# SENEGAL

## STAFF REPORT FOR THE 2012 ARTICLE IV CONSULTATION, FOURTH REVIEW UNDER THE POLICY SUPPORT INSTRUMENT, AND REQUEST FOR MODIFICATION OF AN ASSESSMENT CRITERION—DEBT SUSTAINABILITY ANALYSIS

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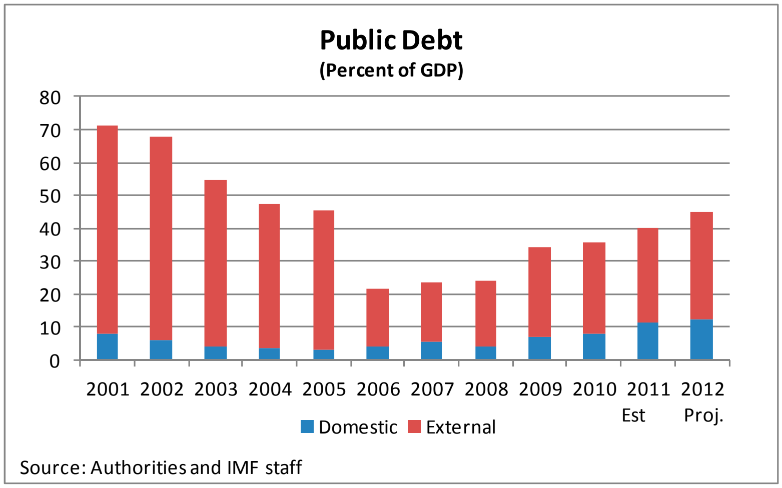
Prepared by the staffs of the International Monetary Fund and the International Development Association

*Since the last debt sustainability analysis (DSA) was published in May 2011, Senegal's debt outlook has deteriorated. Growth in 2012 was slower than expected, due to the drought in the Sahel, and fiscal consolidation has been somewhat less than expected, reflecting the impact of exogenous shocks, the higher cost of electricity subsidies, and measures taken by the authorities to stabilize petroleum product prices. On balance, Senegal continues to face a low risk of debt distress, but risks have increased. Overall, the analysis highlights the importance of reducing fiscal deficits, improving debt management, approaching nonconcessional borrowing with caution, and further developing domestic debt markets.*[1]

[1] The DSA presented in this document is based on the Debt Sustainability Framework (DSF) for low-income countries (LICs). See "Debt Sustainability in Low-Income Countries—Proposal for an Operational Framework and Policy Implications" and "Debt Sustainability in Low-Income Countries—Further Considerations on an Operational Framework and Policy Implications."

# BACKGROUND

1. **Senegal's public debt has increased steadily in recent years.**[2] The ratio of public debt to GDP is projected to reach 46 percent in 2012, close to levels that prevailed when Senegal benefited from debt relief under the Multilateral Debt Relief Initiative (MDRI) in 2006. The bulk of public debt is external (i.e., owed to non-residents of the West African Economic and Monetary Union, WAEMU), although the share of domestic debt has increased.[3]




2. **Most of Senegal's public external debt is on concessional terms.** Two-thirds of the debt is owed to multilateral creditors—primarily the World Bank, the IMF, and the African Development Bank. The largest bilateral creditors are France, Kuwait, China, Saudi Arabia, and India.

**Total External Debt, Central Government**

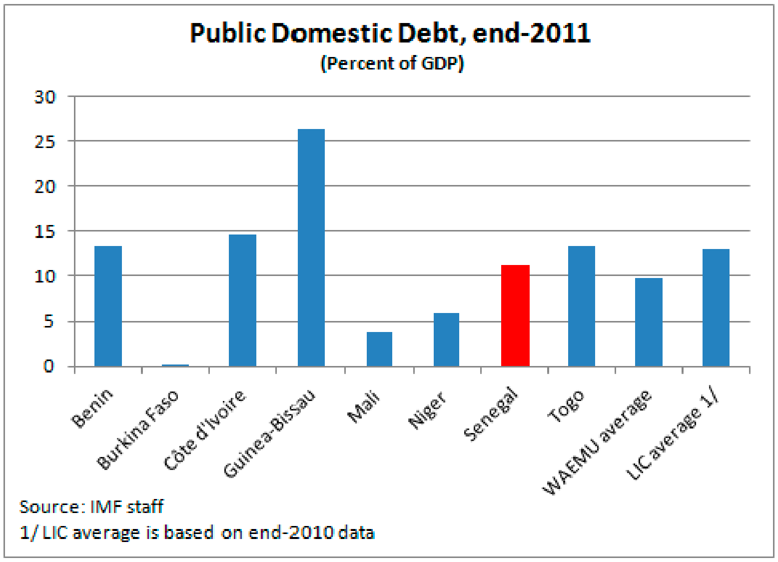
| | 2008 | 2009 | 2010 | 2011 | 2011 |
|---|---|---|---|---|---|
| | (Percent of GDP) | | | | (Share) |
| **Total** | 19.6 | 26.9 | 27.5 | 28.8 | 100.0 |
| **Multilateral creditors** | 12.0 | 17.5 | 18.2 | 18.5 | 64.2 |
| IDA/BIRD | 7.0 | 8.0 | 8.0 | 8.8 | 30.5 |
| AfDB/AfDF | 1.5 | 2.2 | 2.5 | 2.8 | 9.9 |
| IMF | 0.5 | 1.8 | 3.0 | 1.5 | 5.3 |
| OFID/BADEA/IsDB | 1.7 | 3.2 | 2.8 | 2.8 | 9.7 |
| European Investment Bank | 0.2 | 0.3 | 0.3 | 0.3 | 0.9 |
| Other | 1.2 | 2.0 | 1.8 | 2.3 | 7.9 |
| **Bilateral creditors** | 7.6 | 7.9 | 7.6 | 6.6 | 23.0 |
| OECD countries | 2.2 | 2.8 | 2.7 | 2.1 | 7.3 |
| Arab countries | 4.1 | 3.8 | 2.8 | 2.2 | 7.7 |
| Other | 1.2 | 1.4 | 2.2 | 2.3 | 8.0 |
| **Commercial creditors** | 0.0 | 1.5 | 1.6 | 3.7 | 12.8 |
| **Memorandum Item** | | | | | |
| Nominal GDP (CFAF billion) | 5994 | 6029 | 6369 | 6818 | |

Source: Senegalese authorities

[2] Public debt refers to debt of the central government.

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

**3. Public domestic debt remains relatively low but has grown quickly in recent years.** At end-2011, domestic debt was equal to 11 percent of GDP, slightly above the average in WAEMU countries but below the average across all low-income countries. Domestic debt is denominated in local currency and mostly held by WAEMU banks. Domestic debt as a share of total public debt has increased from 7 percent in 2005 to 28 percent in 2011, reflecting the development of the WAEMU market and external debt relief.




**4. Senegal has started relying on nonconcessional borrowing to finance infrastructure projects.** In December 2009, the government issued its first Eurobond. The 5-year, US$200 million bond had a coupon of 8.75 percent and was priced to yield 9.25 percent. The proceeds of the issuance helped finance the Dakar-Diamniadio toll road. In May 2011, the government issued a 10-year, US$500 million Eurobond, with a coupon of 8.75 percent and priced to yield 9.125 percent. Of the US$500 million raised, US$200 million was used to retire the 2009 Eurobond; the remainder has been earmarked for the toll road and for investments in the energy sector.

**5. Private sector exposure is relatively limited, and contingent liabilities contained.** Private external debt has averaged about 20 percent of GDP over the last decade and was equal to 24 percent of GDP at end-2010.[4] Half of this debt was in the form of trade credits and bank deposits; the rest consisted of debt securities, loans, and other liabilities. This exposure was partially offset by private external assets amounting to 8 percent of GDP. Preliminary estimates of contingent liabilities suggest that they amount to less than 10 percent of GDP.[5] There are no explicit government guarantees of enterprises' external and internal debt since the settlement of the ICS chemical company crisis in 2007.

**6. The authorities have taken steps to improve debt management.** A new public debt directorate has been created by combining the two units that had previously managed domestic debt and external debt separately. The new directorate recently prepared Senegal's first medium-term debt strategy, which recommends extending the maturity of debt issued on the regional market and continuing to prioritize concessional external borrowing.

[4] Estimates of private sector external debt are based on BCEAO data on the international investment position.

[5] The fiscal risk posed by these entities is approximated by the standardized stress test that simulates a 10-percent-of-GDP increase in other debt creating flows.

# UNDERLYING ASSUMPTIONS

7. **This DSA is consistent with the macroeconomic framework outlined in the staff report for the Fourth Review under the Policy Support Instrument.** The baseline scenario assumes the implementation of sound macroeconomic and structural policies, leading to an increase in economic growth and a narrowing of fiscal deficits over the long term (Box 1). Notable revisions compared to the May 2011 DSA include:

- Real GDP growth is expected to be a bit lower over the next few years and the long term compared to previous projections, partly owing to a less favorable external environment.
- The 2012 fiscal deficit has been revised upward, in line with the program. Projected fiscal deficits over the medium and long term are somewhat lower compared to the previous DSA, to be more in line with the authorities' commitment to meet the key WAEMU convergence criterion on the fiscal deficit.[6]
- The current account deficit in 2012 is expected to be smaller than previously projected following a better-than-expected outturn in 2011. Long-term current account deficit projections have been revised lower in line with the downward revision to long-run fiscal deficits.

**Evolution of selected macroeconomic indicators**

| | 2010 | 2011 | 2012 | 2013 | 2014 | Long term 1/ |
|---|---|---|---|---|---|---|
| Real GDP growth | | | | | | |
| Current DSA | 4.1 | 2.6 | 3.7 | 4.3 | 4.8 | 5.3 |
| Previous DSA | 4.2 | 4.5 | 4.8 | 5.0 | 5.2 | 5.8 |
| Overall fiscal deficit (percent of GDP) | | | | | | |
| Current DSA | 5.2 | 6.7 | 5.9 | 4.9 | 4.3 | 2.7 |
| Previous DSA | 5.2 | 6.9 | 5.6 | 4.6 | 4.4 | 3.7 |
| Current account deficit (percent of GDP) | | | | | | |
| Current DSA | 4.4 | 6.1 | 7.6 | 7.1 | 6.7 | 5.3 |
| Previous DSA | 5.9 | 8.2 | 8.0 | 7.5 | 7.4 | 7.1 |

1/ Defined as the last 15 years of the projection period. For the current DSA, the long term covers the years 2018-2032; for the previous DSA, it covers 2017-2031.

[6] The convergence criterion calls for the basic fiscal balance, in percent of GDP, to be greater than or equal to zero. Senegal's basic fiscal balance is assumed to move from a deficit of 3.0 percent of GDP in 2012 to a deficit of 0.5 percent by the end of the projection period. (The basic fiscal balance is defined as total revenue, plus budget support grants, plus the counterpart of HIPC/MDRI-related spending, minus current expenditures and domestically-financed capital expenditure.)

## Box 1. Macroeconomic Assumptions for 2012–2031

**Real GDP growth:** After a substantial slowdown in 2011 because of the drought in the Sahel, real GDP growth is expected to rebound to 3.7 percent in 2012, driven by higher public investment in infrastructure and a recovery in agricultural production. Growth is expected to accelerate over the next few years, reaching 5.2 percent by 2017, as the authorities implement their structural reform agenda, including further investments in the energy sector, comprehensive tax reform, and improvements to the business climate and governance. In the long term, the resolution of energy sector problems is expected to eliminate a major constraint on growth. Real GDP growth is projected to average 5.2 over 2017–2031, compared to an average of 5.1 percent in the five years prior to the outbreak of the global financing crisis.

**Public investment:** The authorities are expected to maintain public investment at relatively high levels, with the ratio of public capital expenditure to GDP projected to reach 12.1 percent in 2012 before gradually declining to 11.2 percent by the end of the projection period. This compares to levels between 6 and 11 percent over the past decade.

**Current account deficit**: The current account deficit is projected to widen in 2012 as a result of higher imports of food (related to last year's drought, which led to a poor harvest) and weak export demand (linked to the crisis in Mali). Over the medium and long term, the current account deficit is expected to narrow in line with anticipated fiscal consolidation.

**Inflation:** Inflation is expected to remain moderate at about 2.5 percent.

**Fiscal deficit:** The fiscal deficit in 2012 is expected to fall to 5.9 percent of GDP, mostly due to delays in energy investments. In line with the program's objective to reduce the fiscal deficit to maintain debt sustainability, the authorities are targeting a deficit of 4.9 percent of GDP in 2013. Over the medium and long term, the fiscal deficit is projected to narrow gradually to 2.8 percent, reflecting the authorities' commitment to deliver fiscal consolidation consistent with the WAEMU convergence criterion on the basic fiscal balance.

**Financing:** The authorities are expected to rely increasingly on external nonconcessional borrowing to finance infrastructure projects. In 2013, the authorities are assumed to use the remaining space ($200 million) for nonconcessional borrowing in the program. Thereafter, Senegal is expected to borrow 0.5 percent of GDP per year on nonconcessional terms. The net US$500 million in nonconcessional borrowing in 2011 and 2013 are assumed to be rolled over at maturity. Over the period 2012–2014, the authorities are expected to contract CFAF 42 billion (about US$79 million) in external debt with a grant element between 15 and 35 percent, consistent with the program. The average grant element of new external borrowing is projected to fall from 30 percent to 9 percent over the projection period, as Senegal gradually moves away from concessional borrowing, mainly from multilateral creditors, toward nonconcessional borrowing from bilateral and commercial creditors. Meanwhile, the share of domestic financing is expected to gradually increase over the long term as the WAEMU market develops.

**8. Another change compared to the previous DSA is the value of the discount rate in the DSA template used to calculate the present value (PV) of external debt.** The discount rate, which follows the long-term U.S. dollar commercial interest reference rate (CIRR), was recently adjusted from 4.0 percent to 3.0 percent.[7] Holding other variables steady, a change in the discount rate from 4 percent to 3 percent raises the present value of debt.

**9. Stress tests lead to breaches of three thresholds** (Figure 1a, Table 1a, and Table 1b). Three debt burden indicators—the PV of debt to GDP, the PV of debt to exports, and debt service to revenue—breach their indicative thresholds under certain standardized stress tests. Under current DSA guidelines, such breaches could be interpreted to suggest that Senegal's risk of debt distress has increased from low to moderate. The breach of the debt-to-GDP threshold is relatively minor (less than 2 percentage points) but protracted, and occurs under a stress test simulating a one-time 30-percent depreciation of the exchange rate.[8] The debt-to-exports threshold is breached by a wider margin in a scenario where borrowing terms are less favorable than under the baseline scenario, which underscores the importance of approaching further nonconcessional borrowing with caution. The debt service-to-revenue threshold is breached by a very small margin in 2021 under the one-time 30-percent depreciation shock. Under the historical scenario, in which key variables are projected to remain fixed at their 10-year historical average, the PV of debt to GDP and the PV of debt to exports approach, but do not breach, their respective thresholds. The more favorable outcome under the baseline scenario compared to the historical scenario reflects projected improvements in real GDP growth and the current account deficit, as discussed above.

**10. Taking remittances into consideration, however, a more favorable assessment emerges.** Debt burden indicators remain well below their thresholds in the baseline scenario, while stress tests lead to minor breaches of two thresholds (Figure 1b and Table 3b).[9] The inclusion of remittances in the analysis is justified by the fact that remittances have become an important and reliable source of foreign exchange in Senegal, a pattern that is expected to continue. Remittances have grown every year since 2000, with the exception of 2009, when they fell 6 percent. In 2011, remittances were equal to 13 percent of GDP. The PV of debt to GDP plus remittances peaks at 37 percent, compared to a threshold of 36 percent, under a one-time 30-percent depreciation of the exchange rate, while the ratio of debt service to revenue (which is not affected by remittances) once again breaches its threshold by a very small margin in 2021 under the one-time 30-percent depreciation shock. The PV of debt to exports plus remittances approaches, but does not breach, the threshold in the historical scenario.

[7] The rules of the DSF require the discount rate to be changed when the U.S. dollar CIRR (six-month average) diverges from the discount rate by at least 100 basis points for a continuous period of at least six months. When this occurs, the magnitude of the change in the discount rate is required to be 100 basis points. See "A Review of Some Aspects of the Low-Income Country Debt Sustainability Framework."

[8] The exchange rate shock is arguably overstated in the case of Senegal in light of the peg to the euro, which is guaranteed by the French Treasury. At end-2011, 8 percent of Senegal's public external debt stock was denominated in euro, and another 42 percent was denominated in SDR (which is partially linked to the euro).

[9] The previous DSA did not discuss remittances, since the low risk rating was justified even without including remittances.

# PUBLIC DSA

**11. Indicators of overall public debt (external plus domestic) and debt service do not point to significant vulnerabilities related to the level of domestic debt** (Figure 2 and Table 2a). In the baseline scenario, the PV of total public debt to GDP and the PV of total public debt to revenue remain relatively flat over the projection period, despite the fact that the share of domestic debt is projected to increase over time as the WAEMU market develops. The PV of public debt to GDP peaks at 42 percent, well below the benchmark level of 56 percent associated with heightened public debt vulnerabilities for medium performers. The short average maturity of domestic debt (slightly over one year) is, however, a source of vulnerability, as it exposes the government to significant rollover and interest rate risks. In 2013, public debt service is expected to spike, owing mainly to a sharp increase in amortization payments on domestic debt.

**12. Stress tests, however, indicate that the path of public debt would become explosive in the absence of fiscal consolidation** (Table 2b). In a scenario that assumes an unchanged primary deficit (as a percent of GDP) over the entire projection period, starting with the level projected in 2012, the PV of public debt to GDP grows rapidly, breaching the 56 percent benchmark level in 2021. The benchmark level is also breached in the "historical" scenario (holding real GDP growth and the primary deficit constant at their historical levels) and in a growth shock scenario. These stress tests, which produce similar results for the PV of public debt-to-revenue indicator, highlight the importance of reducing fiscal deficits and raising potential output growth.

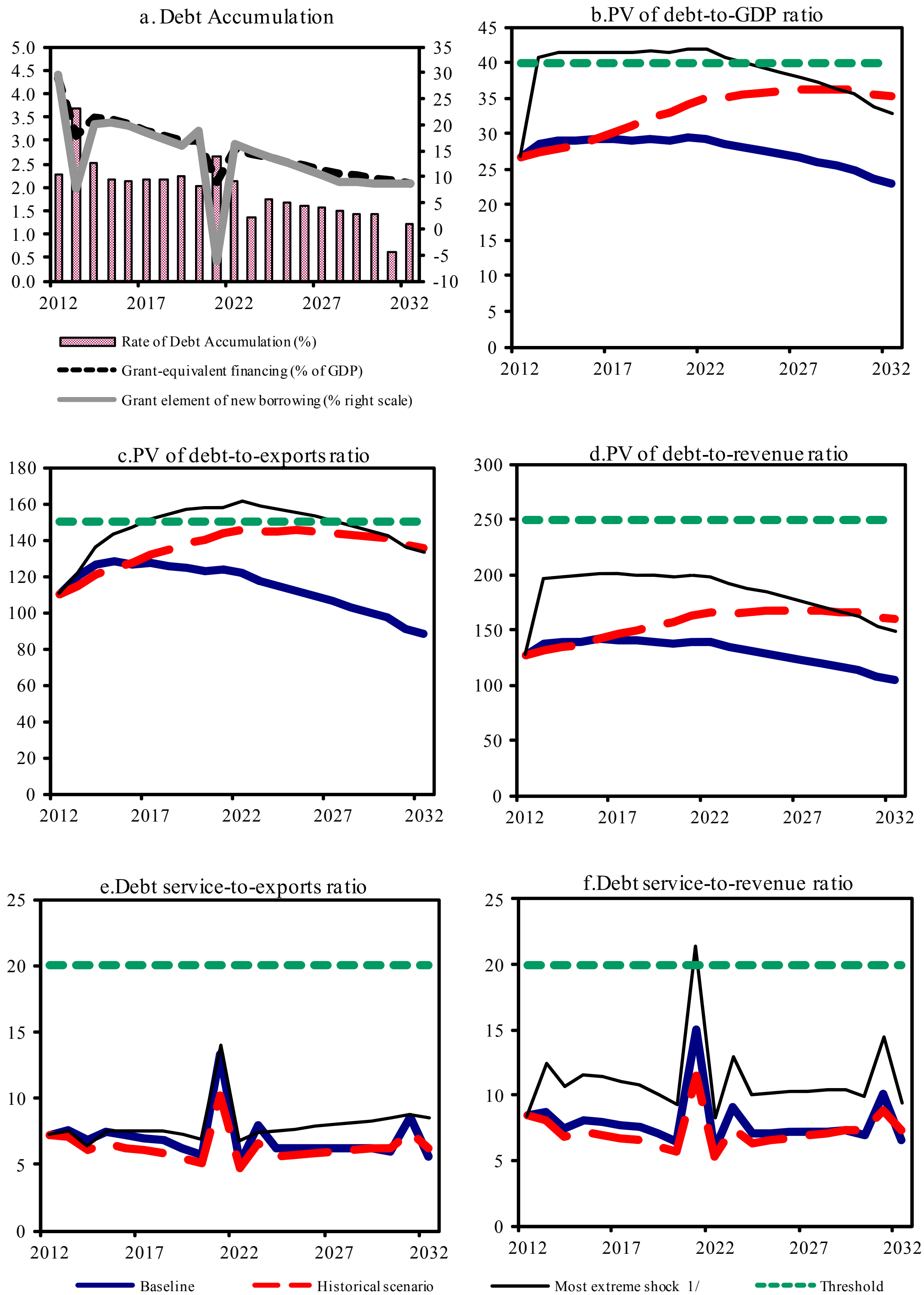
# CONCLUSION

**13. In staff's view, Senegal continues to face a low risk of debt distress**. Stress tests in the external DSA result in breaches of three thresholds, but the inclusion of remittances produces a better picture, with only marginal breaches. This justifies keeping a low risk rating for now under the assumption of fiscal consolidation and strengthened debt management.

**14. Vulnerabilities have increased over recent years, and new risks have emerged.** Since Senegal benefited from comprehensive debt relief under HIPC and MDRI, public debt has grown steadily. The 2011 Eurobond, while addressing medium-term rollover risks, has exposed Senegal to longer term rollover risk, underscoring the importance of improving debt management. While Senegal is expected to gradually shift to nonconcessional external borrowing as it moves toward emerging market status, it should approach such borrowing with caution given current debt levels and the sensitivity of debt indicators to less favorable borrowing terms. Relatively low levels of domestic debt suggest that there is scope to further develop domestic debt markets to decrease reliance on external financing; reliance on the regional debt market should however increase gradually, taking into account the cost and maturities of such borrowing. At the same time, it will be critical to reduce fiscal deficits from levels seen in recent years to maintain debt sustainability.

**15. The authorities generally agreed with the assessment, stressed their fiscal consolidation efforts, and questioned the impact of the change in the discount rate.** They acknowledged that fiscal consolidation and a cautious approach to nonconcessional borrowing were critical for safeguarding debt sustainability. They pointed out that they have taken action since taking office to keep the fiscal deficit under control in 2012. Efforts made to reduce the cost of running the government will help keep the 2012 fiscal deficit below 6 percent of GDP, a development bucking earlier trends. The authorities also intend to keep reducing the fiscal deficit in 2013 and the medium term, while addressing the country's social and development needs. Their fiscal objective is to reduce the deficit below 5 percent of GDP in 2013 and below 4 percent by 2015. Reconciling these various objectives will require a significant improvement in public spending efficiency. Efforts to reduce the cost of running the government will continue and produce their full impact in 2013 and beyond. A comprehensive streamlining of agencies in 2013 is also expected to generate substantial savings in the medium term. Finally, the authorities are working on rationalizing expenditure in key sectors such as education and health (with World Bank assistance) and on more cost-effective support to the most vulnerable segments of the population. In this regard, energy subsidies will be substantially reduced next year and in the medium term. The authorities challenged staff to explain why a mechanical change in the discount rate should translate into a deterioration of the debt outlook. Staff explained that the change in the discount rate applied to all countries, not just Senegal, and was consistent with the Fund's longstanding methodology for calculating present values.

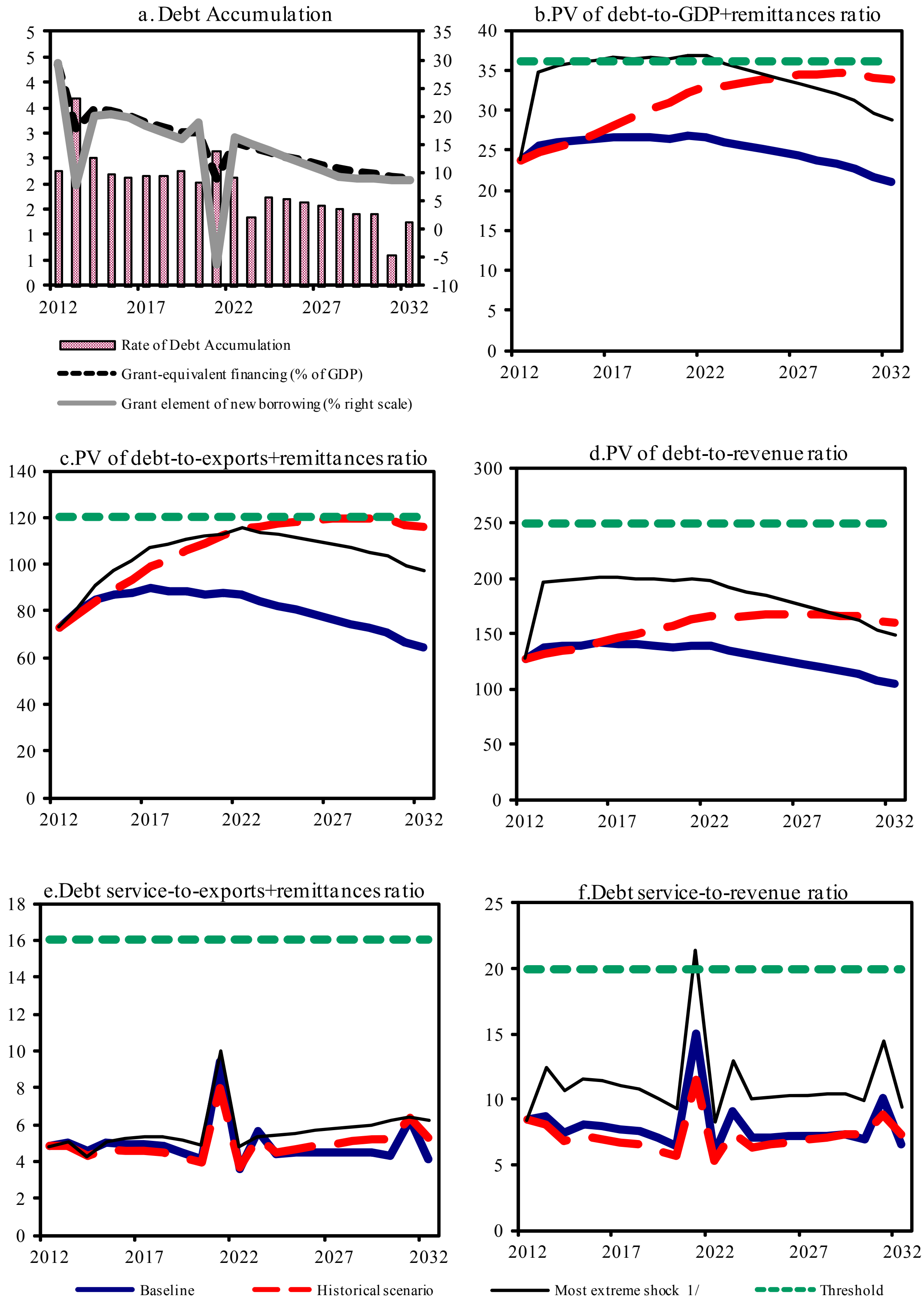
## Figure 1a. Senegal: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2012-2031 1/




Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2022. In figure b. it corresponds to a One-time depreciation 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 One-time depreciation shock

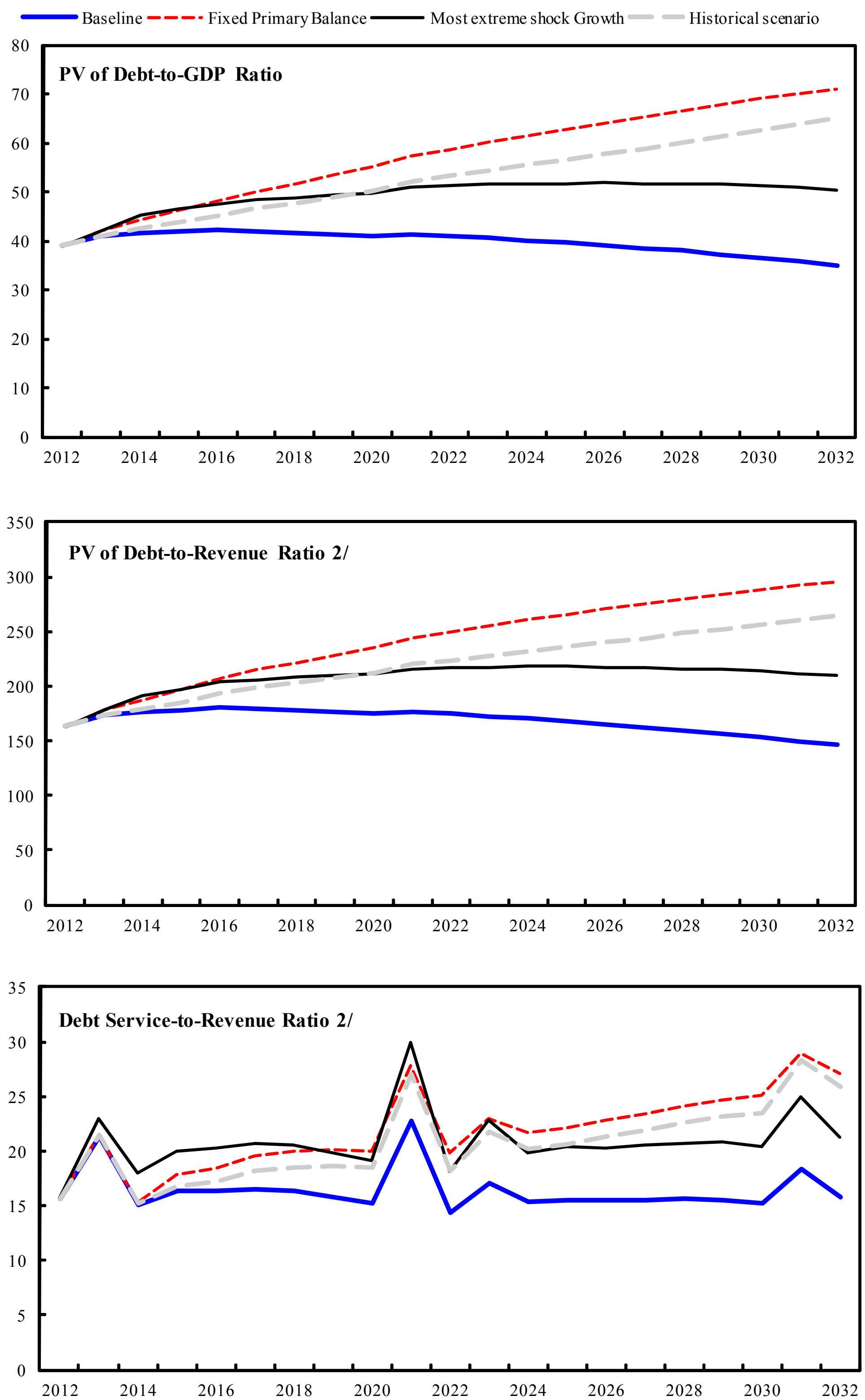
**Figure 1b. Senegal: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios (with Remittances), 2012-2032 1/**




Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2022. In figure b. it corresponds to a One-time depreciation 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 One-time depreciation shock

**Figure 2. Senegal: Indicators of Public Debt Under Alternative Scenarios, 2012-2031 1/**




Sources: Country authorities; and staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest ratio in 2022.
2/ Revenues are defined inclusive of grants.

**Table 1a.: External Debt Sustainability Framework, Baseline Scenario, 2012-2032 1/**

**(In percent of GDP, unless otherwise indicated)**

| | Actual | | | Historical 0 Average | 0 Standard Deviation | Projections | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | | | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2012-2017 Average | 2022 | 2032 | 2018-2032 Average |
| **External debt (nominal) 1/** | **50.7** | **53.4** | **49.0** | | | **53.6** | **54.5** | **54.6** | **54.1** | **53.6** | **53.1** | | **49.9** | **38.0** | |
| o/w public and publicly guaranteed (PPG) | 26.9 | 27.5 | 28.8 | | | 32.7 | 34.6 | 35.4 | 35.8 | 36.1 | 36.2 | | 35.7 | 26.9 | |
| Change in external debt | 5.6 | 2.7 | -4.4 | | | 4.6 | 0.9 | 0.0 | -0.5 | -0.5 | -0.6 | | -0.6 | -1.2 | |
| Identified net debt-creating flows | 7.0 | 2.0 | -1.7 | | | 3.8 | 3.8 | 3.2 | 2.7 | 2.4 | 2.1 | | 2.1 | 2.1 | |
| **Non-interest current account deficit** | **6.5** | **3.9** | **5.3** | **7.6** | **3.1** | **7.0** | **6.5** | **6.0** | **5.6** | **5.2** | **4.9** | | **4.7** | **4.6** | 4.6 |
| Deficit in balance of goods and services | 16.9 | 15.5 | 16.2 | | | 17.5 | 16.6 | 15.9 | 15.0 | 14.1 | 13.6 | | 13.4 | 13.2 | |
| Exports | 24.4 | 25.0 | 24.7 | | | 24.2 | 23.9 | 23.0 | 22.8 | 23.0 | 22.9 | | 24.0 | 26.1 | |
| Imports | 41.3 | 40.5 | 40.9 | | | 41.7 | 40.4 | 38.9 | 37.8 | 37.1 | 36.5 | | 37.4 | 39.3 | |
| Net current transfers (negative = inflow) | -11.5 | -12.1 | -11.4 | -9.8 | 2.2 | -11.0 | -10.4 | -10.0 | -9.5 | -9.0 | -8.6 | | -8.5 | -8.4 | -8.5 |
| o/w official | -0.4 | -0.5 | -0.3 | | | -0.5 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | | -0.3 | -0.2 | |
| Other current account flows (negative = net inflow) | 1.2 | 0.5 | 0.4 | | | 0.5 | 0.3 | 0.1 | 0.1 | 0.1 | -0.2 | | -0.2 | -0.2 | |
| **Net FDI (negative = inflow)** | **-2.0** | **-2.1** | **-1.9** | **-1.6** | **0.7** | **-1.9** | **-1.1** | **-1.1** | **-1.0** | **-1.0** | **-0.9** | | **-0.9** | **-0.9** | -0.9 |
| **Endogenous debt dynamics 2/** | **2.5** | **0.1** | **-5.0** | | | **-1.2** | **-1.5** | **-1.8** | **-1.8** | **-1.8** | **-1.9** | | **-1.7** | **-1.6** | |
| Contribution from nominal interest rate | 0.2 | 0.5 | 0.8 | | | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | | 0.7 | 0.5 | |
| Contribution from real GDP growth | -1.0 | -2.1 | -1.2 | | | -1.9 | -2.2 | -2.5 | -2.5 | -2.6 | -2.6 | | -2.4 | -2.0 | |
| Contribution from price and exchange rate changes | 3.3 | 1.8 | -4.6 | | | … | … | … | … | … | … | | … | … | |
| **Residual (3-4) 3/** | **-1.4** | **0.7** | **-2.7** | | | **0.8** | **-2.9** | **-3.1** | **-3.2** | **-2.8** | **-2.7** | | **-2.7** | **-3.3** | |
| o/w exceptional financing | 0.1 | 1.6 | -0.9 | | | -1.9 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | | -0.1 | 0.0 | |
| PV of external debt 4/ | ... | ... | 44.4 | | | 47.6 | 48.5 | 48.2 | 47.4 | 46.7 | 46.0 | | 43.4 | 34.1 | |
| In percent of exports | ... | ... | 179.8 | | | 196.7 | 203.0 | 209.4 | 208.1 | 203.0 | 200.9 | | 180.9 | 130.9 | |
| **PV of PPG external debt** | **...** | **...** | **24.2** | | | **26.7** | **28.6** | **29.0** | **29.1** | **29.1** | **29.1** | | **29.3** | **23.0** | |
| **In percent of exports** | **...** | **...** | **97.9** | | | **110.3** | **119.6** | **126.2** | **127.8** | **126.6** | **127.2** | | **121.9** | **88.1** | |
| **In percent of government revenues** | **...** | **...** | **119.8** | | | **127.6** | **137.3** | **139.0** | **139.4** | **141.3** | **140.8** | | **138.4** | **104.0** | |
| **Debt service-to-exports ratio (in percent)** | **19.1** | **19.1** | **27.0** | | | **19.8** | **19.1** | **19.4** | **19.6** | **18.2** | **17.4** | | **15.0** | **14.8** | |
| **PPG debt service-to-exports ratio (in percent)** | **5.0** | **5.7** | **14.0** | | | **7.3** | **7.6** | **6.8** | **7.4** | **7.2** | **7.0** | | **5.1** | **5.6** | |
| **PPG debt service-to-revenue ratio (in percent)** | **6.5** | **7.4** | **17.2** | | | **8.4** | **8.7** | **7.5** | **8.1** | **8.0** | **7.7** | | **5.8** | **6.6** | |
| Total gross financing need (Billions of U.S. dollars) | 1.2 | 0.9 | 1.4 | | | 1.4 | 1.4 | 1.5 | 1.5 | 1.5 | 1.5 | | 2.1 | 4.4 | |
| Non-interest current account deficit that stabilizes debt ratio | 0.9 | 1.2 | 9.7 | | | 2.3 | 5.5 | 6.0 | 6.1 | 5.6 | 5.5 | | 5.3 | 5.8 | |
| **Key macroeconomic assumptions** | | | | | | | | | | | | | | | |
| Real GDP growth (in percent) | 2.1 | 4.1 | 2.6 | 3.9 | 1.9 | 3.7 | 4.3 | 4.8 | 5.0 | 5.1 | 5.2 | 4.7 | 5.2 | 5.6 | 5.3 |
| GDP deflator in US dollar terms (change in percent) | -6.7 | -3.4 | 9.4 | 7.6 | 8.4 | -7.0 | 0.1 | 2.1 | 2.2 | 2.0 | 2.1 | 0.3 | 2.3 | 2.4 | 2.4 |
| Effective interest rate (percent) 5/ | 0.4 | 0.9 | 1.7 | 0.8 | 0.4 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 | 1.5 | 1.4 | 1.5 | 1.3 | 1.4 |
| Growth of exports of G&S (US dollar terms, in percent) | -11.1 | 3.1 | 10.8 | 10.3 | 10.5 | -5.4 | 3.0 | 3.1 | 6.2 | 8.3 | 6.9 | 3.7 | 8.6 | 8.9 | 8.7 |
| Growth of imports of G&S (US dollar terms, in percent) | -25.0 | -1.4 | 13.4 | 13.7 | 17.2 | -1.7 | 1.3 | 2.8 | 4.3 | 5.2 | 5.7 | 2.9 | 8.4 | 8.7 | 8.3 |
| Grant element of new public sector borrowing (in percent) | ... | ... | ... | ... | ... | 29.6 | 7.8 | 20.2 | 20.4 | 19.7 | 18.4 | 19.4 | 16.4 | 8.6 | 11.3 |
| Government revenues (excluding grants, in percent of GDP) | 18.6 | 19.4 | 20.2 | | | 20.9 | 20.8 | 20.9 | 20.9 | 20.6 | 20.7 | | 21.2 | 22.1 | 21.4 |
| Aid flows (in Billions of US dollars) 6/ | 0.9 | 0.7 | 0.6 | | | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | | 0.9 | 1.1 | |
| o/w Grants | 0.4 | 0.3 | 0.3 | | | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | | 0.6 | 1.1 | |
| o/w Concessional loans | 0.5 | 0.4 | 0.2 | | | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | | 0.2 | 0.0 | |
| Grant-equivalent financing (in percent of GDP) 7/ | ... | ... | ... | | | 4.3 | 3.1 | 3.5 | 3.4 | 3.3 | 3.2 | | 2.8 | 2.1 | 2.5 |
| Grant-equivalent financing (in percent of external financing) 7/ | ... | ... | ... | | | 56.4 | 40.2 | 52.9 | 54.2 | 54.2 | 53.6 | | 54.1 | 52.0 | 50.8 |
| *Memorandum items:* | | | | | | | | | | | | | | | |
| Nominal GDP (Billions of US dollars) | 12.8 | 12.9 | 14.5 | | | 13.9 | 14.6 | 15.6 | 16.7 | 17.9 | 19.2 | | 27.7 | 58.9 | |
| Nominal dollar GDP growth | -4.8 | 0.6 | 12.3 | | | -3.6 | 4.3 | 7.1 | 7.3 | 7.2 | 7.4 | 5.0 | 7.6 | 8.2 | 7.7 |
| PV of PPG external debt (in Billions of US dollars) | | | 3.3 | | | 3.6 | 4.2 | 4.5 | 4.9 | 5.2 | 5.6 | | 8.1 | 13.5 | |
| (PVt-PVt-1)/GDPt-1 (in percent) | | | | | | 2.3 | 3.7 | 2.5 | 2.2 | 2.1 | 2.2 | 2.5 | 2.1 | 1.2 | 1.7 |
| Gross workers' remittances (Billions of US dollars) | 1.7 | 1.8 | 1.9 | | | 1.7 | 1.7 | 1.8 | 1.8 | 1.8 | 1.9 | | 2.7 | 5.7 | |
| PV of PPG external debt (in percent of GDP + remittances) | ... | ... | 21.4 | | | 23.7 | 25.5 | 26.1 | 26.3 | 26.4 | 26.6 | | 26.7 | 21.0 | |
| PV of PPG external debt (in percent of exports + remittances) | ... | ... | 64.2 | | | 72.9 | 79.8 | 84.5 | 86.8 | 87.8 | 89.6 | | 87.0 | 64.4 | |
| Debt service of PPG external debt (in percent of exports + remittances) | ... | ... | 9.2 | | | 4.8 | 5.0 | 4.6 | 5.0 | 5.0 | 4.9 | | 3.6 | 4.1 | |

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/ Defined as grants, concessional loans, and debt relief.

7/ 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, 2012-2032**
**(In percent)**

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | **2022** | 2032 |
| **PV of debt-to-GDP ratio** | | | | | | | | |
| **Baseline** | 27 | 29 | 29 | 29 | 29 | 29 | **29** | 23 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 27 | 27 | 28 | 28 | 29 | 30 | **35** | 35 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 27 | 29 | 31 | 33 | 34 | 35 | **39** | 35 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 27 | 29 | 30 | 31 | 31 | 31 | **31** | 24 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 27 | 29 | 31 | 31 | 31 | 31 | **31** | 23 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 27 | 29 | 30 | 30 | 30 | 30 | **30** | 24 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 27 | 31 | 34 | 34 | 34 | 34 | **33** | 24 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 27 | 29 | 30 | 30 | 30 | 30 | **30** | 23 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 27 | 41 | 41 | 41 | 42 | 42 | **42** | 33 |
| **PV of debt-to-exports ratio** | | | | | | | | |
| **Baseline** | 110 | 120 | 126 | 128 | 127 | 127 | **122** | 88 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 110 | 115 | 121 | 125 | 127 | 132 | **146** | 135 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 110 | 121 | 136 | 143 | 147 | 152 | **162** | 133 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 110 | 119 | 126 | 128 | 126 | 127 | **122** | 88 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 110 | 126 | 143 | 145 | 143 | 143 | **136** | 96 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 110 | 119 | 126 | 128 | 126 | 127 | **122** | 88 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 110 | 132 | 149 | 150 | 148 | 147 | **137** | 92 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 110 | 121 | 126 | 127 | 126 | 126 | **120** | 86 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 110 | 119 | 126 | 128 | 126 | 127 | **122** | 88 |
| **PV of debt-to-revenue ratio** | | | | | | | | |
| **Baseline** | 128 | 137 | 139 | 139 | 141 | 141 | **138** | 104 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 128 | 132 | 134 | 136 | 142 | 146 | **165** | 160 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 128 | 139 | 150 | 156 | 164 | 168 | **184** | 157 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 128 | 140 | 146 | 146 | 148 | 148 | **145** | 109 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 128 | 140 | 148 | 148 | 150 | 149 | **145** | 106 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 128 | 138 | 144 | 144 | 146 | 146 | **144** | 108 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 128 | 151 | 164 | 164 | 165 | 163 | **156** | 109 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 128 | 139 | 142 | 142 | 144 | 143 | **140** | 104 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 128 | 196 | 198 | 199 | 201 | 201 | **198** | 149 |

**Table 1b.Senegal: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2012-2032 (concluded)**
**(In percent)**

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2022 | 2032 |
| **Debt service-to-exports ratio** | | | | | | | | |
| **Baseline** | 7 | 8 | 7 | 7 | 7 | 7 | **5** | 6 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 7 | 7 | 6 | 7 | 6 | 6 | **5** | 6 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 7 | 8 | 6 | 7 | 7 | 8 | **7** | 9 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 7 | 8 | 7 | 7 | 7 | 7 | **5** | 6 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 7 | 8 | 7 | 8 | 8 | 8 | **6** | 6 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 7 | 8 | 7 | 7 | 7 | 7 | **5** | 6 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 7 | 8 | 7 | 8 | 8 | 7 | **5** | 6 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 7 | 7 | 7 | 7 | 7 | 7 | **5** | 6 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 7 | 8 | 7 | 7 | 7 | 7 | **5** | 6 |
| **Debt service-to-revenue ratio** | | | | | | | | |
| **Baseline** | 8 | 9 | 7 | 8 | 8 | 8 | **6** | 7 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 8 | 8 | 7 | 7 | 7 | 7 | **5** | 7 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 8 | 9 | 7 | 8 | 8 | 8 | **8** | 10 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 8 | 9 | 8 | 9 | 8 | 8 | **6** | 7 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 8 | 9 | 8 | 8 | 8 | 8 | **6** | 7 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 8 | 9 | 8 | 8 | 8 | 8 | **6** | 7 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 8 | 9 | 8 | 9 | 9 | 8 | **6** | 7 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 8 | 9 | 7 | 8 | 8 | 8 | **6** | 7 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 8 | 12 | 11 | 12 | 11 | 11 | **8** | 9 |
| *Memorandum item:* | | | | | | | | |
| Grant element assumed on residual financing (i.e., financing required above baseline) 6/ | 8 | 8 | 8 | 8 | 8 | 8 | **8** | 8 |

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 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, 2012-2032**
**(In percent of GDP, unless otherwise indicated)**

| | Actual | | | | | Estimate | Projections | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | Average | Standard Deviation | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2012-17 Average | 2022 | 2032 | 2018-32 Average |
| **Public sector debt 1/** | 34.2 | 35.7 | 40.0 | | | 45.0 | 46.8 | 48.1 | 48.7 | 49.0 | 49.0 | | 47.4 | 38.9 | |
| o/w foreign-currency denominated | 26.9 | 27.5 | 28.8 | | | 32.7 | 34.6 | 35.4 | 35.8 | 36.1 | 36.2 | | 35.7 | 26.9 | |
| Change in public sector debt | 10.2 | 1.5 | 4.3 | | | 4.9 | 1.9 | 1.3 | 0.6 | 0.3 | 0.0 | | -0.5 | -1.1 | |
| Identified debt-creating flows | 3.2 | 5.7 | 4.3 | | | 4.9 | 1.9 | 1.2 | 0.6 | 0.4 | 0.0 | | -0.3 | -1.0 | |
| Primary deficit | 4.2 | 4.2 | 5.2 | 3.0 | 1.9 | 4.3 | 3.1 | 2.7 | 2.3 | 2.1 | 1.9 | 2.7 | 1.6 | 0.6 | 1.3 |
| Revenue and grants | 21.7 | 22.0 | 22.4 | | | 23.9 | 23.5 | 23.6 | 23.6 | 23.3 | 23.3 | | 23.5 | 24.0 | |
| *of which: grants* | 3.0 | 2.5 | 2.2 | | | 2.9 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | | 2.3 | 1.9 | |
| Primary (noninterest) expenditure | 25.9 | 26.2 | 27.5 | | | 28.1 | 26.5 | 26.3 | 25.9 | 25.4 | 25.2 | | 25.1 | 24.6 | |
| Automatic debt dynamics | -0.7 | 1.8 | -0.7 | | | 1.1 | -1.0 | -1.6 | -1.7 | -1.8 | -1.8 | | -1.9 | -1.6 | |
| Contribution from interest rate/growth differential | 0.6 | -0.9 | -0.8 | | | -0.7 | -1.0 | -1.7 | -1.8 | -1.9 | -2.0 | | -1.9 | -1.6 | |
| *of which: contribution from average real interest rate* | 1.1 | 0.4 | 0.1 | | | 0.7 | 0.8 | 0.5 | 0.5 | 0.5 | 0.5 | | 0.5 | 0.6 | |
| *of which: contribution from real GDP growth* | -0.5 | -1.4 | -0.9 | | | -1.4 | -1.8 | -2.2 | -2.3 | -2.3 | -2.4 | | -2.4 | -2.1 | |
| Contribution from real exchange rate depreciation | -1.3 | 2.7 | 0.1 | | | 1.8 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | ... | ... | |
| Other identified debt-creating flows | -0.3 | -0.3 | -0.2 | | | -0.6 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Privatization receipts (negative) | 0.0 | 0.0 | 0.0 | | | -0.6 | -0.1 | 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) | -0.3 | -0.3 | -0.2 | | | 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 | 7.0 | -4.2 | 0.1 | | | 0.1 | -0.1 | 0.1 | 0.0 | 0.0 | -0.1 | | -0.1 | -0.1 | |
| **Other Sustainability Indicators** | | | | | | | | | | | | | | | |
| **PV of public sector debt** | ... | ... | 35.4 | | | 38.9 | 40.8 | 41.7 | 42.0 | 42.1 | 41.9 | | 41.0 | 35.0 | |
| o/w foreign-currency denominated | ... | ... | 24.2 | | | 26.7 | 28.6 | 29.0 | 29.1 | 29.1 | 29.1 | | 29.3 | 23.0 | |
| o/w external | ... | ... | 24.2 | | | 26.7 | 28.6 | 29.0 | 29.1 | 29.1 | 29.1 | | 29.3 | 23.0 | |
| PV of contingent liabilities (not included in public sector debt) | ... | ... | ... | | | ... | ... | ... | ... | ... | ... | | ... | ... | |
| Gross financing need 2/ | 8.0 | 8.2 | 12.3 | | | 12.1 | 12.1 | 10.5 | 10.5 | 10.2 | 9.9 | | 8.1 | 6.7 | |
| PV of public sector debt-to-revenue and grants ratio (in percent) | … | … | 158.3 | | | 163.2 | 173.6 | 176.9 | 178.2 | 181.0 | 180.0 | | 174.5 | 145.9 | |
| PV of public sector debt-to-revenue ratio (in percent) | … | … | 175.5 | | | 186.1 | 196.1 | 199.7 | 201.2 | 204.2 | 202.5 | | 193.8 | 158.5 | |
| o/w external 3/ | … | … | 119.8 | | | 127.6 | 137.3 | 139.0 | 139.4 | 141.3 | 140.8 | | 138.4 | 104.0 | |
| Debt service-to-revenue and grants ratio (in percent) 4/ | 9.1 | 9.8 | 19.9 | | | 15.7 | 21.4 | 15.1 | 16.4 | 16.3 | 16.6 | | 14.4 | 15.8 | |
| Debt service-to-revenue ratio (in percent) 4/ | 10.6 | 11.1 | 22.1 | | | 17.9 | 24.1 | 17.0 | 18.5 | 18.4 | 18.6 | | 15.9 | 17.2 | |
| Primary deficit that stabilizes the debt-to-GDP ratio | -6.0 | 2.7 | 0.8 | | | -0.7 | 1.2 | 1.5 | 1.7 | 1.8 | 1.9 | | 2.0 | 1.7 | |
| **Key macroeconomic and fiscal assumptions** | | | | | | | | | | | | | | | |
| Real GDP growth (in percent) | 2.1 | 4.1 | 2.6 | 3.9 | 1.9 | 3.7 | 4.3 | 4.8 | 5.0 | 5.1 | 5.2 | 4.7 | 5.2 | 5.6 | 5.3 |
| Average nominal interest rate on forex debt (in percent) | 2.0 | 2.1 | 3.7 | 2.3 | 0.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.0 | 2.2 |
| Average real interest rate on domestic debt (in percent) | 10.1 | 3.6 | 3.6 | 1.9 | 3.5 | 6.2 | 6.7 | 4.2 | 4.2 | 3.9 | 3.9 | 4.8 | 4.2 | 5.8 | 4.3 |
| Real exchange rate depreciation (in percent, + indicates depreciation) | -6.7 | 10.4 | 0.3 | -3.3 | 10.4 | 6.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Inflation rate (GDP deflator, in percent) | -1.4 | 1.4 | 4.3 | 2.7 | 2.5 | 2.2 | 2.4 | 2.4 | 2.5 | 2.4 | 2.5 | 2.4 | 2.3 | 2.4 | 2.4 |
| Growth of real primary spending (deflated by GDP deflator, in percent) | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| Grant element of new external borrowing (in percent) | ... | ... | ... | … | … | 29.6 | 7.8 | 20.2 | 20.4 | 19.7 | 18.4 | 19.4 | 16.4 | 8.6 | ... |

Sources: Country authorities; and staff estimates and projections.
1/ The public sector refers to the central 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 2b.Senegal: Sensitivity Analysis for Key Indicators of Public Debt 2012-2032**

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2022 | 2032 |
| **PV of Debt-to-GDP Ratio** | | | | | | | | |
| **Baseline** | 39 | 41 | 42 | 42 | 42 | 42 | 41 | 35 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 39 | 41 | 42 | 44 | 45 | 47 | 53 | 65 |
| A2. Primary balance is unchanged from 2012 | 39 | 42 | 44 | 46 | 48 | 50 | 59 | 71 |
| A3. Permanently lower GDP growth 1/ | 39 | 41 | 42 | 43 | 44 | 44 | 47 | 52 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2013-2014 | 39 | 42 | 45 | 47 | 48 | 48 | 51 | 50 |
| B2. Primary balance is at historical average minus one standard deviations in 2013-2014 | 39 | 43 | 46 | 46 | 46 | 45 | 44 | 37 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 39 | 42 | 45 | 46 | 46 | 47 | 48 | 45 |
| B4. One-time 30 percent real depreciation in 2013 | 39 | 52 | 52 | 52 | 51 | 51 | 48 | 41 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2013 | 39 | 50 | 51 | 51 | 50 | 50 | 47 | 39 |
| **PV of Debt-to-Revenue Ratio 2/** | | | | | | | | |
| **Baseline** | 163 | 174 | 177 | 178 | 181 | 180 | 174 | 146 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 163 | 174 | 180 | 186 | 194 | 199 | 224 | 265 |
| A2. Primary balance is unchanged from 2012 | 163 | 179 | 188 | 196 | 207 | 215 | 250 | 295 |
| A3. Permanently lower GDP growth 1/ | 163 | 175 | 179 | 182 | 187 | 188 | 198 | 214 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2013-2014 | 163 | 179 | 191 | 197 | 204 | 206 | 217 | 209 |
| B2. Primary balance is at historical average minus one standard deviations in 2013-2014 | 163 | 181 | 193 | 194 | 196 | 195 | 186 | 153 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 163 | 179 | 190 | 194 | 199 | 200 | 204 | 187 |
| B4. One-time 30 percent real depreciation in 2013 | 163 | 221 | 221 | 219 | 220 | 217 | 205 | 171 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2013 | 163 | 214 | 216 | 215 | 217 | 214 | 202 | 162 |
| **Debt Service-to-Revenue Ratio 2/** | | | | | | | | |
| **Baseline** | 16 | 21 | 15 | 16 | 16 | 17 | 14 | 16 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 16 | 21 | 15 | 17 | 17 | 18 | 18 | 26 |
| A2. Primary balance is unchanged from 2012 | 16 | 21 | 15 | 18 | 18 | 20 | 20 | 27 |
| A3. Permanently lower GDP growth 1/ | 16 | 21 | 15 | 17 | 17 | 17 | 16 | 21 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2013-2014 | 16 | 22 | 16 | 18 | 18 | 19 | 17 | 21 |
| B2. Primary balance is at historical average minus one standard deviations in 2013-2014 | 16 | 21 | 15 | 19 | 19 | 18 | 15 | 17 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 16 | 22 | 16 | 18 | 18 | 18 | 16 | 19 |
| B4. One-time 30 percent real depreciation in 2013 | 16 | 23 | 18 | 20 | 20 | 21 | 18 | 21 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2013 | 16 | 21 | 16 | 27 | 18 | 20 | 15 | 18 |

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.

**Table 3b.Senegal: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt (with Remittances), 2012-2032**
**(In percent)**

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | **2022** | 2032 |
| **PV of debt-to-GDP+remittances ratio** | | | | | | | | |
| **Baseline** | 24 | 26 | 26 | 26 | 26 | 27 | **27** | 21 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 24 | 25 | 25 | 26 | 27 | 28 | **33** | 34 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 24 | 26 | 28 | 29 | 31 | 32 | **35** | 32 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 24 | 26 | 27 | 27 | 28 | 28 | **28** | 22 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 24 | 26 | 28 | 28 | 28 | 28 | **28** | 21 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 24 | 26 | 27 | 27 | 27 | 27 | **28** | 22 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 24 | 29 | 32 | 31 | 31 | 31 | **30** | 22 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 24 | 26 | 27 | 27 | 27 | 27 | **27** | 21 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 24 | 35 | 36 | 36 | 36 | 36 | **37** | 29 |
| **PV of debt-to-exports+remittances ratio** | | | | | | | | |
| **Baseline** | 73 | 80 | 85 | 87 | 88 | 90 | **87** | 64 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 73 | 78 | 84 | 89 | 93 | 99 | **116** | 116 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 73 | 81 | 91 | 97 | 102 | 107 | **115** | 97 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 73 | 80 | 84 | 87 | 88 | 89 | **87** | 64 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 73 | 83 | 94 | 96 | 97 | 99 | **95** | 69 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 73 | 80 | 84 | 87 | 88 | 89 | **87** | 64 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 73 | 97 | 109 | 102 | 102 | 104 | **98** | 67 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 73 | 86 | 89 | 88 | 89 | 90 | **87** | 63 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 73 | 80 | 84 | 87 | 88 | 89 | **87** | 64 |
| **PV of debt-to-revenue ratio** | | | | | | | | |
| **Baseline** | 128 | 137 | 139 | 139 | 141 | 141 | **138** | 104 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 128 | 132 | 134 | 136 | 142 | 146 | **165** | 160 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 128 | 139 | 150 | 156 | 164 | 168 | **184** | 157 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 128 | 140 | 146 | 146 | 148 | 148 | **145** | 109 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 128 | 140 | 148 | 148 | 150 | 149 | **145** | 106 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 128 | 138 | 144 | 144 | 146 | 146 | **144** | 108 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 128 | 151 | 164 | 164 | 165 | 163 | **156** | 109 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 128 | 139 | 142 | 142 | 144 | 143 | **140** | 104 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 128 | 196 | 198 | 199 | 201 | 201 | **198** | 149 |

**Table 3b.Senegal: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt (with Remittances), 2012-2032 (concluded)**
**(In percent)**

**Debt service-to-exports+remittances ratio**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Baseline** | 5 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 5 | 5 | 4 | 5 | 5 | 5 | **4** | 5 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 5 | 5 | 4 | 5 | 5 | 5 | **5** | 6 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 5 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 5 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 5 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 5 | 6 | 5 | 5 | 5 | 5 | **4** | 5 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 5 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 5 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |

**Debt service-to-revenue ratio**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Baseline** | 8 | 9 | 7 | 8 | 8 | 8 | **6** | 7 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2012-2032 1/ | 8 | 8 | 7 | 7 | 7 | 7 | **5** | 7 |
| A2. New public sector loans on less favorable terms in 2012-2032 2 | 8 | 9 | 7 | 8 | 8 | 8 | **8** | 10 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2013-2014 | 8 | 9 | 8 | 9 | 8 | 8 | **6** | 7 |
| B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/ | 8 | 9 | 8 | 8 | 8 | 8 | **6** | 7 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014 | 8 | 9 | 8 | 8 | 8 | 8 | **6** | 7 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/ | 8 | 9 | 8 | 9 | 9 | 8 | **6** | 7 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 8 | 9 | 7 | 8 | 8 | 8 | **6** | 7 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/ | 8 | 12 | 11 | 12 | 11 | 11 | **8** | 9 |
| *Memorandum item:* | | | | | | | | |
| Grant element assumed on residual financing (i.e., financing required above baseline) 6/ | 8 | 8 | 8 | 8 | 8 | 8 | **8** | 8 |

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.