INTERNATIONAL MONETARY FUND AND
INTERNATIONAL DEVELOPMENT ASSOCIATION

BANGLADESH

# Joint Fund-World Bank Debt Sustainability Analysis (DSA) 2008[1]


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the International Development Association

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***Bangladesh's risk of debt distress is low based on external debt indicators.*** *Bangladesh's external debt burden indicators do not breach the relevant policy-dependent indicative thresholds under the baseline scenario and exhibit only a marginal breach under the stress tests.[2] Debt burden indicators are significantly worse when domestic debt is included. Accordingly, this analysis reveals a more elevated risk of debt distress on public debt compared to results based solely on external debt. Staffs will monitor closely the evolution of domestic debt and the government's ability to mobilize domestic resources.*


1. **The results of this DSA are similar to those of the previous DSA.**[3] The primary difference between the two is that in the current DSA, one of the thresholds is marginally breached in the most extreme stress test, namely the combination of one-half standard-

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[1] This DSA has been prepared jointly by World Bank and IMF staffs and in consultation with the Asian Development Bank using the debt sustainability framework for low-income countries approved by the Boards of both institutions. The DSA is based on macroeconomic data gathered in the context of IMF missions to Dhaka in 2008. Estimated debt outstanding and disbursed as of end–FY2007 provides the basis for debt figures.

[2] The low-income country debt sustainability framework (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.

[3] IMF Country Report No. 06/406 (Annex I).

deviation shocks to net transfers, export growth, GDP growth, and the GDP deflator. This breach emerges largely because the relative magnitude of the shock is substantially higher compared to the previous DSA. As a result of the significant volatility displayed in some of Bangladesh's historical macroeconomic series, the standard deviation of exports and net transfers has increased; meanwhile, baseline projections for those variables were revised upwards. Since the values of the key parameters under the shock are simulated to be the historical average subtracted of half a standard deviation, this is now much lower vis-à-vis the baseline compared to the analysis done in the previous DSA.[4] The projections of debt to GDP in the previous DSA were, by and large, accurate as the actual outturn deviated from the projection by less than 1 percentage point. Moreover, the longer-term debt dynamics under the baseline are similar, but slightly more favorable.

**2. 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 own medium-term framework, 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 slightly higher in the medium term than historical averages, but taper off to the historical average in the out years. Export performance for 2006 and 2007[5] was substantially better than projected in the previous DSA, and accordingly projections in the current DSA were revised upward. On the other hand, import growth is also projected to be significantly higher than the historical average throughout the projection period but particularly in the medium term. Finally, due to a strong growth in remittances from Bangladeshis in the United States, United Kingdom, and Gulf states, private net current transfers are expected to continue their increasing trend.

[4] For example, in the case of net transfers, the shock simulated in this year's DSA is equivalent to a decline (vs. the baseline scenario) of 6–7 percentage points of GDP, compared to a decline of 4 percentage points simulated in the previous DSA.

[5] All references are to the Bangladeshi fiscal year which runs from July 1 through June 30.

**Box 1. Bangladesh: Macroeconomic Assumptions Underlying the DSA**

**The macroeconomic assumptions are as follows:**

**Real GDP growth** in the medium term is, at 6.4 percent, above the recent historical average of 5.6 percent, and it picks up in the outer years to 7 percent. This is close to (but slightly lower than) Bangladesh's own medium-term 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, increases in 2008 due to higher food and energy prices, but then declines and stabilizes at around 4 percent.

The growth of **exports** and **imports** is strong in the medium term (14 percent and 17 percent respectively); as the economy opens both will increase in terms of GDP with imports gaining the most as increasing investment and intermediate goods are imported.

The **current account** (including grants) moves from a small surplus to a deficit, which peaks in the outer years at about 2 percent of GDP, as a result primarily of continued strong growth of capital and intermediate goods imports related to increasing investment projects. These effects are offset to some extent by strong growth of remittances, which are projected to grow at an annual average of about 13 percent over the medium and long term.

**Net aid inflows** reach 2 percent of GDP and stabilize in that range (consistent with Bangladesh’s medium-term framework). The projections assume that the grant element of new borrowing decreases over the 20-year period from 48 percent to 39 percent in the out years.

The **overall fiscal deficit** (excluding grants) is assumed to remain close to the historical average (around 4 percent of GDP), while the primary deficit declines slightly over time. A modest rise is assumed in the **revenue-to-GDP ratio** (excluding grants) in the initial years (from 11½ percent in FY08 to 13 percent in FY13), supported by efforts to mobilize domestic revenues.

**Real interest rates** on domestic currency debt are assumed to stay more or less constant at about 3.5 percent.

## I. External Debt Sustainability Analysis

3. **All external debt indicators remain well below the policy-dependent debt burden thresholds under the baseline scenario, but one threshold is breached under the most extreme standard stress test.** 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 1 and Figure 1)**.** The NPV of debt-to-GDP ratio decreases from about 17 percent in 2007 to 9 percent (compared to an indicative threshold of 40 percent) during the projection period, while the NPV debt-to-exports ratio decreases from 84 percent to 30 percent (compared to an indicative threshold of 150 percent), and the debt service ratio decreases from 5 percent to 3 percent (compared to an indicative threshold of 20 percent).

- **The standard stress tests do not reveal any serious vulnerability** although the NPV of debt to revenues threshold is breached in the most extreme test, in which GDP growth, exports, net current transfers, and FDI suffer a one-half standard deviation shock (Table 2 and Figure 1). The breach is temporary, lasting for two years. The dynamics lead to a sharp secular decline in the ratio thereafter. As explained earlier, the debt dynamics are similar to the previous DSA, and the increased magnitude of the shocks (which causes the breach of the threshold) reflects the volatility in some of Bangladesh's macroeconomic variables rather than newly identified risks.

- **The Table below summarizes Bangladesh's indicative thresholds, actual 2007 ratios, and average debt ratios under the baseline scenario.**

**Policy-Based External Debt Burden Thresholds for Bangladesh**

| | Threshold | Bangladesh's Ratios | |
|---|---|---|---|
| | | 2007 | 2008-28 1/ |
| PV of debt in percent of | | | |
| GDP | 40 | 17 | 11 |
| Exports | 150 | 84 | 44 |
| Revenues | 250 | 166 | 92 |
| Debt Service in percent of | | | |
| Exports | 20 | 5 | 3 |
| Revenues | 30 | 10 | 6 |

1/ Average for the period under the baseline scenario.

## II. Public Debt[6] Sustainability Analysis

4. **Domestic debt has been relatively stable over the past five years.** Gross debt has remained around 18–19 percent of GDP from end–June 2002 to end–June 2007 (Table 3). 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.

5. **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 3). 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.

6. **Despite the manageable outlook in the baseline scenario, the alternative scenarios and bound tests indicate that the projected paths of debt indicators are sensitive to alternative assumptions and point to considerable risks** (Table 4).

[6] Public debt includes domestic central government debt and external public and publicly guaranteed debt.

- **The public debt position is vulnerable to a growth slowdown**. The NPV of public debt-to-GDP ratio ceases to decline under a low growth scenario, in which growth slows down to baseline minus one half the standard deviation of the historical growth rate, (about 6.6 percent per year—see scenario A3). In fact because the low growth scenario also assumes that revenues adjust downward to lower growth whereas expenditures do not, the debt-to-GDP ratio starts to rise modestly in the outer years (2015 onwards). This highlights the need to manage expenditures prudently, while protecting priority spending, in the event of a growth slowdown.

- **Public debt indicators are also vulnerable to one-off debt creating flows** (scenario B5). Underpricing of energy products by BPC and BPDB, and of fertilizer prices by BCIC are creating contingent liabilities that may need to be borne by the government. These contingent liabilities are presently growing by almost 1 percent 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 percent of GDP—which could be conservative given that contingent liabilities will increase further unless policies are changed—the debt-service to revenue ratio reaches 36 percent in 2010, compared with the baseline ratio of 23 percent.

## III. Debt Management

7. **In response to a request from the authorities, a joint Bank/Fund mission visited Bangladesh in January 2008 to provide technical assistance to help improve Bangladesh's medium-term debt strategy formulation.** The mission focused on assisting the authorities to create the capacity to formulate debt management strategies through comprehensive sharing and analysis of external and domestic debt data and the identification, measurement, and management of cost and risk in the context of DSA.

8. **The authorities have made significant progress in moving forward with the recommendations of the mission.** Among other actions: (i) a committee was created under the chairmanship of the Resource and Debt Management Wing of the Finance Division of the Ministry of Finance with members from all the divisions and departments that currently deal with debt information; (ii) UNCTAD's debt management system (DMFAS) was installed to help to monitor and analyze existing debt; and (iii) Finance Division staff are working with Fund and Bank staff to familiarize themselves with the preparation of DSAs.

## IV. Conclusion

9. **It is the staffs' view that Bangladesh should be considered at low risk of debt distress based on external indicators, but the analysis reveals a more elevated risk of debt distress on public debt.** 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

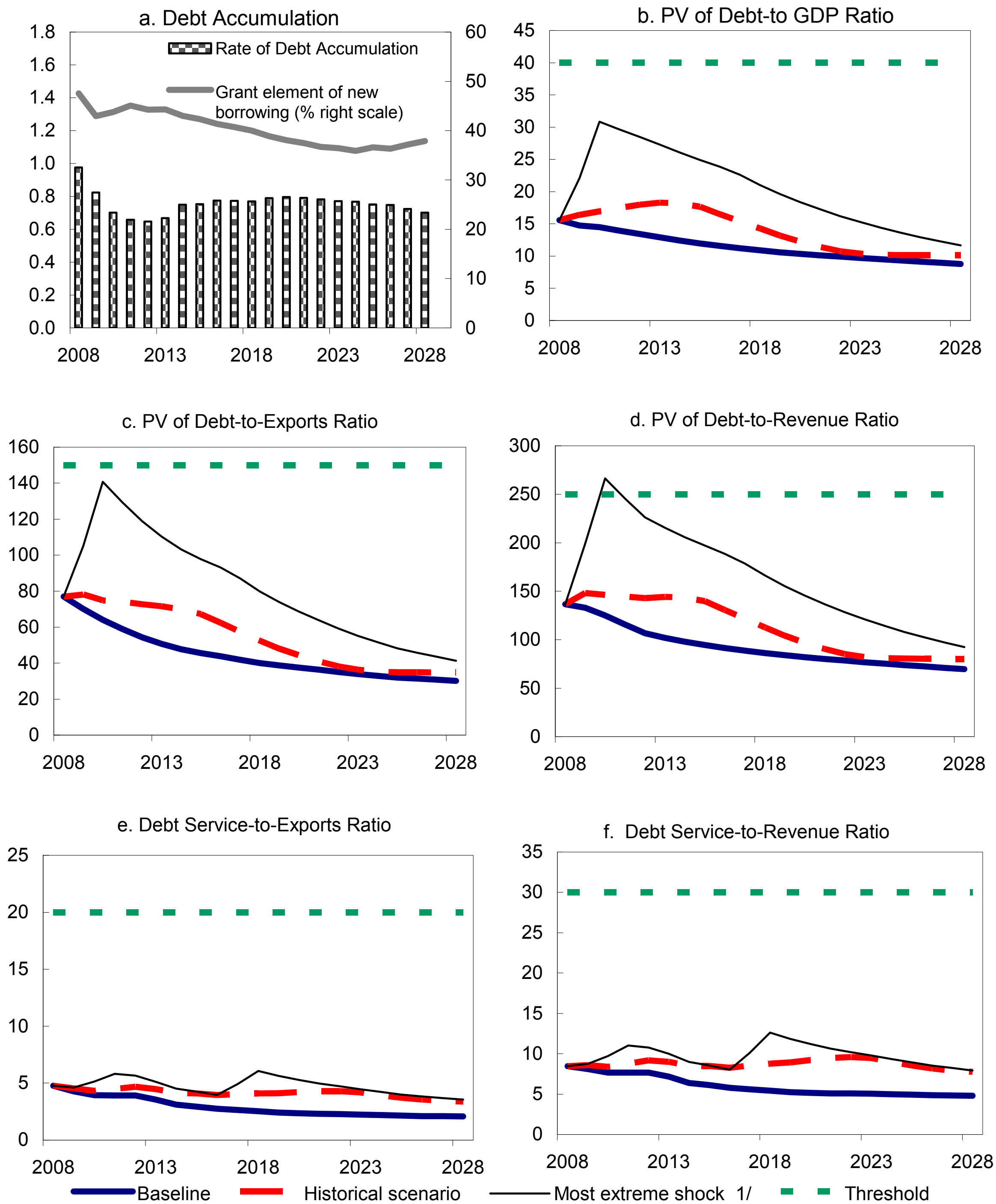
close to the indicative debt burden thresholds. A temporary and minor breach of one threshold under a particularly severe stress test does not change this conclusion. Risks to domestic debt accumulation, however, especially coming from the possible recognition of contingent liabilities, raise concerns.

**10. 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. The substantial jump in the key liquidity ratio (debt service to revenues) under the shock that simulates the recognition of contingent liabilities is a particular cause for concern, and highlights the risks that can materialize if economic policies are not managed carefully and public enterprise losses are not contained.

**11. Efforts to mobilize domestic revenues, especially in the initial years, as well as the appropriate management of contingent liabilities, and managing expenditures prudently while protecting priority spending are the keys to ensure improvement in the debt indicators**. This exercise also underscores the importance of effective management of the existing debt and new debt accumulation.

**12. The staff encourages the authorities to build on recent steps and move forward as quickly as possible to strengthen debt management capacity.** In this regard, it will be important to develop a comprehensive external debt data base and to centralize the reporting of all external aid flows.

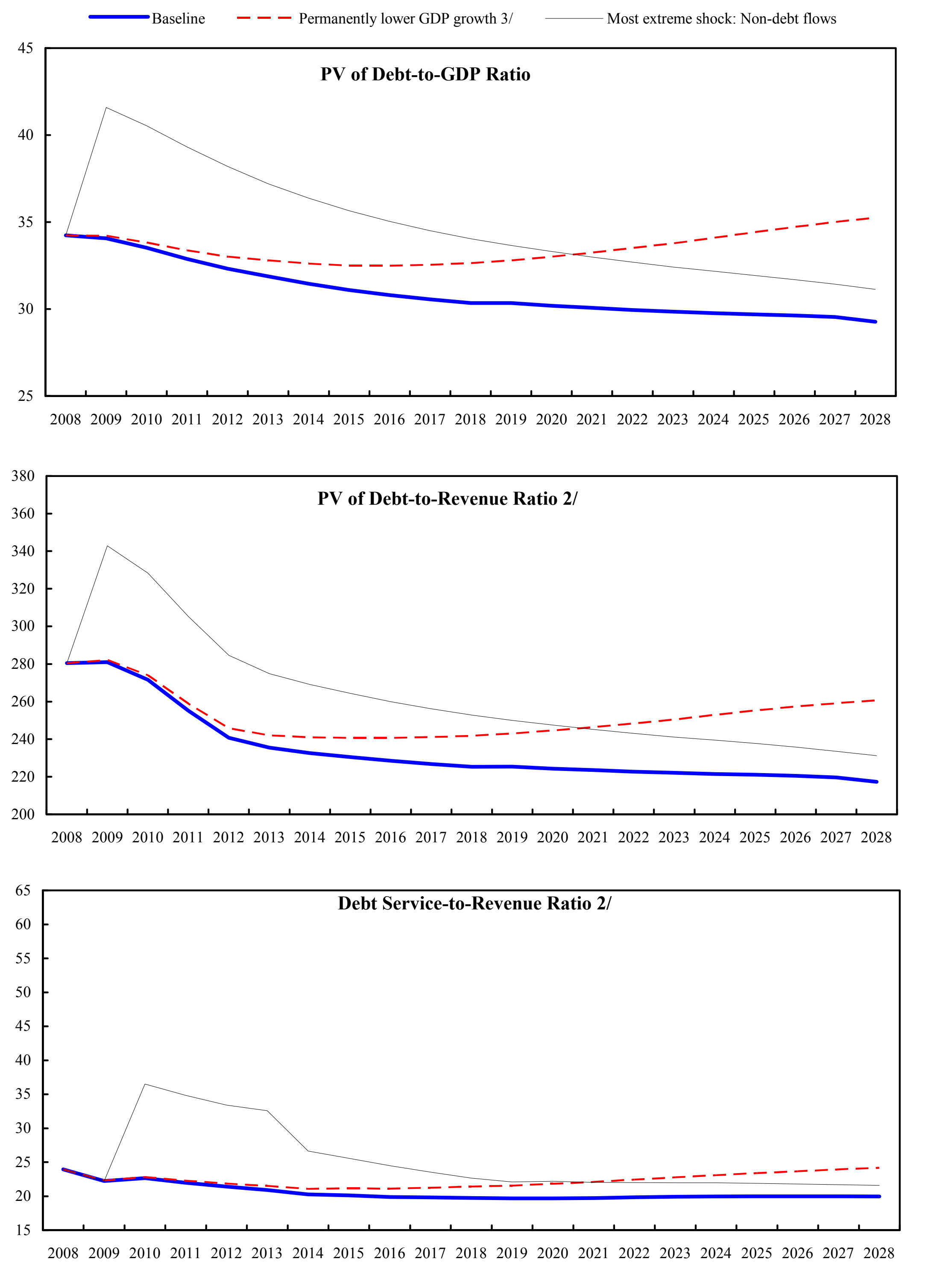
**Figure 1. Bangladesh: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2008–28 1/**




Source: Staff projections and simulations.

1/ The most extreme stress test is the test that yields the highest ratio in 2018. In figure b. it corresponds to a Combination shock; in c. to a Combination shock; in d. to a Combination shock; in e. to a Combination shock and in picture f. to a Combination shock.

**Figure 2. Bangladesh: Indicators of Public Debt Under Alternative Scenarios, 2008–28 1/**




Sources: Country authorities; and Fund staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest average ratio during the projection period.
2/ Revenues are defined inclusive of grants.
3/ Assumes a growth rate equal to the baseline less 1/2 standard deviation of the historical growth rate.

**Table 1. Bangladesh: External Debt Sustainability Framework, Baseline Scenario, 2005–28** 1/
(In percent of GDP, unless otherwise indicated)

| | Actual | | | Historical Average 2/ | Standard Deviation | Projections | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | | | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2008–2013 Average | 2018 | 2028 | 2014–2028 Average |
| **External debt (nominal) 1/** | **29.6** | **28.9** | **28.7** | | | **25.9** | **24.4** | **23.8** | **22.9** | **22.0** | **21.1** | | **17.3** | **13.1** | |
| *Of which:* public and publicly guaranteed (PPG) | 29.3 | 28.6 | 28.4 | | | 25.7 | 24.2 | 23.6 | 22.6 | 21.7 | 20.9 | | 16.9 | 12.6 | |
| Change in external debt | -1.4 | -0.7 | -0.1 | | | -2.8 | -1.6 | -0.6 | -0.9 | -0.9 | -0.9 | | -0.6 | -0.3 | |
| Identified net debt-creating flows | -2.3 | -2.8 | -4.3 | | | -3.2 | -3.2 | -2.7 | -3.0 | -2.9 | -2.6 | | 0.1 | -0.9 | |
| **Noninterest current account deficit** | **0.6** | **-1.2** | **-1.0** | **-0.1** | **1.0** | **-1.1** | **-1.1** | **-0.7** | **-0.8** | **-0.6** | **-0.3** | | **2.4** | **1.7** | 1.8 |
| Deficit in balance of goods and services | 6.9 | 6.4 | 7.2 | | | 8.8 | 10.2 | 11.7 | 12.5 | 13.5 | 14.8 | | 19.9 | 19.4 | |
| Exports | 16.2 | 18.9 | 20.5 | | | 20.2 | 21.0 | 22.6 | 23.7 | 24.7 | 25.5 | | 27.2 | 29.1 | |
| Imports | 23.1 | 25.4 | 27.7 | | | 29.1 | 31.2 | 34.3 | 36.2 | 38.2 | 40.3 | | 47.1 | 48.4 | |
| Net current transfers (negative = inflow) | -7.1 | -8.6 | -9.4 | -6.3 | 1.7 | -11.0 | -12.4 | -13.5 | -14.5 | -15.3 | -16.2 | | -18.7 | -19.1 | -18.8 |
| *Of which:* official | -0.1 | -0.1 | -0.1 | | | -0.2 | -0.3 | -0.1 | -0.1 | -0.1 | -0.1 | | -0.1 | 0.0 | |
| Other current account flows (negative = net inflow) | 0.8 | 1.0 | 1.1 | | | 1.1 | 1.1 | 1.1 | 1.2 | 1.2 | 1.2 | | 1.3 | 1.4 | |
| **Net FDI (negative = inflow)** | **-1.3** | **-1.1** | **-1.0** | **-0.7** | **0.3** | **-0.9** | **-0.9** | **-1.0** | **-1.1** | **-1.1** | **-1.2** | | **-1.4** | **-1.9** | -1.6 |
| **Endogenous debt dynamics 3/** | **-1.6** | **-0.5** | **-2.2** | | | **-1.2** | **-1.1** | **-1.0** | **-1.2** | **-1.2** | **-1.2** | | **-0.9** | **-0.7** | |
| Denominator: 1+g+r+gr | 1.1 | 1.0 | 1.1 | | | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | | 1.1 | 1.1 | |
| Contribution from nominal interest rate | 0.4 | 0.3 | 0.3 | | | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | | 0.2 | 0.2 | |
| Contribution from real GDP growth | -1.7 | -1.9 | -1.7 | | | -1.5 | -1.4 | -1.3 | -1.4 | -1.4 | -1.4 | | -1.1 | -0.8 | |
| Contribution from price and exchange rate changes | -0.2 | 1.1 | -0.8 | | | … | … | … | … | … | … | | … | … | |
| **Residual (3-4) 4/** | **0.9** | **2.1** | **4.1** | | | **0.4** | **1.6** | **2.1** | **2.0** | **2.0** | **1.7** | | **-0.8** | **0.6** | |
| *Of which:* exceptional financing | -1.3 | -1.1 | -1.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| PV of external debt 5/ | ... | ... | 17.5 | | | 15.8 | 14.9 | 14.7 | 14.2 | 13.7 | 13.2 | | 11.2 | 9.2 | |
| In percent of exports | ... | ... | 85.3 | | | 78.0 | 71.1 | 65.0 | 59.9 | 55.3 | 51.6 | | 41.4 | 31.7 | |
| **PV of PPG external debt** | **...** | **...** | **17.2** | | | **15.6** | **14.7** | **14.5** | **14.0** | **13.4** | **12.9** | | **10.9** | **8.8** | |
| **In percent of exports** | **...** | **...** | **83.9** | | | **76.9** | **70.1** | **64.1** | **59.0** | **54.3** | **50.6** | | **40.1** | **30.2** | |
| **In percent of government revenues** | **...** | **...** | **166.1** | | | **136.5** | **132.9** | **125.1** | **115.5** | **106.7** | **101.9** | | **86.1** | **69.5** | |
| **Debt service-to-exports ratio (in percent)** | **7.8** | **5.8** | **5.1** | | | **5.1** | **4.5** | **4.2** | **4.2** | **4.2** | **3.8** | | **2.9** | **2.5** | |
| **PPG debt service-to-exports ratio (in percent)** | **7.6** | **5.6** | **4.9** | | | **4.8** | **4.3** | **3.9** | **3.9** | **3.9** | **3.6** | | **2.5** | **2.1** | |
| **PPG debt service-to-revenue ratio (in percent)** | **11.7** | **10.0** | **9.8** | | | **8.5** | **8.1** | **7.7** | **7.7** | **7.7** | **7.2** | | **5.4** | **4.8** | |
| Total gross financing need (billions of U.S. dollars) | 0.3 | -0.7 | -0.7 | | | -0.7 | -1.0 | -0.7 | -0.8 | -0.8 | -0.5 | | 3.6 | 2.7 | |
| Noninterest current account deficit that stabilizes debt ratio | 1.9 | -0.5 | -0.9 | | | 1.7 | 0.4 | -0.1 | 0.2 | 0.3 | 0.6 | | 3.1 | 2.0 | |
| **Key macroeconomic assumptions** | | | | | | | | | | | | | | | |
| Real GDP growth (in percent) | 6.0 | 6.6 | 6.4 | 5.6 | 0.7 | 6.2 | 6.0 | 5.5 | 6.5 | 6.7 | 7.0 | 6.3 | 7.0 | 7.0 | 7.0 |
| GDP deflator in U.S. dollar terms (change in percent) | 0.6 | -3.6 | 2.7 | -0.7 | 3.0 | 9.9 | 5.0 | 0.9 | 2.0 | 1.9 | 1.9 | 3.6 | 2.9 | 2.9 | 2.9 |
| Effective interest rate (percent) 6/ | 1.3 | 1.0 | 1.0 | 1.1 | 0.1 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.5 | 1.3 |
| Growth of exports of G&S (U.S. dollar terms, in percent) | 15.5 | 20.2 | 18.3 | 11.0 | 7.7 | 15.2 | 15.5 | 14.6 | 13.6 | 13.7 | 12.7 | 14.2 | 11.7 | 10.1 | 11.0 |
| Growth of imports of G&S (U.S. dollar terms, in percent) | 19.6 | 12.9 | 19.5 | 9.7 | 8.7 | 22.4 | 19.3 | 17.2 | 14.4 | 14.9 | 15.1 | 17.2 | 11.7 | 10.1 | 11.5 |
| Grant element of new public sector borrowing (in percent) | ... | ... | ... | ... | ... | 47.6 | 43.0 | 43.8 | 45.1 | 44.3 | 44.3 | 44.7 | 40.0 | 37.9 | 38.6 |
| Government revenues (excluding grants, in percent of GDP) | 10.5 | 10.7 | 10.3 | | | 11.4 | 11.1 | 11.6 | 12.1 | 12.6 | 12.7 | | 12.6 | 12.6 | 12.6 |
| Aid flows (in billions of US dollars) 7/ | 0.7 | 0.6 | 0.5 | | | 2.0 | 2.2 | 2.0 | 2.3 | 2.6 | 2.8 | | 4.2 | 10.2 | |
| *Of which:* Grants | 0.2 | 0.3 | 0.2 | | | 0.6 | 0.9 | 0.7 | 0.8 | 0.9 | 1.0 | | 1.6 | 4.3 | |
| *Of which:* Concessional loans | 0.5 | 0.4 | 0.4 | | | 1.4 | 1.3 | 1.3 | 1.5 | 1.6 | 1.8 | | 2.5 | 6.0 | |
| Grant-equivalent financing (in percent of GDP) 8/ | ... | ... | ... | | | 1.8 | 1.8 | 1.4 | 1.5 | 1.6 | 1.6 | | 1.4 | 1.3 | 1.4 |
| Grant-equivalent financing (in percent of external financing) 8/ | ... | ... | ... | | | 62.6 | 65.2 | 62.6 | 63.6 | 63.1 | 63.4 | | 61.8 | 61.7 | 61.0 |
| *Memorandum items:* | | | | | | | | | | | | | | | |
| Nominal GDP (billions of US dollars) | 60.3 | 62.0 | 67.7 | | | 79.0 | 87.9 | 93.6 | 101.6 | 110.5 | 120.5 | | 194.9 | 509.6 | |
| Nominal dollar GDP growth | 6.6 | 2.7 | 9.3 | | | 16.7 | 11.3 | 6.5 | 8.6 | 8.7 | 9.0 | **10.1** | 10.1 | 10.1 | 10.1 |
| PV of PPG external debt (in billions of US dollars) | | | 11.6 | | | 12.3 | 12.9 | 13.6 | 14.2 | 14.8 | 15.6 | | 21.2 | 44.7 | |
| (PVt-PVt-1)/GDPt-1 (in percent) | | | | | | 1.0 | 0.8 | 0.7 | 0.7 | 0.6 | 0.7 | 0.7 | 0.8 | 0.7 | 0.8 |

Source: Staff simulations.

1/ Includes both public and private sector external debt.
2/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.
3/ Derived as [r - g - r(1+g)]/(1+g+r+gr) times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and r = growth rate of GDP deflator in U.S. dollar terms.
4/ 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.
5/ Assumes that PV of private sector debt is equivalent to its face value.
6/ Current-year interest payments divided by previous period debt stock.
7/ Defined as grants, concessional loans, and debt relief.
8/ Grant-equivalent financing includes grants provided directly to the government and through new borrowing (difference between the face value and the PV of new debt).

**Table 2. Bangladesh: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2008–28**

(In percent)

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | **2018** | 2028 |
| **PV of debt-to GDP ratio** | | | | | | | | |
| **Baseline** | 16 | 15 | 14 | 14 | 13 | 13 | **11** | 9 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2008–2028 1/ | 16 | 16 | 17 | 17 | 18 | 18 | **14** | 10 |
| A2. New public sector loans on less favorable terms in 2008–2028 2/ | 16 | 15 | 15 | 14 | 14 | 13 | **11** | 9 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2009–2010 | 16 | 15 | 15 | 14 | 14 | 13 | **11** | 9 |
| B2. Export value growth at historical average minus one standard deviation in 2009–2010 3/ | 16 | 16 | 19 | 18 | 17 | 16 | **13** | 9 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–2010 | 16 | 16 | 17 | 16 | 15 | 15 | **12** | 10 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–2010 4/ | 16 | 20 | 25 | 24 | 23 | 23 | **17** | 10 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 16 | 22 | 31 | 30 | 28 | 27 | **21** | 12 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/ | 16 | 21 | 20 | 20 | 19 | 18 | **15** | 12 |
| **PV of debt-to-exports ratio** | | | | | | | | |
| **Baseline** | 77 | 70 | 64 | 59 | 54 | 51 | **40** | 30 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2008–2028 1/ | 77 | 78 | 75 | 74 | 73 | 72 | **52** | 35 |
| A2. New public sector loans on less favorable terms in 2008–2028 2/ | 77 | 70 | 64 | 60 | 55 | 51 | **40** | 31 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2009–2010 | 77 | 70 | 64 | 59 | 54 | 51 | **40** | 30 |
| B2. Export value growth at historical average minus one standard deviation in 2009–2010 3/ | 77 | 86 | 102 | 94 | 86 | 80 | **61** | 40 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–2010 | 77 | 70 | 64 | 59 | 54 | 51 | **40** | 30 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–2010 4/ | 77 | 95 | 112 | 103 | 95 | 88 | **64** | 35 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 77 | 105 | 141 | 129 | 119 | 110 | **80** | 41 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/ | 77 | 70 | 64 | 59 | 54 | 51 | **40** | 30 |
| **PV of debt-to-revenue ratio** | | | | | | | | |
| **Baseline** | 137 | 133 | 125 | 115 | 107 | 102 | **86** | 69 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2008–2028 1/ | 137 | 148 | 146 | 145 | 143 | 144 | **113** | 80 |
| A2. New public sector loans on less favorable terms in 2008–2028 2/ | 137 | 133 | 126 | 117 | 108 | 103 | **87** | 71 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2009–2010 | 137 | 134 | 127 | 117 | 108 | 104 | **88** | 71 |
| B2. Export value growth at historical average minus one standard deviation in 2009–2010 3/ | 137 | 145 | 160 | 148 | 136 | 130 | **106** | 74 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–2010 | 137 | 145 | 143 | 132 | 122 | 116 | **98** | 79 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–2010 4/ | 137 | 179 | 219 | 202 | 186 | 177 | **138** | 80 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 137 | 199 | 266 | 245 | 226 | 215 | **166** | 92 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/ | 137 | 186 | 175 | 162 | 149 | 143 | **121** | 97 |

**Table 2. Bangladesh: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2008–2028 (concluded)**

(In percent)

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | **2018** | 2028 |
| **Debt service-to-exports ratio** | | | | | | | | |
| **Baseline** | 5 | 4 | 4 | 4 | 4 | 4 | **3** | 2 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2008–2028 1/ | 5 | 5 | 4 | 4 | 5 | 4 | **4** | 3 |
| A2. New public sector loans on less favorable terms in 2008–2028 2/ | 5 | 4 | 4 | 4 | 4 | 4 | **3** | 2 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2009–2010 | 5 | 4 | 4 | 4 | 4 | 4 | **3** | 2 |
| B2. Export value growth at historical average minus one standard deviation in 2009–2010 3/ | 5 | 5 | 5 | 5 | 5 | 5 | **4** | 3 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–2010 | 5 | 4 | 4 | 4 | 4 | 4 | **3** | 2 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–2010 4/ | 5 | 4 | 4 | 5 | 5 | 4 | **5** | 3 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 5 | 5 | 5 | 6 | 6 | 5 | **6** | 4 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/ | 5 | 4 | 4 | 4 | 4 | 4 | **3** | 2 |
| **Debt service-to-revenue ratio** | | | | | | | | |
| **Baseline** | 8 | 8 | 8 | 8 | 8 | 7 | **5** | 5 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2008–2028 1/ | 8 | 9 | 8 | 9 | 9 | 9 | **9** | 8 |
| A2. New public sector loans on less favorable terms in 2008–2028 2/ | 8 | 8 | 8 | 8 | 8 | 8 | **6** | 4 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2009–2010 | 8 | 8 | 8 | 8 | 8 | 7 | **6** | 5 |
| B2. Export value growth at historical average minus one standard deviation in 2009–2010 3/ | 8 | 8 | 8 | 8 | 8 | 8 | **7** | 6 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–2010 | 8 | 9 | 9 | 9 | 9 | 8 | **6** | 5 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–2010 4/ | 8 | 8 | 9 | 9 | 9 | 9 | **10** | 7 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 8 | 9 | 10 | 11 | 11 | 10 | **13** | 8 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/ | 8 | 11 | 11 | 11 | 11 | 10 | **8** | 7 |
| *Memorandum item:* | | | | | | | | |
| Grant element assumed on residual financing (i.e., financing required above baseline) 6/ | 39 | 39 | 39 | 39 | 39 | 39 | **39** | 39 |

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 (implicitl 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 3. Public Sector Debt Sustainability Framework, Baseline Scenario, 2005–28**

(In percent of GDP, unless otherwise indicated)

| | Actual | | | | | Estimate | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | Average 1/ | Standard Deviation | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2008-13 Average | 2018 | 2028 |
| **Public sector debt 2/** | 47.5 | 46.9 | 46.5 | | | 44.4 | 43.8 | 42.8 | 41.7 | 40.7 | 39.9 | | 36.4 | 33.1 |
| *Of which:* foreign currency denominated | 29.3 | 28.7 | 28.3 | | | 25.7 | 24.9 | 24.1 | 23.0 | 22.0 | 21.0 | | 17.0 | 12.7 |
| Change in public sector debt | -1.6 | -0.5 | -0.4 | | | -2.1 | -0.6 | -1.0 | -1.1 | -1.0 | -0.9 | | -0.5 | -0.3 |
| Identified debt-creating flows | -0.8 | 0.2 | -1.7 | | | -2.1 | -0.6 | -0.8 | -0.9 | -0.8 | -0.7 | | -0.4 | -0.1 |
| Primary deficit | 1.4 | 1.0 | 1.1 | 1.3 | 0.8 | 2.2 | 1.7 | 0.9 | 1.0 | 1.0 | 1.0 | 1.3 | 1.0 | 0.9 |
| Revenue and grants | 10.9 | 11.1 | 10.6 | | | 12.2 | 12.1 | 12.3 | 12.9 | 13.4 | 13.5 | | 13.5 | 13.5 |
| *Of which: grants* | 0.4 | 0.4 | 0.2 | | | 0.8 | 1.0 | 0.8 | 0.8 | 0.8 | 0.8 | | 0.8 | 0.8 |
| Primary (noninterest) expenditure | 12.2 | 12.1 | 11.7 | | | 14.4 | 13.9 | 13.2 | 13.9 | 14.4 | 14.5 | | 14.5 | 14.4 |
| Automatic debt dynamics | -2.2 | -0.9 | -2.8 | | | -4.2 | -2.3 | -1.7 | -2.0 | -1.8 | -1.7 | | -1.4 | -1.0 |
| Contribution from interest rate/growth differential | -3.2 | -3.5 | -3.4 | | | -4.1 | -3.9 | -2.8 | -2.7 | -2.3 | -2.0 | | -1.6 | -1.2 |
| *Of which: contribution from average real interest rate* | -0.5 | -0.5 | -0.5 | | | -1.4 | -1.4 | -0.5 | -0.1 | 0.3 | 0.7 | | 0.8 | 1.0 |
| *Of which: contribution from real GDP growth* | -2.8 | -3.0 | -2.8 | | | -2.7 | -2.5 | -2.3 | -2.6 | -2.6 | -2.7 | | -2.4 | -2.2 |
| Contribution from real exchange rate depreciation | 1.0 | 2.6 | 0.6 | | | -0.2 | 1.6 | 1.1 | 0.8 | 0.5 | 0.3 | | ... | ... |
| 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 | -0.8 | -0.7 | 1.3 | | | 0.0 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | | -0.1 | -0.2 |
| **Other Sustainability Indicators** | | | | | | | | | | | | | | |
| **PV of public sector debt** | 18.1 | 18.2 | 35.3 | | | 34.2 | 34.1 | 33.5 | 32.9 | 32.3 | 31.9 | | 30.3 | 29.3 |
| *Of which:* foreign-currency denominated | 0.0 | 0.0 | 17.1 | | | 15.5 | 15.2 | 14.8 | 14.2 | 13.6 | 13.0 | | 10.9 | 8.8 |
| *Of which:* external | ... | ... | 17.1 | | | 15.5 | 15.2 | 14.8 | 14.2 | 13.6 | 13.0 | | 10.9 | 8.8 |
| PV of contingent liabilities (not included in public sector debt) | ... | ... | ... | | | ... | ... | ... | ... | ... | ... | | ... | ... |
| Gross financing need 3/ | 3.4 | 3.9 | 3.6 | | | 3.8 | 5.1 | 4.3 | 3.6 | 3.8 | 3.8 | | 3.7 | 3.6 |
| PV of public sector debt-to-revenue and grants ratio (in percent) | 167.1 | 164.6 | 333.7 | | | 280.5 | 280.9 | 271.5 | 255.2 | 240.7 | 235.5 | | 225.3 | 217.3 |
| PV of public sector debt-to-revenue ratio (in percent) | 172.8 | 171.0 | 341.4 | | | 300.5 | 307.5 | 289.4 | 272.2 | 256.9 | 251.3 | | 240.1 | 231.7 |
| *Of which:* external 4/ | … | … | 165.6 | | | 136.4 | 136.9 | 127.6 | 117.2 | 107.8 | 102.4 | | 86.6 | 69.9 |
| Debt service-to-revenue and grants ratio (in percent) 5/ | 23.2 | 23.2 | 25.3 | | | 24.0 | 22.2 | 22.6 | 22.0 | 21.4 | 20.9 | | 19.7 | 19.9 |
| Debt service-to-revenue ratio (in percent) 5/ | 15.5 | 16.6 | 18.3 | | | 19.8 | 18.8 | 18.8 | 17.8 | 17.0 | 16.8 | | 17.0 | 17.6 |
| Primary deficit that stabilizes the debt-to-GDP ratio | 3.0 | 1.6 | 1.5 | | | 4.3 | 2.4 | 1.9 | 2.2 | 2.0 | 1.9 | | 1.6 | 1.2 |
| **Key macroeconomic and fiscal assumptions** | | | | | | | | | | | | | | |
| Real GDP growth (in percent) | 6.0 | 6.6 | 6.4 | 5.6 | 0.7 | 6.2 | 6.0 | 5.5 | 6.5 | 6.7 | 7.0 | 6.3 | 7.0 | 7.0 |
| Average nominal interest rate on forex debt (in percent) | 1.2 | 0.9 | 0.9 | 1.1 | 0.1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.2 | 1.1 | 1.2 |
| Average real interest rate on forex debt (in percent) | 7.2 | 13.4 | 7.4 | 10.0 | 3.6 | 2.4 | 5.9 | 10.4 | 9.3 | 9.3 | 9.3 | 7.8 | 8.3 | 8.2 |
| Real exchange rate depreciation (in percent, + indicates depreciation) | 8.2 | 19.9 | 5.2 | 9.7 | 6.4 | -1.3 | ... | ... | ... | ... | ... | … | ... | ... |
| Inflation rate (GDP deflator, in percent) | 0.6 | -3.6 | 2.7 | -0.7 | 3.0 | 9.9 | 5.0 | 0.9 | 2.0 | 1.9 | 1.9 | 3.6 | 2.9 | 2.9 |
| Growth of real primary spending (deflated by GDP deflator, in percent) | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Grant element of new external borrowing (in percent) | ... | ... | ... | … | … | 47.6 | 43.0 | 43.8 | 45.1 | 44.3 | 44.3 | 44.7 | 40.0 | 37.9 |

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

1/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.
2/ Central government gross debt.
3/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period.
4/ Revenues excluding grants.
5/ Debt service is defined as the sum of interest and amortization of medium and long-term debt.

**Table 4. Bangladesh: Sensitivity Analysis for Key Indicators of Public Debt 2008–28**

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2018 | 2028 |
| **PV of Debt-to-GDP Ratio** | | | | | | | | |
| **Baseline** | 34 | 34 | 34 | 33 | 32 | 32 | 30 | 29 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 34 | 33 | 33 | 33 | 33 | 33 | 35 | 40 |
| A2. Primary balance is unchanged from 2008 | 34 | 33 | 33 | 33 | 33 | 33 | 33 | 35 |
| A3. Permanently lower GDP growth 1/ | 34 | 34 | 33 | 33 | 33 | 32 | 32 | 35 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010 | 34 | 34 | 34 | 33 | 33 | 33 | 32 | 31 |
| B2. Primary balance is at historical average minus one standard deviations in 2009-2010 | 34 | 34 | 34 | 33 | 33 | 32 | 31 | 30 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 34 | 34 | 34 | 33 | 33 | 32 | 31 | 30 |
| B4. One-time 30 percent real depreciation in 2009 | 34 | 40 | 39 | 38 | 37 | 36 | 33 | 30 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2009 | 34 | 41 | 40 | 39 | 38 | 37 | 34 | 31 |
| **PV of Debt-to-Revenue Ratio 2/** | | | | | | | | |
| **Baseline** | 280 | 281 | 271 | 255 | 241 | 236 | 225 | 217 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 276 | 275 | 268 | 256 | 245 | 245 | 257 | 292 |
| A2. Primary balance is unchanged from 2008 | 276 | 276 | 271 | 258 | 247 | 244 | 247 | 258 |
| A3. Permanently lower GDP growth 1/ | 276 | 278 | 270 | 255 | 243 | 240 | 241 | 261 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010 | 276 | 280 | 273 | 258 | 245 | 241 | 235 | 233 |
| B2. Primary balance is at historical average minus one standard deviations in 2009-2010 | 276 | 278 | 276 | 259 | 244 | 239 | 229 | 221 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 276 | 278 | 274 | 258 | 244 | 239 | 229 | 218 |
| B4. One-time 30 percent real depreciation in 2009 | 276 | 333 | 318 | 295 | 275 | 265 | 241 | 223 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2009 | 276 | 339 | 325 | 302 | 282 | 273 | 252 | 232 |
| **Debt Service-to-Revenue Ratio 2/** | | | | | | | | |
| **Baseline** | 24 | 22 | 22 | 22 | 22 | 21 | 21 | 22 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 24 | 22 | 23 | 22 | 22 | 22 | 23 | 26 |
| A2. Primary balance is unchanged from 2008 | 24 | 22 | 23 | 23 | 23 | 23 | 22 | 23 |
| A3. Permanently lower GDP growth 1/ | 24 | 22 | 23 | 23 | 22 | 22 | 22 | 24 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010 | 24 | 22 | 23 | 23 | 22 | 22 | 21 | 21 |
| B2. Primary balance is at historical average minus one standard deviations in 2009-2010 | 24 | 22 | 23 | 23 | 23 | 22 | 20 | 20 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 24 | 22 | 23 | 23 | 22 | 22 | 20 | 20 |
| B4. One-time 30 percent real depreciation in 2009 | 24 | 24 | 26 | 26 | 26 | 25 | 24 | 23 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2009 | 24 | 22 | 37 | 35 | 34 | 33 | 23 | 21 |

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

1/ Assumes that real GDP growth is at baseline minus 1/2 standard deviation.
2/ Revenues are defined inclusive of grants.