INTERNATIONAL MONETARY FUND

AND

INTERNATIONAL DEVELOPMENT ASSOCIATION

SENEGAL

Joint IMF/IDA Debt Sustainability Analysis

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

Approved by Roger Nord and Thomas Dorsey (IMF)
and Sudhir Shetty and Sudarshan Gooptu (World Bank)

May 7, 2010

Senegal remains at a low risk of debt distress. Under the baseline scenario and various shock scenarios, all the debt burden indicators remain well below their indicative policy-dependent thresholds. External debt is vulnerable to a permanent deterioration in borrowing terms, which highlights the need for prudent debt management especially as the authorities seek greater access to external resources on nonconcessional terms. While the inclusion of domestic debt does not alter the overall assessment of Senegal's debt vulnerabilities, it raises the debt burden indicators (under the baseline and stress tests), suggesting the need for fiscal consolidation once the impact of the crisis subsides.

I. BACKGROUND

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

2. **In December 2009, Senegal issued its first Euro Bond.** 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 will finance the Dakar-Diamniadio toll road.

3. **Domestic public debt is low.** At end 2009, domestic debt reached 8 percent of GDP, or one-fourth of total debt.[1] This debt is denominated in local currency and mostly held by WAEMU banks. In 2009, net domestic debt issuance reached almost 3 percent of GDP.

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

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.

- 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 4½ 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 projections also assume successful implementation of its infrastructure program (including road, port, and airport).

- FDI (net) is expected to remain relatively low over the short run, in part owing to the financial crisis. It is expected to pick up, as economic prospects improve and uncertainty is reduced, to average about 3 percent of GDP in the long term.

- The primary fiscal deficit is expected to decline over the medium term, as the impact of the crisis subsides. Fiscal consolidation is expected to continue in order to safeguard debt sustainability. Most of Senegal's public financing needs are projected to be filled through external concessional borrowing.

6. **Compared to the previous DSA, macroeconomic assumptions have been revised to reflect more updated information regarding the impact of the crisis.**[2] GDP growth has been revised down from 3.1 percent in 2009 to 1.5 percent, while long-term real GDP growth remains unchanged. The current account deficit (excluding interest payments) in 2009 has been revised down by about 2 percentage points, reflecting a sharper-than-expected contraction in imports and stronger-than-expected remittances.

---

[2] In the previous DSA, completed in June 2009 (Country Report 09/205). Senegal was classified as a low risk of debt distress.

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 1.5 percent in 2009, to an average of 3.8 percent over 2010-11, 4.8 percent over 2012–15, and over 5¼ percent over the long term.

Inflation: Inflation, as measured by the GDP deflator (in US. dollar), is expected to increase as excess capacity is reduced. Inflation is expected to stabilize at around 2 percent.

Current account deficit (excluding interest payments): the current account deficit is expected to deteriorate slightly over the medium term as uncertainty abates and economic prospects improve. The current account deficit excluding interest payments is expected to stabilize at around 8.5 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 (despite the crisis).

Fiscal deficit: after a primary deficit of 4.4 percent of GDP in 2009, modest primary fiscal deficits averaging 3.4 percent of GDP are expected in 2010 and 2011, reflecting a reduction in the need for countercyclical fiscal policy. Thereafter, the primary deficit gradually declines as public expenditure management—a reform focus under the program supported by the IMF's Policy Support Instrument and the Bank's budget support operations (PFSC and PRSCs)—continues to be improved, and further efficiency gains are being made in tax administration.

Aid flows (grants and concessional loans): access to concessional resources is expected to decline as Senegal's development improves. Grants are expected to decline gradually from 2.7 percent of GDP in 2010 to 2.1 percent of GDP by the end of the projection period, while concessional loans are expected to decline from 1.9 percent of GDP to 1.7 percent of GDP over the same period.

Public domestic borrowing: as the WAEMU debt markets become more liquid and efficient, Senegal is expected to rely increasingly on domestic financing. Senegal's domestic borrowing is expected to be less than one-third of the total public financing needs and claims on the government are expected to be largely held by commercial banks.

III. EXTERNAL DSA

7. **External PPG debt burden indicators under the baseline scenario remain well below their policy-dependent thresholds** (Figure 1, Table 1).[3] Workers' remittances represent a reliable and large source of foreign exchange for Senegal, accounting for around 10 percent of GDP and more than 40 percent of exports over the projection period. As such, they are explicitly considered in this DSA (Figure 2).[4] The modified debt burden indicators—

[3] 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.

[4] For a detailed discussion of the treatment of remittances in LIC DSAs, please see "*Staff Guidance Note on the Application of the Joint Fund-Bank Debt Sustainability Framework for Low-Income Countries,"* SM/10/16.

the PV of external debt and external debt service as ratios to the sum of exports and gross remittances, and to the sum of gross domestic product and gross remittances, respectively—are significantly lower than the updated DSF thresholds (10 percent lower than the usual DSF thresholds).

8. **Stress tests do not reveal serious vulnerabilities for external public debt, as the various indicators remain below the thresholds** (Figure 2, Table 2)**.** The most common extreme stress test is a general deterioration in the terms of external borrowing, i.e., an increase by 2 percentage points in the interest rate on new external public borrowing. Despite this adverse shock, the debt burden indicators remain well below their thresholds.

IV. PUBLIC DSA

9. **Indicators of overall public debt (external plus domestic debt) and debt service follow a similar pattern as those for external public debt alone** (Table 3, Figure 3). While more elevated than under the external DSA, the public debt burden indicators do not suggest increased concerns for debt sustainability.

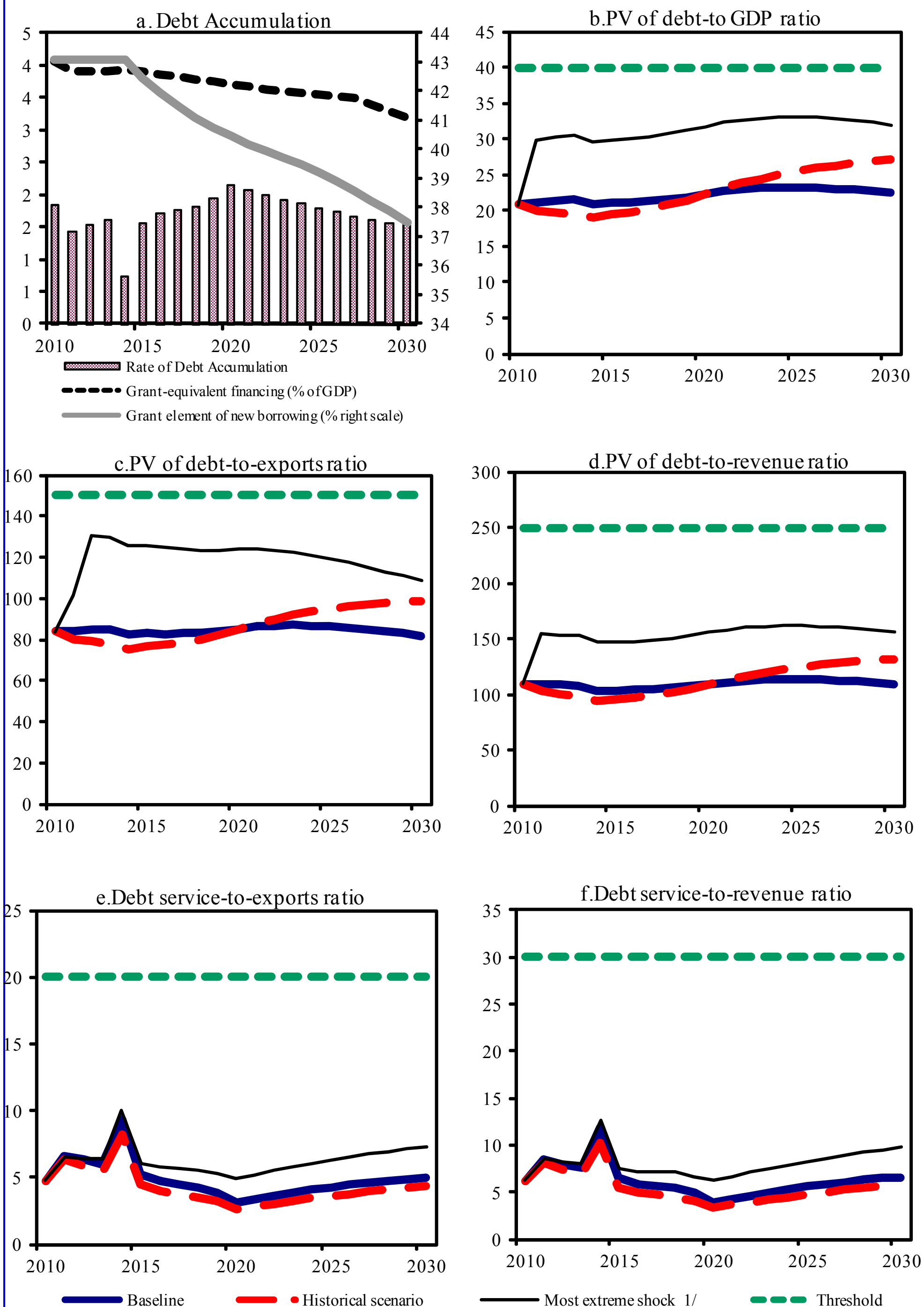
10. **Public debt sustainability hinges on containing the fiscal deficit in the medium and long term.** If the fiscal balance were to remain at its 2010 level, the debt burden indicators would appear to be on an upward trend, suggesting that the debt situation is unsustainable, highlighting the importance of an exit strategy for fiscal stimulus.

11. **The public debt position is also vulnerable to shocks to real GDP growth.** Under a scenario with permanently lower real growth, the PV of debt-to-GDP stabilizes at close to 50 percent, which is about 10 percentage points above the baseline. This highlights the need for the authorities to continue pursuing their goal of raising potential output growth.

V. CONCLUSION

12. **Senegal's external debt burden is subject to a low risk of debt distress.** The sustainability of Senegal's external PPG debt seems to be vulnerable to a permanent deterioration in its borrowing terms. This highlights the need for prudent debt management by Senegal, especially as it seeks to gain greater access to external resources on nonconcessional terms. Adding domestic debt, while raising the debt burden indicators, does not change the overall assessment of Senegal's debt vulnerabilities, but highlights the need for fiscal consolidation once the impact of the crisis subsides.

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 Terms shock and in figure f. to a Terms shock

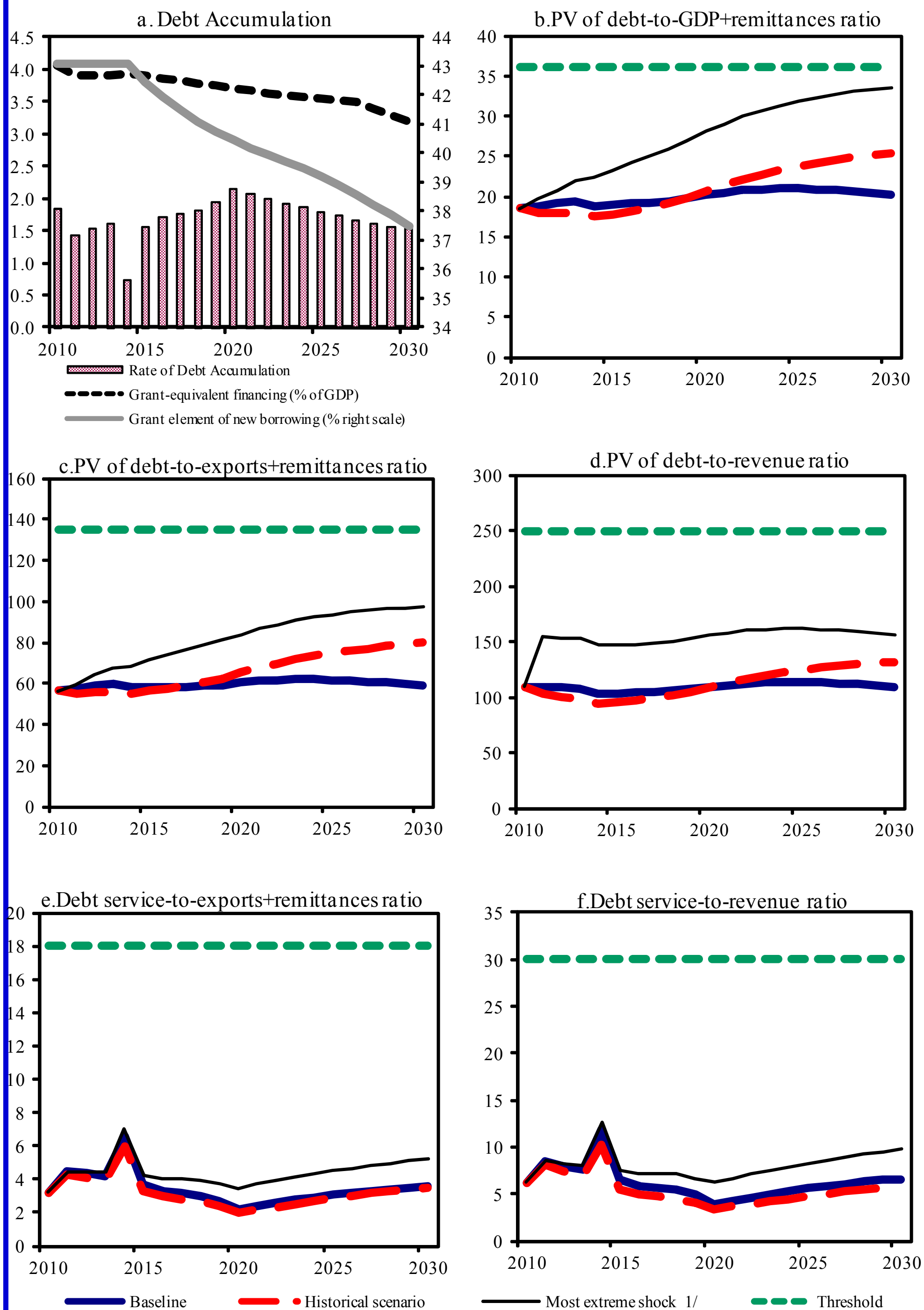
Table 1.: External Debt Sustainability Framework, Baseline Scenario, 2007-2030 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 0	Standard Deviation 0	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**	**44.1**			**48.1**	**49.7**	**51.0**	**52.4**	**53.2**	**54.4**		**58.4**	**59.6**	
o/w public and publicly guaranteed (PPG)	17.9	19.8	24.0			27.1	27.8	28.5	29.1	28.9	29.6		32.4	32.7	
Change in external debt	2.0	3.3	6.7			4.0	1.5	1.3	1.4	0.8	1.2		0.9	-0.3	
Identified net debt-creating flows	3.9	7.1	8.8			5.5	5.2	4.7	4.5	3.8	3.6		3.2	2.6	
Non-interest current account deficit	**11.3**	**13.9**	**8.2**	**7.6**	**3.2**	**8.0**	**8.3**	**8.5**	**8.6**	**8.8**	**8.7**		**8.6**	**8.3**	8.5
Deficit in balance of goods and services	22.4	26.6	20.0			19.5	19.2	19.0	18.7	18.8	18.6		18.4	17.8	
Exports	25.5	26.4	23.3			24.8	25.0	25.0	25.3	25.4	25.4		26.2	27.4	
Imports	47.9	53.0	43.2			44.3	44.2	44.0	43.9	44.2	44.0		44.6	45.2	
Net current transfers (negative = inflow)	-11.4	-12.7	-11.7	-8.5	2.6	-11.3	-10.9	-10.5	-10.1	-10.1	-10.1		-10.0	-9.7	-9.9
o/w official	-1.0	-0.5	-0.7			-0.6	-0.5	-0.5	-0.6	-0.6	-0.6		-0.7	-0.8	
Other current account flows (negative = net inflow)	0.3	0.0	-0.1			-0.1	0.0	0.0	0.0	0.1	0.2		0.2	0.1	
Net FDI (negative = inflow)	**-2.4**	**-2.0**	**-1.6**	**-1.3**	**0.7**	**-1.8**	**-1.9**	**-2.2**	**-2.5**	**-3.2**	**-3.1**		**-3.1**	**-3.1**	-3.1
Endogenous debt dynamics 2/	**-5.0**	**-4.8**	**2.2**			**-0.8**	**-1.2**	**-1.5**	**-1.7**	**-1.8**	**-2.0**		**-2.3**	**-2.6**	
Contribution from nominal interest rate	0.5	0.4	0.5			0.7	0.7	0.6	0.6	0.6	0.5		0.5	0.5	
Contribution from real GDP growth	-1.3	-0.7	-0.6			-1.5	-1.9	-2.1	-2.3	-2.4	-2.5		-2.8	-3.1	
Contribution from price and exchange rate changes	-4.2	-4.5	2.3			...	...	...	...	...	...		...	...	
Residual (3-4) 3/	**-1.9**	**-3.8**	**-2.1**			**-1.5**	**-3.7**	**-3.4**	**-3.1**	**-3.0**	**-2.4**		**-2.3**	**-2.9**	
o/w exceptional financing	-0.8	-0.6	-0.7			-0.6	-0.5	-0.5	-0.5	-0.4	-0.4		-0.3	-0.1	
PV of external debt 4/	...	...	38.8			41.9	42.9	43.8	44.8	45.2	45.8		48.3	49.3	
In percent of exports	...	...	166.7			168.8	171.6	175.1	177.4	178.3	180.3		184.3	179.9	
PV of PPG external debt	**...**	**...**	**18.7**			**20.8**	**21.1**	**21.3**	**21.5**	**20.9**	**21.0**		**22.3**	**22.4**	
In percent of exports	**...**	**...**	**80.3**			**84.0**	**84.3**	**85.1**	**85.2**	**82.4**	**82.8**		**85.2**	**81.8**	
In percent of government revenues	**...**	**...**	**101.6**			**109.1**	**108.8**	**108.3**	**108.2**	**103.7**	**103.4**		**109.4**	**109.3**	
Debt service-to-exports ratio (in percent)	**11.6**	**12.9**	**20.3**			**18.7**	**19.9**	**18.8**	**16.5**	**20.3**	**16.4**		**14.0**	**14.6**	
PPG debt service-to-exports ratio (in percent)	**3.4**	**2.8**	**3.8**			**4.8**	**6.6**	**6.3**	**6.0**	**9.4**	**5.2**		**3.0**	**5.0**	
PPG debt service-to-revenue ratio (in percent)	**4.2**	**3.8**	**4.8**			**6.2**	**8.5**	**8.0**	**7.6**	**11.8**	**6.5**		**3.9**	**6.6**	
Total gross financing need (Billions of U.S. dollars)	1.3	2.0	1.4			1.4	1.6	1.6	1.6	1.8	1.7		2.3	4.9	
Non-interest current account deficit that stabilizes debt ratio	9.3	10.6	1.5			4.0	6.8	7.2	7.2	8.0	7.5		7.7	8.6	
Key macroeconomic assumptions															
Real GDP growth (in percent)	4.8	2.3	1.5	3.8	2.0	3.4	4.1	4.5	4.7	4.9	5.0	4.4	5.2	5.6	5.3
GDP deflator in US dollar terms (change in percent)	15.1	15.2	-5.8	6.0	10.1	0.1	1.0	1.6	1.5	1.6	1.6	1.2	2.1	2.2	2.2
Effective interest rate (percent) 5/	2.0	1.5	1.4	1.7	0.4	1.6	1.4	1.3	1.2	1.2	1.0	1.3	0.9	0.9	0.9
Growth of exports of G&S (US dollar terms, in percent)	19.9	22.1	-15.7	8.0	13.2	10.4	6.0	6.2	7.4	6.9	6.9	7.3	8.1	8.2	8.1
Growth of imports of G&S (US dollar terms, in percent)	33.9	30.4	-21.9	13.0	16.9	6.1	5.0	5.6	6.2	7.2	6.3	6.1	7.7	8.0	7.8
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	43.1	43.1	43.1	43.1	43.1	42.5	43.0	40.4	37.5	39.7
Government revenues (excluding grants, in percent of GDP)	20.7	19.2	18.4			19.1	19.4	19.6	19.9	20.1	20.3		20.4	20.5	20.4
Aid flows (in Billions of US dollars) 7/	0.7	0.9	0.8			0.6	0.6	0.6	0.7	0.7	0.8		1.1	2.0	
o/w Grants	0.3	0.3	0.4			0.4	0.3	0.4	0.4	0.4	0.4		0.6	1.1	
o/w Concessional loans	0.3	0.5	0.4			0.2	0.3	0.3	0.3	0.3	0.4		0.5	0.9	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			4.1	3.9	3.9	3.9	3.9	3.9		3.7	3.2	3.6
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			68.9	67.4	67.2	67.0	66.4	66.1		65.1	62.3	64.6
Memorandum items:															
Nominal GDP (Billions of US dollars)	11.3	13.3	12.7			13.2	13.9	14.7	15.7	16.7	17.8		25.4	53.4	
Nominal dollar GDP growth	20.6	17.9	-4.3			3.6	5.1	6.2	6.3	6.5	6.7	5.7	7.5	8.0	7.6
PV of PPG external debt (in Billions of US dollars)			2.5			2.7	2.9	3.1	3.4	3.5	3.7		5.7	12.0	
(PVt-PVt-1)/GDPt-1 (in percent)						1.8	1.4	1.5	1.6	0.7	1.6	1.4	2.2	1.5	1.8
Gross remittances (Billions of US dollars)	1.4	1.9	1.6			1.6	1.6	1.7	1.7	1.8	1.9		2.7	5.8	
PV of PPG external debt (in percent of GDP + remittances)	...	...	16.6			18.6	18.8	19.1	19.4	18.9	19.0		20.2	20.2	
PV of PPG external debt (in percent of exports + remittances)	...	...	51.9			56.2	57.2	58.6	59.7	57.8	58.2		60.4	58.7	
Debt service of PPG external debt (in percent of exports + remittances)	...	...	2.4			3.2	4.5	4.3	4.2	6.6	3.6		2.2	3.6	

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).

Figure 2. 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 Terms shock; in c. to a Terms shock; in d. to a One-time depreciation shock; in e. to a Terms shock and in figure f. to a Terms shock

Table 2.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+remittances ratio								
Baseline	19	19	19	19	19	19	**20**	20
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	19	18	18	18	17	18	**21**	25
A2. New public sector loans on less favorable terms in 2010-2030 2	19	20	21	22	22	23	**28**	34
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	19	19	20	20	20	20	**21**	21
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	19	20	23	24	23	23	**23**	21
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	19	20	21	21	21	21	**22**	22
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	19	24	27	26	25	25	**25**	22
B5. Combination of B1-B4 using one-half standard deviation shocks	19	23	28	27	26	26	**26**	23
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	19	26	26	26	26	26	**28**	28
PV of debt-to-exports+remittances ratio								
Baseline	56	57	59	60	58	58	**60**	59
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	56	55	56	56	55	56	**65**	80
A2. New public sector loans on less favorable terms in 2010-2030 2	56	60	64	68	68	71	**84**	97
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	56	57	58	60	58	58	**60**	59
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	56	66	83	85	82	82	**82**	73
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	56	57	58	60	58	58	**60**	59
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	56	80	93	81	78	78	**76**	64
B5. Combination of B1-B4 using one-half standard deviation shocks	56	78	96	86	83	82	**81**	68
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	56	57	58	60	58	58	**60**	59
PV of debt-to-revenue ratio								
Baseline	109	109	108	108	104	103	**109**	109
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	109	104	100	98	95	95	**109**	132
A2. New public sector loans on less favorable terms in 2010-2030 2	109	114	118	123	123	127	**152**	181
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	109	111	114	113	109	108	**115**	115
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	109	117	133	132	126	125	**127**	116
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	109	114	121	120	115	115	**122**	122
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	109	129	148	146	140	138	**138**	120
B5. Combination of B1-B4 using one-half standard deviation shocks	109	129	155	153	147	145	**144**	124
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	109	154	154	153	147	147	**156**	155

Table 2.Senegal: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2010-2030 (continued)
(In percent)

Debt service-to-exports+remittances ratio

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

Debt service-to-revenue ratio

Baseline	6	8	8	8	12	6	**4**	7
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2010-2030 1/	6	8	7	7	10	6	**3**	6
A2. New public sector loans on less favorable terms in 2010-2030 2	6	8	8	8	13	8	**6**	10
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2011-2012	6	9	8	8	12	7	**4**	7
B2. Export value growth at historical average minus one standard deviation in 2011-2012 3/	6	8	8	8	12	7	**4**	7
B3. US dollar GDP deflator at historical average minus one standard deviation in 2011-2012	6	9	9	8	13	7	**4**	7
B4. Net non-debt creating flows at historical average minus one standard deviation in 2011-2012 4/	6	8	8	8	13	7	**4**	8
B5. Combination of B1-B4 using one-half standard deviation shocks	6	9	9	9	13	7	**5**	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2011 5/	6	12	11	11	17	9	**6**	9
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	36	36	36	36	36	36	**36**	36

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.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	25.1	32.1			35.7	38.0	39.6	41.0	42.2	42.6		46.3	45.8	
o/w foreign-currency denominated	17.9	19.8	24.0			27.1	27.8	28.5	29.1	28.9	29.6		32.4	32.7	
Change in public sector debt	1.5	0.6	7.0			3.6	2.3	1.5	1.4	1.2	0.4		0.7	-0.4	
Identified debt-creating flows	-0.4	3.3	3.1			4.3	2.1	1.5	1.4	1.2	1.1		0.6	-1.4	
Primary deficit	3.3	4.1	4.4	2.0	2.4	3.6	3.3	2.9	2.9	2.9	2.9	3.1	2.8	1.0	2.4
Revenue and grants	23.6	21.8	21.7			21.8	21.8	22.1	22.3	22.6	22.8		22.8	22.5	
of which: grants	2.9	2.6	3.4			2.7	2.5	2.5	2.4	2.4	2.4		2.4	2.0	
Primary (noninterest) expenditure	26.9	25.9	26.2			25.4	25.1	25.0	25.2	25.5	25.6		25.6	23.5	
Automatic debt dynamics	-3.3	-0.5	-1.0			1.0	-1.0	-1.2	-1.3	-1.5	-1.6		-2.0	-2.3	
Contribution from interest rate/growth differential	-1.3	-0.9	-0.2			-0.9	-1.2	-1.5	-1.6	-1.7	-1.8		-2.1	-2.4	
of which: contribution from average real interest rate	-0.3	-0.3	0.2			0.2	0.2	0.2	0.2	0.2	0.2		0.1	0.1	
of which: contribution from real GDP growth	-1.0	-0.6	-0.4			-1.1	-1.4	-1.7	-1.8	-1.9	-2.0		-2.3	-2.5	
Contribution from real exchange rate depreciation	-2.0	0.4	-0.8			1.9	0.3	0.2	0.3	0.3	0.2		...	...	
Other identified debt-creating flows	-0.4	-0.3	-0.3			-0.3	-0.3	-0.2	-0.2	-0.2	-0.2		-0.1	-0.1	
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)	-0.4	-0.3	-0.3			-0.3	-0.3	-0.2	-0.2	-0.2	-0.2		-0.1	-0.1	
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	1.9	-2.7	3.9			-0.7	0.3	0.1	0.1	0.0	-0.7		0.1	1.0	
Other Sustainability Indicators															
PV of public sector debt	6.6	5.3	26.7			29.4	31.2	32.4	33.4	34.2	34.1		36.2	35.4	
o/w foreign-currency denominated	0.0	0.0	18.7			20.8	21.1	21.3	21.5	20.9	21.0		22.3	22.4	
o/w external	...	...	18.7			20.8	21.1	21.3	21.5	20.9	21.0		22.3	22.4	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	5.5	6.6	7.8			7.4	7.3	8.6	9.3	10.8	10.7		10.2	7.5	
PV of public sector debt-to-revenue and grants ratio (in percent)	27.8	24.3	123.0			135.1	143.1	146.4	149.5	151.4	149.5		159.0	157.2	
PV of public sector debt-to-revenue ratio (in percent)	31.7	27.6	145.5			154.1	161.4	164.8	167.9	169.7	167.3		177.4	172.8	
o/w external 3/	…	…	101.6			109.1	108.8	108.3	108.2	103.7	103.4		109.4	109.3	
Debt service-to-revenue and grants ratio (in percent) 4/	4.5	6.3	7.2			9.0	12.0	13.0	13.2	18.1	14.7		14.3	17.2	
Debt service-to-revenue ratio (in percent) 4/	5.1	7.1	8.6			10.2	13.6	14.6	14.8	20.3	16.5		15.9	18.9	
Primary deficit that stabilizes the debt-to-GDP ratio	1.8	3.5	-2.6			0.0	0.9	1.4	1.5	1.7	2.5		2.1	1.4	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	4.8	2.3	1.5	3.8	2.0	3.4	4.1	4.5	4.7	4.9	5.0	4.4	5.2	5.6	5.3
Average nominal interest rate on forex debt (in percent)	1.4	1.6	1.7	1.4	0.3	2.3	2.0	1.8	1.7	1.6	1.3	1.8	1.2	1.2	1.2
Average real interest rate on domestic debt (in percent)	-1.4	-2.9	6.2	0.6	3.5	2.7	3.8	3.8	3.8	3.8	3.8	3.6	3.8	3.7	3.8
Real exchange rate depreciation (in percent, + indicates depreciation)	-11.9	2.2	-3.9	-3.4	10.3	8.1	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	5.4	7.3	-0.5	2.8	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	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	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Grant element of new external borrowing (in percent)	...	...	...	…	…	43.1	43.1	43.1	43.1	43.1	42.5	43.0	40.4	37.5	...

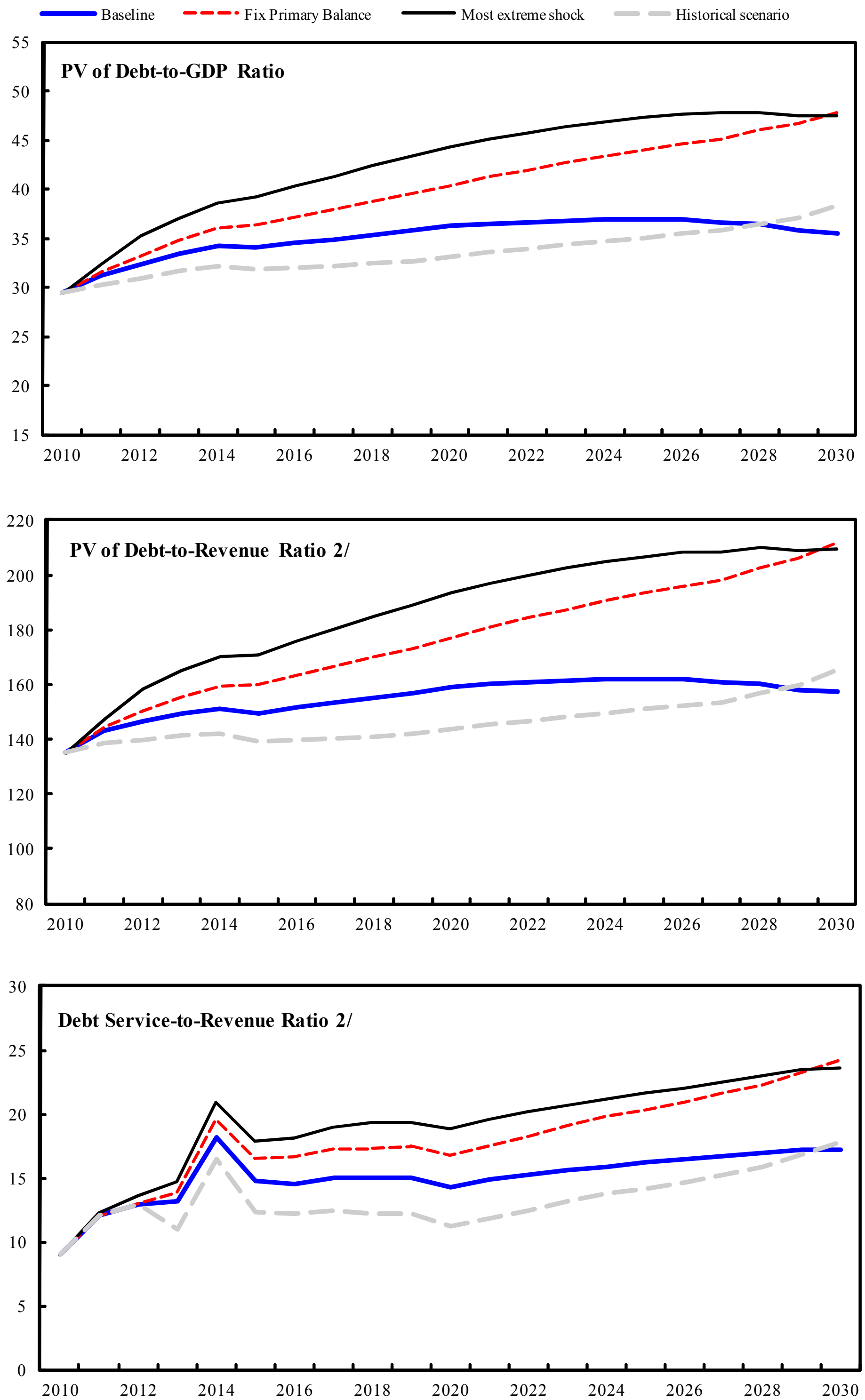
Sources: Country authorities; and staff estimates and projections.
1/ Public sector refers to the general government.
2/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period.
3/ Revenues excluding grants.
4/ Debt service 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.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	29	31	32	33	34	34	36	35
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	29	30	31	32	32	32	33	38
A2. Primary balance is unchanged from 2010	29	32	33	35	36	36	40	48
A3. Permanently lower GDP growth 1/	29	31	33	34	35	36	41	50
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	29	32	35	37	39	39	44	47
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	29	32	34	35	36	36	38	36
B3. Combination of B1-B2 using one half standard deviation shocks	29	32	33	35	36	37	41	42
B4. One-time 30 percent real depreciation in 2011	29	40	40	40	40	39	39	35
B5. 10 percent of GDP increase in other debt-creating flows in 2011	29	39	40	41	41	40	41	38
PV of Debt-to-Revenue Ratio 2/								
Baseline	135	143	146	150	151	150	159	157
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	135	139	140	141	142	139	144	166
A2. Primary balance is unchanged from 2010	135	144	150	156	160	160	177	212
A3. Permanently lower GDP growth 1/	135	144	148	153	157	157	180	218
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	135	148	158	165	170	171	193	209
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	135	147	156	158	160	157	165	161
B3. Combination of B1-B2 using one half standard deviation shocks	135	144	151	156	160	160	178	187
B4. One-time 30 percent real depreciation in 2011	135	182	181	181	179	173	170	156
B5. 10 percent of GDP increase in other debt-creating flows in 2011	135	181	182	181	181	177	181	171
Debt Service-to-Revenue Ratio 2/								
Baseline	9	12	13	13	18	15	14	17
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	9	12	13	11	16	12	11	18
A2. Primary balance is unchanged from 2010	9	12	13	14	20	16	17	24
A3. Permanently lower GDP growth 1/	9	12	13	13	19	16	17	25
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2011-2012	9	12	14	15	21	18	19	24
B2. Primary balance is at historical average minus one standard deviations in 2011-2012	9	12	13	15	21	16	15	18
B3. Combination of B1-B2 using one half standard deviation shocks	9	12	13	13	19	16	17	21
B4. One-time 30 percent real depreciation in 2011	9	14	16	17	24	19	18	23
B5. 10 percent of GDP increase in other debt-creating flows in 2011	9	12	15	30	21	22	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 3.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.