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Analyzing Bangladesh's Debt Sustainability Using SimSIP Debt

Bernhard G. Gunter and A. F. M. Ataur Rahman*

Abstract

The ability to pay for a government-led investment strategy to achieve the millennium development goals (MDGs) is determined by the resources available to the government through economic growth, taxation, loans, and grants. Unsustainable public debts increase poverty directly through negative impacts on economic growth as well as indirectly through cuts in spending. Hence, the issue of fiscal debt sustainability is critical for achieving the MDGs. In this paper, we use the debt projection module of SimSIP Debt to project the evolution of Bangladesh's public debt over a 15-year horizon (from fiscal year 2006 to fiscal year 2021) under three different macroeconomic scenarios and two different financing scenarios of an ambitious government-led investment strategy.

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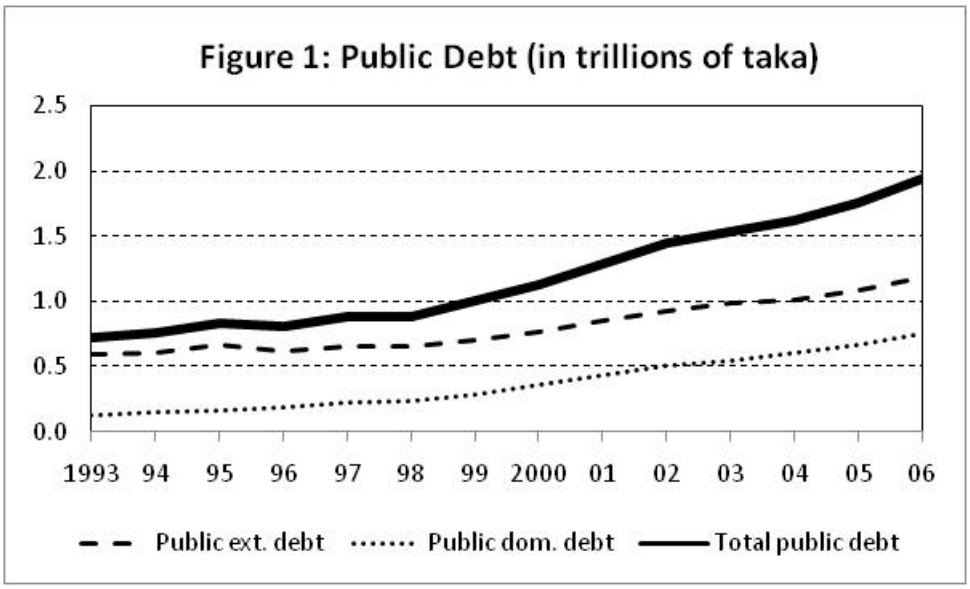
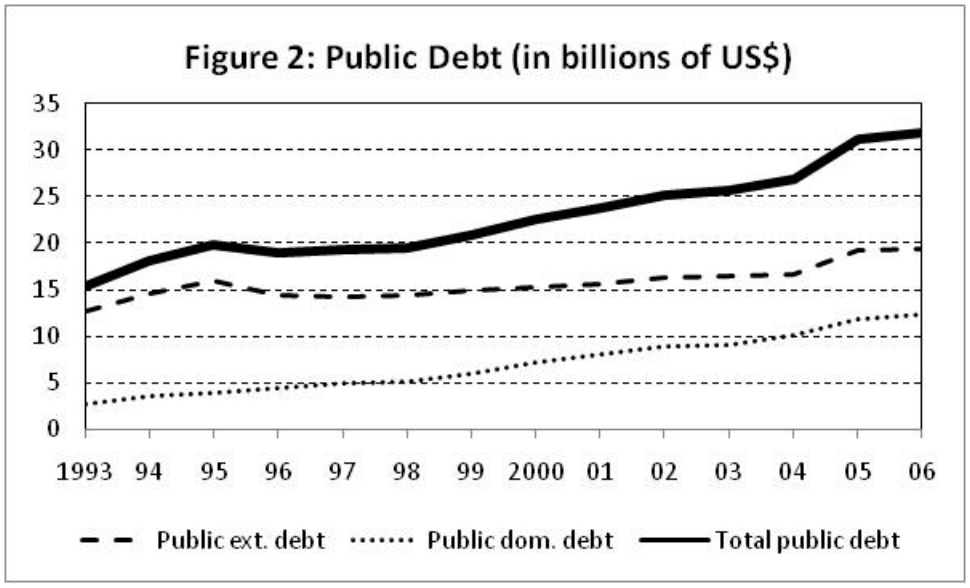
I. Introduction

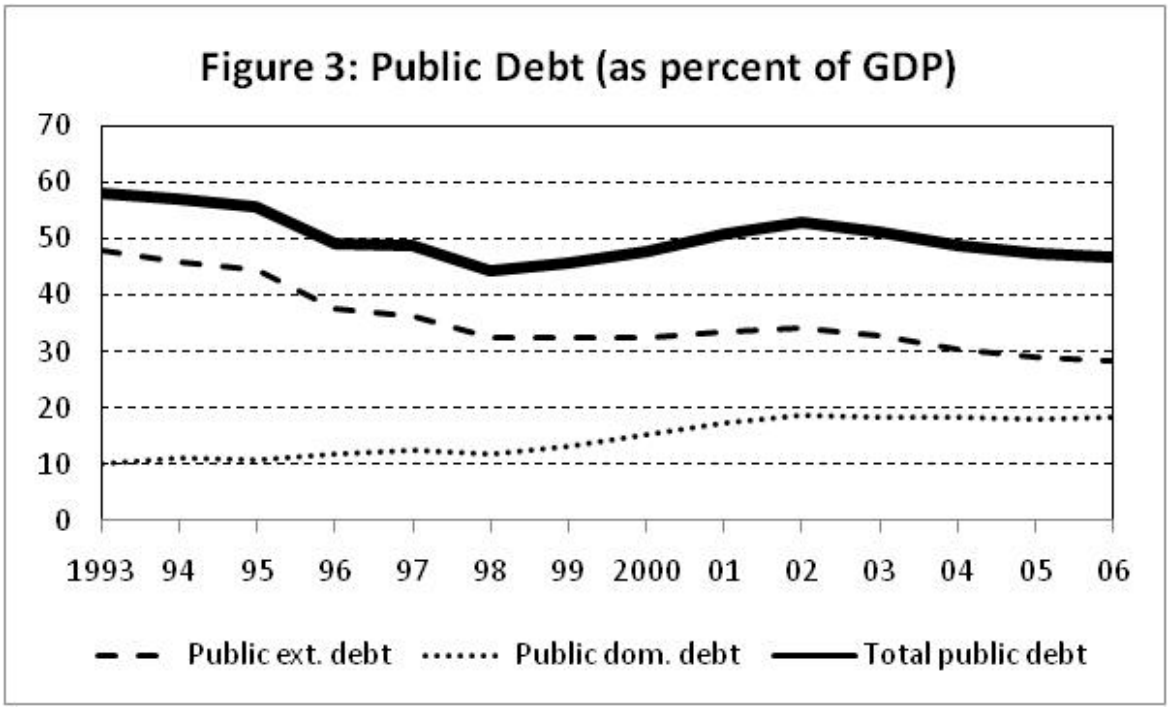
As Figure 1 shows, at the end of 1993, Bangladesh's total public debt amounted to 725 billion taka. Six years later, at the end of 1999, it just surpassed the 1 trillion level; and at the end of 2006, Bangladesh's total public debt amounted to nearly 2 trillion taka (about US$32 billion, see Figure 2).[1] This increase in public debt levels has worried many observers inside and outside Bangladesh.





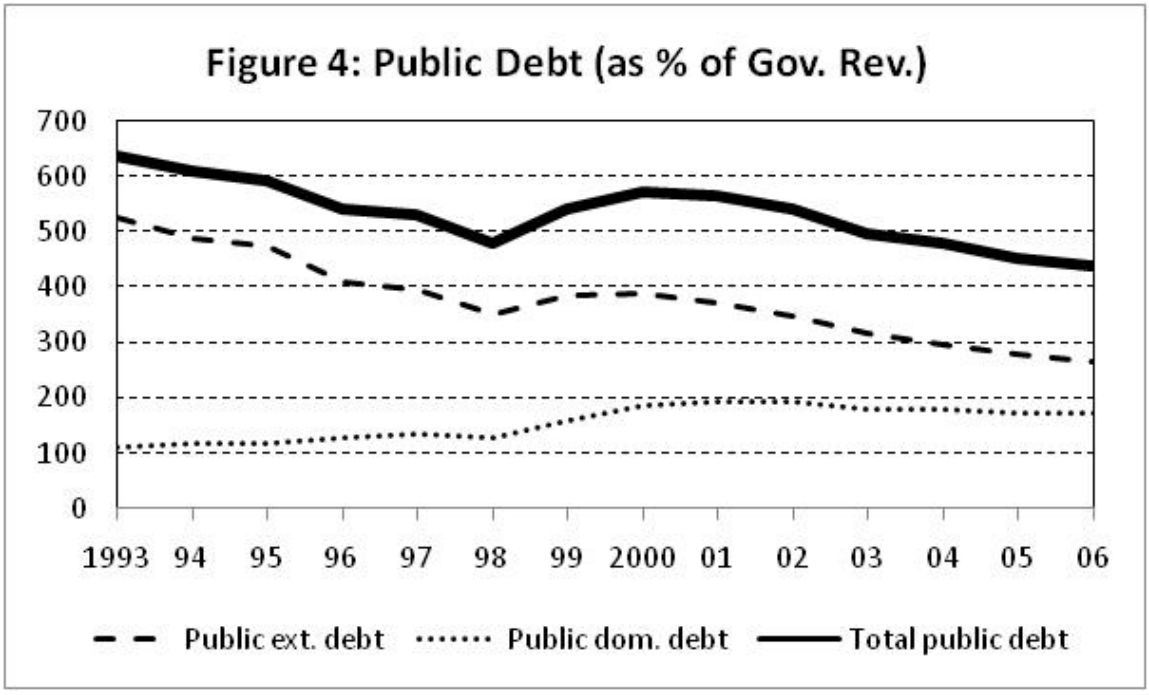
[1] Unless otherwise stated, all data has been taken from three IMF Country Reports and/or their corresponding Statistical Annexes for Bangladesh; see IMF (1998), (IMF (2003), and IMF (2007). Fiscal data refers as reported in IMF Country Reports to central government operations, which excludes grants that are provided directly to sectoral ministries as well as some debt to public corporations. Years are always expressed in terms of fiscal years (i.e., fiscal year 1993 covers July 1992-June1993).

However, as Figure 3 shows, Bangladesh's public debt has actually decreased in terms of gross domestic product (GDP), from 58 percent in 1993 to 46.7 percent in 2006 (including a temporary and limited increase from 1998 to 2002).

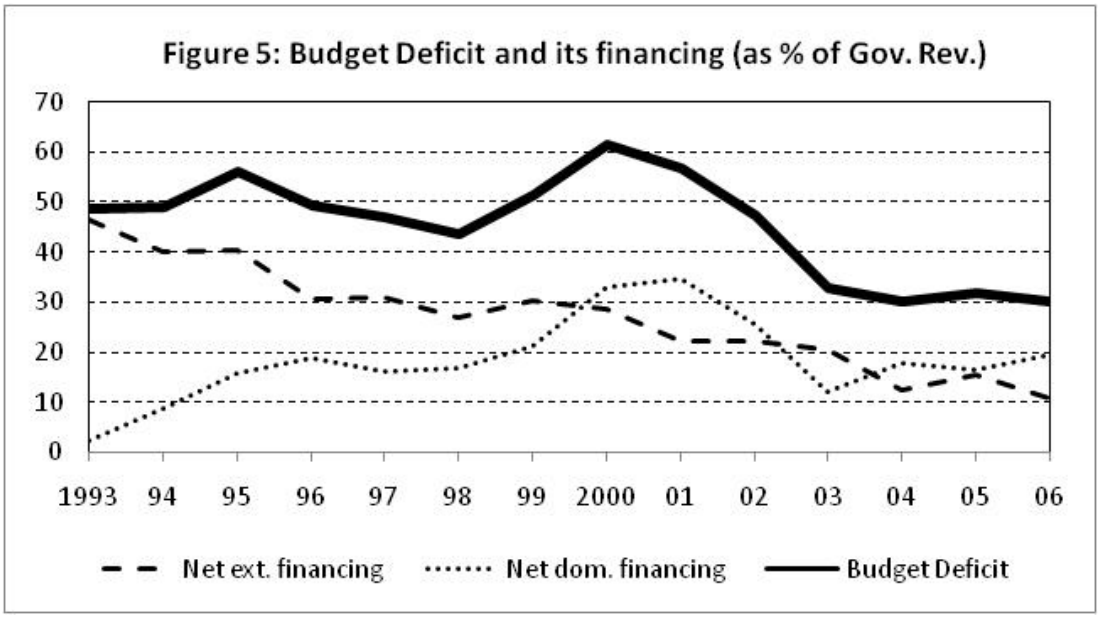


Nonetheless, there is a clear divergence in trends between external public debt and domestic public debt, both as percentages of GDP, with external public debt showing an overall decreasing trend, while domestic public debt has been increasing from 1993 to 2002 (reaching a maximum 18.7 percent of GDP) and stabilized at around 18 percent of GDP since 2002. The overall decline in total public debt to GDP is due to the fact that the mostly decrease in external public debt to GDP has more than compensated for the initial increase and recent stability in domestic public debt to GDP.

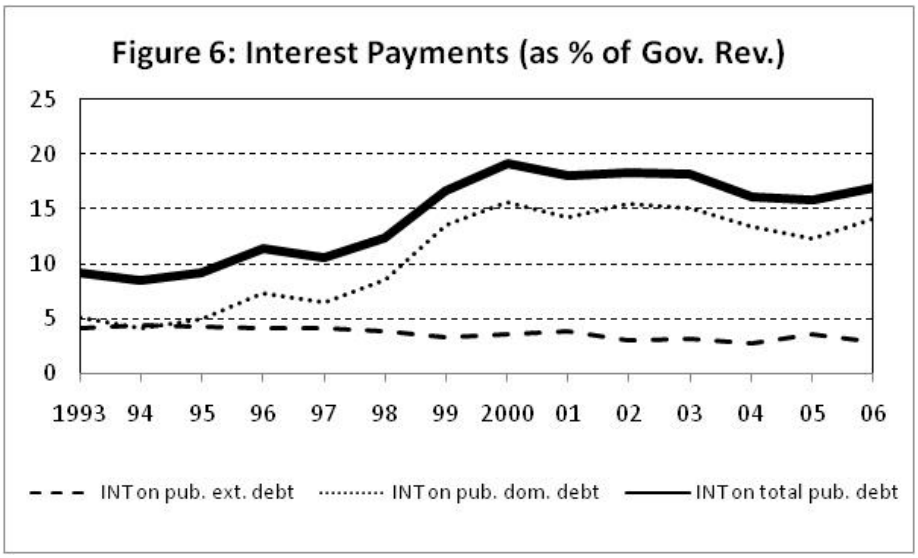
A similar picture evolves if expressing Bangladesh's total public debt in terms of government revenues. As Figure 4 shows, Bangladesh's external public debt has decreased from 527 percent of government revenues in 1993 to 267 percent of government revenues in 2006. Bangladesh's domestic public debt has increased from 111 percent of government revenues in 1993 to 192 percent in 2001 and decreased slightly to 171 percent of government revenues in 2006. This resulted in an overall decrease in total public debt from 638 percent of government revenues in 1993 to 438 percent of government revenues in 2006 (though with a temporary increase from 1998-2000).



As Figure 5 shows, the substitution of external borrowing with domestic borrowing started in the early 1990s. In 1993, domestic financing amounted to less than 5 percent of the government's budget deficit, while external financing amounted to more than 95 percent. The share of domestic financing of the budget deficit increased to over 60 percent in 2001, after which it displays some volatility, though reaching a record high of 64 percent in 2006.



The fiscal burden of the relatively sharp increase in domestic public debt is clearly visible in Figure 6, showing the evolution of interest rate payments on external and domestic pubic debts as percentages of government revenues.

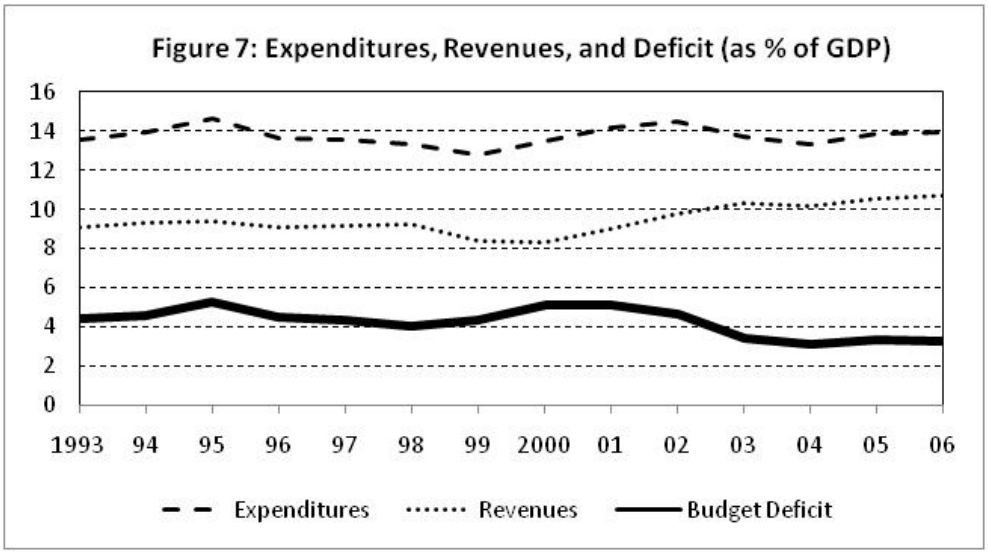


While Bangladesh's public debt seems to be sustainable based on the trends shown in Figures 3 and 4, its fiscal burden is limiting Bangladesh's ability to pay for social spending programs to achieve the Millennium Development Goals (MDGs), especially if keeping in mind that additional investments needed to achieve the MDGs in Bangladesh are estimated to amount to about US$8 billion per year.[2] Indeed, in 2006, the Bangladeshi government paid 2.8 percent of its revenues as interest payments on its external debt while it paid 14.1 percent of its revenues as interest on its domestic public debt. Including due principal repayments, Bangladesh's annual debt service payments amount currently to nearly 100 percent of government revenues. The government is only able to pay this large debt service by rolling over the due principal repayments in terms of new borrowing, especially domestic borrowing.

As Figure 7 shows, expenditures of the Bangladeshi government remained relatively stable at about 14 percent of GDP, while government revenues show an overall increasing trend, especially after the temporary decrease in 1999 and 2000. With government expenditures to GDP levels relatively stable, changes in government deficits reflected thus far mostly changes in government revenues. However, even if government revenues would continue to increase and non-essential expenditures would be cut

[2] Based on the calculations of the United Nations (UN) Millennium Project (2005), average investments needed per person over a ten-year period (2006-2015) to meet the MDGs amount to US$1047, of which current spending (including grants and loans) cover less than half, leaving a MDG financing gap of US$587 over a ten year period, or about US$59 per year and per person. Hence, additional investments needed per year to achieve the MDGs in Bangladesh would amount to about US$8 billion, which is nearly 7 times the aid level Bangladesh currently receives (US$1.2 in 2006). It should be stressed that the funds for such a nearly 7 times increase in aid levels to Bangladesh as well as for similar increases to other needy countries would be easily available if the international donor community would make good on the long-standing goal of providing 0.7 percent of gross national income (GNI) as aid.

drastically, given that the needed additional expenditures to reach the MDGs in Bangladesh (US$8 billion) amount to about 12 percent of the 2006 GDP level, the government led investment strategy to achieve the MDGs could not be financed without external grants and/or a significant increase in budget deficits.



Following the considerable amount of debt relief that has been provided to about half of the so-called least developed countries (LDCs) under recent international debt relief initiatives,[3] Bangladesh has today one of the highest public debt levels among LDCs, especially if expressed in terms of government revenues. As has been detailed by Gunter (2002, 2003, and 2007) and UNCTAD (2004), the main source for this outcome is due to the fact that domestic public debt is not taken into account when determining a country's qualification for recent debt relief initiatives. Bangladesh's public debt levels are lower than those of most other South Asian countries (e.g. that of India), Bangladesh's economy is also far more vulnerable to shocks and therefore far less able to sustain higher debt levels.

This paper analyzes the sustainability of Bangladesh's public debt under alternative assumptions and financing scenarios. In order to better assess Bangladesh's debt sustainability, we make use of SimSIP Debt, a debt projection module developed by Gunter, Lopez, Ramadas and Wodon (2002).[4] This debt projection module is used to simulate the evolution of Bangladesh's public debt over a 15-year horizon, based on initial conditions and projections for government expenditures, government revenues, and other parameters. Given that Bangladesh's external debt is mostly concessional, this

[3] These include the Heavily Indebted Poor Country (HIPC) Initiative, post-HIPC Paris Club debt relief, and Multilateral Debt Relief Initiative (MDRI), whereby the MDRI has been based on the human development approach to debt sustainability as it provided 100% debt relief on certain debts of MDRI eligible countries.
[4] The SimSIP Debt Simulator and its Manual are available free of costs on the World Bank's SimSIP website: http://www.worldbank.org/simsip.

analysis looks at the level and trends of net present value (NPV) debt sustainability indicators and (nominal) debt service to government ratios.[5]

The next section (Section II), presents some approaches, concepts, and examples for analyzing debt sustainability (Section II.1-II.3) as well as the theoretical background for the debt projection module of SimSIP Debt (II.4). The third section (Section III) then simulates the evolution of Bangladesh's public debt for three alternative macroeconomic scenarios while keeping the share of priority spending to GDP fixed for all three scenarios. Section IV goes one step further by simulating the evolution of Bangladesh's public debt for two different financing scenarios of an ambitious government-led investment strategy, for example to achieve the MDGs. While most assumptions (and the results that depend on them) are for illustrative purposes, they do imply policy implications for the government as well as the donor community, which are then summarized in the last section of the paper (Section V).

II. The Theory of Analyzing Debt Sustainability

A common definition of debt sustainability is whether a country can meet its current and future debt service obligations in full, without recourse to debt relief, rescheduling, or accumulation of arrears. However, to determine if a country's debt is sustainable or not is a complex issue and there are a variety of approaches of how to analyze debt sustainability. The theoretically most appealing approach is to derive debt sustainability criteria based on discounting the net present value of the government's debt over an infinite horizon. However, the limitations of this approach has led to the development of more practical debt sustainability indicators that are usually based on a ratio of a debt variable to another key macroeconomic variable. Another approach is to look at the consistency of the government's budget deficit with the government's desired level of indebtedness; see Gunter, Lopez, Ramadas and Wodon (2002) for more details.

II.1. External versus Fiscal Sustainability

In addition to the different approaches, there are two main criteria to assess debt sustainability: one criterion is to look at the external sustainability of a country's debt; the other criterion is to look at the fiscal sustainability of a country's debt. The external criterion is supposed to compare a country's external debt or debt service to a country's exports. The fiscal criterion compares a country's public and publicly guaranteed debt or debt service to government revenues. While the results based on these two categories of debt sustainability criteria yield many times to similar results, external sustainability is neither necessary nor sufficient for fiscal sustainability and vice versa.

II.2. Nominal Stock of Debt versus Net Present Value of Future Debt Service

Excluding debt sustainability indicators that compare current debt service obligations to some macroeconomic variables (e.g., the debt service-to-export ratio), there are two main

[5] Bangladesh's debt sustainability has recently also been analyzed by Islam (2007) and Islam and Biswas (2006). Their analyses differ considerably to our analysis as they use the nominal debt sustainability concept, assess debt sustainability based on changes and differentials, and are only backward-looking (covering data up to fiscal year 2007).

concepts of defining debt sustainability indicators. The more traditional concept compares the nominal stock of disbursed and outstanding debt to some macroeconomic variables. The more sophisticated concept calculates first the NPV of all future debt service on disbursed and outstanding debt and compares then the NPV debt to some macroeconomic variable (like GDP, exports, and/or government revenues). As shown in Gunter (2001), the debt-to-government ratio is the most relevant indicator for the determination of a debt overhang. The NPV calculation sums up all future debt service obligations, whereby future debt service obligations are discounted depending on when the debt service is due. This is especially important if a country has a lot of concessional debt.

There are many options of how to determine discount rates, and depending on user preferences, distinctions can be made in terms of

- the currency in which future debt service is payable
  (e.g., the discount rate for the US Dollar or the British Pound),
- the kind of reference rate to use for the discount rate
  (e.g., the lending rate or the borrowing rate),
- the time-period for the discount rate
  (e.g., the short-term or long-term lending rate), and
- the period over which the discount rate is averaged
  (e.g., over the last 6 months or the last 10 years).

Due to practical and theoretical limitations of using a complex definition of short-term discount rates to determinate long-term debt sustainability, the SimSIP Debt's Debt Projection Module uses only one discount rate, which is however flexible over time.[6]

II.3. Examples of Debt Sustainability Indicators

The debt indicator approach defines debt by a variety of macroeconomic debt sustainability indicators. The following are some examples of debt sustainability indicators as they are used in a) the World Bank's Global Development Finance (GDF), b) the HIPC Initiative, c) target 15 of the MDGs, and d) the European Union's (EU) Maastricht Treaty.

The World Bank's Global Development Finance (GDF, formerly World Debt Tables) classifies external indebtedness based on two ratios, the ratio of the NPV of total external debt (calculated based on all future debt service) to the three-year backward looking average of gross national product (GNP), and the ratio of the NPV of total external debt (calculated based on all future debt service) to the three-year backward looking average of exports of goods and services (including workers' remittances). If either ratio exceeds a critical value—80 percent for the NPV debt to GNP ratio and 220 percent for the NPV

[6] As is illustrated in more details in Gunter (2002), there is no definitive correct or wrong concept of how to define discount rates, however, it is generally preferred to use long-term average discount rates in order to avoid changes in the resulting NPV calculations that are due to marginal and arbitrary changes in discount rates.

debt to exports ratio—the country is classified as severely indebted. If the critical value is not exceeded but either ratio is three-fifths or more of the critical value (that is, 48 percent for the present value of debt service to GNP and 132 percent for the present value of debt service to exports), the country is classified as moderately indebted. If both ratios are less than three-fifths of the critical value, the country is classified as less indebted.[7]

In the framework of the HIPC Initiative, a country is considered to have a sustainable external debt if the ratio of the present value external debt (calculated based on all future debt service) to the three-year backward looking average of exports of goods and non-factor services (excluding workers' remittances) is smaller or equal to 150 percent. However, given to the limitations of the export criterion, especially for countries with a high export to GDP ratio, the HIPC Initiative added a fiscal criterion of debt sustainability for countries that have an export to GDP ratio of at least 30 percent and a government revenue to GDP ratio of at least 15 percent. For HIPCs satisfying both of these thresholds, the HIPC Initiative considers an additional fiscal criterion: a HIPC's external debt is sustainable if the ratio of the present value of public and publicly guaranteed external debt to government revenues is smaller or equal to 250 percent.

Within the set of MDGs, target 15 is defined as to deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long-term. The four indicators for this target are (a) the proportion of official bilateral HIPC debt cancelled, (b) the debt service as a percentage of exports of goods and services, (c) the proportion of official development assistance (ODA) provided as debt relief, and (d) the number of countries reaching HIPC decision and completion points.[8]

The European Union's (EU) Maastricht Treaty (signed in early 1992) limited the ratio of government debt to GDP to 60 percent, though it was also agreed that higher ratios are acceptable as long as the debt to GDP ratio is sufficiently falling over time. Indeed, most countries of the EU had debt to GDP ratios above 60 percent for most of the times during the 1990s, and at least three countries (Belgium, Greece, and Italy) had debt to GDP ratios of more than 100 percent. Anyway, it should be stressed that the Maastricht Treaty's debt to GDP ratio should not be interpreted as debt sustainability indicator, but as convergence criteria set by a group of European countries that intended to adopt a single currency by the end of 2001.

The three most commonly used macroeconomic variables used as a denominator of a debt ratio or a debt service ratio are (a) gross domestic/national product (GDP/GNP), (b) exports, and (c) government revenues. There are some options on how to define each of these three macroeconomic variables. For example, exports could (a) in- or exclude worker's remittances, (b) in- or exclude re-exports (exports that simply pass through the country), and (c) be based on current-year values or multi-year averages.

[7] Please see http://www.worldbank.org/prospects/gdf2002/ for more detailed information.
[8] Please see http://www.undp.org/mdg/ for further information.

Reflecting the fact that for a broad group of countries debt sustainability cannot be determined by one specific indicator, the debt projection module adopts a flexible approach to debt sustainability, which provides the user with various options on how to define debt sustainability.

II.4. Theoretical Foundation of the Debt Projection Module

The Debt Projection Module calculates the values for various debt indicators based on three modeling elements: the modeling of government expenditures, the modeling of government revenues, and the specification of the government deficit, which is financed by new borrowing after deducting grants and debt relief. Both, expenditures and revenues are influenced by the level of gross domestic product (Y), which is determined by the previous year's level [Y(t-1)], the projected growth rate for the year (g), and the inflation rate (π):

$$Y(t) = (1+\pi(t)) * (1+g(t)) * Y(t-1) \qquad (1)$$

On the expenditure side, the module differentiates between interest payments on public foreign debt, interest payments on public domestic debt, principal repayments on foreign and domestic debt, and other government expenditures. The average interest rates (not the interest payments) on outstanding foreign and domestic debts are exogenously fixed for any given year due to loan contracts, though the module differentiates between interest rates on public domestic and foreign debt. Given that new loans (due to principal repayments and deficit financing) are generally a small fraction of the debt stock, interest rates on domestic and foreign debts change only slowly over time. For simplicity, principal repayments are financed by new loans, though not necessarily from the same source (domestic or foreign) and at the same interest rate and maturity. All other expenditures (all expenditures excluding interest and principal payments) are a predetermined percentage of GDP, though this percentage rate may change over time. If we denote the interest rates on domestic and foreign debt by i_f and i_d (averages for the various loan contracts), the stocks of debt by $D_f(t-1)$ and $D_d(t-1)$, and the exchange rate by $E(t)$, we have three kind of expenditures: interest payments on foreign government debt $[i_f(t-1)*D_f(t-1)*E(t)]$; interest payments on domestic government debt $[i_d(t-1)*D_d(t-1)]$; and government expenditures on social and non-social sectors $[G_{sec}(t)] = \alpha(t)*Y(t)$. Total government spending is:

$$G(t) = i_f(t-1)*D_f(t-1)*E(t) + i_d(t-1)*D_d(t-1) + \alpha(t)*Y(t) \qquad (2)$$

On the revenue side, we simplify the analysis by combining tax-, seignorage- and all other non-tax revenues to one percentage share [$\beta(t)$] of GDP. Changes over time in this percentage share reflect changes in tax rates, the efficiency of revenue collection, and money-financing,[9]. The simulator calculates the intermediate values based on a linear trend. Grants [N(t)] and debt service relief [DSR(t)] are exogenously determined by foreign donors. Like foreign borrowing, grants and debt service relief are converted into domestic currency at the end of each period. If revenues before grants and before debt relief are denoted by $REV_{bef}(t) = \beta(t)*Y(t)$, revenues with grants and debt relief are:

[9] To avoid negative implications of increased money-financing on growth, money-financing is usually restricted. In general, the non-inflationary level of seignorage is limited to about one percent of GDP.

$$REV_{aft}(t) = \beta(t)*Y(t) + E(t)*N(t) + E(t)*DSR(t). \quad (3)$$

Budget deficits [BD(t)] are simply the difference between total revenues (including grants and debt relief) and total government expenditures:

$$BD(t) = G(t) - REV_{aft}(t) \quad (4)$$

The module assumes that the government faces no constraints in financing expenditures through new borrowing, and the user is free to choose what share of the new debt comes from domestic sources. If new domestic and foreign borrowing by the government are denoted respectively by $BD_d(t)$ and $BD_f(t)$, the change in debt is:

$$BD(t) = E(t)*BD_f(t) + BD_d(t) \quad (5)$$

The simulator makes no assumptions for the impact of new borrowing on GDP growth, inflation, the exchange rate, and the level of loan concessionality[10]. While the assumptions for GDP growth, inflation, exchange rate depreciation, and average interest rates on domestic and foreign loans are all exogenous variables, the module allows to adjust the growth rate of real GDP downward, the inflation rate and the exchange rate depreciation upward, and the interest rates on domestic and foreign loans upward the higher the average ratio of government deficit to GDP is over the projection period. For countries with sustainable poverty reduction strategies in place, these considerations are less crucial since consultations with donors would reduce the existence of excessive financing gaps. Combining (4) and (5) yields:

$$G(t) - REV_{aft}(t) = BD(t) = E(t)*BD_f(t) + BD_d(t) \quad (6)$$

The model is dynamic since the current year's budget deficit is linked to the previous year's budget deficit through the current year's total government expenditures that include interest payments on previous year's debt stock. Once the level of debt is known over time, it is easy to compute the NPV of a country's public foreign debt by using debt service projections based on the average interest rate and the average maturity of outstanding public foreign debt. For a country's public domestic debt and a country's private foreign debt, the NPV values are set equal to the nominal values.

III. Projections for Bangladesh's Debt under Alternative Scenarios

We simulate the evolution of Bangladesh's public debt from 2006-2021, based on initial conditions and projections for government expenditures, government revenues, and some other parameters. Hence, we include all public debt (domestic and external) and exclude

[10] In reality, increased borrowing tends to increase the growth rate of real GDP up to some critical level (which is difficult to determine), and consistently high government deficits tend to have negative impacts on real GDP growth and price stability. Depending on the country's access to foreign concessional financing, the costs of new borrowing may also increase with a rising fiscal deficit. At low levels of fiscal deficits, the portion of concessional financing will be relative high. With rising financing gaps, more and more new loans will have increased interest rates.

all private debt. Given that Bangladesh has considerable amounts of both concessional external and non-concessional domestic debts, we calculate the debt stock indicators in NPV terms. We first analyze Bangladesh's fiscal public debt sustainability under three different macroeconomic scenarios and then simulate the sustainability of Bangladesh's fiscal debt for two alternative financing scenarios of an ambitious government-led investment strategy to achieve the MDGs.

III.1. Alternative Macroeconomic Scenarios

The three alternative scenarios constitute (i) a baseline scenario based on historical values, (ii) a relatively arbitrary pessimistic scenario, and (iii) a relatively arbitrary optimistic scenario, whereby we always provide simulations for Bangladesh's NPV public debt-to-GDP ratio, the NPV public debt-to-revenue ratio, and the public debt service-to-revenue ratio. The actual initial conditions for 2006 and the baseline macroeconomic scenario which is mostly based on an indicator's historic averages (indicated by an "h" behind its numerical value) of 2002-06 are provided in Figure 8.[11]

Figure 8: Initial conditions and baseline macroeconomic scenario assumptions

	Public Ext. Debt		Nominal
	Stock	Int. Pay.	GDP
Initial Value	17,701	186	61,893

	Grants	Exports	Excha. Rate (T/$)
Initial Value	0	10,526	67.2
Growth (t0)	0	17.7	9.4
Growth (t15)	**0**	**8.3 (h)**	**5.0 (h)**

	Discount rate (%)	Interest rate (%)	Inflation rate (%)	Real GDP growth (%)	Rev. to GDP(%)	P.Spe.to GDP(%)	Average Maturity (years)
Value (FY06)	**5.0**	1.05	7.2	6.6	10.7	12.1	15
Value (FY21)	**5.0**	**1.05**	**5.3 (h)**	**5.7 (h)**	**15.7 (h)**	**17.1**	**15**

	Public Dom. Debt	Interest on Public Domestic Debt
Initial Value	11,265	932

	Share of Dom. Financing (%)	Interest rate (%)	Discount rate (%)	Average Maturity (years)
Value (FY06)	64	8.27	**8.27**	3
Value (FY21)	**64**	**8.27**	**8.27**	**3**

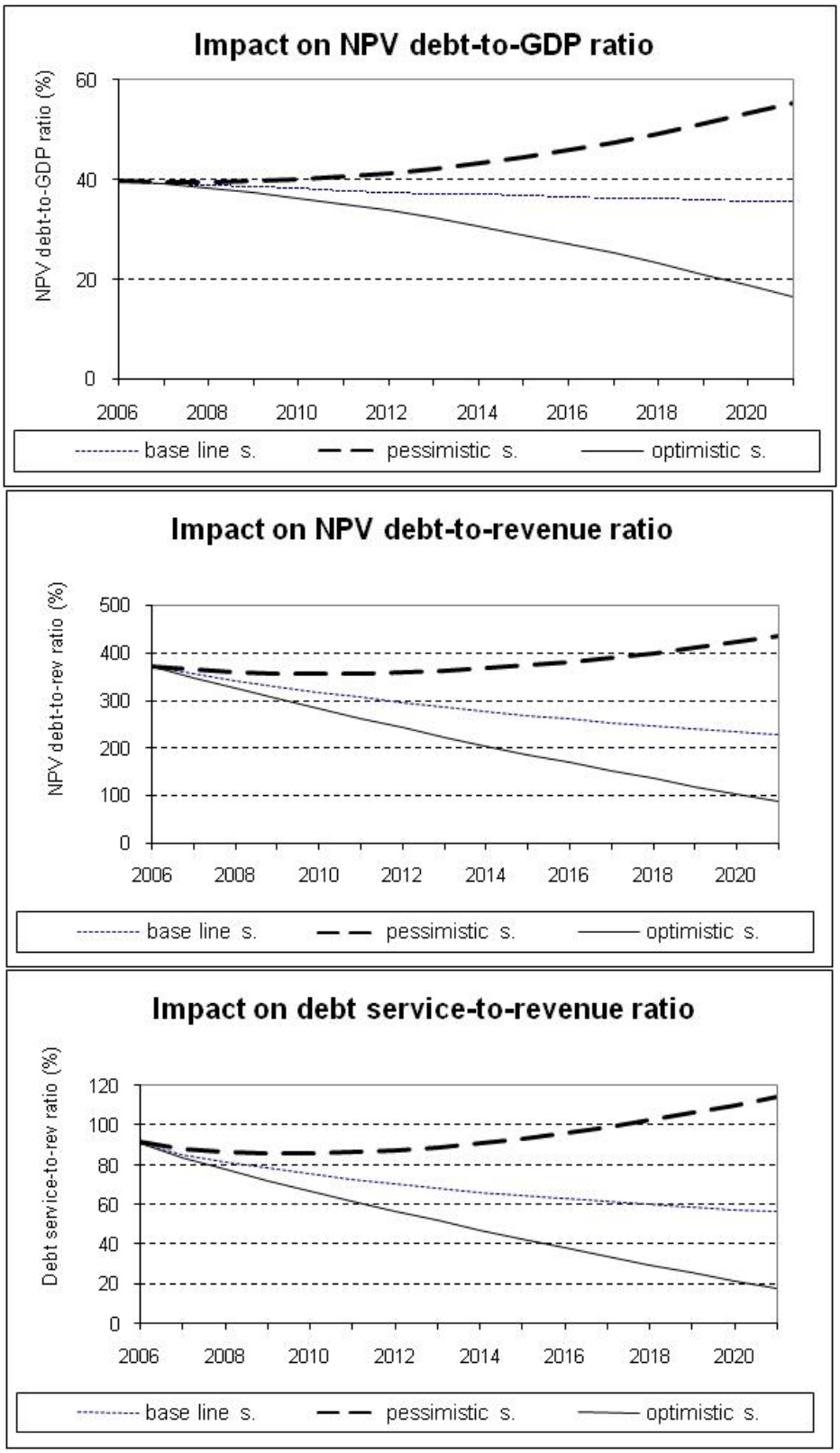
[11] All initial values as well as all values for t0 are based on actual data for 2006, except the discount rates, which are set at 5% for the external debt and equal to the public debt interest rate for the domestic debt in order to avoid any distortions in the NPV calculation. The values for t15 are either based on historical averages of 2002-2006 or set equal to the t0 values in cases where historical data is not easily available, except the primary spending to GDP ratio for 2021, which is consistent to the revenue to GDP ratio for 2021 set 5 percentage points higher than the 2006 value. The increase in the revenue to GDP ratio reflects the historical trend of 2002-06, where the revenue to GDP ratio increased by about 1.6 percentage points, hence 5 percentage points over a 15 year time period.

The parameter values for the pessimistic and optimistic scenarios are set relatively arbitrarily, though for illustrating different evolutions under economically consistent parameter choices. They are not based on any probability, predications or value judgment. The point is to have some comparisons to the baseline scenario, though the relative changes across indicators (see Table 1) are based on basic macroeconomic theory, that is, the pessimistic scenario shows lower GDP growth combined with lower export growth, higher inflation rates, a higher exchange rate depreciations, and lower shares in government revenues to GDP; and similarly, the optimistic scenario shows higher GDP growth combined with higher export growth, lower inflation rates, lower exchange rate depreciations, and higher shares of government revenues to GDP.

Table 1: Alternative Assumptions Under Different Macroeconomic Scenarios

		baseline scenario	pessimstic scenario	optimistic scenario
GDP growth rate (%)	FY06	6.6	6.6	6.6
	FY21	5.7 (h)	3.7	7.7
Exports growth rate (%)	FY06	17.7	17.7	17.7
	FY21	8.3 (h)	4	12
Inflation rate (%)	FY06	7.2	7.2	7.2
	FY21	5.3 (h)	7.3	3.3
Depreciation rate (%)	FY06	9.4	9.4	9.4
	FY21	5.0 (h)	6	4
Share of priorty spending to GDP (%)	FY06	12.1	12.1	12.1
	FY21	17.1	17.1	17.1
Share of gov. rev. to GDP (%)	**FY06**	**10.7**	**10.7**	**10.7**
	FY21	**15.7 (h)**	**12.7**	**18.7**

Figure 9: Results of the baseline, pessimistic, and optimistic scenarios



III.2. Results

The results for these three scenarios are graphically presented in Figure 9, showing the three different evolutions of the NPV debt-to-GDP ratios, the NPV debt-to-revenue ratios, and the debt service-to-revenue ratios for each of the three scenarios, clearly reflecting the baseline, pessimistic, and optimistic scenarios. The different results for each of the three fiscal debt sustainability indicators are due mostly to the change in the GDP growth rates and the change in the revenue to GDP ratios. The changes in inflation rates and depreciation rates influence the results only marginally. The change in export growth rates has due to the simplicity of the module no effect on these three indicators, though export growth rates would have a major impact on external debt sustainability indicators.

IV. Debt Sustainability versus Development?

This section analyzes the implications on debt sustainability of an ambitious government-led investment strategy targeted at eliminating poverty, accelerating broad-based sustainable development, or preparing the country for the negative implications of climate change; in short, a strategy to reach all the MDGs. We use the MDG-costing as an approximation of the costs for such a strategy, which as mentioned above, has been put at US$8 billion per year. There obviously are many assumptions and uncertainties related to this figure, yet, we will use it for illustrative purposes and apply it over the whole 15-year projection period of the debt projection module as even with reaching the MDGs by 2015, half of Bangladesh's poverty would remain and would need to be eradicated many years beyond 2015.

In terms of government spending, the US$8 billion annual investment strategy would imply an initial increase in the share of the primary spending to GDP of about 13 percentage points. With optimistic GDP growth rates of about 8 percent per annum and an initial GDP of about US$62 billion, the 13 percentage points increase in primary spending to GDP of 2006 would fall to a 5 percentage points increase in primary spending to GDP in 2021. Given that the share of primary spending to GDP amounted to 12.1 percent of GDP in 2006, the share of primary spending including the investment strategy would slowly decrease from about 25 percent of GDP in 2006 to about 17.1 percent of GDP at the end of the projection period (2021). This is also identical to the 2021 value under the baseline scenario, which was chosen there to keep the difference between government revenues to GDP and primary expenditures to GDP fixed at 5 percent for all years.

IV.1. Alternative Financing Scenarios

Given the limitations Bangladesh faces to raise revenues (or to cut other expenditures) to finance such an investment strategy (reflected in an accelerated increase in the percentage of revenues to GDP), most of these expenditures would initially be covered by loans and grants, whereby we consider two illustrative scenarios as follows:

a) the debt scenario assumes that the resulting financing gap in the government's budget would be covered exclusively by debt financing (keeping the shares of external and domestic financing unchanged);

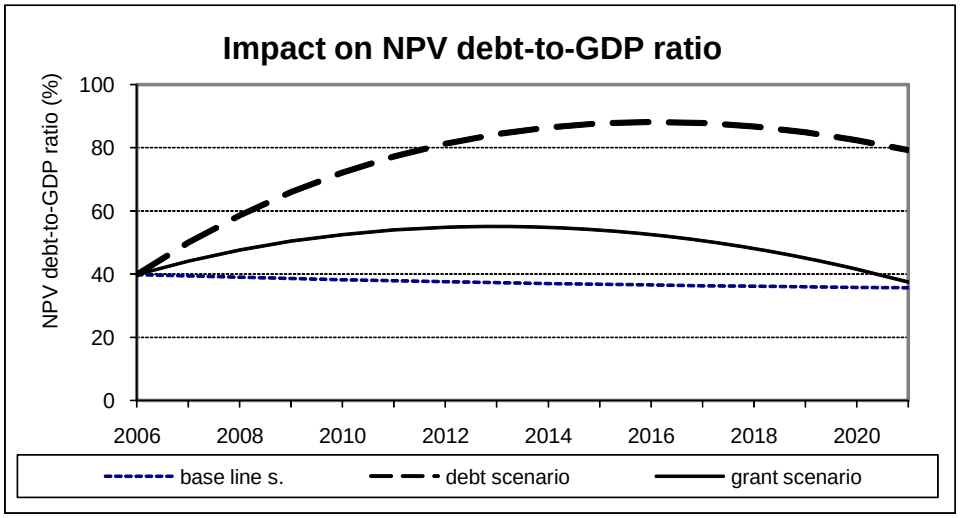
b) the grant scenario assumes that half (US$4 billion) of the annual costs would be covered by external grants provided by Bangladesh's development partners, while the other half would be debt-financed (keeping the shares of external and domestic financing unchanged).

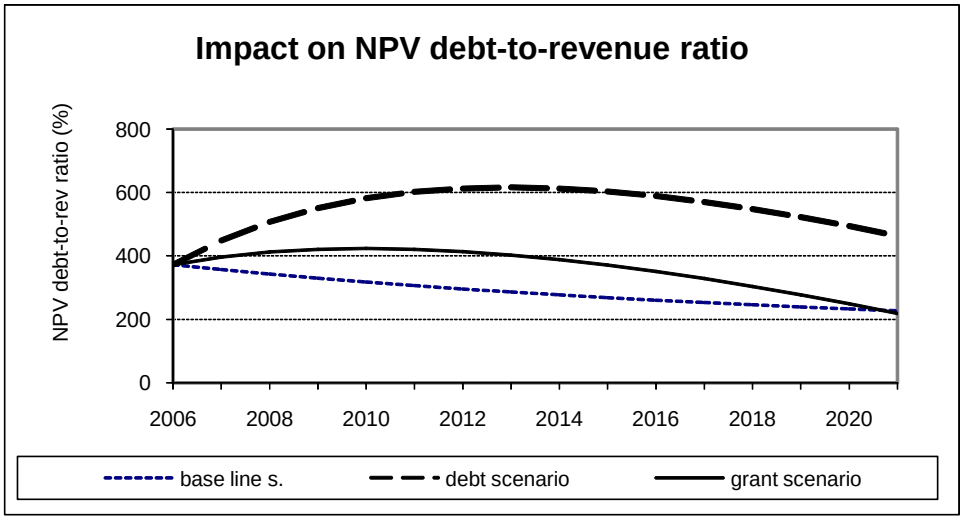
While such an ambitious investment strategy would obviously affect all other macroeconomic parameters, we limit the parameter changes to GDP growth, inflation, interest rate, exchange rate depreciation, and the share of government revenues to GDP (see Table 2). These parameter changes are once again not based on any estimation, predication or value judgment, but simply chosen for illustrative purposes, though keeping some basic macroeconomic theory in mind.

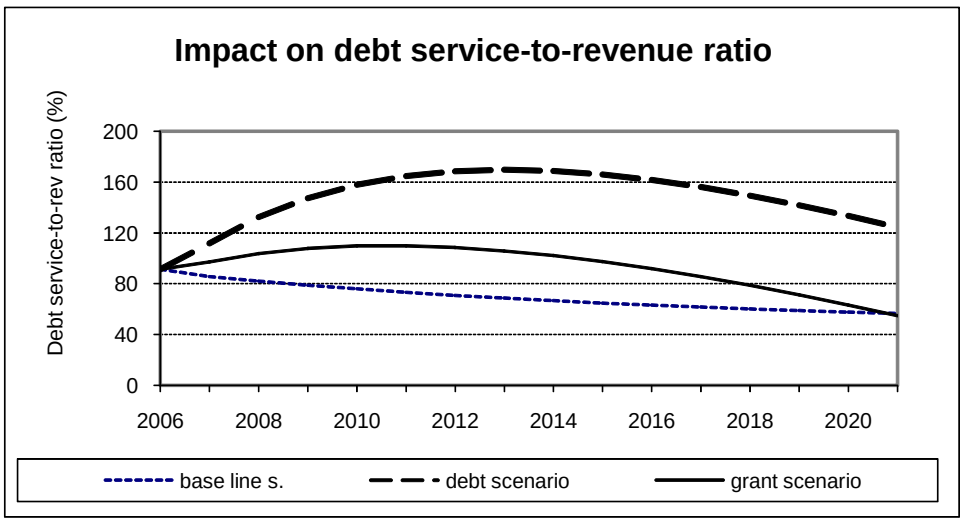
Table 2: Alternative Financing Scenarios of a Government-led Investment Strategy to Achieve the MDGs

		baseline scenario	all debt scenario	50% grant scenario
GDP growth rate (%)	FY06	6.6	7.6	8.6
	FY21	5.7 (h)	5.7 (h)	5.7 (h)
Exports growth rate (%)	FY06	17.7	17.7	17.7
	FY21	8.3 (h)	8.3 (h)	8.3 (h)
Inflation rate (%)	FY06	7.2	9.2	8.1
	FY21	5.3 (h)	5.3 (h)	5.3 (h)
Depreciation rate (%)	FY06	9.4	11.4	10.4
	FY21	5	5	5
Share of priorty spending to GDP (%)	FY06	12.1	25.0	25.0
	FY21	17.1	17.1	17.1
Share of gov. rev. to GDP (%)	**FY06**	**10.7**	**13.7**	**13.7**
	FY21	**15.7 (h)**	**15.7 (h)**	**15.7 (h)**
Grants to the central gov.	FY06 level	0	0	4,000
	FY06 growth	0	0	0
	FY21 growth	0	0	0

Figure 10: Results of the baseline, debt, and grant scenarios







IV.2. Results

The simulation results provided in Figure 10 show that Bangladesh would obviously experience a significant increase in debt levels, but that—at least for the parameters chosen—the debt ratios would start to fall (i) after about 10 years under the debt scenario, and (ii) after about 7 years under the grant scenario. The three graphs of Figure 10 also show that at the end of the projection period (2021), the debt ratios would remain considerably above the initial values under the debt scenario, while all three ratios would fall below their initial levels under the grant financing strategy.

The simulations seem to indicate that some acceleration of Bangladesh's development strategy might be considered as long as the increase in debt levels is clearly limited and temporary. The problem however is that Bangladesh's initial debt values are already high for a least developed country and that there are no clear criteria for acceptable increases in debt levels. Empirical work by Kraay and Nehru (2006) has shown that debt distress levels are lower for countries that have better policies and institutions compared to countries that have worse policies and institutions, whereby the quality of policy and institutions has been determined by the World Bank's country policy and institutional assessment (CPIA). While there remain doubts about the appropriateness and objectivity of the World Bank's CPIA, there is broad agreement that better policies and better institutions lower the risk of a country to face debt distress. This broad agreement on the linkage between policies and debt distress has been operationalized in the joint World Bank–IMF debt sustainability framework (DSF) to determine country-specific debt-burden thresholds, see IMF and IDA (2005).

However, the Bank-Fund DSF makes no adjustments in a country's borrowing constraints due to development achievements. In other words, the DSF does not reduce the tension between (a) debt-financing national development strategies to achieve the MDGs and (b) maintaining debt sustainability. Given this shortcoming, Gunter (2007) has suggested to adopt a new MDG-consistent debt sustainability concept, which would allow a country to increase its borrowing limits within certain limits as long as it makes progress with achieving the MDGs. The basic rationale behind the MDG-consistent debt sustainability is that progress made towards achieving the MDGs can be considered an asset for an economy, similar to the asset of having good policies and institutions.

For example, a country that has achieved universal primary education is likely more debt sustainable than a country in which only 50 percent of children go to school. Hence, instead of linking borrowing limits to possibly biased assessments of a country's policies and institutions, the linkage to MDG achievements would be more objective. Furthermore, while the exact adjustments in borrowing limits would need to be based on empirical verifications of what levels are indeed sustainable, the MDG-consistent debt sustainability concept would allow a country to increase its borrowing limits over time. The remainder of this section applies and illustrates the proposed MDG-consistent debt sustainability concept to Bangladesh.

IV.4. Application of the MDG-Consistent Debt Sustainability Concept

The MDG-consistent debt sustainability concept implies that an explicit adjustment is made in until now solely financial debt sustainability indicators, whereby the adjustment is to divide the debt indicators by an MDG-index, whereby the MDG-index takes progress made with achievements of certain MDG-targets into account.

Taking data constraints as well as analytical constraints into account, the concrete index proposed is a composite of the following four MDG targets:

- Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day (measured by its first indicator: proportion of population below $1 (1993 PPP) per day).
- Target 3: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling (measured by its first indicator: net enrolment ratio in primary education).
- Target 5: Reduce by two thirds, between 1990 and 2015, the under-five mortality rate (measured by its first indicator: under-five mortality rate).
- Target 6. Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio (measured by its first indicator: maternal mortality ratio).

While other MDGs and MDG-targets could be added, we have limited the calculation of the proposed MDG-index to these four targets as they strike some balance between (a) reflecting the core of MDGs with (b) analytical simplicity and data constraints. The calculation of each sub-index is then simply the percentage to which each target has been achieved. For example, if a country had achieved all four targets, each sub-index would be 100. If a country has not made any progress in any of the four targets, each sub-index would be 0. Hence, the overall MDG-index may be defined as follows:

$$\text{MDG-index} = 1 + \left(\frac{\text{Percentage of Target 1 achieved}}{100} + \frac{\text{Percentage of Target 3 achieved}}{100} + \frac{\text{Percentage of Target 5 achieved}}{100} + \frac{\text{Percentage of Target 6 achieved}}{100} \right) / 8$$

The first fixed addend of 1 has been put into the calculation formula to ensure that the MDG-index has a minimum of 1; the sum of the four elements reflecting the four MDG targets are divided by eight to ensure that the MDG-index has a maximum of 1.5. Hence, the MDG-index takes a value of 1 if a country has made zero progress in achieving the four MDG-targets; it takes a value of 1.5 if a country has fully achieved all four MDG-targets.

Using the available data on Bangladesh's progress with achieving the MDGs[12] implies an MDG index for Bangladesh of currently 1.25 (see Gunter (2007) for details). Appling this MDG-index to the NPV debt to GDP ratio (shown in the top graph of Figure 10) would imply a reduction from 40 percent (in 2006) to 32 percent (in 2006). Instead of reducing

[12] See the official UN site for the MDG indicators at http://mdgs.un.org/unsd/mdg/Data.aspx.

the value from 40 percent to 32 percent, if Bangladesh would like to use the fiscal space that is provided by switching to an MDG-consistent debt sustainability concept, she could have accumulated new debt in the amount of US$9.9 billion in 2006.[13] Furthermore, assuming that Bangladesh would continue to make progress in achieving the MDGs and grow as assumed in the baseline scenario, she would be able to accumulate additional new concessional loans in the amount of about US$1.1 billion a year, while following the debt path of the baseline scenario, that is, reducing her MDG-consistent NPV debt to GDP ratio from 40 percent in 2006 to 35.7 percent in 2021.

V. Conclusions and Policy Implications

We have reviewed the trends in Bangladesh's public debt from 1993 to 2006, which are overall decreasing even though domestic public debt has increased from 111 percent of government revenues in 1993 to 192 percent in 2001. The overall trends also indicate that Bangladesh's public debt is sustainable. However, three points need to be stressed: First, comparing Bangladesh's current public debt levels with those of other low income countries, Bangladesh is actually one of the highest indebted countries in terms of both NPV debt to government revenues and public debt service to government revenues.[14] Second, looking at the composition of Bangladesh's public debt over time, the only reasons why Bangladesh did not qualify for HIPC debt relief are due to a) Bangladesh's substitution of external debt with domestic debt (which started in the early 1990s), and b) the HIPC framework's focus on external public debt sustainability. Third, given that there are no justifications for having excluded public debts from sustainability criteria, especially if linking the goal of debt sustainability with the goal of poverty reduction, and that recent debt relief initiatives have led to substantial reductions in the debt levels of an arbitrary subset of low income countries, the cancelation of Bangladesh's external debt would be more than justified based on economic as well as equity considerations.

We have used SimSIP's debt projection module to simulate Bangladesh's public debt sustainability under three different macroeconomic scenarios, reflecting a base line, pessimistic, and optimistic scenarios. More specifically, we have simulated the evolution of Bangladesh's fiscal debt sustainability in terms of projections for three ratios: (1) the NPV total public debt to GDP ratio, (2) the NPV total public debt to revenue ratio, and (3) the total public debt service to revenue ratios. Even though our projections were based on a set of different scenarios with a very limited number of parameter changes, various robustness checks have shown that additional parameter changes provide qualitatively similar results as long as the parameter changes are consistent with economic theory (that is, it would not make sense to assume that economic growth leads to a reduction in the

[13] In addition to creating fiscal space by switching to an MDG-consistent debt sustainability concept, useful and complementary suggestions have also been put forward by Roy, Heuty and Letouzé (2006), concentrating on alternative fiscal policy rules that would foster an enabling reform for scaled up public investments that aim at allowing borrowing by governments for the sole purpose of financing net public investments.

[14] While the full extent of this will only become clear once the 2007 debt data (i.e., post MDRI) is available, the conclusion can already been drawn by comparing the ratios of external to domestic public debts of Bangladesh with those of the African HIPCs, see Table 10 of UNTAD (2004).

share of government revenues to GDP). We are therefore able to draw the following policy implications from our simulations.

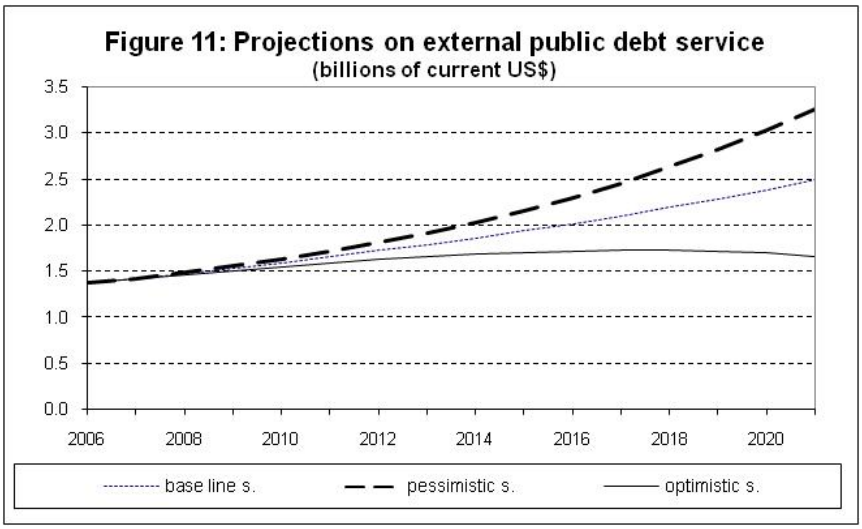
First, while Bangladesh' public debt is likely to remain sustainable over the next decade, economic shocks (may they be due to increased climate change-induced disasters and/or due to deteriorations in the world economy) can easily push Bangladesh on clearly unsustainable debt paths. Indeed, we should keep in mind that Bangladesh has experienced growth rates during the last few years that are unprecedented in its history, yet, we have used 2002-2006 for the projections of the baseline scenario. In other words, many observers would consider the baseline scenario to be a highly optimistic scenario. Indeed, taking shocks like climate change-induced disasters and possible social unrest due to rising food prices into account, our pessimistic scenario (with a sustained growth rate of close to 4 percent) could easily be the more realistic scenario than the baseline scenario, with leading to clearly accelerating and unsustainable public debt levels. Hence, the cancellation of Bangladesh's external public debt would not only serve as a shock absorber but also allow Bangladesh to use its scarce resources to achieve the MDGs.

Second, while Bangladesh may not face unsustainable debt levels in macroeconomic terms, if approaching debt sustainability from a human and social development perspective,[15] Bangladesh's debt is not sustainable simply because Bangladesh has more urgent needs to reduce poverty than to make external debt service payments amounting even in the optimistic scenario to more than US$1.5 billion every year over the next 12 years (2009-2021; see Figure 11). Indeed, given that total public debt service payments amount currently to nearly 100 percent of government revenues, it is clear that these debt service payments can only be made as old debt is replaced by new debt, i.e. principal as well as interest payments are mostly covered by new loans.

Third, while the substitution of external financing with domestic financing made sense during the 1990s, the continuing substitution of external financing with domestic financing should be reversed to avoid a further increase in domestic interest payments relative to external interest payments (as it was shown in Figure 6). Clearly, domestic debt has the advantage of not carrying any currency risk, however, taking Bangladesh's record in terms of maintaining macroeconomic stability into account, devaluations of the taka have been limited and do not appear to pose a risk for the sustainability of Bangladesh's external debt. On the other hand, domestic debt (on which the Bangladeshi

[15] The human development approach to debt relief has originally been suggested by Northover, Joyner and Woodward at CAFOD in 1998. It argues that most of the world's poorest countries have an unsustainable debt as countries with a large proportion of their population living in absolute poverty have a more urgent need to spend their resources on poverty reduction than on debt service. Given the large amounts of resources needed to achieve the MDGs, the human development approach to debt sustainability is generally associated with the suggestion to forgive all remaining HIPC debt, see especially Sachs (2002). A detailed proposal along these lines has been made by Berlage, Cassimon, Dreze, and Reding (2004). Recognizing that primary needs of human development are not met in many poor developing countries and that the HIPC Initiative is not sufficient to resolve the debt overhang problem, they suggest a 15-year program that is targeted at implementing the MDGs while eliminating all of the outstanding debt for a set of 49 poor countries. As Berlage et al. point out, given that the concern for human development applies to all poor countries, heavily indebted or not, they suggest adding 7 non-HIPCs with a 1997 Human Development Index below 0.5: Bangladesh, Bhutan, Djibouti, Eritrea, Haiti, Nepal, and Nigeria.

government spent 14.1 percent of its revenues just on the interest of the domestic debt) has the disadvantage of being non-concessional and also highly regressive in terms of income considerations (as the poor lack the funds to invest in government-issued debt instruments).



Finally, we have used SimSIP's debt projection module to simulate Bangladesh's public debt sustainability under two different financing scenarios of an ambitious government led investment strategy: (i) the debt scenario (which assumed that the resulting financing gap in the government's budget would be covered exclusively by debt financing) and the grant scenario (which assumed that half of the costs would be covered by external grants). While the results of the debt scenario imply increases in the debt levels for most of the projection period with levels high enough to have negative implications on investment and growth (which is not taken into account by the simulations), the grant scenario implies a clearly limited increase in debt levels, with reduced debt levels at the end of the projection period similar to those under the baseline scenario.

Hence, the key question here is if temporarily higher debt levels can be justified to reduce poverty and to achieve the MDGs, and our recommendations here are threefold. First, considering that progress with achieving the MDGs increases a country's ability to sustain higher debt levels, we consider the grant scenario to constitute a feasible option for Bangladesh. Second, adopting an acceptably defined MDG-consistent debt sustainability concept would be useful to reduce the tension between the goals of achieving the MDGs and achieving debt sustainability. Third, even if the annual US$8 billion investment strategy is considered to be too ambitious and too risky for Bangladesh's debt sustainability, Bangladesh's record in terms of reducing poverty in the recent past justifies a rapid scale-up of aid to Bangladesh, and providing this scaled-up aid via grants would for sure be fully consistent with achieving long-term debt sustainability in Bangladesh.

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