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STAFF REPORT FOR THE 2017 ARTICLE IV CONSULTATION—DEBT SUSTAINABILITY ANALYSIS

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This debt sustainability analysis (DSA) confirms that Sudan continues to be in debt distress.[1] *Both public and external debt ratios remain high, and the bulk of external debt is in arrears. Consistent with the results of past DSAs, Sudan's external debt is assessed to be unsustainable. All external debt indicators breach their indicative thresholds under the baseline scenario, and stay above the thresholds throughout the time horizon of the analysis. It is therefore critical for Sudan to undertake sound economic policies, including a prudent borrowing strategy, and to continue garnering support for debt relief.*

[1] This DSA was prepared jointly by IMF and World Bank staff under the joint Fund-Bank Low-Income Country (LIC) Debt Sustainability Framework (DSF). Sudan's Country Policy and Institutional Assessment (CPIA) Rating averaged 2.5 for 2016 and falls under the weak performer category. Sudan's fiscal year runs from January 1 to December 31.

BACKGROUND AND RECENT DEVELOPMENTS

1. The economy of Sudan has not fully adjusted to the secession of South Sudan in 2011, which resulted in a sharp decline in its oil exports and fiscal revenues. Sudan lost about three-quarters of oil production, two-thirds of exports, and half of fiscal revenues in the secession. A heavy debt burden, U.S. sanctions (which were revoked with effect from October 12, 2017), and volatile domestic and regional political environments continue to weigh on economic performance. A series of stabilization and reform efforts undertaken by the authorities during 2011-16 provided some support for the required economic adjustment, but fiscal and external imbalances persist.

2. Economic performance in 2016 was mixed. Economic growth increased slightly but remained modest at 3.5 percent. Inflation remained high at 17.8 percent reflecting loose fiscal and monetary policies, exchange rate depreciation and fuel and electricity price hikes. Oil-related revenues weakened further, partly offset by a decline in spending on subsidies, resulting in a fiscal deficit of 1.6 percent of GDP. The external current account deficit (accrual basis) narrowed due to a decline in imports, but remained high at 8.9 percent of GDP and international reserves remained low. Import growth weakened in light of measures taken in 2016, including: introduction of a commercial bank incentive rate close to the parallel rate and which is now used for many formal transactions; fuel and electricity price increases in November 2016; and the adoption a negative list on selected "luxury" imports.

3. In 2017, economic performance is expected to remained relatively unchanged. Economic growth is projected to slightly slowdown to 3.2 percent on the back of weaker domestic demand. Fiscal deficit is projected at 1.8 percent of GDP, while the current account deficit is expected to continue to improve driven by lower imports. Continued loose monetary policy conditions, hikes in fuel and electricity prices, and exchange rate depreciation have led to a sharp increase in inflation, which reached 35.1 percent in September 2017. Risks to the outlook are broadly balanced with large margins of uncertainty with the current set of policies in place.

4. Prospects for debt relief. Debt relief prospects are predicated on obtaining assurances of support from key creditors, normalizing relations with international financial institutions, and establishing a track record of cooperation with the IMF on policies and payments. In 2016, the Sudanese authorities agreed with South Sudan to extend the deadline for the "zero-option" until October 2018.[2] They also agreed to continue to reach out to creditors to garner support for debt relief.

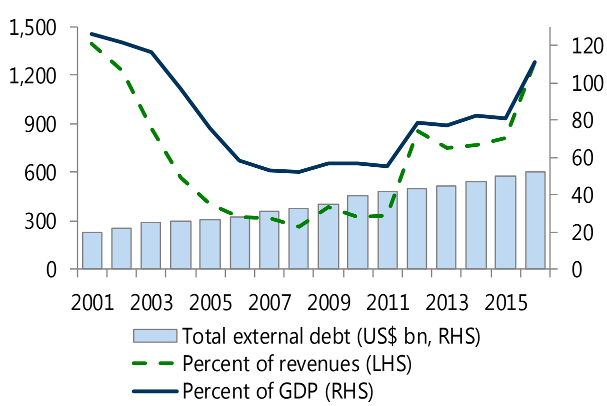
[2] The so-called "zero-option" is a 2012 agreement between Sudan and South Sudan whereby Sudan retains all the external liabilities after the secession of South Sudan, provided that the international community gives firm commitments of delivery of debt relief within two years. Absent such commitment, Sudan's external debt would be apportioned with South Sudan based on a formula to be determined. This deadline lapsed in September 2016, but the parties agreed to extend for two years to September 2018.

STRUCTURE OF DEBT

5. Sudan's external debt is very high and growing with the pace of the SDG depreciation.[3] It reached USD52.4 billion or 111 percent of GDP at end-2016 and, because of the large exchange rate depreciation, rose by 29.5 percent of GDP in 2016. On an end-of-period basis, the SDG depreciated about 59 percent in 2016 against the US dollar; on a period-average basis, however, the SDG depreciated by 36 percent against the US dollar. This discrepancy between end-of-period and period average exchange rate movements generates large residuals for 2016 in Table 1. In 2017, however, the debt-to-GDP ratio is projected to decline to 95 percent reflecting a sharp increase in prices (and nominal GDP) generated by pass-through of exchange rate depreciation, and sharp increases in fuel and electricity prices in November 2016—nominal GDP is projected to increase by 39 percent in 2017. This results in high residual yet again for 2017 in Table 1.

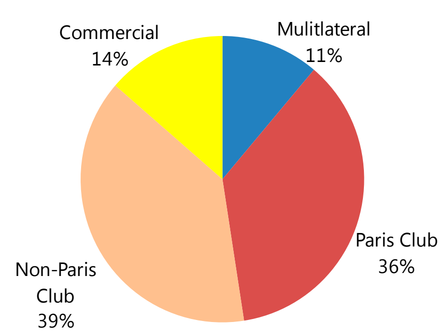
6. The structure of external debt has been stable over the last decade (Figures 1 and 2). It includes an estimated USD2.5 billion deposited in the Central Bank of Sudan by official creditors in 2016 and 2017.[4] About 84 percent of the external debt was in arrears in 2016. The bulk is public and publicly guaranteed (PPG) debt (USD50.7 billion, of which 85 percent are in arrears), mainly owed to bilateral creditors and roughly equally divided between Paris Club and non-Paris Club creditors Figure (2). Only a small fraction is private debt owed to suppliers (USD1.7 billion).

Figure 1. Stock of External Debt, 2001–16



Sources: Sudanese authorities, World Bank, and IMF staff estimates.

Figure 2. Structure of 2016 PPG External Debt



Sources: Sudanese authorities, World Bank, and IMF staff estimates

[3] Debt data were provided by the Sudanese authorities, complemented by information obtained during the 2011 external debt reconciliation exercise, as well as Fund and World Bank staffs' estimates.

[4] The $2.5 billion reflects deposits from friendly Gulf states including Saudi Arabia, Kuwait, and Qatar. It appears in the BOP under "Other capital flows (net); public."

Stock of External Debt

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total external debt (US$ million)	19,810	22,137	24,918	25,861	26,612	28,216	31,052	32,561	34,866	39,486	41,450	43,191	45,022	46,781	49,747	52,383
Percent of GDP (RHS)	126	122	117	97	76	58	53	52	57	57	55	79	77	83	81	111
Percent of exports	1,320	1,070	952	679	523	413	309	248	411	305	350	688	696	727	901	1,035
Percent of revenues (LHS)	1,400	1,231	874	565	400	326	315	260	389	328	334	860	747	767	813	1,282

Structure of Public and Publicly Guaranteed Debt

	2010		2016	
	(In US$ million)	(In percent)	(In US$ million)	(In percent)
Total PPG	**37,927**	**100.0**	**50,668**	**100.0**
Mulitlateral	**5,200**	**13.7**	**5,697**	**11.2**
Bilateral	**27,754**	**73.2**	**38,089**	**75.2**
Paris Club	13,964	36.8	18,360	36.2
Non-Paris Club	13,790	36.4	19,730	38.9
Commercial	**4,974**	**13.1**	**6,881**	**13.6**

Sources: Sudanese authorities; and IMF staff estimates.

7. **External public borrowing has been limited in recent years.** Sudan has been largely cut off from access to external financing due to its arrears with the creditors and U.S. sanctions. It has been only able to contract new debt—below 1 percent of GDP per year since 2012–with a limited number of multilateral and non-Paris Club bilateral creditors. The newly contracted debt has been mainly used to finance projects in the agriculture, services and energy sectors. In 2016, some USD319 million of new debt (0.6 percent of GDP) was contracted, all from bilateral creditors. There has not been any new private external debt in decades. In addition, official creditors from friendly Gulf countries deposited an estimated USD1.6 billion in the Central Bank of Sudan in 2015 and USD0.8 billion in 2016.[5] These amounts were added to outstanding debt. So far in 2017, only one bilateral loan of USD170 million was contracted to finance projects in electricity generation.

8. **Sudan's total public debt reached 116 percent of GDP by end-2016.**[6] The bulk of the public debt is external debt. Domestic debt reached 8.4 percent of GDP by end-2016. Domestic debt is expected to rise to about 12 percent of GDP by 2037 given the elevated deficits and limited external financing.

[5] The authorities did not disclose the exact terms and conditions of the deposits. However, they indicated that the interest rate was about 4–5 percent, and the average maturity in the range of 5–7 years.

[6] The decline in debt-to-GDP ratios in 2015–16 was partly due to high inflation and nominal GDP growth based on the weighted average exchange rate between official and parallel market.

New External Debt Contracted (2012–17)

	2012	2013	2014	2015	2016	2017Q2
Total new debt (in US$ million)	**431**	**618**	**152**	**262**	**319**	**170**
In percent of GDP	**0.6**	**1.1**	**0.2**	**0.4**	**0.6**	**0.3**
Of which:						
Concessional	134	16	5	6	-	-
Nonconcessional	296	602	147	256	319	170
By creditor (in percent)						
Multilateral	79	48	65	63	-	-
Non-Paris Club bilateral	21	52	35	37	100	100
Average grant element (in percent)	**30**	**28**	**27**	**22**	**27**	**35**
By sector (in percent)	**100**	**100**	**100**	**100**	**100**	**100**
Agriculture	32	38	-	2	62	-
Energy	7	47	33	-	-	-
Services	61	-	36	34	38	100
Industrial Development	-	6	31	-	-	-
Other	-	10	-	63	-	-

Sources: Sudanese authorities; and IMF staff calculations.

DEBT SUSTAINABILITY ANALYSIS

A. Underlying Assumptions

9. The macroeconomic assumptions underlying this DSA have been updated based on developments in 2016 and 2017H1 (Box 1). The baseline scenario assumes a deteriorating fiscal deficit and monetizing of the deficit, an overvalued official exchange rate and permanent removal of sanctions. As in previous DSAs, this DSA update does not include arrears clearance, possible external debt relief, or debt apportionment between Sudan and South Sudan in its baseline or alternative scenarios.

B. External Debt Sustainability

10. Sudan's external debt stock remains unsustainable under the baseline scenario (Figure 1 and Table 1). All PPG external debt level ratios continue to breach their indicative thresholds throughout the 20-year projection period. The present value (PV) of PPG external debt is at about 166 percent of GDP at end-2016—more than fivefold the 30 percent threshold for weak policy performers—and is projected to stay above the threshold through the projection period.[7] Similarly, in 2016, the PV of debt-to-exports is about 1,860 percent and the PV of debt-to-revenue ratio is about 1,930 percent, well above their respective thresholds. Despite the improvement in the PV of debt-to-exports over the medium to long run, the other two ratios will continue to deteriorate, keeping the debt at unsustainable levels. Under the historical

[7] Ratios in terms of GDP are calculated using a weighed exchange rate between the official and the parallel market rate.

averages scenario, the debt path shows improvements over the medium/long-terms given the lower current account deficit (3.7 percent of GDP average for 2007–16). However, since Sudan lost most of its oil revenue in the secession, and policy adjustment has been incomplete, the outlook for the current account balance has worsened.

Box 1. Macroeconomic Assumptions 2017–37

Natural resources. Oil production is projected at 90 thousand barrels/day in 2017, slightly lower than the 2016 production level. Ageing oil fields and a low international oil price outlook along with moderate expansion of further exploration keep oil production flat at 90 thousand barrels/day over the medium term. Meanwhile, non-oil GDP is projected to grow by about 3.4 percent, on average, by 2022 and remain stable afterwards. Price projections are guided by the IMF's latest World Economic Outlook (WEO). The price of Sudan's crude oil is projected to average USD$47/barrel in the medium term.

Real sector. Real GDP growth rate is expected to slightly decline to 3.2 percent in 2017 driven by weaker domestic demand. Real growth is expected to increase to 4 and 3.7 percent in 2018 and 2019, respectively, boosted by the impact of sanctions removal, and then gradually decline to 3 percent by 2022, and remain unchanged on average over 2022–37. Medium-term real GDP growth mainly reflects our baseline scenario assumptions: sanctions have been revoked, but there is no further progress toward debt relief, nor do the authorities undertake far-reaching economic reforms.[1] With a still-overvalued exchange rate, weak business environment, and loose fiscal policies financed by money creation, macro imbalances are likely to intensify, compromising growth prospects. Inflation, as measured by the GDP deflator, is projected to slightly increase from about 25.7 percent in 2017 to about 26 percent in 2022. Inflation is expected to increase in the medium to long term averaging 31.2 percent in 2023–37.

Fiscal sector. The fiscal deficit is projected to deteriorate over the medium term to 3.7 percent by 2022, reflecting a combination of revenue losses arising from the substantial use of the overvalued official exchange rate for government transactions and dwindling oil revenues, and unchanged pattern in current spending. Over the long run post-2022, the fiscal deficit is expected to stabilize at 3.5 percent through 2032 and thereafter improve slightly to 3.4 percent by 2037. Under those assumptions, the domestic debt-to-GDP ratio is projected to rise over the long run.

External sector. The current account deficit is expected to worsen over the medium term, to a high of about 8.5 percent of GDP by end-2022, reflecting the deteriorating effect of fiscal deficit as well as stable growth in real GDP. In the long run, it is projected to remain elevated at 6.3 percent of GDP, on average. The deficit will be financed by foreign direct investment and continued accumulation of external debt. Sizable financing gap are assumed to be covered by external debt throughout the projection period.

External debt. Reflecting continued limited access to international finance and a deteriorating debt service capacity, disbursements of new loans are expected to be limited, at about 0.6 percent of GDP during 2017–37. In line with the recent portfolio of new contracted debt, the share of new concessional loans is assumed at around one-third. It is assumed that Sudan will continue not to service obligations arising from the stock of arrears. In addition, the projected financing gaps are added to the external debt stock.

1/ For more information on sources of growth in Sudan, see IMF Country Report No. 16/324, Annex II.

11. In addition, Sudan's debt outlook is vulnerable to a range of shocks (Figure 1 and Table 2). The PV of debt-to-GDP is most vulnerable to a one-time depreciation shock, whereas the PV of debt-to-exports and debt service-to-exports ratios are most vulnerable to an export shock. The debt-to-revenue and debt service-to-revenue ratios are most vulnerable to a GDP deflator shock. A standard one-time 30 percent depreciation shock in 2018 would increase the PV-of-debt to 188 percent of GDP in that year and remain elevated over the projection horizon.[8]

C. Public Debt Sustainability

12. Public DSA remain unsustainable and continue to mirror those of the external DSA (Figure 2 and Table 3). The debt ratios, remain at relatively high levels in the long term. The present value of public debt is about 172 percent of GDP at end of 2016 and will remain above the threshold through the projection period reaching about 200 percent of GDP by 2037. Similarly, the PV of public debt to revenue will increase to about 2,732 percent from its current level of 1,974 percent by end of 2016.

13. Like the external DSA, the public DSA bound tests show that public debt path is most **vulnerable** to a one-time 30 percent real depreciation (Table 4).

CONCLUSIONS

14. Sudan's external debt remains in distress and unsustainable. The results of this DSA are broadly unchanged from those in previous DSAs, as no major policy correction has been undertaken and no debt relief has been granted to Sudan. In addition, the debt burden increases over time as the amounts needed to close projected financing gaps are added to the outstanding debt stocks. In the long term, all public and public-guaranteed external debt burden ratios remain well above their respective indicative thresholds. Public debt is also unsustainable, driven mostly by external debt dynamics.

15. Further efforts are needed for Sudan to obtain much-needed debt relief and regain access to external financing. Sudan needs to: (i) step up outreach efforts to its creditors to garner broad support for debt relief; (ii) continue to cooperate with the IMF on economic policies and payments with a view to establishing a track record of sound macro policies; (iii) continue efforts to develop a full-fledged PRSP; and (iii) minimize new borrowing on non-concessional terms, since it further increases the future debt burden, and instead secure foreign support on highly concessional terms to finance necessary development and infrastructure expenditures.

16. The authorities generally agreed with the results and assessments of the DSA. They agreed that external debt is at unsustainable levels, debt service burdens are beyond Sudan's debt servicing capacity, and as a result Sudan continues to accumulate external debt arrears. They agreed that non-concessional borrowing is costly and therefore should be minimized. They reiterated that debt relief is urgently needed for economic development, and remain hopeful that the international community will

[8] The peaks in debt service in 2022 in Figure 1 are due to estimated bullet repayments of central bank deposits.

provide debt relief in the near future. In this regard, the authorities are committed to continue reaching out to creditors.

17. The authorities are developing a national debt strategy. In February 2016, they held a donor-sponsored workshop to formulate a national debt policy. The workshop included a high-level seminar exploring the experience of Ethiopia in receiving HIPC and MDRI debt relief and was followed by a trip to Addis Ababa. The resulting national debt strategy is awaiting approval by the government. The strategy focuses on debt management and meeting the requirements to receive HIPC along with developing domestic debt markets to finance development projects. The authorities consider that technical assistance on external debt management, external debt statistics, macroeconomic policies, and financial programming would be helpful to advance their debt strategy.

Table 1. Sudan: External Debt Sustainability Framework, Baseline Scenario, 2014-2037 1/

(In percent of GDP, unless otherwise indicated)

	Actual			Historical 6/	Standard 6/	Projections									
				Average	Deviation							2017-2022			2023-2037
	2014	2015	2016			2017	2018	2019	2020	2021	2022	Average	2027	2037	Average
External debt (nominal) 1/	**82.8**	**81.3**	**110.8**			**94.9**	**97.7**	**99.6**	**101.7**	**104.3**	**104.2**		**124.8**	**169.6**	
of which: public and publicly guaranteed (PPG)	80.1	78.6	107.8			92.0	94.8	96.7	98.8	101.5	101.4		121.7	164.8	
Change in external debt	5.4	-1.5	29.5			-15.9	2.8	1.8	2.1	2.6	-0.1		4.5	4.3	
Identified net debt-creating flows	-2.3	5.3	16.1			1.4	1.4	1.6	2.3	2.9	4.1		2.8	1.1	
Non-interest current account deficit	**5.3**	**7.6**	**6.0**	**3.7**	**3.6**	**2.6**	**3.7**	**3.8**	**4.2**	**4.6**	**5.2**		**5.6**	**6.8**	6.0
Deficit in balance of goods and services	6.0	7.2	6.3			3.5	4.6	4.8	5.2	5.7	6.4		6.8	8.5	
Exports	10.3	8.6	8.8			8.9	9.2	9.5	9.4	9.1	8.6		10.1	16.1	
Imports	16.4	15.8	15.1			12.5	13.8	14.3	14.6	14.8	15.0		16.9	24.6	
Net current transfers (negative = inflow)	-1.8	-0.5	-0.9	-1.5	0.8	-1.6	-1.6	-1.7	-1.8	-1.9	-2.0		-2.0	-2.7	-2.2
of which: official	-1.0	0.1	0.1			-0.6	-0.6	-0.6	-0.7	-0.8	-0.8		-0.8	-0.9	
Other current account flows (negative = net inflow)	1.1	0.9	0.5			0.7	0.7	0.8	0.8	0.8	0.8		0.9	1.0	
Net FDI (negative = inflow)	**-2.5**	**-2.9**	**-2.0**	**-3.5**	**0.9**	**-1.2**	**-1.5**	**-1.5**	**-1.5**	**-1.5**	**-1.5**		**-2.0**	**-3.8**	-2.5
Endogenous debt dynamics 2/	**-5.1**	**0.7**	**12.1**			**0.0**	**-0.8**	**-0.7**	**-0.4**	**-0.2**	**0.4**		**-0.9**	**-2.0**	
Contribution from nominal interest rate	2.6	2.9	3.1			3.4	2.9	2.9	2.8	2.8	3.5		3.0	3.5	
Contribution from real GDP growth	-2.2	-2.4	-3.2			-3.4	-3.7	-3.5	-3.2	-3.1	-3.1		-3.9	-5.5	
Contribution from price and exchange rate changes	-5.5	0.2	12.2			...	...	...	...	...	...		...	...	
Residual (3-4) 3/	**7.7**	**-6.8**	**13.4**			**-14.9**	**-0.9**	**-0.6**	**-0.5**	**-0.7**	**-4.5**		**1.8**	**3.2**	
of which: exceptional financing	-3.0	-2.2	-3.2			-3.0	-2.9	-2.9	-2.8	-2.7	-4.2		-3.2	-3.2	
PV of external debt 4/	...	...	166.2			140.4	141.9	141.7	141.7	142.3	139.5		153.8	192.8	
In percent of exports	...	...	1893.4			1569.8	1549.7	1493.6	1510.9	1562.6	1629.8		1518.9	1194.3	
PV of PPG external debt	**...**	**...**	**163.2**			**137.5**	**139.0**	**138.9**	**138.9**	**139.5**	**136.7**		**150.6**	**188.0**	
In percent of exports	**...**	**...**	**1859.5**			**1537.6**	**1518.1**	**1463.3**	**1480.5**	**1531.4**	**1596.7**		**1487.8**	**1164.8**	
In percent of government revenues	**...**	**...**	**1932.0**			**1663.5**	**1663.5**	**1738.8**	**1840.1**	**1919.5**	**1975.4**		**2151.7**	**2579.0**	
Debt service-to-exports ratio (in percent)	**32.7**	**37.1**	**33.5**			**37.1**	**36.1**	**34.1**	**33.9**	**34.7**	**69.9**		**31.5**	**36.5**	
PPG debt service-to-exports ratio (in percent)	**32.3**	**36.6**	**33.0**			**36.5**	**35.6**	**33.6**	**33.3**	**34.0**	**69.2**		**30.6**	**35.4**	
PPG debt service-to-revenue ratio (in percent)	**32.5**	**32.5**	**34.2**			**39.5**	**39.0**	**39.9**	**41.4**	**42.6**	**85.6**		**44.3**	**78.4**	
Total gross financing need (Billions of U.S. dollars)	3.9	5.0	4.0			2.9	3.4	3.5	3.8	4.2	6.7		4.8	6.0	
Non-interest current account deficit that stabilizes debt ratio	-0.1	9.1	-23.6			18.5	0.9	2.0	2.0	2.0	5.3		1.1	2.5	
Key macroeconomic assumptions															
Real GDP growth (in percent)	3.2	3.0	3.5	1.0	5.1	3.2	4.0	3.7	3.3	3.1	3.0	3.4	3.2	3.3	3.2
GDP deflator in US dollar terms (change in percent)	7.7	-0.2	-13.1	2.3	13.1	2.2	-2.4	-0.8	-0.4	-0.5	-0.2	-0.4	-2.8	-4.4	-3.3
Effective interest rate (percent) 5/	3.8	3.6	3.4	4.3	0.6	3.2	3.1	3.0	2.9	2.9	3.4	3.1	2.5	2.1	2.4
Growth of exports of G&S (US dollar terms, in percent)	-0.5	-14.3	-8.3	1.9	32.8	7.5	3.9	6.6	1.7	-0.4	-3.4	2.7	4.1	4.3	4.1
Growth of imports of G&S (US dollar terms, in percent)	-5.3	-0.4	-14.5	-0.7	6.8	-12.7	12.2	6.5	5.1	4.5	3.8	3.2	3.2	3.3	3.2
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	35.2	33.3	33.1	33.0	32.9	32.9	33.4	32.7	32.4	32.6
Government revenues (excluding grants, in percent of GDP)	10.3	9.7	8.4			8.3	8.4	8.0	7.5	7.3	6.9		7.0	7.3	7.1
Aid flows (in Billions of US dollars) 7/	0.4	0.2	0.1			0.2	0.1	0.1	0.1	0.1	0.1		0.0	0.0	
of which: Grants	0.4	0.2	0.1			0.2	0.1	0.1	0.1	0.1	0.1		0.0	0.0	
of which: Concessional loans	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			0.5	0.9	1.0	1.1	1.1	1.1		0.9	0.7	0.9
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			52.8	40.3	38.2	36.8	35.9	35.5		34.2	33.5	34.0
Memorandum items:															
Nominal GDP (Billions of US dollars)	62.3	64.1	57.6			60.8	61.7	63.5	65.3	67.0	68.9		71.0	67.0	
Nominal dollar GDP growth	11.1	2.8	-10.0			5.5	1.5	2.9	2.9	2.6	2.8	3.0	0.3	-1.3	-0.2
PV of PPG external debt (in Billions of US dollars)			76.7			78.2	80.2	82.4	84.8	87.4	88.1		100.0	117.8	
(PVt-PVt-1)/GDPt-1 (in percent)						2.6	3.3	3.6	3.8	4.0	1.0	3.0	3.6	1.2	2.8
Gross workers' remittances (Billions of US dollars)	0.9	0.7	0.9			0.9	1.0	1.0	1.1	1.2	1.2		1.3	1.7	
PV of PPG external debt (in percent of GDP + remittances)	...	...	160.8			135.5	136.9	136.6	136.6	137.1	134.3		147.8	183.5	
PV of PPG external debt (in percent of exports + remittances)	...	...	1588.2			1317.7	1298.9	1246.3	1254.9	1287.5	1324.2		1252.7	1009.5	
Debt service of PPG external debt (in percent of exports + remittances)	...	...	28.1			31.3	30.4	28.6	28.2	28.6	57.4		25.8	30.7	

Sources: Country authorities; and staff estimates and projections.

1/ Includes both public and private sector external debt.

2/ Derived as [r - g - ρ(1+g)]/(1+g+ρ+gρ) times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and ρ = growth rate of GDP deflator in U.S. dollar terms.

3/ Includes exceptional financing (i.e., changes in arrears and debt relief); changes in gross foreign assets; and valuation adjustments (Notably, the large residuals for 2016 and 2017 is due to large exchange rate depreciation and valuation adjustment). 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.

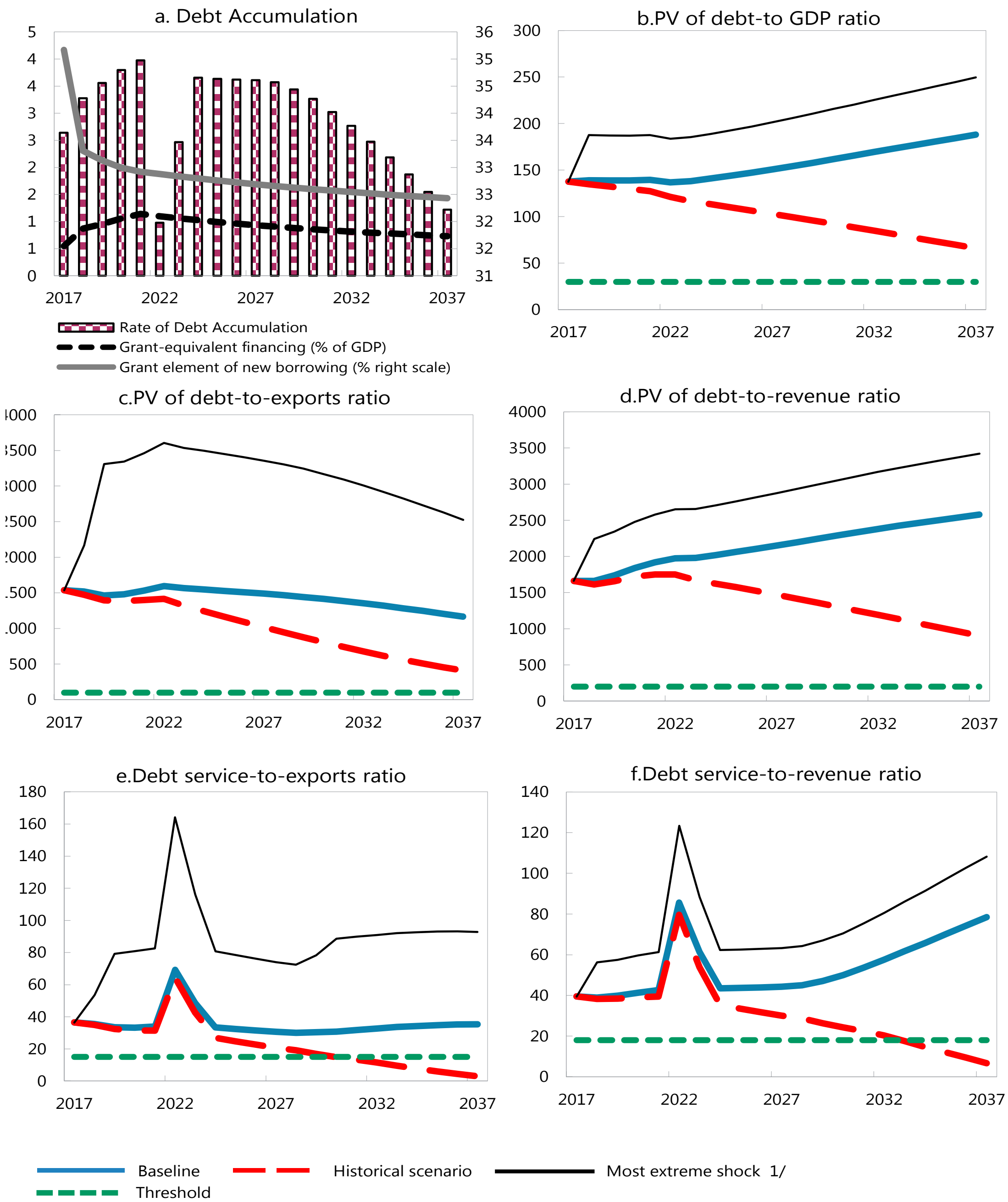
5/ Current-year interest payments divided by previous period debt stock.

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).

Figure 1. Sudan: Indicators of Public and Publicly Guaranteed External Debt under Alternative Scenarios, 2017-2037 1/



Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio on or before 2027. 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 figure f. to a One-time depreciation shock

Table 2. Sudan: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2017-2037

(In percent)

	Projections							
	2017	2018	2019	2020	2021	2022	**2027**	2037
PV of debt-to GDP ratio								
Baseline	138	139	139	139	139	137	**151**	188
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2017-2037 1/	138	135	132	130	127	121	**103**	66
A2. New public sector loans on less favorable terms in 2017-2037 2	138	130	131	131	133	131	**148**	193
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	138	141	152	152	153	149	**164**	203
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	138	132	135	135	136	133	**147**	176
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	138	142	157	157	158	154	**169**	210
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	138	130	129	129	130	127	**139**	173
B5. Combination of B1-B4 using one-half standard deviation shocks	138	140	155	155	156	152	**167**	204
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	138	188	187	187	188	184	**201**	249
PV of debt-to-exports ratio								
Baseline	1538	1518	1463	1480	1531	1597	**1488**	1165
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2017-2037 1/	1538	1473	1396	1385	1398	1415	**1017**	409
A2. New public sector loans on less favorable terms in 2017-2037 2	1538	1425	1379	1401	1457	1528	**1459**	1195
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	1538	1419	1366	1381	1427	1486	**1377**	1070
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	1538	2166	3308	3345	3458	3607	**3356**	2526
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	1538	1419	1366	1381	1427	1486	**1377**	1070
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	1538	1417	1364	1378	1424	1483	**1375**	1070
B5. Combination of B1-B4 using one-half standard deviation shocks	1538	1730	2108	2131	2203	2295	**2131**	1633
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	1538	1419	1366	1381	1427	1486	**1377**	1070
PV of debt-to-revenue ratio								
Baseline	1663	1664	1739	1840	1920	1975	**2152**	2579
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2017-2037 1/	1663	1614	1658	1722	1753	1751	**1471**	905
A2. New public sector loans on less favorable terms in 2017-2037 2	1663	1561	1638	1742	1826	1890	**2110**	2647
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	1663	1686	1905	2014	2099	2157	**2338**	2781
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	1663	1579	1695	1793	1870	1925	**2093**	2413
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	1663	1699	1971	2083	2171	2232	**2418**	2877
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	1663	1553	1621	1713	1786	1835	**1988**	2368
B5. Combination of B1-B4 using one-half standard deviation shocks	1663	1680	1943	2054	2141	2202	**2390**	2805
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	1663	2244	2344	2478	2582	2654	**2876**	3421

Table 2. Sudan: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2017-2037 (concluded)

(In percent)

	Projections							
	2017	2018	2019	2020	2021	2022	**2027**	2037
Debt service-to-exports ratio								
Baseline	37	36	34	33	34	69	**31**	35
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2017-2037 1/	37	35	32	31	31	64	**21**	3
A2. New public sector loans on less favorable terms in 2017-2037 2	37	36	34	34	35	71	**35**	45
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	37	36	34	33	34	69	**30**	34
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	37	53	79	81	83	164	**74**	93
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	37	36	34	33	34	69	**30**	34
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	37	36	33	33	34	69	**30**	34
B5. Combination of B1-B4 using one-half standard deviation shocks	37	43	51	51	52	106	**47**	55
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	37	36	34	33	34	69	**30**	34
Debt service-to-revenue ratio								
Baseline	40	39	40	41	43	86	**44**	78
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2017-2037 1/	40	38	38	39	39	80	**30**	7
A2. New public sector loans on less favorable terms in 2017-2037 2	40	39	40	42	44	88	**51**	101
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	40	42	47	48	50	100	**51**	88
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	40	39	41	43	45	88	**46**	89
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	40	43	48	50	52	104	**53**	91
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	40	39	40	41	42	85	**44**	74
B5. Combination of B1-B4 using one-half standard deviation shocks	40	42	47	50	51	101	**53**	95
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	40	56	57	60	61	123	**63**	108
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	32	32	32	32	32	32	**32**	32

Sources: Country authorities; and staff estimates and projections.

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

Table 3. Sudan: Public Sector Debt Sustainability Framework, Baseline Scenario, 2014–2037
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 5/	Standard Deviation 5/	Estimate	Projections								
	2014	2015	2016			2017	2018	2019	2020	2021	2022	2017-22 Average	2027	2037	2023-37 Average
Public sector debt 1/	90.2	90.5	116.2			99.6	102.9	105.1	107.5	110.2	110.5		131.9	176.9	
of which: foreign-currency denominated	80.1	78.6	107.8			92.0	94.8	96.7	98.8	101.5	101.4		121.7	164.8	
Change in public sector debt	5.8	0.3	25.7			-16.6	3.3	2.2	2.4	2.7	0.3		4.5	4.2	
Identified debt-creating flows	3.7	-3.6	26.8			-16.5	2.0	0.7	0.9	1.3	1.9		3.7	6.5	
Primary deficit	0.5	1.0	1.1	0.8	1.5	1.3	1.6	1.9	2.5	2.8	3.2	2.2	3.1	3.4	3.2
Revenue and grants	10.8	10.0	8.7			8.6	8.6	8.2	7.7	7.4	7.0		7.1	7.3	
of which: grants	0.6	0.3	0.2			0.3	0.2	0.2	0.2	0.1	0.1		0.1	0.0	
Primary (noninterest) expenditure	11.3	11.1	9.8			9.8	10.2	10.1	10.2	10.2	10.2		10.2	10.7	
Automatic debt dynamics	3.2	-4.6	25.6			-17.8	0.4	-1.2	-1.5	-1.5	-1.3		0.5	3.1	
Contribution from interest rate/growth differential	-20.1	-11.6	-13.5			-29.7	-17.1	-19.0	-20.7	-22.5	-24.3		-28.3	-36.9	
of which: contribution from average real interest rate	-17.5	-9.0	-10.4			-26.1	-13.3	-15.3	-17.3	-19.3	-21.1		-24.4	-31.5	
of which: contribution from real GDP growth	-2.6	-2.6	-3.1			-3.6	-3.8	-3.7	-3.4	-3.2	-3.2		-4.0	-5.5	
Contribution from real exchange rate depreciation	23.3	7.0	39.1			11.9	17.5	17.8	19.2	21.0	23.0		...	...	
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	0.0	
Privatization receipts (negative)	0.0	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	
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	2.1	3.9	-1.0			-0.1	1.3	1.5	1.5	1.4	-1.6		0.9	-2.3	
Other Sustainability Indicators															
PV of public sector debt	...	...	171.7			145.1	147.1	147.3	147.5	148.2	145.8		160.8	200.2	
of which: foreign-currency denominated	...	...	163.2			137.5	139.0	138.9	138.9	139.5	136.7		150.6	188.0	
of which: external	...	...	163.2			137.5	139.0	138.9	138.9	139.5	136.7		150.6	188.0	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	4.5	3.9	2.8			3.1	3.4	3.7	4.2	4.5	7.4		5.0	7.2	
PV of public sector debt-to-revenue and grants ratio (in percent)	...	...	1974.3			1697.3	1713.1	1801.5	1913.1	2000.5	2071.1		2276.9	2732.4	
PV of public sector debt-to-revenue ratio (in percent)	...	...	2031.6			1755.2	1759.7	1844.0	1954.8	2039.7	2107.4		2297.0	2745.3	
of which: external 3/	...	...	1932.0			1663.5	1663.5	1738.8	1840.1	1919.5	1975.4		2151.7	2579.0	
Debt service-to-revenue and grants ratio (in percent) 4/	50.3	46.0	42.5			45.4	44.2	45.2	46.9	48.5	90.5		53.6	89.4	
Debt service-to-revenue ratio (in percent) 4/	53.1	47.4	43.7			46.9	45.4	46.2	48.0	49.4	92.1		54.1	89.8	
Primary deficit that stabilizes the debt-to-GDP ratio	-5.3	0.7	-24.6			17.9	-1.6	-0.3	0.0	0.1	2.9		-1.4	-0.8	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	3.2	3.0	3.5	1.0	5.1	3.2	4.0	3.7	3.3	3.1	3.0	3.4	3.2	3.3	3.2
Average nominal interest rate on forex debt (in percent)	3.9	3.7	3.5	4.4	0.6	3.3	3.2	3.1	3.0	2.9	3.5	3.1	2.5	2.0	2.4
Average real interest rate on domestic debt (in percent)	-21.5	-7.7	-10.1	-7.6	9.3	-20.7	-12.3	-14.5	-16.2	-17.7	-19.9	-16.9	-17.6	-16.3	-17.3
Real exchange rate depreciation (in percent, + indicates depreciation	41.1	10.1	58.7	23.4	23.8	14.9	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	32.1	16.0	17.8	20.4	10.4	34.7	20.0	22.0	24.2	26.3	28.8	26.0	28.0	26.0	27.4
Growth of real primary spending (deflated by GDP deflator, in percer	13.0	-4.2	-17.0	-0.9	7.2	8.6	10.3	3.0	4.6	3.3	-1.3	4.8	2.7	2.7	3.0
Grant element of new external borrowing (in percent)	...	...	...	...	...	35.2	33.3	33.1	33.0	32.9	32.9	33.4	32.7	32.4	...

Sources: Country authorities; and 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.

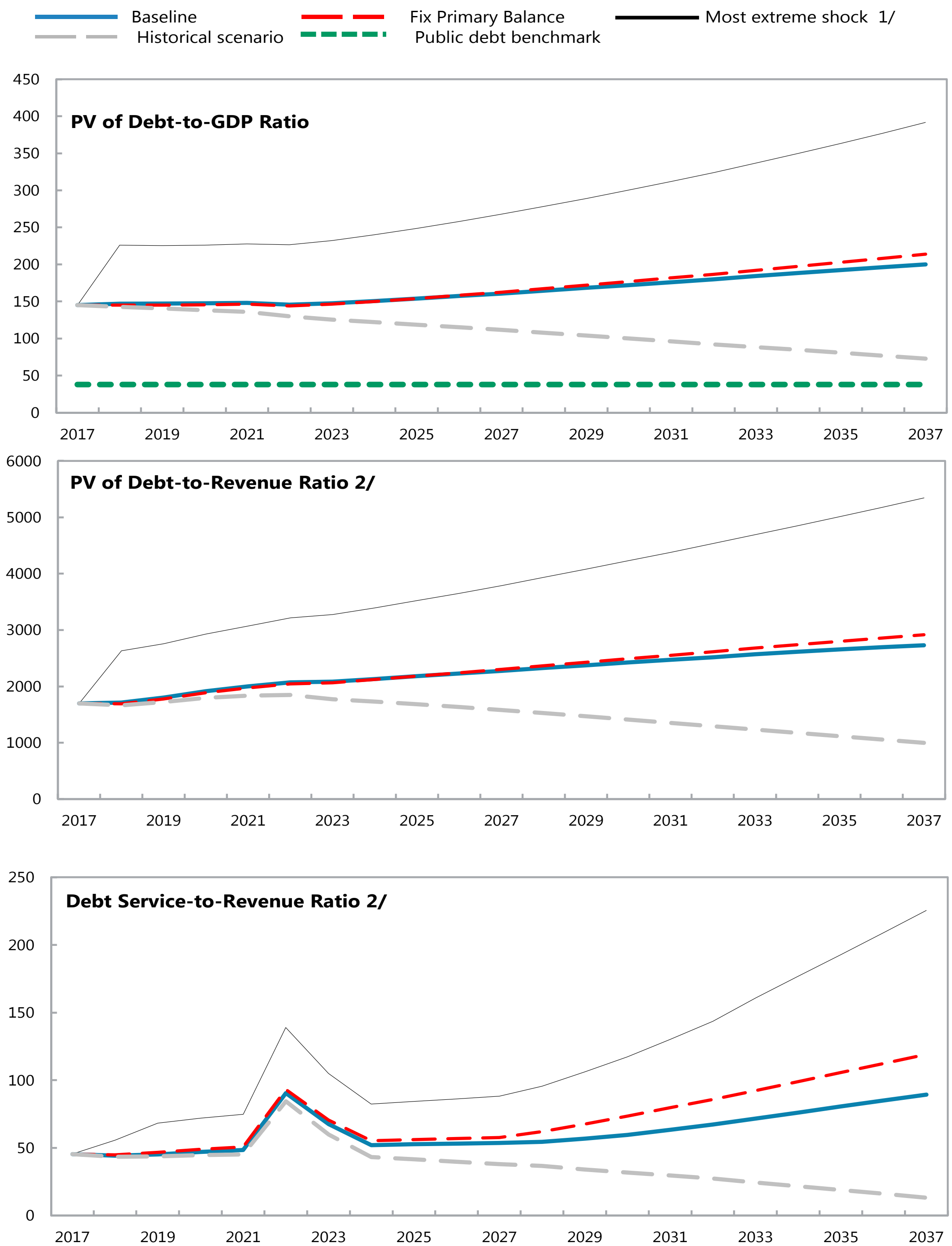
5/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

Table 4. Sudan: Sensitivity Analysis for Key Indicators of Public Debt 2017–2037

		Projections						
	2017	2018	2019	2020	2021	2022	2027	2037
PV of Debt-to-GDP Ratio								
Baseline	145	147	147	148	148	146	161	200
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	145	143	141	138	136	130	112	73
A2. Primary balance is unchanged from 2017	145	145	145	145	146	144	163	214
A3. Permanently lower GDP growth 1/	145	147	149	152	156	157	198	330
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2018-201	145	158	173	175	178	178	215	321
B2. Primary balance is at historical average minus one standard deviations in 2018-201	145	146	146	148	149	148	175	252
B3. Combination of B1-B2 using one half standard deviation shocks	145	153	162	164	166	166	199	294
B4. One-time 30 percent real depreciation in 2018	145	226	225	226	228	226	268	392
B5. 10 percent of GDP increase in other debt-creating flows in 2018	145	152	153	154	156	155	184	262
PV of Debt-to-Revenue Ratio 2/								
Baseline	1697	1713	1801	1913	2000	2071	2277	2732
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	1697	1664	1722	1796	1834	1847	1582	997
A2. Primary balance is unchanged from 2017	1697	1690	1776	1886	1974	2044	2302	2917
A3. Permanently lower GDP growth 1/	1697	1711	1824	1971	2102	2225	2803	4501
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2018-201	1697	1837	2103	2257	2391	2514	3037	4372
B2. Primary balance is at historical average minus one standard deviations in 2018-201	1697	1697	1792	1913	2016	2108	2484	3436
B3. Combination of B1-B2 using one half standard deviation shocks	1697	1784	1974	2115	2237	2346	2811	4005
B4. One-time 30 percent real depreciation in 2018	1697	2632	2758	2928	3072	3215	3791	5345
B5. 10 percent of GDP increase in other debt-creating flows in 2018	1697	1768	1867	1996	2106	2205	2605	3583
Debt Service-to-Revenue Ratio 2/								
Baseline	45	44	45	47	48	91	54	89
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	45	43	44	45	45	84	38	13
A2. Primary balance is unchanged from 2017	45	45	47	49	51	93	58	119
A3. Permanently lower GDP growth 1/	45	45	48	51	54	100	70	201
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2018-201	45	49	55	58	61	112	76	204
B2. Primary balance is at historical average minus one standard deviations in 2018-201	45	45	47	50	52	95	62	154
B3. Combination of B1-B2 using one half standard deviation shocks	45	47	52	54	57	105	70	181
B4. One-time 30 percent real depreciation in 2018	45	56	68	72	75	139	88	226
B5. 10 percent of GDP increase in other debt-creating flows in 2018	45	45	49	53	54	97	65	171

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

Figure 2. Sudan: Indicators of Public Debt Under Alternative Scenarios, 2017–2037 1/



Sources: Country authorities; and staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest ratio on or before 2027.
2/ Revenues are defined inclusive of grants.