



BANGLADESH

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FIRST REVIEW UNDER THE THREE-YEAR ARRANGEMENT UNDER THE EXTENDED CREDIT FACILITY AND REQUEST FOR WAIVER OF NONOBSERVANCE OF A PERFORMANCE CRITERION—DEBT SUSTAINABILITY ANALYSIS UPDATE

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This debt sustainability analysis (DSA) updates the joint IMF/IDA DSA from October 14, 2011, reflecting the most recent macroeconomic developments and borrowing needs.¹ While this DSA includes new external borrowing on nonconcessional terms envisaged over the near and medium term, its results indicate that Bangladesh remains at a low risk of debt distress, consistent with the previous DSA. Further improvements in debt management and project planning capacity will be key to using nonconcessional resources productively.²

1. At end-FY12 (i.e., end-June 2012), Bangladesh's debt stock comprised of:

- Public and publicly-guaranteed external debt with a face value equivalent to 21 percent of GDP, about 82 percent of which is owed to multilateral creditors; and
- Domestic debt, which amounted to 21 percent of GDP, comprising Treasury bonds and bills (53 percent), National Savings Certificates (34 percent), and government overdrafts at the central bank (14 percent).

¹ In line with the 2010 Staff Guidance Note, a full joint LIC DSAs is expected to be prepared once every three years for PRGT-eligible IDA-only countries. In between, short annual updates are expected to be produced unless macroeconomic conditions since the last full DSA have significantly changed. See *Staff Guidance Note on the Application of the Joint Fund-Bank Debt Sustainability Framework for Low-Income Countries* (www.imf.org) and IDA/SECM2010-0029.

² The DSA presented in this document is based on the standard low-income countries (LIC) DSA framework. See *Debt Sustainability in Low-Income Countries: Further Considerations on an Operational Framework, Policy Implications* (www.imf.org) and IDA/SECM2004/0629. Under the Country Policy and Institutional Assessment (CPIA), Bangladesh is rated as a medium performer, with an average rating of 3.43 during 2009–11, and the DSA uses the indicative threshold for countries in this category.

2. **Main changes in assumptions.** Since the previous DSA in the staff report for the 2011 Article IV Consultation, key updates are:³

- **A slightly revised macroeconomic framework.** Over the near and medium term, real GDP growth has been marked down to an average of 6.4 percent during FY13–15 (compared to 6.7 percent in the previous DSA) given global uncertainties, reflected primarily in lower export growth as a result of the euro area crisis. All growth assumptions are based on the government's maintenance of macroeconomic stability, pursuit of broad-ranging structural reforms, and strengthening of its trade and investment climate, as necessary to put Bangladesh's economy on a higher growth trajectory. However, weak governance, policy indecision, and capacity constraints could dampen the growth outlook if not dealt with upfront.

Bangladesh: Public and Publicly Guaranteed External Debt (At end-June 2012)		
	In Millions of U.S. Dollars	In Percent of Total External Debt
Multilateral debt	18,977	81.8
World Bank	10,646	45.9
Asian Development Bank	7,196	31.0
International Monetary Fund	535	2.3
International Fund for Agricultural Development	311	1.3
Islamic Development Bank	200	0.9
Other	88	0.4
Bilateral debt	2,532	10.9
Japan	1,935	8.3
Korea, Republic of	202	0.9
Kuwait	163	0.7
United States	91	0.4
Other	142	0.6
Short-term debt	1,680	7.2
Total	23,189	100.0
(Percent of GDP)	20.7	

Source: Data provided by Bangladesh authorities; and IMF staff estimates.

- **Primary fiscal deficit.** Over the medium term, the primary deficit is smaller than in the previous DSA mainly as a result of fiscal policy commitments under the Extended Credit Facility (ECF) arrangement with the IMF to: (i) accelerate tax policy and revenue administration reforms; (ii) contain subsidy-related costs and improve public financial management; and (iii) strengthen debt management.
- **Higher external borrowing.** Bangladesh has large investment needs in power generation and other basic infrastructure. Compared to the previous DSA, the external borrowing by the central government is assumed to increase by about 0.4 percentage points of GDP a year over the medium term and by 0.2 percentage points of GDP a year over the long term to meet these needs. In addition, the current DSA assumes higher nonconcessional borrowing by the public sector (including state-owned enterprises) than in the previous DSA, mainly for high-impact infrastructure projects.⁴ It also includes US\$1.5 billion in new nonconcessional

³ See IMF [Country Report No. 11/314](#).

⁴ Under the ECF arrangement, the performance criterion (ceiling) on new nonconcessional external debt is assumed to rise over time to accommodate the new borrowing.

external borrowing recently contracted with the Russian Federation.⁵ Relative to the previous DSA, private sector borrowing is assumed to increase by about 0.2 percentage points of GDP a year over the medium term and 0.4 percentage points of GDP a year over the long term, in line with envisaged improvements in the business climate and access to external resources.

- **Lower domestic borrowing.** In line with the authorities' fiscal policy commitments, central government domestic debt is projected to remain constant at about 20 percent of GDP over the medium term and then decrease to 17 percent of GDP by the end of the projection period. The previous DSA projected a gradual increase in domestic debt to 28 percent of GDP by the end of the projection period.

BASELINE SCENARIO

3. The external sector DSA projects the present value (PV) of external debt-to-GDP falling over the long run to 14 percent by FY33. While all external debt indicators remain well below the policy-dependent debt burden thresholds under the baseline scenario, one threshold is breached temporarily under the standardized stress tests. The debt service-to-revenue ratio would exceed the 20 percent threshold in FY14 in the case of a one-time 30 percent nominal depreciation relative to the baseline in FY14, but the breach is temporary and caused by maturing short-term oil-related suppliers' credits, most of which are expected to be rolled over and refinanced by new short-term credits.

4. The public sector DSA, in its baseline, sees the present value (PV) of public sector debt-to-GDP ratio fall gradually to 29 percent of GDP in FY33. That said, at least two pertinent risks exist in addition to those tested in the scenario analysis that could raise the debt service-to-revenue ratio: (i) underperforming tax collections could call for a scaling back of fiscal spending, with possible negative growth effects; and (ii) large operating losses in energy- and fertilizer-related state-owned enterprises (SOEs) could create contingent fiscal liabilities and crowd out more growth-critical fiscal spending.

ALTERNATIVE SCENARIO

5. Alternative assumptions and outcome. The alternative scenario (see Figure 4 and Table 6) assumes that Bangladesh proceeds with new nonconcessional borrowing of US\$6.0 billion to construct two 1,000MW nuclear reactors during FY17–21. Within the range of current cost estimates

⁵ Under separate agreements signed in January 2013 between Bangladesh and the Russian Federation, the latter will provide nonconcessional loans to assess the technical feasibility and overall viability of nuclear power in Bangladesh (US\$500 million) and for defense-related purchases (US\$1.0 billion). However, the baseline scenario excludes actual construction costs for the nuclear power plant, as feasibility studies are expected to inform the analysis whether construction will be pursued in the future, including possible funding arrangements. Staffs assume the nuclear-related loan is disbursed during FY14–16 and the defense-related loan during FY14–17.

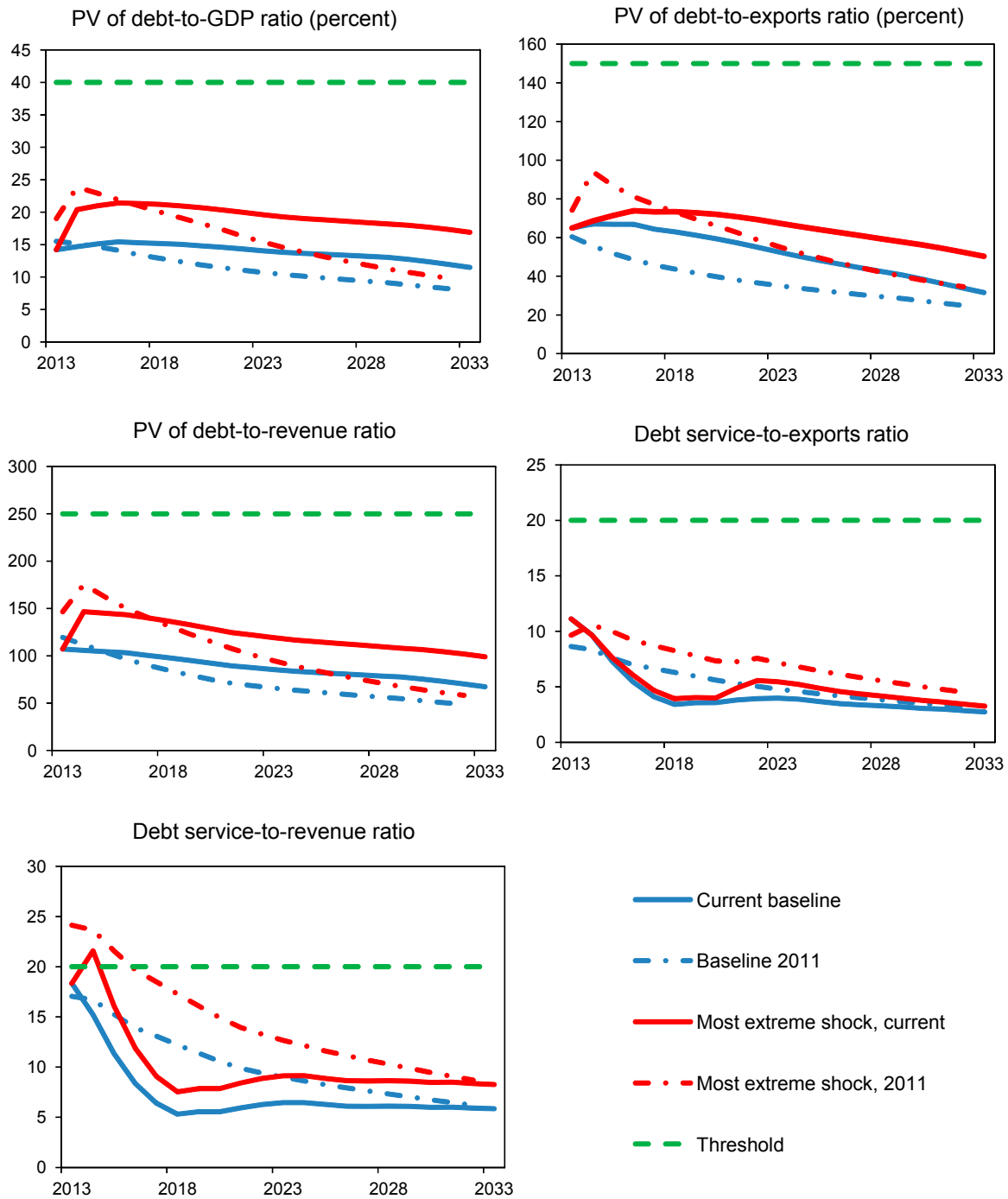
cited in Bangladesh (US\$4–8 billion), the risk of external debt distress remains low, but the total cost of construction remains to be verified by feasibility studies. The introduction of nuclear power would create health, safety, and environmental challenges especially given the high population density in Bangladesh, which are likely to require ample investment in technical expertise and regulatory capacity. Feasibility studies need to ascertain such costs to make sure that sufficient fiscal resources are set aside for proper risk mitigation. In this context, staffs would encourage Bangladesh to continue to pursue a full range of alternatives in developing the power sector and evaluate the potential investment in nuclear power in the context of least-cost options for generating electricity. Staffs would also encourage Bangladesh to establish fiscal contingencies to ensure adequate safeguards are in place, in the event the government proceeds with constructing the new reactors. On the upside, nuclear power will expand the electricity supply—a major growth constraint in Bangladesh, and possibly increase growth over the long run.

6. Nonconcessional borrowing in Bangladesh reinforces the need to protect the overall quality of public expenditure and keep debt levels manageable. In view of the relatively high cost of nonconcessional resources, all projects tied to this type of borrowing should be closely vetted, properly evaluated, and carefully monitored to ensure sound governance and oversight in the contracting and use of these funds. Staffs urge the government to continue to avail the large pool of existing commitments (mainly concessional) and undertake additional external borrowing mainly on concessional terms, consistent with Bangladesh's debt management capacity.

Appendix Table 1. DSA Update: Key Variables 1/

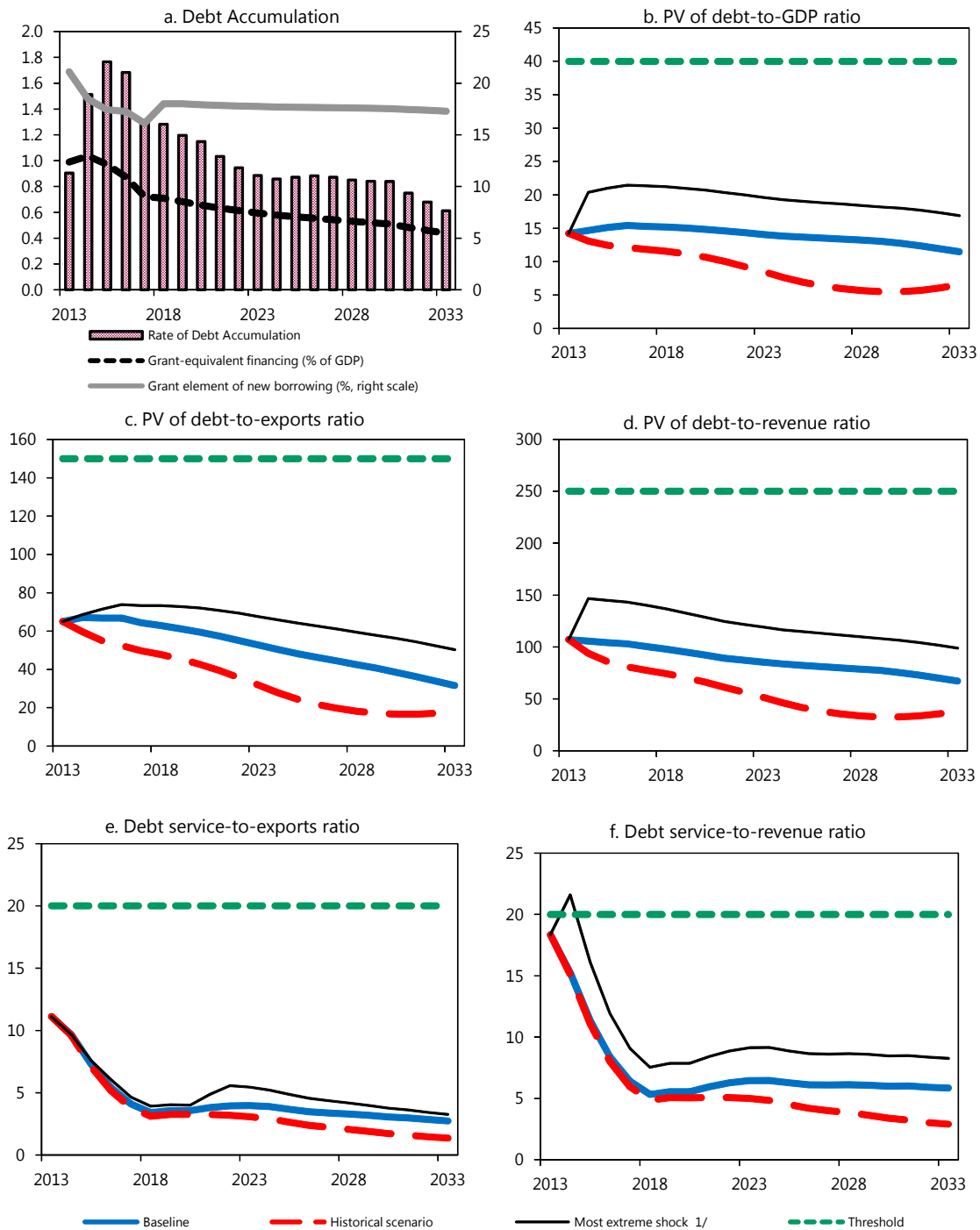
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028	2033
	(Percent of GDP, unless otherwise indicated)											
Nominal GDP (US\$ billions)	100	112	116	128	139	151	165	180	196	300	435	631
Real GDP (percentage change)	6.1	6.7	6.3	5.8	6.4	7.0	7.1	7.2	7.3	6.6	6.0	6.0
GDP deflator (percentage change)	6.5	7.5	8.0	7.5	6.2	6.2	5.9	5.7	4.6	4.5	4.5	4.5
Fiscal (central government)												
Total revenue and grants	11.5	11.9	13.0	13.8	14.4	15.0	15.4	15.6	15.9	16.7	17.0	17.3
Foreign grants	0.6	0.3	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.2	0.2
Total expenditure	14.6	16.0	16.4	17.7	18.2	18.4	18.7	19.0	19.1	19.3	19.1	18.6
Interest payments	2.1	2.0	2.2	2.3	2.1	2.1	1.9	1.8	1.9	1.9	1.9	1.7
Overall balance	-3.1	-4.1	-3.4	-3.9	-3.8	-3.5	-3.3	-3.4	-3.2	-2.6	-2.1	-1.3
Primary balance	-0.9	-2.2	-1.2	-1.7	-1.7	-1.4	-1.5	-1.5	-1.3	-0.7	-0.2	0.4
Net domestic financing	1.3	3.8	2.4	2.9	2.4	2.0	1.7	2.3	2.4	2.1	1.6	1.1
Net external financing	0.9	0.4	0.8	1.0	1.4	1.5	1.6	1.1	0.8	0.5	0.5	0.2
Balance of payments												
Exports of goods and services	18.6	22.5	23.1	21.9	21.9	22.6	23.1	23.7	24.1	26.7	31.1	36.3
Imports of goods and services	25.5	34.3	34.1	32.3	33.5	34.2	34.3	34.6	35.0	38.1	41.6	45.3
Workers' remittances	10.9	10.4	11.1	11.4	11.4	11.5	11.6	11.7	11.7	11.1	10.2	9.4
Current account, including official transfers	3.2	-2.0	-0.5	0.1	-1.0	-0.9	-0.5	-0.1	-0.1	-1.4	-1.4	-0.7
Foreign direct investment	0.9	0.7	1.0	0.9	1.0	1.0	1.0	1.1	1.2	1.8	2.1	2.5
External borrowing												
Central government	1.6	0.9	1.5	1.7	2.1	2.1	2.2	1.6	1.5	1.3	1.3	1.0
Public enterprises with guarantee	0.0	0.0	0.0	0.1	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Debt service by public enterprises	...	...	...	0.0	0.0	0.0	0.1	0.2	0.2	0.4	0.4	0.4
Gross official reserves	3.2	3.1	2.9	3.2	3.4	3.7	4.1	4.3	4.5	4.7	4.6	5.0
(Months of imports of goods and services)												
Sources: Bangladesh authorities; and staff estimates and projections.												
1/ Data on a fiscal year basis, with 2010 corresponding to July 2009–June 2010.												

Appendix Figure 1. Bangladesh: Current Projections of External DSA Indicators Compared with Estimates Made in 2011



Sources: Bangladesh authorities; and staff estimates and projections.

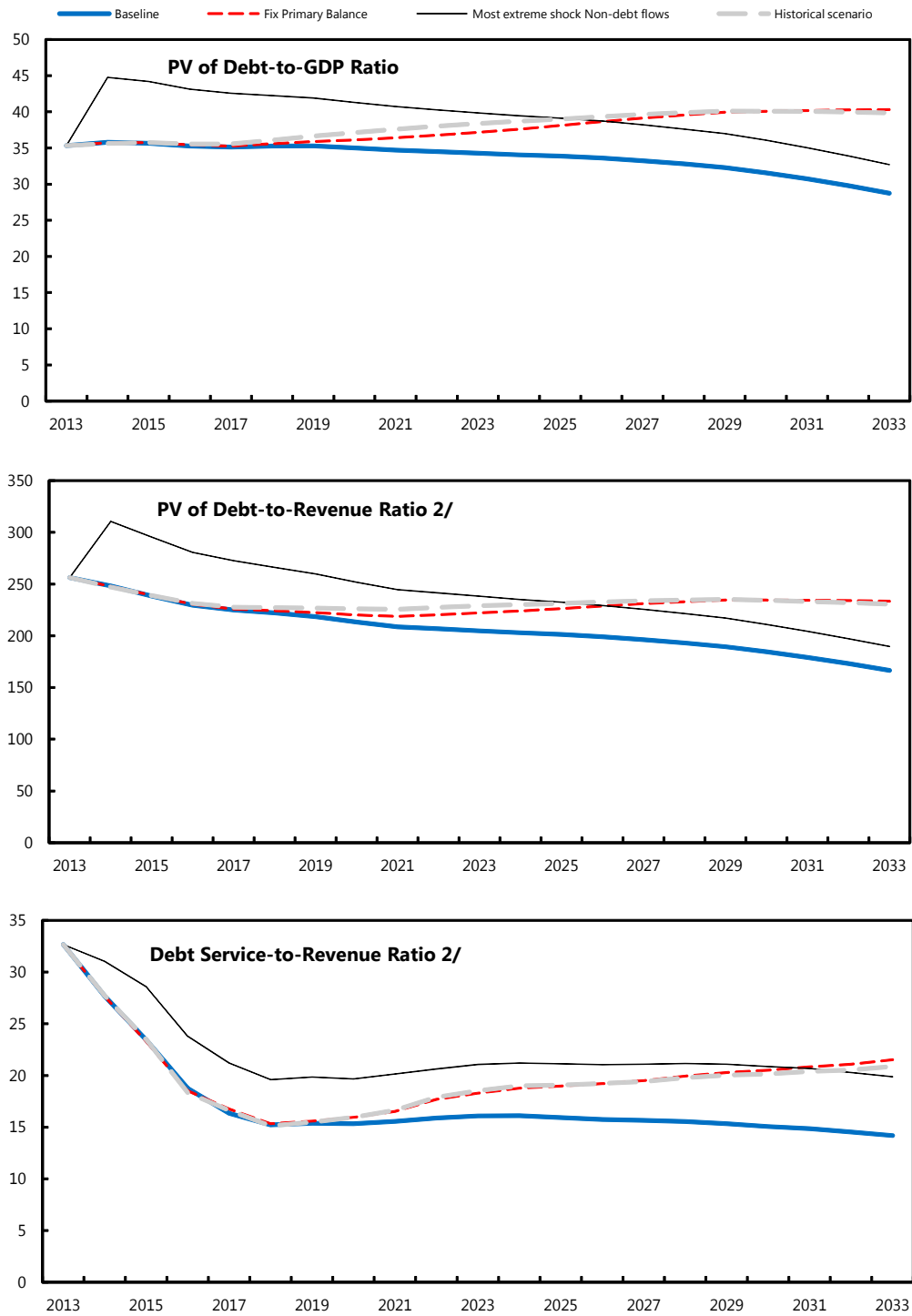
Appendix Figure 2. Bangladesh: Indicators of Public and Publicly Guaranteed External Debt under Different Scenarios, 2013–33 1/



Sources: Bangladesh authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2023. In figure b, it corresponds to a One-time depreciation shock; in c, to a Terms shock; in d, to a One-time depreciation shock; in e, to a Non-debt flows shock and in figure f, to a One-time depreciation shock

Appendix Figure 3. Bangladesh: Indicators of Public Debt under Different Scenarios, 2013–33 1/



Sources: Bangladesh authorities; and staff estimates and projections.
 1/ The most extreme stress test is the test that yields the highest ratio in 2023.
 2/ Revenues are defined inclusive of grants.

Appendix Table 2. Bangladesh: External Debt Sustainability Framework, Baseline Scenario, 2010–33
(In percent of GDP, unless otherwise indicated)

	Actual			Historical ^{1/} Standard ^{1/}		Projections						2019–2033			
	2010	2011	2012	Average	Deviation	2013	2014	2015	2016	2017	2018	2013–2018		Average	
												Average	2023	2033	Average
External debt (nominal) 2/	22.3	22.7	22.2			20.7	21.2	21.5	21.6	21.1	20.8				
<i>Of which: Public and publicly guaranteed (PPG)</i>	21.1	21.4	20.7			19.4	19.9	20.2	20.4	20.0	19.7				
Change in external debt	-3.3	0.3	-0.5			-1.4	0.5	0.3	0.1	-0.4	-0.3				
Identified net debt-creating flows	-7.0	-1.0	-1.2			-2.2	-1.2	-1.5	-1.9	-2.4	-2.4				
Non-interest current account deficit	-3.5	1.8	0.2	-0.8	1.5	-0.5	0.6	0.5	0.2	-0.3	-0.2				0.7
Deficit in balance of goods and services	6.8	11.8	11.0			10.4	11.6	11.5	11.3	10.8	10.9				
Exports	18.6	22.5	23.1			21.9	21.9	22.6	23.1	23.7	24.1				
Imports	25.5	34.3	34.1			32.3	33.5	34.2	34.3	34.6	35.0				
Net current transfers (negative = inflow)	-11.6	-11.1	-11.8	-9.5	2.1	-11.8	-11.8	-11.9	-11.9	-12.0	-12.0				-10.8
<i>Of which: Official</i>	-0.1	-0.1	-0.1			-0.1	-0.1	-0.1	-0.1	-0.1	-0.1				
Other current account flows (negative = net inflow)	1.2	1.1	1.0			0.8	0.8	0.8	0.9	0.9	0.9				
Net FDI (negative = inflow)	-0.9	-0.7	-1.0	-0.9	0.2	-0.9	-1.0	-1.0	-1.0	-1.1	-1.2				-1.9
Endogenous debt dynamics 3/	-2.6	-2.1	-0.4			-0.7	-0.8	-1.0	-1.0	-1.1	-1.0				
Contribution from nominal interest rate	0.2	0.2	0.3			0.4	0.4	0.4	0.4	0.4	0.4				
Contribution from real GDP growth	-1.4	-1.3	-1.4			-1.2	-1.2	-1.4	-1.4	-1.4	-1.4				
Contribution from price and exchange rate changes	-1.4	-1.0	0.7			...	...	...	...	...	...
Residual (3-4) 4/	3.6	1.3	0.7			0.8	1.7	1.8	2.0	2.0	2.1				
<i>Of which: Exceptional financing</i>	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0				
PV of external debt 5/	...	...	16.7			15.6	16.0	16.4	16.6	16.4	16.3				
In percent of exports	...	...	72.2			71.2	73.0	72.3	72.0	69.2	67.5				
PV of PPG external debt	...	...	15.2			14.2	14.7	15.1	15.4	15.3	15.2				
In percent of exports	...	...	65.8			65.0	67.1	66.8	66.8	64.3	62.9				
In percent of government revenues	...	...	122.1			107.2	105.7	104.3	103.1	100.4	98.0				
Debt service-to-exports ratio (in percent)	5.5	4.1	5.7			12.7	11.2	8.7	6.8	5.3	4.6				
PPG debt service-to-exports ratio (in percent)	5.2	3.8	4.8			11.1	9.7	7.3	5.4	4.1	3.4				
PPG debt service-to-revenue ratio (in percent)	8.8	7.4	8.8			18.3	15.2	11.3	8.4	6.4	5.3				
Total gross financing need (Billions of U.S. dollars)	-3.3	2.4	1.3			3.3	4.3	3.3	1.9	0.3	-0.4				
Non-interest current account deficit that stabilizes debt ratio	-0.1	1.5	0.7			0.9	0.1	0.2	0.0	0.2	0.1				
Key macroeconomic assumptions															
Real GDP growth (in percent)	6.1	6.7	6.3	6.2	0.4	5.8	6.4	7.0	7.1	7.2	7.3	6.8	6.6	6.0	6.4
GDP deflator in US dollar terms (change in percent)	5.9	4.5	-2.8	3.0	4.1	4.8	1.8	1.8	1.8	1.8	1.7	2.3	1.6	1.6	1.6
Effective interest rate (percent) 6/	1.1	0.9	1.5	1.1	0.2	2.2	2.1	2.0	1.9	1.8	1.9	2.0	2.1	2.4	2.2
Growth of exports of G&S (U.S. dollar terms, in percent)	7.5	34.5	6.0	14.9	8.5	5.1	8.4	12.5	11.3	12.3	11.0	10.1	11.0	11.2	11.1
Growth of imports of G&S (U.S. dollar terms, in percent)	5.7	50.0	2.7	16.5	14.0	4.9	12.3	11.3	9.6	10.0	10.4	9.7	10.2	9.6	10.0
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	21.1	18.5	17.4	17.3	16.1	18.0	18.1	17.7	17.3	17.7
Government revenues (excluding grants, in percent of GDP)	10.9	11.7	12.4			13.3	13.9	14.5	14.9	15.2	15.5				
Aid flows (in Billions of U.S. dollars) 7/	2.2	1.3	2.3			1.3	1.6	1.6	1.6	1.3	1.3				
<i>Of which: Grants</i>	0.6	0.3	0.6			0.7	0.7	0.7	0.7	0.7	0.7				
<i>Of which: Concessional loans</i>	1.6	1.1	1.7			0.6	0.9	0.9	0.9	0.6	0.6				
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			1.0	1.0	1.0	0.9	0.7	0.7				0.6
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			37.0	30.9	29.0	28.8	29.3	31.2				27.9
Memorandum items:															
Nominal GDP (Billions of U.S. dollars)	100.4	111.9	115.6			128.2	138.8	151.3	165.0	180.1	196.5				
Nominal dollar GDP growth	12.3	11.5	3.3			10.9	8.3	9.0	9.1	9.1	9.1	9.2	8.3	7.7	8.1
PV of PPG external debt (in Billions of U.S. dollars)	...	...	17.0			18.0	20.0	22.4	25.0	27.1	29.4				
(Pvt-Pvt-1)/GDPT-1 (in percent)	...	...	...			0.9	1.5	1.8	1.7	1.3	1.3	1.4	0.9	0.6	0.9
Gross workers' remittances (Billions of U.S. dollars)	11.0	11.7	12.8			14.6	15.9	17.5	19.2	21.1	23.0				
PV of PPG external debt (in percent of GDP + remittances)	...	...	13.7			12.8	13.2	13.5	13.8	13.7	13.6				
PV of PPG external debt (in percent of exports + remittances)	...	...	44.4			42.7	44.1	44.3	44.4	43.1	42.4				
Debt service of PPG external debt (in percent of exports + remittances)	...	...	3.2			7.3	6.4	4.8	3.6	2.7	2.3				

Sources: Bangladesh authorities; and 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, including debt owed to the IMF, plus external borrowing by public enterprises that is supported by central government guarantees, including short-term oil-related suppliers' credits. The years in the table refers to fiscal years. For example, 2012 refers to July 2011-June 2012.

3/ Derived as $[r - g - p(1+g)] / (1+g+p+gp)$ times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and p = 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).

Appendix Table 3. Bangladesh: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2013–33
(In percent)

	Projections							
	2013	2014	2015	2016	2017	2018	2023	2033
PV of debt-to GDP ratio								
Baseline	14	15	15	15	15	15	14	11
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2013–2033 1/	14	13	12	12	12	12	8	7
A2. New public sector loans on less favorable terms in 2013–2033 2/	14	15	16	17	17	18	18	18
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2014–2015	14	14	15	15	15	15	14	12
B2. Export value growth at historical average minus one standard deviation in 2014–2015 3/	14	15	17	17	17	16	15	12
B3. US dollar GDP deflator at historical average minus one standard deviation in 2014–2015	14	15	16	16	16	16	15	13
B4. Net non-debt creating flows at historical average minus one standard deviation in 2014–2015 4/	14	18	23	23	22	22	18	13
B5. Combination of B1–B4 using one-half standard deviation shocks	14	17	21	21	21	20	17	13
B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/	14	20	21	21	21	21	20	17
PV of debt-to-exports ratio								
Baseline	65	67	67	67	64	63	53	32
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2013–2033 1/	65	60	55	52	50	48	32	18
A2. New public sector loans on less favorable terms in 2013–2033 2/	65	69	71	74	73	73	68	50
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2014–2015	65	66	65	66	63	62	52	33
B2. Export value growth at historical average minus one standard deviation in 2014–2015 3/	65	68	79	78	75	73	59	36
B3. US dollar GDP deflator at historical average minus one standard deviation in 2014–2015	65	66	65	66	63	62	52	33
B4. Net non-debt creating flows at historical average minus one standard deviation in 2014–2015 4/	65	84	100	98	93	89	67	35
B5. Combination of B1–B4 using one-half standard deviation shocks	65	76	91	89	85	82	63	34
B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/	65	66	65	66	63	62	52	33
PV of debt-to-revenue ratio								
Baseline	107	106	104	103	100	98	85	67
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2013–2033 1/	107	94	86	81	78	75	51	38
A2. New public sector loans on less favorable terms in 2013–2033 2/	107	108	111	114	114	114	110	107
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2014–2015	107	104	104	103	101	98	86	71
B2. Export value growth at historical average minus one standard deviation in 2014–2015 3/	107	106	114	112	109	106	90	71
B3. US dollar GDP deflator at historical average minus one standard deviation in 2014–2015	107	106	108	107	105	102	89	74
B4. Net non-debt creating flows at historical average minus one standard deviation in 2014–2015 4/	107	132	157	151	145	139	109	74
B5. Combination of B1–B4 using one-half standard deviation shocks	107	124	147	142	137	132	106	75
B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/	107	147	145	143	140	137	119	99

Appendix Table 3. Bangladesh: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2013–33 (concluded)
(In percent)

	Projections							
	2013	2014	2015	2016	2017	2018	2023	2033
Debt service-to-exports ratio								
Baseline	11	10	7	5	4	3	4	3
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2013–2033 1/	11	10	7	5	4	3	3	1
A2. New public sector loans on less favorable terms in 2013–2033 2/	11	10	7	6	4	4	4	4
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2014–2015	11	10	7	5	4	3	4	3
B2. Export value growth at historical average minus one standard deviation in 2014–2015 3/	11	10	8	6	5	4	5	3
B3. US dollar GDP deflator at historical average minus one standard deviation in 2014–2015	11	10	7	5	4	3	4	3
B4. Net non-debt creating flows at historical average minus one standard deviation in 2014–2015 4/	11	10	8	6	5	4	5	3
B5. Combination of B1-B4 using one-half standard deviation shocks	11	9	7	6	5	4	5	3
B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/	11	10	7	5	4	3	4	3
Debt service-to-revenue ratio								
Baseline	18	15	11	8	6	5	6	6
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2013–2033 1/	18	15	11	8	6	5	5	3
A2. New public sector loans on less favorable terms in 2013–2033 2/	18	15	11	9	7	6	7	8
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2014–2015	18	15	12	9	7	5	7	6
B2. Export value growth at historical average minus one standard deviation in 2014–2015 3/	18	15	11	9	7	5	7	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2014–2015	18	16	12	9	7	6	7	6
B4. Net non-debt creating flows at historical average minus one standard deviation in 2014–2015 4/	18	15	12	9	7	6	9	7
B5. Combination of B1-B4 using one-half standard deviation shocks	18	15	12	9	7	6	8	7
B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/	18	22	16	12	9	8	9	8
<i>Memorandum item:</i>								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	14	14	14	14	14	14	14	14
Sources: Bangladesh authorities; and staff estimates and projections.								
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/ Export value 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.								

Appendix Table 4. Bangladesh: Public Sector Debt Sustainability Framework, Baseline Scenario, 2010–33

(In percent of GDP, unless otherwise indicated)

	Actual			Estimate		Projections									
	2010	2011	2012	Average	Standard Deviation	2013	2014	2015	2016	2017	2018	2013–18		2019–33	
												Average	2023		2033	Average
Public sector debt 2/	41.4	42.4	41.4			40.5	41.0	40.8	40.2	39.8	39.8			38.0	31.6
<i>Of which: foreign-currency demoninated</i>	21.1	21.4	20.7			19.4	19.9	20.2	20.4	20.0	19.7			17.8	14.4
<i>Of which: guarantee-supported external borrowing</i>	...	...	...			0.1	0.6	1.2	1.6	2.0	2.3			3.4	5.0
Change in public sector debt	-4.1	1.0	-1.0			-0.9	0.5	-0.2	-0.5	-0.4	-0.1			-0.3	-1.2
Identified debt-creating flows	-2.0	0.1	-0.1			-0.9	0.6	-0.2	-0.3	-0.3	-0.2			-0.4	-1.2
Primary deficit	0.9	2.2	1.1	1.3	0.5	1.5	1.6	1.3	1.5	1.5	1.3	1.5	1.5	0.7	-0.3
Revenue and grants	11.5	11.9	13.0			13.8	14.4	15.0	15.4	15.6	15.9			16.7	17.3
<i>Of which: Grants</i>	0.6	0.3	0.5			0.5	0.5	0.5	0.4	0.4	0.4			0.3	0.2
Primary (noninterest) expenditure	12.4	14.1	14.1			15.3	16.0	16.3	16.8	17.1	17.2			17.5	16.9
Automatic debt dynamics	-2.9	-2.1	-1.3			-2.6	-1.5	-2.1	-2.2	-2.3	-2.0			-1.6	-1.3
Contribution from interest rate/growth differential	-1.8	-2.3	-2.1			-1.5	-1.7	-2.0	-2.2	-2.2	-2.0			-1.6	-1.1
<i>of which: Contribution from average real interest rate</i>	0.8	0.3	0.4			0.8	0.8	0.7	0.5	0.5	0.8			0.8	0.7
<i>of which: Contribution from real GDP growth</i>	-2.6	-2.6	-2.5			-2.3	-2.4	-2.7	-2.7	-2.7	-2.7			-2.4	-1.9
Contribution from real exchange rate depreciation	-1.1	0.2	0.8			-1.1	0.1	-0.1	-0.1	-0.1	0.0			...	...
Other identified debt-creating flows	0.0	0.0	0.0			0.1	0.5	0.6	0.4	0.4	0.4			0.4	0.4
Guarantee-supported external borrowing	0.0	0.0	0.0			0.1	0.5	0.6	0.4	0.4	0.4			0.4	0.4
Residual, including asset changes	-2.1	1.0	-0.9			0.0	-0.1	-0.1	-0.2	-0.1	0.1			0.0	0.0
Other Sustainability Indicators															
PV of public sector debt	...	...	35.9			35.3	35.8	35.7	35.3	35.1	35.3			34.3	28.7
<i>Of which: Foreign-currency demoninated</i>	...	...	15.2			14.2	14.7	15.1	15.4	15.3	15.2			14.1	11.5
<i>Of which: External</i>	...	...	15.2			14.2	14.7	15.1	15.4	15.3	15.2			14.1	11.5
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...			...	...
Gross financing need 3/	3.9	4.9	4.9			7.3	6.6	5.5	4.8	4.3	3.8			3.4	2.1
PV of public sector debt-to-revenue and grants ratio (in percent)	...	...	276.8			256.2	248.4	238.5	229.5	225.0	222.1			204.8	166.5
PV of public sector debt-to-revenue ratio (in percent)	...	...	288.7			266.6	257.5	246.2	236.0	230.7	227.3			208.3	168.3
<i>Of which: External 4/</i>	...	...	122.1			107.2	105.7	104.3	103.1	100.4	98.0			85.4	67.3
Debt service-to-revenue and grants ratio (in percent) 5/	25.2	22.1	24.3			32.7	27.7	23.4	18.8	16.4	15.2			16.1	14.2
Debt service-to-revenue ratio (in percent) 5/	26.6	22.6	25.3			34.0	28.7	24.2	19.3	16.8	15.6			16.4	14.3
Primary deficit that stabilizes the debt-to-GDP ratio	5.0	1.1	2.1			2.5	1.1	1.6	2.0	1.9	1.4			1.1	0.8
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	6.1	6.7	6.3	6.2	0.4	5.8	6.4	7.0	7.1	7.2	7.3	6.8	6.6	6.0	6.4
Average nominal interest rate on forex debt (in percent)	1.1	0.9	1.2	1.0	0.1	1.8	1.7	1.6	1.5	1.4	1.5	1.6	1.5	1.6	1.5
Average real interest rate on domestic debt (in percent)	3.6	2.3	3.0	3.5	1.0	3.6	3.6	3.6	2.9	3.1	4.2	3.5	4.3	4.3	4.3
Real exchange rate depreciation (in percent, + indicates depreciation)	-4.9	1.2	4.1	-0.3	4.7	-5.5	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	6.5	7.5	8.0	6.3	1.5	7.5	6.2	6.2	5.9	5.7	4.6	6.0	4.5	4.5	4.5
Growth of real primary spending (deflated by GDP deflator, in percent)	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Grant element of new external borrowing (in percent)	...	...	...	...	...	21.1	18.5	17.4	17.3	16.1	18.0	18.1	17.7	17.3	17.7

Sources: Bangladesh 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, including debt owed to the IMF, plus external borrowing by public enterprises that is supported by central government guarantees, including short-term oil-related suppliers' credits.

The years in the table refers to fiscal years. For example, 2012 refers to July 2011–June 2012.

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.

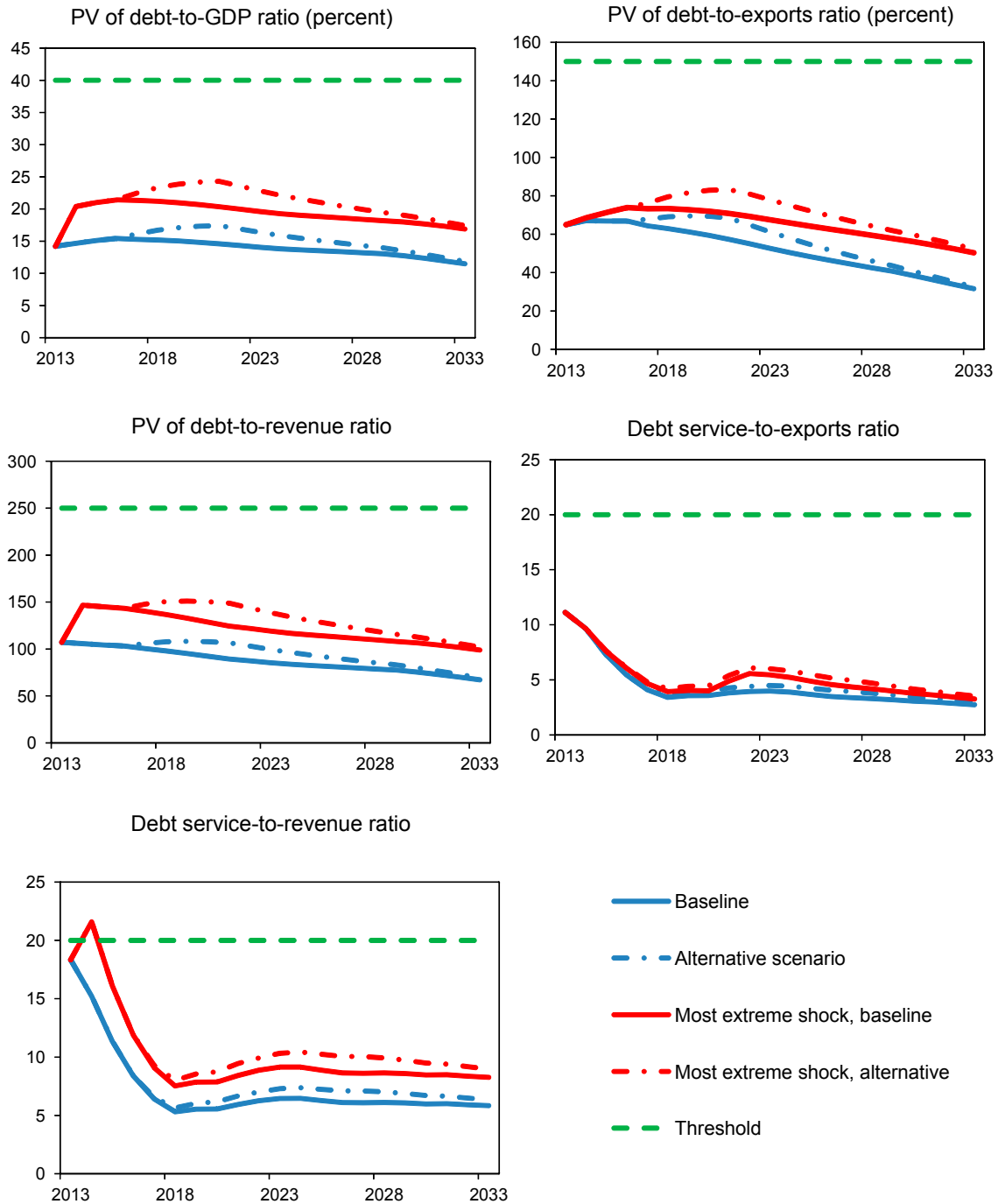
4/ Revenues excluding grants.

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

Appendix Table 5. Bangladesh: Sensitivity Analysis for Key Indicators of Public Debt 2013–33

	Projections							
	2013	2014	2015	2016	2017	2018	2023	2033
PV of Debt-to-GDP Ratio								
Baseline	35	36	36	35	35	35	34	29
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	35	36	36	36	36	36	38	40
A2. Primary balance is unchanged from 2013	35	36	36	35	35	36	37	40
A3. Permanently lower GDP growth 1/	35	36	36	35	35	36	35	31
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2014–2015	35	36	37	36	37	37	37	33
B2. Primary balance is at historical average minus one standard deviations in 2014–2015	35	36	36	36	36	36	35	29
B3. Combination of B1-B2 using one half standard deviation shocks	35	36	36	36	36	36	36	32
B4. One-time 30 percent real depreciation in 2014	35	42	41	40	40	40	40	38
B5. 10 percent of GDP increase in other debt-creating flows in 2014	35	45	44	43	43	42	40	33
PV of Debt-to-Revenue Ratio 2/								
Baseline	256	248	238	229	225	222	205	166
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	256	247	239	231	228	227	229	231
A2. Primary balance is unchanged from 2013	256	248	239	231	226	224	222	233
A3. Permanently lower GDP growth 1/	256	249	239	230	226	224	210	181
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2014–2015	256	250	245	237	234	232	220	189
B2. Primary balance is at historical average minus one standard deviations in 2014–2015	256	250	243	234	229	226	207	168
B3. Combination of B1-B2 using one half standard deviation shocks	256	249	243	235	232	230	216	184
B4. One-time 30 percent real depreciation in 2014	256	291	276	263	256	251	227	186
B5. 10 percent of GDP increase in other debt-creating flows in 2014	256	311	296	281	273	266	238	190
Debt Service-to-Revenue Ratio 2/								
Baseline	33	28	23	19	16	15	16	14
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	33	28	23	18	17	15	19	21
A2. Primary balance is unchanged from 2013	33	28	23	19	17	15	18	22
A3. Permanently lower GDP growth 1/	33	28	23	19	16	15	17	16
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2014–2015	33	28	24	19	17	16	18	17
B2. Primary balance is at historical average minus one standard deviations in 2014–2015	33	28	23	19	18	16	16	14
B3. Combination of B1-B2 using one half standard deviation shocks	33	28	24	19	17	16	17	16
B4. One-time 30 percent real depreciation in 2014	33	31	29	24	21	20	21	20
B5. 10 percent of GDP increase in other debt-creating flows in 2014	33	28	27	43	21	25	19	21
Sources: Bangladesh authorities; and staff estimates and projections.								
1/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of the length of the projection period.								
2/ Revenues are defined inclusive of grants.								

Appendix Figure 4. Bangladesh: Comparison of External DSA Indicators in Baseline and Alternative Scenario, 2013–33 1/



Sources: Bangladesh authorities; and staff estimates and projections.

1/ The alternative scenario assumes new nonconcessional borrowing of US\$6.0 billion to construct two 1,000MW nuclear reactors during FY17–21.

Appendix Table 6. Bangladesh: External Debt Sustainability Framework, Alternative Scenario, 2010–33
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average	Standard Deviation	Projections										
	2010	2011	2012			2013	2014	2015	2016	2017	2018	2013–2018 Average		2023	2033	2019–2033 Average
	External debt (nominal) 2/	22.3	22.7			22.2			20.7	21.2	21.5	21.6	21.9	22.1			21.4	16.9
<i>Of which: Public and publicly guaranteed (PPG)</i>	21.1	21.4	20.7			19.4	19.9	20.2	20.4	20.7	21.0			19.9	14.7	
Change in external debt	-3.3	0.3	-0.5			-1.4	0.5	0.3	0.1	0.2	0.3			-0.5	-0.6	
Identified net debt-creating flows	-7.0	-1.0	-1.2			-2.2	-1.2	-1.5	-1.9	-1.6	-1.7			-1.7	-2.7	
Non-interest current account deficit	-3.5	1.8	0.2	-0.8	1.5	-0.5	0.6	0.5	0.2	0.5	0.5			1.0	0.3	0.9
Deficit in balance of goods and services	6.8	11.8	11.0			10.4	11.6	11.6	11.3	11.7	11.7			11.4	9.1	
Exports	18.6	22.5	23.1			21.9	21.9	22.6	23.1	23.8	24.2			26.7	36.3	
Imports	25.5	34.3	34.1			32.3	33.5	34.2	34.4	35.5	35.8			38.1	45.4	
Net current transfers (negative = inflow)	-11.6	-11.1	-11.8	-9.5	2.1	-11.8	-11.8	-11.9	-12.0	-12.0	-12.0			-11.3	-9.6	-10.8
<i>Of which: Official</i>	-0.1	-0.1	-0.1			-0.1	-0.1	-0.1	-0.1	-0.1	-0.1			-0.1	-0.1	
Other current account flows (negative = net inflow)	1.2	1.1	1.0			0.8	0.8	0.8	0.9	0.9	0.9			0.9	0.9	
Net FDI (negative = inflow)	-0.9	-0.7	-1.0	-0.9	0.2	-0.9	-1.0	-1.0	-1.0	-1.1	-1.2			-1.8	-2.5	-1.9
Endogenous debt dynamics 3/	-2.6	-2.1	-0.4			-0.7	-0.8	-1.0	-1.0	-1.0	-1.0			-0.8	-0.6	
Contribution from nominal interest rate	0.2	0.2	0.3			0.4	0.4	0.4	0.4	0.4	0.4			0.5	0.4	
Contribution from real GDP growth	-1.4	-1.3	-1.4			-1.2	-1.2	-1.4	-1.4	-1.4	-1.5			-1.3	-1.0	
Contribution from price and exchange rate changes	-1.4	-1.0	0.7			...	...	...	...	...	...			...	...
Residual (3-4) 4/	3.6	1.3	0.7			0.8	1.7	1.8	2.0	1.8	1.9			1.2	2.1	
<i>Of which: Exceptional financing</i>	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	
PV of external debt 5/	...	...	16.7			15.6	16.0	16.4	16.6	17.3	17.8			17.9	14.0
In percent of exports	...	...	72.2			71.2	73.0	72.3	72.0	72.6	73.7			66.9	38.5
PV of PPG external debt	...	...	15.2			14.2	14.7	15.1	15.4	16.1	16.7			16.4	11.9
In percent of exports	...	...	65.8			65.0	67.1	66.8	66.8	67.8	69.1			61.2	32.6
In percent of government revenues	...	...	122.1			107.2	105.7	104.4	103.2	105.9	107.8			99.4	69.4
Debt service-to-exports ratio (in percent)	5.5	4.1	5.7			12.7	11.2	8.7	6.8	5.4	4.8			5.8	4.4	
PPG debt service-to-exports ratio (in percent)	5.2	3.8	4.8			11.1	9.7	7.3	5.4	4.2	3.6			4.5	3.0	
PPG debt service-to-revenue ratio (in percent)	8.8	7.4	8.8			18.3	15.2	11.4	8.4	6.5	5.7			7.3	6.4	
Total gross financing need (Billions of U.S. dollars)	-3.3	2.4	1.3			3.3	4.3	3.3	1.9	1.8	1.2			2.3	-3.1	
Non-interest current account deficit that stabilizes debt ratio	-0.1	1.5	0.7			0.9	0.1	0.2	0.0	0.3	0.3			1.5	1.0	
Key macroeconomic assumptions																
Real GDP growth (in percent)	6.1	6.7	6.3	6.2	0.4	5.8	6.4	7.0	7.1	7.2	7.3			6.8	6.0	6.4
GDP deflator in U.S. dollar terms (change in percent)	5.9	4.5	-2.8	3.0	4.1	4.8	1.8	1.8	1.8	1.8	1.7			2.3	1.6	1.6
Effective interest rate (percent) 6/	1.1	0.9	1.5	1.1	0.2	2.2	2.1	2.0	1.9	1.9	2.1			2.0	2.4	2.4
Growth of exports of G&S (U.S. dollar terms, in percent)	7.5	34.5	6.0	14.9	8.5	5.1	8.4	12.5	11.3	12.3	10.9			10.1	11.0	11.1
Growth of imports of G&S (U.S. dollar terms, in percent)	5.7	50.0	2.7	16.5	14.0	4.9	12.3	11.3	9.6	12.7	10.2			10.1	10.2	9.6
Grant element of new public sector borrowing (in percent)	21.1	18.5	17.4	17.3	6.3	7.8			14.7	17.7	17.3
Government revenues (excluding grants, in percent of GDP)	10.9	11.7	12.4	13.3	13.9	14.5	15.0	15.2	15.5			16.5	17.1	16.6
Aid flows (in Billions of U.S. dollars) 7/	2.2	1.3	2.3			1.3	1.6	1.6	1.6	1.3	1.3			1.7	2.9	
<i>Of which: Grants</i>	0.6	0.3	0.6			0.7	0.7	0.7	0.7	0.7	0.7			0.8	1.2	
<i>Of which: Concessional loans</i>	1.6	1.1	1.7			0.6	0.9	0.9	0.9	0.6	0.6			0.9	1.7	
Grant-equivalent financing (in percent of GDP) 8/			1.0	1.0	1.0	0.9	0.6	0.6			0.6	0.4	0.5
Grant-equivalent financing (in percent of external financing) 8/			37.0	30.9	29.0	28.8	17.9	19.5			28.8	26.5	25.9
Memorandum items:																
Nominal GDP (Billions of U.S. dollars)	100.4	111.9	115.6			128.2	138.8	151.2	164.8	179.8	196.1			299.1	630.1	
Nominal dollar GDP growth	12.3	11.5	3.3			10.9	8.3	8.9	9.0	9.1	9.1			9.2	8.3	7.7
PV of PPG external debt (in Billions of U.S. dollars)	...	...	17.0			18.0	20.0	22.4	25.0	28.6	32.3			48.3	77.6
(PVt-PVt-1)/GDPt-1 (in percent)			0.9	1.5	1.8	1.7	2.2	2.1			1.7	0.8	0.5
Gross workers' remittances (Billions of U.S. dollars)	11.0	11.7	12.8			14.6	15.9	17.5	19.2	21.1	23.0			33.2	59.5	
PV of PPG external debt (in percent of GDP + remittances)	...	...	13.7			12.8	13.2	13.6	13.8	14.4	15.0			14.7	10.8
PV of PPG external debt (in percent of exports + remittances)	...	...	44.4			42.7	44.1	44.3	44.4	45.4	46.5			43.3	25.9
Debt service of PPG external debt (in percent of exports + remittances)	...	...	3.2			7.3	6.4	4.8	3.6	2.8	2.4			3.2	2.4

Sources: Bangladesh authorities; and 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, including debt owed to the IMF, plus external borrowing by public enterprises that is supported by central government guarantees, including short-term oil-related suppliers' credits. The years in the table refers to fiscal years. For example, 2012 refers to July 2011–June 2012.

3/ 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.

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).