

INTERNATIONAL DEVELOPMENT ASSOCIATION
INTERNATIONAL MONETARY FUND

GHANA

Joint Bank/Fund Debt Sustainability Analysis¹

Prepared by the staffs of the International Development Association
and the International Monetary Fund

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The external debt sustainability analysis (DSA) indicates that Ghana's external debt dynamics is subject to moderate risk of debt distress, and when taken together with domestic debt developments, the overall assessment suggests that Ghana's debt distress has increased compared to the 2007 DSA.² This results from the recent rapid accumulation of external and domestic public debt contracted on commercial terms, and high current account and fiscal deficits that expose the country to structural vulnerabilities in the event of a reversal of favorable terms of trade.

Two alternative scenarios are also examined in the Joint DSA. The first alternative scenario combines lower GDP growth but the same level of external borrowing projected under the baseline scenario. This scenario indicates that the risk of debt distress could become high if higher economic growth does not materialize. The second alternative scenario simulates the impact of recent oil discoveries on exports and economic growth. This second alternative scenario indicates that, if oil-related fiscal revenues are used efficiently, the risk of debt distress could become low.

A. BACKGROUND

- 1. The debt relief provided by the World Bank, IMF, and the AfDF under the Multilateral Debt Relief Initiative (MDRI) helped reduce Ghana's total public debt to**

¹ Prepared by IMF and World Bank staffs in collaboration with the Ghanaian Authorities.

² *Staff Guidance Note on the Application of the Joint Fund-Bank Debt Sustainability Framework for Low-Income Countries* (SecM2007-0226) and (SM/07/131).

about 42 percent of GDP in 2006 from 78 percent of GDP in 2005 (Table 1).³ Public external debt declined to US\$2,177 million at end-2006 (17 percent of GDP) from US\$6348 million in 2005 (59 percent of GDP). However, domestic debt increased to US\$3,133 million (25 percent of GDP) in 2006 from US\$1,997 million in 2005 (19 percent of GDP) on account of financing the rising fiscal deficit by issuing bonds with longer maturities in the domestic market.

Table 1. Ghana: Total Government Debt

	2003	2004	2005	2006	2007
	(In millions of US dollars)				
1. EXTERNAL DEBT	7,549	6,448	6,348	2,177	3,587
Multilateral Institutions	5,058	5,287	5,565	1,327	1,710
International Development Association (IDA)	3,965	4,012	4,336	803	1,137
International Monetary Fund (IMF)	453	447	424	158	167
African Development Bank Group (AfDB)	501	551	555	141	153
Other	139	277	251	225	254
Official bilateral	2,223	922	602	732	956
Commercial 1/	268	239	180	118	920
2. DOMESTIC DEBT	1,540	1,868	1,997	3,133	3,969
Banking System	899	1,402	1,755	2,431	2,748
Non-Bank sector	641	466	242	637	785
Non-residents	-	-	-	66	437
3. TOTAL GOVERNMENT DEBT (1 + 2)	9,089	8,315	8,345	5,311	7,556
	(in percent of GDP)				
Memorandum items					
Government Debt	119.1	93.7	77.8	41.7	49.8
External debt	99.0	72.6	59.2	17.1	23.7
Domestic debt	20.2	21.0	18.6	24.6	26.2

Source: Ministry of Finance and Bank of Ghana.

1/ Includes a bond placement in September 2007.

³ Initiative for Heavily Indebted Poor Countries (HIPC) and Multilateral Debt Relief Initiative—Status of Implementation (IDA/SecM2007-540) and (SM/07/310).

2. **Ghana's public and publicly guaranteed debt increased to about 50 percent of GDP at end-2007** to finance higher public investment, specifically the expansion of the country's electricity generation capacity and the development of the road network. Most of this new debt has been contracted on commercial terms (59 percent) in the international capital market, export credit agencies, and local-currency denominated government bonds. In particular, in September 2007, the authorities placed US\$750 million in Eurobonds with a coupon of 8.5 percent at 10-year maturity, which was sold at a spread of 387 basis points over U.S. Treasuries for the equivalent period. The remaining part of the new external public debt has been contracted on concessional terms with multilateral institutions and bilateral official creditors (Table 1).

B. MACROECONOMIC AND FINANCING ASSUMPTIONS

3. **The macroeconomic framework takes into consideration the impact of the planned fiscal adjustment on growth in 2008-2009, while it is assumed that the economy will return to sustained growth over the medium term.** The Joint DSA assumes continued macroeconomic stability over the medium term, the fiscal deficit decreases to 7 percent of GDP while access to external financing amounts to an average of 6 percent of GDP. Inflation projections take into consideration increasing oil and food prices in the international market in the short term, and the implementation of tight monetary policy under the central bank's inflation targeting framework (Box 1).

4. **Borrowing assumptions reflect the need to maintain a sizeable public investment program over the medium term.** Based on discussions with the authorities, gross concessional flows are assumed to remain at between 6 and 7 percent of GDP through 2013, while nonconcessional borrowing is expected to gradually increase to 3 percent of GDP over the same period on account of the implementation of the government's public investment program (Table 2). Interest rates reflect current IDA-blend terms for concessional borrowing and market conditions for commercial loans with borrowing rates at about 9 percent.

Box 1: Ghana: Baseline Scenario Macroeconomic Assumptions

Growth. Real GDP growth decelerates to 5.8 percent in 2009-10 due to fiscal adjustment and the impact of higher utility prices on the output of the manufacturing sector. Thereafter, the real GDP grows at an average of 6 percent over the period 2011-2028, driven by steady agricultural performance, stronger activity in the construction sector related to public capital expenditure, and investments in the mining sector.

Inflation. The inflation rate is projected to increase to 13.5 percent in 2008 on account of high oil and food prices and domestic demand pressures. Inflation is expected to decrease gradually to an average of about 9 percent in 2009-10. Over the medium term, and as result of tight monetary policy, inflation is projected to decrease to the long-term central bank target of 5 percent.

The fiscal deficit is assumed to decrease to an average of about 7 percent of GDP over the long-term. The partial elimination of subsidies in the electricity sector would help reduce the fiscal deficit to 7 percent of GDP in the long-term from 10.3 percent of GDP in 2008, while **tax revenue performance** would remain at about 25 percent of GDP due to the continuation of strong tax administration policies over the medium term.

External current account. The current account deficit will gradually decrease from 13.2 percent of GDP to about 9 percent of GDP over the medium term, as oil imports moderate and exports receipts increased due to a sustained growth effort in the cocoa and mining sectors. **The reserve coverage in months of imports** of goods and services (G&S) would gradually increase to 5 months in the long-term from its current level of 2 months of imports.

Exports of goods and services. Exports are projected to grow at an annual rate of 8 percent in the period 2008-15, and thereafter at 6 percent on average until 2028. Projections assume that mineral products and cocoa would continue to be the main Ghanaian exports over the long-term.

Remittances are assumed to reach a peak of about 13 percent of GDP in 2013 and remain at that level over the long term. **Foreign direct investment** is envisaged to average 7 percent of GDP over the projection period reflecting capital flows needed to maintain the production level and competitiveness of the mining sector in the long-term.

Official external grants are assumed to remain constant at about 3 percent of GDP over the long-term, while **concessional loan financing** is projected to decrease to about 1 percent of GDP over the long-term. In addition, it is assumed that **the sovereign bond** issued in September 2007 would be fully repaid in 2017, as originally scheduled.

Table 2. Ghana: Capital Flows (gross), 2008–2013
(In million of US dollars)

	Committed			Projected		
	2008	2009	2010	2011	2012	2013
I. Grants	596	704	787	872	939	1,024
<i>In percent of GDP</i>	3.4	3.7	3.9	3.9	3.9	3.8
II. Concessional borrowing	696	579	638	614	560	560
<i>In percent of GDP</i>	4.0	3.1	3.1	2.8	2.3	2.1
III. Commercial borrowing	125	205	272	320	570	820
<i>In percent of GDP</i>	0.7	1.1	1.3	1.4	2.3	3.1
Total External Financing (I + II + III)	1,417	1,488	1,696	1,806	2,070	2,404
<i>In percent of GDP</i>	8.1	7.9	8.3	8.2	8.5	9.0

Source: Ministry of Finance.

C. BASELINE SCENARIO

The external baseline DSA scenario shows that Ghana is at moderate risk of debt distress. The external and fiscal DSA assume decreasing fiscal deficit due to measures to reduce partially energy subsidies, the continuation of strong tax revenue performance, and macroeconomic stability. These efforts would in turn support the expansion of the private sector and sustain GDP growth over the medium-term.

External debt sustainability

5. **External debt burden indicators are below the thresholds in the baseline scenario, but all indicators steadily increase over the long term.**⁴ Ghana's external debt burden indicators remain below the established CPIA-dependent thresholds during the projection period, while these debt indicators increased over the long-term due to moderate GDP and export growth performance. All in all, external debt would increase from about 24 percent of GDP in 2007 to about 40 percent of GDP in 2028 reflecting increasing commercial financing.

⁴ The World Bank Country Policy and Institutional Assessment (CPIA) classifies Ghana as a strong performer. The debt burden thresholds for strong policy performers are 200, 50, and 300 for the NPV of debt in percent of exports, GDP, and revenue, respectively. Under the same strong policy classification, thresholds for debt service are 25 and 35 percent of exports and revenue, respectively.

6. **Ghana’s risk of debt distress is moderate, as stress tests show that debt burden indicators breach the thresholds in four out of five bound standard stress tests.**⁵ The stress tests indicate that some relevant shocks that breach the thresholds include a one-time 30 percent depreciation and contracting government debt in less favorable terms. In addition, a stress test that reduces non-debt creating flows, including current transfers and FDI, to their historical average level minus one standard deviation increases the NPV of debt-to-GDP ratio close to or above the thresholds for the period 2012-2020.⁶ The same type of shock would increase the debt service-to-exports ratio above its indicative threshold of 25 percent. The deterioration of these indicators under a non-debt creating shock illustrates the relevance of FDI and remittances to maintaining long term external stability, and the urgency of implementing structural reforms that could help sustain higher economic growth than the one projected in this DSA.

Public debt sustainability

7. **The baseline scenario shows that Ghana’s total public debt increases from about 50 percent of GDP in 2007 to 81 percent of GDP in 2028.** This increase in public debt is well above the authorities’ reference level of 60 percent of GDP, as indicated in the 2008 Budget Act. The NPV of debt-to-revenue and grants ratio would increase from about 166 percent in 2008 to 281 percent in 2028, as a result of a protracted fiscal adjustment due to high government expenditure in 2008-2014 in spite of strong tax revenue performance.

8. **Sensitivity analysis suggests that maintaining the current fiscal stance would result in a sharp increase across all debt indicators and high fiscal vulnerability.** If the primary balance remains at its projected 2008 level (7.4 percent of GDP), the NPV of debt-to-GDP ratio would triple in a twenty-year period (rising from 46 percent in 2008 to 134 percent in 2028), while the NPV of debt-to-revenue ratio would increase to 464 percent from 166 percent over the same period. In addition, the debt service-to-revenue ratio would increase up to 69 percent in 2028 from 26 percent in 2008, if the primary deficit is maintained at its 2008 level. Overall, stress tests indicate that fiscal adjustment and a prudent debt management and debt policy strategy need to be implemented to preserve debt sustainability in the long-term.

⁵ The *Staff Guidance Note on the Application of the Joint Fund-Bank Debt Sustainability Framework for Low-Income Countries (SecM2007-0226)* and (SM/07/131) defines a “moderate risk of debt distress” when: “alternative scenarios or stress tests result in a significant rise in debt-service indicators over the projection period, the nearing or breaching of debt or debt-service thresholds, even though the baseline scenario does not indicate a breach of the relevant thresholds.”

⁶ The time series on FDI shows a structural permanent increase starting in 2003. As a result of this analysis, the stress test on lower non-debt creating flows was estimated by using an FDI historical average based on 5-year period (2003-2007), rather than the standard 10-year period.

D. ALTERNATIVE SCENARIOS

Two alternative scenarios are briefly described in this section. The first scenario illustrates the impact of lower real GDP growth rate if, for instance, the planned increase in public investment are not adequately selected or implemented. The second scenario shows the impact of oil exports on growth and debt sustainability. This second scenario is based on preliminary estimates of crude oil exports with a 90 percent confidence and their likely impact on fiscal revenue.

ALTERNATIVE SCENARIO: LOW-GDP-GROWTH WITH BASELINE BORROWING

9. **If the actual GDP growth rate is lower than in the baseline scenario, the risk of debt distress would be high.** This alternative scenario illustrates what could happen if borrowing is contracted as projected in the baseline scenario, but GDP growth remains at a low level because low-return projects were selected. Under these circumstances, external debt increases to about 57 percent of GDP in 2028 (compare to 40 percent of GDP in the baseline). This result underscores the importance of having a debt management strategy that is complemented by an institutional framework that elicits the selection of high return public projects with significant impact on productivity and economic growth.

10. **Under this low growth-baseline borrowing scenario, external debt burden indicators breach the indicative policy thresholds under stress tests.** A stress test in which government borrowing is contracted under less favorable financial terms would increase the NPV of external debt-to-GDP ratio to 90 percent in 2028 from 20 percent in 2008 breaching the 50 percent threshold for strong performers. Under the same type of stress test, the NPV of debt-to-exports ratio increases to about 222 percent in 2028 from 45 percent in 2008. Overall, the external DSA in the low-GDP-growth scenario shows a more vulnerable economy to changes in the financing terms for the government.

11. **Sensitivity analysis under the low-GDP-growth scenario indicates that total public debt is significantly vulnerable to a fiscal shock.** If the primary balance remains at its projected 2008 level, the NPV of debt-to-GDP ratio would increase to 131 percent in 2028 from 33 percent in 2008, while the NPV of debt-to-revenue and grants ratio would increase to 447 percent from about 116 percent under the same type of shock. In addition, the debt service-to-revenue ratio would increase up to 107 percent in 2028 from 26 percent in 2008. Overall, stress tests in the low-growth scenario show that fiscal efforts and sound debt management are required to avoid a fast accumulation of total government debt.

OIL SCENARIO⁷

12. **The recent oil discoveries in Ghana would create a new exporting sector that has the potential of guaranteeing much needed additional fiscal resources to achieve MDGs and to finance higher growth.** Preliminary estimates of the oil discoveries indicate that oil reserves could be at about 500 million of barrels, and when they are commercially exploited could generate additional fiscal revenues (including taxes, royalties, and direct participation on production) of about 3 to 4 percent of GDP on average for the next 20- to 30-year period. Thus, oil exports might help finance growth, achieve export diversification, and reach MDGs, if resources are used efficiently.⁸

13. **The oil scenario shows that debt burden indicators improve considerably over the long term.** The main result of the oil export scenario is that the NPV of external-debt-to-GDP ratio converges to about 9 percent of GDP in 2028 and NPV of external-debt-to-export ratio decreases to 34 percent. Oil production would definitely improve the macroeconomic situation in Ghana, as the NPV of total government debt would decrease to about 70 percent of GDP in 2028 (Table 3). All in all, Ghana's risk of debt distress could be classified as low in the oil scenario, as all stress test indicators remain below the indicative debt burden thresholds.

⁷ At present, oil reserves have not yet been declared commercially viable. The IMF and the World Bank are working with a prudent size of oil reserve projection, which, according to oil experts, has a 90 percent confidence of being declared commercially viable. Also, the projections assume that oil revenues are used entirely to retire public debt rather than to finance additional public spending. Other aspects about the oil sector can be found on the annex to this supplement.

⁸ Appendix I describes the methodology used to incorporate the oil sector into the macroeconomic framework, oil production assumptions, and its related fiscal impact on revenues and financing needs.

Table 3. Ghana: External Debt Sustainability Indicators under Alternative Scenarios

	Thresholds	2008	2018	2028
Baseline Scenario				
NPV of Debt to GDP ratio	50	20	35	40
NPV of debt to exports ratio	200	45	109	150
Debt service to exports ratio	25	3	11	23
Low-GDP-growth Scenario				
NPV of Debt to GDP ratio		20	38	56
NPV of debt to exports ratio		45	122	185
Debt service to exports ratio		3	12	29
Oil-exporting Scenario				
NPV of Debt to GDP ratio		20	22	9
NPV of debt to exports ratio		45	69	34
Debt service to exports ratio		3	9	7

Source: DSA estimates.

F. CONCLUSIONS

14. *The external DSA indicates that Ghana's external debt dynamics is subject to moderate risk of debt distress, and when taken together with domestic debt developments, the overall assessment suggests that Ghana's debt distress has increased compared to the 2007 DSA.*⁹ This results from the recent rapid accumulation of external and domestic public debt contracted on commercial terms, and high current account and fiscal deficits that exposed the country to structural vulnerabilities in the event of a reversal of favorable terms of trade. The alternative scenario of low growth-baseline borrowing also indicates that debt sustainability could deteriorate significantly, if higher economic growth does not materialize. Under an alternative oil scenario and assuming efficient use of additional oil-related fiscal revenues, the risk of debt distress could become low.

⁹ Staff Guidance Note on the Application of the Joint Fund-Bank Debt Sustainability Framework for Low-Income Countries (SecM2007-0226 and SM/07/131).

15. **Stress tests applied to total public debt underscore the need of maintaining a sound fiscal policy and the urgency of implementing structural reforms aimed at achieving higher growth and diversification of exports.** While diversifying exports and implementing structural reforms would contribute toward reducing Ghana's external vulnerabilities, these should be complemented by the implementation of prudent debt management and debt strategy policies as well as developing a sound institutional framework for selecting high-return public investment projects. Implementing these policies is critical to help preserve debt sustainability.

Table 2. Ghana: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, 2007-28
(In percent)

	2008	2009	2010	2011	2012	Projections						
						2013	2014	2015	2016	2017	2018	2028
NPV of debt-to-GDP ratio												
Baseline	20	21	23	24	25	27	29	31	33	33	35	40
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2008-27 1/	20	14	11	8	7	8	8	10	11	11	12	20
A2. New public sector loans on less favorable terms in 2008-27 2/	20	22	25	28	31	34	37	41	44	45	48	62
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	20	21	23	25	26	28	30	32	34	34	36	41
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	20	24	32	33	34	36	37	38	40	39	40	41
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	20	24	30	32	34	36	39	41	44	44	46	53
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	20	34	48	48	49	50	50	50	51	49	49	44
B5. Combination of B1-B4 using one-half standard deviation shocks	20	29	42	43	44	45	46	48	49	48	49	48
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	20	30	32	34	36	38	41	44	47	47	49	56
NPV of debt-to-exports ratio												
Baseline	45	48	53	57	63	71	80	89	98	101	109	150
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2007-26 1/	45	32	25	20	19	20	23	28	33	33	38	76
A2. New public sector loans on less favorable terms in 2007-26 2/	45	51	59	66	77	89	102	116	129	137	149	235
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	45	48	53	57	63	71	80	89	98	101	109	150
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	45	60	86	90	98	107	117	126	135	137	145	179
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	45	48	53	57	63	71	80	89	98	101	109	150
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	45	77	111	115	121	130	137	143	149	149	154	166
B5. Combination of B1-B4 using one-half standard deviation shocks	45	64	87	91	98	106	115	122	130	132	138	164
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	45	48	53	57	63	71	80	89	98	101	109	150
NPV of debt-to-revenue ratio												
Baseline	85	89	94	96	100	106	114	122	130	130	137	154
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2007-26 1/	85	59	44	34	30	30	33	38	44	43	48	77
A2. New public sector loans on less favorable terms in 2007-26 2/	85	94	106	113	122	134	146	159	172	177	187	241
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	85	90	97	99	103	110	118	126	134	134	141	159
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	85	103	134	134	136	140	146	151	156	154	159	169
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	85	102	125	128	133	141	152	162	172	173	182	205
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	85	143	199	196	194	195	197	197	198	193	193	170
B5. Combination of B1-B4 using one-half standard deviation shocks	85	124	173	172	173	177	182	187	191	188	191	186
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	85	126	133	136	142	150	161	173	184	184	194	218
(In percent)												
Debt service-to-exports ratio												
Baseline	3	2	3	3	4	4	5	7	8	15	11	23
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2008-27 1/	3	2	2	1	2	2	2	2	3	9	5	13
A2. New public sector loans on less favorable terms in 2008-27 2/	3	2	3	3	4	4	5	6	8	14	10	31
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	3	2	3	3	4	4	5	7	8	15	11	23
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	3	3	3	5	6	7	8	10	12	20	15	27
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	3	2	3	3	4	4	5	7	8	15	11	23
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	3	2	4	6	7	8	10	13	15	21	17	25
B5. Combination of B1-B4 using one-half standard deviation shocks	3	3	3	5	6	6	8	10	12	19	15	25
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	3	2	2	3	4	4	5	7	8	15	11	23
Debt service-to-revenue ratio												
Baseline	6	5	5	5	6	7	8	9	11	19	14	23
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2008-27 1/	6	5	3	2	3	3	3	3	4	11	6	13
A2. New public sector loans on less favorable terms in 2008-27 2/	6	5	5	5	6	6	7	8	10	18	13	32
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	6	5	5	5	6	7	8	9	11	20	14	24
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	6	5	5	7	8	9	10	13	14	22	17	24
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	6	5	6	7	8	9	10	12	15	26	19	31
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	6	5	7	10	11	12	15	18	19	27	21	26
B5. Combination of B1-B4 using one-half standard deviation shocks	6	5	7	9	10	11	13	16	18	27	21	28
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	6	6	7	7	9	9	11	13	16	27	20	33
<i>Memorandum item.</i>												
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	36	27	27	24	14	7	3	0	-3	-5	-6	-15

Source: Staff projections and simulations.

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

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

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

4/ Includes official and private transfers and FDI.

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

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

Table 3. Ghana: Public Sector Debt Sustainability Framework, Baseline Scenario, 2005-2028
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 5/ ⁵	Standard Deviation 5/ ⁵	Estimate						Projections		2014-28 Average	
	2005	2006	2007			2008	2009	2010	2011	2012	2013	2008-13 Average	2018		2028
Public sector debt 1/	77.1	41.9	49.8			51.4	56.2	60.1	63.1	65.5	67.1		73.9	81.0	
o/w foreign-currency denominated	59.2	17.1	23.7			24.8	26.7	28.9	30.4	31.7	33.2		38.6	39.6	
Change in public sector debt	...	-35.2	7.9			1.5	4.9	3.8	3.0	2.4	1.6		1.1	0.1	
Identified debt-creating flows	...	-5.5	0.5			0.9	4.3	3.3	2.5	2.0	1.3		0.9	0.1	
Primary deficit	-0.7	4.2	6.0	1.9	2.1	7.4	8.2	6.8	6.2	5.9	5.1	6.6	3.3	1.5	2.9
Revenue and grants	29.1	27.4	28.6			27.9	27.6	28.1	28.8	29.2	29.4		29.1	28.9	
of which : grants	5.2	5.4	6.0			4.9	3.9	4.1	4.1	4.0	3.9		3.6	3.1	
Primary (noninterest) expenditure	28.4	31.5	34.6			35.2	35.7	34.9	35.0	35.1	34.5		32.4	30.4	
Automatic debt dynamics	...	-8.9	-4.0			-5.1	-3.2	-3.2	-3.2	-3.5	-3.5		-2.4	-1.4	
Contribution from interest rate/growth differential	...	-4.8	-2.6			-3.8	-3.1	-3.2	-3.1	-3.2	-3.1		-2.1	-1.1	
of which : contribution from average real interest rate	...	-0.2	-0.2			-0.8	-0.3	-0.1	0.3	0.8	1.1		2.0	3.0	
of which : contribution from real GDP growth	...	-4.6	-2.5			-3.0	-2.8	-3.1	-3.4	-4.0	-4.2		-4.1	-4.1	
Contribution from real exchange rate depreciation	...	-4.1	-1.4			-1.3	-0.1	0.0	-0.2	-0.3	-0.4		...	...
Other identified debt-creating flows	-1.5	-0.8	-1.5			-1.4	-0.7	-0.3	-0.4	-0.4	-0.3		0.0	0.0	
Privatization receipts (negative)	-0.2	0.0	-0.8			-0.9	-0.3	0.0	0.0	0.0	0.0		0.0	0.0	
Recognition of implicit or contingent liabilities	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Debt relief (HIPC and other)	-1.2	-0.8	-0.6			-0.4	-0.4	-0.3	-0.4	-0.4	-0.3		0.0	0.0	
Other (specify, e.g. bank recapitalization)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes	...	-29.7	7.4			0.7	0.6	0.5	0.5	0.4	0.4		0.2	0.0	
NPV of public sector debt	37.8	42.6	45.7			46.2	50.5	53.8	56.4	59.0	61.0		70.2	81.0	
o/w foreign-currency denominated	19.9	17.8	19.6			19.6	21.0	22.6	23.8	25.2	27.1		34.9	39.7	
o/w external	19.9	17.8	19.6			19.6	21.0	22.6	23.8	25.2	27.1		34.9	39.7	
NPV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...
Gross financing need 2/	...	...	...			19.5	20.4	20.2	20.5	21.1	21.0		21.7	24.9	
NPV of public sector debt-to-revenue and grants ratio (in percent)	130.1	155.6	160.1			165.8	183.1	191.4	195.6	201.9	207.2		240.9	280.7	
NPV of public sector debt-to-revenue ratio (in percent)	158.8	194.2	203.0			200.8	213.7	223.8	228.0	233.9	239.2		275.3	314.3	
o/w external 3/	...	...	86.9			85.2	88.7	94.1	96.2	100.1	106.2		136.7	153.9	
Debt service-to-revenue and grants ratio (in percent) 4/	12.5	12.3	10.9			25.7	23.3	25.2	25.8	27.5	28.6		36.1	48.8	
Debt service-to-revenue ratio (in percent) 4/	15.3	15.4	13.8			31.1	27.2	29.4	30.1	31.9	33.0		41.3	54.6	
Primary deficit that stabilizes the debt-to-GDP ratio	...	39.3	-1.9			5.8	3.3	3.0	3.2	3.5	3.4		2.2	1.4	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	5.9	6.4	6.3	5.1	0.9	6.5	5.8	5.8	6.0	6.8	6.8	6.3	6.0	5.3	5.7
Average nominal interest rate on forex debt (in percent)	...	1.6	5.9	3.7	3.1	4.8	3.4	3.5	3.5	3.5	3.7	3.7	5.2	6.9	5.7
Average real interest rate on domestic currency debt (in percent)	...	4.1	-2.8	0.6	4.9	-5.8	-2.5	-1.8	-0.3	1.1	1.8	-1.3	2.7	2.8	2.6
Real exchange rate depreciation (in percent, + indicates depreciation)	-9.6	-7.5	-8.4	1.1	22.7	-5.7	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	15.0	12.8	14.4	20.1	7.7	16.2	10.4	9.4	8.0	6.5	5.9	9.4	5.0	5.0	5.2
Growth of real primary spending (deflated by GDP deflator, in percent)	2.3	18.3	16.6	10.1	13.6	8.5	7.3	3.3	6.3	7.0	5.0	6.2	4.6	4.6	4.8
Grant element of new external borrowing (in percent)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

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.

Table 4. Country: Sensitivity Analysis for Key Indicators of Public Debt 2008-2028

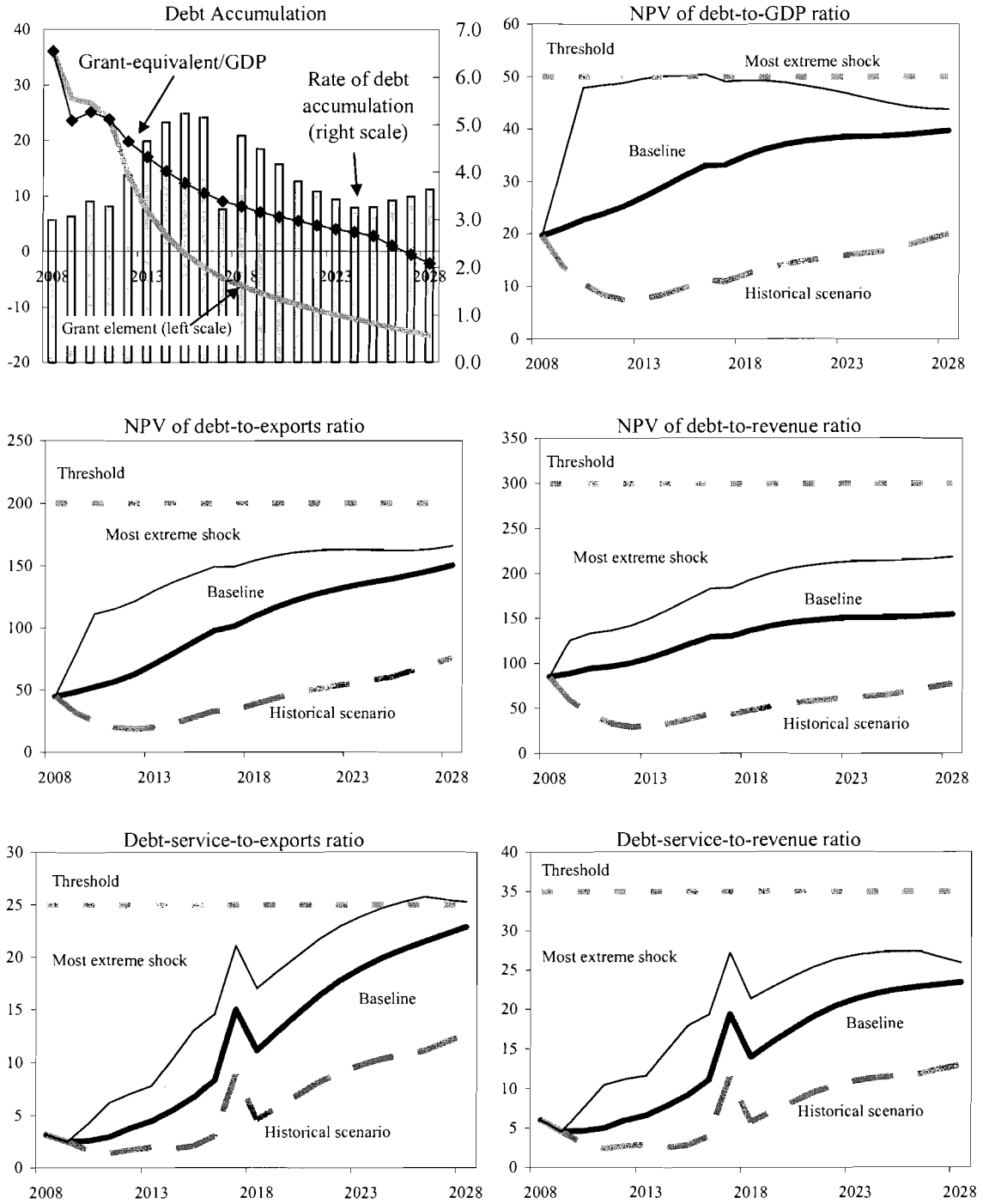
	Projections							
	2008	2009	2010	2011	2012	2013	2018	2028
NPV of Debt-to-GDP Ratio								
Baseline	46	51	54	56	59	61	70	81
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	46	45	44	43	44	44	51	68
A2. Primary balance is unchanged from 2008	46	50	54	57	61	65	88	134
A3. Permanently lower GDP growth 1/	46	51	54	57	60	62	74	92
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	46	52	56	60	63	66	78	94
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	46	47	47	50	53	56	66	78
B3. Combination of B1-B2 using one half standard deviation shocks	46	46	46	49	52	54	65	77
B4. One-time 30 percent real depreciation in 2009	46	59	62	64	66	68	79	98
B5. 10 percent of GDP increase in other debt-creating flows in 2009	46	60	63	65	67	69	76	85
NPV of Debt-to-Revenue Ratio 2/								
Baseline	166	183	191	196	202	207	241	281
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	166	163	157	150	149	149	172	232
A2. Primary balance is unchanged from 2008	166	180	191	199	210	222	301	464
A3. Permanently lower GDP growth 1/	166	184	193	197	205	211	253	318
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	166	187	200	207	215	223	267	324
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	166	169	169	175	182	189	226	271
B3. Combination of B1-B2 using one half standard deviation shocks	166	167	165	170	178	184	222	266
B4. One-time 30 percent real depreciation in 2009	166	215	221	222	227	232	272	339
B5. 10 percent of GDP increase in other debt-creating flows in 2009	166	217	223	225	230	233	262	295
Debt Service-to-Revenue Ratio 2/								
Baseline	26	23	25	26	28	29	36	49
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	26	23	18	18	20	21	32	44
A2. Primary balance is unchanged from 2008	26	23	24	26	29	31	44	69
A3. Permanently lower GDP growth 1/	26	23	25	26	28	29	38	54
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	26	24	26	28	29	31	39	54
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	26	23	20	21	25	27	35	47
B3. Combination of B1-B2 using one half standard deviation shocks	26	24	19	19	25	27	35	47
B4. One-time 30 percent real depreciation in 2009	26	24	27	28	30	31	41	57
B5. 10 percent of GDP increase in other debt-creating flows in 2009	26	23	37	30	30	30	37	51

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

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

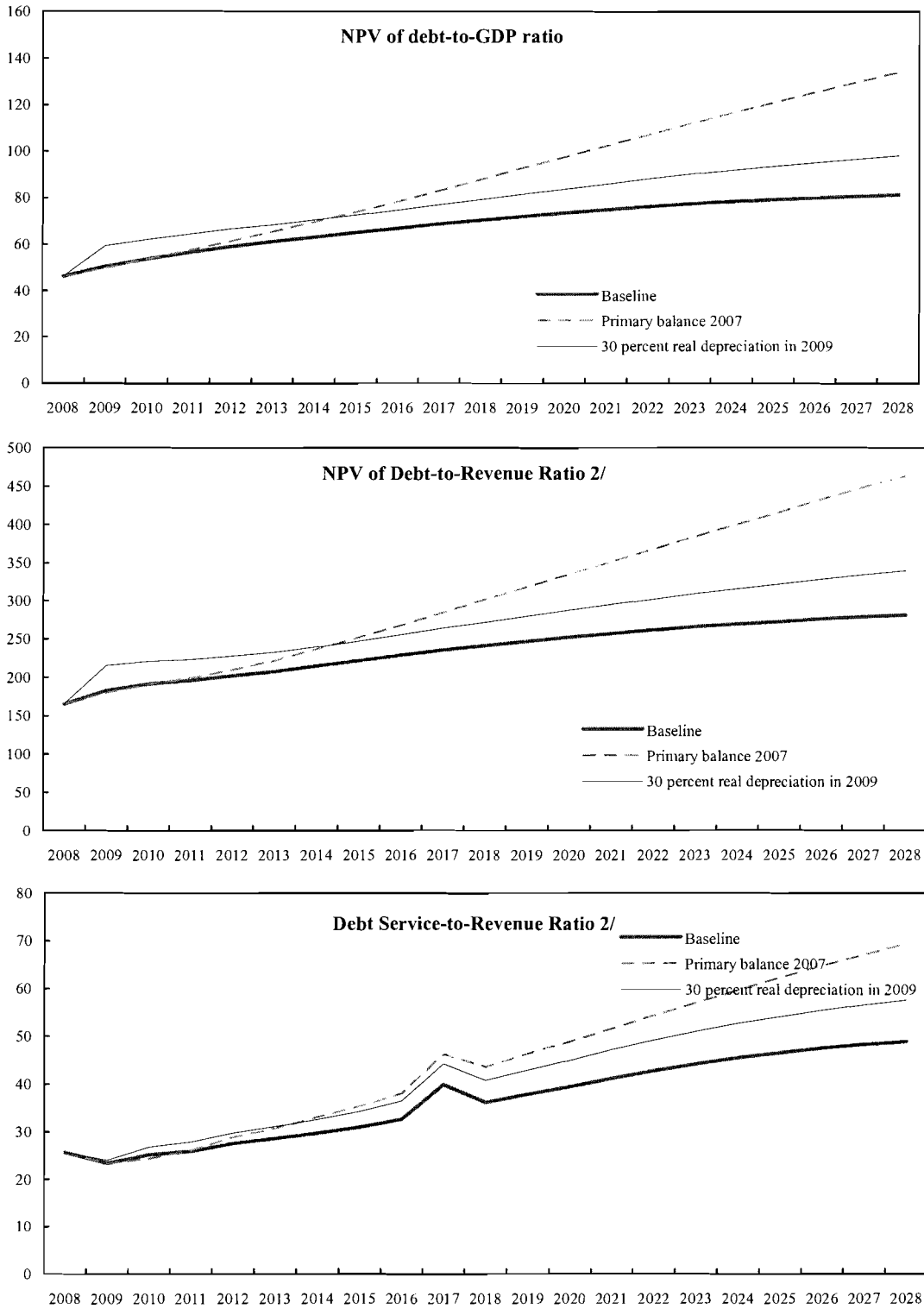
2/ Revenues are defined inclusive of grants.

Figure 1. Ghana: Indicators of Public and Publicly Guaranteed External Debt
Baseline, 2008-2028



Source: Staff projections and simulations.

Figure 2.Ghana: Indicators of Public Debt Under Alternative Stress Tests, 2008-2028 1/

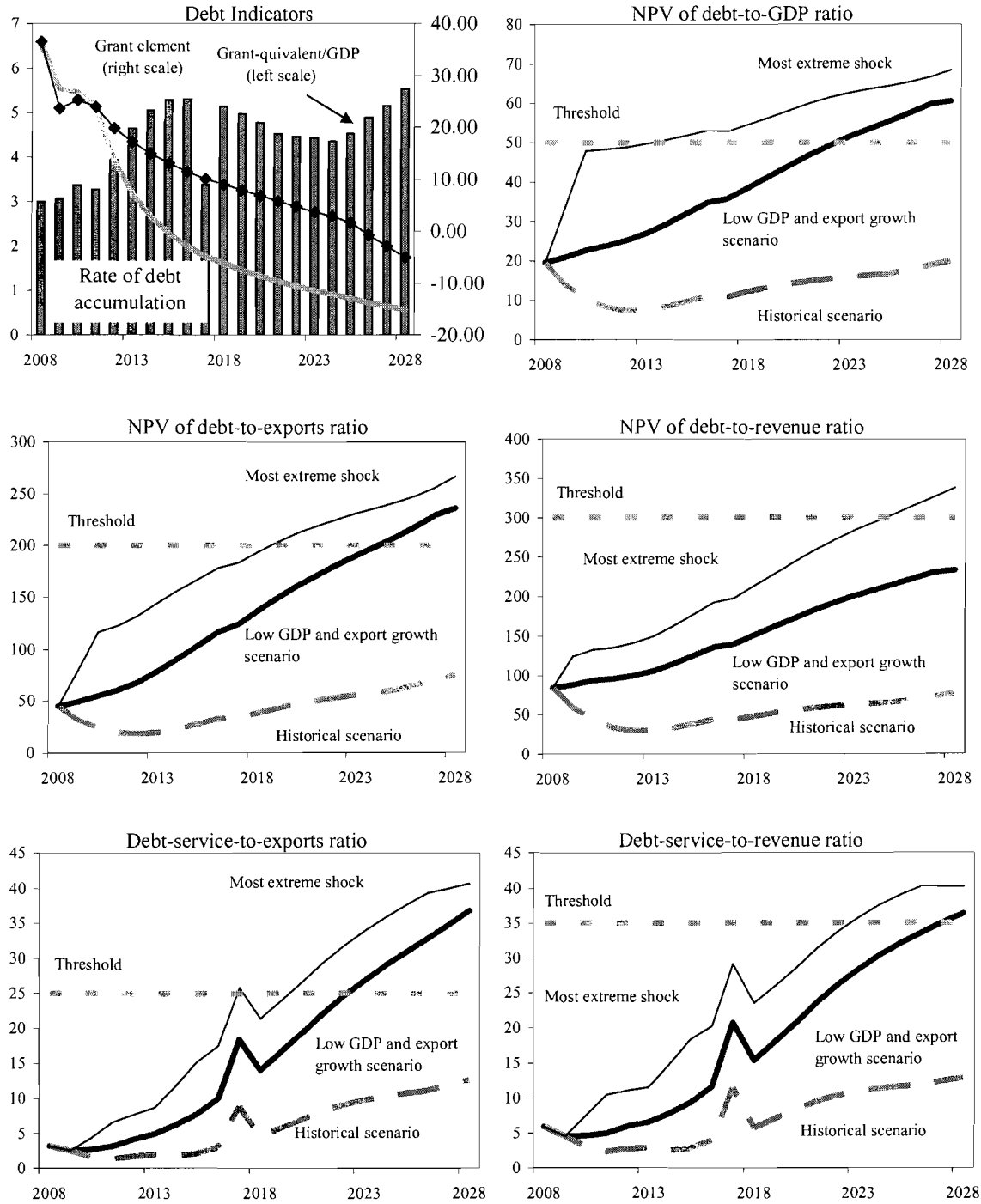


Source: Staff projections and simulations.

1/ Most extreme stress test is test that yields highest ratio in 2018.

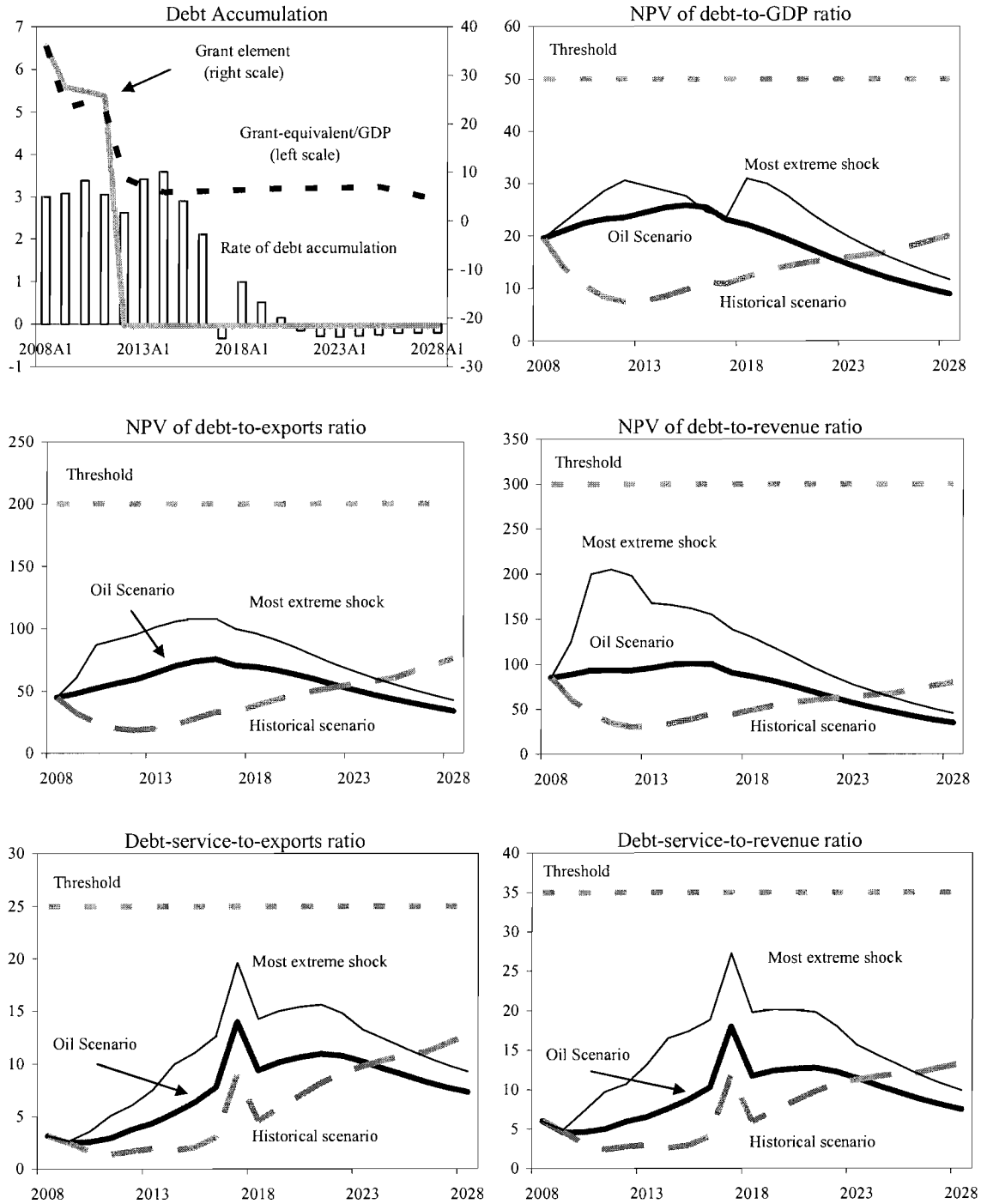
2/ Revenue including grants.

Figure 3. Ghana: Indicators of Public and Publicly Guaranteed External Debt
Alternative Low GDP and Export Growth Scenario, 2008-2028



Source: Staff projections and simulations.

Figure 4. Ghana: Indicators of Public and Publicly Guaranteed External Debt
Oil Exporting Scenario, 2008-2028



Source: Staff projections and simulations.

APPENDIX I.

GHANA'S PETROLEUM SECTOR: PRELIMINARY MACROECONOMIC IMPACT¹⁰

Ghana's recent oil discovery, once confirmed, can have a significant positive impact on national income, growth, poverty reduction, and debt sustainability. The exploration and investment is expected to be fully financed by foreign direct investment. Following an initial investment of about US\$2.7 billion, production and exports would start in 2011, with a peak in 2013, and a depletion of oil reserves by 2030. Cumulative government revenues would be US\$20 billion, or 160 percent of 2008 GDP.

I. INTRODUCTION

16. **On June 18, 2007, UK-based Tullow Oil announced a significant off-shore oil discovery in Ghana.** The discovery was made by an Anglo-American consortium (Tullow Oil operates with Kosmos Energy and Anadarko Petroleum of the US) in which Ghana's National Petroleum Corporation holds a 10 percent interest.¹¹

17. **On May 6 2008, Tullow Oil announced a second oil discovery.** This will probably encourage increased exploration in Ghana, giving further impetus to the investment plans outlined by several foreign companies. The news is likely to result in an upgrade of the current conservative assessment of proven reserves of 170 million barrels to 500–600 million barrel mark. So far, there has been no substantial discovery of an associated gas cap.

Proven Oil Reserves, Selected SSA Countries
(Billions of barrels, as at Jan. 2007)

Equatorial Guinea	1.1
Ghana	0.170-1.1
Chad	1.5
Congo, Rep. of	1.6
Gabon	2.0
Angola	8.0
Nigeria	36.2

Sources: BP Statistical Review, Oil and Gas Journal; and

18. **The discovery is yet to be designated commercially viable,** and production may not begin for three to five years. Following a full appraisal, the investment phase can start perhaps in 2009, with an estimated cost of US\$2–3 billion. Oil production could start after 2011.

19. **The state oil company, GNPC plays a key role in the sector raising an issue of conflict of interest.** GNPC is not only a producer of petroleum but is also responsible for promotion of exploration and development of Ghana's petroleum resources. Moreover, besides its interest in upstream operations, GNPC also regulates the operations and activities of investors, evaluates potential investors, and takes part in negotiations for petroleum agreements. Monitoring of oil company operations is done through a Joint Management Committee (JMC) which apply sanctions through the Minister for Energy. As concerns are being raised regarding GNPC acting both as a regulator and operator, the government is

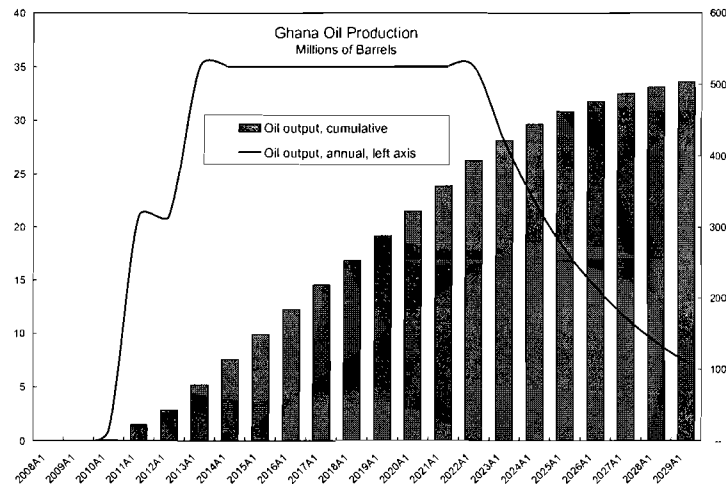
¹⁰ Prepared by Julien Hartley (IMF).

¹¹ Currently Ghana produces small quantities of oil, about 700 barrels a day.

reviewing the appropriateness of GNPC being both a regulator and one of the regulated bodies.

II. MAIN ASSUMPTIONS

20. **The main oil production assumptions are derived from the GNPC development plan,** except for the starting date, which we conservatively assume will be in 2011 rather than 2010. Total reserves are assumed about 500 million barrels (currently rated as 90% probable). The first phase would be development of the core area; the initial processing capacity of 60,000 barrels per day would be upgraded later to about 120,000 barrels of oil per day. It is assumed that US\$2–3 billion would be spent on field development through 2011 and about US\$200 million a year allocated for production costs. Oil prices follow the IMF’s WEO projections minus a 10 percent prudential discount through 2014, and they are assumed to remain constant thereafter.



21. **Ghana’s existing petroleum regime provides a number of revenue sources for the state**¹²—among them royalties, interest, petroleum income tax, additional oil entitlement, and rental payments. Royalty rates are negotiated; for the blocks operated by Kosmos and Tullow, the rate is 5 percent. The carried interest entitles the government to a share of production after operation costs (including royalties) that have been recovered; GNPC’s carried interest is 10 percent. The state has the option to acquire an additional interest within a certain period after an oil discovery is declared commercial, at which point GNPC has to bear its share of development and production costs. The petroleum income tax law sets the income tax rate at 50 percent; but for the current discoveries a 35 percent rate is applied. According to GNPC, petroleum agreements can also stipulate an additional profits tax (the “additional oil entitlement”) that would be levied based on the contractor’s rate of return to allow the state to capture a share of exceptionally profitable operations.

¹² The main laws are the Ghana National Petroleum Corporation Law PNDCL 64 of 1983 and the Petroleum (Exploration and Production) Law PNDCL 199 of 1987.

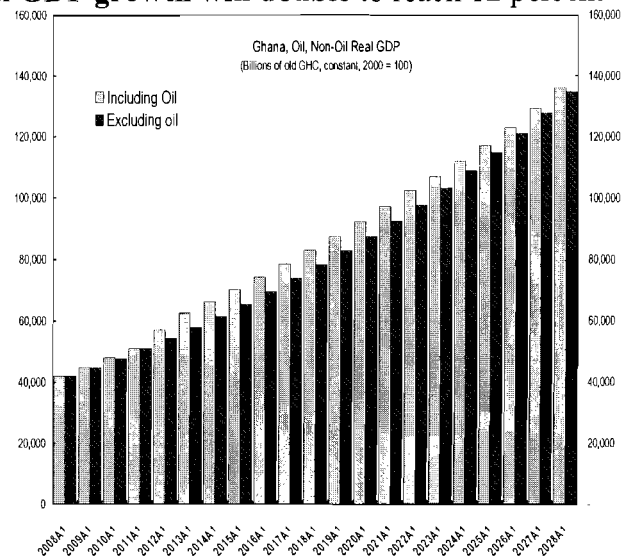
Box 1. Ghana: Main Elements of the Oil Regime

1. **Royalties.** A royalty is levied on gross production of oil whether or not the operation is profitable. The assumption is that it will be paid in cash, but it could also be paid in the form of oil.
2. **Carried interest.** The carried interest is levied after royalty and operating costs are deducted. Again, the assumption is that it will be paid in but it could also be paid in the form of oil.
3. **Petroleum income tax.** The marginal tax rate is levied in cash and applied after deduction of royalties (considered a cost of production) and carried interest and after allowing for linear depreciation of capital expenditures over five years.
4. **Use of oil revenue.** Oil revenues can be spent, saved in a stabilization fund or future generation's fund, used to retire debt, distributed to citizens, and any combination of these. In this paper for simplicity it is assumed that revenue is used for debt reduction.

22. **It is assumed that all production is exported** (thus there is no import substitution at this stage) and that all after-tax profits of contractors are transferred offshore as well. Direct investment is assumed to have a 95 percent import and 5 percent local content. The impact on the current account balance in the initial, investment phase is through high imports for investment financed by FDI; when production starts, production is exported and profits are repatriated.

III. MAIN FINDINGS

23. **With the start of oil production, real GDP growth will double to reach 12 percent by 2012, and then will be slightly higher than real GDP growth without oil.** This is explained by large investment with 95 percent from imports in the investment phase and then a rapid increase in production and exports, which plateau after two years and begin to decline in 2022. Taking into account the fact that the oil business is highly specialized, spillovers are assumed to be modest. Ghana's cumulative real per capita GDP over the period would be US\$1,695 higher than without oil.



24. **The government's share of total oil receipts would be around 30 percent when production starts, reach 35 percent at the peak of production in 2018, and then gradually decrease to 25 percent as production declines.** At the peak oil receipts would reach more than US\$1 billion, accounting for more than 10 percent of total budget revenues (excluding grants) or 2 ½ percent of GDP.

Ghana. Government Revenue Take, 2011-2029
(In US\$ millions)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Value of oil production	2,136	2,131	3,544	3,544	3,544	3,544	3,544	3,544	3,544	3,544	3,544	3,544	2,835	2,268	1,814	1,452	1,161	929	743
Total government oil revenue	752	723	1,324	1,326	1,352	1,428	1,457	1,485	1,553	1,491	1,491	1,491	1,176	925	723	562	433	330	247
Implied government share (in percent)	35.2	33.9	37.3	37.4	38.1	40.3	41.1	41.9	43.8	42.1	42.1	42.1	41.5	40.8	39.9	38.7	37.3	35.5	33.3
Revenues in percent of GDP	3.1	2.7	4.4	4.0	3.7	3.6	3.4	3.2	3.1	2.8	2.6	2.4	1.8	1.3	0.9	0.7	0.5	0.3	0.2

25. **For simplicity, it is assumed that oil revenues would be fully used to retire debt and thus no additional spending would take place.** As a result, Ghana's total public sector would decrease from 49.8 percent at end-2007 and to 19.2 percent in 2028, as opposed to 55.6 percent under the baseline without oil.

26. **The current account would be affected in the two main phases in a different manner:**

- In the investment phase, trade balance** would worsen significantly because of the large imports of capital goods, adding some 9 percent of GDP to the trade deficit in 2010-12. However, since investment is assumed to be fully foreign direct investment (FDI) financed, Ghana's reserve position would improve, inter alia, to the extent of the 5 percent of local content.
- In the production and export phase,** the net improvement (oil exports minus profit repatriation) of the current account would reach about an average of 4 percent of GDP per annum. During the peak of production (2013-22) reserves would improve on average by 2.6 months of imports of goods and services.

Ghana. Oil Balance of Payments, 2008-28

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Current account balance	-2,410	-2,753	-2,512	97	-218	1,243	1,039	792	548	274	-26	-352	-687	-1,056	-1,403	-2,614	-3,544	-4,586	-5,120	-6,004	-7,940
Trade Balance (incl. oil)	-4,832	-5,807	-5,582	-3,250	-3,650	-2,593	-3,237	-3,941	-4,660	-5,436	-6,247	-7,120	-8,043	-9,036	-10,077	-11,984	-13,667	-15,523	-16,843	-18,579	-21,437
Exports	5,609	5,924	6,256	9,018	9,408	11,354	11,851	12,386	12,958	13,571	14,226	14,927	15,678	16,481	17,341	17,474	17,830	18,381	19,109	19,986	20,002
of which: oil	0	0	0	2,373	2,368	3,938	3,938	3,938	3,938	3,938	3,938	3,938	3,938	3,938	3,938	3,150	2,520	2,016	1,613	1,290	0
Imports	-10,441	-11,531	-11,839	-12,266	-13,058	-13,947	-15,088	-16,327	-17,619	-19,007	-20,473	-22,047	-23,721	-25,517	-27,418	-29,458	-31,496	-33,904	-35,951	-38,575	-41,440
of which: oil	-3,233	-3,621	-3,757	-3,946	-4,203	-4,478	-4,776	-5,086	-5,408	-5,742	-6,089	-6,448	-6,820	-7,204	-7,593	-7,996	-8,419	-8,866	-9,335	-9,830	-10,251
of which: capital goods for oil industry	-102	-378	-241	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Services Balance	-320	-340	-360	-398	-668	-675	-690	-720	-753	-791	-842	-898	-959	-1,025	-1,064	-1,151	-1,244	-1,345	-1,455	-1,573	-1,701
of which: oil profits	0	0	0	0	-231	-192	-156	-132	-108	-86	-74	-63	-52	-42	0	0	0	0	0	0	0
Capital and financial account	2,043	2,300	2,716	2,603	2,386	2,783	3,102	3,240	3,323	2,770	3,522	3,637	3,786	3,956	4,203	4,530	4,908	5,321	5,772	6,243	6,742
of which: FDI in oil industry	0	0	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NIR (-increase)	367	453	-204	-2,701	-2,168	-4,026	-4,141	-4,033	-3,871	-3,044	-3,496	-3,285	-3,098	-2,900	-2,800	-1,916	-1,364	-735	-652	-239	1,199
<i>Memorandum items:</i>																					
Current account balance incl. oil trans. (%GDP)	-13.8	-14.6	-12.4	0.4	-0.9	4.6	3.5	2.4	1.5	0.7	-0.1	-0.8	-1.4	-1.9	-2.4	-4.1	-5.1	-6.1	-6.3	-6.9	-8.4
GIR, in months of imports of G&S	2.1	1.7	1.8	3.7	5.1	7.5	9.6	11.3	12.7	13.4	14.2	14.7	15.0	15.2	15.1	14.8	14.2	13.6	12.9	12.1	11.7

27. **The impact of oil production on Ghana's external debt sustainability as well as total debt would be clearly positive; for details see an alternative scenario incorporating oil in the joint Fund-Bank DSA.**

28. **Overall, the impact of oil on Ghana's economy under these assumptions would be considerable although not extraordinary.** Growth would pick up relative to the non-oil scenario and cumulative government revenues would reach about US\$20 billion, equivalent to percent of 2008 GDP. It should be noted that this outcome is sensitive to a number of assumptions (net oil wealth would be depleted by 2030 and no other wells will come into production; oil prices are constant after 2014 notwithstanding historical volatility of world oil

prices; the fiscal framework is unchanged, etc). More precise estimates on the impact of oil can be made after Ghana's oil is announced to be commercially viable, with firmer estimates on the size of oil reserves.