INTERNATIONAL MONETARY FUND

AND

INTERNATIONAL DEVELOPMENT ASSOCIATION

SENEGAL

Joint IMF/IDA Debt Sustainability Analysis

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International Development Association

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November 12, 2010

Senegal remains at low risk of debt distress.[1,2] *This debt sustainability analysis (DSA) updates the joint IMF/IDA DSA from May 7, 2010 to integrate the authorities' intention to temporarily increase infrastructure investment by external borrowing on nonconcessional terms, in line with the Fund's revised Debt Limits Policy. Under the baseline scenario, which includes US$500 million of nonconcessional borrowing over 2011–13 to finance new infrastructure projects (1.4 percent of GDP in 2011, 1.6 percent of GDP in 2012, and 0.2 percent of GDP in 2013), all the debt burden indicators remain well below their policy-dependent indicative thresholds. Still, debt vulnerabilities increase as suggested by standardized stress tests, where in some instances two debt burden indicators (PV of debt-to-GDP ratio and PV of debt-to-export ratio) temporarily and marginally exceed their thresholds. This calls for a cautious approach with such borrowing and stresses the importance of improving debt management. The inclusion of domestic debt does not alter the overall assessment of Senegal's risk of debt distress.*

[1] The DSA has been produced jointly by the staffs of the International Monetary Fund and the World Bank, in consultation with the Senegalese authorities. The fiscal year for Senegal is January–December.

[2] The DSA presented in this document is based on the standard low-income countries (LIC) DSA framework. 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, Policy Implications" (http://www.imf.org/external/np/pdr/sustain/2004/091004.htm and IDA/SECM2004/0629, 9/10/04) and "Applying the Debt Sustainability Framework for Low-Income Countries Post Debt Relief" (8/11/06).

I. Background

1. **Most of Senegal's external debt is concessional.** About 60 percent of end-2009 external debt was owed to multilateral institutions (especially the World Bank, the IMF, and AfDB). Major bilateral creditors include France, Kuwait, Spain, China, and India.[3]

2. **In December 2009, Senegal issued its first Euro Bond** (see text table). The US$200 million bond has a maturity of 5 years, and a coupon of 8.75 percent, but was priced to yield 9.25 percent. The proceeds of the issuance helped finance the Dakar-Diamniadio toll road.

Total External Debt, Central Government

	Percent of GDP, as of end of year				% of total
	2006	2007	2008	2009	2009
Total	17.7	17.9	19.7	27.0	100.0
Multilateral creditors	10.0	11.3	12.0	16.2	60.0
IDA/IBRD	6.0	6.6	7.0	8.0	29.6
AFDB/AfDF	1.0	1.2	1.5	1.7	6.2
IMF	0.2	0.2	0.5	2.7	10.0
OFID/BADEA/IDB	1.5	1.8	1.7	2.3	8.4
EBI	0.2	0.2	0.2	0.2	0.6
Others	1.2	1.2	1.2	1.3	5.0
Bilateral creditos	7.6	6.5	7.6	9.3	34.4
OECD countries	1.7	1.1	2.2	3.2	11.7
Arab Countries	4.7	4.3	4.2	4.2	15.6
Others	1.1	1.1	1.2	1.9	7.2
Commercial creditos	0.1	0.1	0.0	1.5	5.6
Euro Bond	0.0	0.0	0.0	1.5	5.5
Others	0.1	0.1	0.0	0.0	0.1
Memorandum Item					
Nominal GDP, billions of CFA	4893.4	5408.3	5950.1	6023.2	

Source : Authorities and Fund Staff

3. **Domestic public debt is low.** At end 2009, domestic debt reached 8 percent of GDP, or one-fourth of total debt.[4] This debt is denominated in local currency and mostly held by WAEMU banks. In 2009, net domestic debt issuance reached about 2.5 percent of GDP.

[3] Senegal reached its completion under the HIPC Initiative in 2004. Only three creditors have so far not provided HIPC debt relief: the Saudi Fund for Development, Oman, and Abu Dhabi.

4. **Private sector exposure also appears relatively limited**. Private external debt was estimated at 20 percent of GDP at end-2009, limiting concerns about potential fiscal contingent liabilities stemming from private debt.

II. UNDERLYING ASSUMPTIONS

5. **The macroeconomic framework rests on the implementation of sound macroeconomic and structural policies** (Box 1).

- Growth is projected to accelerate over the next few years, as the effects of the international economic and financial crisis dissipate and the authorities continue their structural reforms aimed at raising growth. In particular, over 2011–13, the baseline includes the direct impact of new large infrastructure projects currently considered by the authorities (extension of the highway to the new Blaise-Diagne airport, Mbour, and Thies).

- Over the long run, real GDP growth is projected to exceed 5 percent. Between 1995 (after the devaluation) and 2007 (before the food, fuel and financial crisis), real GDP growth averaged about 4.5 percent. The long-run projections assume that Senegal reduces constraints to growth through continued structural reforms, including in the business climate, the energy and financial sectors, as well as labor markets. The baseline projection also assumes successful completion of Senegal's ongoing infrastructure program (including the Dakar-Diamniadio highway, port, and airport). However, the baseline does not explicitly model the possible impact on long-run real GDP growth of new large infrastructure projects.

- FDI (net) is expected to rebound slowly after the impact of the financial crisis subsides. It is expected to pick up, as economic prospects improve and uncertainty is reduced, to average slightly more than 2.5 percent of GDP in the long term.

- The overall fiscal deficit is expected to remain sizeable in the short term, as large infrastructure projects are implemented. Fiscal consolidation is expected to start in the medium term in order to safeguard debt sustainability. While most of Senegal's public financing needs are projected to be filled through external concessional borrowing, nonconcessional borrowing is expected to finance the large infrastructure projects in the short term.

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[4] Domestic debt includes debt issued in the WAEMU financial market.

Box 1. Macroeconomic Assumptions for 2010–30

Real GDP growth: Real GDP growth is expected to pick up once the effect of the global economic and financial crisis subsides. In particular, growth is expected to increase from 2.2 percent in 2009, to an average of 4.2 percent during 2010–11, 4.8 percent during 2012–15, and over 5.25 percent for the long term.

Inflation: Inflation is expected to stabilize at about 2 percent.

Current account deficit (excluding interest payments): the current account deficit is expected to deteriorate slightly over the short term reflecting higher imports associated with the infrastructure projects. The current account deficit excluding interest payments is expected to stabilize at around 7.6 percent by the end of the projection period, as the growth of exports overtakes that of imports. Remittances are expected to grow slowly over the medium term after a stronger-than-expected performance in 2009–10 (despite the crisis).

Fiscal deficit: large infrastructure spending is expected to lead to significant fiscal deficits (excluding grants) over the medium term (7.1 percent of GDP in 2010, 8.1 percent in 2011, 7.6 percent in 2012). Thereafter, the overall deficit gradually declines as infrastructure spending returns to a more normal level, public expenditure management—a reform focus under the program supported by the IMF Policy Support Instrument and the Bank's budget support operations (PFSC and PRSCs)—continues to be improved, and revenues increase through further efficiency gains in tax administration and tax reform.

Financing: external nonconcessional borrowing is assumed to finance the infrastructure projects during 2011–2013.[5] Moreover, in addition to the amortization of the 2009 Euro Bond (in 2014), additional external nonconcessional borrowing is assumed to amount to 1 percent of GDP annually for 2014–2030. Overall access to concessional resources is expected to decline as Senegal's development improves, leading to a decline in the grant element from 27.1 percent in 2015 to 21.6 percent by the end of the projection period.

Public domestic borrowing: domestic financing is expected to be less than a quarter of the total public financing needs over the long term and claims on the government are expected to be largely held by commercial banks.

[5] In addition, Senegal is also considering contracting in 2011 a maximum of CFAF30 billion in nonconcessional loans with a grant element of between 15 percent and 35 percent. This financing would not increase the deficit, but would be used for example in the event of an unexpected shortfall in concessional financing or to substitute for domestic financing. Given the relatively small amount, this is not expected to change the outcome of the DSA. For example, a loan of CFAF 30 billion with a grant element of 25 percent would increase the PV of debt-to-GDP by only 0.3 percent of GDP in 2011.

6. **Compared to the May 2010 DSA,[6] the macroeconomic assumptions have been revised to reflect more updated information, including the short-term impact of large infrastructure projects.** Notable changes since the last DSA include

- Additional infrastructure spending (extension of the toll road to the new Blaise-Diagne airport, Mbour, and Thies) is expected to amount to 1.4 percent of GDP in 2011, 1.6 percent of GDP in 2012, and 0.2 percent of GDP in 2013. This amounts to approximately US$500 million over the program period.[7, 8]

Evolution of selected macroeconomic indicators

	2009	2010	2011	2012	2013
Real GDP growth					
Previous DSA	1.5	3.4	4.1	4.5	4.7
Current DSA	2.2	4.0	4.4	4.7	4.8
Primary fiscal deficit (percent of GDP)					
Previous DSA	4.7	3.7	3.4	3.0	3.0
Current DSA	4.1	3.7	4.7	3.9	2.5
Overall fiscal deficit (percent of GDP)					
Previous DSA	8.1	6.9	6.5	6.2	6.2
Current DSA	7.9	7.1	8.1	7.6	6.2
Current account deficit (percent of GDP)					
Previous DSA	8.7	8.7	9.0	9.1	9.2
Current DSA	7.7	8.2	9.0	9.5	9.1

- Following upward revisions of official estimates for 2008 and 2009 and stronger activity indicators, real GDP growth has been revised for 2010.
- For 2011–13, real GDP growth was revised upward, reflecting the impact of large infrastructure spending. Long-term real GDP growth remains unchanged at 5.25 percent compared to the previous DSA.
- The primary and overall fiscal deficit has been revised upward for 2011–12 to reflect the impact of the new infrastructure projects.
- The current account deficit has been revised downward in 2009–10, owing to an upward revision to remittances. However, despite higher remittances for 2011–13, the

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[6] See IMF Country Report No. 10/165, June 2010.

[7] The infrastructure projects are expected to be financed through external nonconcessional borrowing (interest rate of 8 percent, 7-year maturity, and 6-year grace period). The terms and conditions of the new external nonconcessional borrowing are expected to be better than the ones for the 2009 Euro Bond because of more favorable market conditions.

[8] Delays in the implementation of the projects could impact the timing of government spending.

current account deficit is roughly unchanged compared to the previous DSA, reflecting higher imports related to the infrastructure projects.

III. EXTERNAL DSA

7. **External PPG debt burden indicators under the baseline scenario remain well below their policy-dependent thresholds** (Figure 1, Table 1a).[9,10] While large external nonconcessional borrowing puts upward pressure on debt burden indicators based on the PV of PPG external debt, these indicators never breach their respective thresholds. The large spikes in the debt service ratios reflect the amortization of the Euro Bond (in 2014), and the repayment of the nonconcessional financing associated with the new infrastructure projects. While the debt service indicators do not breach their thresholds, the large spikes highlight the need for the authorities to improve debt management in order to minimize rollover risks.

8. **Stress tests do not reveal serious vulnerabilities for external public debt** (Table 1b). Two debt burden indicators (PV of debt-to-GDP and PV of debt-to-exports) breach their thresholds under a number of standardized stress tests, but these breaches are marginal and temporary. The largest breach occurs under the exports shock, when the PV of external PPG debt-to-exports reaches 158 percent, compared to a threshold of 150 percent. There are also similar (but slightly smaller) breaches under the combination shock for the PV of debt-to-exports ratio. Small breaches are also evident in the second half of the projection period under the less concessional financing scenario (the interest rate on new external PPG borrowing is 200 basis points higher than under the baseline) for the PV of debt-to-GDP and the PV of debt-to-exports ratios. These shocks highlight the need for Senegal to diversify its export base as well as seek financing consistent with debt sustainability.

IV. PUBLIC DSA

9. **Indicators of overall public debt (external plus domestic debt) and debt service follow a similar pattern to those for external public debt alone** (Table 2a and Figure 2). While more elevated than under the external DSA, the public debt burden indicators do not suggest increased concerns for debt sustainability.

[9] The indicative external debt burden thresholds for Senegal are shown in Figure 1. They are based on Senegal's classification as a "medium" performer given its (three-year average) score of 3.67 on the World Bank's Country Policy and Institutional Assessment index (CPIA). The CPIA measures the quality of policies and institutions; weak performers score below 3.25, strong performers above 3.75.

[10] Large residuals in Table 1a can largely be explained by capital grants. The evolution of the external debt-to-GDP ratio is explained by the contribution of the current account (excluding interest), net FDI, and the endogenous debt dynamic. However, in addition to net FDI, capital grants are also a source of non-debt creating flows.

10. **Public debt sustainability hinges on containing the fiscal deficit in the medium and long term** (Table 2b). If the fiscal balance were to remain at its 2010 level, the debt burden indicators would appear to be on an upward trend, suggesting that the debt situation is unsustainable. This indicates the importance of fiscal consolidation once the impact of the crisis subsides. It also stresses the need for prioritization of government spending if additional infrastructure needs were to emerge.

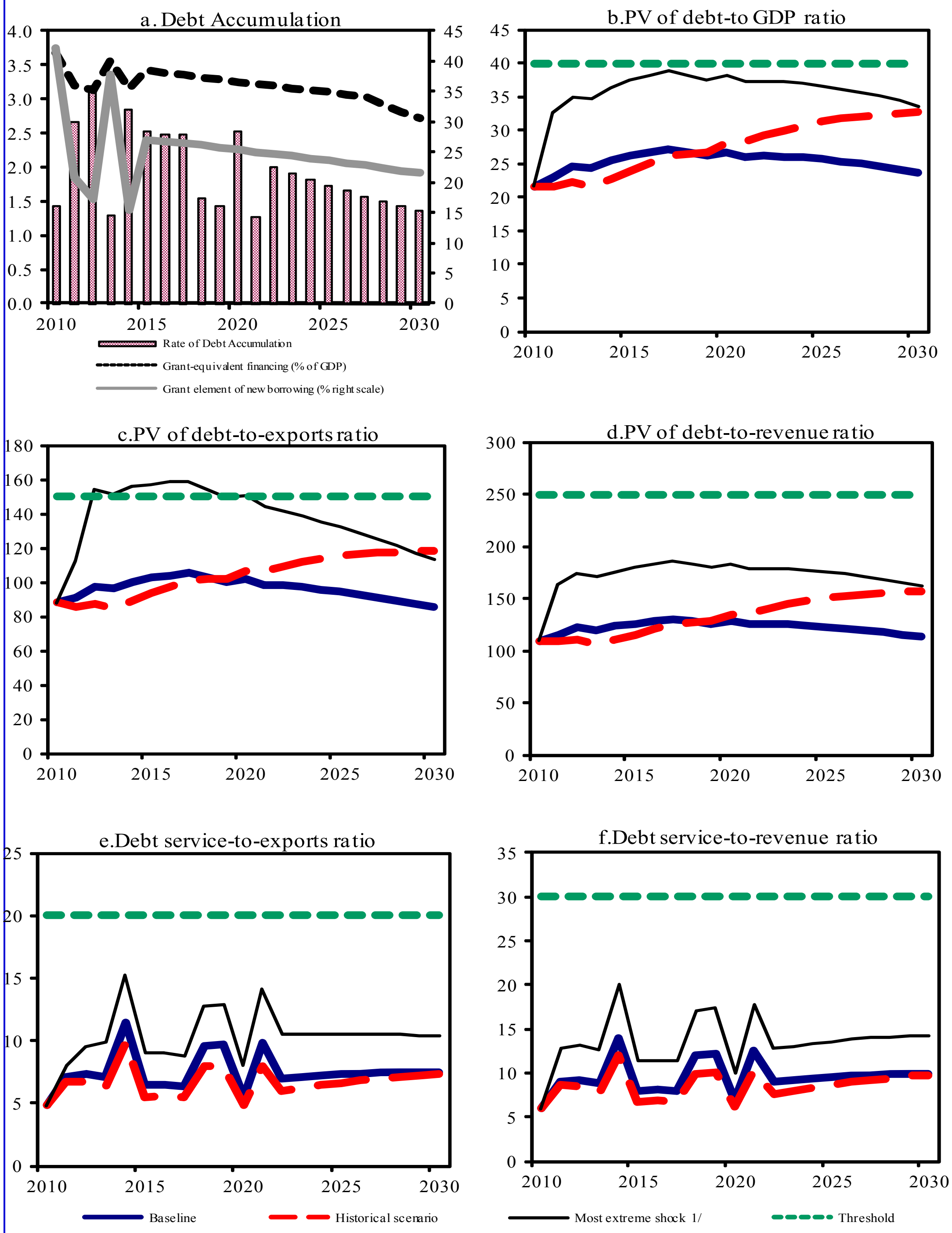
11. **The public debt position is also vulnerable to shocks to real GDP growth.** This indicates a need for the authorities to continue pursuing their goal of raising potential output growth. In that respect, the new infrastructure projects may help mitigate concerns over long-term potential output growth.

V. Conclusion

12. **Senegal's external debt burden is subject to a low risk of debt distress.** This occurs despite the explicit assumption of large nonconcessional borrowing in order to finance new infrastructure projects. The DSA suggests that external nonconcessional borrowing by Senegal of up to US$500 million (over the program period), would be consistent with the IMF's debt limit policy and the World Bank nonconcessional borrowing policy because Senegal remains a low risk of debt distress despite the nonconcessional borrowing. The external DSA highlights the need for Senegal to diversify its export base and improve its debt management capacity in order to minimize rollover risks, and seek better financing terms. Adding domestic debt, while raising the debt burden indicators, does not change the overall risk assessment, but indicates the need for fiscal consolidation once the impact of the crisis subsides and the infrastructure projects are implemented.

13. **The authorities agree that there is some scope for nonconcessional external borrowing**. The authorities also agree that Senegal's risk of external debt distress is low.

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



Sources: Country authorities; and staff estimates and projections.

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 figure f. to a One-time depreciation shock

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

	Actual			Historical 0 Average 0	Standard Deviation	Projections									
	2007	2008	2009			2010	2011	2012	2013	2014	2015	2010-2015 Average	2020	2030	2016-2030 Average
External debt (nominal) 1/	**34.1**	**37.4**	**47.3**			**53.5**	**55.4**	**57.2**	**57.5**	**58.9**	**60.1**		**61.1**	**55.8**	
o/w public and publicly guaranteed (PPG)	17.9	19.7	27.0			31.6	33.1	34.9	35.0	36.3	37.4		38.3	33.2	
Change in external debt	2.0	3.2	10.0			6.2	1.9	1.9	0.3	1.5	1.2		0.5	-0.8	
Identified net debt-creating flows	3.9	7.0	7.0			4.4	4.9	5.1	4.3	4.1	3.3		3.0	2.7	
Non-interest current account deficit	**11.4**	**13.9**	**7.3**	**7.6**	**3.0**	**7.6**	**8.3**	**8.7**	**8.3**	**8.2**	**7.9**		**7.7**	**7.5**	7.6
Deficit in balance of goods and services	22.4	26.5	20.0			19.6	19.5	19.4	18.4	18.1	17.6		17.4	17.0	
Exports	25.5	26.3	24.1			24.5	25.2	25.3	25.3	25.4	25.6		26.4	27.7	
Imports	47.8	52.8	44.1			44.1	44.7	44.7	43.7	43.5	43.2		43.7	44.7	
Net current transfers (negative = inflow)	-11.4	-12.7	-12.6	-8.6	2.8	-12.0	-11.3	-10.7	-10.1	-10.1	-9.8		-9.7	-9.5	-9.7
o/w official	-1.0	-0.5	-0.7			-0.5	-0.4	-0.5	-0.5	-0.5	-0.5		-0.6	-0.7	
Other current account flows (negative = net inflow)	0.4	0.1	0.0			0.1	0.1	0.1	0.1	0.1	0.1		0.1	0.0	
Net FDI (negative = inflow)	**-2.4**	**-2.0**	**-2.3**	**-1.4**	**0.8**	**-1.8**	**-1.8**	**-1.9**	**-2.2**	**-2.3**	**-2.6**		**-2.6**	**-2.6**	-2.6
Endogenous debt dynamics 2/	**-5.1**	**-4.9**	**2.0**			**-1.4**	**-1.6**	**-1.7**	**-1.9**	**-1.8**	**-2.0**		**-2.1**	**-2.2**	
Contribution from nominal interest rate	0.4	0.4	0.4			0.5	0.7	0.7	0.7	0.9	0.8		0.8	0.7	
Contribution from real GDP growth	-1.3	-0.9	-0.9			-1.9	-2.3	-2.4	-2.6	-2.6	-2.8		-2.9	-2.9	
Contribution from price and exchange rate changes	-4.2	-4.3	2.5			…	…	…	…	…	…		…	…	
Residual (3-4) 3/	**-1.9**	**-3.8**	**2.9**			**1.7**	**-3.0**	**-3.3**	**-4.0**	**-2.6**	**-2.2**		**-2.5**	**-3.5**	
o/w exceptional financing	-0.4	-1.9	0.1			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
PV of external debt 4/	...	...	39.0			43.5	45.2	46.9	46.8	48.1	49.0		49.6	46.2	
In percent of exports	...	...	162.0			177.2	179.5	185.5	184.7	189.1	191.2		187.8	166.7	
PV of PPG external debt	**...**	**...**	**18.7**			**21.6**	**22.9**	**24.6**	**24.3**	**25.5**	**26.2**		**26.8**	**23.6**	
In percent of exports	**...**	**...**	**77.6**			**88.0**	**91.0**	**97.2**	**96.0**	**100.2**	**102.4**		**101.4**	**85.1**	
In percent of government revenues	**...**	**...**	**100.4**			**109.5**	**115.3**	**122.0**	**119.5**	**123.7**	**125.9**		**128.5**	**113.1**	
Debt service-to-exports ratio (in percent)	**12.2**	**14.5**	**18.2**			**18.0**	**19.2**	**19.3**	**18.7**	**22.4**	**17.1**		**15.8**	**17.3**	
PPG debt service-to-exports ratio (in percent)	**5.7**	**4.3**	**5.0**			**4.8**	**7.1**	**7.4**	**7.1**	**11.4**	**6.5**		**5.5**	**7.5**	
PPG debt service-to-revenue ratio (in percent)	**6.9**	**5.9**	**6.5**			**6.0**	**9.0**	**9.3**	**8.8**	**14.1**	**8.0**		**7.0**	**10.0**	
Total gross financing need (Billions of U.S. dollars)	1.4	2.1	1.2			1.3	1.5	1.6	1.6	1.8	1.7		2.3	5.0	
Non-interest current account deficit that stabilizes debt ratio	9.4	10.7	-2.6			1.5	6.4	6.9	8.1	6.7	6.7		7.2	8.3	
Key macroeconomic assumptions															
Real GDP growth (in percent)	5.0	3.2	2.2	3.9	1.9	4.0	4.4	4.7	4.8	4.9	5.0	4.6	5.2	5.6	5.3
GDP deflator in US dollar terms (change in percent)	14.9	14.4	-6.3	5.8	10.0	-4.8	0.2	1.5	1.5	1.6	1.7	0.3	2.2	2.3	2.2
Effective interest rate (percent) 5/	1.6	1.3	1.0	1.4	0.3	1.1	1.3	1.4	1.3	1.6	1.4	1.4	1.5	1.4	1.4
Growth of exports of G&S (US dollar terms, in percent)	19.9	22.1	-12.3	8.3	12.5	0.8	7.3	6.7	6.5	7.0	7.6	6.0	8.2	8.3	8.2
Growth of imports of G&S (US dollar terms, in percent)	33.9	30.4	-20.1	13.2	16.4	-0.9	6.0	6.2	4.1	6.1	5.9	4.6	7.7	8.1	7.9
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	42.1	20.7	17.2	37.9	15.5	27.1	26.7	25.4	21.6	24.3
Government revenues (excluding grants, in percent of GDP)	21.1	19.4	18.6			19.7	19.9	20.2	20.3	20.6	20.8		20.8	20.8	20.8
Aid flows (in Billions of US dollars) 7/	0.6	0.9	0.8			0.5	0.5	0.6	0.6	0.7	0.7		0.9	1.7	
o/w Grants	0.3	0.3	0.4			0.3	0.3	0.3	0.3	0.4	0.4		0.6	1.0	
o/w Concessional loans	0.3	0.5	0.4			0.2	0.2	0.2	0.3	0.3	0.3		0.4	0.6	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			3.7	3.2	3.1	3.6	3.1	3.4		3.3	2.7	3.1
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			67.0	47.7	43.8	63.1	40.3	52.8		53.5	52.6	53.6
Memorandum items:															
Nominal GDP (Billions of US dollars)	11.3	13.3	12.8			12.7	13.2	14.1	15.0	16.0	17.0		24.3	51.1	
Nominal dollar GDP growth	20.6	18.1	-4.2			-1.0	4.6	6.2	6.4	6.6	6.8	4.9	7.5	8.0	7.6
PV of PPG external debt (in Billions of US dollars)			2.5			2.7	3.0	3.4	3.6	4.1	4.5		6.5	12.0	
(PVt-PVt-1)/GDPt-1 (in percent)						1.4	2.7	3.2	1.3	2.9	2.5	2.3	2.5	1.4	1.8
Gross workers' remittances (Billions of US dollars)	1.4	1.9	1.8			1.7	1.6	1.6	1.6	1.7	1.8		2.5	5.3	
PV of PPG external debt (in percent of GDP + remittances)	...	...	16.5			19.1	20.4	22.0	21.9	23.0	23.8		24.2	21.3	
PV of PPG external debt (in percent of exports + remittances)	...	...	49.5			57.3	61.0	66.5	67.0	70.4	72.8		72.7	61.8	
Debt service of PPG external debt (in percent of exports + remittances)	...	...	3.2			3.1	4.8	5.0	5.0	8.0	4.6		3.9	5.4	

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. 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 1b.Senegal: 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	22	23	25	24	25	26	**27**	24
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	22	22	22	22	23	24	**28**	33
A2. New public sector loans on less favorable terms in 2010-2030 2	22	23	26	28	29	32	**38**	42
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	22	23	26	25	27	27	**28**	25
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	22	25	31	31	32	32	**32**	25
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	22	24	27	27	28	29	**30**	26
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	22	29	35	35	36	36	**35**	26
B5. Combination of B1-B4 using one-half standard deviation shocks	22	28	37	36	37	38	**36**	27
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	22	33	35	35	36	37	**38**	34
PV of debt-to-exports ratio								
Baseline	88	91	97	96	100	102	**101**	85
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	88	86	88	85	89	93	**106**	118
A2. New public sector loans on less favorable terms in 2010-2030 2	88	92	104	110	116	125	**144**	152
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	88	91	97	96	100	102	**101**	85
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	88	112	154	151	156	157	**150**	114
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	88	91	97	96	100	102	**101**	85
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	88	114	140	138	141	141	**132**	95
B5. Combination of B1-B4 using one-half standard deviation shocks	88	118	155	153	156	156	**146**	104
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	88	91	97	96	100	102	**101**	85
PV of debt-to-revenue ratio								
Baseline	109	115	122	120	124	126	**128**	113
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	109	109	110	106	110	115	**135**	157
A2. New public sector loans on less favorable terms in 2010-2030 2	109	117	131	137	143	154	**183**	202
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	109	118	128	125	130	132	**135**	119
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	109	127	155	151	154	155	**152**	121
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	109	120	135	132	137	139	**142**	125
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	109	144	176	172	174	174	**168**	126
B5. Combination of B1-B4 using one-half standard deviation shocks	109	143	183	178	180	180	**174**	130
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	109	164	174	170	176	179	**183**	161

Table 1b.Senegal: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2010-2030 (continued)
(In percent)

Debt service-to-exports ratio

Baseline	5	7	7	7	11	6	**6**	7
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	5	7	7	6	10	5	**5**	7
A2. New public sector loans on less favorable terms in 2010-2030 2	5	7	7	7	11	7	**8**	11
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	5	7	7	7	11	6	**6**	7
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	5	8	10	10	15	9	**8**	10
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	5	7	7	7	11	6	**6**	7
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	5	7	8	8	13	8	**7**	9
B5. Combination of B1-B4 using one-half standard deviation shocks	5	7	9	9	14	8	**8**	10
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	5	7	7	7	11	6	**6**	7

Debt service-to-revenue ratio

Baseline	6	9	9	9	14	8	**7**	10
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	6	9	8	8	12	7	**6**	10
A2. New public sector loans on less favorable terms in 2010-2030 2	6	9	8	9	14	8	**10**	14
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	6	9	10	9	15	8	**7**	10
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	6	9	10	10	15	9	**8**	11
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	6	9	10	10	16	9	**8**	11
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	6	9	10	10	16	9	**9**	12
B5. Combination of B1-B4 using one-half standard deviation shocks	6	9	10	11	16	10	**10**	12
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	6	13	13	13	20	11	**10**	14
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	14	14	14	14	14	14	**14**	14

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 (implicitl 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 2a.Senegal: 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/	24.5	25.0	34.6			40.0	43.4	45.9	46.8	47.5	47.9		47.7	44.2	
o/w foreign-currency denominated	17.9	19.7	27.0			31.6	33.1	34.9	35.0	36.3	37.4		38.3	33.2	
Change in public sector debt	1.5	0.5	9.6			5.4	3.4	2.5	0.9	0.6	0.5		-0.2	-0.3	
Identified debt-creating flows	-1.8	3.2	3.1			6.4	3.5	2.7	1.1	0.8	0.6		0.0	-0.2	
Primary deficit	3.3	4.2	4.3	2.0	2.3	3.9	4.7	3.9	2.5	2.2	2.3	3.3	2.0	1.7	1.9
Revenue and grants	23.6	21.7	21.7			22.1	22.2	22.4	22.6	22.9	23.1		23.1	22.9	
of which: grants	2.6	2.3	3.0			2.4	2.3	2.3	2.3	2.3	2.3		2.3	2.0	
Primary (noninterest) expenditure	26.9	25.9	25.9			26.0	26.8	26.4	25.2	25.1	25.4		25.1	24.6	
Automatic debt dynamics	-3.1	-0.4	-0.9			2.5	-1.2	-1.3	-1.5	-1.5	-1.6		-1.9	-2.0	
Contribution from interest rate/growth differential	-1.5	-1.6	0.5			-1.0	-1.3	-1.4	-1.6	-1.6	-1.8		-1.9	-2.0	
of which: contribution from average real interest rate	-0.5	-0.8	1.0			0.4	0.4	0.5	0.5	0.6	0.5		0.4	0.4	
of which: contribution from real GDP growth	-1.1	-0.8	-0.5			-1.3	-1.7	-1.9	-2.1	-2.2	-2.3		-2.4	-2.4	
Contribution from real exchange rate depreciation	-1.5	1.2	-1.3			3.5	0.2	0.2	0.2	0.2	0.2		...	...	
Other identified debt-creating flows	-2.0	-0.6	-0.3			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Privatization receipts (negative)	-1.7	-0.3	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)	-0.4	-0.3	-0.3			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	3.3	-2.7	6.5			-1.0	-0.1	-0.2	-0.1	-0.1	-0.2		-0.2	0.0	
Other Sustainability Indicators															
PV of public sector debt	6.6	5.3	26.3			30.0	33.2	35.6	36.1	36.6	36.8		36.1	34.5	
o/w foreign-currency denominated	0.0	0.0	18.7			21.6	22.9	24.6	24.3	25.5	26.2		26.8	23.6	
o/w external	...	...	18.7			21.6	22.9	24.6	24.3	25.5	26.2		26.8	23.6	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	6.0	7.8	8.0			7.6	8.7	10.2	9.4	10.6	9.1		8.2	8.1	
PV of public sector debt-to-revenue and grants ratio (in percent)	27.8	24.3	121.6			136.0	149.9	158.7	159.7	159.9	159.2		156.2	150.9	
PV of public sector debt-to-revenue ratio (in percent)	31.2	27.2	141.3			152.2	167.1	176.8	177.6	177.7	176.7		173.4	165.7	
o/w external 3/	…	…	100.4			109.5	115.3	122.0	119.5	123.7	125.9		128.5	113.1	
Debt service-to-revenue and grants ratio (in percent) 4/	6.2	8.2	9.1			8.5	12.1	14.2	14.3	20.0	15.0		13.8	17.6	
Debt service-to-revenue ratio (in percent) 4/	7.0	9.2	10.6			9.5	13.5	15.8	15.9	22.2	16.7		15.3	19.3	
Primary deficit that stabilizes the debt-to-GDP ratio	1.8	3.6	-5.3			-1.5	1.3	1.4	1.6	1.6	1.8		2.1	2.0	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	5.0	3.2	2.2	3.9	1.9	4.0	4.4	4.7	4.8	4.9	5.0	4.6	5.2	5.6	5.3
Average nominal interest rate on forex debt (in percent)	2.9	2.5	2.0	1.9	0.5	2.0	2.2	2.4	2.2	2.6	2.3	2.3	2.3	2.3	2.2
Average real interest rate on domestic debt (in percent)	-1.3	-2.2	8.1	0.9	3.0	2.9	4.1	4.1	4.1	3.7	3.7	3.8	3.7	4.0	3.9
Real exchange rate depreciation (in percent, + indicates depreciation)	-9.4	7.0	-6.7	-3.2	10.6	13.4	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	5.3	6.6	-0.9	2.6	2.3	1.4	2.0	2.0	2.0	2.1	2.1	1.9	2.2	2.3	2.2
Growth of real primary spending (deflated by GDP deflator, in percent)	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1
Grant element of new external borrowing (in percent)	...	...	...	…	…	42.1	20.7	17.2	37.9	15.5	27.1	26.7	25.4	21.6	...

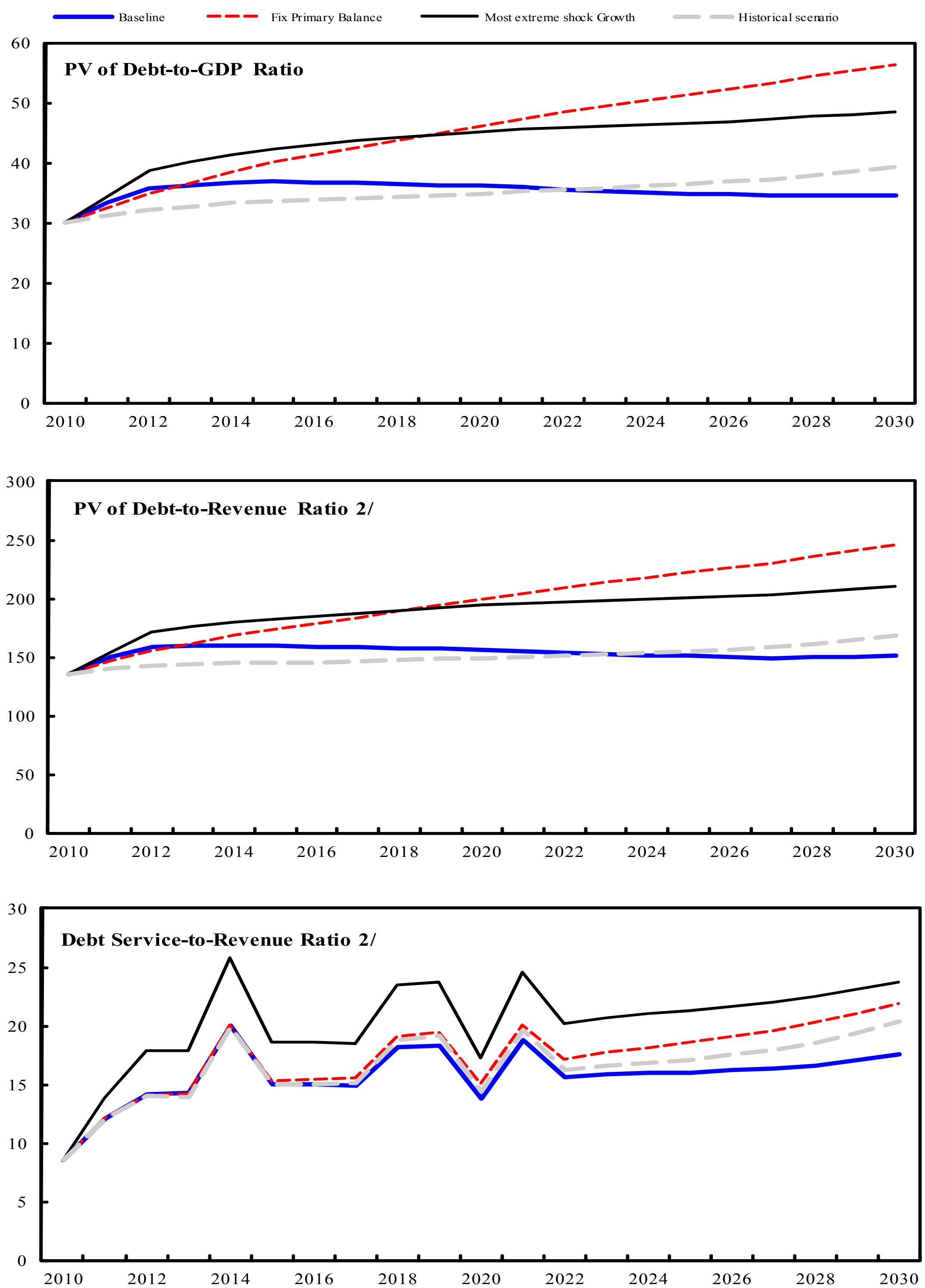
Sources: Country authorities; and staff estimates and projections.
1/ The public sector refers to the central governemnt.
2/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period.
3/ Revenues excluding grants.
4/ Debt 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 2b.Senegal: 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	30	33	36	36	37	37	36	35
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	30	31	32	33	33	34	35	39
A2. Primary balance is unchanged from 2010	30	33	35	37	39	40	46	56
A3. Permanently lower GDP growth 1/	30	33	36	37	38	39	41	50
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	30	34	39	40	41	42	45	48
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	30	33	36	36	37	37	36	35
B3. Combination of B1-B2 using one half standard deviation shocks	30	32	35	36	37	38	39	42
B4. One-time 30 percent real depreciation in 2011	30	42	44	44	44	43	41	38
B5. 10 percent of GDP increase in other debt-creating flows in 2011	30	42	44	44	45	44	43	39
PV of Debt-to-Revenue Ratio 2/								
Baseline	136	150	159	160	160	159	156	151
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	136	140	143	144	145	145	149	168
A2. Primary balance is unchanged from 2010	136	147	156	162	168	173	200	246
A3. Permanently lower GDP growth 1/	136	151	161	163	165	166	177	216
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	136	155	171	176	180	182	194	211
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	136	149	159	160	160	159	156	151
B3. Combination of B1-B2 using one half standard deviation shocks	136	146	154	157	160	162	170	182
B4. One-time 30 percent real depreciation in 2011	136	190	196	193	191	187	176	167
B5. 10 percent of GDP increase in other debt-creating flows in 2011	136	189	196	196	194	192	184	168
Debt Service-to-Revenue Ratio 2/								
Baseline	8	12	14	14	20	15	14	18
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	8	12	14	14	20	15	14	20
A2. Primary balance is unchanged from 2010	8	12	14	14	20	15	15	22
A3. Permanently lower GDP growth 1/	8	12	14	14	20	15	15	21
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	8	12	15	15	21	16	15	21
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	8	12	14	14	20	15	14	18
B3. Combination of B1-B2 using one half standard deviation shocks	8	12	14	14	20	15	14	19
B4. One-time 30 percent real depreciation in 2011	8	14	18	18	26	19	17	24
B5. 10 percent of GDP increase in other debt-creating flows in 2011	8	12	15	16	21	16	15	19

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.Senegal: Indicators of Public Debt Under Alternative Scenarios, 2010-2030 1/



Sources: Country authorities; and 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.