model 1

An individual standard multiple regression was performed to investigate the effects of external debt on the selected economic variables. R for regression was significantly different from zero ($R^2 = 0.939$, $p = 0.001$). The adjusted R^2 is 0.933. Therefore, 93% of the variance in the selected economic variables is caused by the external debt.

The regression coefficient (slope) for the external debt is 5.151. This means that external debt has a positive effect on the economy while controlling for the effects of domestic debt. The slope also means that with every increase of one standard deviation in the external debt, the selected economic variables will increase by 5.151 standard deviations, while controlling for the effects of domestic debt. The positive effect of the rate of external debt on the selected economic variables is statistically significant at alpha=0.001.

3.4.1.2 Model 2

An individual standard multiple regression was performed to investigate the effects of domestic debt on the selected economic variables. R for regression was significantly different from zero ($R^2 = 0.917$, $p = 0.001$). The adjusted R^2 is 0.909. Therefore, 91% of the variance in the selected economic variables is caused by the domestic debt.

The regression coefficient (slope) for the domestic debt is 5.090. This means that domestic debt has a positive effect on the economy while controlling for the effects of external debt. The slope also means that with every increase of one standard deviation in the domestic debt, the selected economic variables will increase by 5.090 standard deviations, while controlling for the effects of external debt. The positive effect of the rate of domestic debt on the selected economic variables is statistically significant at alpha=0.001.

3.4.2 Discussion on the first kind of regression analysis

The regression coefficient (slope) as well as the adjusted R2 for the external debt is higher than those of the domestic debt. This means that external debt is more aligned with the selected economic variables than domestic debt. As such, the government should be more inclined towards external debt than domestic debt from an economic point of view. It is interesting that Bangladesh borrows more from domestic sources while the external sources are cheap in terms of interest rate. Let us demonstrate this with

the help of an example. Suppose Bangladesh borrows USD 100, both domestically and externally. If the exchange rate is BDT 100 per US dollar and the foreign borrowing rate is 1% per annum, then Bangladesh has to pay $1 annually as interest, which is equivalent to BDT 100. On the other hand, if the interest rate on domestic borrowing is 12% per annum, then Bangladesh has to repay BDT 1200 as interest. Thus, domestic borrowing is more costly than external borrowing. However, the government deems it less risky than external borrowing (Ministry of Finance, 2022).

3.4.3 Regression analysis – 2: Macroeconomic determinants of debt

In order to know how much the macroeconomic situation dictates the amount of external and domestic debt in Bangladesh, a regression analysis was conducted. The regression results are summarized in Table 3.3, which are described below.

Table 3.3: Macroeconomic determinants of external and domestic debt of Bangladesh

Predictors	**External Debt**	**Domestic Debt**
	Estimates	***Estimates***
(Intercept)	0.000	0.000
	(0.018)	(0.063)
Gross Domestic Product (gdp_z)	1.079**	0.613
	(0.215)	(0.731)
Unemployment Rate (ur_z)	0.273*	0.094
	(0.062)	(0.211)
Inflation Rate (ir_z)	-0.040	0.225
	(0.062)	(0.212)
Tax and Non-tax Revenue Collection (rc_z)	0.035	0.130
	(0.157)	(0.535)
Foreign Currency Reserve (fcr_z)	-0.439*	0.290
	(0.138)	(0.469)
National Export (ne_z)	-0.569**	0.014
	(0.121)	(0.412)
National Import (ni_z)	0.588**	0.062
	(0.118)	(0.402)
Observations	12	12
R^2/ R^2 adjusted	0.999 / 0.996	0.983 / 0.952

*$p<0.05$ **$p<0.01$ ***$p<0.001$

3.4.4 Discussion on the second kind of regression analysis

The effects of all the macroeconomic determinants on external debt, except inflation rate and revenue collection, are statistically significant. However, the effects of all the macroeconomic determinants on domestic debt are not statistically significant.

These selected macroeconomic factors can explain 99.9% of the variations in the external debt and 98.3% of the variations in the domestic debt.

For every 1 billion taka increase in GDP, the government can borrow 1.079 billion taka of external debt and 0.613 billion taka of domestic debt while controlling for the effects of the other economic factors.

For every 1% rise in unemployment rate, the government can increase the external borrowing by 27.3% and domestic borrowing by 9.4% while controlling for the effects of the other economic factors.

For every 1% rise in inflation rate, the government should decrease the external borrowing by 4% and instead should increase the domestic borrowing by 22.5% while controlling for the effects of the other economic factors.

For every 1 billion taka increase in the government's tax and non-tax revenue collection, the government can borrow 0.035 billion taka of external debt and 0.130 billion taka of domestic debt while controlling for the effects of the other economic factors.

For every 1 million USD increase in the foreign currency reserve of the country, the government should decrease external borrowing by 0.439 million USD of external debt and should increase domestic borrowing by 0.290 million USD while controlling for the effects of the other economic factors.

For every 1 billion taka increase in national export, the government should decrease external debt by 0.569 billion taka and should increase domestic debt by 0.014 billion taka while controlling for the effects of the other economic factors.

For every 1 billion taka increase in national import, the government should increase external debt by 0.588 billion taka and should decrease domestic debt by 0.062 billion taka while controlling for the effects of the other economic factors.

3.5 Result and discussion on the portfolio analysis

3.5.1 Restructuring the external debt portfolio

The result of the external debt portfolio analysis is shown in Table 3.4 below.

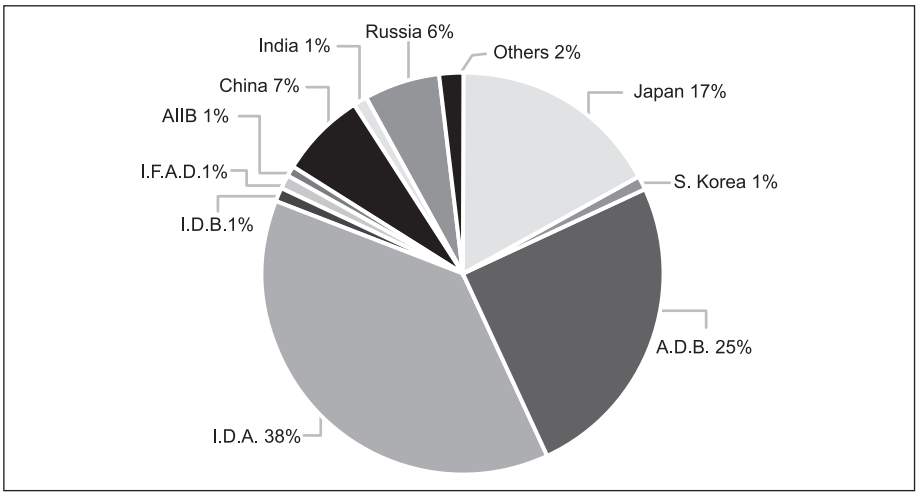
Table 3.4: Portfolio analysis of the external debt (figures are rounded)

Name of the Country	$\frac{(\bar{R}_i - R_F)}{\beta_i}$	$\frac{(\bar{R}_i - R_F)\beta_i}{{\sigma_i}^2}$	$\frac{{\beta_i}^2}{{\sigma_i}^2}$	$\sum_{i=1}^{n}\frac{(\bar{R}_i - R_F)\beta_i}{{\sigma_i}^2}$	$\sum_{i=1}^{n}\frac{{\beta_i}^2}{{\sigma_i}^2}$	C_i	z_i	$\frac{z_i}{\sum z_i}$
ADB	(7)	(60)	0	350,073	7	51,452	(1,306)	0.00
AIIB	(111)	(5)	0	350,073	7	51,452	(91)	0.00
BELARUS	(1,246)	(0)	0	350,073	7	51,452	(8)	0.00
BELGIUM	(3,119)	(0)	0	350,073	7	51,452	(3)	0.00
CHINA	(2)	(104)	0	350,073	7	51,452	(2,848)	0.01
DENMARK	(640)	(1)	0	350,073	7	51,452	(16)	0.00
E.E.C	(1,202)	(0)	0	350,073	7	51,452	(9)	0.00
EIB	(372)	(1)	0	350,073	7	51,452	(27)	0.00
FRANCE	(149)	(4)	0	350,073	7	51,452	(68)	0.00
GERMANY	(20)	(24)	0	350,073	7	51,452	(479)	0.00
I.D.A	(41)	(12)	0	350,073	7	51,452	(239)	0.00
I.D.B	(97)	(5)	0	350,073	7	51,452	(104)	0.00
I.F.A.D	(824)	(1)	0	350,073	7	51,452	(13)	0.00
INDIA	(67)	(8)	0	350,073	7	51,452	(149)	0.00
ITFC	(1,856)	(0)	0	350,073	7	51,452	(6)	0.00
JAPAN	1	248,635	4	350,073	7	51,452	(208,609)	0.60
KUWAIT	(580)	(1)	0	350,073	7	51,452	(18)	0.00
NDF	(6,159)	(0)	0	350,073	7	51,452	(2)	0.00
O.P.E.C	(216)	(2)	0	350,073	7	51,452	(47)	0.00
PAKISTAN	(9,294)	(0)	0	350,073	7	51,452	(1)	0.00
RUSSIA	(12)	(37)	0	350,073	7	51,452	(768)	0.00
SAUDI ARABIA	(84)	(6)	0	350,073	7	51,452	(120)	0.00
SOUTH KOREA	1	101,714	3	350,073	7	51,452	(135,083)	0.39
SPAIN	(8,093)	(0)	0	350,073	7	51,452	(1)	0.00
SWITZERLAND	(5,673)	(0)	0	350,073	7	51,452	(2)	0.00
U.A.E.	(237)	(2)	0	350,073	7	51,452	(43)	0.00

As can be seen in the last column of Table 3.2, the external debt portfolio is restructured in such a way that 60% of the external debt should be sourced from Japan, 39% should be sourced from South Korea, and the remaining 1% from China. All other bilateral and multilateral sources should be avoided in order to have a positive impact on the economy. In order to understand the restructuring effect of the external debt portfolio

analysis, it is imperative that we have a look at the existing structure of the external debt portfolio, which is as follows:

Figure 3.1: Existing structure of the external debt portfolio



Source: Ministry of finance, 2022.

From Figure 3.1 and Table 3.4, we can see that the structure of the portfolio has shifted dominantly from multilateral sources, such as IDA and IDB and the new structure has leaned more towards bilateral sources, i.e., Japan and South Korea.

3.5.2 Restructuring the domestic debt portfolio

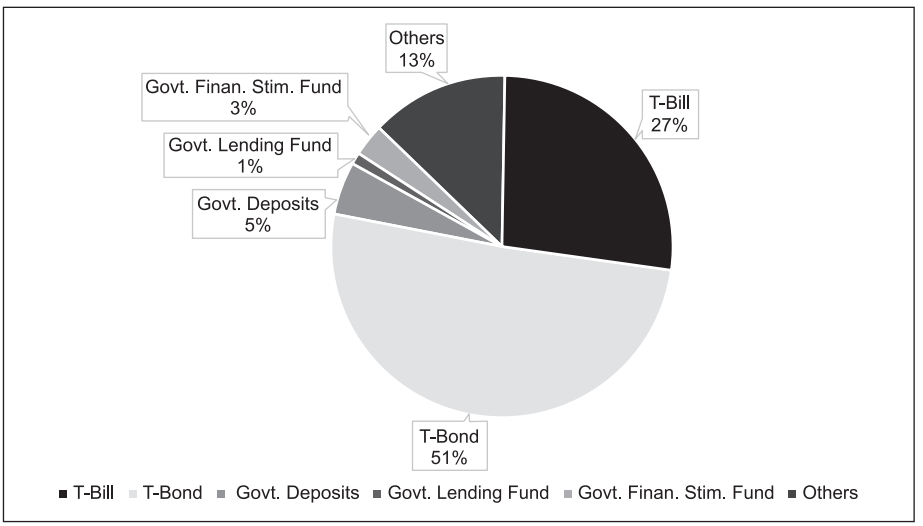
The result of the domestic debt portfolio analysis is shown in Table 3.3 below.

Table 3.5: Portfolio analysis of the domestic debt (figures are rounded)

Name of the Instruments	$\frac{(\overline{R}_i - R_F)}{\beta_i}$	$\frac{(\overline{R}_i - R_F)\beta_i}{{\sigma_i}^2}$	$\frac{{\beta_i}^2}{{\sigma_i}^2}$	$\sum_{i=1}^{n}\frac{(\overline{R}_i - R_F)\beta_i}{{\sigma_i}^2}$	$\sum_{i=1}^{n}\frac{{\beta_i}^2}{{\sigma_i}^2}$	C_i	z_i	$\frac{z_i}{\sum z_i}$
Savings Scheme	1	46,503	2	36,608	4	8,852	(20,676)	0.56
Provident Fund	(3)	(6,099)	0	36,608	4	8,852	(2,844)	0.08
Ways and Means Advances	(2,862)	(13)	0	36,608	4	8,852	(6)	0.00
Treasury bonds	-	-	1	36,608	4	8,852	(11,551)	0.32
Treasury bills	(7)	(3,782)	0	36,608	4	8,852	(1,534)	0.04

As can be seen in the last column of the Table 3.3, the domestic debt portfolio is restructured in such a way that 56% of the domestic debt should be sourced from the national savings schemes, 8% from provident fund, 32% from treasury bonds, and the remaining 4% from treasury bills. In order to understand the restructuring effect of the domestic debt portfolio analysis, it is imperative that we have a look at the existing structure of the domestic debt portfolio, which is as follows:

Figure 3.2: Existing structure of the domestic debt portfolio



Source: Ministry of finance, 2022.

From Figure 3.2 and Table 3.5, we can see that the structure of the portfolio has shifted dominantly from treasury bills and treasury bonds and the new structure has leaned more towards national savings schemes and treasury bonds.

3.5.3 Discussion on portfolio analysis

3.5.3.1 External debt

It is very interesting to note that while the portfolio theory suggests portfolio diversification in order to minimize risk, the portfolio analysis we have conducted has paved the way for portfolio concentration. The explanation is that portfolio diversification is the strategy in the case of personal finance. However, public finance differs in a diametrically opposite way to personal finance (Rosen, 1992). For example, in the case

of personal budgeting, we cut our coat according to our cloth. That is, a person first ascertains his or her income limit and then spends judiciously and rationally to keep his or her budget within his or her income limit. But, in the case of public finance, the government first estimates its expenditure and then looks for ways and means to increase its income to cover the expenditure. In the same way, while portfolio diversification is the strategy for personal finance, portfolio concentration is the strategy for public finance that holds true for both domestic and public debt.

Debt is a financial product that every country and international lending agencies want to sell to the countries in need of it in order to make some profit on it. They would rationally want to sell more of their debt to the needy countries. If Bangladesh diversifies its external debt portfolio, it will mean that lending countries and organizations would try to convince or compel Bangladesh to subscribe to more credit. Thus, at one stage, Bangladesh would be heavily indebted to those lending countries and organizations. In case Bangladesh defaults on its loan due to economic failure, the lending countries and organizations would create pressure on repaying its debt at the cost of gold and foreign currency reserves. That is why portfolio diversification in the case of external debt is detrimental for a country.

3.5.3.2 Domestic debt

Whereas T-bills and T-bonds benefit the institutions, they do not directly benefit the public. Instead, if the government uses a national savings scheme, it will create a social safety net for the vulnerable groups of society, particularly women, retired and aged people.

3.6 Analysis and reflection on the nexus between the results and the existing literature

The results of the analysis are strikingly different from those of the existing literature on debt structure. For example, some of the existing literature provides only descriptive statistics relating to public debt, such as the debt-to-GDP ratio and the relative structure of domestic and external debt (Khatun, 2024). In respect of regression analysis, academic studies, such as those of Rahman et al. (2012) and Islam and Hossain (2024), regressed the debt variable (external debt only) only on a single economy-related variable (gross domestic product). Their findings are that debt and GDP have a significant positive relationship. The results and findings of this study go further than those of the previous studies. In addition to GDP,

this study examines the relationship between debt (both domestic and external) and all the relevant economic variables. While the previous studies were concerned with the direction of the relationship between debt and economic variables, the results of this study inform policymakers about the vector and the magnitude of the relationship. With respect to the portfolio analysis, previous studies, such as that of Patwary (2021), provide only a cursory analysis of descriptive statistics on public debt (both domestic and international) without suggesting the optimal portfolio structure. On the other hand, this study shows how to find the optimal portfolio structure for both domestic and external debt.

3.7 Implications of the research

3.7.1 Policy Implications

There are several policy implications that can be derived from the research. First, for domestic debt, the GoB should refrain from using some of its debt instruments for public interest. Second, for external debt, the GoB should concentrate its debt portfolio by choosing one or two selective bilateral or multilateral sources. Again, such selection would depend on the terms and conditions of the borrowing agreement. Third, the GoB should ensure flexibility in its portfolio mix through various tools, such as swaps, hedging, forwards, futures and other financial derivatives. Fourth, the GoB should not consider its domestic debt as a fiscal instrument. Instead, it should be considered as an instrument for the social safety net. Fifth, the optimal portfolio mix with respect to both external and domestic debt would depend on the economic circumstances of the country.

3.7.2 Societal impact of restructuring

In terms of external debt restructuring, no significant societal impact will be visible. However, the Bangladeshi diaspora living in a country that does not lend to Bangladesh will feel honored. Moreover, the bilateral relations between Bangladesh and the non-lending countries will improve, which will help Bangladeshi people immigrate and work in those countries. The societal impact of restructuring the domestic debt is that the people of Bangladesh will lead happy lives due to increased savings.

3.7.3 Influence of the Findings on Policy and Practice

The findings of this research have several potential influences on policy and practice. First, the nature of the work of the employees in the National

Savings Directorate, the Internal Resources Division, and the Economic Relations Division will change. Second, the existing debt portfolio composition will be changed drastically. Third, the existing practices of determining the portfolio composition will be changed drastically. Fourth, bilateral and multilateral diplomatic and economic relations will be changed. Fifth, in the case of domestic debt, more reliance on Savings Schemes may become a political issue and can be used in the election manifesto of the political parties.

3.8 Conclusions and recommendations

3.8.1 Conclusions

Experts in the field of public debt management have emphasized judicious public debt management through restructuring the debt portfolio in order to avoid adverse effects of debt on the economy. While the current practices of debt management are subjective and suffer from biases, it is imperative that the GoB engages in a data-driven decision-making approach with respect to domestic and external debt restructuring. To this end, this paper demonstrates and performs two innovative quantitative analyses with a view to restructuring the public debt portfolio of Bangladesh. One is the regression analysis, and the other is the portfolio analysis. Existing literature on regression analysis provides only a cursory idea about the impact of debt on the economy, taking into account only one variable, such as GDP. This article analyses the impact of debt on the economy as well as the impact of each economic variable on debt. In respect of portfolio analysis, the existing literature is concerned with descriptive statistics on public debt (both domestic and international) without suggesting the optimal portfolio structure. This article uses portfolio analysis in the light of portfolio theory and comes up with the optimal portfolio structure given the current economic condition of the country. If the debt portfolio is restructured using these two types of analysis, it is expected that Bangladesh will have a balanced composition of the debt portfolio that will help it achieve autarky.

This paper presents research because the previous studies on the public debt management of Bangladesh have shed little light on its restructuring mechanism. Similar studies for other countries are also parochial because they address only one economic variable (GDP). This study opens up a new vista of research by incorporating all the relevant economic variables and by offering an optimal portfolio mix for both domestic and external

debt. Further research can be conducted on issues, such as ascertaining how much to borrow domestically or externally and the optimal public debt portfolio structure during different phases of the economic life cycle of a country, to name a few.

Debts go in tandem with national economic situations. Thus, debts are highly dynamic. One should not presume that the structure of the portfolio would remain the same in the next years or even in the next six months. Thus, the debt portfolio needs to be constantly reviewed, monitored and updated, at least on an annual basis, using the formula shown in this article. A software can be used that can provide policymakers with a decision on the structure once the inputs are provided.

3.8.2 Recommendations

After restructuring the public debt portfolio using the above two analyses, it is recommended that GoB take a number of initiatives to manage its debt more judiciously so that it can contribute significantly towards sustaining the positive impact of public debt on the economy. First, the GoB should try to secure external debts from bilateral sources instead of multilateral sources because they can be sourced and serviced easily. Moreover, the terms and conditions of the debt and the interest rate are more favorable in the case of bilateral debts. Another reason is that there is no trading relationship with multilateral agencies. Thus, debt cannot be serviced efficiently without a trading relationship. Second, the GoB should service its debt through international barter rather than with cash because of its pressure on foreign exchange reserves. Third, the GoB should try to facilitate the way and should provide a guarantee for other private sector external debt. Fourth. the GoB should carefully review its debt utilization strategy. At present, debts are utilized in the inefficient and unproductive sectors that do not have strong debt servicing capacity. Thus, the government should utilize the proceeds in directly productive activities. Fifth, the GoB should also review its debt servicing strategy carefully. Although its debt portfolio in terms of countries are concentrated, it should not concentrate its debt currencies. At present, most of the debt liabilities are met in the USD, Euro or SDR. These currencies fluctuate wildly in the international market. Thus, if the GoB diversifies its debt currencies, it will be able to minimize the exchange rate risk. As the external debt portfolio is concentrated and has shifted towards Japan and South Korea, the GoB can opt for using those currencies, which are relatively stable in the international market. Sixth, the GoB should utilize the proceeds in a

more intelligent way to minimize the pressure on foreign exchange. This could be done by lending the proceeds from external debt to the local development financial institutions, who will, in turn, lend the money to the exporters of the country. Thus, the government can use the proceeds, along with the interest earned, to service its own debt. Seventh, the GoB should apply the techniques of financial derivatives for risk minimization of international debt service obligations. Swaps, options, etc. should be practiced in the international market to help minimize the risk of interest rate and exchange rate fluctuations.

Appendix 1

Detailed Data on Debt Disbursement and Interest Paid on External and Domestic Debt

(a) External debt

(in million USD)

Sl.	Country / Organization	Total Disbursed	Interest Rate (%)	Total Interest
1	ADB	6,556.48	2%	$400.97
2	AIIB	433.363	2.50%	$27.80
3	BELARUS	49.999	0.01%	$2.50
4	BELGIUM	2.478	0%	$1.00
5	CHINA	14,301.60	2%	$874.64
6	DENMARK	95.291	0.20%	$4.87
7	E.E.C	48	0.75%	$2.59
8	EIB	143.4	1.50%	$8.35
9	FRANCE	340.555	2.00%	$20.83
10	GERMANY	59.075	2.49	$147.10
11	I.D.A	1,359.77	0.75%	$73.47
12	I.D.B	497.23	2.50%	$31.90
13	I.F.A.D	68.255	1%	$3.78
14	INDIA	824.151	1%	$45.67
15	ITFC	25	3%	$1.68
16	JAPAN	1,156,153.12	1%	$64,068.59
17	KUWAIT	101.945	0.50%	$5.37
18	NDF	9.376	0.75%	$0.51
19	O.P.E.C	246.399	1.50%	$14.35
20	PAKISTAN	5.489	2%	$0.34
21	RUSSIA	4,048.05	1.50%	$235.78
22	SAUDI ARABIA	599.468	2%	$36.66
23	SOUTH KOREA	748,658.29	1%	$41,487.13
24	SPAIN	6.957	1%	$0.39
25	SWITZERLAND	10.179	0.75%	$0.55
26	U.A.E.	225.346	1.50%	$13.13
27	U.S.A.	9.719	2%	$0.59
28	YUGOSLAVIA	40.764	3%	$2.74

Source: Flow of External Resources into Bangladesh 2020-2021, Golden Jubilee Special Edition https://erd.portal.gov.bd/site/page/7f192f96-1442-48b4-a947-2e09ce30ec54/Flow-of-External-Resources-2020-21

(b) Domestic debt

Sl.	Instruments	Total Interest (Crore Taka)
1	Savings Scheme	$45,100.00
2	Provident Fund	$6,200.00
3	Ways and Means Advances	$10.00
4	Treasury bonds	$25,193.00
5	Treasury bills	$3,342.00

Source: Kashem, A & Abdullah, S, 2023, Govt's domestic debt up by Tk65,000cr in FY23, The Business Standard, 28 May, 2023, https://www.tbsnews.net/economy/govts-borrowing-treasury-bills-tk73167cr-fy23-639738

Appendix 2

Debt and Economy Related Variables used in Regression Analysis

FY	Billion Tk.	Billion Tk.	Billion Tk.	%	%	Billion Tk.	Milion USD	Billion Tk.	Billion Tk.
	External Debt Principal	Domestic Debt Principal	GDP	Unemployment Rate	Inflation Rate	Revenue Collection	Foreign Reserve	National Export	National Import
2011-12	140.4	344.7	10552	3.8	8.69	1148.9	10364	2101.4	2634.6
2012-13	199.5	324.7	11989.2	4.1	6.78	1396.7	15315	2123.6	2683.8
2013-14	186.8	409.8	13436.7	4.4	7.35	1566.7	21508	2314.3	2842.4
2014-15	238.7	547.1	15158	4.4	6.41	1633.7	25020	2384.4	2925.4
2015-16	270.47	621.75	20758	4.4	5.92	1774	30168	2617.2	3122.8
2016-17	315.87	699.03	23243	4.3	5.44	2185	33493	2691.6	3441
2017-18	510.4	660.17	26392	4.4	5.78	2594.54	32943	2972.5	4471.5
2018-19	538.83	787.45	29514	4.4	5.48	3166.12	32717	3327.6	4658
2019-20	636.59	973.45	31705	4.4	5.65	3480.7	36037	2783.5	4297.6
2020-21	809.54	1150.52	35302	5.2	5.56	3515.3	46391	3130	5146.1
2021-22	918.12	1242.88	39717	5.1	6.15	3890	41827	4789.6	8023.5
2022-23	1017.69	1406.25	44393	4.7	8.78	4330	32267	3400.8	4745.7

Sources: 1. *Bangladesh Economic Review 2023, Ministry of Finance, https://mof.portal.gov.bd/site/page/28ba57f5-59ff-4426-970a-bf014242179e/Bangladesh-Economic-Review-2023*

2. *World Bank. https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=BD*

References

Adesola, I., Olaide, A., Adeola, B., Bright, I., & Victor, O. (2015). Nigerian debt portfolio and its implication on economic growth. *Journal of Economics and Sustainable Development 6*(18): 87-99.

Adinugrahan, S., & Ridwan, M. (2015). *Efficiency of foreign debt portfolio management in emerging economies* [Master's thesis, Uppsala University]. DiVA Portal. https://www.diva-portal.org/smash/get/diva2:815967/FULLTEXT01.pdf

Afonso, A., Alves, J. and Monteiro, S. (2024). Banks' portfolio of government debt and sovereign risk: From safe havens to stormy seas. *Finance Research Letters 70*. 106277.

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.

Aktar, J. (2023). Public debt in Bangladesh: An analysis of external debt and its impact on economy. *Journal of Gono Bishwabidyalay 4*(1): 293-312.

Alam, N., & Taib, F. M. (2013). An investigation of the relationship of external public debt with budget deficit, current account deficit, and exchange rate depreciation in debt trap and non-debt trap countries. *European Scientific Journal 9*(22): 144-158.

Asonuma, T., Chamon, M., Erce, A. and Sasahara, A. (2024). Costs of sovereign debt crises: restructuring strategies and bank intermediation. *Journal of International Economics*, *152*. 1-27.

Ayunku, P. E., & Markjackson, D. (2020). Impact of external debt on Nigeria's foreign reserve portfolios. *Asian Journal of Economics and Empirical Research 7*(1). 1-7.

Backus, D. K., & Kehoe, P. J. (1989). On the denomination of government debt: a critique of the portfolio balance approach. *Journal of Monetary Economics 23*(3). 359-376.

Beaugrand, P, Loko, B, Mlachila, M (2002). *The Choice Between External and Domestic Debt in Financing Budget Deficits: The Case of Central and West African Countries*. Retrieved from https://www.imf.org/external/pubs/ft/wp/2002/wp0279.pdf

Bi, R., M. Chamon, and J. Zettelmeyer. 2016. The problem that wasn't: coordination failures in sovereign debt restructurings. *IMF Economic Review, 64*(3), 471.

Buchheit, L., Chabert, G., DeLong, C., & Zettelmeyer, J. (2019). The restructuring process. In Abbas, S.A., Pienkowski, A. & Rogoff, K. (eds.) *Sovereign Debt: A Guide for Economists and Practitioners*. Oxford: Oxford University Press, pp.328-364.

Cahyadin, M., & Ratwianingsih, L. (2020). External debt, exchange rate, and unemployment in selected ASEAN countries. *Jurnal Ekonomi & Studi Pembangunan 21*(1): 16-36.

Chouraqui, J. C., Jones, B., & Montador, R. B. (1986*). Public debt in a medium-term context and its implications for fiscal policy*. Retrieved from https://www.oecd-ilibrary.org/deliver/628367225815.pdf?itemId=/content/paper/628367225815&mimeType=application/pdf

Coimbra, N. (2020). Sovereigns at risk: A dynamic model of sovereign debt and banking leverage. *Journal of International Economics,* 124, 103298.

Consiglio, A., & Zenios, S. A. (2015). Risk management optimization for sovereign debt restructuring. *Journal of Globalization and Development 6*(2): 181-213.

Destais, C., Eidam, F., & Heinemann, F. (2019). *The design of a sovereign debt restructuring mechanism for the euro area: Choices and trade-offs* (No. 11). EconPol Policy Report. Retrieved from https://www.econstor.eu/bitstream/10419/219514/1/econpol-pol-report-11.pdf

Economic Relations Division (ERD) (2022). *Flow of External Resources into Bangladesh 2020-2021, Golden Jubilee Special Edition*. Retrieved from https://erd.portal.gov.bd/site/page/7f192f96-1442-48b4-a947-2e09ce30ec54/Flow-of-External-Resources-2020-21

Economic Relations Division (ERD) (2023). *ERD Handbook*. Retrieved from https://erd.portal.gov.bd/sites/default/files/files/erd.portal.gov.bd/npfblock//21.11.23_Final_ERD%20Handbook%202023.pdf

Elberry, N. A., Naert, F., & Goeminne, S. (2023). Optimal public debt composition during debt crises: A review of theoretical literature. *Journal of Economic Surveys 37*(2). 351-376.

Emmanuel, C., Harris, E., & Komakech, S. (2010). Towards a better understanding of capital investment decisions. *Journal of Accounting & Organizational Change 6*(4): 477-504.

Goetzmann, W. N., Brown, S. J., Gruber, M. J., & Elton, E. J. (2014). Modern portfolio theory and investment analysis. *John Wiley & Sons*, *9th edition*.

Guzman, M., & Stiglitz, J. E. (2016). Creating a framework for sovereign debt restructuring that works. In Guzman , M., Ocampo, J.A. and Stiglitz, J.E. (eds.) *Too little, too late: the quest to resolve sovereign debt crises.* New York: Columbia University Press, pp. 3-32.

Hahm, J. H., & Kim, J. (2003). Cost-at-risk and benchmark government debt portfolio in Korea. *International Economic Journal 17*(2). 79-103.

Islam, M. A., & Hossain, F. (2024). Impact of external debt on GDP of Bangladesh. *Sprin Journal of Arts, Humanities and Social Sciences 03* (11). 47-50.

Junaedi, D., Norman, E., Salistia, F., Arsyad, M. R., & Paramansyah, A. (2022). The Analysis of the Impact of Debt on the Indonesian Economy for the Period 1976-2021. *ManBiz: Journal of Management and Business 1*(1): 1-18.

Kabwoya, E.C., Odhiambo, A.K., Kisilu, M.D., Kevine, O. and Okumu, A.I. (2024). Regression analysis of the effects of debt on economic performance in Kenya. *African Scientific Annual Review 1*(1): 28-38.

Karakaplan, M. U. (2009). "The conditional effects of external debt on inflation." Sosyal Ekonomik Araştırmalar Dergisi 9(17): 203-217.

Kashem, A & Abdullah, S, 2023, Govt's domestic debt up by Tk 65,000cr in FY23. *The Business Standard*. 28 May, 2023. Retrieved from https://www.tbsnews.net/economy/govts-borrowing-treasury-bills-tk73167cr-fy23-639738

Kastrop, C., & Ebert, W. (2012). Closing the gaps of the SGP: Why a sovereign debt restructuring mechanism? Reflections from a political economy perspective. In *Rules and institutions for sound fiscal policy after the crisis* (pp. 259–275). Retrieved from https://citeseerx.ist.psu.edu/t?repid=rep1&type=pdf&doi=39953d9051d2fc28f9d0feaed49b42faab868420

Khatun, F. (2024). How can Bangladesh manage its external debt? *The Daily Star*. 27 March, 2024. Retrieved from https://www.thedailystar.net/opinion/views/macro-mirror/news/how-can-bangladesh-manage-its-external-debt-3575536

Looney, R. E. (1989). The influence of arms imports on Third World debt. *The Journal of Developing Areas 23*(2): 221-232.

Mahdavi, S. (2004). Shifts in the composition of government spending in response to external debt burden. *World Development 32*(7): 1139-1157.

Ministry of Finance. (2022). Medium term debt management strategy Bangladesh: Period: FY2021-22 to FY2023-24. Retrieved from https://mof.portal.gov.bd/sites/default/files/files/mof.portal.gov.bd/page/a1ba0f11_4d9f_41f4_81a8_386f7f1530f4/Medium%20Term%20Debt%20Management%20Strategy%20of%20Bangladesh_FY%2022-24.pdf

Ministry of Finance. (2023). Bangladesh Economic Review 2023. Retrieved from https://mof.portal.gov.bd/site/page/28ba57f5-59ff-4426-970a-bf014242179e/Bangladesh-Economic-Review-2023

Nicholas, G.P. (2014). Selected Debt Restructuring Experiences in the Caribbean.

In Yartey, C.A. & Turner-Jones, T. (eds.) *Caribbean renewal: tackling fiscal and debt challenges*. Washington, DC: International Monetary Fund, pp.205-229. https://doi.org/10.5089/9781484369142.071.

Patwary, M. S. H. (2021). Public debt management in Bangladesh: An analysis of debt portfolio perspective. *International Journal of Developing and Emerging Economies 9*(1). 1-12.

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): 28-36.

Rafindadi, A. A., & Musa, A. (2019). An empirical analysis of the impact of public debt management strategies on Nigeria's debt profile. *International Journal of Economics and Financial Issues 9*(2): 125-137.

Rosen, H. S. (1992). Public finance. In *The encyclopedia of public choice* (pp. 252–262). Boston, MA: Springer US.

The World Bank. (2023). Data. Retrieved from https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=BD