INTERNATONAL MONETARY FUND

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BENIN

Joint IMF/World Bank Debt Sustainability Analysis 2011[1]

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This debt sustainability analysis (DSA) suggests that Benin's risk of debt distress is low. Under baseline projections, all external debt indicators remain below their respective thresholds over the long run. This assessment rests however on the assumption that macroeconomic policies remain prudent, structural reforms are promptly implemented and effectively enhance growth and competitiveness, and that the fiscal deficit continues to be financed largely with external concessional assistance. Under stress test conditions reflecting the past value and variability of key macroeconomic variables, debt sustainability indicators would worsen but would remain below sustainability thresholds.

[1] Prepared by IMF and IDA staff in collaboration with the Beninese authorities and staff of the African Development Bank. The fiscal year for Benin is January 1–December 31. The previous DSA update was performed in May 2010 (IMF Country Report No. 10/195).

I. Introduction

1. **This DSA uses the debt sustainability framework for low-income countries.** Debt sustainability is assessed in relation to country-specific, policy-dependent thresholds for debt stock and debt service burden. On the basis of the Country Policy and Institutional Assessment (CPIA) rating, Benin is classified as a medium performer in terms of policies;[2] accordingly, the sustainability thresholds for the net present value (PV) of external debt for Benin are set at 40 percent of GDP, 150 percent of exports, and 250 percent of revenue, respectively, while the sustainability thresholds for external debt service are set at 20 percent of exports and 30 percent of revenue, respectively.[3] This DSA is conducted on a gross basis.

II. Background

2. **Benin's external debt remains at a comfortable level, after undergoing a significant reduction in 2003 under the Highly Indebted Poor Countries (HIPC) initiative and in 2006 under the Multilateral Debt Reduction Initiative (MDRI).**[4] At the end of 2010, Benin's external debt amounted to about $1.3 billion, equivalent to 19 percent of GDP, mostly consisting of official concessional loans; 83 percent of this debt was owed to multilateral creditors, including outstanding credit to the IMF for SDR 35.4 million, and 17 percent was owed to bilateral creditors.[5]

3. **Domestic debt represented about 20 percent of total public debt at end-2010.** The stock of domestic debt at end-2010 amounted to 12.1 percent of GDP, including securitized wage arrears for 3.2 percent of GDP, that are being repaid according to a specified multi-year schedule, as well as treasury bills and central bank-secured bonds issued on the regional debt market on nonconcessional terms. These issues have been increasing since 2006, reflecting the expansion of the regional debt market and fiscal slippages in 2009 and 2010, but are expected to decrease as a share of GDP in the medium term in line with the authorities' prudent borrowing strategy.

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[2] The quality of data underlying the DSA remains uneven. The DSA is based primarily on data provided by the public debt management department of the Ministry of Finance of Benin (*Caisse Autonome d'Amortissement*). Data on private external debt are not available. In 2010, West AFRITAC (West Africa Technical Assistance Center) provided technical assistance to improve debt data management.

[3] Benin's CPIA rating for 2007–09 was 3.54; a rating between 3.25 and 3.75 corresponds to a medium performance (as opposed to weak or strong performance).

[4] As a result of these initiatives, Benin's external debt stock declined from 43 percent of GDP at end-2002 to 11 percent of GDP at end-2006.

[5] Since no data on private external debt are available, overall external debt stock is here equal to the public or publicly guaranteed external debt.

4. **The stock of debt increased by 2.8 percentage points of GDP in 2010, reflecting the mobilization of external concessional loans to finance the budget.** New concessional loans amounted to \$160 million, including budget support from the World Bank for about \$30 million under the sixth Poverty Reduction Support Credit (PRSC 6) and loans earmarked to finance the Public Investment Program for about \$115 million. These loans, together with foreign direct investment of \$120 million and external grants of \$100 million, contributed to finance the external current account deficit, which narrowed to \$450 million, equivalent to 6.9 percent of GDP, driven by improvements in the balance of goods and services.

5. **Benin's risk of debt distress was classified as moderate in the previous DSA in May 2010.**[6] Under the baseline scenario, all external debt indicators were projected to remain below their indicative thresholds over the long run. However, it was noted that debt ratios moved rapidly toward the thresholds, or breached them, under less favorable scenarios.

III. UNDERLYING ASSUMPTIONS

6. **This DSA is based on the same macroeconomic and policy assumptions as those used in the previous DSA, with slight adjustments reflecting updated medium-term projections and a more prudent assessment of the long-term growth prospects** (Table 1; Box 1). As in the previous DSA, baseline projections assume that (i) key structural reforms aimed at enhancing competitiveness and growth would be adopted over the medium term; (ii) the authorities would proceed with their plans to improve public infrastructure; (iii) fiscal policy would remain prudent, to maintain macroeconomic stability; and (iv) concessional assistance from external official donors would continue to be available to finance the budget deficit and public investment. However, long-term projections of real GDP growth and of the non-interest external current account balance have been adjusted to take account of the risk that recent increases in petroleum and commodity prices may be permanent and could have an adverse impact on Benin's economy, and that structural reforms may be introduced at a slower pace than previously expected. Real GDP growth is now expected to increase to an annual rate of 5 percent over the medium to long term (compared with 6 percent in the previous DSA), the non-interest current account deficit is projected to remain at about 5.5 percent of GDP in the long term (compared with 5.3 percent in the previous DSA), and average annual inflation is projected to rise to 3 percent in the long run (compared with 2.5 percent in the previous DSA); revenue is projected (more prudently, consistently with the recent experience) to stabilize at about 22 percent of GDP, and, in response, the primary fiscal deficit is projected to stay at 1.25 percent of GDP in the long

[6] IMF Country Report No. 10/195.

term. Compared with the previous DSA, medium-term projections have been revised in line with recent updates in the medium-term macroeconomic framework.[7]

Table 1. Benin: Key Long-Term Assumptions (2017-31)
(In percent, unless otherwise indicated)

Parameter	Current DSA	Previous DSA
Real GDP growth	*5.0*	*6.0*
Inflation	*3.0*	*2.5*
Annual devaluation of the CFA franc vis-à-vis the dollar	0.5	0.5
Primary balance (in percent of GDP)	-1.3	-1.0
Revenue (in percent of GDP)	*22.0*	*25.0*
Grants (in percent of GDP)	*2.0*	*2.8*
Noninterest external current account balance (in percent of GDP)	*-5.5*	*-5.3*
Transfers (in percent of GDP)	*4.0*	*6.0*
Growth in remittances	9.0	9.0
Foreign direct investment (in percent of GDP)	2.1	2.1
Interest on domestic debt	*5.5*	*5.0*

7. **After the slippages of 2009, fiscal policy has been brought to a more sustainable footing.** The primary deficit, including grants, which improved from 3.8 percent of GDP in 2009 to 1.0 percent of GDP in 2010, is expected to turn into a surplus of 0.6 percent of GDP by 2016, as a result of structural reforms aimed at strengthening revenue mobilization and improving public financial management.

[7] Discussed in the companion IMF country report on the second review under the Extended Credit Facility (ECF) arrangement.

Box 1. Macroeconomic Assumptions

Medium term (2011–16): The projections are consistent with the macroeconomic framework of the Second Review under the ECF Arrangement and reflect a recovery after the crisis, as well as fiscal policies aimed at maintaining macroeconomic stability, protecting vulnerable groups, and enhancing investment in public infrastructure. A key assumption is that concessional financing from external donors would continue to be available throughout the projection period. The analysis also assumes the implementation of structural reforms aimed at increasing efficiency and competitiveness and improving the business climate. As a result, after slowing down to 2.6-2.7 percent in 2009–10, real GDP growth is projected to record a long-term sustainable level of 5 percent, while fiscal prudence and the anchor of the fixed exchange rate peg are expected to keep inflation at 3 percent. The primary fiscal deficit is projected to turn into a surplus of 0.6 percent of GDP by 2016, reflecting improvements in public fiscal management and efforts to contain recurrent expenditures. The noninterest external current account deficit is expected to widen in 2011 and 2012 and then to narrow to about 5 ½ percent of GDP by 2016, as fiscal adjustment dampens demand for imports.

Long term (2017–31): long-term projections reflect the impact of the structural reforms implemented in previous periods and the continuation of policies aimed at maintaining macroeconomic stability. Under these assumptions:

- **Real GDP growth** would average 5 percent in line with its long-term potential.
- **Inflation** would remain at about 3 percent.
- **The primary fiscal deficit** would stabilize at about 1¼ percent of GDP, following improvements in revenue collection and continued efforts to contain nonpriority recurrent expenditures, in particular the wage bill.
- **The noninterest external current account deficit** would remain at about 5 ½ percent of GDP, reflecting a growing demand for imports supported by foreign direct investment and workers' remittances and only partly compensated by growing exports.
- Improved infrastructure and a more favorable business climate would attract net **foreign direct investment** equivalent to about 2 percent of GDP per year.
- Reflecting continued support from donors for Benin's infrastructural development and reform efforts, gross financing needs are assumed to be largely covered by external official grants and concessional loans.
- Over the medium and long term, the DSA assumes that the authorities will continue to benefit from concessional borrowing mainly from multilateral donors, with a grant element equivalent to about 33 percent.
- Reflecting the authorities' commitment to a prudent borrowing strategy and the regular repayment of outstanding securitized wage arrears, government domestic debt is expected to decrease from 12 percent of GDP at end-2010 to 4 percent of GDP in 2031.
- The annual real interest rate on domestic debt is projected at 2.5 percent.

IV. Debt Sustainability Assessment

A. General Assessment and Debt Distress Classification

8. **Benin is at a low risk of debt distress.** The improvement compared with the previous DSA (when the risk of debt distress was considered moderate) stems from the better-than-expected export performance in 2010, stemming from a transitory increase in international cotton prices and from a more persistent improvement in nontraditional exports.[8] As a result, all external debt and debt service ratios, including the PV of debt-to-GDP ratio, remain well below the policy-dependent thresholds throughout the projection period, both under baseline assumptions and under standard stress tests (Figure 1). Debt service, in particular, is projected to remain low in percent of exports and revenue, confirming that borrowing on concessional terms enhances Benin's capacity to honor its debt obligations.[9]

9. **This assessment depends nevertheless on a set of favorable assumptions on growth, fiscal consolidation, and the availability of external non-debt and concessional financing.** Although this scenario is considered realistic under the program, less favorable developments, such as delays in achieving a higher sustainable rate of growth, a less prolonged willingness of external donors to provide concessional funds, or weaker inflows of investment and remittances, could significantly weaken sustainability. The 2010 debt sustainability analysis concluded, on the basis of standard stress tests based on a more volatile reference period, that Benin had a moderate risk of debt distress.[10] The current assessment seems consistent with Benin's improved debt and economic situation, but the comparison with the 2010 assessment highlights the fact that debt sustainability can worsen significantly even as a result of comparatively modest deterioration in macroeconomic developments.

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[8] These changes compared to earlier projections have been incorporated in the medium-term export projections. The improvement in exports compared with the 2010 DSA projections is less prominent when measured in dollar terms (6.5 percent) than in CFA francs (18.3 percent), as the 5 percent depreciation of the CFA franc vis-à-vis the dollar in 2010 was not anticipated in the 2010 DSA projections, which assumed instead a 5 percent appreciation. A fraction of exports of goods and services, however, is accounted for by re-exports, which is a potential risk factor.

[9] The assessment, however, does include a one-time slightly nonconcessional loan in the amount of $10 million (0.13 percent of GDP) in 2012, reflecting the authorities' current commitments.

[10] In the 2010 DSA, the rate of PV to exports crossed its policy-based threshold and remained about 5 percentage points above it for four years under stress test assumptions that export growth in 2011 and 2012 would be equal to the average of the past ten years minus one standard deviation. In the current DSA, exports remain below the threshold even under this scenario, as average export growth was stronger, and its variance lower, in the ten years to 2010 than it was from 2000 to 2009.

10. **Most notably, the current assessment critically depends on a prompt implementation of the authorities' program of prudent macroeconomic policies and efficiency-enhancing structural reforms.** These policies will be essential to promote growth, expand exports, attract foreign direct investments, and contain the fiscal deficit, thus improving long-term debt dynamics. It is also critical that the authorities continue to cover their financing needs primarily with external concessional assistance**.**

11. **The authorities concur with the overall conclusions of the DSA, which is in line with their own debt sustainability analysis.** The authorities have confirmed their commitment to a prudent borrowing strategy centered on an ongoing mobilization of grants and concessional external loans, with limited borrowing on nonconcessional terms on the regional market to cover short-term budget financing needs. The authorities have however underlined that limited borrowing on slightly nonconcessional terms might be necessary to finance infrastructural projects with a high rate of return for which concessional funds are not readily available. The authorities also intend to preserve fiscal and debt sustainability by pursuing a prudent policy of medium-term fiscal consolidation.

B. External Debt

12. **Under baseline assumptions, the external debt-to-GDP ratio stabilizes at about 20 percent of GDP, slightly above current levels** (Figure 1). The PV of external debt is projected to increase moderately, from 13 percent of GDP and 70 percent of revenue in 2010 to about 15 percent of GDP and 72 percent of revenue by 2031, also reflecting a decline in the average grant element of new loans associated with a gradual reduction in the availability of concessional financing. In proportion of exports, the PV of debt is projected to decline below current levels after peaking at 83 percent in 2018. Debt service payments are projected not to exceed 5 ½ percent of exports and revenue, and to decline as a share of both in the long term (Table 2).

13. **External vulnerability indicators worsen only slightly under standard stress test conditions.** The most significant risks would occur if key macroeconomic parameters remained at their average level of the past ten years;[11] in this case, the PV of debt would continue to increase to about 25 percent of GDP and 130 percent of revenue by 2031, and would stabilize at about 110 percent of exports after 2020 (Table 3; Figure 1), remaining, however, within the sustainability thresholds. The ratios of debt service to exports and to revenue would remain well below their respective thresholds under all standard stress tests. It should be noted that all stress tests assume a continued availability of concessional financing.

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[11] Specifically, it is assumed that real GDP would grow by 3.9 percent per year, that the GDP deflator in U.S. dollar terms would increase by 6.9 percent per year, that the noninterest external current account deficit would stay at 7.7 percent of GDP, and that net foreign direct investment (FDI) inflows would amount to 1.8 percent of GDP throughout the projection period.

C. Public Debt

14. **Public debt indicators are projected to improve in the medium term with the repayment of securitized wage arrears and continued reliance on external concessional assistance to finance the deficit** (Figure 2). The stock of total public debt is projected to decline from 31 percent of GDP in 2010 to about 25 percent of GDP by 2024, and its PV is projected to decline, from about 25 percent of GDP and 135 percent of revenue in 2010 to about 20 percent of GDP and 90 percent of revenue in 2031. Public debt service is projected to decline significantly as a share of revenue, from 17 percent in 2011 to less than 10 percent in 2013 to about 5 percent in 2017, reflecting the gradual repayment of the remaining stock of securitized wage arrears and a net reduction in the stock of debt issued on nonconcessional terms in the regional market (Table 4).

15. **Stress tests show a somewhat less favorable development.** Under the most extreme shock scenario (which would occur if real GDP growth and the primary fiscal balance remained at the average level of 2001-10[12]), the PV of debt-to-GDP ratio would stabilize at about 25 percent, while the debt-to-revenue ratio would peak at 121 percent in 2016 and then decline to about 117 percent of GDP by 2031. Under another standard stress test scenario, under which real GDP growth in 2012 and 2013 would be equal to its historical average minus one standard deviation,[13] the PV of debt would stabilize at 24 percent of GDP and about 110 percent of revenue; a similar outcome would occur if both real GDP growth and the primary fiscal balance in 2012 and 2013 were equal to their historical average minus one-half their standard deviations (Table 5; Figure 2).[14] The stress tests show, predictably, a high sensitivity of debt indicators to lower GDP growth. A prompt and effective implementation of structural reforms aimed at increasing growth and competitiveness thus appears critical to maintain debt sustainability.

[12] 3.9 percent and 1.6 percent of GDP, respectively.

[13] 2.7 percent.

[14] 3.3 percent and 2.6 percent of GDP, respectively.

Table 2: External Debt Sustainability Framework, Baseline Scenario, 2008-2031 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical 6/ Average	Standard 6/ Deviation	Projections									
	2008	2009	2010			2011	2012	2013	2014	2015	2016	2011-2016 Average	2021	2031	2017-2031 Average
External debt (nominal) 1/	**16.8**	**16.5**	**19.0**			**18.6**	**19.6**	**20.3**	**20.5**	**20.7**	**21.1**		**22.0**	**20.3**	
o/w public and publicly guaranteed (PPG)	16.8	16.5	19.0			18.6	19.6	20.3	20.5	20.7	21.1		22.0	20.3	
Change in external debt	5.1	-0.3	2.5			-0.4	1.0	0.7	0.1	0.3	0.3		-0.2	-0.1	
Identified net debt-creating flows	...	7.5	5.2			5.5	4.9	4.1	3.3	3.0	2.7		2.8	2.8	
Non-interest current account deficit	**...**	**8.7**	**6.7**	**7.7**	**1.4**	**7.4**	**7.2**	**6.6**	**6.1**	**6.0**	**5.7**		**5.6**	**5.5**	5.6
Deficit in balance of goods and services	13.4	13.3	11.1			11.9	11.0	10.7	10.0	9.7	9.4		9.5	9.6	
Exports	17.8	16.7	18.0			17.5	17.8	17.5	17.5	17.5	17.5		19.5	24.1	
Imports	31.1	30.0	29.1			29.4	28.8	28.3	27.5	27.2	26.8		29.0	33.7	
Net current transfers (negative = inflow)	-5.5	-4.9	-4.5	-5.4	0.9	-4.5	-3.8	-4.1	-4.0	-3.8	-3.8		-3.8	-4.0	-3.9
o/w official	-3.0	-3.8	-3.0			-2.8	-2.0	-2.2	-2.2	-2.0	-2.1		-2.1	-2.1	
Other current account flows (negative = net inflow)	...	0.2	0.0			0.0	0.0	0.0	0.0	0.1	0.1		0.0	0.0	
Net FDI (negative = inflow)	**-2.6**	**-1.6**	**-1.8**	**-1.8**	**1.2**	**-1.6**	**-1.9**	**-2.0**	**-2.1**	**-2.2**	**-2.3**		**-2.1**	**-2.1**	-2.1
Endogenous debt dynamics 2/	**...**	**0.4**	**0.3**			**-0.4**	**-0.4**	**-0.6**	**-0.7**	**-0.7**	**-0.8**		**-0.7**	**-0.6**	
Contribution from nominal interest rate	...	0.3	0.2			0.3	0.3	0.3	0.3	0.2	0.2		0.3	0.3	
Contribution from real GDP growth	-0.5	-0.5	-0.4			-0.6	-0.7	-0.9	-0.9	-1.0	-1.0		-1.0	-0.9	
Contribution from price and exchange rate changes	-1.6	0.6	0.5			...	...	...	...	...	...		...	...	
Residual (3-4) 3/	**...**	**-7.9**	**-2.7**			**-5.9**	**-3.8**	**-3.4**	**-3.2**	**-2.8**	**-2.4**		**-3.1**	**-2.9**	
o/w exceptional financing	...	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
PV of external debt 4/	...	...	13.0			12.7	13.2	13.5	13.5	13.8	14.1		15.4	14.6	
In percent of exports	...	...	72.1			72.6	74.0	76.7	77.5	78.6	80.8		79.1	60.6	
PV of PPG external debt	**...**	**...**	**13.0**			**12.7**	**13.2**	**13.5**	**13.5**	**13.8**	**14.1**		**15.4**	**14.6**	
In percent of exports	**...**	**...**	**72.1**			**72.6**	**74.0**	**76.7**	**77.5**	**78.6**	**80.8**		**79.1**	**60.6**	
In percent of government revenues	**...**	**...**	**70.1**			**67.9**	**69.1**	**69.1**	**68.6**	**69.3**	**70.8**		**76.1**	**72.3**	
Debt service-to-exports ratio (in percent)	**...**	**3.4**	**4.1**			**5.0**	**5.4**	**5.4**	**5.2**	**4.9**	**4.5**		**3.9**	**3.1**	
PPG debt service-to-exports ratio (in percent)	**...**	**3.4**	**4.1**			**5.0**	**5.1**	**5.1**	**4.9**	**4.8**	**4.4**		**3.9**	**3.1**	
PPG debt service-to-revenue ratio (in percent)	**...**	**3.1**	**4.0**			**4.7**	**4.8**	**4.6**	**4.4**	**4.3**	**3.9**		**3.7**	**3.7**	
Total gross financing need (Millions of U.S. dollars)	383.4	506.2	368.9			504.7	502.8	479.4	449.3	453.3	444.4		662.7	1413.3	
Non-interest current account deficit that stabilizes debt ratio	...	9.0	4.2			7.8	6.2	5.9	5.9	5.7	5.4		5.8	5.6	
Key macroeconomic assumptions															
Real GDP growth (in percent)	5.0	2.7	2.6	3.9	1.2	3.8	4.3	4.8	5.0	5.0	5.0	4.6	5.0	5.0	5.0
GDP deflator in US dollar terms (change in percent)	15.3	-3.5	-3.0	6.9	8.2	10.2	2.6	1.7	1.7	1.8	1.9	3.3	3.0	3.0	3.0
Effective interest rate (percent) 5/	...	1.7	1.4	1.6	0.2	1.5	1.8	1.8	1.4	1.1	1.0	1.4	1.7	1.8	1.5
Growth of exports of G&S (US dollar terms, in percent)	26.9	-6.8	7.4	13.4	17.2	10.7	9.0	5.2	6.4	7.1	6.6	7.5	10.5	10.5	10.5
Growth of imports of G&S (US dollar terms, in percent)	15.7	-4.4	-3.5	13.1	18.1	15.3	4.9	4.8	3.8	5.7	5.6	6.7	9.8	9.8	9.8
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	33.6	39.8	41.1	37.1	35.1	34.0	36.8	33.3	32.1	32.8
Government revenues (excluding grants, in percent of GDP)	19.6	18.5	18.6			18.7	19.1	19.5	19.8	19.9	19.9		20.2	20.2	20.2
Aid flows (in Millions of US dollars) 7/	116.9	212.5	97.4			257.6	248.6	286.5	259.9	253.2	262.1		352.1	683.8	
o/w Grants	116.9	212.5	97.4			192.7	140.6	168.7	179.2	179.5	189.0		279.0	610.7	
o/w Concessional loans	0.0	0.0	0.0			64.8	108.0	117.8	80.7	73.7	73.1		73.1	73.1	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			3.5	2.8	3.0	2.7	2.6	2.6		2.4	2.4	2.5
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			65.5	63.5	66.7	67.6	64.4	63.3		66.1	65.8	65.0
Memorandum items:															
Nominal GDP (Millions of US dollars)	6668.4	6605.9	6574.2			7519.8	8044.1	8579.1	9162.5	9795.3	10474.7		15497.9	33926.5	
Nominal dollar GDP growth	21.1	-0.9	-0.5			14.4	7.0	6.7	6.8	6.9	6.9	8.1	8.2	8.2	8.2
PV of PPG external debt (in Millions of US dollars)			851.9			959.5	1055.4	1150.4	1236.9	1344.9	1473.7		2375.4	4937.9	
(PVt-PVt-1)/GDPt-1 (in percent)						1.6	1.3	1.2	1.0	1.2	1.3	1.3	1.1	1.1	1.3
Gross workers' remittances (Millions of US dollars)	200.7	123.0	140.7			164.3	181.5	197.0	201.5	209.0	215.7		331.9	785.8	
PV of PPG external debt (in percent of GDP + remittances)	...	...	12.7			12.4	12.9	13.2	13.3	13.5	13.8		15.1	14.3	
PV of PPG external debt (in percent of exports + remittances)	...	...	64.4			64.5	65.7	67.8	68.8	70.1	72.3		71.2	55.3	
Debt service of PPG external debt (in percent of exports + remittances)	...	...	3.6			4.5	4.5	4.5	4.4	4.3	4.0		3.5	2.8	

Sources: Country authorities; and staff estimates and projections.

1/ Includes debt denominated in CFA francs toward regional multilateral creditors.
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. 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 3.Benin: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2011-2031
(In percent)

	Projections							
	2011	2012	2013	2014	2015	2016	**2021**	2031
PV of debt-to GDP ratio								
Baseline	13	13	13	14	14	14	**15**	15
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2011-2031 1/	13	13	14	15	16	17	**23**	26
A2. New public sector loans on less favorable terms in 2011-2031 2	13	14	15	16	16	17	**21**	23
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	13	13	14	14	14	15	**16**	15
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	13	15	17	17	17	17	**18**	16
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	13	14	14	14	15	15	**16**	16
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	13	13	14	14	15	15	**16**	15
B5. Combination of B1-B4 using one-half standard deviation shocks	13	13	14	14	14	15	**16**	15
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	13	19	19	19	19	20	**22**	21
PV of debt-to-exports ratio								
Baseline	73	74	77	77	79	81	**79**	61
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2011-2031 1/	73	73	78	83	90	98	**116**	109
A2. New public sector loans on less favorable terms in 2011-2031 2	73	79	86	89	94	100	**110**	96
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	73	74	76	77	78	81	**79**	60
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	73	93	121	121	121	123	**114**	80
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	73	74	76	77	78	81	**79**	60
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	73	76	82	82	83	85	**82**	61
B5. Combination of B1-B4 using one-half standard deviation shocks	73	77	83	84	85	87	**84**	64
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	73	74	76	77	78	81	**79**	60
PV of debt-to-revenue ratio								
Baseline	68	69	69	69	69	71	**76**	72
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2011-2031 1/	68	69	70	74	79	86	**112**	130
A2. New public sector loans on less favorable terms in 2011-2031 2	68	74	77	79	83	87	**106**	114
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	68	70	71	71	71	73	**79**	75
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	68	76	88	86	86	87	**89**	77
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	68	72	74	73	74	76	**81**	77
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	68	71	73	73	73	75	**79**	73
B5. Combination of B1-B4 using one-half standard deviation shocks	68	70	73	72	72	74	**79**	74
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	68	97	97	97	98	100	**107**	102

Table 3 (contd.) Benin: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2011-2031
(In percent)

	Projections							
	2011	2012	2013	2014	2015	2016	**2021**	2031
Debt service-to-exports ratio								
Baseline	5	5	5	5	5	4	**4**	3
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2011-2031 1/	5	5	5	5	4	4	**4**	4
A2. New public sector loans on less favorable terms in 2011-2031 2	5	5	5	5	5	5	**5**	5
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	5	5	5	5	5	4	**4**	3
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	5	6	7	7	7	6	**5**	4
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	5	5	5	5	5	4	**4**	3
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	5	5	5	5	5	5	**4**	3
B5. Combination of B1-B4 using one-half standard deviation shocks	5	5	5	5	5	5	**4**	3
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	5	5	5	5	5	4	**4**	3
Debt service-to-revenue ratio								
Baseline	5	5	5	4	4	4	**4**	4
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2011-2031 1/	5	5	4	4	4	4	**4**	5
A2. New public sector loans on less favorable terms in 2011-2031 2	5	5	5	5	5	4	**5**	6
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2012-2013	5	5	5	5	4	4	**4**	4
B2. Export value growth at historical average minus one standard deviation in 2012-2013 3/	5	5	5	5	5	4	**4**	4
B3. US dollar GDP deflator at historical average minus one standard deviation in 2012-2013	5	5	5	5	5	4	**4**	4
B4. Net non-debt creating flows at historical average minus one standard deviation in 2012-2013 4/	5	5	5	4	4	4	**4**	4
B5. Combination of B1-B4 using one-half standard deviation shocks	5	5	5	4	4	4	**4**	4
B6. One-time 30 percent nominal depreciation relative to the baseline in 2012 5/	5	7	6	6	6	6	**5**	5
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 4. Benin: Public Sector Debt Sustainability Framework, Baseline Scenario, 2008-2031
(In percent of GDP, unless otherwise indicated)

	Actual					Estimate	Projections								
	2008	2009	2010	Average 5/	Standard Deviation 5/	2011	2012	2013	2014	2015	2016	2011-16 Average	2021	2031	2017-31 Average
Public sector debt 1/	26.9	28.3	31.1			30.7	30.4	30.1	29.1	28.2	27.2		26.1	24.0	
o/w external	16.8	16.5	19.0			18.6	19.6	20.3	20.5	20.7	21.1		22.0	20.3	
Change in public sector debt	5.8	1.4	2.8			-0.4	-0.3	-0.4	-1.0	-0.8	-1.0		-0.3	-0.2	
Identified debt-creating flows	0.1	1.4	1.5			-1.7	-0.2	-1.0	-1.6	-1.8	-1.9		-0.2	-0.1	
Primary deficit	1.4	3.8	1.0	1.6	1.9	0.8	0.9	0.1	-0.3	-0.5	-0.6	0.1	1.3	1.3	1.3
Revenue and grants	21.3	21.7	20.0			21.2	20.8	21.5	21.7	21.7	21.7		22.0	22.0	
of which: grants	1.8	3.2	1.5			2.6	1.7	2.0	2.0	1.8	1.8		1.8	1.8	
Primary (noninterest) expenditure	22.7	25.5	21.1			22.0	21.8	21.6	21.4	21.2	21.1		23.3	23.3	
Automatic debt dynamics	-1.2	-1.8	1.0			-2.5	-0.9	-1.1	-1.2	-1.2	-1.3		-1.5	-1.3	
Contribution from interest rate/growth differential	-2.8	0.2	0.1			-2.3	-1.1	-1.1	-1.2	-1.2	-1.3		-1.5	-1.3	
of which: contribution from average real interest rate	-1.7	0.9	0.8			-1.2	0.2	0.3	0.2	0.1	0.1		-0.2	-0.2	
of which: contribution from real GDP growth	-1.0	-0.7	-0.7			-1.1	-1.3	-1.4	-1.4	-1.4	-1.3		-1.3	-1.2	
Contribution from real exchange rate depreciation	1.6	-2.0	0.9			-0.2	0.2	0.0	0.0	0.0	0.0		...	...	
Other identified debt-creating flows	-0.2	-0.6	-0.5			0.0	-0.3	0.0	0.0	0.0	0.0		0.0	0.0	
Privatization receipts (negative)	-0.2	-0.6	-0.5			0.0	-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)	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	5.8	0.0	1.3			1.3	0.0	0.6	0.6	0.9	0.8		-0.1	-0.1	
Other Sustainability Indicators															
PV of public sector debt	...	...	25.1			24.8	24.0	23.2	22.1	21.3	20.2		19.5	18.3	
o/w foreign-currency denominated	...	...	13.0			12.7	13.2	13.5	13.5	13.8	14.1		15.4	14.6	
o/w external	...	...	13.0			12.7	13.2	13.5	13.5	13.8	14.1		15.4	14.6	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
PV of public sector debt-to-revenue and grants ratio (in percent)	…	…	125.2			116.8	115.3	108.0	101.9	97.9	93.0		88.5	83.1	
PV of public sector debt-to-revenue ratio (in percent)	…	…	135.2			132.8	125.9	118.9	112.0	106.9	101.4		96.4	90.5	
o/w external 3/	…	…	70.1			67.9	69.1	69.1	68.6	69.3	70.8		76.1	72.3	
Debt service-to-revenue and grants ratio (in percent) 4/	6.3	6.0	7.2			15.1	11.8	8.8	9.4	8.8	8.1		4.4	4.2	
Debt service-to-revenue ratio (in percent) 4/	6.9	7.1	7.8			17.2	12.9	9.7	10.3	9.7	8.9		4.8	4.6	
Primary deficit that stabilizes the debt-to-GDP ratio	-4.5	2.3	-1.7			1.2	1.2	0.5	0.7	0.3	0.4		1.5	1.4	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	5.0	2.7	2.6	3.9	1.2	3.8	4.3	4.8	5.0	5.0	5.0	4.6	5.0	5.0	5.0
Average nominal interest rate on forex debt (in percent)	1.5	1.7	1.4	2.9	4.7	1.5	1.5	1.5	1.2	1.0	0.9	1.3	1.7	1.8	1.5
Average real interest rate on domestic debt (in percent)	-4.6	0.5	0.8	-1.1	3.0	2.4	3.1	3.0	3.2	3.5	3.7	3.2	1.9	1.9	1.9
Real exchange rate depreciation (in percent, + indicates depreciation)	16.2	-11.7	5.2	0.6	10.1	-1.0	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	7.2	2.0	1.8	2.8	1.9	3.2	2.6	2.7	2.6	2.6	2.6	2.7	3.5	3.5	3.5
Growth of real primary spending (deflated by GDP deflator, in percent)	0.1	0.2	-0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Grant element of new external borrowing (in percent)	...	...	...	…	…	33.6	39.8	41.1	37.1	35.1	34.0	36.8	33.3	32.1	...

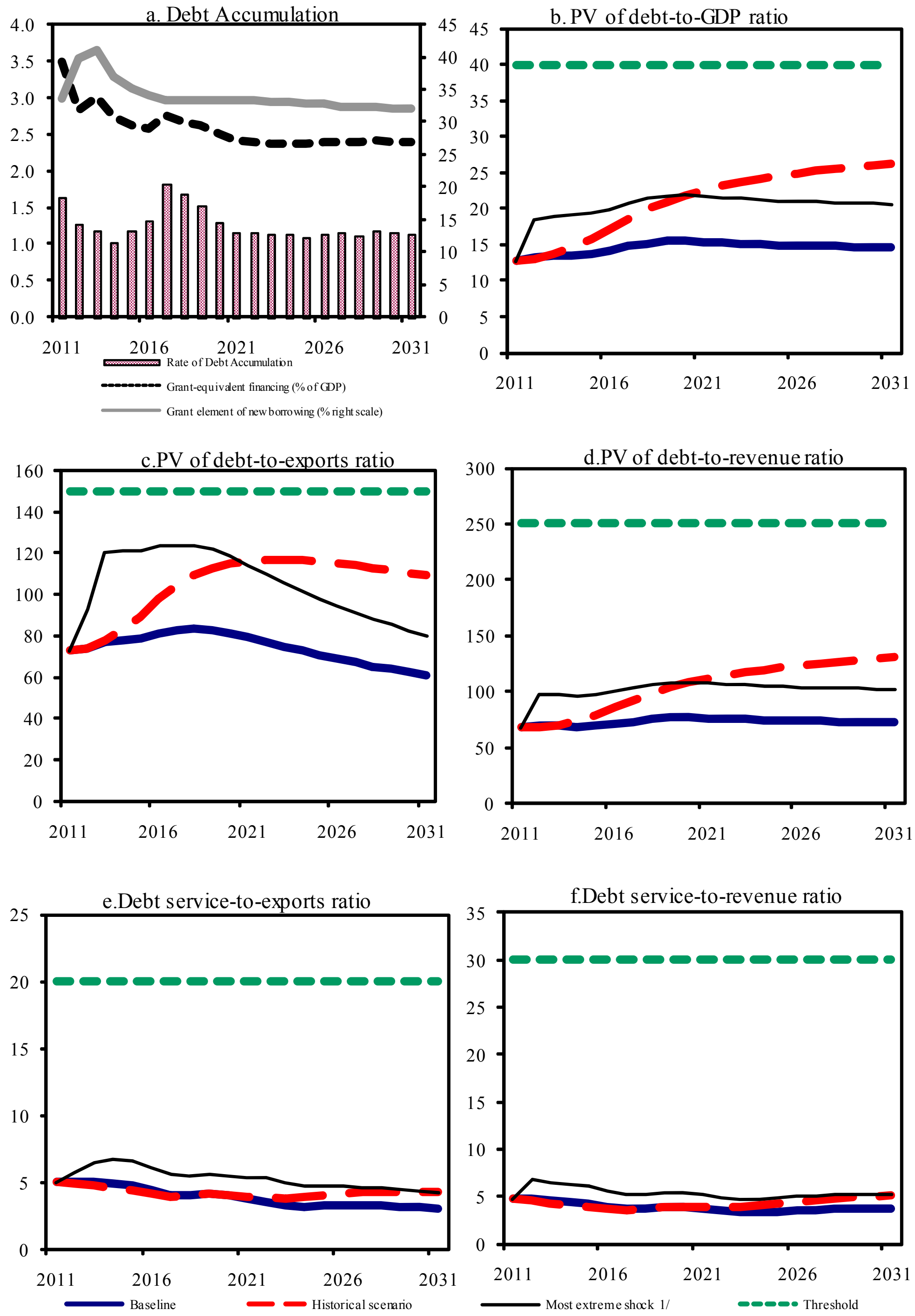
Sources: Country authorities; and staff estimates and projections.
1/ Indicates coverage of public sector, e.g., general government or nonfinancial public sector. Also whether net or gross debt is used.
2/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term 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 5. Benin: Sensitivity Analysis for Key Indicators of Public Debt 2011-2031

	Projections							
	2011	2012	2013	2014	2015	2016	2021	2031
PV of Debt-to-GDP Ratio								
Baseline	25	24	23	22	21	20	19	18
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	25	25	25	25	26	27	26	26
A2. Primary balance is unchanged from 2011	25	24	24	23	23	23	20	16
A3. Permanently lower GDP growth 1/	25	24	23	22	22	21	22	24
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2012-2013	25	25	25	24	24	23	24	24
B2. Primary balance is at historical average minus one standard deviations in 2012-2013	25	26	27	26	25	24	22	20
B3. Combination of B1-B2 using one half standard deviation shocks	25	25	26	26	25	24	24	23
B4. One-time 30 percent real depreciation in 2012	25	29	27	26	25	23	21	19
B5. 10 percent of GDP increase in other debt-creating flows in 2012	25	31	30	28	27	26	23	20
PV of Debt-to-Revenue Ratio 2/								
Baseline	117	115	108	102	98	93	89	83
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	117	118	116	116	119	121	119	117
A2. Primary balance is unchanged from 2011	117	115	110	107	107	106	91	74
A3. Permanently lower GDP growth 1/	117	116	109	103	100	96	98	110
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2012-2013	117	118	114	110	108	105	107	111
B2. Primary balance is at historical average minus one standard deviations in 2012-2013	117	124	127	119	114	109	100	89
B3. Combination of B1-B2 using one half standard deviation shocks	117	122	123	117	114	110	108	105
B4. One-time 30 percent real depreciation in 2012	117	139	128	119	113	106	94	84
B5. 10 percent of GDP increase in other debt-creating flows in 2012	117	148	138	130	124	118	107	93
Debt Service-to-Revenue Ratio 2/								
Baseline	15	12	9	9	9	8	4	4
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	15	12	9	10	9	8	5	5
A2. Primary balance is unchanged from 2011	15	12	9	9	9	8	4	4
A3. Permanently lower GDP growth 1/	15	12	9	9	9	8	4	4
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2012-2013	15	12	9	10	9	8	5	4
B2. Primary balance is at historical average minus one standard deviations in 2012-2013	15	12	9	9	9	8	4	4
B3. Combination of B1-B2 using one half standard deviation shocks	15	12	9	10	9	8	4	4
B4. One-time 30 percent real depreciation in 2012	15	13	11	11	11	10	6	6
B5. 10 percent of GDP increase in other debt-creating flows in 2012	15	12	9	9	9	8	4	4

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.

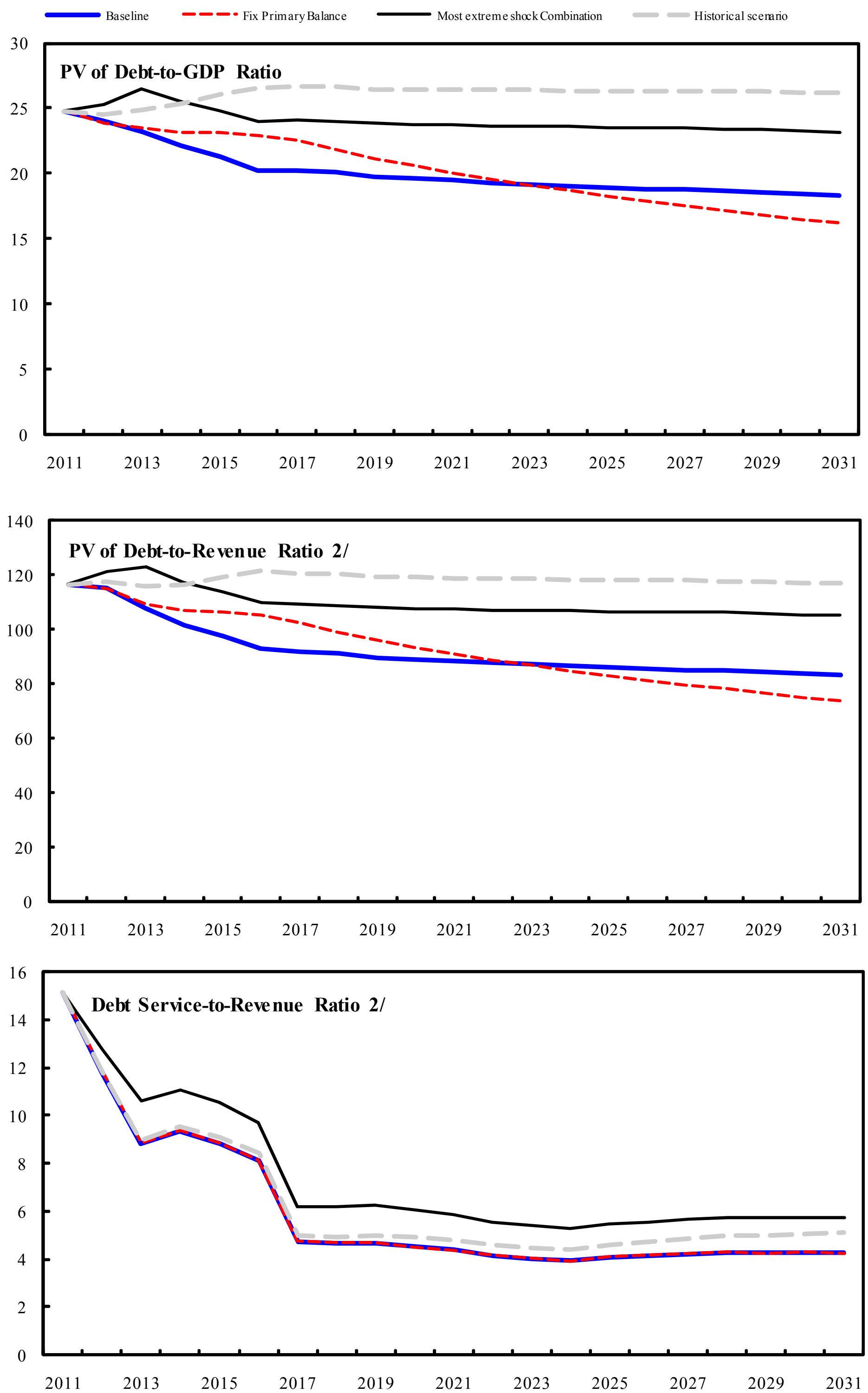
Figure 1. Benin: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2011-2031 1/



Sources: Country authorities; and staff estimates and projections.

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

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



Sources: Country authorities; and staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest ratio in 2021.
2/ Revenues are defined inclusive of grants.