

Bangladesh: Joint Bank-Fund Debt Sustainability Analysis

Bangladesh’s risk of debt distress is low based on external debt indicators, but taking into account results from the public sector debt sustainability analysis (DSA), staffs categorize the overall risk of debt distress as moderate. Bangladesh’s external debt burden indicators do not breach the relevant policy-dependent indicative thresholds¹ under the baseline scenario, standard alternative scenarios and boundary tests, as well as two country-specific boundary scenarios. Nevertheless, debt burden indicators are significantly worse in the public sector DSA—which includes domestic debt—and the staffs will monitor closely the evolution of domestic debt and the government’s ability to mobilize domestic resources.

This DSA has been prepared jointly by World Bank and IMF staffs using the debt sustainability framework for low income countries approved by the Boards of both institutions (LIC DSF). The DSA is based on macroeconomic data gathered in the context of two IMF missions to Dhaka in 2006. Estimated debt outstanding and disbursed as of end-FY2005 provides the basis for debt figures.^{2 3}

Box 1 summarizes the medium-term macroeconomic framework underlying the DSA. Most notably, it is based on projections for growth that are in line with but slightly lower than those in the country’s PRSP, and estimates of external assistance that reflect both expected scaling up in the context of the millennium development goals (MDGs) as well as the country’s ability to absorb additional external financing. Export growth rates are conservative compared to recent trends, but the high share of garment exports (about 75 percent of the total) combined with the projected end of temporary protection against Chinese garments in the US market (which absorbs 40 percent of Bangladesh’s garment

¹ The low income country debt sustainability framework (LIC DSF) provides indicative levels (thresholds) of debt burdens beyond which a country’s risk of debt distress reaches levels that are considered unacceptable. The LIC DSF recognizes that better policies and institutions allow countries to manage higher levels of debt, and thus the threshold levels are policy-dependent. Bangladesh’s policies and institutions, as measured by the World Bank’s Country Policy and Institutional Assessment (CPIA), place it as a “medium performer”. The relevant indicative thresholds for this category are: 40 percent for the NPV of debt-to-GDP ratio, 150 percent for the NPV of debt-to-exports ratio, 250 percent for the NPV of debt-to-revenue ratio, 20 percent for the debt service-to-exports ratio and 30 percent for the debt service-to-revenue ratio. These thresholds are applicable to public and publicly guaranteed external debt.

² The fiscal year runs from July 1st to June 30th.

³ For creditors other than the IDA and the IMF, end-FY 2005 debt outstanding and disbursed was estimated based on end-December 2004 debt data gathered in the context of the HIPC-ring fencing (“Heavily Indebted Poor Countries (HIPC Initiative)—List of Ring-Fenced Countries that Meet the Income and Indebtedness Criteria at end-2004,” April 12, 2006, EBS/06/35 and IDA/R2006-0041/2). This assumption is not expected to have a material impact on this DSA. For example, the NPV of new borrowing from the Asian Development Bank during the first half of 2005 is estimated at US\$45 million, or 0.5% of the overall NPV of debt.

exports) by end-2008 has led staffs to consider a stress test with substantially lower export growth rates.

Box 1. Macroeconomic Assumptions Underlying the DSA

The macroeconomic assumptions are as follows:

Real GDP growth is, at about 6.5 percent, above the recent historical average of 5.3 percent, picking up a bit in the outer years. This is close to (but slightly lower than) Bangladesh's PRSP projections, and assumes continued progress in broad-based structural reforms and increased openness of the economy that should allow Bangladesh to benefit from dynamic growth elsewhere in the Asian region.

Inflation, as measured by the GDP deflator, decreases in the short term and stabilizes at around 2 percent.

The growth of **exports** and **imports** is strong over the projection period (averaging between 9 and 10 percent) as both remain constant as shares of GDP. The risk of lower exports is taken into account as a separate scenario.

The **current account deficit** (including grants) increases gradually over the projection period and stabilizes in the outer years at just above 2 percent of GDP, as a result primarily of continued strong growth of capital and intermediate goods imports related to increasing investment projects.

Net aid inflows gradually increase and stabilize in the range of 2 percent of GDP (consistent with Bangladesh's PRSP). The projections assume that grants comprise a decreasing percent of total aid disbursements over the 25-year period, ranging from 34 percent at the beginning to 10 percent at the end. Standard terms were used for new borrowings (e.g. for IDA disbursements, 0.75 percent interest rate, 10-year grace period, and 40-year maturity).

The **primary fiscal deficit** is assumed to remain largely unchanged and close to the historical average (around 1.5 percent of GDP for FY2006-26). A modest rise is assumed in the **revenue-to-GDP ratio** (excluding grants) in the initial years (from 10.5 percent in FY2005 to 12.0 percent in FY2011), supported by efforts to mobilize domestic revenues.

Real interest rates on domestic currency debt are assumed somewhat higher than the historical average consistent with the expected decrease in the inflation rate.

EXTERNAL DEBT SUSTAINABILITY ANALYSIS

All external debt indicators remain well below the policy-dependent debt burden thresholds under the baseline scenario and standard stress tests. The main results of the external DSA are as follows:

- **All debt indicators in the baseline scenario are expected to decline over the 20-year projection period** (Table A1 and Figure 1). The NPV of debt-to-GDP ratio decreases from about 17 percent to 15 percent (compared to an indicative threshold of 40 percent) during the projection period, while the NPV debt-to-exports ratio decreases from about 92 percent to 68 percent (compared to an indicative threshold of 150 percent), and the debt service ratio decreases from over 5 percent to about 4 percent (compared to an indicative threshold of 20 percent).

- **The standard stress tests do not reveal any serious vulnerability** as all ratios remain well below the indicative debt-burden thresholds (Table A2 and Figure 1).
- **Table 1 below summarizes Bangladesh’s indicative thresholds, actual 2005 ratios, and average debt ratios under the baseline scenario.**

Table 1. Policy-based External Debt Burden Thresholds for Bangladesh

	Thresholds	Bangladesh's Ratios	
		2005	2006-2026 ¹
NPV of debt in percent of			
GDP	40	17	15
Exports	150	106	74
Debt Service in percent of			
Exports	20	6	5

1. Average for the period.

Standard shocks and bound tests are generally appropriate for Bangladesh. Although the volatility of Bangladesh’s growth rates in the past decade was exceptionally low, even a two-standard deviation temporary shock would not cause a serious deterioration of external debt ratios. In the absence of key structural reforms, however, long-term growth could be significantly lower and thus staffs considered such a scenario as a boundary case. Special attention was paid to export growth, which is viewed as the country’s main vulnerability from an external debt sustainability perspective, and a more stringent bound test was added. Risks to the exchange rate and foreign financing are low, and the standard stress tests are appropriate. Finally, despite vulnerability to natural disasters, Bangladesh’s economy has been increasingly resilient to those risks and they are not considered by staffs to be a source of concern in the DSA.

An alternative boundary scenario was calculated using substantially lower export growth rates over an extended period, but debt levels remained below indicative thresholds under reasonable assumptions. Although export performance has continued to be strong despite the increased competition following the expiration of ATC quotas in 2005, the full impact of this development might only be seen from 2008 onwards, when the temporary quotas for China will expire. Since exports are concentrated in the ready-made garments (RMG) sector (such exports amount to about 75 percent of Bangladesh’s total exports) there are risks to the baseline export growth projections. Staffs assess that if the threat of competition from China materializes, the export growth rate could fall to as low as 5 percent per year, or about one standard deviation from the historical average. Accordingly, we calculated a scenario where export growth falls to that level for the first ten years of the projection period.

- **Bangladesh's debt ratios would not cross any indicative thresholds in a scenario where the growth rate of exports falls to 5 percent per year for the next 10 years, the most extreme scenario in the staffs' view.**
- **The export growth rate would have to fall below 3.2 percent per year for ten years for the indicative thresholds to be breached; staffs consider this scenario highly unlikely.** Even in this case, the debt-service to exports ratio would reach only 10 percent and remain well below the indicative threshold.
- **A slowdown in garment exports would have a limited impact on GDP growth.** The garment sector directly accounts for at most 10 percent of Bangladesh's economy (although its impact via subsidiary industries is more significant). Accordingly, even if the sector were to stagnate, the impact on GDP growth would be muted by the other, more diverse sources of growth.

Staffs also considered the risks to long-term growth stemming from a failure to implement key structural reforms. There are risks that a failure to implement important structural reforms, particularly those in the power sector, could significantly depress growth rates. However, according to staffs' calculations, Bangladesh's GDP would have to contract at a rate of over 3 percent per year over a 10-year period for the ratio of NPV of debt-to-GDP to exceed the indicative threshold, an implausible scenario in the staffs' view.

The lower ratio of NPV of debt to exports calculated in this DSA compared to the ratio calculated during the HIPC ringfencing exercise is due primarily to methodological factors as explained in detail in Table A6 and Box 2. The ringfencing ratio was calculated under the HIPC methodology, which was designed for assessing debt relief needs and entails using currency-specific discount rates, end-2004 exchange rates, and a three-year average for exports in the denominator. Meanwhile, the LIC DSF methodology employed in the present analysis was designed to assess debt sustainability and entails using a standard 5 percent discount rate, exchange rate projections from the IMF's World Economic Outlook (WEO) and one-year exports in the denominator.

The difference in ratios due to methodological differences draws attention to the relative mismatch in the currency composition of Bangladesh's external debt and its exports. As Figure 1 below shows, a large part (37% in NPV terms) of Bangladesh's liabilities are yen-denominated. However, since only 1% of Bangladesh's exports go to Japan, this analysis cautions that an appreciation of the Japanese yen vis-à-vis other currencies could lead to a substantial deterioration of Bangladesh's external debt ratios.

**Box 2. Reconciliation of the NPV of debt to exports ratios between
(i) the December 2004 HIPC Ringfencing Exercise and (ii) the June 2005 DSA**

At the time of the HIPC ringfencing exercise, Bangladesh's debt-to-exports ratio as of December 2004 was estimated as 146 percent, while using the present LIC framework methodology, this ratio is estimated to be 106 percent at June -2005. This 40 percentage point (pp) drop in the ratio is due primarily to four methodological factors:

(i) a 10 pp decrease is due to the change in the exchange rates used to calculate the projected debt service streams: projected exchange rates (from WEO) under the LIC framework versus end-2004 exchange rates under the HIPC methodology;

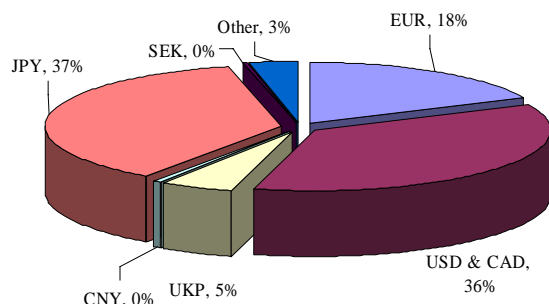
(ii) a 17 pp decrease is explained by the change in the discount rate used to calculate the NPV of debt: a single (5 percent) discount rate under the LIC framework versus currency-specific discount rates under the HIPC methodology;

(iii) a 17 pp decrease is due to the change in the denominator used to calculate the ratio: current exports under the LIC framework versus a three-year backward-looking average under the HIPC framework. Note that Bangladesh's exports in end-2004 were 16 percent higher than the backward-looking average; and

(iv) a 7 pp increase is due to undoing the Naples treatment to Paris Club debt that was assumed under the HIPC ringfencing exercise.

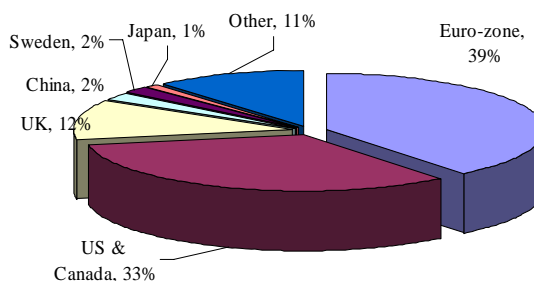
The remainder of the difference is due to economic factors (new borrowing, the increase in exports from Dec-2004 to June-2005), as well as data discrepancies.

Bangladesh: Currency Composition of Debt (% of NPV) 1/



1/ SDR allocated to basket currencies using 2005 weights.

Bangladesh: Major Export Partners (2002-2003 average)



Source: IMF DOTS

PUBLIC DEBT⁴ SUSTAINABILITY ANALYSIS

Domestic debt has been relatively stable over the past five years. Gross debt has increased by less than ¼ percentage point of GDP from 18.7 percent of GDP at end-June 2002 to 18.9 percent of GDP at end-May 2006, and net debt has remained the same at 15.9 percent of GDP (Table A3). The majority of the domestic debt is in the form of treasury bills and savings certificates held by nonbanks, and just over a quarter is held by the central bank.

The baseline scenario entails a gradual decline in the NPV of public debt-to-GDP ratio, with both external and domestic debt declining relative to nominal GDP (Table A4 and Figure 2). The NPV of public debt-to-revenue ratio is also projected to decline while the debt service-to-revenue ratio remains relatively low reflecting highly concessional terms on external loans.

Despite the manageable outlook in the baseline scenario, the alternative scenarios and bound tests point to considerable risks (Table A5).

- **The public debt position is vulnerable to one-off debt creating flows** (scenario B5). Underpricing of energy products by BPC and BPDB, and operating losses by Biman Airlines are creating contingent liabilities that will need to be borne by the government. These contingent liabilities are presently growing by 1-1.5% of GDP per annum, and in the absence of an effective strategy to address this problem, the risks of large debt-creating flows in the future are elevated. Under the assumption of a one-off debt creating flow of 10% of GDP – which could be conservative given that contingent liabilities will increase further unless policies are changed – the debt-service to revenue ratio reaches 47% in 2008, nearly 2.5 times the baseline ratio of 20%.
- In addition, **the NPV of public debt-to-GDP ratio ceases to decline under alternative growth assumptions** (scenarios A3 and B1). This is especially worrisome since a scenario of low growth is likely to be accompanied by other shocks.

The alternative scenarios and stress tests indicate that the projected paths of debt indicators are sensitive to alternative assumptions. While the historical data suggest that a deterioration of the primary balance is not a major risk, the contingent liabilities associated with quasi-fiscal activities of public enterprises are significant and, if combined with the risk of lower GDP growth or a failure to improve revenue performance, would pose some risks to the sustainability of public debt.

⁴ Public debt includes domestic central government debt and external public and publicly-guaranteed debt.

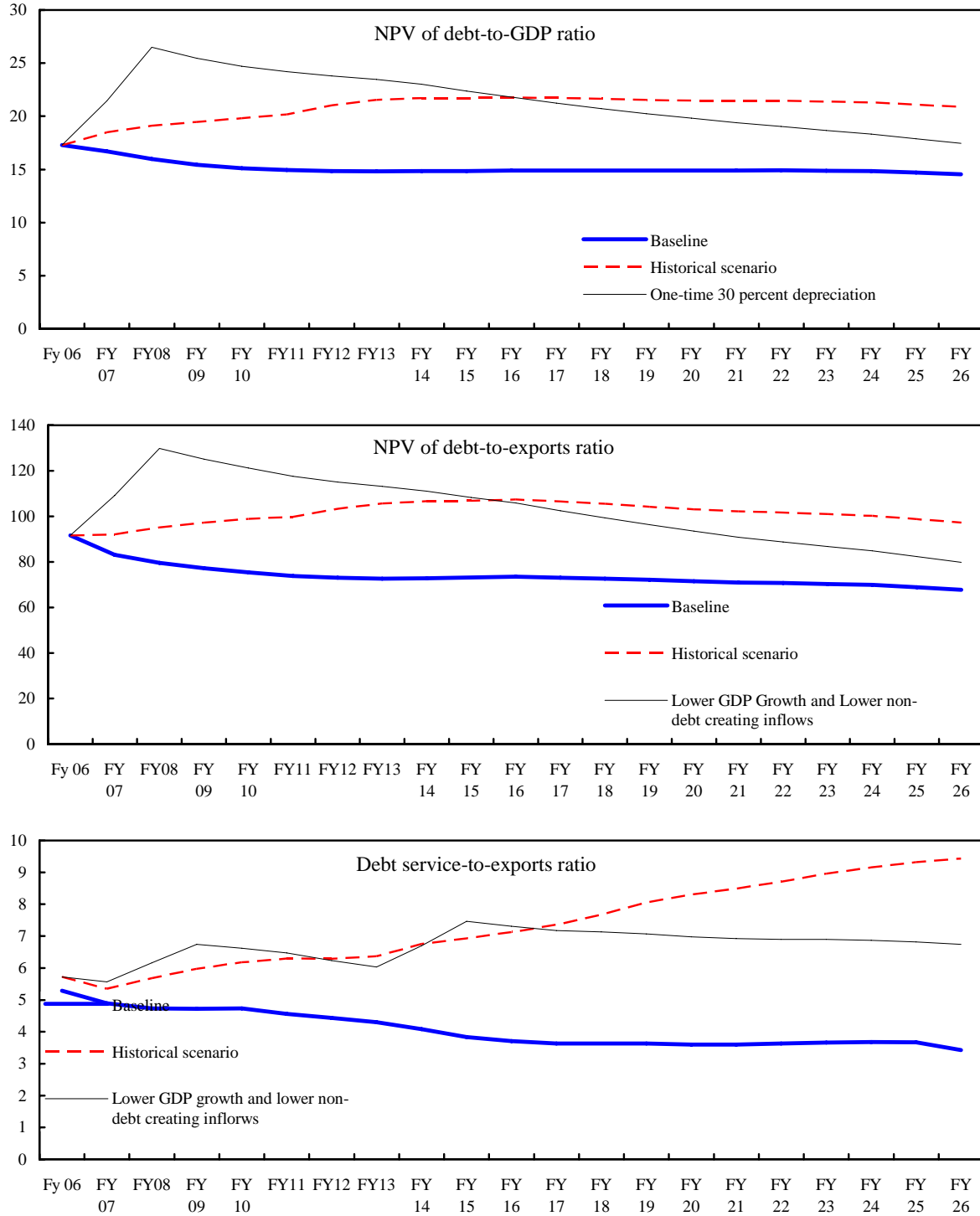
CONCLUSION

It is the staffs' view that Bangladesh should be considered at low risk of debt distress based on external indicators, but the risk of debt distress is moderate once domestic obligations are included in the analysis. The baseline projections and the associated standard stress tests show little risk related to external debt given that none of the indicators breaches or is close to the indicative debt burden thresholds. However, risks to domestic revenue mobilization and domestic debt accumulation raise concerns, and as such Bangladesh is categorized as at moderate risk of debt distress overall.

The substantial increase in debt ratios when domestic debt is included, allied to concerns about contingent liabilities, calls for careful management of the public debt. While the NPV of public debt-to-revenue ratio would decline over the 20-year horizon (albeit from a relatively high level) under baseline assumptions, the ratio would remain high in some of the bound tests, highlighting the risks that can materialize if economic policies are not managed carefully and public enterprise losses are not contained.

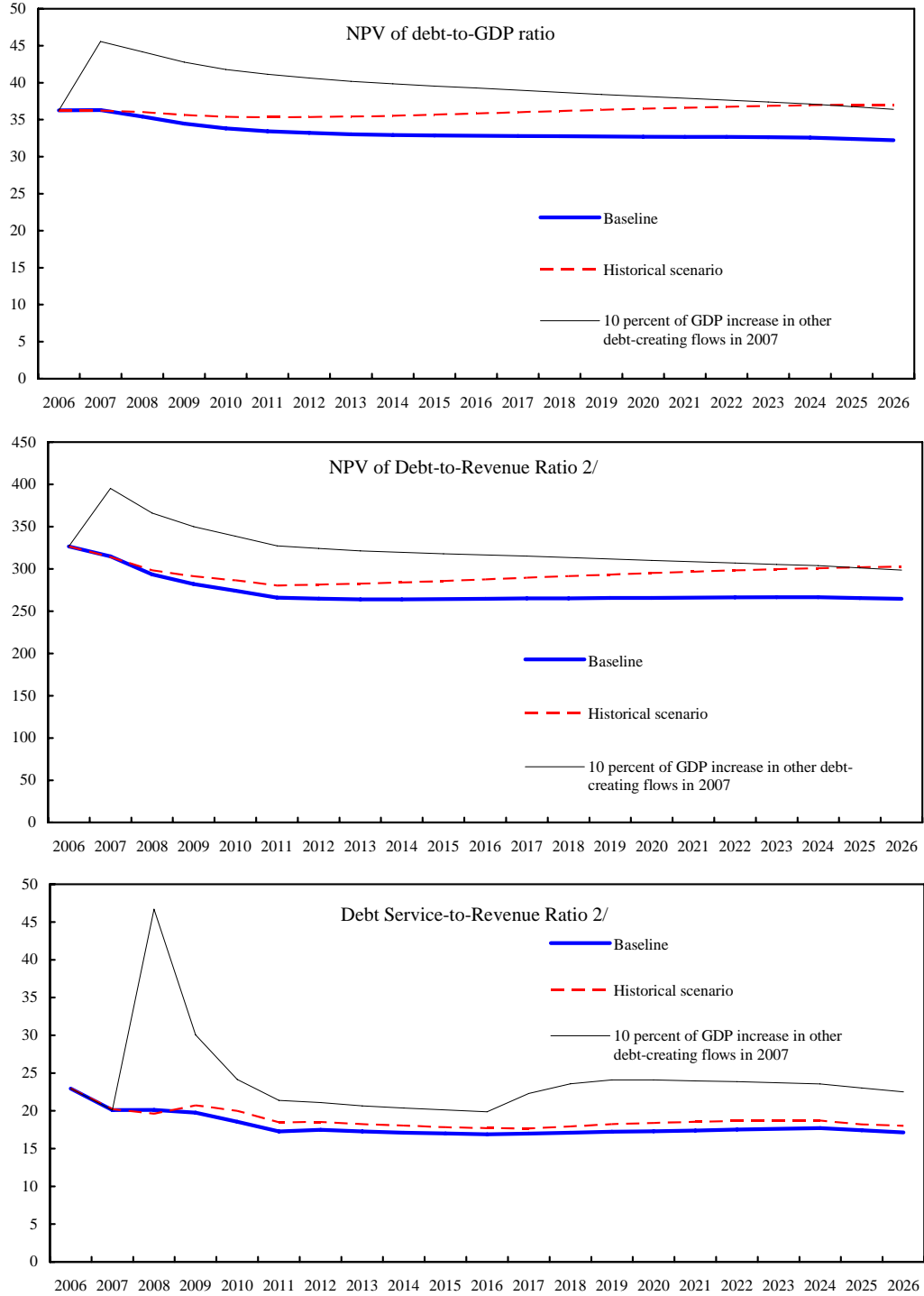
Efforts to mobilize domestic revenues, especially in the initial years, are the key to ensure improvement in the debt indicators. This exercise also underscores the importance of effective management of the existing debt and new debt accumulation.

Figure 1. Bangladesh: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2006-2026
(In percent)



Source: Staff projections and simulations.

Figure 2. Bangladesh: Indicators of Public Debt Under Alternative Scenarios, 2006-2026 1/



Source: Staff projections and simulations.

1/ Most extreme stress test is test that yields highest ratio in 2016.

2/ Revenue including grants.

Table A1. Bangladesh: External Debt Sustainability Framework, Baseline Scenario, 2006-2026 1/
(In percent of GDP, unless otherwise indicated)

	Actual										Historical Average 6/	Standard Deviation 6/	Projections						2006-11				
	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05			Fy 06	FY 07	FY08	FY 09	FY 10	FY11	Average	FY 16	FY 26		
External debt (nominal) 1/	#	38.3	34.5	32.7	32.6	32.7	33.5	33.7	32.6	30.7	27.9			28.9	27.5	25.9	24.6	23.7	23.2			21.7	20.2
o/w public and publicly guaranteed (PPG)	#	38.3	34.5	32.6	32.4	32.5	33.2	33.5	32.3	30.4	27.7			28.7	27.2	25.6	24.4	23.5	22.9			21.3	19.6
Change in external debt	...	-4.2	-3.8	-1.8	-0.2	0.1	0.7	0.3	-1.1	-1.9	-2.7			1.0	-1.5	-1.6	-1.3	-0.9	-0.6			-0.2	-0.2
Identified net debt-creating flows	...	-0.6	0.2	-0.3	-0.5	0.0	0.6	-1.0	-3.0	-3.5	-2.1			-3.8	-3.2	-2.1	-1.4	-1.3	-1.2			-0.5	-0.2
Non-interest current account deficit	#	1.9	1.6	0.9	0.6	0.8	0.8	-0.1	-0.6	-0.3	0.3	0.4	0.7	-1.2	-0.7	0.4	0.9	1.0	1.1			1.7	1.8
Deficit in balance of goods and services	#	8.9	6.9	5.5	5.4	5.6	5.6	5.4	5.4	5.9	6.6			6.4	7.2	8.3	8.6	8.5	8.3			7.6	5.6
Exports	#	10.9	11.8	12.8	13.3	14.0	14.7	14.5	14.5	15.0	16.2			18.9	20.1	20.1	20.0	20.0	20.2			20.3	21.5
Imports	#	19.8	18.7	18.3	18.7	19.6	20.3	19.9	19.9	21.0	22.8			25.3	27.3	28.4	28.6	28.5	28.5			27.8	27.1
Net current transfers (negative = inflow)	#	-4.8	-4.6	-4.3	-4.6	-4.9	-5.1	-5.8	-6.5	-6.7	-7.1	-5.4	1.0	-8.6	-9.1	-8.9	-8.6	-8.3	-7.9			-6.7	-4.6
Other current account flows (negative = net inflow)	#	-2.2	-0.7	-0.3	-0.2	0.1	0.2	0.4	0.4	0.5	0.7			1.0	1.1	1.0	0.9	0.8	0.7			0.8	0.8
Net FDI (negative = inflow)	#	0.0	-0.1	-0.3	-0.4	-0.4	-0.3	-0.4	-0.6	-0.7	-0.9	-0.4	0.3	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1			-1.1	-1.1
Endogenous debt dynamics 2/	...	-2.6	-1.3	-0.9	-0.8	-0.4	0.1	-0.5	-1.8	-2.5	-1.6			-1.5	-1.4	-1.4	-1.3	-1.2	-1.2			-1.1	-0.9
Contribution from nominal interest rate	...	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.3			0.3	0.3	0.2	0.2	0.2	0.2			0.3	0.4
Contribution from real GDP growth	...	-1.8	-2.0	-1.7	-1.5	-1.9	-1.7	-1.4	-1.7	-1.9	-1.7			-1.8	-1.6	-1.6	-1.5	-1.5	-1.4			-1.3	-1.3
Contribution from price and exchange rate changes	...	-1.2	0.3	0.5	0.4	1.1	1.5	0.6	-0.5	-0.9	-0.2			...	...	...	...	...	...			...	...
Residual (3-4) 3/	...	-3.6	-3.9	-1.5	0.4	0.2	0.1	1.2	1.9	1.6	-0.6			4.8	1.7	0.5	0.1	0.4	0.7			0.3	0.0
o/w exceptional financing	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
NPV of external debt 4/	17.4			17.5	17.0	16.2	15.7	15.4	15.2			15.3	15.1
In percent of exports	107.4			92.9	84.4	80.9	78.5	76.6	75.2			75.5	70.5
NPV of PPG external debt	17.4	17.1		17.3	16.7	16.0	15.4	15.1	14.9			14.9	14.5
In percent of exports	115.6	106.0		91.6	83.1	79.6	77.2	75.4	73.8			73.5	67.7
Debt service-to-exports ratio (in percent)	#	13.4	12.1	9.8	8.9	9.0	8.6	8.5	8.0	7.0	6.4			5.6	5.2	5.1	5.0	5.0	4.9			4.2	4.1
PPG debt service-to-exports ratio (in percent)	#	13.4	12.1	9.8	8.7	8.7	8.3	8.1	7.6	6.6	6.0			5.3	4.9	4.7	4.7	4.7	4.6			3.7	3.4
Total gross financing need (billions of U.S. dollars)	0.7	0.8	0.8	0.4	0.0	0.0	0.3			-0.7	-0.5	0.3	0.7	0.9	0.9			2.0	5.5
Non-interest current account deficit that stabilizes debt ratio	...	6.1	5.3	2.7	0.8	0.7	0.1	-0.4	0.5	1.6	3.0			-2.2	0.8	2.0	2.2	1.9	1.6			1.9	2.0
Key macroeconomic assumptions																							
Real GDP growth (in percent)	...	4.6	5.4	5.2	4.9	5.9	5.3	4.4	5.3	6.3	6.0	5.3	0.6	6.5	6.0	6.5	6.5	6.5	6.6	6.4	6.7	7.0	
GDP deflator in US dollar terms (change in percent)	...	2.8	-0.7	-1.3	-1.2	-3.2	-4.3	-1.7	1.6	3.0	0.6	-0.5	2.4	-3.4	1.1	3.0	3.1	2.5	1.7	1.3	2.0	2.0	
Effective interest rate (percent) 5/	...	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.1	0.0	1.0	0.9	0.9	1.0	1.0	1.1	1.0	1.5	2.1	
Growth of exports of G&S (US dollar terms, in percent)	...	11.8	13.6	12.6	7.7	7.9	5.4	1.6	6.6	13.4	14.6	9.5	4.3	20.2	14.0	9.5	9.4	9.3	9.4	12.0	8.5	9.7	
Growth of imports of G&S (US dollar terms, in percent)	...	11.1	-1.1	1.6	5.8	7.6	4.3	0.5	7.2	15.0	15.9	6.8	5.8	14.2	15.7	14.0	10.5	8.7	8.4	11.9	7.4	8.8	
Grant element of new public sector borrowing (in percent)	41.6	44.3	41.1	37.6	36.8	34.9	39.4	28.8	22.9	
<i>Memorandum item:</i>																							
Nominal GDP (billions of US dollars)	#	40.5	42.5	44.1	45.6	46.8	47.1	48.4	51.7	56.6	60.3			62.0	66.5	72.9	80.0	87.4	94.7			143.1	338.4

Source: Staff simulations.

1/ Includes both public and private sector external debt.

2/ Derived as $[r - g - \rho(1+g)] / (1+g+\rho+gp)$ times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and ρ = growth rate of GDP deflator in U.S. dollar terms.

3/ Includes exceptional financing (i.e., changes in arrears and debt relief); changes in gross foreign assets; and valuation adjustments. For projections also includes contribution from price and exchange rate changes.

4/ Assumes that NPV of private sector debt is equivalent to its face value.

5/ Current-year interest payments divided by previous period debt stock.

6/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

Table A2. Bangladesh: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, 2006-26
(In percent)

	Projections							
	Fy 06	FY 07	FY08	FY 09	FY 10	FY11	FY 16		FY 26
NPV of debt-to-GDP ratio								
Baseline	17	17	16	15	15	15	15	15
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2007-26 1/	17	18	19	19	20	20	22	21
A2. New public sector loans on less favorable terms in 2007-26 2/	17	17	17	17	17	17	19	21
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2007-08	17	17	16	16	16	15	15	15
B2. Export value growth at historical average minus one standard deviation in 2007-08 3/	17	18	19	18	18	17	17	15
B3. US dollar GDP deflator at historical average minus one standard deviation in 2007-08	17	17	18	17	17	16	16	16
B4. Net non-debt creating flows at historical average minus one standard deviation in 2007-08 4/	17	21	24	23	22	22	20	16
B5. Combination of B1-B4 using one-half standard deviation shocks	17	21	26	25	25	24	22	17
B6. One-time 30 percent nominal depreciation relative to the baseline in 2007 5/	17	24	23	22	21	21	21	21
NPV of debt-to-exports ratio								
Baseline	92	83	80	77	75	74	73	68
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2007-26 1/	92	92	95	97	99	100	107	97
A2. New public sector loans on less favorable terms in 2007-26 2/	92	85	84	83	84	84	93	97
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2007-08	92	83	80	77	75	74	73	68
B2. Export value growth at historical average minus one standard deviation in 2007-08 3/	92	96	105	102	99	96	92	79
B3. US dollar GDP deflator at historical average minus one standard deviation in 2007-08	92	83	80	77	75	74	73	68
B4. Net non-debt creating flows at historical average minus one standard deviation in 2007-08 4/	92	103	118	114	110	107	97	73
B5. Combination of B1-B4 using one-half standard deviation shocks	92	109	130	125	121	118	106	80
B6. One-time 30 percent nominal depreciation relative to the baseline in 2007 5/	92	83	80	77	75	74	73	68
Debt service ratio								
Baseline	5	5	5	5	5	5	4	3
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2007-26 1/	6	5	6	6	6	6	7	9
A2. New public sector loans on less favorable terms in 2007-26 2/	6	5	5	5	5	5	5	7
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2007-08	6	5	5	5	5	5	4	5
B2. Export value growth at historical average minus one standard deviation in 2007-08 3/	6	6	6	6	6	6	6	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2007-08	6	5	5	5	5	5	4	5
B4. Net non-debt creating flows at historical average minus one standard deviation in 2007-08 4/	6	5	6	6	6	6	7	6
B5. Combination of B1-B4 using one-half standard deviation shocks	6	6	6	7	7	6	7	7
B6. One-time 30 percent nominal depreciation relative to the baseline in 2007 5/	6	5	5	5	5	5	4	5
<i>Memorandum item:</i>								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	28	28	28	28	28	28	28	28

Source: Staff projections and simulations.

1/ Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.

2/ Assumes that the interest rate on new borrowing is by 2 percentage points higher than in the baseline., while grace and maturity periods are the same as in the baseline.

3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).

4/ Includes official and private transfers and FDI.

5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.

6/ Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.

Table A3. Bangladesh: Domestic Debt of Central Government
(end of period; billions of taka, unless otherwise specified)

	Jun-02	Jun-03	Jun-04	Jun-04	Jun-05	May-06
			Old	New		
Gross Domestic Debt	511.3	554.1	622.0	638.7	726.9	785.6
(in percent of GDP)	18.7	18.4	18.7	19.2	19.6	18.9
Net Domestic Debt	434.0	471.5	531.3	547.8	611.0	663.9
(in percent of GDP)	15.9	15.7	16.0	16.5	16.5	15.9
Bangladesh Bank, net	107.9	62.2	74.7	108.8	145.0	188.3
of which: Treasury bills	112.8	67.0	79.6	113.0	150.6	195.5
of which: Saving Certificate	2.5	2.4	0.0	0.0	0.0	0.0
Government Deposits	-12.0	-11.9	-10.1	-10.3	-12.4	-12.5
Deposit Money Banks, net	75.9	111.0	111.8	94.3	92.5	73.7
of which: Treasury bills	132.2	172.3	182.4	150.9	169.0	155.2
of which: Bonds and Saving Certificate	1.0	0.3	0.5	0.5	0.3	0.3
Government Deposits	-65.3	-70.7	-80.6	-80.6	-103.5	-109.1
Nonbanks	250.2	298.4	344.7	344.7	373.5	401.9
of which: Treasury bills	0.3	5.2	10.0	10.0	11.8	11.5
of which: Saving Certificate and Prize Bonds	249.9	293.1	334.4	334.4	359.5	387.9

Source: Bangladesh authorities and staff estimates.

Table A4. Bangladesh: Public Sector Debt Sustainability Framework, Baseline Scenario, 2003-2026
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 4/	Standard Deviation 4/	Estimate					Projections				
	2003	2004	2005			2006	2007	2008	2009	2010	2011	2006-11 Average	2016	2026	2012-26 Average
Public sector debt 1/	51.1	48.7	47.6			46.9	45.7	44.1	42.5	41.4	40.7		38.8	36.9	
o/w foreign-currency denominated	32.8	30.4	29.5			28.7	27.1	25.6	24.4	23.5	22.9		21.5	20.3	
Change in public sector debt	-1.8	-2.4	-1.0			-0.7	-1.3	-1.6	-1.6	-1.1	-0.7		-0.3	-0.2	
Identified debt-creating flows	-2.2	-1.6	-0.4			0.1	-1.3	-1.5	-1.4	-0.9	-0.6		-0.3	-0.1	
Primary deficit	0.4	0.8	1.3	1.4	0.8	1.0	1.7	1.1	1.1	1.3	1.4	1.3	1.6	1.5	1.5
Revenue and grants	11.4	10.6	10.9			11.1	11.5	12.1	12.2	12.3	12.6		12.4	12.2	
of which : grants	1.1	0.4	0.4			0.4	0.5	0.7	0.7	0.6	0.6		0.4	0.2	
Primary (noninterest) expenditure	11.8	11.4	12.2			12.1	13.2	13.2	13.4	13.7	14.0		14.0	13.7	
Automatic debt dynamics	-2.6	-2.4	-1.7			-1.0	-3.0	-2.6	-2.5	-2.3	-2.0		-1.8	-1.7	
Contribution from interest rate/growth differential	-2.2	-2.9	-2.7			-2.8	-2.5	-2.4	-2.3	-2.2	-2.0		-1.9	-1.7	
of which : contribution from average real interest rate	0.5	0.2	0.1			0.2	0.1	0.4	0.4	0.4	0.5		0.6	0.7	
of which : contribution from real GDP growth	-2.6	-3.0	-2.7			-2.9	-2.7	-2.8	-2.7	-2.6	-2.6		-2.5	-2.4	
Contribution from real exchange rate depreciation	-0.5	0.5	0.9			1.8	-0.5	-0.2	-0.3	-0.1	0.1		...	...
Other identified debt-creating flows	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Privatization receipts (negative)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recognition of implicit or contingent liabilities	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Debt relief (HIPC and other)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Other (specify, e.g. bank recapitalization)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes	0.4	-0.9	-0.6			-0.8	0.1	-0.1	-0.2	-0.2	-0.1		0.0	0.0	
NPV of public sector debt	...	...	36.1			36.3	36.3	35.4	34.5	33.8	33.5		32.8	32.2
o/w foreign-currency denominated	...	...	17.9			18.0	17.7	17.0	16.3	15.9	15.6		15.5	15.7
o/w external	...	...	17.9			18.0	17.7	17.0	16.3	15.9	15.6		15.5	15.7
NPV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...
NPV of public sector debt-to-revenue ratio (in percent) 2/	...	...	331.1			326.8	314.8	293.5	282.0	274.2	266.0		264.7	264.5
o/w external	...	...	164.7			162.6	153.5	140.6	133.4	128.5	124.2		125.3	128.5
Debt service-to-revenue ratio (in percent) 2/ 3/	24.2	21.5	21.9			23.0	20.1	20.1	19.7	18.5	17.3		16.9	17.1	
Primary deficit that stabilizes the debt-to-GDP ratio	2.3	3.3	2.3			1.7	3.0	2.7	2.7	2.4	2.1		1.8	1.7	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	5.3	6.3	6.0	5.3	0.6	6.5	6.0	6.5	6.5	6.5	6.6	6.4	6.7	6.9	6.8
Average nominal interest rate on forex debt (in percent)	1.0	1.0	1.4	1.1	0.1	1.1	1.2	1.0	1.0	1.1	1.1	1.1	1.5	2.2	1.7
Average real interest rate on domestic currency debt (in percent)	4.5	3.8	2.7	4.5	2.1	3.6	2.0	3.7	3.8	3.8	4.1	3.5	4.2	4.2	4.2
Real exchange rate depreciation (in percent, + indicates depreciation)	-1.4	1.6	3.3	3.0	3.9	6.6
Inflation rate (GDP deflator, in percent)	4.5	4.2	5.1	3.8	1.3	5.5	6.0	5.0	5.2	4.5	3.7	5.0	3.7	3.7	3.7
Growth of real primary spending (deflated by GDP deflator, in percent)	-0.3	2.8	13.2	4.7	10.3	5.7	16.0	5.9	8.0	8.8	9.2	8.9	6.7	7.0	6.6
Grant element of new external borrowing (in percent)	41.6	44.3	41.1	37.6	36.8	34.9	39.4	28.8	22.9	...

Sources: Country authorities; and Fund staff estimates and projections.

1/ Central government gross debt.

2/ Revenues including grants.

3/ Debt service is defined as the sum of interest and amortization of medium and long-term debt.

4/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

Table A5. Bangladesh: Sensitivity Analysis for Key Indicators of Public Debt 2006-2026

	Projections							
	2006	2007	2008	2009	2010	2011	2016	2026
NPV of Debt-to-GDP Ratio								
Baseline	36	36	35	34	34	33	33	32
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	36	36	36	36	35	35	36	37
A2. Primary balance is unchanged from 2006	36	36	35	34	33	32	30	26
A3. Permanently lower GDP growth 1/	36	36	36	35	34	34	34	35
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	36	37	37	36	36	36	36	38
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	36	37	37	36	35	35	34	33
B3. Combination of B1-B2 using one half standard deviation shocks	36	37	37	36	35	35	34	33
B4. One-time 30 percent real depreciation in 2007	36	44	42	41	40	39	37	35
B5. 10 percent of GDP increase in other debt-creating flows in 2007	36	46	44	43	42	41	39	36
NPV of Debt-to-Revenue Ratio 2/								
Baseline	327	315	293	282	274	266	265	264
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	327	314	298	291	287	280	288	302
A2. Primary balance is unchanged from 2006	327	309	288	276	266	255	238	212
A3. Permanently lower GDP growth 1/	327	315	295	284	277	269	273	290
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	327	320	305	296	290	284	293	308
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	327	319	305	293	285	276	273	270
B3. Combination of B1-B2 using one half standard deviation shocks	327	318	306	293	285	276	272	269
B4. One-time 30 percent real depreciation in 2007	327	380	351	334	322	309	296	288
B5. 10 percent of GDP increase in other debt-creating flows in 2007	327	395	366	350	339	327	317	299
Debt Service-to-Revenue Ratio 2/								
Baseline	23	20	20	20	19	17	17	17
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	23	20	20	21	20	18	18	18
A2. Primary balance is unchanged from 2006	23	20	18	19	18	16	14	11
A3. Permanently lower GDP growth 1/	23	20	20	20	19	18	18	20
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	23	20	21	21	20	19	19	22
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	23	20	21	23	20	18	17	18
B3. Combination of B1-B2 using one half standard deviation shocks	23	20	21	22	20	18	17	17
B4. One-time 30 percent real depreciation in 2007	23	21	21	21	20	19	19	20
B5. 10 percent of GDP increase in other debt-creating flows in 2007	23	20	47	30	24	21	20	23

Sources: Country authorities; and Fund staff estimates and projections.

1/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of 20 (i.e., the length of the projection period).

2/ Revenues are defined inclusive of grants.

Table A6: Bangladesh: Decomposition of the decrease of the NPV of debt-to-exports ratio from 146 percent at end-December 2004 to 106 percent at end-June 2005
(in percentage points, unless otherwise indicated)

Contributing factors to the change in the NPV of debt-to-exports ratio	Changes due to methodology 1/	Changes due to economic variables 2/	Total
NPV of debt to exports ratio as at end-2004 (HIPC methodology)	146.3		146.3
i) Parameters used to calculate the NPV of debt			-26.4
Exchange rates	-9.5		
Discount rates	-16.9		
ii) New borrowing		1.0	1.0
iii) Undoing hypothetical stock treatment under Naples terms	7.5		7.5
iv) Exports of goods and NFS	-17.3	-4.7	-22.1
v) Other factors	3/	-0.4	-0.4
vi) Residual	4/	0.0	0.0
NPV of debt to exports ratio as at end-December 2004 (LIC methodology)	110.1		
NPV of debt to exports ratio as at end-June 2005 (LIC methodology)		106.0	106.0
<i>Memorandum item</i>			
<i>Change in the NPV of debt-to-exports ratio</i>	<i>36.3</i>	<i>4.1</i>	<i>40.4</i>

1/ Corresponds to the impact of calculating the NPV of debt-to-exports ratio under the methodology proposed in the debt sustainability framework for low income countries (DSF) instead of the HIPC methodology. It also includes the impact of removing the assumption of a hypothetical debt stock reduction from bilateral and commercial creditors under Naples terms required to assess HIPC eligibility.

2/ Corresponds to changes in the NPV of debt-to-exports ratio due to debt flows (disbursements, repayments) and changes in the export denominator between end-december 2004 and end-June 2005.

3/ Corresponds to the effect of repayments (-3.1 percentage points) and moving the NPV reference date forward (+2.7 percentage points).

4/ The residual accounts for data discrepancies as well as rounding errors.