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GHANA

Joint IMF and World Bank Debt Sustainability Analysis

Prepared by the staffs of the World Bank and
the International Monetary Fund

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This debt sustainability analysis (DSA) updates that prepared for the 2008 Article IV consultation, discussions for which were completed in June 2008.[1] The starting point for the DSA is less favorable than a year ago, reflecting the rise in the debt-to-GDP ratio between end-2007 and end-2008 on account of the large fiscal deficit in 2008. At the same time, notwithstanding the large fiscal deficit in 2008, the new government's goals for fiscal consolidation are more ambitious than those discussed a year ago. Further, there is now greater assurance that oil production will start in 2011, and this assumption is now included in the macroeconomic baseline. The combination of a more ambitious fiscal consolidation sustained over the medium to long term, together with stronger real GDP growth and higher export levels post-oil production all contribute to a more favorable DSA baseline than in 2008. Public sector net debt is projected to fall to less than 40 percent of GDP by the end of the projection period from 60-70 percent of GDP in 2008- 2012. By contrast, DSA baseline projections in 2008 showed public debt rising to exceed 80 percent of GDP over a 20-year period. Notwithstanding this improvement, stress test analysis suggests that Ghana remains at moderate risk of debt distress, in line with the 2008 DSA.

Key risks to Ghana's debt sustainability relate to the medium- to long-term fiscal outlook, as well as the prospects for growth in a post-oil economy. The baseline depends on determined

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[1] The DSA was prepared by IMF and World Bank staffs in collaboration with the Ghanaian authorities.

fiscal adjustment in the near term, combined with rigorous efforts to limit borrowing needs over the medium- to long-term. Failure to reduce the primary deficit from 2009 levels would be associated with a near doubling of the public debt-to-GDP ratio over two decades. Similarly, the baseline assumes sustained, strong growth in the non-oil, non-mineral economy and a diversified and competitive export base. This will require macroeconomic stability, continued improvements in the business climate, and prudent management of Ghana's oil revenues.

I. BACKGROUND

1.   **Ghana's public debt at end-2008 was an estimated 58 percent of GDP**. This compares with a projection of 51 percent of GDP in the 2008 DSA. The less favorable starting position for the current DSA reflects the larger than previously assumed fiscal deficit in 2008 (14½ percent of GDP, or 4 percentage points higher than previously projected), as well as the impact of currency depreciation on the foreign debt-to-GDP ratio in 2008. Public sector external and domestic debts were similar in scale at end-2008, both close to US$4 billion (29 percent of GDP each).

2.   **External debt has risen rapidly since 2006—up from 17 to 29 percent of GDP**. This reflects Ghana's $750 million Eurobond issue at end-2007, together with new concessional bilateral financing, and new borrowing contracted from the IDA since 2006, following the Multilateral Debt Reduction Initiative (MDRI). Data on private sector external debt are of low quality, but appear to have remained broadly stable at about 15 percent of GDP between 2007 and 2008.

3.   **The sharp rise in Ghana's external (and total) public debt during 2006-08 illustrates the risks to the DSA**. A highly expansionary fiscal position financed by external borrowing triggered a very rapid deterioration in the debt position. This trend was amplified by the resulting balance of payments pressures and currency depreciation, which led to the revaluation of foreign currency-denominated claims relative to domestic GDP. This debt surge was effectively stemmed when Ghana's access to market financing was closed off as a result of the global financing crisis. Avoiding future such episodes of debt deterioration will require more determined fiscal management as well as more cautious debt management policies.

Ghana: Total public Debt, 2004-08

	2004	2005	2006	2007	2008
	(In millions of U.S. dollars)				
1. External debt	**6,448**	**6,348**	**2,177**	**3,586**	**4,035**
Multilateral Institutions	5,287	5,565	1,327	1,710	2,028
IMF	447	424	158	167	163
IDA	4,012	4,336	803	1,137	1,320
AfDB	551	555	141	153	230
Other	277	251	225	254	315
Official bilateral	960	636	760	978	1,168
Non-concessional[1]	201	147	90	898	839
2. Domestic debt	**1,868**	**1,997**	**3,133**	**3,819**	**4,020**
Banking system	1,402	1,755	2,431	2,598	2,588
Non-bank sector	466	242	637	785	920
Non-residents	0	0	66	437	363
Other[2]	0	0	0	0	149
3. Total public debt (1 + 2)	**8,315**	**8,345**	**5,310**	**7,405**	**8,055**
Memorandum items					
Total public debt[3]	**94.2**	**78.3**	**42.0**	**51.2**	**58.2**
External debt	73.1	59.6	17.2	24.8	29.2
Domestic debt	21.2	18.8	24.8	26.4	29.0

Source: 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.

II. BASELINE SCENARIO

A. Fiscal and oil sector assumptions

4.   **The baseline scenario features early correction of Ghana's large fiscal deficit**.
During 2009-10, the budget is strengthened by planned cuts in public spending, relative to
GDP, based on a rationalization of capital spending, efforts to contain wage bill expansion,
and the elimination of energy subsidies. At the same time, the revenue-to-GDP ratio is
projected to rise, reflecting the planned elimination of customs tariff and other tax

exemptions and rationalization of VAT thresholds and coverage. Moreover, government revenues are projected to receive a boost from the planned implementation of a single revenue authority for income, customs, and VAT tax collections. As a consequence, the fiscal deficit is projected to decline from 14½ percent of GDP in 2008 to 6 percent in 2010.[2]

5.   **The fiscal accounts also benefit from 2011 onwards from Ghana's projected move to oil producer status**. This is now more assured than a year ago, even if a declaration of commercial viability remains to be issued (as of mid-June 2009). The DSA baseline reflects planned production from the Jubilee I offshore oil field, but does not include possible gas production or production from other oil fields for which exploration is still underway. Oil production is assumed to average 120 thousand barrels per day during 2012-15, with a subsequent steady decline. Based on the latest WEO projections, the price of Ghana's oil exports would increase to US$83 per barrel by 2014; prices are assumed to stabilize at this level over the medium term in nominal terms. Oil revenues are projected to peak at about 6 percent of GDP during 2011-2017 (see Text Table). The government's incomes reflect a combination of income tax and royalty collections, production sharing agreements, and provision for an additional oil entitlement if favorable oil prices result in a rate of return in excess of specific thresholds. The latter element is tentatively projected to increase from under 1 percent of GDP during 2011-2018 to more than 1½ percent of GDP during 2019-25.

6.   **The DSA is strengthened, temporarily, by projected oil revenue savings**. The government is in the process of setting up a framework that would guide the utilization of oil resources. For purposes of this DSA, we assume that one-third of tax and royalty revenues would be saved, while two-thirds would be spent on growth-enhancing investment projects.[3] For the additional oil entitlement, which is a less predictable source of revenue, the DSA assumes that one-half is saved, with the remainder spent, as above, on investment projects. Oil savings are projected to reach a cumulative 6 percent of GDP by 2017, effectively reducing public sector net indebtedness.[4] The saved oil revenues would support spending over the long-term. When oil revenues begin a projected decline from 2019, spending would be sustained in part by drawing down the accumulated oil savings. The oil savings account would be depleted by 2028 and thereafter oil-related spending would be limited to about 1 percent of GDP, in line with residual oil revenues. Although the 2008 DSA baseline did not

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[2] The 8.5 percent of GDP reduction in the fiscal deficit during 2008-2010 is projected to occur through a 1.1 percent of GDP increase in revenues, 3.8 percent of GDP decline in expenditures, 0.1 percent of GDP reduction in arrears, and an additional 3.5 percent of GDP in fiscal measures.

[3] These projects are expected to address the key bottlenecks in developing the industrial and manufacturing capacity of Ghana, including transportation infrastructure, telecommunication, power and energy, as well enhancing the productivity of agriculture. Project selections would be guided by adequate cost-benefit analysis yielding high rates of return.

[4] The DSA assumes that oil savings are invested abroad and earn a yield in line with the U.S. dollar Libor interest rate.

include potential oil production, this possibility was examined in an alternative scenario.[5] This scenario assumed that oil revenues would be saved throughout the DSA period, in contrast to the assumption here that the revenue stream would be fully spent by the end of the DSA. As a result, the impact of oil production in the 2008 alternative scenario was more positive than in the DSA baseline prepared for this report.

Long-Term Fiscal Baseline, 2009-2029
(In percent of GDP)

	Pre-oil (2009-2010)	Oil surplus saved (2011-2018)	Oil savings consumed (2019-2029)
Revenues and grants, of which:	29.1	29.3	29.2
Non-oil revenues	23.6	20.7	25.0
Oil revenues	0.0	5.7	2.7
Of which: additional oil entitlement	0.0	0.8	1.4
Grants	5.5	2.9	1.5
Expenditures, of which:	37.2	33.0	33.3
Oil-financed projects	0.0	3.8	3.4
Other fiscal items, net[1]	-0.4	-1.8	-2.1
Overall balance	-7.7	-1.9	-2.0
Memorandum items:			
Non-oil balance	-7.7	-3.7	-1.3
Primary balance	-3.8	0.2	0.1
Net public debt (end-period)	66.6	44.2	36.1
Gross public debt	66.6	57.0	36.1
Oil savings balance (-)	0.0	12.8	0.0

[1] Arrears clearance, VAT refunds, and new fiscal measures in 2010 budget.

B. Macroeconomic assumptions

7.   The DSA baseline assumes prudent economic policies to foster stable macroeconomic conditions. A decline in inflation to single-digit levels and strong productivity growth would support broad-based growth in the non-extractive sectors (Box 1).

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[5] See Figure 4 of the 2008 DSA.

Box 1: Baseline Macroeconomic Assumptions

Real GDP growth: After averaging more than 6 percent annually during 2004-08, output growth is set to slow to below 5 percent during 2009-10 reflecting fiscal tightening and global slowdown. Real GDP would expand by about 20 percent in 2011 as oil production begins. In the nonoil sector, growth is projected to average 5-6 percent during 2012-29, reflecting broad-based non-mineral growth.

Inflation: Consumer price inflation exceeded 20 percent in the first quarter of 2009. A decline through 2009-2010 reflects slowing economic growth, fiscal tightening, and tight monetary policies. Over the medium term, inflation is expected to converge to the Bank of Ghana's target of 5 percent.

Government balances: The primary deficit is assumed to narrow to less than one percent of GDP over the long-term. Expenditures would remain broadly stable in relation to the GDP, with a reprioritization toward growth-oriented infrastructure investments financed by oil revenues. Foreign grant receipts are projected to decline relative to GDP as Ghana benefits from oil incomes, but this is more than offset by an increase in domestic revenues from non-oil taxation.

Current account balance: Over 2009-11, the current account deficit is projected to narrow but remain at double-digit level in relation to GDP, reflecting imported equipments for the new oil fields as well as projected government's infrastructure investment. Beyond that, the current account deficit would narrow to about 4-5 percent of GDP by the end of the forecasting period. This assumption is consistent with fundamental determinants of Ghana's domestic savings and investment, as explained in Box 2. Exports are projected to peak at 62.3 percent of GDP during 2012, boosted by oil production. During 2019-2029, declining oil exports are partly offset by strong growth in non-mineral exports, leaving exports at 47.4 percent of GDP in 2029.

Financing flows. Ghana's deficit in trade in goods and services is projected to remain in the 14-16 percent of GDP range. This would be financed, in large part, by private and public transfers averaging 14-15 percent of GDP, with a gradual decline in official transfers being offset by higher private transfers. Non-debt creating inflows (mainly comprising foreign direct investment) are projected to average about 10 percent of GDP during 2009-14, largely reflecting development of the oil and gas sector. The growth of the nonoil economy, including the expansion of services, is expected to attract foreign investment. As oil activity wanes, these inflows would gradually decline to 4-5 percent of GDP during the medium-to-long run, in line with the average for Sub-Saharan African countries.

Box 2: Fundamental Determinants of Ghana's Current Account Balance Norm

Economic theory suggests that the long-term external balance is influenced by the key fundamental determinants of domestic savings and investments. Below parameter estimates from a panel study are used to project Ghana's long-term current account deficit.[1]

		The Macroeconomic Balance Approach (dependent variable CA/GDP)				
	Pooled	Ghana		Trading partners	Pooled results	
	parameter	2011-18	2019-25	(four-year averages)	2011-18	2019-25
Fiscal balance (rel. to trading partners)	0.20	-3.2	-3.3	-1.8	-0.3	-0.3
Population growth rate (rel. to trading partners) 1/	-1.21	1.6	1.1	0.6	-1.1	-0.6
Initial NFA (from Lane and Milesi-Ferretti)	0.02	-79.0	-79.0		-1.6	-1.6
Oil balance to GDP (average 2005-08, WEO)	0.23	-2.0	-8.4		-0.5	-1.9
Per capita growth (rel. to trading partners)	-0.21	4.5	2.7	1.4	-0.6	-0.3
Current account norm					**-4.1**	**-4.7**

The above analysis suggests a current account deficit of about 4-5 percent of GDP in the medium-to-long-term. For comparison, the estimate for current account deficit norm in 2009 using the same methodology yielded 8.6 percent of GDP. The difference reflects a smaller fiscal deficit, slowing population growth, and a smaller oil import deficit.

[1] See Jaewoo Lee et al., "Exchange Rate Assessments: CGER Methodologies," Occasional Paper, No. 261, IMF, Washington DC, 2008.

C. External Debt Sustainability

8.   **The baseline displays stable external debt indicators, which remain well below the respective thresholds (Figure 1).[6]** These results show substantial improvement over the 2008 DSA where the external debt indicators gradually deteriorated over the medium-to-long run, although remaining below the respective thresholds. This substantial improvement partly reflects the inclusion of oil in the baseline scenario, which has the effect of increasing output and export levels.

9.   **The public sector external debt-to-GDP ratio is projected to rise modestly between 2008 and 2029** (from 29 to 33 percent of GDP). The increase would be somewhat larger in net present value terms (from 18 to 31 percent of GDP), reflecting an assumed increase in nonconcessional borrowing. The NPV of private external debt is projected to decline from 13.7 percent of GDP in 2008 to below 10 percent by 2029, as external financing would be increasingly in the form of non-debt creating direct investment inflows (Table 1).

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[6] The World Bank's Country Policy and Institutional Assessment (CPIA) rates Ghana as a strong performer. Under the joint IMF-World Bank debt sustainability framework, the corresponding indicative debt burden thresholds are 50 percent for the NPV of debt-to-GDP ratio, 200 percent for the NPV of debt-to-exports ratio, and 25 percent for the debt-service-to-exports ratio. See *Operational Framework for Debt Sustainability Framework in Low-Income Countries—Further Consideration*, available at www.imf.org and www.worldbank.org.

10.   **Increased borrowing at non-concessional terms raises the cost of servicing debt.**
As Ghana becomes more prosperous and moves to middle-income status, the structure of the
country's external financing is likely to change. In particular, reduced grant and concessional
financing would give way to borrowing at non-concessional terms, which is typically at
shorter maturity and higher cost (in the DSA, the average maturity of non-concessional
borrowing is 6 years and the assumed interest rate is 8 percent). A shift to non-concessional
funding would leave the debt-to-GDP ratio largely unaffected, while increasing the debt
service ratios (measured relative to exports and government revenues, see Figure 1). The
DSA assumes a high-case level of non-concessional borrowing of US$0.5 billion annually
during 2009-14.[7] While this overstates current non-concessional borrowing plans, it ensures
that the DSA is resilient to higher outturns. This approach also covers the risks that non-
concessional borrowing will adversely affect the grant element of new IDA financing.

D. Stress Testing and Alternative Scenarios

11.   **In the case of Ghana, standardized stress tests potentially overstate DSA risks**.
The standard stress tests for growth and export performance assume that outturns during
2010-2011 fall short of the historic average by one standard deviation. This represents a
dramatic revision to baseline projections for 2011, where growth and exports are both
projected to surge with the start of oil production.[8] Given the step-like profile of oil
production and exports—with a one-off increase in 2011 followed by broad stability for the
following five-year period, these stress tests effectively eliminate the benefits of the oil sector
from the DSA baseline. Indeed, the outcome is worse than a scenario without oil, since oil
exports are eliminated without reducing the imports that they would have financed.

12.   **The DSA is much more resilient when standardized tests are adjusted to reflect
the arrival of oil in 2011**. We applied the standardized shocks to the period 2009-10, yet
retaining the oil-induced acceleration in real growth and exports starting in 2011 (Figure 1
and Table 2). In these stress tests, all debt indicators would remain below their respective
thresholds, except for the debt service-to-revenue ratio, which would exceed the threshold
level by a modest amount toward the end of the projection period.

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[7] The PRGF provides for a maximum of US$300 million of new non-concessional borrowing through mid-2010
to finance oil and gas projects. This explains the difference in external debt-to-GDP figures with the staff report.

[8] Real GDP is projected to rise by 24 percent in 2011, while exports are projected to rise by 51 percent in dollar
terms.

E. Public Debt Sustainability

13.   **The baseline scenario shows that Ghana's net public debt would fall during the medium term from 73 percent of GDP in 2010 to 37 percent by 2029.**[9] This would return the debt ratio to below the recent post-MDRI low of 41 percent in 2006. The projected decline in debt-to-GDP ratio reflects a move to broad primary fiscal balance, which limits new debt creation, combined with sustained economic expansion (Table 3).

14.   **The DSA benefits from a projected decline in domestic borrowing.** In the baseline scenario, the present value of debt-to-GDP ratio benefits from a rebalancing from domestic to foreign debt, which has higher concessionality. A more balanced reduction in foreign and domestic debt would be associated with a less marked improvement in the present value of debt-to-GDP ratio and the debt service indicators. At the same time, a larger reduction in foreign debt would reduce vulnerability to exchange rate changes.

15.   **The favorable DSA depends on successful fiscal stabilization**. If the primary balance remains at projected 2009 levels (5 percent of GDP) throughout the DSA, the present value of debt would rise from 59 to 109 percent of GDP. The DSA is also sensitive to currency valuation, with a 30 percent depreciation raising the present value of debt-to-GDP ratio by 25 percentage points by the end of the projection period.

16.   **The DSA is relatively insensitive to oil price assumptions**. Alternative scenarios to explore the impact of different oil price assumptions produced little net change in the DSA baseline, though less favorable results are possible, depending on the assumptions. In a straightforward balance of payments projection, a lower global oil price would result in deterioration in the trade balance during 2011-15, when Ghana is a net oil exporter. But the trade balance would strengthen in the subsequent period, when Ghana shifts back to net oil importer status. As a result, Ghana's resort to additional external financing is limited in duration (2011-15), and offset by improvements in the balance of payments beyond 2015. At the level of the public sector, the DSA impact depends on how spending responds to lower oil revenues. The DSA baseline assumes that spending moves in line with oil revenues over the long term, constrained by the assumption that oil-related spending slows once the oil fund is depleted. If the government sought to maintain spending at higher levels, even in the absence of the necessary oil fund savings, the DSA would be less favorable.

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[9] The higher level compared to the IMF staff report figures reflect the additional nonconcessional borrowing included in the DSA analysis (para. 10).

III. CONCLUSIONS

17.   **The 2009 DSA shows an improvement from last year under the baseline for key debt indicators.**. This reflects a tighter fiscal stance over the DSA period than in last year's DSA, combined with the incorporation of oil production in the baseline for the first time. Debt ratios are projected to be broadly stable over the DSA period, rather than showing the deteriorating trend evident in the 2008 baseline. Moreover, while the debt service indicators rise, the trend is more favorable than in last year's baseline. The stress test results are generally favorable, once allowance is made for complications in applying standardized tests to the period in which oil production and exports are projected to start. As discussed in paragraph 12, the most extreme shocks are projected to leave the debt indicators well below threshold levels except for the debt service-to-revenue ratio, which would slightly exceed the 35 percent threshold.

18.   **Despite the baseline improvements, Ghana remains at moderate risk of debt distress due to short- and medium-term vulnerabilities from two key factors: oil revenues and fiscal performance.** Even with oil production, failure to reduce the large primary fiscal deficit and sustain this consolidation over the coming years would result in a much less favorable DSA outlook. The historic scenario, which reflects the looser fiscal stance in recent years, shows substantially higher debt-to-GDP and debt-service ratios, with the former quickly exceeding the threshold levels. Therefore, the ability to sustain fiscal consolidation over the medium to long term, and the potential to accelerate non-oil growth in the medium term while oil revenues increase have emerged as key risks to an otherwise favorable baseline.

19.   **The DSA depends closely on prudent macroeconomic management of oil wealth**. The baseline assumes that oil production is combined with strong private sector investment and sustained strong growth in the non-mineral sector, and continued export diversification. This will require judicious use of oil revenues in terms of the size and nature of additional public expenditure to limit Dutch disease effects. If the latter were to emerge as a problem, the DSA would be adversely impacted. The new oil fields currently under exploration could further improve the fiscal and growth performance in the baseline—though the premium on prudent management of oil revenues would be redoubled. To minimize these risks, it will be important to develop a strategy for using oil and gas revenues in a productive manner.

Table 1. Ghana.: External Debt Sustainability Framework, Baseline Scenario, 2006-2029 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical 0 Average	Standard 0 Deviation	Projections						2009-2014 Average	2019	2029	2015-2029 Average
	2006	2007	2008			2009	2010	2011	2012	2013	2014				
External debt (nominal) 1/	**33.3**	**39.2**	**42.8**	**94.4**	**46.5**	**57.2**	**63.4**	**57.3**	**56.8**	**55.8**	**53.5**	**57.3**	**49.1**	**40.2**	**46.6**
o/w public and publicly guaranteed (PPG)	17.2	24.8	29.2	79.7	46.4	41.5	47.7	44.1	43.9	43.3	41.4	43.7	38.5	33.5	37.2
Change in external debt	-41.6	5.9	3.6	-5.1	27.6	14.4	6.2	-6.1	-0.4	-1.0	-2.3	1.8	0.1	-1.2	-0.9
Identified net debt-creating flows	-6.8	1.3	9.1	1.8	27.7	3.1	0.8	-14.4	-4.9	-3.6	-3.5	-3.8	1.5	-1.1	0.1
Non-interest current account deficit	**9.2**	**11.7**	**18.5**	**6.2**	**6.3**	**11.8**	**14.7**	**8.3**	**7.1**	**8.3**	**4.9**	**9.2**	**8.4**	**2.4**	**6.5**
Deficit in balance of goods and services	24.9	27.1	34.2	21.4	6.6	26.3	28.8	13.8	12.3	13.9	11.2	17.7	19.4	15.4	17.9
Exports	40.2	40.1	44.0	40.9	4.6	52.2	54.4	61.8	62.3	60.7	59.2	58.4	52.1	47.4	51.0
Imports	65.1	67.2	78.1	62.3	8.1	78.4	83.2	75.6	74.7	74.6	70.3	76.1	71.5	62.8	68.9
Net current transfers (negative = inflow)	-16.0	-16.0	-16.5	-15.2	3.2	-14.5	-14.0	-13.5	-14.0	-14.4	-14.9	-14.2	-14.0	-13.3	-13.8
o/w official	-3.1	-3.7	-4.2	-3.7	1.0	-5.0	-4.0	-2.5	-2.5	-2.4	-2.4	-3.1	-1.0	-0.3	-0.8
Other current account flows (negative = net inflow)	0.3	0.6	0.8	0.4	0.4	0.0	-0.1	7.9	8.8	8.8	8.6	5.7	3.1	0.3	2.4
Net FDI (negative = inflow)	**-5.0**	**-5.7**	**-7.5**	**-2.5**	**2.5**	**-7.9**	**-12.4**	**-11.5**	**-9.4**	**-10.4**	**-7.0**	**-9.7**	**-6.0**	**-3.0**	**-5.7**
Endogenous debt dynamics 2/	**-11.1**	**-4.7**	**-1.8**	**-2.3**	**26.2**	**-0.8**	**-1.5**	**-11.2**	**-2.6**	**-1.6**	**-1.4**	**-3.2**	**-0.8**	**-0.5**	**-0.8**
Contribution from nominal interest rate	0.7	0.3	0.9	1.6	0.8	1.4	1.2	1.2	1.3	1.2	1.2	1.3	1.0	1.5	1.3
Contribution from real GDP growth	-4.1	-1.6	-2.7	-4.6	1.7	-2.2	-2.8	-12.4	-3.9	-2.8	-2.6	-4.4	-1.9	-2.0	-2.0
Contribution from price and exchange rate changes	-7.7	-3.4	0.0	0.7	26.4	...	...	...	...	...	...		...	...	
Residual (3-4) 3/	**-34.7**	**4.6**	**-5.6**	**-6.9**	**19.4**	**11.2**	**5.4**	**8.3**	**4.5**	**2.6**	**1.2**	**5.5**	**-1.4**	**-0.1**	**-0.9**
o/w exceptional financing	0.0	0.0	0.0	2.2	2.6	1.7	0.8	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
PV of external debt 4/	...	...	31.7	31.7		43.8	49.6	45.0	45.3	44.4	42.5	45.1	40.4	38.2	40.0
In percent of exports	...	...	72.0	72.0		84.0	91.1	72.7	72.6	73.2	71.8	77.6	77.6	80.6	78.7
PV of PPG external debt	**...**	**...**	**18.0**	**18.0**		**28.2**	**33.9**	**31.8**	**32.3**	**31.9**	**30.4**	**31.4**	**29.8**	**31.4**	**30.6**
In percent of exports	**...**	**...**	**41.0**	**41.0**		**54.0**	**62.3**	**51.4**	**51.9**	**52.6**	**51.4**	**53.9**	**57.2**	**66.2**	**60.3**
In percent of government revenues	**...**	**...**	**79.0**	**79.0**		**117.0**	**138.6**	**121.9**	**123.0**	**121.8**	**117.6**	**123.3**	**105.6**	**114.4**	**110.1**
Debt service-to-exports ratio (in percent)	17.8	9.8	10.8	20.9	6.4	9.9	10.4	8.7	9.4	9.9	10.7	9.8	12.4	18.4	15.1
PPG debt service-to-exports ratio (in percent)	**11.4**	**3.0**	**4.6**	**14.2**	**6.7**	**4.0**	**4.8**	**4.6**	**5.4**	**5.9**	**6.8**	**5.3**	**8.5**	**15.6**	**11.5**
PPG debt service-to-revenue ratio (in percent)	**20.8**	**5.3**	**8.9**	**32.3**	**19.9**	**8.7**	**10.8**	**10.9**	**12.9**	**13.7**	**15.6**	**12.1**	**15.7**	**27.0**	**20.9**
Total gross financing need (Billions of U.S. dollars)	1.4	1.5	2.5	1.3	0.7	1.5	1.2	0.4	0.7	0.9	1.0	0.9	2.8	5.9	3.6
Non-interest current account deficit that stabilizes debt ratio	50.8	5.8	14.9	11.7	26.4	-2.6	8.5	14.4	7.5	9.3	7.2	7.4	8.3	3.6	7.4
Key macroeconomic assumptions															
Real GDP growth (in percent)	6.4	5.7	7.3	5.3	1.1	4.5	5.0	24.2	7.1	5.3	5.0	8.5	4.1	5.4	4.6
GDP deflator in US dollar terms (change in percent)	11.5	11.4	0.1	3.9	15.8	-14.4	-1.5	-0.8	-1.0	2.1	2.7	-2.2	2.9	4.7	3.3
Effective interest rate (percent) 5/	1.1	1.1	2.4	1.7	0.4	2.9	2.2	2.4	2.3	2.3	2.3	2.4	2.3	4.1	2.9
Growth of exports of G&S (US dollar terms, in percent)	30.7	17.5	17.8	11.3	10.7	6.2	7.8	40.0	6.9	4.6	5.2	11.8	4.7	8.9	6.5
Growth of imports of G&S (US dollar terms, in percent)	25.2	21.5	24.9	14.5	14.1	-10.2	9.6	12.0	4.7	7.3	1.7	4.2	6.9	7.5	7.2
Grant element of new public sector borrowing (in percent)	...	...	...			22.5	22.0	20.4	19.6	17.2	18.7	20.1	4.4	-5.6	1.8
Government revenues (excluding grants, in percent of GDP)	21.9	22.7	22.8	19.7	3.5	24.1	24.4	26.1	26.3	26.2	25.8	25.5	28.2	27.4	27.8
Aid flows (in Billions of US dollars) 7/	0.7	0.9	0.7	0.4	0.3	1.5	1.3	1.2	1.0	1.1	1.1	1.2	1.1	1.3	1.1
o/w Grants	0.7	0.9	0.7	0.4	0.3	0.9	0.7	0.6	0.6	0.7	0.7	0.7	0.6	0.9	0.7
o/w Concessional loans	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.4	0.4	0.4	0.5	0.4	0.4	0.4
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			8.6	7.2	4.8	4.4	4.1	4.1	5.5	2.3	0.8	1.8
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			49.5	47.8	45.3	50.9	51.2	54.7	49.9	27.1	8.3	22.1
Memorandum items:															
Nominal GDP (Billions of US dollars)	12.7	15.0	16.1	9.5	4.0	14.4	14.9	18.3	19.4	20.9	22.5	18.4	30.9	72.0	42.3
Nominal dollar GDP growth	18.7	17.7	7.3	9.5	17.1	-10.6	3.4	23.2	6.0	7.5	7.8	6.2	7.1	10.4	8.1
PV of PPG external debt (in Billions of US dollars)			2.9	2.9		4.1	5.0	5.8	6.3	6.7	6.8	5.8	9.2	22.6	13.1
(PVt-PVt-1)/GDPt-1 (in percent)						**7.2**	**6.8**	**5.3**	2.5	1.9	0.9	4.1	3.2	3.1	2.6

Source: Staff simulations.

1/ Includes both public and private sector external debt.
2/ 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.
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, 2009-2029

(In percent)

	Projections							
	2009	2010	2011	2012	2013	2014	**2019**	2029

PV of debt-to GDP ratio

Baseline	28	34	32	32.3	31.9	30.4	**29.8**	31
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	28	34	43	49	53	56	**54**	57
A2. New public sector loans on less favorable terms in 2009-2029 2	28	36	36	38	38	37	**42**	49
B. Bound Tests								
B1. Real GDP growth at historic average minus one standard deviation in 2009-10	28	34	32	32	32	30	**30**	31
B2. Export value growth at historic average minus one standard deviation in 2009-10 3/	28	40	45	45	44	41	**35**	32
B3. US dollar GDP deflator at historic average minus one standard deviation in 2009-10	28	38	35	36	35	34	**33**	35
B4. Net non-debt-creating flows at historic average minus one standard deviation in 2009-10 4/	28	49	45	45	43	40	**34**	32
B5. Combination of B1-B4 using one-half standard deviation shocks	28	49	46	46	45	42	**36**	33
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	28	49	46	46	46	43	**43**	45

PV of debt-to-exports ratio

Baseline	54	62	51	52	53	51	**57**	66
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	54	63	70	78	88	95	**103**	121
A2. New public sector loans on less favorable terms in 2009-2029 2	54	67	58	60	63	63	**80**	103
B. Bound Tests								
B1. Real GDP growth at historic average minus one standard deviation in 2009-10	54	62	51	52	52	51	**57**	66
B2. Export value growth at historic average minus one standard deviation in 2009-10 3/	54	84	82	82	82	79	**76**	76
B3. US dollar GDP deflator at historic average minus one standard deviation in 2009-10	54	62	51	52	52	51	**57**	66
B4. Net non-debt-creating flows at historic average minus one standard deviation in 2009-10 4/	54	90	72	72	71	68	**66**	67
B5. Combination of B1-B4 using one-half standard deviation shocks	54	89	73	74	73	70	**68**	68
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	54	62	51	52	52	51	**57**	66

PV of debt-to-revenue ratio

Baseline	117	139	122	123	122	118	**106**	114
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	117	140	165	186	204	218	**191**	208
A2. New public sector loans on less favorable terms in 2009-2029 2	117	149	137	143	145	145	**148**	177
B. Bound Tests								
B1. Real GDP growth at historic average minus one standard deviation in 2009-10	117	139	122	123	122	118	**106**	115
B2. Export value growth at historic average minus one standard deviation in 2009-10 3/	117	165	172	172	168	160	**125**	116
B3. US dollar GDP deflator at historic average minus one standard deviation in 2009-10	117	155	136	137	135	131	**117**	127
B4. Net non-debt-creating flows at historic average minus one standard deviation in 2009-10 4/	117	200	171	171	165	156	**122**	116
B5. Combination of B1-B4 using one-half standard deviation shocks	117	199	175	176	170	161	**126**	119
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	117	199	175	176	174	168	**151**	164

Table 2.Ghana: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2009-2029 (continued)

(In percent)

	Projections							
	2009	2010	2011	2012	2013	2014	**2019**	2029
Debt service-to-exports ratio								
Baseline	4	5	5	5.4	5.9	6.8	**8.5**	16
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	4	5	5	6	7	10	**15**	21
A2. New public sector loans on less favorable terms in 2009-2029 2	4	5	3	3	3	3	**6**	21
B. Bound Tests								
B1. Real GDP growth at historic average minus one standard deviation in 2009-10	4	5	5	5	6	7	**8**	16
B2. Export value growth at historic average minus one standard deviation in 2009-10 3/	4	5	6	7	9	11	**12**	18
B3. US dollar GDP deflator at historic average minus one standard deviation in 2009-10	4	5	5	5	6	7	**8**	16
B4. Net non-debt-creating flows at historic average minus one standard deviation in 2009-10 4/	4	5	6	6	9	9	**11**	16
B5. Combination of B1-B4 using one-half standard deviation shocks	4	5	6	7	9	10	**11**	16
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	4	5	5	5	6	7	**8**	16
Debt service-to-revenue ratio								
Baseline	9	11	11	12.9	13.7	15.6	**15.7**	27
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	9	10	12	15	17	22	**28**	36
A2. New public sector loans on less favorable terms in 2009-2029 2	9	11	6	7	7	8	**11**	37
B. Bound Tests								
B1. Real GDP growth at historic average minus one standard deviation in 2009-10	9	11	11	13	14	16	**16**	27
B2. Export value growth at historic average minus one standard deviation in 2009-10 3/	9	11	12	15	18	22	**20**	27
B3. US dollar GDP deflator at historic average minus one standard deviation in 2009-10	9	12	12	14	15	17	**17**	30
B4. Net non-debt-creating flows at historic average minus one standard deviation in 2009-10 4/	9	11	13	15	20	22	**20**	27
B5. Combination of B1-B4 using one-half standard deviation shocks	9	11	14	16	20	22	**21**	28
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	9	15	16	18	20	22	**22**	39
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	-4.5	-4.0	-3.6	-3.1	-2.8	-2.6	-1.2	0.0

Source: Staff projections and simulations.

1/ Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.
2/ Assumes that the interest rate on new borrowing is by 2 percentage points higher than in the baseline., while grace and maturity periods are the same as in the baseline.
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).
4/ Includes official and private transfers and FDI.
5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.
6/ Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.

Figure 1. Ghana: Indicators of Public and Publicly Guaranteed External Debt under
Alternatives Scenarios, 2009-2029 1/
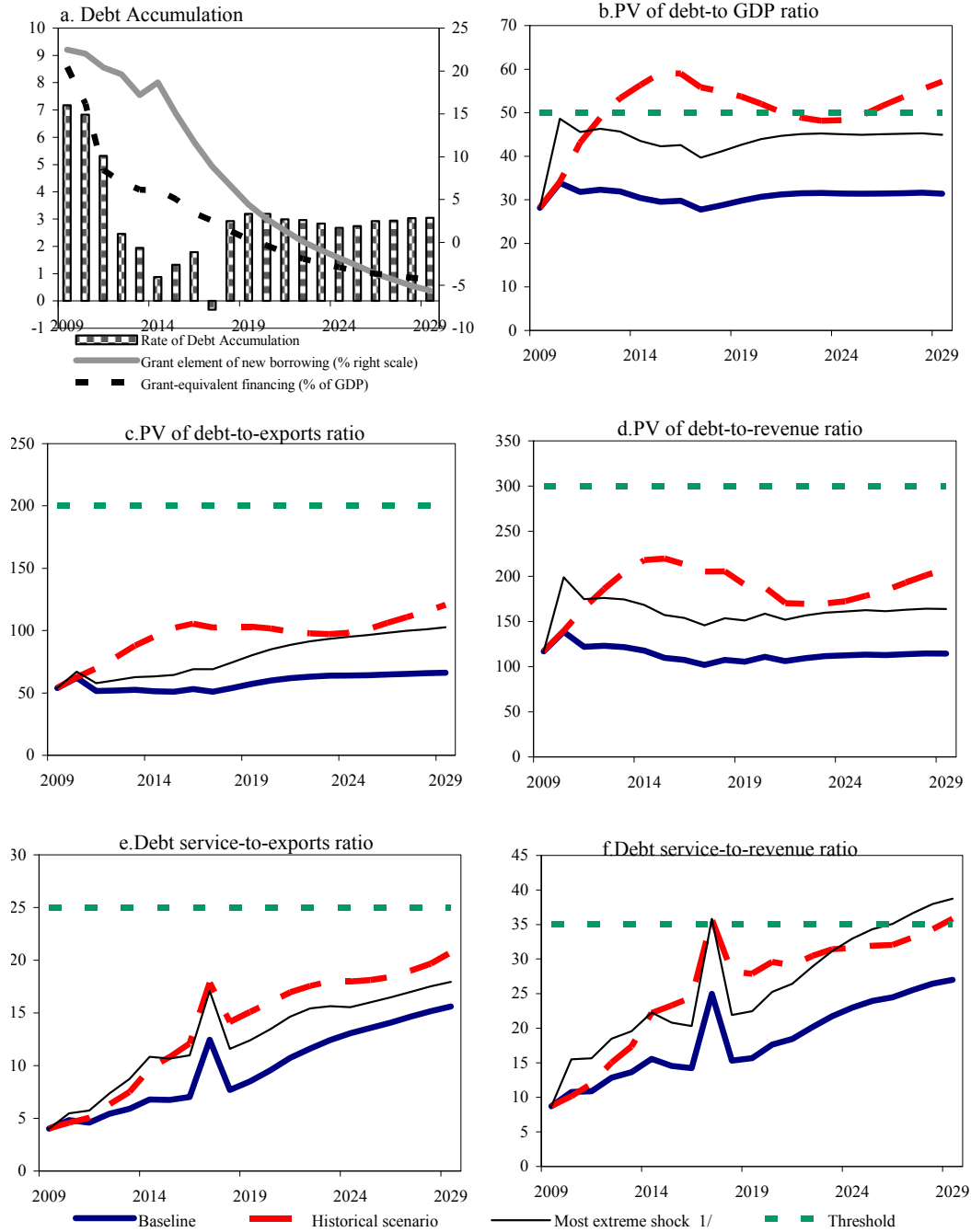
Source: Staff projections and simulations.

1/ The most extreme stress test is the test that yields the highest ratio in 2019. 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 Exports shock and in picture f. to a One-time depreciation shock

Table 3. Ghana: Public Sector Debt Sustainability Framework, Baseline Scenario, 2006-2029
(In percent of GDP, unless otherwise indicated)

	Actual 2006	Actual 2007	Actual 2008	Average	Standard Deviation	Estimate 2009	2010	2011	2012	2013	2014	2009-14 Average	2019	2029	2015-29 Average
Public sector debt 1/	42.0	51.2	58.2	104.6	46.7	70.0	72.6	63.1	60.4	57.6	54.6	63.1	44.2	36.3	41.4
o/w foreign-currency denominated	17.2	24.8	29.2	79.7	46.4	41.5	47.7	44.1	43.9	43.3	41.4	43.7	38.5	33.5	37.2
Change in public sector debt	-36.3	9.1	7.0	-4.7	27.7	11.8	2.6	-9.5	-2.6	-2.8	-3.1	-0.6	-1.3	-1.5	-1.2
Identified debt-creating flows	-5.8	0.8	4.1	-0.5	29.2	4.7	-1.3	-12.1	-3.0	-2.9	-2.8	-2.9	-2.2	-2.2	-1.9
Primary deficit	4.2	6.1	10.7	3.6	3.8	5.3	2.4	0.7	-0.2	-0.1	0.0	1.4	-0.4	-0.4	-0.2
Revenue and grants	27.3	28.8	27.5	24.1	5.4	30.1	29.4	29.4	29.6	29.5	29.1	29.5	30.2	28.7	29.6
of which: grants	5.4	6.1	4.7	4.4	2.2	6.0	5.0	3.3	3.3	3.3	3.3	4.0	2.0	1.3	1.8
Primary (noninterest) expenditure	31.5	34.9	38.1	27.6	5.9	35.5	31.8	30.2	29.4	29.4	29.1	30.9	29.7	28.3	29.4
Automatic debt dynamics	-9.2	-3.8	-0.5	-2.9	27.7	0.0	-3.2	-12.4	-2.4	-2.6	-2.8	-3.9	-1.8	-1.9	-1.7
Contribution from interest rate/growth differential	-5.1	-2.9	-3.9	-5.6	2.1	-2.9	-2.7	-12.7	-2.8	-2.6	-2.5	-4.4	-1.4	-1.0	-1.2
of which: contribution from average real interest rate	-0.4	-0.7	-0.5	-0.4	1.2	-0.4	0.6	1.4	1.4	0.4	0.3	0.6	0.4	1.0	0.6
of which: contribution from real GDP growth	-4.7	-2.3	-3.5	-5.2	1.5	-2.5	-3.3	-14.1	-4.2	-3.0	-2.8	-5.0	-1.8	-1.9	-1.9
Contribution from real exchange rate depreciation	-4.1	-0.9	3.4	2.7	26.7	2.9	-0.4	0.4	0.3	0.0	-0.3	0.5	...	...	-0.2
Other identified debt-creating flows	-0.8	-1.5	-6.1	-1.1	1.9	-0.6	-0.6	-0.4	-0.3	-0.3	0.0	-0.4	0.0	0.0	0.0
Privatization receipts (negative)	0.0	-0.8	-5.7	-0.7	1.8	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	0.0	0.0	0.0	0.0
Debt relief (HIPC and other)	-0.8	-0.7	-0.4	-0.4	0.5	-0.6	-0.6	-0.4	-0.3	-0.3	0.0	-0.4	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	-30.5	8.3	3.0	-4.3	13.6	7.1	4.0	2.5	0.4	0.1	-0.3	2.3	0.8	0.7	0.7
Other Sustainability Indicators															
PV of public sector debt	24.8	26.4	50.0	26.9	9.2	58.9	60.2	51.8	49.2	46.7	44.0	51.8	35.9	34.6	35.2
o/w foreign-currency denominated	0.0	0.0	21.0	2.3	7.0	30.4	35.3	32.8	32.7	32.3	30.8	32.4	30.2	31.8	31.0
o/w external	...	...	21.0	21.0		30.4	35.3	32.8	32.7	32.3	30.8	32.4	30.2	31.8	31.0
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...	...	...	...	...
Gross financing need 2/	16.5	16.8	22.5	19.0	4.0	18.0	15.4	11.6	10.2	9.1	9.9	12.4	11.2	8.3	10.3
PV of public sector debt-to-revenue and grants ratio (in percent)	90.7	91.5	182.0	97.1	49.3	195.5	204.5	176.0	166.3	158.5	151.0	175.3	119.1	120.6	119.1
PV of public sector debt-to-revenue ratio (in percent)	113.2	116.0	219.2	118.5	57.3	244.5	246.3	198.3	187.4	178.3	170.2	204.1	127.4	126.1	126.8
o/w external 3/	...	...	91.8	91.8		126.3	144.4	125.6	124.4	123.4	119.2	127.2	107.1	116.0	111.6
Debt service-to-revenue and grants ratio (in percent) 4/	30.7	19.3	24.1	49.9	27.7	22.4	23.5	21.0	20.6	18.3	20.4	21.0	23.1	27.5	25.4
Debt service-to-revenue ratio (in percent) 4/	38.4	24.5	29.0	58.5	28.0	28.0	28.3	23.7	23.2	20.6	23.0	24.5	24.8	28.8	27.0
Primary deficit that stabilizes the debt-to-GDP ratio	40.5	-3.1	3.6	13.7	23.5	-6.5	-0.2	10.3	2.4	2.7	3.1	2.0	0.9	1.1	1.0
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	6.4	5.7	7.3	5.3	1.1	4.5	5.0	24.2	7.1	5.3	5.0	8.5	4.1	5.4	4.6
Average nominal interest rate on forex debt (in percent)	1.4	2.1	3.8	1.9	0.9	4.3	3.1	3.2	3.0	2.9	2.9	3.2	2.9	5.0	3.6
Average real interest rate on domestic debt (in percent)	3.4	-2.4	-3.4	0.7	4.9	-4.3	-0.9	3.4	5.1	-0.1	-0.8	0.4	0.6	0.3	0.9
Real exchange rate depreciation (in percent, + indicates depreciation)	-7.4	-5.2	14.6	-7.2	10.4	10.0	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	12.8	13.9	16.9	20.0	7.7	17.2	11.0	6.7	3.1	4.6	5.5	8.0	5.7	7.6	6.1
Growth of real primary spending (deflated by GDP deflator, in percent)	0.2	0.2	0.2	0.1	0.1	0.0	-0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Oil Fund assets (percent of GDP; end of period)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	6.8	11.6	13.4	0.0	6.4
Grant element of new external borrowing (in percent)	...	...	...	...	...	22.5	22.0	20.4	19.6	17.2	18.7	20.1	4.4	-5.6	...

Sources: Country authorities; and Fund staff estimates and projections.
1/ [Indicate coverage of public sector, e.g., general government or nonfinancial public sector. Also whether net or gross 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.

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Table 4. Ghana: Sensitivity Analysis for Key Indicators of Public Debt 2009-2029

	Projections							
	2009	2010	2011	2012	2013	2014	2019	2029

PV of Debt-to-GDP Ratio

Baseline	59	60	52	49	47	44	36	35

A. Alternative scenarios

A1. Real GDP growth and primary balance are at historical averages	59	61	65	66	66	66	73	90
A2. Primary balance is unchanged from 2009	59	63	58	61	63	65	85	113
A3. Permanently lower GDP growth 1/	59	60	52	50	48	45	42	50

B. Bound tests

B1. Real GDP growth at historic average minus one standard deviation in 2009-10	59	61	52	50	48	45	40	41
B2. Primary balance is at historical average minus one standard deviations in 2009-10	59	65	56	53	51	48	42	41
B3. Combination of B1-B2 using one half standard deviation shocks	59	63	54	52	49	47	41	40
B4. One-time 30 percent real depreciation in 2010	59	74	63	60	57	55	51	61
B5. 10 percent of GDP increase in other debt-creating flows in 2010	59	70	60	57	54	51	45	43

PV of Debt-to-Revenue Ratio 2/

Baseline	196	204	176	166	158	151	119	121

A. Alternative scenarios

A1. Real GDP growth and primary balance are at historical averages	196	208	215	218	220	222	241	313
A2. Primary balance is unchanged from 2009	196	214	199	206	214	224	281	392
A3. Permanently lower GDP growth 1/	196	205	177	168	161	156	140	174

B. Bound tests

B1. Real GDP growth at historic average minus one standard deviation in 2009-10	196	206	178	169	162	155	134	143
B2. Primary balance is at historical average minus one standard deviations in 2009-10	196	221	190	180	172	165	140	142
B3. Combination of B1-B2 using one half standard deviation shocks	196	215	185	175	167	160	136	141
B4. One-time 30 percent real depreciation in 2010	196	251	214	202	194	187	170	211
B5. 10 percent of GDP increase in other debt-creating flows in 2010	196	237	203	192	184	176	150	148

Debt Service-to-Revenue Ratio 2/

Baseline	22	23	21	21	18	20	23	28

A. Alternative scenarios

A1. Real GDP growth and primary balance are at historical averages	22	23	25	25	24	28	35	47
A2. Primary balance is unchanged from 2009	22	23	22	22	22	27	38	55
A3. Permanently lower GDP growth 1/	22	24	21	21	19	21	24	32

B. Bound tests

|								
B1. Real GDP growth at historic average minus one standard deviation in 2009-10	22	24	21	21	19	21	24	29
B2. Primary balance is at historical average minus one standard deviations in 2009-10	22	24	23	23	20	23	24	29
B3. Combination of B1-B2 using one half standard deviation shocks	22	24	22	22	19	22	24	29
B4. One-time 30 percent real depreciation in 2010	22	26	26	27	25	29	35	53
B5. 10 percent of GDP increase in other debt-creating flows in 2010	22	23	23	24	22	24	25	30

Sources: Country authorities; and Fund staff estimates and projections.
1/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of the length of the projection period.
2/ Revenues are defined inclusive of grants.

Figure 2. Ghana: Indicators of Public Debt Under Alternative Scenarios, 2009-2029 1/
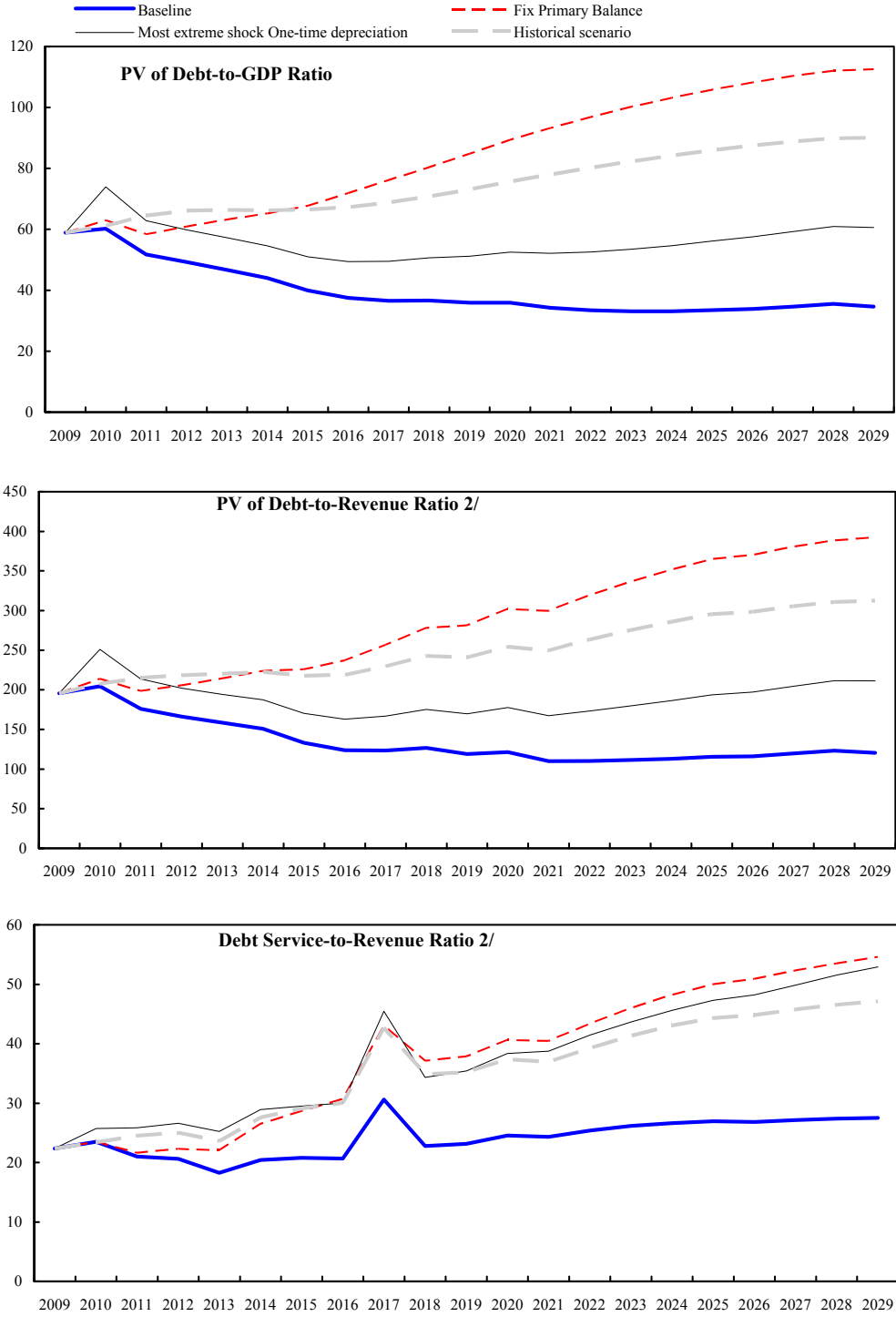
Sources: Country authorities; and Fund staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest ratio in 2019.
2/ Revenues are defined inclusive of grants.