

INTERNATIONAL DEVELOPMENT ASSOCIATION
INTERNATIONAL MONETARY FUND

GHANA

Joint Bank-Fund Debt Sustainability Analysis

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And the International Monetary Fund

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Given risks to the fiscal outlook and the potential external spillovers of a less favorable fiscal outcome, Ghana's risk of external debt distress is assessed to remain at a moderate level, unchanged from the 2010 debt sustainability assessment. However, Ghana's debt burden indicators have improved since the June 2010 assessment. External debt burden indicators are projected to remain well below their respective indicative thresholds, provided that the programmed fiscal consolidation is achieved and external public sector borrowing is restrained. At the same time, overall public sector debt is projected to increase moderately in relation to GDP over the long term. If the planned fiscal consolidation is achieved without a substantial further debt build-up, an improved rating of low risk of debt distress could be considered in a future assessment.

I. BACKGROUND

1. **This debt sustainability analysis (DSA) was prepared jointly by the staffs of the IDA and IMF, based on debt data provided by the Ghanaian authorities.** It updates the June 2010 debt sustainability assessment prepared by IMF staff for the combined first and second reviews under the Extended Credit facility (ECF).¹

Recent debt developments

2. **Public debt at end-2010 was higher than in the 2010 DSA (Text Table 1).** Total public debt at end-year was an estimated 39 percent of GDP, 1 percentage points higher than projected in the 2010 DSA.² This reflected a larger-than-programmed fiscal deficit and associated increases in domestic financing.

¹ Appendix II, IMF Country Report No. 10/178, June 2010.

² Data for state-owned enterprises are not available while private sector debt data are inherently weak. The data also exclude the outstanding stock of domestic payment arrears, which is discussed further below.

Text Table 1. Debt Outturns, 2010 (in percent of GDP)

	2010 DSA ^{1/}		2011 DSA	
	2009	2010	2009	2010
	Est.	Proj.	Act.	Est.
Total external debt	24.5	27.5	28.1	27.8
Public sector ^{2/}	19.4	20.3	19.4	20.3
Private sector	5.1	7.2	8.7	7.5
Public debt ^{3/}	35.9	37.8	36.0	38.9
Of which: public domestic debt	16.5	17.5	16.6	18.6

^{1/} Rebased using revised national accounts.

^{2/} Public and publicly guaranteed external sector debt.

^{3/} Domestic and external public debt.

3. **The government continued to accumulate domestic payment arrears in 2010.** At end-year, the outstanding stock of arrears and public liabilities in respect of SEO debts was estimated at 9 percent of GDP, which was not reflected in the public debt data. About one-third of these liabilities will be cleared in 2011 through a 2-to-1 mix of cash payments and bond issues. This element of arrears therefore adds to the debt balance at end-2011. The residual arrears balance is assumed to be regularized through cash outlays or bond issues in 2012–13, adding to the debt burden over this period. The authorities' program includes policies to avoid the reoccurrence of arrears.

4. **Ghana's external debt stock has risen substantially since its MDRI debt relief.** External debt totaled US\$6.1 billion at end-2010, up from US\$2.1 billion in 2006 after debt relief under the Multilateral Debt Reduction Initiative (MDRI).³ The increase largely reflects borrowing from bilateral and multilateral institutions, including under the IMF ECF program. Non-concessional borrowing includes Ghana first sovereign bond issued in 2007 (US\$750 million, maturing in 2017); subsequently, commercial borrowing has been at a more modest pace (Text Table 2).⁴

³ It has doubled as a percentage of GDP during this period.

⁴ Non-resident holdings of government securities issued in the local currency are part of domestic public debt.

Text Table 2. Total Public Debt, 2004-10

	2004	2005	2006	2007	2008	2009	2010
(In millions of U.S. dollars)							
1. External debt	6,448	6,348	2,177	3,586	4,035	5,008	6,111
Multilateral Institutions	5,287	5,565	1,327	1,710	2,028	2,462	2,971
IMF	447	424	158	167	163	270	388
IDA	4,012	4,336	803	1,137	1,320	1,536	1,789
AfDB	551	555	141	153	230	271	422
Other	277	251	225	254	315	385	372
Official bilateral	960	636	760	978	1,168	1,687	2,112
Non-concessional ¹	201	147	90	898	839	859	1,028
2. Domestic debt	1,830	1,927	3,133	3,821	4,315	4,273	5,618
Banking system	1,385	1,684	2,431	2,599	2,677	2,974	3,589
Non-bank sector	444	242	637	1,222	1,277	960	968
Non-residents	0	0	66	0	361	339	1,062
Other ²	0	0	0	0	0	0	0
3. Total public debt (1 + 2)	8,277	8,275	5,310	7,407	8,350	9,280	11,729
Memorandum items							
Total public debt³	58.0	48.4	26.2	31.0	33.6	36.0	38.9
External debt	45.2	37.2	10.7	15.0	16.2	19.4	20.3
Domestic debt	12.8	11.3	15.5	16.0	17.4	16.6	18.6

Sources: Ministry of Finance and Bank of Ghana.

¹ Includes a bond placement in September 2007.

² Includes Jubilee bond and other standard credits.

³ In percent of GDP.

Box 1: Rebasings of National Accounts

Rebased national accounts for 2006–09 were adopted in November 2010. The revisions included improved data sources, a change in the base year from 1993 to 2006, and updated compilation methodologies (the 1993 system of national accounts, and the latest version of the industrial classification standards, ISIC version 4).

Under the new data, national incomes have been revised up by an average of 65 percent during 2006–09, while the average real growth rate for these years is about one percentage point higher than earlier estimated. On the rebased data, the gross national income per capita is estimated to have reached US\$1,240 in 2010 (using Atlas method), making Ghana a lower middle income country.

The updated accounts reflect better the sectoral composition of economic activity, and capture more effectively service sector and informal activities. The revised data highlight the increasing importance of the service sector, which accounts for about one-half of the economy and explains in part the faster growth rate in the sample period (particularly in the information/communication and financial services).

II. ASSUMPTIONS UNDERLYING THE DSA

Baseline macroeconomic assumptions

5. **The current DSA macroeconomic assumptions are broadly in line with the 2010 exercise** (Text Table 3 and Box 2). Key differences between the 2010 and 2011 exercises are a somewhat weaker initial fiscal position and changes in the assumptions regarding the mix of external borrowing (concessional vs. non-concessional) and the terms of financing. The projected real interest rate on public debt would be lower by about 0.5 percent per annum. It reflects a downward revision of interest payments on existing external borrowing, which more than offsets a higher projected interest rate on domestic debt. The rebased nominal GDP also affects a number of debt ratios.

6. **The DSA depends importantly on successful fiscal consolidation in 2011–12.** The primary fiscal balance is assumed to be close to zero during 2010–15, which will require a fiscal correction of about 4 percentage points of GDP from 2010 levels (Text Table 3).

Text Table 3. Key Macroeconomic Assumptions

	2009	2010	2010-15	2016-30
Real growth ¹	(annual percentage change)			
DSA - 2010	3.5	4.5	7.8	4.9
DSA - 2011	4.7	5.7	7.6	4.9
Level of nominal GDP	(in U.S. dollar millions; end of period)			
DSA - 2010	16,654	15,513	32,959	100,389
DSA - 2011	25,988	31,084	58,620	195,920
Inflation (GDP deflator)	(annual percentage change)			
DSA - 2010	20.7	12.8	7.3	6.1
DSA - 2011	16.7	14.1	10.2	7.1
Real interest rate (foreign debt) ²	(percent)			
DSA - 2010	2.1	3.7	3.5	3.2
DSA - 2011	2.8	2.8	1.4	2.4
Real interest rate (domestic debt) ³	(percent)			
DSA - 2010	-4.9	3.7	3.6	1.4
DSA - 2011	-1.7	3.8	4.1	2.3
Current account balance ⁴	(in percent of GDP)			
DSA - 2010	-3.1	-7.3	-4.7	-3.9
DSA - 2011	-4.0	-7.2	-4.8	-3.9
Primary fiscal balance ⁴	(in percent of non-oil GDP)			
DSA - 2010	-3.0	-1.8	0.2	0.0
DSA - 2011	-3.0	-4.4	-0.2	-0.1

Sources: Ghanaian authorities and IMF staff estimates and projections.

¹ Rebased national accounts for 2011 DSA.

² Nominal rate is deflated by U.S. inflation rate.

³ Nominal interest rate is deflated by GDP deflator.

⁴ The 2010 DSA ratios adjusted to correspond to rebased GDP levels.

Box 2: Baseline Macroeconomic Assumptions

Real GDP growth: After a slowing of growth to below 5 percent in 2009, growth recovered to an estimated 5.7 percent in 2010. It is projected to accelerate to 13.7 percent in 2011, boosted by rising oil production and robust expansion of the non-oil economy. Over 2012–31, non-oil growth is cautiously projected to average 5–6 percent.

Inflation: Consumer price inflation slowed to 8.6 percent by end 2010, helped by tighter monetary policy and slowing demand, after exceeding 20 percent in 2009. Over the medium term, with supportive fiscal and monetary policies, inflation is expected to converge to the middle single digit range.

Government balances: Following the widening of the primary deficit to 4.4 percent of nonoil GDP in 2010, a balanced primary position is assumed over the long term. This reflects a significant increase in revenue mobilization of up to 5 percent of GDP (partly due to oil production) as well as a small decline in expenditures in relation to nonoil GDP over the medium-to-long term. Within the overall expenditure budget, there is an assumed emphasis on growth-oriented infrastructure investments. Foreign grant receipts are projected to fall significantly (relative to nonoil GDP) over the projection period as Ghana benefits from oil income.

Current account balance: Ghana's external balances have benefitted from strong cocoa and gold export prices in recent years. In the medium-to-long term, the current account deficit is projected to narrow to around 3–4 percent of GDP. Exports are projected to peak at 34–35 percent of GDP in 2011, boosted by commodity exports. After that, declining oil exports are partly offset by rising non-mineral exports, leaving exports at 30–31 percent of GDP over the medium-to-long term. Imports are projected to stabilize around 35–36 percent of GDP, comprising equipments for new oil fields as well as projected government infrastructure investment projects. The current account balance is projected at slightly under 4 percent of GDP over the long term, broadly in line with the current account norm produced by the macroeconomic balance approach.

Financing flows: In the capital account, non-debt creating inflows (largely comprising foreign direct investment) averaged 6.3 percent of GDP in 2010, largely reflecting oil and gas sector investments. Under the baseline which assumes that oil extraction is limited to the Jubilee 1 field, oil-related investments are projected to decelerate, with foreign direct investment stabilizing at around to 3–4 percent of GDP over the medium-to-long run, in line with the average for Sub-Saharan African countries. Official financing is assumed to remain broadly stable at around 3 percent of GDP per annum, while financing is projected to become increasingly non-concessional over the medium-to-long term, and is expected to represent 85–90 percent of total official borrowing by the end of the projection period. The shift would be consistent with Ghana's improving wealth and lower middle-income status.

Commercial borrowing: The projected rise in commercial borrowing is more modest than in last year's DSA, and is consistent with Ghana's prudent pace of external borrowing in 2010 (roughly 0.7 percent of GDP) and its continuing intention to rely on concessional financing where possible (Text Table 4). Non-concessional borrowing is projected to gradually rise as a share of external official financing and average 2 percent of GDP during 2016–30, compared to 3 percent of rebased GDP in the 2010 DSA. Furthermore, the DSA assumes that the ECF program limits on contracting non-concessional external debt will be fully utilized during 2011–12, leading to an upturn in commercial disbursements. There is some downside potential to this assumption, given that the ECF borrowing limit was not fully utilized in 2011.

Text Table 4. Official Borrowing (in US\$ millions)

	2010	2011	2012	2013	2014	2015
Disbursements:						
Concessional loans	1,106	1,518	1,259	792	715	715
Non-concessional loans	216	648	500	600	700	826
<i>(percent of GDP)</i>	0.7	1.7	1.1	1.2	1.3	1.4
Total	1,322	2,166	1,759	1,392	1,415	1,541
Memorandum item:						
Non-concessional loans contracted ¹	329	800	500	600	700	800

Sources: Ghanaian authorities and IMF staff estimates and projections.

¹ Consistent with 2011-12 ECF program limits.

III. EXTERNAL DSA

Baseline scenario

7. **Under the baseline scenario, Ghana's debt indicators are well below the relevant indicative debt distress thresholds.** The projected level and composition of external debt is associated with only a small deterioration in the various debt burden indicators, with all remaining well below their respective thresholds (Text Table 5, Tables 1 and 2, and Figure 1).⁵ The baseline external debt burden trajectories are more favorable than in the 2010 DSA, reflecting the more conservative assumptions regarding external borrowing on non-concessional terms (see last paragraph, Box 2) and rebased GDP data.⁶

⁵ These thresholds are applicable to public and publicly guaranteed (PPG) external debt. External debt stock is measured on gross basis.

⁶ The peak in Figure 1 relates to the repayment of the 2007 sovereign bond. Non-concessional external borrowing is assumed to have a ten-year maturity, with four years grace, and an average interest rate of 8 percent per annum.

Text Table 5. Indicators of External Debt Vulnerabilities (Baseline)

	2015	2020	2030
<hr/>			
PV of debt-to -GDP ratio			
2010 DSA	26.0	23.3	18.2
2011 DSA	18.3	20.9	22.8
<i>Threshold</i>	<i>50</i>	<i>50</i>	<i>50</i>
<hr/>			
PV of debt-to-exports ratio			
2010 DSA	104.5	107.2	86.7
2011 DSA	51.9	65.6	72.3
<i>Threshold</i>	<i>200</i>	<i>200</i>	<i>200</i>
<hr/>			
PV of debt-to-revenue ratio			
2010 DSA	150.6	144.5	118.7
2011 DSA	92.4	113.4	131.4
<i>Threshold</i>	<i>300</i>	<i>300</i>	<i>300</i>
<hr/>			
Debt service-to-exports ratio			
2010 DSA	10.1	17.8	15.5
2011 DSA	2.8	5.9	8.3
<i>Threshold</i>	<i>25</i>	<i>25</i>	<i>25</i>
<hr/>			
Debt service-to-revenue ratio			
2010 DSA	14.5	24.0	21.2
2011 DSA	5.1	10.2	15.2
<i>Threshold</i>	<i>35</i>	<i>35</i>	<i>35</i>
<hr/>			

Standard stress tests

8. **Standard stress tests show limited risks of debt distress as all indicators remain well below their thresholds under most extreme scenarios.** Keeping key variables at their historical levels only increases debt burden indicators marginally.⁷ However, using historical averages does not account for the impact of the start of oil production in 2010–11, which will increase exports and GDP levels. A permanently higher nominal interest rate on new external borrowing has a limited impact on debt burden indicators.⁸

9. **The bound tests show the effects of transitory shocks.** In all cases, the debt burden indicators remain well below their indicative thresholds. The strongest impact on the debt-to-GDP, debt-to-revenue, and debt service-to-revenue ratios arises from a 30 percent

⁷ In the historical scenario, key variables kept at their 2001–10 levels are output growth, inflation (measured by GDP deflator and valued at U.S. dollar terms), non-interest current account balance as a percent of GDP, and non-debt creating external (FDI) financing flows.

⁸ The standard stress test assumes that the interest rate on new borrowing is two percentage points higher than in the baseline scenario. Even with a larger increase of 4 percentage points, debt indicators remain well below the indicative thresholds.

depreciation of the Ghanaian cedi in 2012. For the debt-to-exports and debt service-to-exports ratios, a shock to net non-debt creating flows is most significant.

Customized stress tests

10. **A range of customized stress tests were conducted to assess Ghana's resilience to country-specific shocks.** Ghana's has become increasingly reliant on non-resident purchases of domestic currency bonds, but the outstanding stock remains modest in relation to GDP. If these debts were treated as foreign debts for assessment purposes, external debt and debt service ratios would increase slightly, but overall debt sustainability would not be significantly impacted. As noted above, significantly higher costs of external borrowing can also be sustained without breaching the debt sustainability thresholds.

11. **An alternative scenario was developed to explore the implications of an increase in commercial borrowing.** It was assumed that external commercial borrowing would be 2 percent of GDP annually higher than in the baseline scenario (raising commercial borrowing to 5 percent of GDP in 2031). Debt-to-GDP and debt-service ratios are projected to increase significantly relative to the baseline, but remain below their relevant thresholds (Text Table 6 on the following page). The less favorable debt indicators highlight the risks of increased use of commercial borrowing, while suggesting some room for maneuver relative to the baseline.

12. **Ghana is potentially vulnerable to higher than projected current account deficits.** This could reflect lower export revenues, higher import costs, or a deterioration in the outlook for foreign direct investment. With a non-interest current account deficit averaging 6.6 percent of GDP during 2017–31 (compared to a baseline projection of 3.0 percent of GDP, and a historic average of 4.2 percent of GDP), the larger financing needs would lead to a steady rise in debt and debt service indicators toward the threshold levels by the end of the projections period.

13. **These vulnerabilities could emerge if the assumed fiscal consolidation is not achieved.** A customized scenario has been developed to assess potential spillovers to external debt sustainability from a serious shortfall in fiscal consolidation (see Table 2, Customized scenario A3; and Figure 1). This scenario assumes that public sector finances under-perform and lead to a deterioration in the non-oil fiscal balance. Higher spending is projected to result in higher imports by 3 percentage points of GDP, which is sustained through the projection period. The fiscal situation is further aggravated by the projected shortfall in oil incomes associated with a halving in global oil prices. With lower public saving, there will be a need for higher external financing, which would result in a steady

deterioration in debt- and debt service ratios (Figure 1, Customized scenario).⁹ In this scenario, all debt indicators and the debt-service-to-revenue ratio would breach their indicative thresholds, while the debt service-to-export ratio could stay below its indicative threshold.

Text Table 6. Impact of High Sovereign Market Financing

	2015	2020	2031
PV of external debt-to -GDP ratio			
Baseline	18.3	20.9	22.9
Higher nonconcessional external borrowing	28.4	34.9	36.3
<i>Threshold</i>	50	50	50
PV of external debt-to-exports ratio			
Baseline	51.9	65.6	72.8
Higher nonconcessional external borrowing	80.7	109.7	115.2
<i>Threshold</i>	200	200	200
PV of external debt-to-revenue ratio			
Baseline	92.4	113.4	132.4
Higher nonconcessional external borrowing	143.7	189.7	209.4
<i>Threshold</i>	300	300	300
External debt service-to-exports ratio			
Baseline	2.8	5.9	8.5
Higher nonconcessional external borrowing	4.3	11.6	14.4
<i>Threshold</i>	25	25	25
External debt service-to-revenue ratio			
Baseline	5.1	10.2	15.5
Higher nonconcessional external borrowing	7.6	20.1	26.2
<i>Threshold</i>	35	35	35
PV of public debt-to -GDP ratio			
Baseline	29.2	36.7	42.1
Higher nonconcessional external borrowing	39.3	50.7	55.5
PV of public debt-to-revenue ratio			
Baseline	137.6	192.2	240.3
Higher nonconcessional external borrowing	185.5	265.8	316.4
Public debt service-to-revenue ratio			
Baseline	25.5	39.3	52.8
Higher nonconcessional external borrowing	25.5	44.4	58.7

⁹ The scenario assumes that the external current account deficit would be 3 percent of GDP higher than in the baseline. This results from a combination of lower export revenues (owing to lower global oil prices; net of oil imports), and higher imports by the government.

IV. PUBLIC SECTOR DSA

Baseline scenario

14. **The baseline shows a slow increase in overall public debt relative to GDP over the projection horizon.** Until 2015, public debt-GDP ratio is projected to fall, benefitting from primary fiscal surpluses in the next few years, and bottom out at 34 percent of GDP.¹⁰ With the fading of primary surpluses in the subsequent years, public debt ratios are projected to gradually rise and the debt stock would reach 41 percent of GDP at the end of the projection period (Text Table 7, Table 3 and 4, and Figure 2).¹¹

15. **Debt service cost to revenues rises due to higher external borrowing at commercial terms (Text Table 7).** With the assumed increase in external borrowing at commercial terms over the projection period, the average maturity of external debt would become shorter (see para. 7) and the rollover of external debt would become more frequent. The amortization of external public debt also increases as a share of total debt service costs (reaching 70 percent by 2031, when a large portion of external borrowing is at commercial terms).

¹⁰ Primary surplus is projected to reach 1.4 percent of GDP in 2013 and narrow during the subsequent years. After 2018 the primary position is projected to remain broadly balanced (Table 3).

¹¹ Public debt is measured on net basis. The accumulation of oil assets to the government, starting in 2011, will reduce public sector debt to GDP ratios in Table 3.

Text Table 7. Indicators of Public Debt Vulnerabilities (Baseline)

	2015	2020	2030
PV of debt-to -GDP ratio			
2010 DSA	36.5	29.5	25.3
2011 DSA	29.2	36.7	42.3
PV of debt-to-revenue ratio			
2010 DSA	211.9	182.6	165.5
2011 DSA	137.6	192.2	240.9
Debt service-to-revenue ratio			
2010 DSA	23.8	35.4	38.9
2011 DSA	25.5	39.3	52.2

16. **Fiscal consolidation is key to public debt sustainability.** In the 2010 DSA, the debt-to-GDP ratio was projected to decline during the forecast period, to about 25 percent of rebased GDP. However, debt projections over a long duration are sensitive to variations in the underlying macroeconomic assumptions.

17. **Overall public debt dynamics remain sensitive to assumptions regarding growth and fiscal consolidation** (Figure 2). Under the status quo scenario in which the primary deficit remains at the projected 2011 levels totaling 1.3 percent of GDP (rather than shifting to surplus until 2017 and remaining balanced thereafter), the debt-GDP ratio increases by about 20 percent of GDP by 2031, relative to the baseline, to around 63 percent of GDP (Table 4, test A2). Similarly, debt dynamics are sensitive to growth rates; a one-third of one percentage point reduction in average growth over 2011–31 increases the projected debt-to-GDP ratio by 12 percentage points by 2031 (Table 4, test A3).

18. **Although public debt levels are projected to increase over the coming decades, growth in domestic savings will help meet these financing needs.** Ghana’s financial savings base is small relative to other lower middle-income countries but expanding steadily (as measured, for example, by the M2-GDP ratio). Projected growth in domestic savings over the projection period appears to be adequate to sustain higher levels of debt in relation to GDP.

V. DEBT MANAGEMENT CAPACITY

19. **Improvements in debt management capacity are under way.** Ghana’s policies and institutions, as measured by the World Bank’s Country Policy and Institutional Assessment (CPIA), averaged 3.89 over the period 2007–2009, placing it as a “strong performer.” Efforts to strengthen Ghana’s debt management capacity include publication of a debt management strategy in December 2010 together with improvements in analyzing alternative borrowing

options and their cost and risk implications in a coherent framework. Guidelines have also been prepared and published to help in project selection and appraisal. Consistent with the ECF program limits for nonconcessional borrowing, borrowing plans of the key state-owned enterprises are being monitored closely. Better monitoring will also help to eliminate the data gap related to SOEs debts . Furthermore, the debt management division has been reorganized with units specialized by functional areas, and training is provided to staff on monitoring and risk-management techniques. Plans are being prepared to monitor domestic debt flows more closely.

VI. CONCLUSIONS

20. **The baseline DSA is more favorable than a year ago.** The improvements in debt burden trajectories reflect more moderate external borrowing assumptions as well as upward revisions to the national accounts. As a result, the trajectories of all external debt burden indicators remain well within their respective thresholds, while overall public debt ratios increase only modestly over the projections period.
21. **Risks of debt distress are assessed to remain moderate, in line with the 2010 DSA.** If the planned fiscal consolidation is achieved without a substantial further debt build-up, an improved rating of low risk of debt distress could be considered at a future date.
22. **Successful fiscal consolidation will be essential for achieving the projected debt outcomes.** The customized scenario highlights possible spillovers from deteriorating public finances to the external sector that could lead to higher debt distress.
23. **Robust growth is also important.** Without sustained strong growth, debt and debt service ratios are likely to be higher as shown by some of the stress tests undertaken in the context of public debt. This is an important consideration for the use of commercial financing to fund new project investments. If these investments do not deliver a high economic return, Ghana's debt vulnerabilities could increase significantly.
24. **Continuing improvements should be sought also in debt management capacity.** Good progress made during 2010 should be carried forward in the periods ahead, particularly given Ghana's growing access to market financing. Although Ghana has some flexibility in managing its borrowing at commercial terms, it will be essential that new debts are managed carefully, including extending the maturity of external commercial debt so that the rollover of this debt remains manageable.

Table 1: External Debt Sustainability Framework, Baseline Scenario, 2008-31 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical 0 Standard		Projections									
	2008	2009	2010	Average	0 Deviation	2011	2012	2013	2014	2015	2016	2011-2016 Average	2021	2031	2017-2031 Average
External debt (nominal) 1/	24.0	28.1	27.8	48.6	29.5	27.9	27.7	28.0	27.9	27.8	28.4	28.0	27.3	24.1	26.2
o/w public and publicly guaranteed (PPG)	16.2	19.4	20.3	38.9	27.3	21.7	22.3	23.1	23.4	23.5	24.3	23.1	24.2	22.4	23.5
Change in external debt	0.2	4.2	-0.3	-9.7	12.8	0.2	-0.3	0.3	-0.1	-0.1	0.6	0.1	-0.3	-0.3	-0.3
Identified net debt-creating flows	3.4	-0.1	-3.5	-5.6	8.5	-0.1	-0.8	-1.9	-3.7	-2.6	-1.6	-1.8	-0.9	-1.0	-0.4
Non-interest current account deficit	10.2	3.4	6.6	4.2	3.4	7.0	5.1	3.7	1.9	1.6	2.0	3.5	2.7	2.2	3.0
Deficit in balance of goods and services	19.3	13.0	14.1	13.9	3.3	7.8	6.1	5.5	4.2	4.3	5.4	5.5	8.1	8.2	8.6
Exports	24.8	29.3	30.3	26.9	3.2	39.5	37.7	35.7	35.3	35.3	34.6	36.3	31.5	31.5	31.8
Imports	44.0	42.3	44.4	40.8	3.6	47.3	43.8	41.2	39.5	39.5	40.0	41.9	39.6	39.7	40.4
Net current transfers (negative = inflow)	-9.4	-10.2	-8.6	-10.2	1.3	-7.2	-6.9	-6.9	-7.0	-6.9	-6.7	-6.9	-6.1	-5.7	-6.0
o/w official	-2.5	-3.3	-1.7	-2.5	0.7	-2.0	-1.2	-1.2	-1.2	-1.1	-0.9	-1.3	-0.4	-0.1	-0.3
Other current account flows (negative = net inflow)	0.3	0.6	1.1	0.5	0.3	6.4	6.0	5.1	4.6	4.2	3.3	4.9	6.8	-0.3	0.5
Net FDI (negative = inflow)	-4.2	-6.5	-6.1	-2.7	2.3	-4.5	-4.5	-4.6	-4.5	-3.2	-3.2	-4.1	-3.2	-3.2	-3.2
Endogenous debt dynamics 2/	-2.5	3.0	-4.0	-7.1	7.7	-2.7	-1.3	-1.0	-1.0	-1.0	-0.5	-1.3	-0.4	0.0	-0.3
Contribution from nominal interest rate	0.6	0.6	0.6	0.8	0.4	0.5	0.4	0.5	0.6	0.6	0.7	0.5	0.9	1.2	1.0
Contribution from real GDP growth	-1.7	-1.2	-1.3	-2.6	1.5	-3.1	-1.8	-1.5	-1.6	-1.6	-1.2	-1.8	-1.3	-1.2	-1.2
Contribution from price and exchange rate changes	-1.4	3.6	-3.3	-5.3	7.3	...	...	...	...	...	...	...	...	...	...
Residual (3-4) 3/	-3.3	4.2	3.2	-4.1	12.2	0.3	0.5	2.3	3.6	2.5	2.2	1.9	0.6	0.7	0.1
o/w exceptional financing	-0.2	-0.2	-0.2	-3.5	5.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.0
PV of external debt 4/	...	...	19.6	19.6	...	20.6	21.0	21.7	22.2	22.6	23.5	21.9	24.4	24.7	24.4
In percent of exports	...	...	64.7	64.7	...	52.1	55.6	60.9	62.8	63.9	67.9	60.5	77.3	78.3	76.6
PV of PPG external debt	...	...	12.1	12.1	...	14.3	15.6	16.8	17.6	18.3	19.4	17.0	21.2	22.9	21.6
In percent of exports	...	...	39.8	39.8	...	36.3	41.4	47.1	49.9	51.9	56.0	47.1	67.2	72.8	68.1
In percent of government revenues	...	...	80.6	80.6	...	84.5	86.3	88.9	91.0	92.4	96.6	90.0	116.5	132.4	120.6
Debt service-to-exports ratio (in percent)	12.2	11.1	9.2	29.5	20.1	5.3	4.7	5.3	5.2	5.2	5.8	5.3	8.4	9.6	8.7
PPG debt service-to-exports ratio (in percent)	6.0	5.3	4.4	22.6	19.9	2.2	1.9	2.6	2.6	2.8	3.5	2.6	6.4	8.5	7.0
PPG debt service-to-revenue ratio (in percent)	11.2	11.6	8.9	44.8	37.7	5.0	3.9	4.9	4.8	5.1	6.0	5.0	11.1	15.5	12.5
Total gross financing need (Millions of U.S. dollars)	2561	48	1030	1920	1424	1744	1034	496	-437	131	517	581	1941	4417	3382
Non-interest current account deficit that stabilizes debt ratio	10.1	-0.8	7.0	13.9	11.8	6.8	5.4	3.3	2.0	1.7	1.4	3.4	3.0	2.5	3.3
Key macroeconomic assumptions															
Real GDP growth (in percent)	8.4	4.7	5.7	5.6	1.2	13.7	7.3	6.1	6.2	6.3	4.4	7.4	4.9	5.3	5.0
GDP deflator in US dollar terms (change in percent)	6.3	-13.0	13.1	10.1	11.0	6.1	8.7	5.1	3.2	3.1	2.0	4.7	3.0	4.3	3.4
Effective interest rate (percent) 5/	2.9	2.4	2.6	1.9	0.6	2.1	1.7	1.9	2.2	2.4	2.7	2.2	3.4	5.3	4.0
Growth of exports of G&S (US dollar terms, in percent)	17.8	7.6	23.8	14.8	9.1	57.0	11.5	5.5	8.4	9.7	4.5	16.1	7.0	9.8	7.9
Growth of imports of G&S (US dollar terms, in percent)	24.9	-12.6	25.6	16.1	14.7	28.4	8.0	4.9	5.1	9.8	7.8	10.7	8.5	7.9	8.5
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	15.5	11.9	6.3	3.1	0.7	-0.1	6.2	-8.5	-19.4	-11.9
Government revenues (excluding grants, in percent of GDP)	13.3	13.4	15.0	13.5	0.9	16.9	18.1	18.9	19.3	19.8	20.1	18.9	18.2	17.3	18.0
Aid flows (in Millions of US dollars) 7/	776	776	755	590	243	1450	988	970	1029	1018	916	1062	730	612	676
o/w Grants	776	776	755	590	243	898	695	775	829	818	716	788	530	412	476
o/w Concessional loans	0.3	0.2	0.2	0.2	0.1	552	293	195	200	200	200	273	200	200	200
Grant-equivalent financing (in percent of GDP) 8/	...	...	...	...	...	3.3	2.1	1.8	1.6	1.4	1.1	1.9	0.3	-0.5	0.1
Grant-equivalent financing (in percent of external financing) 8/	...	...	...	...	...	40.2	36.9	39.8	38.9	35.2	29.5	36.7	10.0	-12.9	2.5
Memorandum items:															
Nominal GDP (Millions of US dollars)	28528	25988	31084	19005	8424	37481	43705	48767	53460	58620	62479	50752	89846	215157	124664
Nominal dollar GDP growth	15.2	-8.9	19.6	16.3	11.8	20.6	16.6	11.6	9.6	9.7	6.6	12.4	8.0	9.8	8.6
PV of PPG external debt (in Millions of US dollars)	...	...	3642	...	...	5370	6823	7947	9138	10446	11823	8591	18715	48536	26937
Gross remittances (Millions of US dollars)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
PV of PPG external debt (in percent of GDP + remittances)	...	...	12.1	...	...	14.3	15.6	16.8	17.6	18.3	19.4	...	21.2	22.9	21.6
PV of PPG external debt (in percent of exports + remittances)	...	...	39.8	...	...	36.3	41.4	47.1	49.9	51.9	56.0	...	67.2	72.8	68.1
Debt service of PPG external debt (in percent of exports + remittances)	...	...	4.4	...	...	2.2	1.9	2.6	2.6	2.8	3.5	...	6.4	8.5	7.0

Sources: Ghanaian authorities; and staff estimates and projections.

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 PV 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.

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. Ghana: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2011-2031
(In percent)

	Projections							2021	2031
	2011	2012	2013	2014	2015	2016	2017		
PV of debt-to GDP ratio									
Baseline	14.3	15.6	16.8	17.6	18.3	19.4	21.2	22.9	
A. Alternative Scenarios									
A1. Key variables at their historical averages in 2011-2031 1/	14.3	16.7	19.4	23.8	26.5	28.4	30.2	23.3	
A2. New public sector loans on less favorable terms in 2011-2031 2	14.3	16.6	17.8	19.1	20.4	22.0	26.0	31.1	
A3. Customized scenario	14.3	17.1	19.5	22.2	25.0	28.7	46.1	62.9	
B. Bound Tests									
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	14.3	15.6	16.6	17.7	18.4	19.5	21.4	23.2	
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	14.3	15.6	16.2	17.0	17.7	18.8	20.7	22.4	
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	14.3	17.1	19.0	19.9	20.7	22.0	24.1	26.0	
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	14.3	18.1	21.2	21.8	22.3	23.3	23.7	22.9	
B5. Combination of B1-B4 using one-half standard deviation shocks	14.3	17.2	17.4	18.4	19.2	20.4	22.2	23.9	
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	14.3	21.6	22.5	23.6	24.6	26.1	28.6	30.9	
PV of debt-to-exports ratio									
Baseline	36.3	41.4	47.1	49.9	51.9	56.0	67.2	72.8	
A. Alternative Scenarios									
A1. Key variables at their historical averages in 2011-2031 1/	36.3	44.2	54.5	67.5	75.3	82.3	95.8	73.9	
A2. New public sector loans on less favorable terms in 2011-2031 2	36.3	44.0	49.9	54.2	57.7	63.8	82.6	98.7	
A3. Customized scenario	36.3	44.1	53.5	62.0	70.3	83.2	152.4	207.7	
B. Bound Tests									
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	36.3	41.4	45.7	48.4	50.4	54.6	65.7	71.0	
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	36.3	41.4	45.3	49.3	51.3	55.6	67.0	72.6	
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	36.3	41.4	45.7	48.4	50.4	54.6	65.7	71.0	
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	36.3	48.0	59.5	61.7	63.1	67.3	75.2	72.8	
B5. Combination of B1-B4 using one-half standard deviation shocks	36.3	43.9	44.2	46.0	47.9	51.8	62.1	66.8	
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	36.3	41.4	45.7	48.4	50.4	54.6	65.7	71.0	
PV of debt-to-revenue ratio									
Baseline	84.5	86.3	88.9	91.0	92.4	96.6	116.5	132.4	
A. Alternative Scenarios									
A1. Key variables at their historical averages in 2011-2031 1/	84.5	92.2	102.8	123.1	134.1	141.8	166.0	134.3	
A2. New public sector loans on less favorable terms in 2011-2031 2	84.5	91.8	94.1	98.9	102.8	109.9	143.2	179.4	
A3. Customized scenario	84.5	94.3	103.0	114.7	126.2	143.0	253.6	362.8	
B. Bound Tests									
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	84.5	86.3	87.7	91.4	93.0	97.4	117.9	133.6	
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	84.5	86.3	85.7	87.8	89.4	93.7	113.6	129.1	
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	84.5	94.6	100.3	102.8	104.6	109.5	132.6	150.3	
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	84.5	100.1	112.2	112.6	112.5	116.0	130.3	132.4	
B5. Combination of B1-B4 using one-half standard deviation shocks	84.5	95.0	92.1	95.4	97.0	101.5	122.2	138.0	
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	84.5	119.2	119.1	122.0	124.1	130.0	157.4	178.4	

Table 2.Ghana: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2011-2031 (continued)
(In percent)

Debt service-to-exports ratio								
Baseline	2.2	1.9	2.6	2.6	2.8	3.5	6.4	8.5
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2011-2031 1/	2.2	1.9	2.6	2.9	3.5	4.1	7.3	6.7
A2. New public sector loans on less favorable terms in 2011-2031 2	2.2	1.9	2.4	2.5	2.8	3.1	6.1	12.4
A3. Customized scenario	2.2	1.8	2.7	3.0	3.5	4.5	11.6	21.3
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	2.2	1.9	2.6	2.6	2.8	3.5	6.4	8.5
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	2.2	1.9	2.6	2.7	2.9	3.5	6.5	8.7
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	2.2	1.9	2.6	2.6	2.8	3.5	6.4	8.5
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	2.2	1.9	2.9	3.3	3.5	4.1	7.7	8.8
B5. Combination of B1-B4 using one-half standard deviation shocks	2.2	1.9	2.6	2.5	2.7	3.3	6.1	8.0
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	2.2	1.9	2.6	2.6	2.8	3.5	6.4	8.5
Debt service-to-revenue ratio								
Baseline	5.0	3.9	4.9	4.8	5.1	6.0	11.1	15.5
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2011-2031 1/	5.0	3.9	5.0	5.2	6.2	7.2	12.7	12.3
A2. New public sector loans on less favorable terms in 2011-2031 2	5.0	3.9	4.5	4.6	5.0	5.3	10.5	22.5
A3. Customized scenario	5.0	3.9	5.3	5.6	6.3	7.7	19.2	37.2
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	5.0	3.9	5.0	5.0	5.2	6.2	11.5	16.0
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	5.0	3.9	4.9	4.8	5.0	6.0	11.0	15.4
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	5.0	4.3	5.7	5.6	5.9	7.0	12.9	17.9
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	5.0	3.9	5.5	6.0	6.2	7.1	13.4	16.0
B5. Combination of B1-B4 using one-half standard deviation shocks	5.0	4.1	5.4	5.2	5.5	6.4	11.9	16.5
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	5.0	5.4	6.8	6.6	7.0	8.3	15.3	21.3
<i>Memorandum item:</i>								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	-14.7	-14.7	-14.7	-14.7	-14.7	-14.7	-14.7	-14.7

Sources: Ghanaian 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.

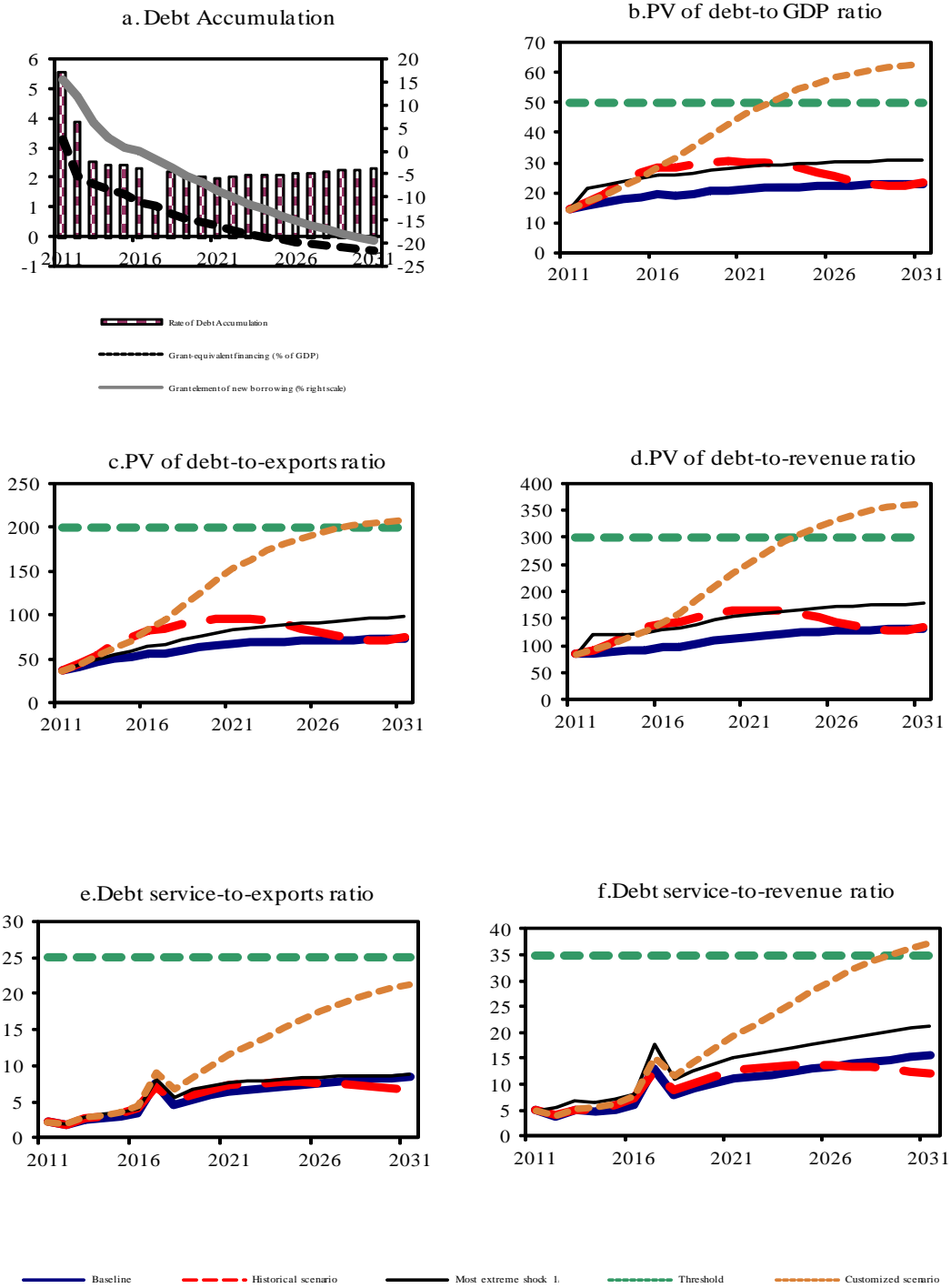
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).

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.

Figure 1: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2011-31 1/



Sources: Ghanaian authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2031. In figure b. it corresponds to a Customized scenario shock; in c. to a Customized scenario shock; in d. to a Customized scenario shock; in e. to a Customized scenario shock and in figure f. to a Customized scenario shock

Table 3: Public Sector Debt Sustainability Framework, Baseline Scenario, 2008-31
(In percent of GDP, unless otherwise indicated)

	Actual			Average	Standard Deviation	Estimate		Projections							
	2008	2009	2010			2011	2012	2013	2014	2015	2016	2011-16 Average	2021	2031	2017-31 Average
Public sector debt 1/	33.6	36.0	38.9	54.8	27.5	39.5	39.5	40.4	35.0	34.4	35.4	37.4	40.8	41.5	40.9
o/w foreign-currency denominated	16.2	19.4	20.3	38.9	27.3	21.7	22.3	23.1	23.4	23.5	24.3	23.1	24.2	22.4	23.5
Change in public sector debt	2.5	2.4	2.9	-8.8	12.2	0.6	0.0	1.0	-5.5	-0.6	1.0	-0.6	0.8	-0.5	0.4
Identified debt-creating flows	1.6	1.7	2.7	-7.5	9.3	-2.8	-4.0	-2.8	-3.5	-3.2	-1.7	-3.0	-1.1	-1.4	-1.3
Primary deficit	6.2	3.0	4.4	2.2	2.2	1.3	-0.7	-1.4	-1.3	-1.2	-0.6	-0.6	0.2	0.2	0.2
Revenue and grants	16.0	16.4	17.4	16.7	1.5	19.3	19.7	20.5	20.9	21.2	21.2	20.5	18.8	17.5	18.4
of which: grants	2.7	3.0	2.4	3.2	1.0	2.4	1.6	1.6	1.6	1.4	1.1	1.6	0.6	0.2	0.5
Primary (noninterest) expenditure	22.3	19.4	21.8	19.0	2.5	20.7	19.0	19.1	19.6	20.0	20.6	19.8	19.0	17.7	18.6
Automatic debt dynamics	-2.1	-1.1	-2.5	-9.2	7.8	-4.9	-3.1	-1.3	-2.0	-1.9	-0.9	-2.4	-1.3	-1.6	-1.4
Contribution from interest rate/growth differential	-3.0	-1.3	-0.8	-3.6	2.0	-3.6	-1.8	-1.2	-1.6	-1.6	-0.8	-1.8	-1.0	-1.0	-1.0
of which: contribution from average real interest rate	-0.6	0.2	1.1	-0.4	0.9	1.1	0.9	1.1	0.7	0.5	0.7	0.8	0.9	1.1	0.9
of which: contribution from real GDP growth	-2.4	-1.5	-2.0	-3.2	1.5	-4.7	-2.7	-2.3	-2.4	-2.1	-1.5	-2.6	-1.9	-2.1	-1.9
Contribution from real exchange rate depreciation	0.9	0.3	-1.6	-5.6	6.0	-1.3	-1.4	-0.1	-0.4	-0.3	-0.1	-0.6	...	...	-0.3
Other identified debt-creating flows	-2.6	-0.2	0.7	-0.6	0.9	0.8	-0.2	-0.2	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0
Privatization receipts (negative)	-2.3	0.0	1.0	-0.3	0.8	1.0	0.0	0.0	0.0	0.0	0.0	0.2	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	0.0	0.0	0.0	0.0
Debt relief (HIPC and other)	-0.3	-0.2	-0.3	-0.3	0.3	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	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	0.0	0.0	0.0	0.0
Residual, including asset changes	1.0	0.6	0.2	-1.3	7.7	3.4	4.0	3.8	-2.0	2.6	2.7	2.4	1.9	0.9	1.7
Other Sustainability Indicators															
PV of public sector debt	17.4	16.6	30.7	16.9	5.6	32.1	32.8	34.1	29.2	29.2	30.5	31.3	37.9	42.1	39.0
o/w foreign-currency denominated	0.0	0.0	12.1	1.3	4.0	14.3	15.6	16.8	17.6	18.3	19.4	17.0	21.2	22.9	21.6
o/w external	...	...	12.1	...	...	14.3	15.6	16.8	17.6	18.3	19.4	17.0	21.2	22.9	21.6
PV of contingent liabilities (not included in public sector debt)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gross financing need 2/	11.5	9.2	10.8	12.5	4.4	10.0	8.1	7.7	7.8	8.0	9.1	8.5	13.4	14.7	13.7
PV of public sector debt-to-revenue and grants ratio (in percent)	108.3	100.9	176.4	92.6	46.4	166.1	166.4	166.6	139.7	137.6	143.9	153.4	201.8	240.3	213.0
PV of public sector debt-to-revenue ratio (in percent)	130.4	123.4	205.0	111.8	52.8	189.5	181.1	180.6	151.0	147.3	152.1	166.9	208.3	242.9	218.1
o/w external 3/	...	...	80.6	80.6	...	84.5	86.3	88.9	91.0	92.4	96.6	90.0	116.5	132.4	120.6
Debt service-to-revenue and grants ratio (in percent) 4/	13.9	16.4	16.9	43.4	30.6	26.0	25.4	26.2	25.6	25.5	27.3	26.0	41.8	52.8	45.1
Debt service-to-revenue ratio (in percent) 4/	16.8	20.1	19.6	53.9	38.2	29.7	27.6	28.4	27.7	27.3	28.9	28.3	43.1	53.4	46.1
Primary deficit that stabilizes the debt-to-GDP ratio	3.7	0.6	1.5	1.9	1.6	0.7	-0.7	-2.4	4.2	-0.6	-1.7	-0.1	-0.6	0.7	-0.3
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	8.4	4.7	5.7	5.6	1.2	13.7	7.3	6.1	6.2	6.3	4.4	7.4	4.9	5.3	5.0
Average nominal interest rate on forex debt (in percent)	4.6	3.8	3.7	2.5	1.3	2.9	2.2	2.4	2.6	2.9	3.1	2.7	3.9	5.7	4.4
Average real interest rate on domestic debt (in percent)	-6.0	-1.7	3.8	-1.4	4.9	4.8	4.7	5.7	3.2	2.4	3.4	4.0	2.6	1.5	2.2
Real exchange rate depreciation (in percent, + indicates depreciation)	6.4	1.7	-8.7	-8.5	7.6	-7.4	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	20.2	16.7	14.1	20.9	7.2	11.2	8.7	8.6	9.6	9.0	7.3	9.1	6.6	7.9	7.2
Growth of real primary spending (deflated by GDP deflator, in percent)	0.1	-0.1	0.2	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
Grant element of new external borrowing (in percent)	...	...	...	...	...	15.5	11.9	6.3	3.1	0.7	-0.1	6.2	-8.5	-19.4	...

Sources: Ghanaian authorities; and staff estimates and projections.

1/ Public sector comprise central government. The concept of net debt is used.

2/ 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.

3/ Revenues excluding grants.

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

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

Table 4. Ghana: Sensitivity Analysis for Key Indicators of Public Debt 2011-2031

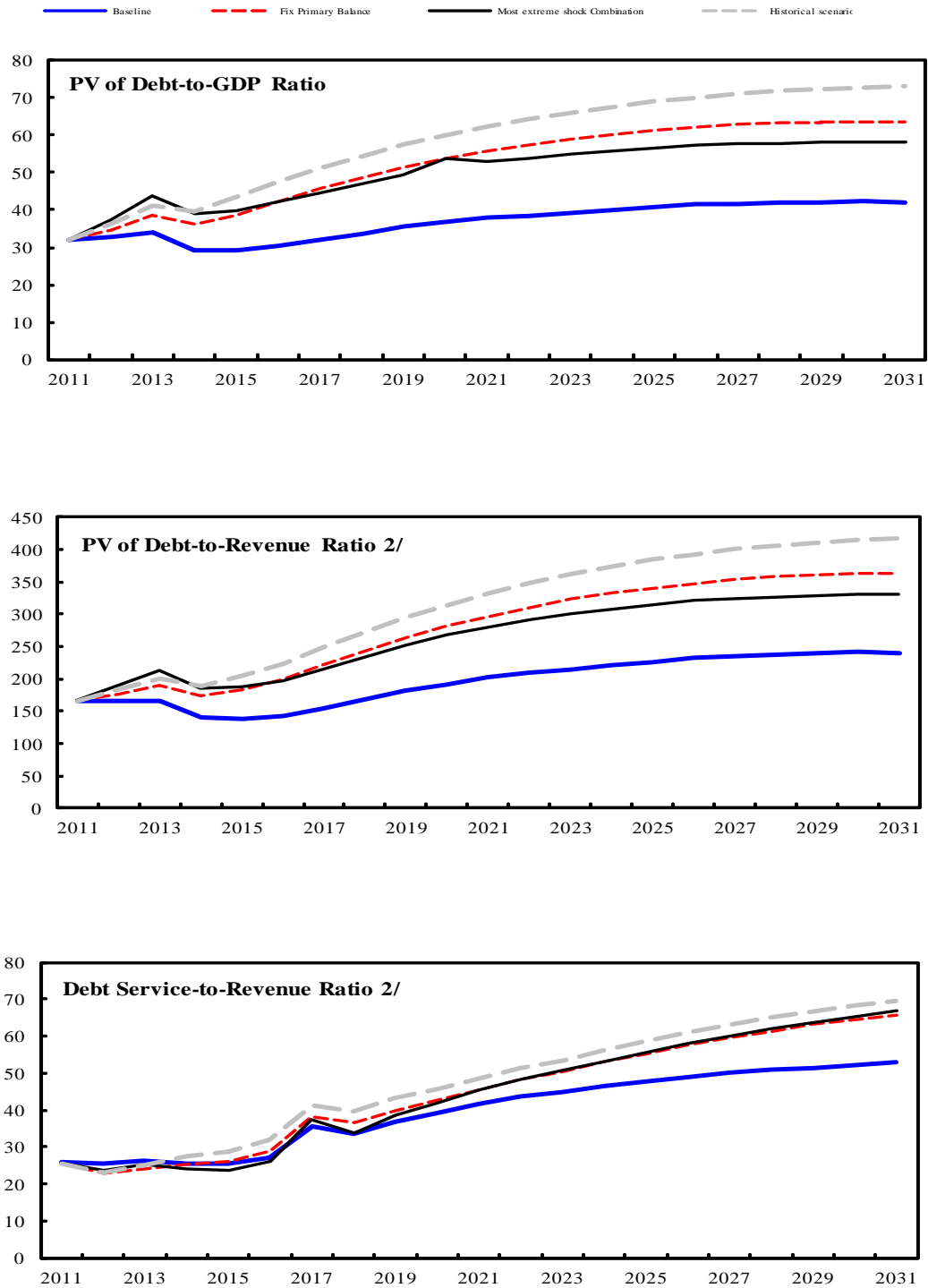
	Projections							
	2011	2012	2013	2014	2015	2016	2021	2031
PV of Debt-to-GDP Ratio								
Baseline	32.1	32.8	34.1	29.2	29.2	30.5	37.9	42.1
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	32.1	36.2	41.3	39.7	43.5	47.5	62.3	72.9
A2. Primary balance is unchanged from 2011	32.1	34.8	38.8	36.2	38.7	42.4	55.8	63.7
A3. Permanently lower GDP growth 1/	32.1	32.9	34.4	29.5	30.2	32.3	43.4	54.0
A4. Alternative Scenario :[Costumize, enter title]	32.1	32.7	34.7	31.1	33.7	36.7	48.3	55.8
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2012-2013	32.1	34.2	37.0	32.5	33.8	36.5	49.2	57.7
B2. Primary balance is at historical average minus one standard deviations in 2012-2013	32.1	37.8	44.8	39.4	39.3	41.0	48.3	49.5
B3. Combination of B1-B2 using one half standard deviation shocks	32.1	37.5	43.9	39.0	39.7	42.1	52.8	58.0
B4. One-time 30 percent real depreciation in 2012	32.1	38.2	39.3	34.2	34.6	36.6	46.9	55.7
B5. 10 percent of GDP increase in other debt-creating flows in 2012	32.1	42.8	43.8	38.4	38.4	40.0	47.5	48.9
PV of Debt-to-Revenue Ratio 2/								
Baseline	166.1	166.4	166.6	139.7	137.6	143.9	201.8	240.3
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	166.1	183.8	201.5	189.9	204.7	223.9	332.3	416.5
A2. Primary balance is unchanged from 2011	166.1	176.6	189.1	173.1	182.8	199.8	297.2	363.2
A3. Permanently lower GDP growth 1/	166.1	167.0	167.8	141.2	142.3	152.3	231.1	308.2
A4. Alternative Scenario :[Costumize, enter title]	166.1	130.0	137.9	122.9	132.5	143.5	187.8	213.5
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2012-2013	166.1	173.3	179.9	155.2	158.8	171.7	261.8	328.9
B2. Primary balance is at historical average minus one standard deviations in 2012-2013	166.1	192.2	218.7	188.5	185.6	193.1	257.5	282.5
B3. Combination of B1-B2 using one half standard deviation shocks	166.1	190.2	213.8	186.4	187.1	198.2	280.9	330.8
B4. One-time 30 percent real depreciation in 2012	166.1	193.8	191.9	163.6	163.1	172.5	249.9	318.1
B5. 10 percent of GDP increase in other debt-creating flows in 2012	166.1	217.2	213.8	183.8	181.0	188.5	252.8	279.3
Debt Service-to-Revenue Ratio 2/								
Baseline	26.0	25.4	26.2	25.6	25.5	27.3	41.8	52.8
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	25.6	23.3	25.0	27.4	28.8	32.0	48.6	69.6
A2. Primary balance is unchanged from 2011	25.6	22.9	24.2	25.3	26.1	29.1	45.6	65.6
A3. Permanently lower GDP growth 1/	25.6	23.0	23.5	22.0	21.3	23.3	40.3	60.4
A4. Alternative Scenario :[Costumize, enter title]	25.6	19.4	25.4	22.3	24.2	25.8	38.0	62.3
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2012-2013	25.6	23.5	24.6	23.7	23.4	25.8	43.6	62.7
B2. Primary balance is at historical average minus one standard deviations in 2012-2013	25.6	22.9	25.3	30.2	30.3	28.2	41.0	57.7
B3. Combination of B1-B2 using one half standard deviation shocks	25.6	23.4	25.7	29.2	29.5	28.9	44.2	63.4
B4. One-time 30 percent real depreciation in 2012	25.6	23.7	25.4	24.0	23.6	26.1	45.7	67.1
B5. 10 percent of GDP increase in other debt-creating flows in 2012	25.6	22.9	27.2	33.9	26.0	27.7	40.6	57.2

Sources: Ghanaian 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.

Figure 2: Indicators of Public Debt Under Alternative Scenarios, 2011-2031 1/



Sources: Ghanaian authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2021.

2/ Revenues are defined inclusive of grants.