



**Policy Analysis Unit (PAU)**

**Working Paper Series: WP 0705**

**Public Debt Management and Debt Sustainability in Bangladesh**

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**December 2006**

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## **Public Debt Management and Debt Sustainability in Bangladesh**

**Md. Ezazul Islam\* and Bishnu Pada Biswas\***

**December 2006**

### **Abstract**

*The main objectives of the paper are: (i) to review the trend in debt composition (ii) to review debt financing sources, and (iii) to assess and analyze debt sustainability of Bangladesh. Debt sustainability equations, covering growth rate, inflation, interest rate, exchange rate and primary deficit (including seignorage) have been estimated for the sample period of FY81-FY06 for assessing debt dynamics. It is found that interest rate component demonstrates stronger influence than that of growth, primary deficit and exchange rate depreciation variables in changing the debt-GDP ratio. The paper concludes that recent dynamics of debt-GDP ratio is marginally convergent. The paper suggests that interest rate on debt (especially NSD certificate rates) may be maintained to such an extent that real interest rates are well below the real output growth.*

**Key Words: Public Debt, GDP, Primary Deficit, Debt Sustainability.**

**JEL Classification: H61, H62, H63.**

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# **Public Debt Management and Debt Sustainability in Bangladesh**

**Md. Ezazul Islam and Bishnu Pada Biswas**

## **Introduction**

The issue of public debt and debt sustainability has long been a concern for policy makers of both fiscal and monetary authority in Bangladesh. High public debt stems from persistent fiscal deficit and has a significant negative effect on economic activity. It leads to high taxes and puts upward pressure on real interest rates, which may crowd out private investment. When a government is no longer able to finance its deficit, it is forced to cut spending or raise revenues, often at times when fiscal policy is needed to help stabilize the economy.

It is important for overall macroeconomic policy to manage the debt and it needs to be coordinated closely with fiscal, monetary and other macroeconomic and financial policies. For this reason, debt manager, fiscal and monetary authorities should share an understanding of the objectives of debt, fiscal and monetary policies, given the interdependence among the policy instruments. Close coordination is needed to choose an appropriate mix of financing and policy adjustment to facilitate economic recovery while preventing the build-up of an unsustainable debt burden.

The main objective of fiscal policy in Bangladesh is to enhance the effectiveness of public expenditure by channeling resources to the appropriate direction and attain faster growth and poverty reduction by mobilizing larger amount of revenue than done presently. With a view to fostering economic growth and accelerating poverty reduction, Bangladesh has been pursuing expansionary fiscal policy since its independence. As a result, total expenditure very often exceeds total revenue which generates fiscal deficit. In the wake of persistent saving-investment gap, export-import gap, and fiscal deficit, a prudent public debt management is an essential issue for sustained macro stability of Bangladesh. Recently, a Debt Management Wing (DMW) has been set up in the Ministry of Finance. The DMW is monitoring debt financing closely with joint collaboration of Bangladesh Bank.

Budget deficit and its financing in Bangladesh, like in many other developing countries, are very important parameters for analyzing monetary effect as well as the fiscal effect in the country's overall economic development. Many industrialized countries face similar long-term budgetary challenges like Bangladesh and have run persistently large budget deficits in recent decades. These large and persistent budget deficits have generated considerable concern. There is a widespread perception that they reduce growth, and could lead to a crisis if they continue for long or become too large. Thus it is important to examine the sources and effects of budget deficits (Romer, 2003).

An understanding of the financing of fiscal deficit is also important because there are different implications of the method of debt financing in the economy. Economic theory tells that if debt financing is met by borrowing from central bank, it is inflationary; if borrowing is from commercial banks; there is a possibility of crowding out of private sector investment. Again, if it is met by issuing bonds, the cost of debt financing will be high. So, debt financing and the method of its management are important issues. In general, deficit financing is met by expanding monetary base. Debt financing by issuing bond is less popular than the money creation (Dornbush and Fischer, 1990).

Debt sustainability is an essential condition for macroeconomic stability and sustained economic growth. Most often, high public debt levels create repayment flows that can crowd-out much needed public spending, and can generate adverse incentives for private investors to engage in activities that spurt long-term growth. An excessive level of public debt can make the nation vulnerable to interruption in aid flow or to sudden shifts in domestic financial market sentiment. These problems are aggravated by a narrow export and production base and various structural, political, and institutional factors that reduce returns on investment (ADB, 2006).

Government debt becomes unsustainable if it continues to rise indefinitely as a share of GDP, or if the cost of debt servicing absorbs an excessive amount of resources. An assessment of the sustainability of a government's debt position is not readily transparent, but depends on projections of such variables as interest rates, economic growth rates, government revenues and expenditure. However, sustainability is likely to become an issue of growing concern when the growth of government interest payments exceeds that of government revenues. Available data and research reports on Bangladesh indicate that currently the debt obligation of the Government is at a tolerable level.<sup>1</sup> However, these reports do not contain any substantial analysis. Recently, ADB (2005) analyzed only external debt and its sustainability of Bangladesh and argued that Bangladesh has capacity to borrow more.

Following a review of the entire gamut of debt obligations of Bangladesh, the main objectives of the paper are: (i) to review the debt composition, debt financing and its implications, and (ii) to assess and analyze debt sustainability of Bangladesh. Data have been compiled from published government and public documents. Descriptive statistics have also been used for trend analysis and sustainability equations have been estimated for assessing debt dynamics for the sample period of FY81-FY06.

The remainder of the paper is organized as follows: Section II describes the theoretical aspect of debt and Government budget constraint and its implications. Section III describes the trend in total debt, composition of debt and debt financing. Section IV describes the assessment of debt sustainability of Bangladesh; and finally, Section V concludes the paper with a summary and some policy recommendations.

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<sup>1</sup> See Economic Review, 2006 and External Resource Flow into Bangladesh, 2005.

## II. Government Budget Constraint and Debt<sup>2</sup>

It is necessary to understand the government's budget constraint before embarking on a discussion of fiscal policy. The government's budget constraints are defined by the equation :

$$\int_{t=0}^{\infty} e^{-R(t)} G(t) dt \leq -D(0) + \int_{t=1}^{\infty} e^{-R(t)} T(t) dt. \quad (1)$$

where,  $G(t)$  and  $T(t)$  denote the government's real purchases and taxes at time  $t$ , and  $D(0)$  its initial real debt outstanding. The present value of government's purchases of goods and services must be less than or equal to its initial wealth plus the present value of its tax receipts (net of transfer payments).

In the equation (1)  $R(t)$  denotes  $\int_{\Gamma=0}^t r(\Gamma) dt$ , where  $r(\Gamma)$  is the real interest rate at time- $\Gamma$ .

Thus the value of a unit of output at time  $t$  discounted back to time-0 is  $e^{-R(t)}$ .

The government's budget constraint does not prevent it from staying permanently in debt, or even from always increasing the amount of its debt. If the growth rate of  $D$  is less than the real interest rate, growing  $D$  satisfies the budget constraint.

The simplest definition of the budget deficit is that it is the rate of change in the stock of debt. The rate of change in the stock of real debt equals the difference between the government's purchases and revenues, plus the real interest on its debt. That is,

$$\dot{D}(t) = [G(t) - T(t)] + r(t) D(t) \quad (2)$$

where again  $r(t)$  is the real interest rate at  $t$ .

The term in brackets on the right-hand side of (2) is referred to as the primary deficit. Focusing on the primary rather than the total deficit is often a better way of gauging how fiscal policy at a given time is contributing to the government's budget constraint. So if one restates the government budget constraint (1) as

$$\int_{t=0}^{\infty} e^{-R(t)} [T(t) - G(t)] dt \geq D(0) \quad (3)$$

The budget constraint now states that the government must run primary surpluses large enough in present value to offset its initial debt.

The government budget constraint involves the present values of the entire path of purchases and revenues, and not the deficit at a point in time. As a result, conventional measures of either the primary or total deficit can be misleading about fiscal actions' contribution to the budget constraint. This is clarified by three examples cited below.

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<sup>2</sup> This section has drawn heavily from Romer (2006).

The first example dwells on inflation on the measured deficit—the change in nominal debt outstanding— i.e., the conventional purchases and revenues plus the nominal interest rate on the debt. If we let B denote the nominal debt, the nominal deficit is thus

$$\dot{B}(t) = P(t) [G(t)-T(t)] + i(t) P(t) D(t) \quad , \quad (4)$$

where p is the price level and i is the nominal interest rate. When inflation rises, the nominal interest rate for a given real rate rises. Thus interest payments and deficits rise. The higher interest payments are just offsetting the fact that the higher inflation is eroding the real value of debt. Nothing involving the behavior of the real stock of debt, and thus nothing involving the government’s budget constraint is affected. By definition, the nominal interest rate equals the real rate plus expected inflation. This allows us to rewrite our expression for the nominal deficit as

$$\begin{aligned} \dot{B}(t) &= P(t)[G(t)-T(t)]+[r(t)+\Pi(t)]P(t)D(t) \\ &= P(t) [ \dot{D}(t) + \Pi(t) D(t) ] , \end{aligned} \quad (5)$$

where the second line uses equation (3) for the rate of change in real debt outstanding. Dividing both side of (5) by the price level yield

$$\frac{\dot{B}}{P(t)} = \dot{D}(t) + \Pi(t) D(t) \quad (6)$$

That is, as long as the stock of debt is positive, higher inflation raises the conventional measure of the deficit even when the price level deflates it.

The second example is the sale of an asset. If the government sells an asset, it increases current revenue and thus reduces the current deficit. But it also forgoes the revenue which would have been generated in future. In the natural case where the value of the asset equals the present value of the revenue it will produce, the sale has no effect on the present value of the government’s revenue. Thus the sale affects the current deficit but does not affect the budget constraint.

The third example is of an un-funded liability. An un-funded liability is a government commitment to incur expenses in the future that is made without provision for corresponding revenues. In contrast to an asset sale, an un-funded liability, provident fund, affects the budget constraints without affecting the current deficit. If the government sells an asset, the set of policies that satisfy the budget constraint is unchanged. If it incurs an un-funded liability, on the other hand, satisfying the budget constraint requires higher future taxes or lower future purchases.

### **III. Trend in Debt, Composition of Debt and Financing of Debt**

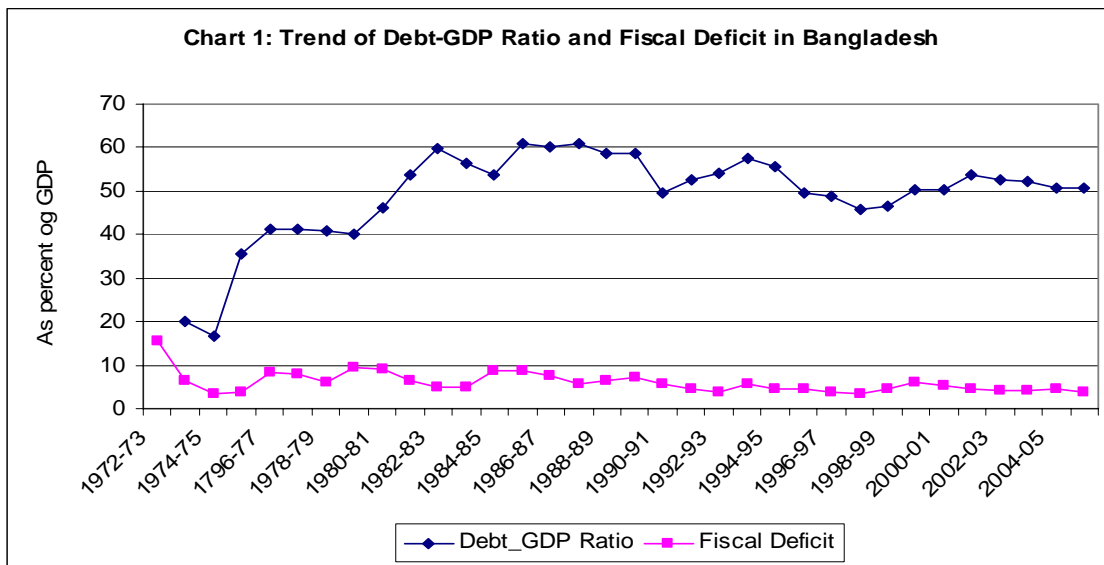
In the wake of persistent high fiscal deficit in the 1970s and 1980s, total debt-GDP ratio in Bangladesh, on average, rose sharply from 33.65 percent during the 1970s to 56.95 percent during the 1980s. During the period, high levels of public debt triggered growth of monetization and financial repression, including forced absorption of Government

bonds by banks and financial institutions<sup>3</sup>, leading to underdevelopment of financial markets. The fiscal adjustment measures initiated in the early 1990s have brought down the debt-GDP ratio to 51.05 percent during the 1990s. With 4.53 percent fiscal deficit, the ratio slightly increased to 51.98 percent, on average, during 2001-2006 (Table 1 and Chart 1).

**Table 1: Average Trend in Fiscal Deficit and Nominal Debt-GDP Ratio in Bangladesh (As percent of GDP)**

Year	Fiscal Deficit	Total Debt	Domestic Debt	External Debt
1970s	7.60	33.65	12.96	20.69
1980s	6.96	56.95	13.38	43.57
1990s	4.70	51.05	12.33	38.72
2000/01-2005/06	4.53	51.98	19.24	32.74

Source: (1) *Economic Trend*, Bangladesh Bank, (2) *External Resource Flow, Economic Relation Division (ERD)*, (3). *National Savings Directorate (NSD)*, (4) *BBS* and (5) *Authors' own calculation*.



Total outstanding *domestic* debt as percent of GDP increased to 19.24 percent, on average, during 2001-2006 from 12.96 percent during 1973-1980. Over the period FY74-FY06, the nominal value of domestic debt grew at the rate of 13.41 percent per year. The growth rate was higher during FY90-FY06 as compared to growth registered during FY74-FY90 (Table 2). External debt-GDP ratio, on the other hand, declined to 32.74 percent during 2001-2006 from 43.57 percent in 1980s (Table 1). In the wake of slower external aid inflow since late 1990s, the growth of external debt came to 6.65 percent per year on average over the period 1990-2006 as compared to the per year growth of 25.54 percent during 1974-1990 (Table 2).

<sup>3</sup> Banks are allowed to hold Government bonds and securities in maintaining Statutory Liquidity Ratio (SLR). During 1970s and 1980s, SLR was about 25 percent for banks. As a result, the government has raised large amount by selling bonds and securities to banks as well as Bangladesh Bank.



Year	Total Debt	External Debt	Domestic Debt	Domestic Debt			
				Govt.(net) from BB	Govt (net) from DMBs	Total Govt. (net)	NSD
1974-1990	20.38	25.54	13.41	7.40	7.59	7.69	26.07
1990-2006	8.80	6.65	14.51	19.47	16.32	17.12	20.32
1974-2006	14.08	14.78	13.41	11.30	13.70	12.27	25.25

*Source: Authors' own calculation by fitting semi-logarithm function ( $\log y = a + b t$ ) based on data of Bangladesh Bank, NSD and ERD.*

Regarding *domestic debt*, the accumulation in domestic debt was from mainly three sources: (1) Bangladesh Bank (BB), (2) Deposit Money Banks (DMBs), and (3) Non-banks (including NSD). Bangladesh Bank and DMBs purchase Government securities/treasury bills to finance budget deficit. When BB purchases government treasury bills<sup>4</sup> to finance the deficit, it engages in money creation. The interest rates of these instruments are determined on ad-hoc basis and the rates are relatively lower as compared to NSD certificates or fixed deposit rates offered by the commercial banks. Interest rates on different instruments are given in Table 3. During the 1970s and 1980s, BB followed administered interest rate policy. In the early 1990s, a market oriented interest rate policy was introduced under Financial Sector Reform Program (FSRP). Subsequently, auction of Government treasury bills system was introduced. As a result, interest rates on treasury bills have been determined through auction since 1995.

The share of outstanding debt financing from Bangladesh Bank (BB) in total domestic public debt remained within 30-31 percent during 1990-2006. In view of the growing need of private sector credit, the Government shifted debt financing operation to non-bank sources. The share of outstanding debt financing from commercial banks (DMBs) decreased from 53 percent in 1990 to 24 percent in 2006. Conversely, the share of non-bank financing (NSD) increased to 46 percent in 2006 from 16 percent in 1990 (Charts 2 and 3).

Growing level of Government borrowing from Bangladesh Bank, which increases the level of high-powered money, grew by 19.76 percent, on average, during 1990-2006 as compared to 11.30 percent, during the whole period of FY74-FY06. As a result, the amount of outstanding debt from Bangladesh bank stood at Taka 246.62 billion at the end of FY06 from Taka 16.78 billion at the end of FY91. High powered money (Reserve Money) and Broad Money increased by 12.46 percent, on average and 14.23 percent respectively during FY90-FY06.

<sup>4</sup> The instruments of government borrowing from BB and DMBs are Treasury Bills, Treasury Bills on Tap, Ways and Means Advances, Special Treasury Bills and Special Treasury Bonds of different maturities.

Year	Treasury Bills			NSD Certificates	
	Treasury Bills	Treasury Bills on Tap**	Ways and Means Advances	5-year	3-year
1981-82	6.00	7.00	7.00	12.20	-
1982-83	6.00	9.50	9.50	12.20	-
1983-84	6.00	9.50	10.00	12.20	-
1984-85	8.50	9.50	10.50	18.00	-
1985-86	9.00	9.00	10.75	18.00	19.55
1986-87	8.00	9.00	10.25	18.00	19.55
1987-88	8.00	9.00	10.25	18.00	19.55
1988-89	8.00	9.00	10.25	18.00	19.55
1989-90	7.50	11.50	9.25	18.00	19.55
1990-91	7.00	11.00	9.25	16.00	15.00
1991-92	7.00	11.00	6.50	16.00	15.00
1992-93	4.75	8.50	6.00	15.00	15.00
1993-94	4.00	8.00	5.00	15.00	15.00
1994-95	4.00	8.00	5.00	15.00	15.00
1995-96	3.50	7.00	5.50	15.00	15.00
1996-97*	6.75	-	6.50	14.00	15.00
1997-98	8.32	-	6.50	14.50	13.50
1998-99	7.51	-	7.50	15.50	13.50
1999-00	6.05	-	6.50	14.50	13.50
2000-01	6.33	-	6.50	12.50	12.00
2001-02	4.81	-	5.50	12.50	12.00
2002-03	7.00	-	5.50	12.50	12.00
2003-04	3.99	-	4.50	11.00	10.50
2004-05	6.60	-	4.50	10.50	10.00
2005-06	7.10	-	4.50	12.00	11.50

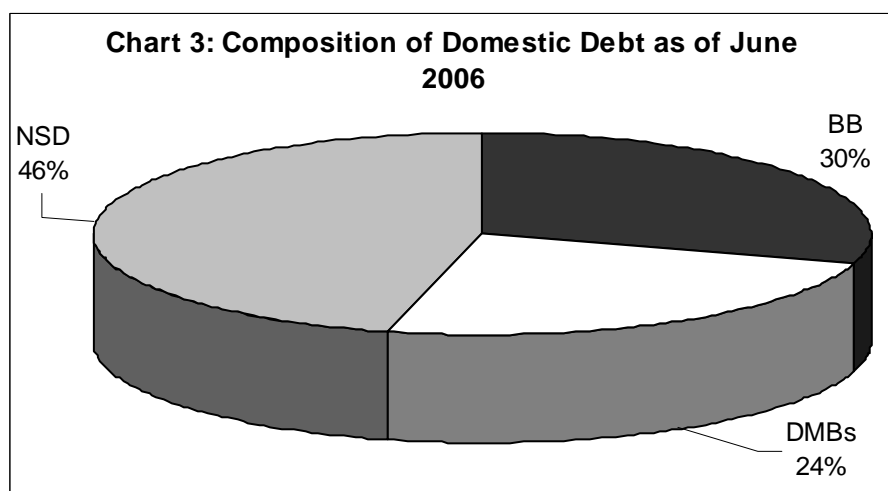
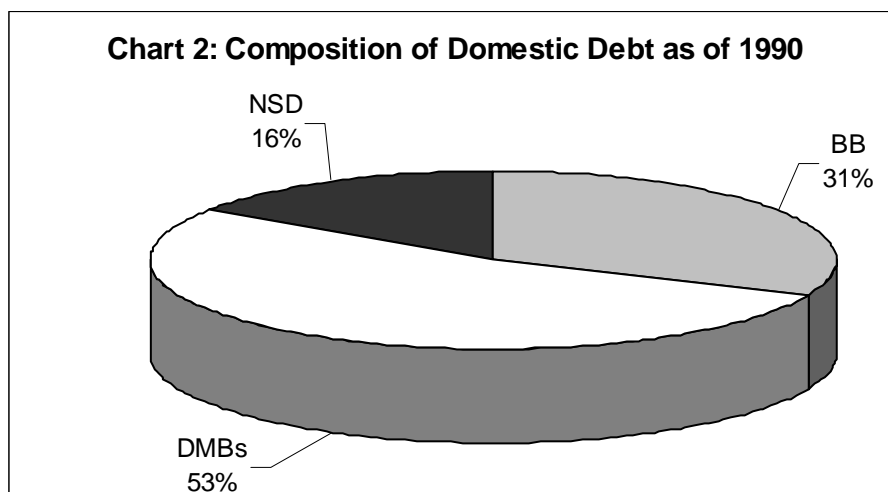
Source: *Economic Trend, Bangladesh Bank (various Issues), Bangladesh Bank Quarterly (Various Issues), and Ahmed and Islam (2006a)*

\*= Treasury Bills rates from 1996/97 to 2005/2006 are 28-day Treasury Bills rate .

\*\*=Treasury bills on Tap was abolished from 1995.

Government borrowing from commercial banks, which generally affects private credit subject to liquidity position, grew by 16.32 percent during 1990-2006 compared to 13.70 percent during 1974-1990. Despite the relatively high growth, the outstanding debt from DMBs stood at Taka 65.98 billion at the end of June FY06, which was Taka 100.51 billion in FY04.

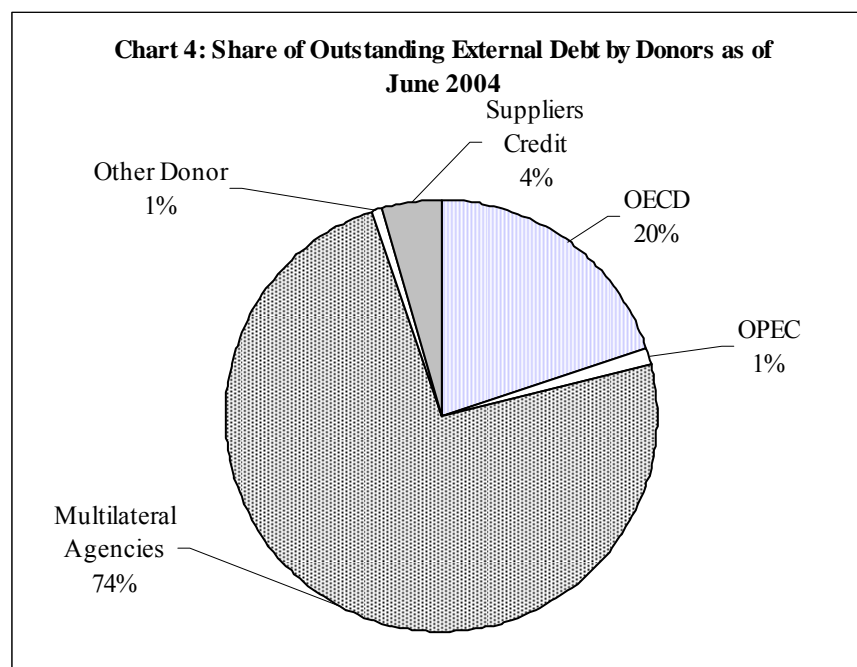
In absence of a broad-based capital market, private sector relies heavily on commercial banks for both term loan and working capital. Market capitalization-GDP ratio for Bangladesh, a good indicator for capital market base, stood at 6 percent of GDP in FY05 (DSE, 2006) as compared to 3 percent in FY01. Thus the credit demand was met by banks and financial institutions which disbursed industrial term loan of Taka 87.00 billion during FY05 (Annual Report, BB). In this perspective, it may be noted that excessive government borrowing from commercial banks may increase lending rate which may partially crowd out private sector credit.



The growth rate of outstanding debt on NSD certificates averaged at a rate of 25.25 percent per year during a 16-year span of 1974-1990 as compared to a 20.32 percent growth rate in 1990-2006. This method of borrowing is expensive. The interest rate is close to market rates but higher than that of the banking system and external financing (Table 3). However, despite the high interest rate, it is non-inflationary. It dampens inflation and encourages household savings. The outstanding stock of NSD certificates sky-rocketed to Taka 394.64 billion at the end of FY06 from Taka 93.00 billion in FY91. Lending and deposits rate of commercial banks are also affected by the high interest rates of NSD certificates (Ahmed and Islam, 2006b). Thus interest rate of NSD certificates is of much significance in maintaining the balance between this form of savings and the banking system.

The trend in external debt-GDP ratio during the 1990-2006 period indicates that the external debt-GDP ratio declined over time. It came down to 30.25 percent of GDP at the end of FY06, from 49.56 percent of GDP at the end of FY88. The ratio for FY88 was the highest during the entire FY74-FY06 period. It may be noted that Bangladesh's external

debt obligation comprises mainly of public sector debt. The share of private sector borrowing is negligible; it is less than 4 percent of the total external debt. The total public sector debt increased from USD 0.501 million in FY1973-74 to about USD 18.90 billion in FY06 (Table 4). Though the external debt obligation in the total aid package of Bangladesh increased over the years, it is still within manageable limits (ERD, 2005). Due to Exchange of Note signed recently between the Governments of Bangladesh and Japan on writing-off principal and interest of 36 Japanese loans signed before 1989, Bangladesh has been exempted from repaying about USD 1.5 billion. Given the fact that most of the debt is owed to multilateral creditors, Bangladesh is not encountering any debt problem at present (Chart 4). According to a recent classification by the World Bank, using present value of total debt service, Bangladesh is a less-indebted country (ERD, 2005).



However, the increasing external debt, together with the expiry of grace periods and unfavorable exchange rate movements, have resulted in increased external debt service. External debt service payments on total public sector debt rose from USD 302 million in FY90 to about USD 644 billion in FY06 which represents 6.18 percent of the country's merchandise exports and 4.23 percent of total foreign exchange earnings (Table 4).

Despite the relatively low cost of external debt services, total interest payment burden in Taka is increasing over time. Total payments went up to Taka 56 billion during FY01-FY06 from Taka 17.57 billion in 1990s. Out of total interest payments, domestic interest payments stood at BDT 45.67 billion during FY01-FY06, reflecting higher interest rate of NSD certificates. The ratio of interest outlay to revenue budget reached 20.14 percent during FY01-FY06 from 14.27 percent in 1990s (Table 5).

Table 4 : Trend in External Debt Amortization and Debt Services (in Million USD)								
Year	Outstanding	Medium and long term debt service Payments			Export earning	Total foreign earnings*	Total DSL as % of total Export earnings	Total DSL as % of total foreign earnings
		Interest	Principal	Total				
1973-74	501	9	9	18	372	419	4.84	4.30
1974-75	974	13	58	71	389	490	18.25	14.49
1975-76	1577	20	36	56	381	474	14.70	11.81
1796-77	1828	28	22	50	417	548	12.00	9.12
1977-78	2783	31	34	65	494	704	13.16	9.23
1978-79	3193	39	50	89	619	898	14.38	9.91
1979-80	3400	42	66	108	726	1228	14.87	8.79
1980-81	4383	41	44	85	710	1364	11.97	6.23
1981-82	4959	47	45	92	626	1285	14.70	7.16
1982-83	5452	51	85	136	687	1533	19.80	8.87
1983-84	5941	58	71	129	811	1686	15.91	7.65
1984-85	6281	64	106	170	934	1661	18.20	10.23
1985-86	7438	73	111	184	819	1634	22.46	11.26
1986-87	8364	81	152	233	1074	2032	21.69	11.47
1987-88	9473	123	166	289	1231	2278	23.47	12.69
1988-89	9879	124	170	294	1292	2453	22.75	11.99
1989-90	10609	116	186	302	1524	2731	19.81	11.06
1990-91	12714	120	197	317	1718	2942	18.45	10.77
1991-92	13330	127	210	337	2994	3406	11.25	9.89
1992-93	13615	135	239	374	2383	3944	15.69	9.48
1993-94	15373	139	263	402	2534	4293	15.86	9.36
1994-95	16767	154	314	468	3473	5490	13.47	8.52
1995-96	15166	153	316	469	3882	5908	12.08	7.94
1996-97	15025	147	316	463	4427	6647	10.45	6.97
1997-98	14033	137	307	444	5172	7495	8.58	5.92
1998-99	14843	166	373	539	5324	7737	10.12	6.97
1999-00	16211	172	447	619	5762	8560	10.74	7.23
2000-01	15074	159	438	597	6476	9117	9.21	6.55
2001-02	16276	151	435	586	5986	9295	9.78	6.30
2002-03	17411	156	452	608	6548	10497	9.28	5.79
2003-04	18511	165	423	588	7603	11899	7.73	4.94
2004-05	18777	185	434	619	8655	13680	7.15	4.52
2005-06P	18908	171	473	644	10422	15224	6.18	4.23

Source: Economic Review, 2006, ERD, and authors' calculation. P= provisional

\* Total foreign exchange earnings= commodity export earnings+ workers remittances+ invisible receipts

Table 5: Trend in Interest Payment on Total Debt in Bangladesh ( In billion Taka)						
Year	Domestic	Foreign	Total	Budget Revenue	Ratio of Interest outlay– Budget Revenue, %	Ratio of Interest to GDP, %
1980s	1.79	2.21	4.01	35.92	10.98	0.84
1990s	11.43	6.14	17.57	117.22	14.27	1.01
2001-2006	45.67	10.34	56.02	279.51	20.14	1.72

Source: Economic Review, 2006 and Authors' own calculation.

Since the interest rates on Government securities were administered and kept well below the market rates of comparable maturity during the eighties and first half of 1990s, the soft option of monetization was considered least burdensome, leading to a deleterious impact on debt management policy and monetary control. It is generally recognized that high level of money financing of deficit leads to high inflation. However, there are few studies that support the fact that such form of deficit financing leads to inflation in Bangladesh. Rangarajan et al (1989) captured the nexus between monetary financing of deficit and inflation in India. A statistically significant relationship can be observed between monetized deficit and growth of domestic debt in India. Therefore, concerns of high levels of public debt for price stability and macro economic balance reinforce the need for stability in debt/GDP ratio in Bangladesh.

#### IV. Assessment of Public Debt Sustainability in Bangladesh

Change in debt-GDP ratio take place over time as a result of the combined effects of certain macro variables namely the interest rate, the exchange rate, budgets deficit and GDP growth. An attempt has been taken for assessing the impact of these factors on the growth of public debt in Bangladesh. The debt-GDP ratio rises when (i) the real interest rate exceeds the real GDP growth, (ii) the exchange rate depreciates, and (iii) the primary budget is balanced or in deficit .The debt dynamics equations are taken from Ley (2003).

##### Total Debt Dynamics:

**1. Change of Total debt:** 
$$\Delta d_t = \frac{r_t - \Pi_t(1 + g_t) - g_t + \varepsilon_t \alpha^f (1 + r_t)}{(1 + \Pi_t)(1 + g_t)} d_{t-1} - (pd_t + \mu_t)$$

Where

$\Delta d_t$  = Change of debt- GDP ratio at t time

$d_{t-1}$  = Stock of debt-GDP ratio

$g$  = real GDP growth

$r_t$  = nominal interest rates of government treasury bill and savings certificates

$\varepsilon_t$  = Exchange rate appreciation / depreciation

$\alpha^f$  = Share of foreign debt

$\Pi_t$  = Rate of inflation

$Pd$  = Primary Budget Balance

$\mu_t$  = Stock change of high powered money to GDP ( $\Delta M / GDP$ )

##### 2. Stress tests for shocks in different components

a. Contribution of real interest rate: 
$$\frac{r_t - \Pi_t(1 + g_t)}{(1 + \Pi_t)(1 + g)} d_{t-1}$$

b. Contribution of the real growth rate: 
$$= \frac{g_t}{(1 + \Pi_t)(1 + g)} d_{t-1}$$

c. Contribution of the exchange rate depreciation/appreciation:  $\frac{\varepsilon_t \alpha^f (1 + r_t)}{(1 + \Pi_t)(1 + g)} d_{t-1}$

**3. Stability of Debt-GDP Ratio:**  $\Delta d_t = \frac{i_t - g_t}{(1 + g)} d_{t-1} - (pd_t + \mu_t)$ . If want  $\Delta d_t = 0$ ,

then,  $\frac{i_t - g_t}{(1 + g)} d_{t-1} = (pd_t + \mu_t)$ , where  $i_t$  = real interest rate. It is implied that it required government primary surplus (including seignorage). The larger the real interest-growth differential,  $i_t - g_t$ , the larger the required surplus. If the interest-growth differential is zero,  $(i_t - g_t) = 0$ , then,  $\Delta d_t = (pd_t + \mu_t)$ .

**4. Explosive Debt-Dynamics (EDDs):** The EDDs are underpinned by the following equations:

1. if  $(1+i)/(1+g) < 1$ , then debt-dynamics convergent and
2. if  $(1+i)/(1+g) > 1$ , debt-dynamics is explosive and adjustment gets larger and larger over time.

To assess debt dynamics in Bangladesh, data on real GDP growth rate, GDP deflator inflation, interest rate (treasury bills and NSD certificates), exchange rate, reserve money, and primary deficit are used for the sample period of FY81-FY06. The estimated results of debt dynamics equations are given in (Table 6). From Table-6, it is clearly evident that changes in debt-GDP ratio showed a mixed trend during FY1981-2006. Change of debt-GDP ratio, on average grew by 2.50 percent in the 1980s, 2.11 percent in the 1990s and 0.63 percent during FY2001-2006. Stress test for the different components indicates that the interest component contributed more to changes in the stock of debt-GDP ratio during the whole sample period compared to the growth component's contribution. Net effect of the interest component stood at 6.21 percent on average during the whole period while growth effect averaged at 2.46 percent. Exchange rate component also contributed to about 2.11 percent during FY81-FY 06 period.

The combined effect of primary budget deficit and changes in high powered money to debt-GDP ratio was strong in the 1980s, which gradually eased during the 1990s and FY 01-FY06 due to improvement in primary balances. Estimated results of EDD indicate that some coefficient values of EDD are less than one for some years. Though the values are lower than 1 but close to 1, which indicate debt-GDP ratio to be explosive. It needs larger adjustment to become convergent. It is worth mentioning here that during the last three years coefficient of EDD remained below one. Bilquees (2003) finds that foreign exchange effect had the strongest effect in pulling up the debt-GDP ratio in Pakistan during FY80-FY03.

Year	Change of Ratio of Debt ( $\Delta d$ )	Interest Rate Contribution	Growth Rate Contribution	Exchange Rate Contribution	Primary Budget Balance (-pd+u)	Explosive Debt-Dynamics (EDD)
1981-82	0.025	0.050	0.010	-0.034	-0.072	0.973
1982-83	-0.030	0.047	0.021	-0.074	-0.028	0.969
1983-84	-0.033	0.015	0.029	-0.020	-0.035	0.909
1984-85	0.059	0.039	0.017	-0.016	-0.093	0.957
1985-86	0.030	0.057	0.022	-0.066	-0.079	0.979
1986-87	0.022	0.031	0.021	-0.012	-0.061	0.951
1987-88	0.041	0.052	0.012	-0.010	-0.049	0.998
1988-89	0.045	0.048	0.015	-0.014	-0.062	0.987
1989-90	0.067	0.067	0.035	-0.012	-0.086	0.985
1990-91	0.026	0.067	0.019	-0.034	-0.044	1.006
<b>Average (FY81-FY90)</b>	<b>0.025</b>	<b>0.045</b>	<b>0.020</b>	<b>-0.029</b>	<b>-0.063</b>	<b>0.967</b>
1991-92	-0.002	0.080	0.031	-0.031	-0.012	1.006
1992-93	0.025	0.081	0.025	-0.012	-0.013	1.033
1993-94	0.027	0.062	0.022	-0.011	-0.030	1.007
1994-95	0.015	0.037	0.027	-0.002	-0.043	0.957
1995-96	0.036	0.073	0.026	-0.006	-0.035	1.009
1996-97	0.020	0.085	0.027	-0.017	-0.021	1.016
1997-98	0.003	0.074	0.025	-0.021	-0.018	0.993
1998-99	0.023	0.083	0.022	-0.020	-0.028	1.010
1999-00	0.038	0.087	0.029	-0.018	-0.037	1.018
<b>Average (FY91-FY00)</b>	<b>0.021</b>	<b>0.073</b>	<b>0.025</b>	<b>-0.017</b>	<b>-0.028</b>	<b>1.005</b>
2000-01	0.027	0.082	0.028	-0.024	-0.028	1.020
2001-02	0.009	0.070	0.023	-0.023	-0.014	1.013
2002-03	0.018	0.075	0.028	-0.003	-0.021	1.001
2003-04	0.002	0.058	0.034	-0.006	-0.019	0.980
2004-05	-0.001	0.064	0.031	-0.014	-0.018	0.982
2005-06	-0.017	0.070	0.035	-0.026	-0.008	0.982
<b>Average (FY01-FY06)</b>	<b>0.006</b>	<b>0.070</b>	<b>0.030</b>	<b>-0.016</b>	<b>-0.018</b>	<b>0.996</b>

*Source: Authors' calculation.*

Debt sustainability is defined as a situation in which a borrower is expected to be able to continue servicing its debt without an unrealistically large correction to the balance of income and expenditure (IMF, 2006). Sustainability thereby encompasses the concepts of solvency and liquidity, without making a sharp distinction between them. Which of these two aspects of sustainability is more relevant in making the sustainability assessment depends on individual country circumstances. From a solvency angle, debt sustainability implies that a debtor must be able to generate sufficient funds in future periods to cover debt-service obligations without indefinitely accumulating debt. In other words, the sovereign must be able to produce a level of primary surpluses that over the medium term, would maintain or lower the ratio of debt to GDP. From a liquidity angle, debt sustainability implies that the debtor must be able to find sufficient amounts of financing



in each period to close any financing gaps without having to resort to disorderly adjustment.

The underlying theoretical notion of fiscal stability and sustainability is that debt/output ratio would inexorably grow to explosive proportions if the real interest rate exceeds real output growth of the economy. Even if output growth exceeds the interest rate, persistent primary account deficits may lead to steady growth in debt/output ratio towards a limit where private savings may become inadequate to absorb the financing requirement of the Government. This necessitates adequate primary surpluses in the budget for maintaining long-term sustainability of the debt/GDP ratio (Bispham 1987, Blanchard 1990, Hamilton and Flavin 1986, Mason 1985, Spaventa 1987, referred in Pillai et al, 1997). However, mere stabilization of the debt/ GDP ratio is not a sufficient condition for fiscal stability if the level at which the ratio is stabilized is very high so as to affect the prospects of monetary stability and growth.

Another interpretation of sustainability of fiscal policy is ensuring Government's solvency constraint, which requires that in an inter-temporal budget constraint, the present value of future government revenues equals the sum of the outstanding debt and the present value of the future stream of expenditures. Buitert (1985) evaluated the Government as solvent when the present value of expected terminal net liabilities (i.e., indebtedness at the end of the planning horizon) is zero. If the real interest rate exceeds the long run growth rate, a sufficient condition for the solvency constraint to be satisfied is that the ratio of debt to trend output would remain bounded. The government can, however, be solvent even if its debt/GDP ratio grows unbounded, provided it is able to raise any non-distortion taxes in order to meet its expenditure obligations. But given the rising debt and the real interest rate exceeding the output growth rate, and ignoring seignorage revenue, the solvency condition eventually requires generation of primary surpluses at some point of time in the future.

In the Bangladesh context, the trends in primary deficits and debt /GDP ratio reveal that till now, the growth in debt/ GDP ratio did not pose any serious concern to stability of fiscal policy. Chart 1 indicates some volatility in the debt-GDP ratio, while fiscal deficit has been declining over time since the 1990s after adoption of fiscal consolidation in the early 1990s. The debt-dynamics turned more favorable during FY01-FY06 as compared with 1980s. The primary deficit and domestic debt as ratio to GDP, on average, declined to 2.70 percent and 49.52 percent, respectively during FY01-FY06 from 4.30 percent and 50.86 percent in FY91. Real interest-real GDP growth differential ( $r-g$ ) was positive (0.5 percent) during the 1990s, which turned to negative (-.4 percent) during FY01-FY06.

In comparison with South Asian countries, debt-GDP ratio of Bangladesh is lower than that of India, Pakistan and Sri Lanka. Debt-GDP ratio for Bangladesh was 50.43 percent in 2001 while it was 55.92 percent for India and 148 percent for Sri Lanka. The ratio for Pakistan stood at 67.9 percent in 2004 (Table 6).

The fiscal stabilization measures initiated during the nineties affected a sharper correction in primary account deficit so as to bring about a turn around in the public debt position during FY01-FY06. Considering the trend of present interest rate, GDP growth rate, exchange rate, inflation, burden of debt services, and debt dynamics, the present level of debt/GDP ratio would be of a little concern from the view point of sustainability of public debt in the medium term.

Year	Bangladesh	India	Pakistan	Sri Lanka
1993	54.23	53.71	79.43	96.80
1994	57.37	55.63	0.00	94.86
1995	55.68	53.18	0.00	94.65
1996	49.68	51.03	0.00	92.34
1997	48.67	49.38	0.00	85.82
1998	45.66	51.12	79.08	90.84
1999	46.68	51.22	0.00	95.06
2000	50.51	52.72	74.67	96.90
2001	50.43	55.92	-	148.16
2002	53.85	60.14	-	105.54
2003	52.47	63.30	59.88	105.83
2004	52.26	62.92	67.9	98.82
2005	50.88	64.22	-	-
2006	50.86	62.17	-	-

*Source: IFS, IMF and authors' calculation, Hand Book of Statistics, RBI*

*Note: Data for Bangladesh indicate end June.*

## V. Conclusion

Bangladesh has been following a moderate expansionary fiscal policy since the 1990s for achieving sustained higher growth to reduce poverty and to meet MDGs. In the wake of persistent fiscal deficit along with trade deficit and savings-investment gap, debt has been accumulating over time. In this backdrop, the main objectives of the paper have been to: (i) review debt composition, debt financing and its implications, and (ii) asses and analyze of debt sustainability of Bangladesh. Data have been compiled from published documents and descriptive statistics have been used for trend analysis. For assessing debt dynamics sustainability, some equations have been estimated for the sample period of FY81-FY06. Major findings are summarized as follows:

- Total gross nominal debt-GDP ratio with some fluctuations stabilized at 51.05 percent, on average, during FY01-FY06 from 56.95 percent in 1980s. Domestic debt increased to 19.24 percent during FY01-FY06 from 13.38 percent in the 1980s, while external debt-GDP ratio declined to 32.74 percent during FY01-FY06 from 43.57 percent in the 1980s.
- Debt monetization through borrowings from Bangladesh Bank, however, grew faster, by 19.47 percent during the period FY90-FY06 as compared to 7.40 percent growth during FY74-FY90. As a result, reserve money and broad

money grew by 12.46 percent and 14.23 percent, on average, respectively during FY90-FY06.

- The share of the component of debt financing, i.e., borrowing from public and commercial banks, has been changing over time. The share of outstanding debt of NSD in domestic debt increased from 16 percent at the end of June 1990 to 46 percent at the end of June 2006. The share of DMBs, on the other hand, declined to 24 percent at the end of June 2006 from 53 percent at the end of June 1990.
- In the face of a relatively narrow-based capital market, a growing credit demand by private sector and in the virtual absence of the bond market, Government has increased debt financing through NSD certificates. Though expensive, it encourages private savings, as reflected in narrowing of the savings-investment gap.
- Interest payment on both domestic and external debt increased by three-folds to Taka 56.34 billion during FY01-FY06 as compared to the level of the 1990s, which is 20.14 percent of total revenue expenditure and 1.72 percent of GDP. Out of total interest payment, domestic interest stood at 45.67 billion during the period.
- In analyzing debt dynamics of Bangladesh, it is seen that interest rate, exchange rate, GDP growth, primary deficit and change of reserve money have combined affect in changing the debt stock. Estimated debt dynamics equations indicate that the interest rate component has exhibited stronger influence than that of the growth component in changing total debt stock during the sample period of FY81-FY06. Primary deficit and exchange rate depreciation also influenced in changing debt stock.
- Though there has been some volatility in debt dynamics during the whole sample period, explosive debt dynamics (EDD) coefficient during last three years indicate that debt dynamics was convergent. Considering all factors of recent debt-dynamics, it seems that debt-GDP ratio is sustainable.

To maintain sustained fiscal sustainability following policy measures may be addressed:

- Interest rates on NSD certificates be maintained to an extent such that real interest rates are well below the real output growth.
- Streamlining/rationalization of tax revenue and tax expenditure may be geared up in such a way that recent pace of reducing primary deficit may be continued.
- A rigorous research may be conducted to identify the relation between debt financing from the banking system and the possibility of crowding out of private sector investment in Bangladesh.
- There is an urgent need for greater coordination between monetary and fiscal policies for improving the primary deficit along with stable inflation, exchange rate and GDP growth to reach a long term sustainable path of debt dynamics.

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