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 Sharmini Coorey and Adnan Mazarei (IMF) and Sudhir Shetty and Carlos Braga (World Bank)

May 30, 2008

The 2008 debt sustainability analysis (DSA) indicates that Senegal is at a low risk of debt distress.[1] *External debt ratios have improved substantially over the past few years thanks to HIPC and MDRI debt relief while domestic debt ratios have traditionally been low, and debt dynamics under the baseline scenario are projected to remain favorable.*

I. Background

1. **Senegal's external debt sustainability indicators improved substantially after the enhanced HIPC Initiative and the Multilateral Debt Relief Initiative (MDRI).** Senegal reached its HIPC completion point in April 2004, when it received debt relief of about US$850 million in nominal terms.[2] In 2005, Senegal qualified for further debt relief under the MDRI when the IMF, the International Development Association (IDA) and the African Development Fund (AfDF) cancelled their claims on Senegal amounting to about US$1.4 billion in nominal terms.[3] As a result of these two initiatives, the NPV of external public and publicly guaranteed (PPG) debt outstanding has been substantially reduced from 33.1 percent of GDP at end-2005 to an estimated 18.3 percent of GDP at end-2007.

[1] The DSA has been prepared jointly by World Bank and IMF staffs. The fiscal year for Senegal is January 1 to December 31.

[2] See *Senegal: Enhanced Initiative for HIPC-Completion Point Document* (Country Report 04/130 or IDA/R2004-0065).

[3] MDRI debt relief from the IMF became effective January 5, 2006, providing stock relief on debt disbursed before end-2004 and still outstanding at end-2005. IDA and the AfDF started providing debt relief in July 2006. The eligible debt covers IDA credits disbursed before end-2003 and AfDF credits disbursed before end-2004 that were still outstanding at the time of qualification.

2. **Nominal external debt amounted to US$4.5 billion (18.1 percent of GDP) at end-2007**, of which the World Bank and AfDB held 44 percent and Paris Club creditors held 6 percent. Since the last DSA (completed in January 2007), the Islamic Development Bank and China have granted debt relief to Senegal and only ECOWAS and Sweden have yet to provide HIPC assistance.

3. **Senegal's public domestic debt remains low.**[4] The NPV of public domestic debt is estimated at 5.6 percent of GDP at end-2007, or one-fourth of total debt. The majority of this debt is non-concessional, denominated in local currency, and held by WAEMU banks. The recent reforms of the regional financial market and ample bank liquidity have allowed Senegal (and other WAEMU member countries) to increasingly place debt instruments, including of longer maturity. In 2007, Senegal issued CFAF 113 billion (2 percent of GDP) in two tranches, at 5.5 percent interest, over five and ten years.

4. **Private sector exposure also appears limited once the sector's sizable assets are considered**. The International Investment Position compiled by the BCEAO for end-2006 indicates that the stock of private external debt is 22 percent of GDP, three quarters of which consist of trade credits. The remainder is primarily loans taken abroad and currency and deposits owed by Senegalese banks to nonresidents. Private sector external assets amounting to 13 percent of GDP may, depending on their disposition to service debt, also help limit private sector exposure. Nonetheless, given its importance in overall external debt sustainability, the future evolution of the private sector debt should be closely monitored.

II. Underlying DSA Assumptions

5. **The macroeconomic framework underlying the DSA is based on the implementation of sound macroeconomic and structural policies, and external financing mainly through grants, highly concessional loans, and significant FDI.** Box 1 summarizes the key macroeconomic assumptions. Growth projections, broadly in line with the baseline scenario of the PRSP II, average 5½ percent over 2008–28. This reflects the authorities' intention to raise the growth potential of the economy by increasing capital and labor utilization and spur productivity growth. In addition to pursuing sound macroeconomic policies, this would be achieved through reform efforts to improve the business environment, diversify exports, develop infrastructure, make the provision of energy more reliable, and reform the labor market. Grants and loans from donors are expected to remain significant. FDI related to a number of well-defined projects is expected to pick up considerably and should help sustain long-term growth. While FDI inflows will lead to higher imports and a temporary increase in the current account deficit in the short run, these should subside over the medium to long run as the FDI–related export production grows. With a primary fiscal

[4] Public domestic debt comprises central government debt. Debt issued in the WAEMU is included in domestic debt.

deficit declining from around 3 percent of GDP to 2 percent of GDP, external borrowing on concessional terms will remain around 2 percent of GDP, with an average grant element of 39 percent. Any additional financing needs will be covered domestically, primarily through bond issues in the regional financial markets.

6. **The underlying DSA assumptions differ from the previous DSA.** Differences arise as medium-term assumptions have been modified to reflect new information on commodity prices, as well as potential and realized increased FDI commitments and a concomitant projected improved performance of exports. Export performance is initially worse than in the previous DSA, reflecting persistent difficulties in the groundnut and fishing sectors and a slower recovery of the phosphate processor ICS. After 2013, FDI-related export production propels export growth to higher levels than previously assumed. Imports are assumed to be higher than in the past. Initially, this reflects higher oil prices and construction and services created by FDI. In later years, reforms lead to faster growth in secondary and tertiary sectors than in the past, resulting in increased imports. Consequently, the medium-run current account deficit is assumed to be higher than in past projections, while the long-run current account deficit fares much better than previously, as export growth begins to outpace import growth. Finally, reflecting the government's renewed commitment to macroeconomic stability under the PSI, the long-run primary fiscal deficit is assumed to improve moderately relative to previous projections.

Box 1. Macroeconomic Assumptions Underlying the DSA

The macroeconomic assumptions over the period 2008–28 are as follows:

Real GDP growth will average 5½ percent.

Inflation, as measured by the GDP deflator, is expected to return, over the medium term, to its historical level of just above two percent.

The noninterest **current account deficit** (including grants) initially widens to about 11 percent of GDP in 2008–13. Export growth is projected to average 12½ percent during the period—helped by a gradual recovery in traditional exports, especially of phosphate products—but lags the rapid growth of imports related to the large FDI projects and increased oil prices. Over 2014–28, once FDI-related exports (rising by 10.8 percent) begin to outpace import growth (rising by 9 percent), the current account deficit could decline to about 7 percent of GDP by 2028. Net FDI is expected to hover at around 6 percent of GDP over the medium to long term.

The **primary fiscal deficit** will gradually decline from just above 3 percent of GDP in 2007 to just under 2 percent of GDP in 2028, reflecting increased revenues and improved public expenditure management—a reform focus under the PSI.

Net aid flows (grants and concessional loans) gradually decline from 7 percent of GDP in 2008 to 3½ percent of GDP in 2028. Averaging 50 percent of total aid flows, concessional loans are assumed to be on standard terms. For example, new IDA borrowing (averaging almost 60 percent of new borrowing) is assumed to have a 0.75 percent interest rate, 10-year grace period, and 40-year maturity.

Public sector domestic borrowing will remain under 40 percent of overall public sector borrowing (based on NPV of debt calculations). Commercial bank holdings of Senegalese treasury bills and bonds remain the primary source of domestic public credit, with an assumed 5½ percent interest rate and maturities ranging from one to ten years.

Nonconcessional borrowing is assumed to remain the exception. The DSA incorporates the borrowing related to the Dakar-Diamniado toll road, at CFAF 40 billion (0.7 percent of GDP) each in 2008 and 2009. According to staff's analysis, the project's expected return exceeds the anticipated costs associated with the non-concessional funds. Alternative donor financing for this project is not in sight, and raising funds of this magnitude in the WAEMU market would exceed that market's capacity. The incorporation of this non-concessional borrowing is in line with the government's commitment to consult with IMF staff (as specified in the PSI) and with Bank staff well in advance for any exceptions that may possibly be needed, for projects for which concessional financing cannot be obtained and a public private partnership (PPP) cannot be negotiated.

III. EXTERNAL DSA

7. **Under the baseline scenario, all PPG external debt indicators remain relatively stable over time and well below the policy-dependent debt burden thresholds.**[5] A marginal rise in some debt indicators is noticeable initially, reflecting growth in the NPV of multilateral debt, before they assume a slight downward trend over time. The decline is most pronounced in the NPV of the debt-to-exports ratio, as export growth outpaces debt growth. The debt service ratios remain relatively stable and far below thresholds, with both the debt-service-to exports and debt-service-to-revenue ratio hovering around 5 percent (Figure 1, Table 1).

8. **Debt indicators in the baseline initially are higher than under the historical scenario, and later fall below the historical scenario.** Initially, higher debt-creating flows resulting from a higher medium-term current account deficit in the baseline, push the projected debt path above the historical path.[6] The medium-term current account deficit in the baseline is more than double that assumed in the historical scenario, which is based on the average current account deficit over the past ten years (Figure 1, Table 2). In the long run, the baseline assumes higher FDI flows than in the historical scenario. Lacking substantial FDI to offset the current account deficit, the historical scenario accumulates debt-creating flows.

9. **The standard stress tests do not reveal any serious vulnerabilities, as all ratios are below the thresholds.** The most extreme stress test for Senegal's NPV of debt relative to GDP and revenue is a temporary reduction in nondebt creating flows such as transfers and FDI in 2009–10 (relative to the historical average). Debt and debt service both rise sharply after the shock but remain below the thresholds during the projection period. A combination of reduced nondebt creating flows and lower GDP and export growth is the most extreme stress test for the NPV of debt-to-exports. In this case, the NPV of debt-to-exports rises considerably, but it remains below the threshold (Figure 1, Table 2).

10. **An alternative stress test was calculated by applying a sudden decline in FDI; as with the other stress tests, debt levels remained below thresholds.** Although the sizeable medium-term FDI growth is based on well-defined projects and FDI flows are generally

---

[5] The quality of policies and institutions is measured by the World Bank's Country Policy and Institutional Assessment (CPIA). An average of the most recent three-years' ratings is applied in the analysis. The indicative external debt burden thresholds for Senegal are: (i) an NPV of external PPG debt-to-GDP ratio of 40 percent; (ii) an NPV of external PPG debt-to-exports ratio of 150 percent; (iii) an NPV of external PPG debt-to-revenue ratio of 250 percent; (iv) an external PPG debt service-to-exports ratio of 20 percent; and (v) an external medium- and long-term PPG debt service-to-revenue ratio of 30 percent.

[6] Much of the projected current account deficit is financed through FDI inflows. However, non-FDI factors such as weak export growth and higher oil prices create a balance of payments gap, which is assumed to be financed by both public and private sector borrowing.

more stable than portfolio flows, there is always the possibility that FDI flows decline drastically. This may occur as a result of a number of exogenous factors, such as the political environment in either Senegal or the FDI-originating country. Even in the extreme scenario that FDI comes to a complete halt in the two years where it is currently projected to be largest (i.e., 2009–10), Senegal's debt ratios would remain within the indicative thresholds (Table 2).

IV. Public DSA

11. **The baseline scenario, consistent with the external DSA, entails a gradual rise in debt indicators.** The NPV of debt-to-GDP (debt-to-revenue) reaches a plateau at 30 percent (135 percent). The relatively smooth path reflects a gradually declining fiscal deficit. The non-concessional domestically issued debt and the assumed temporary reliance on non-concessional external borrowing in 2008 and 2009 do not significantly impact public debt sustainability. The debt service-to-revenue ratio is also relatively low, ranging between 6 and 9 percent (Figure 2, Table 3).

12. **Notwithstanding the manageable outlook in the baseline scenario, public debt sustainability hinges on containing the fiscal deficit.** If the fiscal deficit remains at the 2008 level of 5 percent of GDP (equivalent to a primary deficit of 4.2 percent of GDP) over the entire projection period, the NPV of debt-to-GDP ratio will increase by approximately 2 percent per year, from almost 25 percent in 2008 to 60 percent in 2028. The financing needs created by the accumulated deficits would risk crowding out the private sector. The NPV of debt-to-revenue and debt service indicators paint a similar picture, reinforcing the need for the prudent fiscal policy that is currently envisioned in the baseline (Figure 2, Table 4).

13. **The public debt position remains vulnerable to unexpected shocks.** The second most extreme stress test—a reduction in 2009 and 2010 real GDP growth by 2 percentage points per annum (one standard deviation below past ten years average real GDP growth)—would raise the NPV of debt-to-GDP ratio to close to 60 percent by 2028. The NPV of debt-to-revenue and debt service indicators would follow a similar upward trajectory. Given that Senegal's economy is prey to large fluctuations in real GDP growth, a cautious approach to fiscal policy would thus be advisable.[7]

V. Conclusion

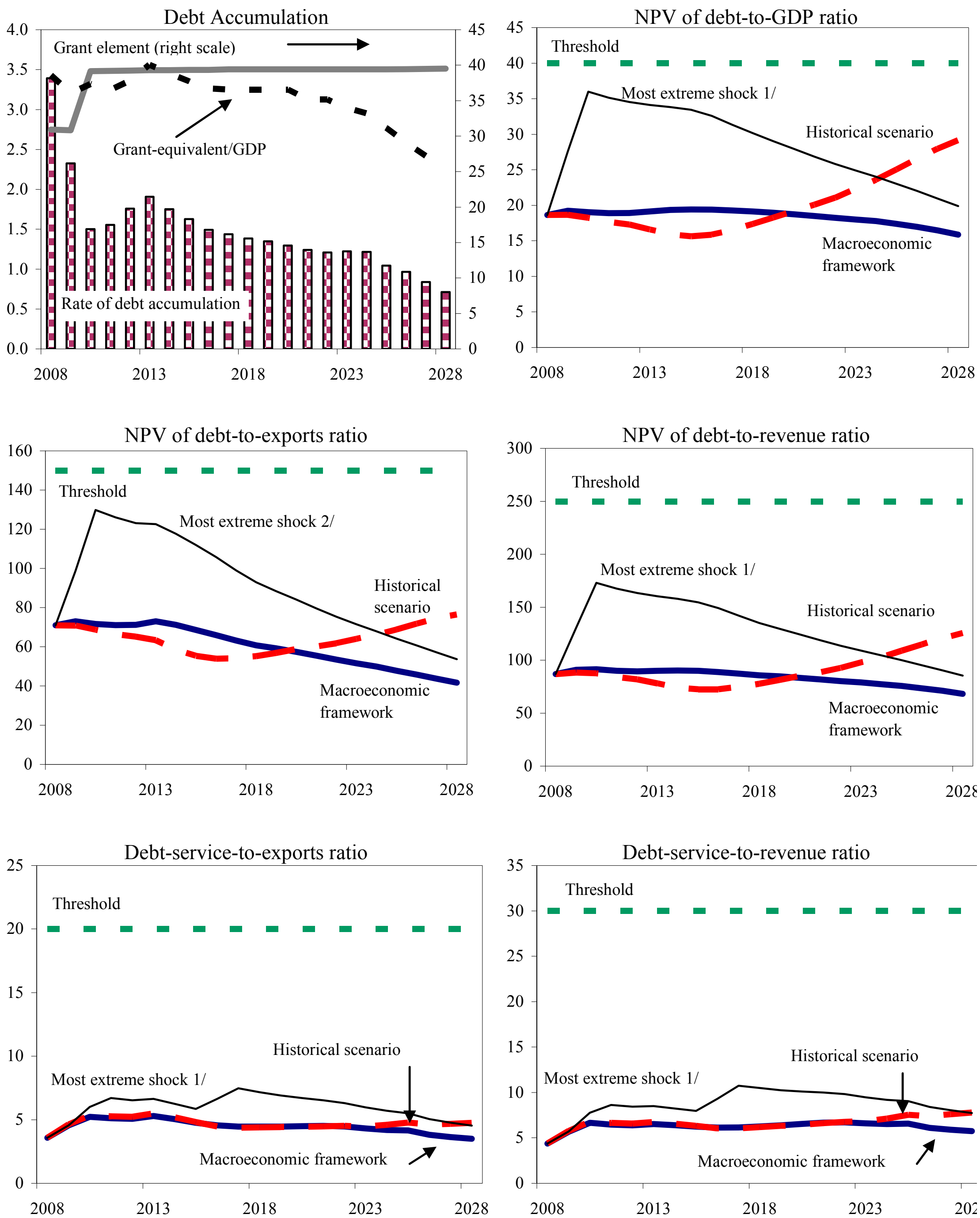
14. **In sum, based on the staff's analysis, Senegal's external debt burden is subject to a low risk of debt distress.** In addition, the public DSA suggests that Senegal's overall risk of debt distress remains low even after considering domestic debt in the analysis. The

[7] Senegal's real GDP growth dropped by almost 3 percentage points in 2006 (from 5.3 percent in 2005 to 2.3 percent in 2006), mainly due to difficulties faced by ICS.

baseline projections and the associated standard stress tests show low risk related to external debt, as all of the indicators remain well below the indicative debt burden thresholds. However, public debt sustainability is vulnerable to increased fiscal deficits (exceeding 4 percent) and negative shocks to real GDP growth. Consequently, Senegal would benefit from continued fiscal discipline, prudent non-concessional borrowing, and sensible debt management.

Figure 1. Senegal: Updated DSA--Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2008-28

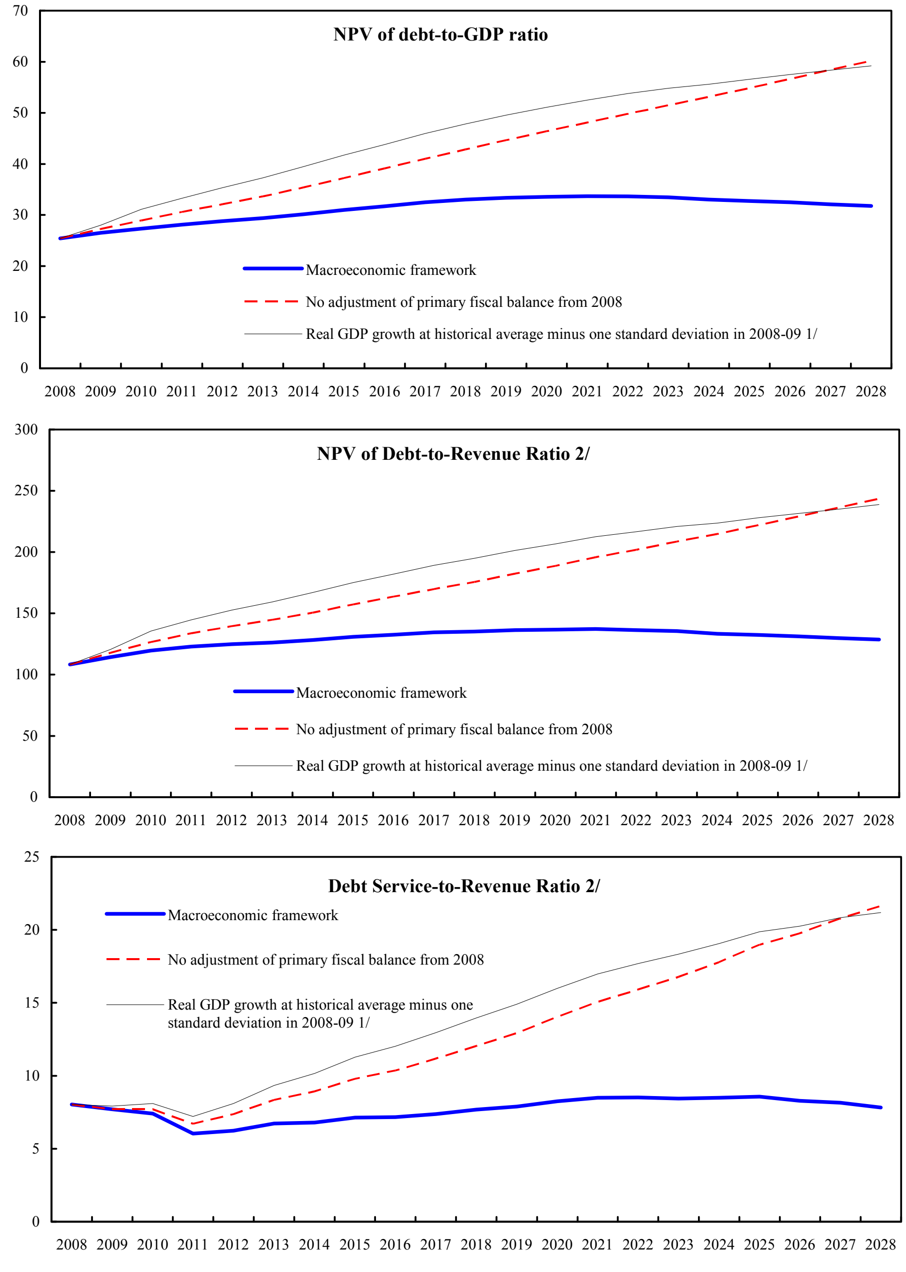
Senegal's PPG external debt ratios remain well below the policy dependent threshold under both the baselin and the most extreme stress test.



Source: Staff projections and simulations.
1/ Non-debt creating flows at historical average minus one standard deviation in 2009-10.
2/ Combination of one-half standard deviation shocks to historical averages of real GDP growth, export growth, GDP deflator, and non-debt creating flows in 2009-10.

Figure 2. Senegal: Updated DSA--Indicators of Public Debt Under Alternative Scenarios, 2008-2028

Senegal's public debt sustainability hinges on containing the fiscal deficit within 4 percent of GDP over the long term, as assumed under the macroeconomic framework.



Source: Staff projections and simulations.
1/ Corresponds to the most extreme stress test, defined as the test that yields the highest debt ratio in 2018.
2/ Revenue including grants.

Table 1. Country: External Debt Sustainability Framework, Baseline Scenario, 2005-2028 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 6/	Standard Deviation 6/	Projections									
	2005	2006	2007			2008	2009	2010	2011	2012	2013	2008-13 Average	2018	2028	2014-28 Average
External debt (nominal) 1/	**63.2**	**40.3**	**40.4**			**41.6**	**42.6**	**43.1**	**43.9**	**44.9**	**46.4**		**47.5**	**35.7**	
o/w public and publicly guaranteed (PPG)	42.4	17.8	18.1			19.3	20.5	20.9	21.4	22.1	23.1		25.2	23.3	
Change in external debt	-1.9	-22.8	0.0			1.2	1.1	0.5	0.8	1.0	1.5		-0.7	-1.6	
Identified net debt-creating flows	2.3	3.7	4.0			3.8	3.7	3.1	3.3	3.2	3.9		1.3	-0.4	
Non-interest current account deficit	**6.7**	**8.4**	**9.8**	**5.6**	**2.2**	**10.3**	**10.6**	**10.9**	**11.1**	**11.0**	**11.1**		**8.7**	**7.0**	8.6
Deficit in balance of goods and services	15.4	17.5	20.2			21.8	22.7	23.1	23.2	23.3	23.4		20.3	18.3	
Exports	27.1	25.9	23.5			26.3	26.3	26.6	26.5	26.5	26.2		31.5	38.1	
Imports	42.5	43.3	43.7			48.0	49.1	49.6	49.7	49.8	49.6		51.8	56.5	
Net current transfers (negative = inflow)	-8.8	-9.0	-10.6	-6.9	2.5	-11.5	-12.2	-12.2	-12.1	-12.3	-12.5		-11.7	-11.6	-11.6
o/w official	-1.4	-0.6	-1.3			-1.2	-1.2	-1.2	-1.1	-1.1	-1.2		-1.2	-1.2	
Other current account flows (negative = net inflow)	0.1	-0.1	0.1			0.0	0.1	0.0	0.1	0.0	0.1		0.0	0.2	
Net FDI (negative = inflow)	**-0.6**	**-2.3**	**-2.7**	**-1.4**	**0.8**	**-5.4**	**-5.6**	**-6.5**	**-6.5**	**-6.5**	**-5.9**		**-6.0**	**-6.1**	-6.1
Endogenous debt dynamics 2/	**-3.7**	**-2.4**	**-3.1**			**-1.1**	**-1.4**	**-1.3**	**-1.3**	**-1.3**	**-1.2**		**-1.4**	**-1.3**	
Contribution from nominal interest rate	1.1	1.0	0.7			0.9	0.9	1.0	1.0	1.1	1.1		1.1	0.8	
Contribution from real GDP growth	-3.4	-1.4	-1.8			-2.0	-2.3	-2.3	-2.3	-2.3	-2.3		-2.5	-2.0	
Contribution from price and exchange rate changes	-1.4	-2.1	-2.0			…	…	…	…	…	…		…	…	
Residual (3-4) 3/	**-4.3**	**-26.5**	**-4.0**			**-2.6**	**-2.6**	**-2.6**	**-2.5**	**-2.3**	**-2.4**		**-2.0**	**-1.3**	
o/w exceptional financing	-2.3	-27.0	-0.4			-0.5	-0.4	-0.3	-0.3	-0.3	-0.2		-0.2	-0.1	
NPV of external debt 4/	...	...	40.5			40.9	41.4	41.2	41.4	41.7	42.4		41.5	28.3	
In percent of exports	...	...	172.5			155.7	157.2	155.2	156.0	157.0	162.1		131.8	74.3	
NPV of PPG external debt	**...**	**...**	**18.3**			**18.6**	**19.2**	**19.0**	**18.9**	**18.9**	**19.1**		**19.1**	**15.9**	
In percent of exports	**...**	**...**	**77.9**			**71.0**	**73.1**	**71.6**	**71.1**	**71.3**	**73.0**		**60.8**	**41.6**	
In percent of government revenues	**...**	**...**	**82.3**			**86.8**	**91.0**	**91.4**	**90.0**	**89.6**	**89.9**		**85.7**	**68.3**	
Debt service-to-exports ratio (in percent)	**14.3**	**12.7**	**13.6**			**13.6**	**15.3**	**16.0**	**16.0**	**16.1**	**16.6**		**8.7**	**5.3**	
PPG debt service-to-exports ratio (in percent)	**5.6**	**4.2**	**4.4**			**3.6**	**4.6**	**5.2**	**5.1**	**5.1**	**5.3**		**4.5**	**3.5**	
PPG debt service-to-revenue ratio (in percent)	**8.3**	**5.2**	**4.7**			**4.4**	**5.7**	**6.7**	**6.5**	**6.4**	**6.5**		**6.3**	**5.7**	
Total gross financing need (billions of U.S. dollars)	0.9	0.9	1.1			1.1	1.3	1.3	1.5	1.6	1.9		1.6	1.8	
Non-interest current account deficit that stabilizes debt ratio	8.6	31.2	9.7			9.1	9.5	10.4	10.3	10.0	9.6		9.4	8.6	
Key macroeconomic assumptions															
Real GDP growth (in percent)	5.6	2.3	4.8	4.6	2.0	5.3	5.9	5.9	5.8	5.7	5.6	5.7	5.6	5.8	5.7
GDP deflator in US dollar terms (change in percent)	2.3	3.4	5.2	2.3	1.5	4.0	2.3	2.2	2.2	2.2	2.2	2.5	2.2	2.3	2.2
Effective interest rate (percent) 5/	1.8	1.7	1.9	1.9	0.4	2.3	2.4	2.6	2.6	2.6	2.6	2.5	2.5	2.2	2.4
Growth of exports of G&S (US dollar terms, in percent)	8.0	1.9	9.3	7.3	8.9	30.1	9.2	10.0	9.0	9.1	7.4	12.5	11.5	9.8	10.8
Growth of imports of G&S (US dollar terms, in percent)	15.7	8.7	21.5	12.4	9.2	27.9	11.2	10.2	9.2	9.3	8.4	12.7	9.2	9.1	9.0
Grant element of new public sector borrowing (in percent)	…	…	…	…	…	30.9	30.8	39.2	39.2	39.2	39.3	36.4	39.4	39.5	39.4
Aid flows (in billions of US dollars) 7/	0.5	0.4	0.7			0.9	0.9	0.8	0.9	1.0	1.2		1.4	2.2	
o/w Grants	0.1	0.1	0.3			0.3	0.3	0.3	0.3	0.4	0.4		0.6	0.9	
o/w Concessional loans	0.1	0.1	0.2			0.5	0.4	0.4	0.4	0.5	0.6		0.7	1.1	
Grant-equivalent financing (in percent of GDP) 8/	…	…	…			3.4	3.2	3.3	3.2	3.4	3.6		3.2	2.3	3.0
Grant-equivalent financing (in percent of external financing) 8/	…	…	…			53.7	56.4	63.8	62.9	61.7	61.1		64.5	64.7	63.6
Memorandum items:															
Nominal GDP (billions of US dollars)	8.7	9.3	11.2			13.0	14.2	15.4	16.8	18.4	20.0		29.3	64.0	
(NPVt-NPVt-1)/GDPt-1 (in percent)						3.4	2.3	1.5	1.6	1.8	1.9	2.1	1.4	0.7	1.3

Source: Staff simulations.

1/ Includes both public and private sector external debt.

2/ Derived as $[r - g - \rho(1+g)]/(1+g+\rho+g\rho)$ 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 NPV 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 NPV of new debt).

Table 2. Country: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, 2008-28
(In percent)

	Projections							
	2008	2009	2010	2011	2012	2013	**2018**	2028
NPV of debt-to-GDP ratio								
Baseline	19	19	19	19	19	19	**19**	16
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-28 1/	19	19	18	18	17	17	**17**	29
A2. New public sector loans on less favorable terms in 2009-28 2/	19	20	21	22	23	24	**26**	27
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009-10	19	20	20	20	20	20	**20**	17
B2. Export value growth at historical average minus one standard deviation in 2009-10 3/	19	21	24	23	23	23	**22**	17
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-10	19	20	20	19	19	19	**20**	17
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-10 4/	19	28	36	35	35	34	**30**	20
B5. Combination of B1-B4 using one-half standard deviation shocks	19	25	33	32	31	31	**28**	20
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	19	27	27	27	27	27	**27**	23
B7. Sudden stop in FDI 2009-10 6/	19	23	27	26	26	26	**24**	18
NPV of debt-to-exports ratio								
Baseline	71	73	72	71	71	73	**61**	42
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-28 1/	71	71	69	67	65	63	**55**	77
A2. New public sector loans on less favorable terms in 2009-28 2/	71	77	79	82	85	91	**84**	70
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009-10	71	73	71	69	69	69	**58**	41
B2. Export value growth at historical average minus one standard deviation in 2009-10 3/	71	87	109	106	104	104	**82**	53
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-10	71	73	71	69	69	69	**58**	41
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-10 4/	71	104	134	130	126	125	**92**	50
B5. Combination of B1-B4 using one-half standard deviation shocks	71	99	130	126	123	123	**93**	54
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	71	73	71	69	69	69	**58**	41
B7. Sudden stop in FDI 2009-10 6/	71	87	100	97	95	95	**74**	45
NPV of debt-to-revenue ratio								
Baseline	87	91	91	90	90	90	**86**	68
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-28 1/	87	88	88	84	82	78	**78**	125
A2. New public sector loans on less favorable terms in 2009-28 2/	87	96	101	103	107	112	**118**	114
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009-10	87	94	97	95	94	95	**91**	74
B2. Export value growth at historical average minus one standard deviation in 2009-10 3/	87	99	114	111	109	108	**97**	72
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-10	87	92	94	92	91	91	**88**	72
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-10 4/	87	130	173	168	163	160	**135**	85
B5. Combination of B1-B4 using one-half standard deviation shocks	87	120	157	152	149	147	**127**	86
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	87	129	129	126	125	126	**121**	99
B7. Sudden stop in FDI 2009-10 6/	87	108	129	125	123	122	**108**	77

Table 2. Country: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, 2008-28 (continued)
(In percent)

Debt service-to-exports ratio

		Projections						
	2008	2009	2010	2011	2012	2013	**2018**	2028
Baseline	4	5	5	5	5	5	**4**	3
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-28 1/	4	5	5	5	5	5	**4**	5
A2. New public sector loans on less favorable terms in 2009-28 2/	4	5	4	4	5	5	**5**	5
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009-10	4	5	5	5	5	5	**4**	3
B2. Export value growth at historical average minus one standard deviation in 2009-10 3/	4	5	7	7	7	7	**6**	5
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-10	4	5	5	5	5	5	**4**	3
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-10 4/	4	5	6	7	7	7	**7**	5
B5. Combination of B1-B4 using one-half standard deviation shocks	4	5	6	7	7	7	**7**	5
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	4	5	5	5	5	5	**4**	3
B7. Sudden stop in FDI 2009-10 6/	4	5	6	6	6	6	**6**	4
Debt service-to-revenue ratio								
Baseline	4	6	7	6	6	7	**6**	6
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-28 1/	4	6	7	7	7	7	**6**	8
A2. New public sector loans on less favorable terms in 2009-28 2/	4	6	5	6	6	6	**7**	8
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009-10	4	6	7	7	7	7	**7**	6
B2. Export value growth at historical average minus one standard deviation in 2009-10 3/	4	6	7	7	7	7	**7**	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-10	4	6	7	7	7	7	**7**	6
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-10 4/	4	6	8	9	8	8	**10**	8
B5. Combination of B1-B4 using one-half standard deviation shocks	4	6	8	8	8	8	**10**	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	4	8	10	9	9	9	**9**	8
B7. Sudden stop in FDI 2009-10 6/	4	6	7	8	7	8	**8**	7
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 7/	35	35	35	35	35	35	**35**	35

Source: Staff projections and simulations.

1/ Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.
2/ Assumes that the interest rate on new borrowing is by 2 percentage points higher than in the baseline., while grace and maturity periods are the same as in the baseline.
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).
4/ Includes official and private transfers and FDI.
5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.
6/ Assumes no FDI flows in 2009-10.
7/ 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, 2005-2028
(In percent of GDP, unless otherwise indicated)

	Actual					Projections									
	2005	2006	2007	Historical Average 5/	Standard Deviation 5/	2008	2009	2010	2011	2012	2013	2008-13 Average	2018	2028	2014-28 Average
Public sector debt 1/	45.8	22.1	23.8			26.1	27.7	29.2	30.6	32.0	33.3		39.1	39.2	
o/w foreign-currency denominated	42.4	17.8	18.1			19.3	20.5	20.9	21.4	22.1	23.1		25.2	23.3	
Change in public sector debt	-1.7	-23.6	1.6			2.4	1.6	1.5	1.4	1.4	1.4		0.8	-0.5	
Identified debt-creating flows	2.3	-2.1	0.5			2.4	1.6	1.5	1.4	1.3	1.3		0.8	-0.4	
Primary deficit	2.3	5.2	3.3	1.1	2.2	4.2	3.4	3.4	3.3	3.3	3.2	3.5	2.8	1.8	2.4
Revenue and grants	20.9	21.4	23.4			23.5	23.2	22.8	22.9	23.0	23.3		24.4	24.7	
of which : grants	1.6	1.5	2.5			2.1	2.1	2.1	2.0	2.0	2.1		2.1	1.5	
Primary (noninterest) expenditure	23.2	26.6	26.7			27.7	26.6	26.2	26.2	26.4	26.5		27.2	26.5	
Automatic debt dynamics	2.8	-5.8	-3.0			-1.4	-1.5	-1.6	-1.7	-1.8	-1.7		-1.9	-2.1	
Contribution from interest rate/growth differential	-3.0	-1.5	-1.1			-0.9	-1.3	-1.4	-1.4	-1.5	-1.5		-1.4	-1.6	
of which : contribution from average real interest rate	-0.5	-0.5	-0.1			0.3	0.2	0.1	0.2	0.2	0.2		0.7	0.6	
of which : contribution from real GDP growth	-2.5	-1.0	-1.0			-1.2	-1.5	-1.5	-1.6	-1.7	-1.7		-2.0	-2.2	
Contribution from real exchange rate depreciation	5.8	-4.3	-2.0			-0.4	-0.2	-0.2	-0.2	-0.2	-0.3		...	...	
Other identified debt-creating flows	-2.8	-1.5	0.3			-0.5	-0.4	-0.3	-0.3	-0.2	-0.2		-0.1	-0.1	
Privatization receipts (negative)	-0.4	-0.6	0.7			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)	-2.5	-0.8	-0.4			-0.5	-0.4	-0.3	-0.3	-0.3	-0.2		-0.2	-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	-4.0	-21.6	1.1			0.0	0.0	0.0	0.0	0.0	0.1		0.1	-0.1	
NPV of public sector debt	...	...	23.9			25.4	26.5	27.3	28.1	28.8	29.4		33.0	31.8	
o/w foreign-currency denominated	...	...	18.3			18.6	19.2	19.0	18.9	18.9	19.1		19.1	15.9	
o/w external	...	...	18.3			18.6	19.2	19.0	18.9	18.9	19.1		19.1	15.9	
NPV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	4.1	6.9	5.4			7.6	6.6	6.6	6.9	8.1	9.1		12.3	13.8	
NPV of public sector debt-to-revenue and grants ratio (in percent)	...	...	102.1			108.2	114.3	119.6	122.8	124.9	126.2		135.3	128.6	
NPV of public sector debt-to-revenue ratio (in percent)	...	...	114.4			118.8	125.7	131.7	134.6	136.8	138.6		147.9	136.6	
o/w external 3/	...	...	...			87.0	91.3	91.8	90.4	90.0	90.3		85.7	68.3	
Debt service-to-revenue and grants ratio (in percent) 4/	6.3	8.0	6.7			8.0	7.7	7.4	6.0	6.2	6.7		7.7	7.8	
Debt service-to-revenue ratio (in percent) 4/	6.9	8.7	7.5			8.8	8.5	8.2	6.6	6.8	7.4		8.4	8.3	
Primary deficit that stabilizes the debt-to-GDP ratio	...	...	1.6			1.9	1.8	1.9	1.9	2.0	1.9		2.0	2.2	
Key macroeconomic and fiscal assumptions															
Nominal GDP (local currency)	4582	4846	5344			5856	6348	6872	7430	8028	8662		12703	27730	
Real GDP growth (in percent)	5.6	2.3	4.8	4.6	2.0	5.3	5.9	5.9	5.8	5.7	5.6	5.7	5.6	5.8	5.7
Average nominal interest rate on forex debt (in percent)	1.9	1.8	2.5	1.7	0.4	1.8	1.9	1.8	1.9	1.8	2.1	1.9	2.0	1.6	1.9
Average real interest rate on domestic currency debt (in percent)	0.9	0.9	-1.6	0.5	1.6	4.3	2.6	2.3	2.2	2.0	1.9	2.6	1.7	1.4	1.5
Real exchange rate depreciation (in percent, + indicates depreciation)	14.2	-10.5	-11.5	-2.1	12.4	-2.6	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	2.3	3.4	5.2	2.3	1.5	4.0	2.3	2.2	2.2	2.2	2.2	2.5	2.2	2.3	2.2
Growth of real primary spending (deflated by GDP deflator, in percent)	10.4	17.3	5.2	10.7	9.3	9.4	1.6	4.4	5.7	6.3	6.1	5.6	5.7	5.9	5.7
Grant element of new external borrowing (in percent)	...	...	...			30.9	30.8	39.2	39.2	39.2	39.3	36.4	39.4	39.5	0.0

Sources: Country authorities; and Fund staff estimates and projections.
1/ Includes central government domestic debt and public and publicly guaranteed external debt. Gross debt is used.
2/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period.
3/ Revenues excluding grants.
4/ Debt service is defined as the sum of interest and amortization of medium and long-term debt.
5/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

Table 4.Senegal: Sensitivity Analysis for Key Indicators of Public Debt 2008-2028

	Projections							
	2008	2009	2010	2011	2012	2013	2018	2028
NPV of Debt-to-GDP Ratio								
Baseline	25	26	27	28	29	29	33	32
A. Alternative scenarios								
Primary balance is unchanged from 2008	25	27	29	31	32	34	43	60
Permanently lower GDP growth 1/	25	27	28	29	30	31	39	54
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	25	28	31	33	35	37	48	59
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	25	26	27	28	28	29	33	32
B3. Combination of B1-B2 using one half standard deviation shocks	25	26	26	26	27	27	30	28
B4. One-time 30 percent real depreciation in 2009	25	34	34	34	34	34	36	33
B5. 10 percent of GDP increase in other debt-creating flows in 2009	25	36	37	38	38	39	42	40
NPV of Debt-to-Revenue Ratio 2/								
Baseline	108	114	120	123	125	126	135	129
A. Alternative scenarios								
Primary balance is unchanged from 2008	108	118	127	134	139	145	176	244
Permanently lower GDP growth 1/	108	115	122	126	131	134	161	217
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	108	121	136	145	153	159	195	239
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	108	114	118	121	124	125	134	128
B3. Combination of B1-B2 using one half standard deviation shocks	108	111	113	115	117	117	123	112
B4. One-time 30 percent real depreciation in 2009	108	146	148	148	147	145	146	135
B5. 10 percent of GDP increase in other debt-creating flows in 2009	108	157	163	165	167	167	172	161
Debt Service-to-Revenue Ratio 2/								
Baseline	8	8	7	6	6	7	8	8
A. Alternative scenarios								
Primary balance is unchanged from 2008	8	8	8	7	7	8	12	22
Permanently lower GDP growth 1/	8	8	7	6	7	7	10	18
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	8	8	8	7	8	9	14	21
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	8	8	7	6	6	7	8	8
B3. Combination of B1-B2 using one half standard deviation shocks	8	8	7	5	5	5	6	5
B4. One-time 30 percent real depreciation in 2009	8	8	8	7	7	8	9	10
B5. 10 percent of GDP increase in other debt-creating flows in 2009	8	8	11	11	11	13	13	12

Sources: Country authorities; and Fund staff estimates and projections.
1/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of 20 (i.e., the length of the projection period).
2/ Revenues are defined inclusive of grants.