

INTERNATIONAL DEVELOPMENT ASSOCIATION AND
INTERNATIONAL MONETARY FUND

SUDAN

Joint World Bank/IMF 2009 Debt Sustainability Analysis

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

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The Joint IMF-World Bank low-income country debt sustainability analysis (DSA) confirms last year's assessment that Sudan continues to be in debt distress, and that there is limited possibility of significant improvement over the medium and long term. Under the baseline scenario, all debt ratios, except for external debt service, remain above their indicative thresholds due largely to the country's massive arrears and despite reasonably prudent macroeconomic policies over the projection period. It will be critical for Sudan to continue to follow sound policies consistent with a prudent borrowing strategy.

I. INTRODUCTION

1. **Sudan's DSA is prepared under the joint Bank-Fund Low-Income Country (LIC) Debt Sustainability Framework (DSF).**¹ The framework follows a methodology for assessing the risk of debt distress in LICs, based on projections of five debt burden indicators (under both baseline and standardized stress-test scenarios), namely the present value (PV) of external debt-to-GDP ratio; the PV of external debt-to-exports ratio; the PV of external debt-to-revenue ratio; debt service-to-exports ratio; and debt service-to-revenue ratio. Empirical evidence suggests low-income countries with a better quality of policies and institutions can sustain a higher level of external debt. The LIC DSA framework, therefore, compares forecasts of these debt burden indicators with policy-dependent thresholds using the three-year average of the World Bank's Country Policy and Institutional Assessment (CPIA).

¹ See "Debt Sustainability in Low-Income Countries: Proposal for an Operational Framework and Policy Implications" (<http://www.imf.org/external/np/pdr/sustain/2004/020304.htm> and IDA/SECM2004/0035, 2/3/04) and "Debt Sustainability in Low-Income Countries: Further Considerations on an Operational Framework and Policy Implications" (<http://www.imf.org/external/np/pdr/sustain/2004/091004.htm> and IDA/SECM2004/0629, 9/10/04).

II. STRUCTURE OF TOTAL EXTERNAL DEBT

2. **Sudan's large total external debt is mostly in arrears, its structure has remained unchanged since 2000, and there has been an improvement in containing non-concessional borrowing in 2009.**² Based on available data, the end-2009 stock of total public and publicly-guaranteed debt is estimated at US\$35.7 billion in nominal terms, of which US\$29 billion is in arrears. About 69 percent of the external debt is owed to official bilateral creditors, which is almost equally divided between Paris Club and non-Paris Club creditors. Of the remainder, multilateral institutions accounted for about 15 percent, while the debt owed to commercial banks and suppliers accounted for some 16 percent (Text tables 1 and 2).

Text Table 1. Sudan: Evolution of External Debt, 2008-09
(End of period, millions of US dollar)

	2008	2009
Total public and publicly guaranteed external debt	33,741	35,687
Principals	14,681	15,407
<i>of which</i> , principle arrears	9,739	9,725
Interest arrears 1/	19,060	20,281
Memorandum item: New borrowings	485	978

Source: Central Bank of Sudan
1/ including late interests

Text Table 2. Sudan: Composition of External Debt, 2008-09
(End of period, millions of US dollar)

	2008	2009
Total public and publicly guaranteed external debt	33,741	35,687
Multilateral creditors	5,477	5,297
Paris club creditors	10,502	11,233
Non-paris club creditors	12,160	13,297
Commercial banks	4,209	4,503
Suppliers	1,393	1,357

Source: Central Bank of Sudan

3. **Sudan contracted US\$906 million of new loans in 2008.** Of this amount, US\$232 million (about 25 percent) were non-concessional loans, well below the US\$700 million ceiling under the Fund's staff-monitored program. About 83 percent of new borrowings are for development in the agriculture sector, while about 6 percent and 11 percent were directed to services and financial sectors, respectively.

III. EXTERNAL DEBT SUSTAINABILITY ANALYSIS

4. **The 2009 DSA is based on conservative assumptions for key macroeconomic variables, in line with the recent global economic crisis, and a lower discount rate compared to the 2008 DSA.** Average real GDP growth was revised downward from an annual rate of 8 percent to about 5.5 percent over the period 2010–30 (Box 1). The overall fiscal deficit is higher on account of lower oil prices and anticipated decline in oil production (Box 2). In addition, current DSF guidelines require a lower discount rate throughout the analysis compared to the 2008 DSA, from 5 percent to 4 percent, due to the recent decline in global interest rates. The outcome for the main debt ratios (discussed below) continues to show a sustained breach of the thresholds, albeit with slight improvement compared to the 2008 DSA on account of a lower discount rate.

² In 2009 Sudan non-concessional debt was around US\$693 million, which is below the IMF Staff Monitored Program (SMP) ceiling of US\$700 million.

A. Baseline Scenario

5. **The baseline scenario (Table 1) shows that Sudan is still in debt distress**, due largely to the country's massive arrears. The results indicate that three debt-burden indicators are expected to exceed their policy-dependent thresholds in the period 2010–20. In particular,

- The PV of debt-to-GDP ratio is expected to decline from 56 percent in 2010 to around 33 percent in 2020 (indicative threshold: 30 percent).
- The PV of debt-to-exports stands at 323 percent in 2010, and is expected to slightly improve over the medium term, but subsequently increase after 2013, mainly due to anticipated decline in oil production, and to reach 535 percent in 2020 (indicative threshold: 100 percent).
- The PV of debt-to-revenue, which is estimated to 323 percent in 2010, is projected to reach 272 percent in 2020 (indicative threshold: 200 percent).

The two debt service indicators (debt service-to-exports ratio and debt service-to-revenue ratio) are expected to remain below their policy-dependent thresholds throughout the forecast period 2010–30. However, these ratios should be interpreted with caution since the baseline scenario assumes Sudan debt servicing performance to remain unchanged. That is, Sudan does not fully repay its debt obligations, and to fully repay only new obligations falling due for some selected creditors, and partially repay arrears accrued after 2007.

Box 1. Macroeconomic Assumptions 2010–30

The macroeconomic assumptions are on the conservative side, reflecting the recent downturn of the global economy and revised oil production projections provided by the authorities.

Real sector: Real GDP is assumed to grow at an annual average rate of about 5.6 percent during 2010–30. The real growth during the 2010–15 is largely based on the projected increase in oil production which is expected to peak in 2012 and to subsequently decrease gradually. It is assumed that the drop in oil output will be offset by robust growth in non-oil GDP. During 2016–30, non-oil growth is projected to average about 6.1 percent, benefiting from structural reforms in the fiscal and financial sectors as well as development of infrastructure. Annual inflation is assumed to decline from 10 percent in 2010 to around 4 percent. Over the period 2010–2030, inflation averages 5 percent.

External sector: The current account deficit (on a cash basis) is projected to be around 5 percent of GDP on average throughout the projection period, with a slight improvement over the long term. The improvement is on account of the projected increase in non-oil exports. The external trade account is expected to deteriorate gradually, reflecting a steady decrease in oil production, while non-oil exports will show steady growth, reflecting a rise in productivity especially in agriculture. Foreign exchange reserve coverage is projected to rise to 2.0 months of imports by 2015.

Fiscal sector: The fiscal deficit (on a cash basis) is projected to average about 4.3 percent of GDP during 2010–15, reflecting a combination of factors: (i) repayment of the entire stock of domestic arrears; (ii) continuation of current spending shares on transfers to states; (iii) moderate improvements in tax revenue collection; (iv) a slight decline in oil revenues; and (v) rising capital expenditure outlays. Over the long term (2016–30), the fiscal deficit is expected to average some 3.1 percent of GDP, reflecting a consolidation of expenditures and a gradual increase in tax revenues to around 10 percent of GDP by 2030.

External financing: Foreign direct investment (FDI) is projected to remain stable, averaging about 4 percent of GDP over the projected period. After the peak in oil-related investment, FDI is expected to shift to agriculture and service sectors. Demand for foreign financing is assumed to decrease as domestic savings will increase in the future in context of a deepening of the financial sector.

Debt: It is assumed that repayments on outstanding debt will continue to a few selected creditors giving new loans, arrears on other outstanding obligations will accumulate, and debt service obligations arising from new borrowing will be paid. Disbursements of new loans are projected at about 1.5 percent of GDP during 2010–15, and 2.0 percent during 2016–30. The share of concessional loans is assumed at 60 percent in 2010—in line with the actual loans contracted in 2008—and subsequently declines gradually to about 50 percent by 2030.

Box 2. Oil Sector Assumptions

The oil sector continues to dominate the Sudanese economy, accounting for a majority of GDP when including associated service sector activity, about 90 percent of exports and about 50–60 percent of government revenue. The DSA assumptions for the sector's future are driven by a production outlook informed by discussions with the Sudanese authorities and operators in the country as well as price projections calculated by the IMF and the World Bank.

Production: The Ministry of Energy and Mining expects a slight increase of 0.5 percent in production in 2010 to around 476 thousand barrels per day (bpd), due to waning mature fields (higher quality Nile blend) and other technical production problems. Peak production is expected in 2012 near 547 thousand bpd, before a gradual descent to about 151 thousand bpd by 2030.

Prices: Forecasting international oil prices involves a high level of uncertainty. The DSA is guided by the IMF's latest World Economic Outlook figures for the medium term and the World Bank's Commodity Market Review for the longer term. Overall, prices are expected to remain stable and average around US\$71 per barrel for Sudanese crude over the medium term before settling to around US\$54 per barrel in the longer term.

B. Standardized Sensitivity Analysis

6. **Alternative scenarios are carried out to assess the robustness of the baseline scenario to various shocks.** The results of these scenarios for the key debt-burden indicators are presented in Table 2 and illustrated in Figure 1.

- The alternative scenario comprises two tests: (A1) *a historical scenario* in which main variables that determine debt dynamics (namely, real GDP growth; inflation, measured by changes in the U.S. dollar GDP deflator; the non-interest external current account in percent of GDP; and non-debt-creating flows in percent of GDP) are assumed to remain at their 10-year historical averages. The second alternative scenario (A2) is *a financing scenario* in which new borrowing is assumed to be on less favorable terms (a 2 percentage points higher interest rate) throughout the projection period.
- The bound tests (B1 through B6) apply two-period/one standard deviation negative shocks to the key macroeconomic variables (i) the above-mentioned parameters plus (ii) export growth, (iii) a combined one-half deviation shock, and (iv) a one-time 30 percent depreciation of the Sudanese pound against US dollar.

7. **Similar to last year’s DSA exercise, the scenario of holding the key debt-dynamics parameters constant over the long term at their historical averages (scenario A1) produces some improvements in both debt and debt service indicators relative to the baseline.** Moreover, one debt indicator (PV of debt-to-GDP) is projected to be lower than the indicative thresholds by 2030. Favorable historical performance of nominal GDP and export growth, due to increasing oil production and a spike in oil prices explains this improvement relative to the baseline scenario. The latter assumes a decline in oil production and oil prices after its peak in 2012 and 2013, respectively. With regard to the unfavorable borrowing condition scenario, a 2 percentage points higher interest rate somewhat flattens the downward path of debt and debt service ratios in all indicators over the projection period (scenario A2).

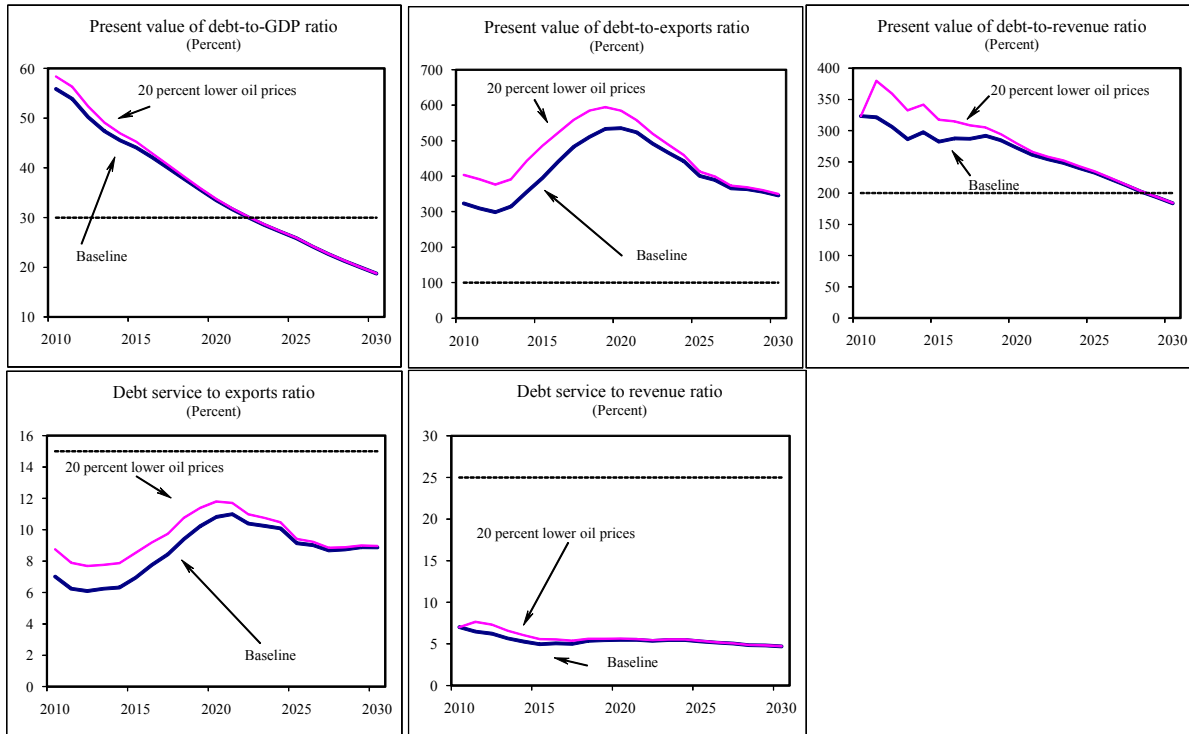
8. **The results of bound tests are very similar to those of the 2008 DSA, namely that the debt situation remains precarious.** For instance,

- A one-time 30 percent nominal depreciation relative to the baseline in 2010 (B6) proved to be the worst scenario for two of the three debt indicators (the PV of debt-to-GDP ratio and the PV of debt-to-revenue ratio). The PV of debt-to-GDP ratio is the highest for this test. Starting at 56 percent in 2010, it declines to 47 percent in 2020 and 26 percent by 2030, which is 7 percentage points higher than the baseline. Similarly, the PV of debt-to-revenue ratio is the highest at 323 percent in 2010, it increases to 381 percent by 2020 and gradually declines to 257 percent in 2030, which is about 70 percentage points above the baseline.
- In the case of debt- and debt service-to-exports ratios, lowering the export value growth at its historical average minus one standard deviation in 2011–12 (B2) gives the most challenging outcome as was the case in the 2008 DSA. The PV of debt-to-exports ratio rises to 469 percent in 2011 from 323 percent in 2010, reaching 1175 percent in 2020, before falling to 679 percent in 2030, which is about double the baseline value. Similarly, the debt service-to-exports ratio climbs to around 40 percent in 2020, before falling to 26 percent in 2030. This outcome is mainly due to the projected decline in oil production starting in 2012.

C. Customized Sensitivity Analysis

9. **Oil is a critical factor in assessing Sudan’s debt sustainability.** To analyze the debt dynamics under less favorable oil revenues, an additional stress test is performed using a 20 percent shock to the baseline oil price projections. Under this customized scenario, Sudan’s external debt indicators worsen significantly, especially with respect to exports (see panel charts below). Considering the volatility in global oil prices, the oil price shock highlights Sudan’s high vulnerability to exogenous shocks.

Comparison Between Baseline and Lower Oil Prices (20 percent)



IV. TOTAL PUBLIC DEBT SUSTAINABILITY ANALYSIS

10. **The results of the total public debt sustainability analysis mirror the ones under the external debt sustainability analysis.**³ Under the baseline scenario (Table 3), debt stock and debt service indicators show similar patterns as those of external debt. The PV of public sector debt-to-GDP starts at a relatively high level in 2010 (71 percent of GDP), it then declines over the medium term to reach about 60 percent in 2015, due to high real GDP growth and a reduction in the fiscal deficit envisaged for 2010–15. The debt service-to-revenue ratio is projected to fluctuate within the range of 12–14 percent for the whole period.

11. **The alternative scenarios confirm that Sudan’s public debt sustainability depends on Sudan’s commitment to improve fiscal soundness and growth potential, particularly in the non-oil economy.**

- Under the bound tests, a one-time 30 percent real depreciation in 2010 (B4) produces the worst scenario for two of the debt indicators. The PV of debt-to-GDP and the PV of debt-to-revenue would be 56 and 436 percent in 2020. The debt service-to-revenue ratio would increase to 17 percent in the same year for the same bound test.

³ The 2010 level of the public debt stock indicators (PV of debt-to-GDP and PV of debt-to-revenue) is substantially higher than those reported last year. This upward jump reflects adverse developments in both external debt—the buildup in external arrears and the contraction of new external loans; and domestic debt—and the further accumulation of sizeable domestic arrears in 2008.

- The no reform scenario, where the primary balance is projected to remain unchanged from the relatively high 2007-09 levels, highlights the vulnerability of Sudan's public debt trajectory to large fiscal imbalances. The PV of debt-to-GDP and debt service-to-revenue ratios for 2020 would be 48 and 13 percents, respectively, about 3 and 2 percentage points higher than the baseline.

V. CONCLUSIONS

12. **The third DSA for Sudan provides further evidence that, despite its considerable economic progress since 2000, Sudan remains in debt distress.** The vulnerabilities highlighted in the DSA need to be effectively addressed in the coming period through proactive public debt and financial management policies, including increased reliance on concessional borrowing to finance necessary development expenditures.

13. **Sudan should reconsider its external borrowing strategy in light of the future debt service burden that would follow if it took on high volumes of non-concessional debt.** Further recourse to such borrowing could also jeopardize Sudan's access to possible debt relief under the Enhanced HIPC Initiative and the MDRI. The authorities believe that debt relief under these two initiatives will play a crucial part in helping Sudan assume a path to achieving sustainable development goals.

Table 1. Sudan: External Debt Sustainability Framework, Baseline Scenario, 2007-2030 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average	0 Deviation	Projections									
	2007	2008	2009			2010	2011	2012	2013	2014	2015	2010-2015 Average	2020	2030	2016-2030 Average
External debt (nominal) 1/	68.5	58.1	65.3			57.0	55.2	51.6	48.8	46.9	45.5		34.7	19.4	
o/w public and publicly guaranteed (PPG)	68.5	58.1	65.3			57.0	55.2	51.6	48.8	46.9	45.5		34.7	19.4	
Change in external debt	-9.7	-10.4	7.2			-8.3	-1.9	-3.6	-2.8	-1.9	-1.4		-2.2	-1.3	
Identified net debt-creating flows	-11.0	-9.1	11.7			0.8	-0.1	-0.3	0.2	-0.3	-0.1		-0.7	-0.2	
Non-interest current account deficit	12.1	8.8	12.4	10.6	2.2	7.9	6.8	6.4	6.2	6.6	5.8		4.8	4.3	4.4
Deficit in balance of goods and services	3.8	-0.8	5.8			1.1	-0.5	-0.5	1.4	2.9	4.8		7.7	6.6	
Exports	20.0	22.4	15.1			17.3	17.4	16.8	15.1	12.8	11.2		6.3	5.4	
Imports	23.7	21.6	20.8			18.4	16.9	16.4	16.5	15.7	16.0		14.0	12.1	
Net current transfers (negative = inflow)	-1.3	0.0	-1.9	-3.4	2.0	-1.8	-1.0	-1.1	-1.2	-1.4	-1.6		-3.6	-2.3	-2.9
o/w official	-0.8	-1.2	-1.2			-1.1	-0.9	-1.0	-1.0	-0.9	-0.9		-0.8	-0.9	
Other current account flows (negative = net inflow)	9.6	9.5	8.6			8.6	8.3	8.0	6.0	5.1	2.6		0.6	-0.1	
Net FDI (negative = inflow)	-6.5	-4.5	-4.8	-5.4	2.8	-4.5	-4.1	-4.0	-4.0	-4.9	-4.0		-3.8	-3.6	-3.6
Endogenous debt dynamics 2/	-16.7	-13.3	4.0			-2.6	-2.8	-2.7	-2.0	-2.1	-1.9		-1.7	-0.9	
Contribution from nominal interest rate	0.4	0.3	0.4			0.4	0.3	0.3	0.3	0.3	0.3		0.2	0.2	
Contribution from real GDP growth	-6.2	-3.8	-2.8			-3.0	-3.1	-3.0	-2.4	-2.4	-2.2		-2.0	-1.0	
Contribution from price and exchange rate changes	-10.8	-9.8	6.4			-8.7	-3.0	-3.3	-2.9	-1.7	-1.5		-1.8	-0.7	
Residual (3-4) 3/	1.4	-1.3	-4.5			-0.4	1.2	0.0	-0.1	0.2	0.2		0.3	-0.3	
o/w exceptional financing	-1.8	-1.5	-2.1			-1.5	-0.4	-0.4	-0.5	-0.3	-0.3		-0.2	-0.1	
PV of external debt 4/	...	...	64.2			55.9	53.9	50.2	47.4	45.5	44.1		33.5	18.8
In percent of exports	...	...	426.5			323.4	309.5	298.5	314.8	356.0	395.1		535.2	345.8
PV of PPG external debt	...	...	64.2			55.9	53.9	50.2	47.4	45.5	44.1		33.5	18.8
In percent of exports	...	...	426.5			323.4	309.5	298.5	314.8	356.0	395.1		535.2	345.8
In percent of government revenues	...	...	423.6			323.4	321.5	306.1	286.3	297.6	282.5		272.4	183.9
Debt service-to-exports ratio (in percent)	4.2	4.1	8.9			7.0	6.2	6.1	6.2	6.3	6.9		10.8	8.9	
PPG debt service-to-exports ratio (in percent)	4.2	4.1	8.9			7.0	6.2	6.1	6.2	6.3	6.9		10.8	8.9	
PPG debt service-to-revenue ratio (in percent)	4.1	4.3	8.9			7.0	6.5	6.2	5.7	5.3	5.0		5.5	4.7	
Total gross financing need (Billions of U.S. dollars)	3.0	3.0	4.9			3.1	2.8	2.9	3.0	2.6	2.8		3.1	5.5	
Non-interest current account deficit that stabilizes debt ratio	21.8	19.1	5.3			16.2	8.7	10.0	9.0	8.5	7.2		6.9	5.6	
Key macroeconomic assumptions															
Real GDP growth (in percent)	10.2	6.8	4.5	8.0	4.9	5.5	6.2	6.2	5.1	5.4	5.1	5.6	5.9	5.5	5.6
GDP deflator in US dollar terms (change in percent)	16.0	16.7	-9.9	13.0	16.8	15.5	5.6	6.4	5.9	3.7	3.2	6.7	5.1	3.7	4.4
Effective interest rate (percent) 5/	0.6	0.5	0.7	0.8	0.3	0.7	0.7	0.7	0.7	0.8	0.8	0.7	0.8	0.8	0.8
Growth of exports of G&S (US dollar terms, in percent)	54.4	39.7	-36.6	39.7	58.7	39.9	13.0	9.1	-0.3	-7.2	-5.3	8.2	4.4	5.7	5.2
Growth of imports of G&S (US dollar terms, in percent)	10.5	13.5	-9.2	28.6	48.7	7.6	2.9	9.4	12.0	4.5	10.3	7.8	8.7	8.5	8.2
Grant element of new public sector borrowing (in percent)	13.8	13.3	13.0	13.2	12.9	12.9	13.2	10.4	8.4	10.0
Government revenues (excluding grants, in percent of GDP)	20.0	21.3	15.2			17.3	16.8	16.4	16.6	15.3	15.6		12.3	10.2	11.8
Aid flows (in Billions of US dollars) 7/	0.3	0.3	0.3			1.5	2.3	3.2	4.0	4.8	5.7		10.0	17.6	
o/w Grants	0.3	0.3	0.3			0.6	0.4	0.4	0.5	0.5	0.6		0.9	1.6	
o/w Concessional loans	0.0	0.0	0.0			1.0	1.9	2.8	3.6	4.3	5.1		9.0	16.0	
Grant-equivalent financing (in percent of GDP) 8/			1.2	0.8	0.7	0.7	0.6	0.7		0.6	0.4	0.5
Grant-equivalent financing (in percent of external financing) 8/			36.5	31.5	31.7	35.2	36.3	39.1		42.3	44.5	43.2
<i>Memorandum items:</i>															
Nominal GDP (Billions of US dollars)	46.5	58.0	54.6			66.6	74.6	84.3	93.8	102.5	111.3		185.6	477.3	
Nominal dollar GDP growth	27.8	24.7	-5.8			21.9	12.1	12.9	11.3	9.3	8.5	12.7	11.4	9.4	10.2
PV of PPG external debt (in Billions of US dollars)			35.1			37.2	40.2	42.3	44.5	46.7	49.1		62.2	89.5	
(PVT-PVt-1)/GDPT-1 (in percent)						3.9	4.5	2.8	2.6	2.3	2.3	3.1	1.7	0.5	1.3

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.Sudan: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2010-2030
(In percent)

	Projections							
	2010	2011	2012	2013	2014	2015	2020	2030
PV of debt-to GDP ratio								
Baseline	56	54	50	47	46	44	33	19
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	56	52	48	44	42	40	34	29
A2. New public sector loans on less favorable terms in 2010-2030 2	56	54	51	49	47	46	36	21
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	56	55	53	50	48	47	36	20
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	56	58	62	58	56	54	39	20
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	56	59	61	58	55	53	41	23
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	56	55	52	49	47	46	35	19
B5. Combination of B1-B4 using one-half standard deviation shocks	56	54	51	48	46	45	34	19
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	56	75	70	66	64	62	47	26
PV of debt-to-exports ratio								
Baseline	323	309	299	315	356	395	535	346
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	323	299	284	294	327	357	551	544
A2. New public sector loans on less favorable terms in 2010-2030 2	323	312	303	322	366	409	570	391
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	323	309	299	315	356	395	535	346
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	323	469	690	726	819	907	1175	679
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	323	309	299	315	356	395	535	346
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	323	316	311	328	370	411	551	349
B5. Combination of B1-B4 using one-half standard deviation shocks	323	313	294	310	351	390	531	348
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	323	309	299	315	356	395	535	346
PV of debt-to-revenue ratio								
Baseline	323	321	306	286	298	283	272	184
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	323	311	292	268	273	255	280	289
A2. New public sector loans on less favorable terms in 2010-2030 2	323	324	311	293	306	293	290	208
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	323	331	325	304	316	300	289	195
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	323	349	377	351	365	345	318	192
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	323	353	371	347	361	343	330	223
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	323	328	319	298	310	294	281	185
B5. Combination of B1-B4 using one-half standard deviation shocks	323	322	309	289	301	286	277	190
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	323	449	428	400	416	395	381	257
Debt service-to-exports ratio								
Baseline	7	6	6	6	6	7	11	9
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	7	6	6	6	6	7	17	27
A2. New public sector loans on less favorable terms in 2010-2030 2	7	6	6	6	7	7	8	6
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	7	6	6	6	6	7	11	9
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	7	9	13	16	17	19	39	26
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	7	6	6	6	6	7	11	9
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	7	6	6	7	7	7	13	10
B5. Combination of B1-B4 using one-half standard deviation shocks	7	6	6	6	6	7	10	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	7	6	6	6	6	7	11	9
Debt service-to-revenue ratio								
Baseline	7	6	6	6	5	5	6	5
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	7	6	6	5	5	5	9	14
A2. New public sector loans on less favorable terms in 2010-2030 2	7	6	6	6	6	5	4	3
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	7	7	7	6	6	5	6	5
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	7	6	7	8	8	7	11	7
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	7	7	8	7	6	6	7	6
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	7	6	6	6	6	5	6	5
B5. Combination of B1-B4 using one-half standard deviation shocks	7	7	6	6	5	5	5	5
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	7	9	9	8	7	7	8	7
<i>Memorandum item:</i>								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	7	7	7	7	7	7	7	7

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. Sudan: Public Sector Debt Sustainability Framework, Baseline Scenario, 2007-2030
(In percent of GDP, unless otherwise indicated)

	Actual			Average	Standard Deviation	Estimate					Projections				
	2007	2008	2009			2010	2011	2012	2013	2014	2015	2010-15 Average	2020	2030	2016-30 Average
Public sector debt 1/	83.5	72.5	78.8			72.7	69.3	66.5	64.2	62.9	61.2		47.5	30.8	
o/w foreign-currency denominated	69.7	60.8	63.6			59.0	55.2	51.6	48.8	46.9	45.5		34.7	19.4	
Change in public sector debt	-0.1	-11.0	6.4			-6.2	-3.4	-2.8	-2.3	-1.3	-1.7		-2.7	-1.3	
Identified debt-creating flows	-6.6	-14.0	3.6			-7.6	-5.5	-3.2	-2.5	-0.9	-1.2		-2.0	0.2	
Primary deficit	4.3	0.0	3.4	1.1	1.8	2.0	3.1	3.4	2.9	3.2	2.4	2.8	1.9	1.9	
Revenue and grants 6/	20.6	21.8	15.7			18.1	17.3	16.9	17.1	15.8	16.2		12.8	10.5	
of which: grants	0.6	0.5	0.6			0.9	0.6	0.5	0.5	0.5	0.5		0.5	0.3	
Primary (noninterest) expenditure	24.8	21.8	19.1			20.1	20.5	20.2	20.0	19.0	18.5		14.7	12.5	
Automatic debt dynamics	-10.8	-14.0	0.2			-9.6	-8.6	-6.6	-5.4	-4.1	-3.6		-3.9	-1.6	
Contribution from interest rate/growth differential	-9.3	-8.1	-3.3			-5.7	-5.0	-4.4	-3.6	-3.3	-3.0		-2.8	-1.3	
of which: contribution from average real interest rate	-1.6	-2.7	-0.1			-1.6	-0.8	-0.4	-0.3	0.0	0.1		0.0	0.4	
of which: contribution from real GDP growth	-7.7	-5.3	-3.1			-4.1	-4.2	-4.0	-3.2	-3.3	-3.1		-2.8	-1.7	
Contribution from real exchange rate depreciation	-1.5	-5.9	3.4			-3.9	-3.7	-2.2	-1.9	-0.8	-0.6		...	...
Other identified debt-creating flows	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	-0.2	
Privatization receipts (negative)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	-0.2	
Recognition of implicit or contingent liabilities	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Debt relief (HIPC and other)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Other (specify, e.g. bank recapitalization)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes	6.5	3.0	2.8			1.4	2.1	0.4	0.2	-0.4	-0.5		-0.7	-1.5	
Other Sustainability Indicators															
PV of public sector debt	...	...	77.8			71.4	68.0	65.1	62.8	61.5	59.7		46.4	30.2
o/w foreign-currency denominated	...	...	62.5			57.8	53.9	50.2	47.4	45.5	44.1		33.5	18.8
o/w external	...	...	62.5			57.8	53.9	50.2	47.4	45.5	44.1		33.5	18.8
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...
Gross financing need 2/	5.6	5.8	2.0			5.7	4.1	5.2	5.4	4.9	5.0		3.8	3.4	
PV of public sector debt-to-revenue and grants ratio (in percent)	...	...	494.5			394.1	392.4	385.8	368.1	390.3	369.6		362.0	286.4
PV of public sector debt-to-revenue ratio (in percent)	...	...	513.1			413.6	405.6	397.0	379.1	401.9	382.6		376.9	296.1
o/w external 3/	...	...	412.2			334.6	321.5	306.1	286.3	297.6	282.5		272.4	183.9
Debt service-to-revenue and grants ratio (in percent) 4/	7.8	9.7	13.8			12.3	12.1	12.1	11.5	11.6	11.1		13.2	14.2	
Debt service-to-revenue ratio (in percent) 4/	6.2	7.5	9.5			9.0	8.8	9.0	8.8	9.4	9.1		10.9	12.1	
Primary deficit that stabilizes the debt-to-GDP ratio	4.3	11.0	-3.0			8.2	6.5	6.2	5.2	4.5	4.1		4.6	3.2	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	10.2	6.8	4.5	8.0	4.9	5.5	6.2	6.2	5.1	5.4	5.1	5.6	5.9	5.5	5.6
Average nominal interest rate on forex debt (in percent)	0.6	0.5	0.7	0.8	0.3	0.7	0.7	0.7	0.7	0.8	0.8	0.7	0.8	0.8	0.8
Real exchange rate depreciation (in percent, + indicates depreciation)	-9.3	-6.0	16.7	-4.0	20.7	-5.7
Inflation rate (GDP deflator, in percent)	16.0	16.7	-9.9	13.0	16.8	15.5	5.6	6.4	5.9	3.7	3.2	6.7	5.1	3.7	4.4
Growth of real primary spending (deflated by GDP deflator, in percent)	0.1	-0.1	-0.1	0.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Grant element of new external borrowing (in percent)	13.8	13.3	13.0	13.2	12.9	12.9	13.2	10.4	8.4	...

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

1/ Indicate coverage of public sector, e.g., general government or nonfinancial public sector.

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.

6/ Revenues net of VAT transfers to Northern states projected at 0.65 percent of GDP during 2009-13.

Table 4. SudanSudan: Sensitivity Analysis for Key Indicators of Public Debt 2010-2030

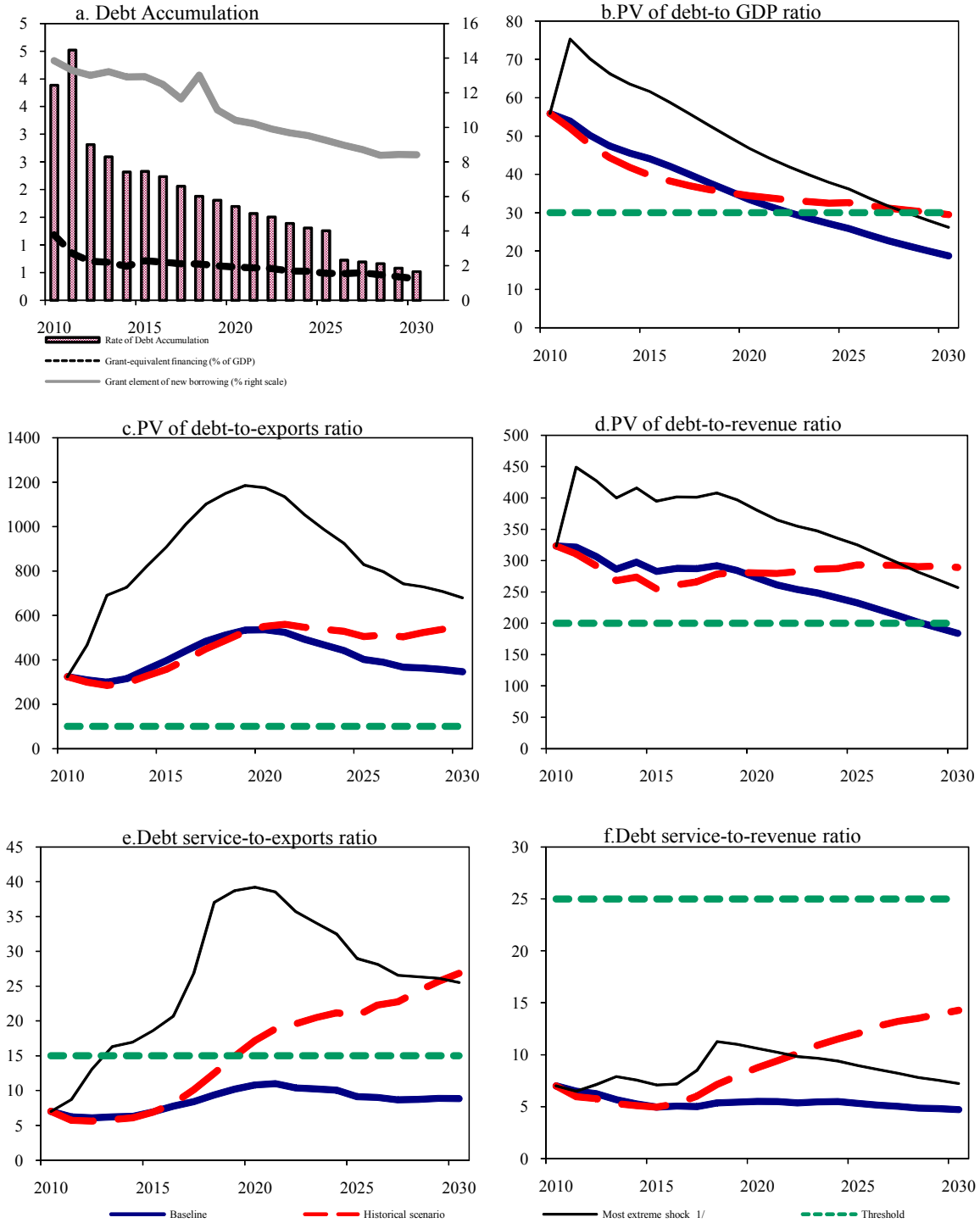
	Projections							
	2010	2011	2012	2013	2014	2015	2020	2030
PV of Debt-to-GDP Ratio								
Baseline	71	68	65	63	61	60	46	30
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	71	65	59	54	50	47	30	15
A2. Primary balance is unchanged from 2010	71	68	64	62	60	58	48	38
A3. Permanently lower GDP growth 1/	71	69	67	66	66	65	58	56
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	71	70	70	69	68	67	55	41
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	71	68	65	62	61	59	46	30
B3. Combination of B1-B2 using one half standard deviation shocks	71	67	64	62	61	59	47	33
B4. One-time 30 percent real depreciation in 2011	71	89	84	80	77	74	56	35
B5. 10 percent of GDP increase in other debt-creating flows in 2011	71	77	74	71	69	67	52	33
PV of Debt-to-Revenue Ratio 2/								
Baseline	394	392	386	368	390	370	362	286
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	394	375	351	318	319	289	238	146
A2. Primary balance is unchanged from 2010	394	390	380	362	381	363	378	365
A3. Permanently lower GDP growth 1/	394	397	396	385	415	402	450	530
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	394	406	417	403	432	414	431	385
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	394	391	383	365	387	367	359	285
B3. Combination of B1-B2 using one half standard deviation shocks	394	389	377	362	386	367	370	313
B4. One-time 30 percent real depreciation in 2011	394	516	499	469	491	461	436	332
B5. 10 percent of GDP increase in other debt-creating flows in 2011	394	447	438	417	440	417	406	317
Debt Service-to-Revenue Ratio 2/								
Baseline	12	12	12	11	12	11	13	14
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	12	12	11	10	9	8	7	6
A2. Primary balance is unchanged from 2010	12	12	12	11	11	11	14	19
A3. Permanently lower GDP growth 1/	12	12	12	12	12	12	17	29
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	12	12	13	13	13	13	17	21
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	12	12	12	11	11	11	13	14
B3. Combination of B1-B2 using one half standard deviation shocks	12	12	12	11	11	11	13	16
B4. One-time 30 percent real depreciation in 2011	12	13	15	14	14	14	17	19
B5. 10 percent of GDP increase in other debt-creating flows in 2011	12	12	15	15	15	14	18	17

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 length of the projection period.

2/ Revenues are defined inclusive of grants.

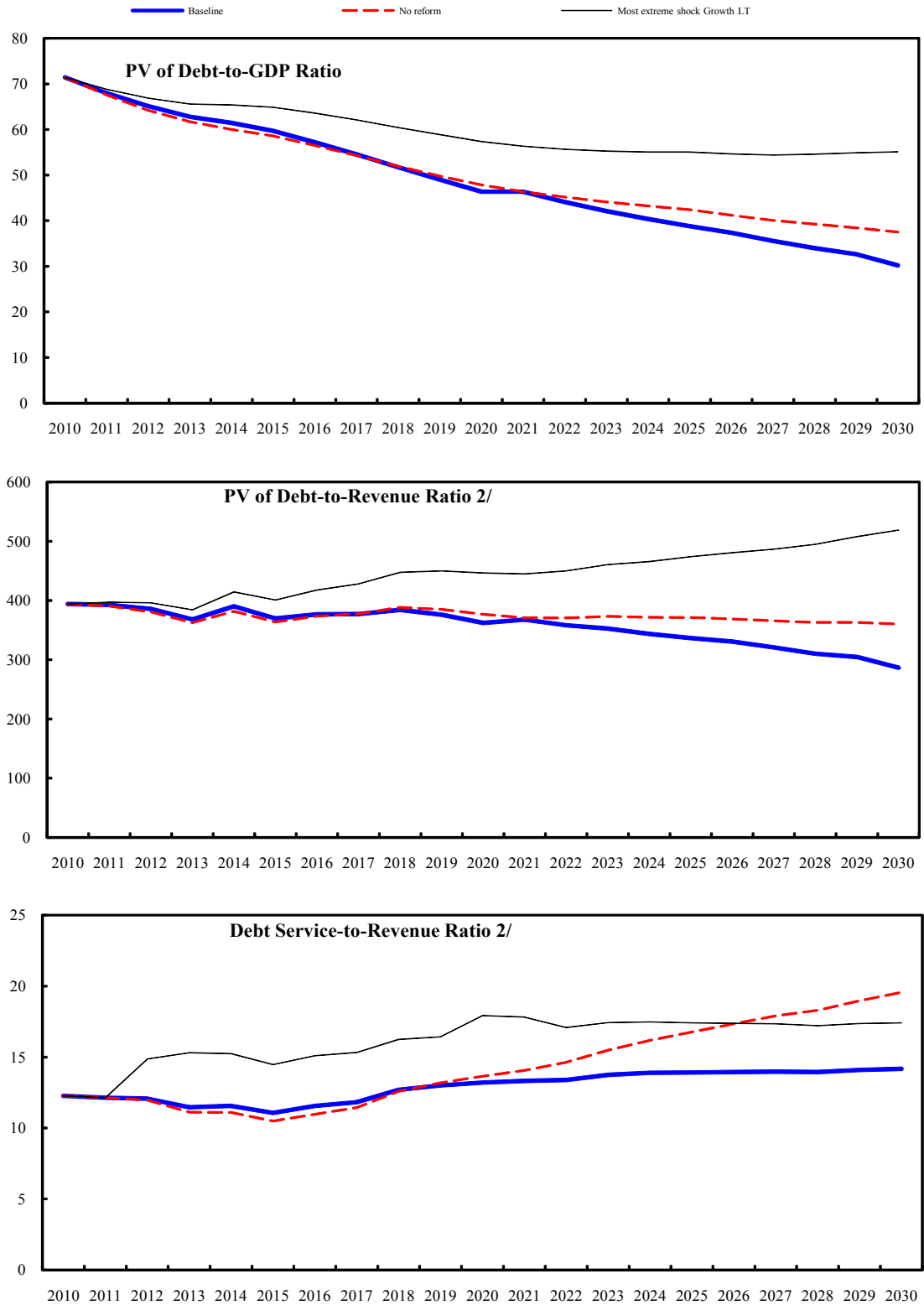
Figure 1. Sudan: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2010-2030 1/



Source: Staff projections and simulations.

1/ The most extreme stress test is the test that yields the highest ratio in 2020. In figure b. it corresponds to a One-time depreciation shock; in c. to a Exports shock; in d. to a One-time depreciation shock; in e. to a Exports shock and in picture f. to a Exports shock

Figure 2.Sudan: Indicators of Public Debt Under Alternative Scenarios, 2010-2030 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 2020.

2/ Revenues are defined inclusive of grants.