

## SIERRA LEONE: JOINT BANK-FUND DEBT SUSTAINABILITY ANALYSIS

*This document assesses the sustainability of Sierra Leone's external and domestic public debt. The debt sustainability analysis (DSA) was conducted jointly by the staffs of the World Bank and the International Monetary Fund (IMF) using the new Debt Sustainability Framework (DSF) for low income countries. The external and domestic debt data underlying this DSA was provided by the authorities of Sierra Leone and reconciled in the case of its three main multilateral creditors.<sup>1</sup> A full reconciliation of external debt will be conducted by the time Sierra Leone reaches the HIPC completion point. On the basis of the analysis of the baseline scenario and several alternative scenarios, the staffs conclude that Sierra Leone faces a moderate risk of external debt distress. In the case of domestic obligations, the staffs recommend to the Sierra Leonean authorities further review of the fiscal implications of converting non-interest bearing obligations to the Bank of Sierra Leone into interest bearing Government liabilities.*

### I. BACKGROUND

1. **Sierra Leone reached the HIPC Decision Point in 2002. Since then, it has received HIPC interim assistance from various multilateral and bilateral creditors.** Based on external debt data for end-2000, the Boards of IDA and the IMF approved debt relief worth US\$600 million in end-2000 NPV terms. Interim relief in the form of debt service reductions was provided by IDA, the IMF, the AfDB, and the European Union.<sup>2</sup> The OPEC Fund provided interim relief through an arrears clearance and the Paris Club provided interim assistance on Cologne terms on maturities falling due in the interim period. Some Paris Club creditors, like Italy, Norway, Switzerland, the United Kingdom, and the United States, agreed to cancel in full debt service payments falling due during the interim period. Of the non-Paris Club bilateral creditors China and Morocco have provided assistance outside the HIPC Initiative through debt cancellations.<sup>3</sup>

2. **The government also benefited from a debt buy-back under the IDA debt reduction facility in 1995.** At that time, the program received financial support from IDA, EU, and the Government of Sierra Leone. A second IDA debt reduction program, currently in the procurement phase, would cover the currently outstanding commercial debt which is estimated at US\$251 million at end-2004.<sup>4</sup>

3. **At end 2004, Sierra Leone's nominal external debt including arrears stood at US\$ 1,720 million (161 percent of GDP).** Two-thirds were owed to multilateral creditors and the remainder to bilateral and commercial creditors (Table 1). Sierra Leone's external debt stock has increased by 43 percent since 2000, the base year of the HIPC Decision Point. Part of this increase can be explained with new disbursements between 2000 and 2004 which are estimated to have been in the range of US\$414 million. The debt stock also rose due to commercial debt

<sup>1</sup> The African Development Bank (AfDB), the IMF, and the World Bank.

<sup>2</sup> Interim relief by AfDB lapsed at end-2004 due to an exhaustion of the HIPC Trust Fund financing AfDB's, but was replenished in 2005, which allowed the resumption of interim debt relief.

<sup>3</sup> China cancelled all disbursed outstanding debt that had matured in 1999 under a special Chinese Initiative. Similarly in 2004, Morocco cancelled the entire outstanding debt amounting to US\$10 million.

<sup>4</sup> The DSA assumes that a buy-back will take place at the beginning of 2007.

that was not known at the Decision Point.<sup>5</sup> This substantial increase is a result of contractor related arrears which were identified as the country emerged from the period of conflict to peace.

**Table 1: Debt Outstanding at End-2004**

Creditor	US\$	Percent
<b>Multilateral, of which:</b>	<b>1,061,796,494</b>	<b>62</b>
IDA	564,727,787	33
AfDB	206,373,425	12
IMF	194,159,605	11
<b>Bilateral</b>	<b>397,203,546</b>	<b>23</b>
<b>Commercial 1/</b>	<b>261,080,731</b>	<b>15</b>
<b>Total</b>	<b>1,720,080,770</b>	<b>100</b>

1/ Of which, US\$ 251 million are in arrears.

Source: Government of Sierra Leone and staff estimates.

4. **Sierra Leone's domestic debt stock has fallen to 33 percent of GDP in 2005 from 57 percent of GDP in 2000.**<sup>6</sup> This decline was the result of high GDP growth after the civil war combined with reductions in the fiscal deficit to 1.3 percent of GDP in 2004 from almost 11 percent of GDP in 2001. Domestic borrowing has been costly, however, with interest rates on treasury bills fluctuating between 15 and 28 percent between 2000 and 2005. Interest payments on domestic debt consumed a substantial portion of government revenues (30 percent, excluding all grants) in 2004.

5. Domestic debt is mainly held by the Bank of Sierra Leone, commercial banks, and the National Social Security Investment Trust (NASSIT). Because the debt is predominantly short-term in nature, the debt stock is subject to a significant roll-over risk.<sup>7</sup> Just over half of the end-2004 stock of domestic debt comprises non-interest bearing, non-negotiable securities with no maturity (about US\$185 million using end-2004 exchange rate), which the government issued in 2000 to the central bank (BSL) to cover the central bank's foreign currency revaluation and operational losses from the conflict period.<sup>8</sup> The remainder of the domestic debt stock is predominantly short-term in nature and therefore subject to a significant roll-over risk.<sup>9</sup>

<sup>5</sup> At the Decision Point, commercial debt (entirely in arrears) was estimated at US\$85.6 million. As of end-2004, the stock of commercial arrears is estimated at US\$251 million.

<sup>6</sup> In addition, the government has accumulated arrears owed to private suppliers and utility companies. These totaled Le 42.9 billion (1.5 percent of GDP) at end-2004.

<sup>7</sup> If a country's debt is heavily concentrated in short-term maturities of less than one year, the government is exposed to a "bunching problem", with a high volume of obligations maturing on certain dates that may all have to be refinanced at the same time.

<sup>8</sup> The baseline scenario assumes the continuity of the status quo, that is, no interest will be accumulated on this debt.

<sup>9</sup> If a country's debt is heavily concentrated in short-term maturities of less than one year, the government is exposed to a "bunching problem," with a high volume of obligations maturing on certain dates that may all have to be refinanced at the same time.

(continued)

## II. METHODOLOGY AND KEY ASSUMPTIONS

6. **Under the new DSF, the evolution of the external and domestic public debt stock and debt service indicators is analyzed under a baseline scenario and a series of bound tests in order to assess a country's probability of facing debt distress in the future.**<sup>10</sup> The assessment of external debt sustainability is guided by indicative country specific debt burden thresholds related to a country's quality of policies and institutions as measured by the World Bank's Country Policy and Institutional Assessment (CPIA). According to the 2004 CPIA, Sierra Leone ranks as a "weak performer" in the quality of its policies and institutions. Indicative external debt burden thresholds for countries in this category are a NPV of debt-to-exports ratio of 100 percent, NPV of debt-to-revenue ratio of 200 percent, a NPV of debt-to-GDP ratio of 30 percent, and debt service to exports and revenues ratios of 15 and 25 percent, respectively.<sup>11</sup>

7. **The analysis underlying the DSA is subject to a number of assumptions.** The external debt numbers underlying the analysis reflect the full delivery of HIPC debt relief (including a buy-back of external commercial debt anticipated for 2007) and additional bilateral debt relief after the expected HIPC completion point in July 2006. New borrowing is assumed to come predominantly from external resources and is driven by fiscal assumptions on grant assistance, revenues and expenditures. New external borrowing is projected to be contracted primarily on IDA terms throughout the entire projections period. New domestic borrowing is assumed to continue to be available only at very short maturities (no more than a year). The share of grants (program and project) in the fiscal financing is assumed to fall over time as the economy becomes less aid dependent: from almost 7 percent of GDP in 2004 to just under 3 percent of GDP by 2025 (excluding HIPC assistance). The underlying macroeconomic assumptions are outlined in Box 1 below.

8. **Staffs' assessment of the country's risk for future debt distress is informed by both the external and fiscal debt sustainability analysis.** In addition to the baseline scenario and bound tests of the DSA, staffs have considered three additional bounds tests: one entertains the implications of the Multilateral Debt Relief Initiative (MDRI), a second simulates the effect of a two year delay in the restart of the rutile and bauxite mines which is scheduled for 2006 under the baseline and the third simulates the impact of paying interest and amortization on what is currently non-interest bearing domestic public debt with no maturity owed to the Bank of Sierra Leone.

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<sup>10</sup> See SM/05/109 (Operational Framework for Debt Sustainability Assessments in Low-Income Countries—Further Considerations). The new framework introduces some methodological change in the calculation of the NPV of debt compared to the HIPC methodology by using a) a fixed 5 percent discount rate instead of currency specific discount rates (under HIPC), b) WEO exchange rate projections instead of fixed exchange rates as of end of the base date and c) annual exports instead of a three-year average of exports as the denominator in the NPV of debt to exports ratio.

<sup>11</sup> The NPV of external debt-to-revenue ratio excludes all grants. By contrast, the revenue ratios quoted in the fiscal analysis in Section IV below assume the inclusion of grants.

**Box 1: Macroeconomic Assumptions 2006-2025**

*The medium term assumptions in the baseline scenario for 2006-2025 are consistent with the proposed IMF PRGF supported program. Key macroeconomic assumptions include the maintenance of a sustained high real GDP growth rate and a stable macroeconomic environment. Substantial mineral endowments, which are expected to be fully rehabilitated in the medium-term, combined with growing exports of cash crops would support the balance of payments and growth, as well as enhance fiscal sustainability.*

- The baseline scenario assumes a sustained high output growth and low inflation. Output growth is projected to slow gradually to 5 percent annually by 2025 from 7.4 percent in 2006. Consumer price inflation is projected to decline to 5 percent towards the end of the period from 9.5 percent in 2006.
- The external trade balance would improve by 5 percentage points of GDP between 2006 and 2014 and then stabilize at a deficit of 11 percent of GDP, reflecting robust export growth. This reflects, initially, the restart of rutile and bauxite production and exports as well as continued strong growth in diamond exports. Imports of goods and services would grow in line with the nominal GDP, following some additional investment-related imports in the initial years for the expansion of the newly restarted rutile and bauxite mines. The external current account deficit is projected to narrow to 4 ½ percent of GDP by 2025 from just less than 7 percent of GDP in 2006 as interest obligations gradually fall as a share of GDP.
- External grants to government were equivalent to an average of 5 percent of GDP per annum in the initial years after the end of the conflict (2002-2005). Following a successful consultative group meeting in London in November 2005, grants are expected to rise to 7.7 percent of GDP in 2006 from 6.8 percent of GDP in 2005 in support of the Governments' Poverty Reduction Strategy. For the remainder of the projection period, the baseline scenario includes the conservative assumption that grants will fall gradually to 3 percent of GDP by 2025 as post-conflict needs fade.
- A reversion of external grant assistance to traditional levels will require fiscal adjustment. The main elements of the envisioned adjustment include steady gains in revenue collection through improved administration and augmentation of the revenue base. Revenues collected would steadily rise from 12.6 percent in 2006 to the average for HIPC completion point countries of 15 percent by the end of the period. Revenues would fully cover all recurrent expenditures from 2018 onward rather than the 67 percent covered in 2005. Recurrent expenditures, excluding interest, would rise from 13.5 percent of GDP in 2006 to 14 percent of GDP in 2010 and then stabilize at that level. Development spending would increase to a peak of 6.6 percent of GDP by 2015 from 3.42 percent in 2006 and then gradually fall to 5.8 percent of GDP by 2025, with some increase in domestic development expenditures to offset the fall in donor-funded projects. The reduction in development expenditures is consistent with the deceleration of the rate of real growth in the economy in the outer years.

**III. EXTERNAL DEBT SUSTAINABILITY**

9. **Under the baseline scenario, Sierra Leone's external debt burden indicators would sharply decline following the delivery of full debt relief at the HIPC completion point.** The NPV of public and publicly guaranteed debt to GDP ratio stood at 88 percent in 2005 and would fall to about 31 percent in 2006 following debt relief (reaching the threshold) and gradually further to about 23 percent by 2025 (See Table 4). The NPV of debt to exports ratio would fall to 111 percent in 2006 and below 100 percent by 2010 from 364 percent in 2005. It would then gradually decline to about 72 percent by 2025. The external debt service-to-export ratio would remain well below its threshold for the entire period, both under the baseline and under most bounds tests. The NPV of external debt to revenue ratio (excluding all grants) would fall from

719 percent in 2005 to 243 percent after the projected Completion Point and then gradually decline until it would fall below the indicative debt burden threshold of 200 in 2012.

10. **The MDRI would further improve Sierra Leone's debt sustainability.** The NPV of debt to GDP ratio would fall to an average of 21 percent for the period 2006-2025 (Table 4). The NPV of debt to exports ratio would fall to 58 percent in 2006 and then gradually rise to 66 percent by 2025. The external debt service to export ratio would fall even further below its threshold. The NPV of external debt to revenue ratio (excluding all grants) would fall to 128 percent in 2006 and remain below the threshold of 200 percent thereafter.

11. **Bounds tests reveal that Sierra Leone's external debt sustainability is vulnerable to a number of down-side risks (Figure 1).** The debt burden indicators are close to or above the indicative thresholds for nearly all bounds tests.<sup>12</sup> Most strikingly, under the historical values test (Table 4), the NPV of debt to export ratio rises rapidly to levels four times as high as those of the baseline by 2025.

12. **These stress tests must be interpreted with some care. While the magnitudes of the shocks lie within the realm of possibility, the probability of such shocks occurring is low for some.** In particular, in the view of the staffs, the historical and export shock scenarios (labeled A1 and B2 in Table 4 below) both overstate risks to the economy. Both scenarios include data for the most violent episodes in the country's civil conflict (which ended in January 2002) and also include the costly reconstruction that followed the end of the conflict.<sup>13</sup> For example, as shown in Table 2 below, the historical average for the non-interest current account balance was 2 percentage points of GDP higher than the projected share for 2005-10. The historical growth rates for real GDP and exports are also substantially lower (and display very high standard deviations) than the projected rates – by roughly 3 and 14 percentage points respectively. In the judgment of the staffs, the likelihood that this historical pattern would be repeated is quite low.<sup>14</sup>

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<sup>12</sup> The documentation for the DSF is clear that the bounds tests do not allow for internal and external adjustment in response to shocks. The implication is that the tests could over-state the consequences of the shocks.

<sup>13</sup> Under the historical scenario key variables (real GDP growth, the GDP deflator, the non-interest current account balance and net foreign investment) are held at historical levels for the period 1995-2004.

<sup>14</sup> Empirical studies such as Collier and Hoeffler (2002) have shown that the probability of a conflict resuming decreases over time. Other studies such as Mason *et al* (2005) also show that the probability of a conflict being restarted is strongly reduced by the prolonged presence of peace-keepers, as was the case for Sierra Leone between 2002 and 2005, and the effects last even after peace-keepers have departed.

**Table 2: Historical and Projected Economic Indicators**

	Historical 1995-2004		2005-10	2011-25
	Average	Standard Deviation	Average	Average
Non-interest current account balance (in percent of GDP)	-7.0	5.1	-5.8	-4.2
Real GDP growth	3.8	13.2	6.6	5.5
GDP deflator in U.S. dollars	-1.1	9.2	4.0	1.2
Export growth (US dollar terms, in percent)	3.1	23.4	16.6	7.0
Net transfers to GDP ratio	5.3	7.6	10.8	7.5
Net non-debt creating flows (FDI) to GDP ratio	0.5	0.8	1.6	1.6

Source: Staff calculations.

13. **A delay in the projected recovery of the export base could undermine external debt sustainability.** In the extreme event that export value growth stays at historically low levels in 2006 and 2007 (Table 4), the NPV of debt to export ratio could reach levels approaching 400 in 2007 and declining to 200 percent by 2025. In the more realistic but also less dramatic case that the restart of bauxite and rutile is simply delayed by two years (programmed to start from 2006 onwards), the debt burden indicators would deteriorate significantly in the short term (200 percent in 2007) before falling to 100 percent by 2021 (bound test B2b).

#### IV. FISCAL DEBT SUSTAINABILITY

14. **Sierra Leone's large domestic debt represents a significant additional burden.** Adding the NPV of domestic debt, including arrears, to the NPV of external obligations raises the debt-to-GDP ratio in 2004 by 33 percentage points of GDP for a total of 115 percent of GDP. (See Table 5 below.) The NPV of debt to revenue ratio for 2004 stands at 692 percent (if the revenue base includes grants) while the debt service to revenue ratio is 27 percent.

15. **The NPV of debt would fall rapidly after the Completion Point and then stabilize by 2017.** Table 6 shows that the NPV of debt to GDP ratio drops to 54 percent by 2006 and falls further to an average of 28 percent from 2015 onward. The NPV of debt to revenue ratio (including grants) follows a similar trend, falling to 291 percent by 2006 and further to an average of 154 percent from 2015 onward. The debt service to revenue ratio (including grants) falls gradually to 14 percent in 2025 from 21 percent in 2005.

16. **A lower primary deficit would help reduce debt but hinder PRSP implementation.** The baseline scenario assumes that the primary deficit will slowly rise to 2.6 percent of GDP by 2016 from 1.2 percent of GDP in 2004 and to a surplus of 1.6 percent of GDP in 2005 before gradually falling again to 2 percent of GDP by 2025. This reflects the initial costs of PRSP implementation in a post-conflict country. By contrast, bound test A2 (Table 6) maintains the primary deficit constant at the 2004 GDP share of 1.2 percent. As a result, the NPV of debt to GDP ratio falls from 54 percent of GDP in 2006 to 15 percent in 2025, compared to 27 percent in the baseline scenario. The tension between high spending requirements and debt sustainability can only be resolved through a combination of concessional borrowing, grant financing, stronger revenue effort and efficiency gains in the delivery of public services.

17. **Temporary or permanently lower GDP growth represents the most significant risk to fiscal debt sustainability in Sierra Leone.** Reflecting the limited room to adjust expenditures and collect additional revenue, the government would have to increase its new borrowing significantly in the face of lower GDP growth. If real GDP growth were permanently lower (by 3 percentage points below the baseline rate), then the NPV of debt-to-GDP ratio would increase to 101 percent of GDP by 2025 rather than 27 percent of GDP in the baseline scenario. (See bound test A3 in Table 6.) If real GDP growth were temporarily negative (-9.5 percent in 2006 and 2007), then the NPV of debt-to-GDP ratio would increase to 79 percent of GDP by 2025. (See bound test B1 in Table 6.)

18. **Debt service obligations resulting from half of the current domestic debt stock may be thought of as an implicit contingent liability.** As of end-2005, approximately 55 percent of the domestic stock included under the fiscal baseline represents non-interest bearing, non-negotiable securities with no maturity, which the government issued to help capitalize the Bank of Sierra Leone. Currently, this loan does not represent any real fiscal burden to the government. Ultimately, the government may wish to convert the loan into a bond and start repaying it. Depending on the terms of the bond, this conversion would lead to a significant increase in the domestic debt service obligations of the government and would weaken the fiscal stance if not implemented with care.

19. **The impact of converting non-interest bearing liabilities to a bond could be substantial.** Table 6 illustrates one possible solution (labeled bound test C1). In this scenario, it is assumed that the current non-interest bearing liability is replaced in 2009 by a 10-year floating interest rate bond (interest rate is linked to the short-term Treasury bill rate). The additional debt service requirements are assumed to be financed by higher domestic borrowing without any compression in fiscal expenditures or increased revenue effort. As a consequence, the NPV debt-to-GDP ratio begins to rise over time and eventually reaches 45 percent of GDP by 2025, almost 18 percentage points higher than the baseline scenario. Similarly, the NPV of debt-to-revenue ratio (including grants) rises to 253 percent of GDP at the end of the projection period, 98 percentage points higher than the baseline scenario. Debt service as a share of revenues (including grants) rises to 27 percent of revenues by 2025, double the baseline scenario rate.

## V. CONCLUSIONS

20. **In staffs' assessment, Sierra Leone faces a moderate risk of debt distress if HIPC and MDRI debt relief are taken into account.** Under the baseline that assumes the full delivery of HIPC debt relief, three external debt indicators (NPV of debt to GDP, exports, and revenues) rise above the indicative debt burden thresholds in the first years but rapidly decline and improve further over the projection period. The implementation of the MDRI in connection with the HIPC completion point would improve the external debt situation of the country sufficiently to ensure all debt indicators remain below their indicative thresholds. However, several bounds tests reveal that the baseline is vulnerable to a multitude of potential shocks, in particular delays in the revival of bauxite and rutile exports, the servicing of non-interest bearing obligations and lower than anticipated real GDP growth.

21. **To ensure future debt sustainability a gradual reduction of the domestic debt stock is as vital as the successful fiscal adjustment programmed under the baseline.** A lower

domestic debt stock would lessen the liquidity and the rollover risk associated with the short maturities of this debt. In order to extend the maturity of domestic borrowing, the government should promote the development of the domestic debt market, which would also facilitate the conversion of the current non-interest bearing, non-maturing domestic debt into a longer-term security. Depending on the terms at which the government will be able to convert this liability, the debt service could rise substantially and lead to additional borrowing. In light of this, and also to avoid crowding out of the private sector, a fiscal tightening or new external borrowing could become necessary. These considerations would warrant a reassessment of Sierra Leone's risk of debt distress at a later stage.

Table 3. Country: External Debt Sustainability Framework, Baseline Scenario, 2002-2025 1/  
(In percent of GDP, unless otherwise indicated)

	actual	Historical Average 6/	Standard Deviation 6/	Projections										
	2004			2005	2006	2007	2008	2009	2010	2005-10 Average	2015	2025	2011-25 Average	
<b>External debt (nominal) 1/</b>	<b>193.4</b>			<b>170.4</b>	<b>152.3</b>	<b>120.6</b>	<b>106.9</b>	<b>98.2</b>	<b>89.7</b>			<b>61.7</b>	<b>38.4</b>	
o/w public and publicly guaranteed (PPG)	160.6			140.9	126.4	97.6	87.0	80.5	74.3			54.0	37.9	
Change in external debt	27.9			-23.0	-18.0	-31.7	-13.7	-8.7	-8.5			-4.0	-1.4	
Identified net debt-creating flows	-8.8			-14.6	-12.8	-10.1	-8.7	-4.3	-4.4			-0.7	0.0	
<b>Non-interest current account deficit</b>	<b>4.2</b>	<b>7.0</b>	<b>4.9</b>	<b>7.6</b>	<b>5.9</b>	<b>6.4</b>	<b>5.8</b>	<b>4.8</b>	<b>4.5</b>	<b>5.8</b>		<b>4.6</b>	<b>3.9</b>	<b>4.2</b>
Deficit in balance of goods and services	15.6			18.7	16.4	15.5	14.2	13.0	12.4			11.3	11.2	
Exports	22.3			24.0	27.9	28.8	29.0	29.7	30.0			29.8	31.3	
Imports	37.9			42.7	44.3	44.3	43.2	42.7	42.4			41.1	42.5	
Net current transfers (negative = inflow)	-13.6	<b>-5.3</b>	<b>7.4</b>	-12.8	-11.8	-11.0	-10.1	-9.8	-9.4	<b>-10.8</b>		-7.5	-7.4	<b>-7.5</b>
Other current account flows (negative = net inflow)	2.3			1.7	1.3	1.9	1.7	1.6	1.5			0.7	0.0	
<b>Net FDI (negative = inflow)</b>	<b>-1.2</b>	<b>-0.5</b>	<b>0.7</b>	<b>-3.3</b>	<b>-1.4</b>	<b>-1.3</b>	<b>-1.3</b>	<b>-1.3</b>	<b>-1.2</b>	<b>-1.6</b>		<b>-1.3</b>	<b>-2.3</b>	<b>-1.6</b>
<b>Endogenous debt dynamics 2/</b>	<b>-11.9</b>			<b>-18.9</b>	<b>-17.3</b>	<b>-15.2</b>	<b>-13.2</b>	<b>-7.8</b>	<b>-7.7</b>			<b>-4.0</b>	<b>-1.7</b>	
Contribution from nominal interest rate	0.7			0.9	1.0	0.4	0.5	0.5	0.5			0.5	0.5	
Contribution from real GDP growth	-11.3			-12.6	-11.2	-8.9	-6.5	-6.0	-5.9			-3.5	-1.9	
Contribution from price and exchange rate changes	-1.3			-7.2	-7.0	-6.6	-7.2	-2.4	-2.3 #			-0.9	-0.3	
<b>Residual (3-4) 3/</b>	<b>36.7</b>			<b>-8.5</b>	<b>-5.3</b>	<b>-21.6</b>	<b>-5.0</b>	<b>-4.4</b>	<b>-4.1</b>			<b>-3.3</b>	<b>-1.4</b>	
o/w exceptional financing	-3.0			-2.8	-2.1	-2.5	-2.2	-2.0	-1.9			-1.7	-0.8	
NPV of external debt 4/	125.1			117.0	56.8	54.1	49.9	47.6	44.7			33.7	23.2	
<b>In percent of exports</b>	<b>560.6</b>			<b>486.8</b>	<b>204.1</b>	<b>187.5</b>	<b>172.1</b>	<b>160.0</b>	<b>148.9</b>			<b>113.1</b>	<b>74.1</b>	
NPV of PPG external debt	92.3			87.6	30.8	31.0	30.0	29.9	29.2			26.0	22.7	
<b>In percent of exports</b>	<b>413.6</b>			<b>364.3</b>	<b>110.7</b>	<b>107.5</b>	<b>103.6</b>	<b>100.6</b>	<b>97.4</b>			<b>87.2</b>	<b>72.5</b>	
<b>In percent of revenues</b>	<b>748.2</b>			<b>719.2</b>	<b>242.7</b>	<b>235.4</b>	<b>220.6</b>	<b>217.3</b>	<b>208.2</b>			<b>180.9</b>	<b>150.3</b>	
Debt service-to-exports ratio (in percent)	9.9			10.2	8.1	3.4	6.5	7.2	9.0			6.8	7.7	
PPG debt service-to-exports ratio (in percent)	9.4			9.5	6.6	2.2	3.7	4.3	5.7			4.4	5.5	
PPG debt service-to-revenue ratio (in percent)	16.9			18.7	14.4	4.7	7.9	9.3	12.2			9.1	11.4	
Total gross financing need (billions of U.S. dollars)	0.1			0.1	0.1	0.1	0.1	0.1	0.1			0.2	0.2	
Non-interest current account deficit that stabilizes debt ratio	-23.7			30.6	24.0	38.1	19.5	13.5	13.0			8.6	5.3	
<b>Key macroeconomic assumptions</b>														
Real GDP growth (in percent)	7.4	3.8	12.7	7.2	7.4	6.5	6.1	6.1	6.6	6.6		5.8	5.1	5.5
GDP deflator in US dollar terms (change in percent)	0.8	-1.1	11.4	3.9	4.3	4.5	6.4	2.3	2.4	4.0		1.4	0.7	1.2
Effective interest rate (percent) 5/	0.4	1.0	0.5	0.5	0.6	0.3	0.5	0.5	0.6	0.5		0.8	1.4	1.0
Growth of exports of G&S (US dollar terms, in percent)	21.1	3.1	23.4	20.0	29.8	15.2	13.5	11.2	10.2	16.6		7.3	6.1	7.0
Growth of imports of G&S (US dollar terms, in percent)	-0.6	14.2	12.9	25.5	16.2	11.4	9.9	7.4	8.3	13.1		7.5	6.2	6.8
Grant element of new public sector borrowing (in percent)	...	...	...	43.9	39.5	42.7	42.8	45.0	47.5	43.6		47.1	47.0	47.1
<i>Memorandum item:</i>														
Nominal GDP (billions of US dollars)	1.1			1.2	1.3	1.5	1.7	1.8	2.0			2.9	5.3	

Source: Staff simulations.

1/ Includes both public and private sector external debt.

2/ Derived as  $[r - g - \rho(1+g)] / (1+g+\rho+gp)$  times previous period debt ratio, with  $r$  = nominal interest rate;  $g$  = real GDP growth rate, and  $\rho$  = 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/ Includes private sector debt.

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 (1995-2004), subject to data availability.

Table 4. Sierra Leone: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, 2005-25  
(In percent)

	Estimate					Projections									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2020	2025		
<b>NPV of debt-to-GDP ratio</b>															
<b>Baseline</b>	88	31	31	30	30	29	28	28	27	26	26	25	23		
<b>MDRI Scenario</b>	88	16	17	18	19	20	21	21	21	21	21	22	21		
<b>A. Alternative Scenarios</b>															
A1. Key variables at their historical averages in 2006-25 1/	88	35	40	44	48	52	55	58	62	65	69	86	98		
A2. New public sector loans on less favorable terms in 2006-25 2/	88	32	33	32	33	33	34	34	34	34	34	36	35		
<b>B. Bound Tests</b>															
B1. Real GDP growth at historical average minus one standard deviation in 2006-07	88	37	43	42	42	41	40	38	37	37	36	36	32		
B2. Export value growth at historical average minus one standard deviation in 2006-07 3/	88	37	46	43	43	41	40	39	38	36	35	32	27		
B2b: Delay in bauxite and rutile production by two years (starting 2008 instead of 2006)	88	38	48	45	44	42	41	39	38	37	36	32	27		
B3. US dollar GDP deflator at historical average minus one standard deviation in 2006-07	88	36	42	41	40	40	38	37	36	35	35	35	31		
B4. Net non-debt creating flows at historical average minus one standard deviation in 2006-07 4/	88	39	47	45	44	43	41	40	39	38	36	32	27		
B5. Combination of B1-B4 using one-half standard deviation shocks	88	50	79	75	73	71	69	66	64	62	60	52	43		
B6. One-time 30 percent nominal depreciation relative to the baseline in 2006 5/	88	43	43	42	42	41	40	39	38	37	36	36	32		
<b>NPV of debt-to-exports ratio</b>															
<b>Baseline</b>	364	111	107	104	101	97	95	92	90	88	87	82	72		
<b>MDRI Scenario</b>	364	58	61	63	65	67	70	71	72	72	72	72	66		
<b>A. Alternative Scenarios</b>															
A1. Key variables at their historical averages in 2006-25 1/	364	125	140	152	161	172	184	195	207	218	231	278	314		
A2. New public sector loans on less favorable terms in 2006-25 2/	364	113	113	112	111	111	112	112	112	113	114	117	113		
<b>B. Bound Tests</b>															
B1. Real GDP growth at historical average minus one standard deviation in 2006-07	364	111	107	104	101	97	95	92	90	88	87	82	72		
B2. Export value growth at historical average minus one standard deviation in 2006-07 3/	364	215	371	352	338	325	315	305	297	288	280	242	201		
B2b: Delay in bauxite and rutile production by two years (starting 2008 instead of 2006)	364	156	200	168	155	148	142	135	130	125	121	103	86		
B3. US dollar GDP deflator at historical average minus one standard deviation in 2006-07	364	111	107	104	101	97	95	92	90	88	87	82	72		
B4. Net non-debt creating flows at historical average minus one standard deviation in 2006-07 4/	364	142	164	155	149	143	138	134	130	126	122	105	87		
B5. Combination of B1-B4 using one-half standard deviation shocks	364	210	329	310	297	285	275	267	259	250	241	203	165		
B6. One-time 30 percent nominal depreciation relative to the baseline in 2006 5/	364	111	107	104	101	97	95	92	90	88	87	82	72		
<b>Debt service to exports ratio</b>															
<b>Baseline</b>	9	7	2	4	4	6	7	7	6	5	4	4	6		
<b>MDRI Scenario</b>	9	6	1	1	1	2	2	3	4	4	4	4	5		
<b>A. Alternative Scenarios</b>															
A1. Key variables at their historical averages in 2006-25 1/	9	7	3	5	6	9	11	12	11	11	10	13	21		
A2. New public sector loans on less favorable terms in 2006-25 2/	9	7	2	4	5	6	7	6	5	5	5	6	8		
<b>B. Bound Tests</b>															
B1. Real GDP growth at historical average minus one standard deviation in 2006-07	9	7	2	4	4	6	7	7	6	5	4	4	6		
B2. Export value growth at historical average minus one standard deviation in 2006-07 3/	9	11	6	11	12	15	18	17	15	16	16	14	16		
B2-b: Delay in bauxite and rutile production by two years (starting 2008 instead of 2006)	9	8	3	5	6	7	8	8	7	7	7	6	7		
B3. US dollar GDP deflator at historical average minus one standard deviation in 2006-07	9	7	2	4	4	6	7	7	6	5	4	4	6		
B4. Net non-debt creating flows at historical average minus one standard deviation in 2006-07 4/	9	7	3	5	5	7	8	7	6	7	7	6	7		
B5. Combination of B1-B4 using one-half standard deviation shocks	9	9	5	9	10	12	14	14	12	14	14	12	13		
B6. One-time 30 percent nominal depreciation relative to the baseline in 2006 5/	9	7	2	4	4	6	7	7	6	5	4	4	6		
<i>Memorandum item:</i>															
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	45	45	45	45	45	45	45	45	45	45	45	45	45		

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.

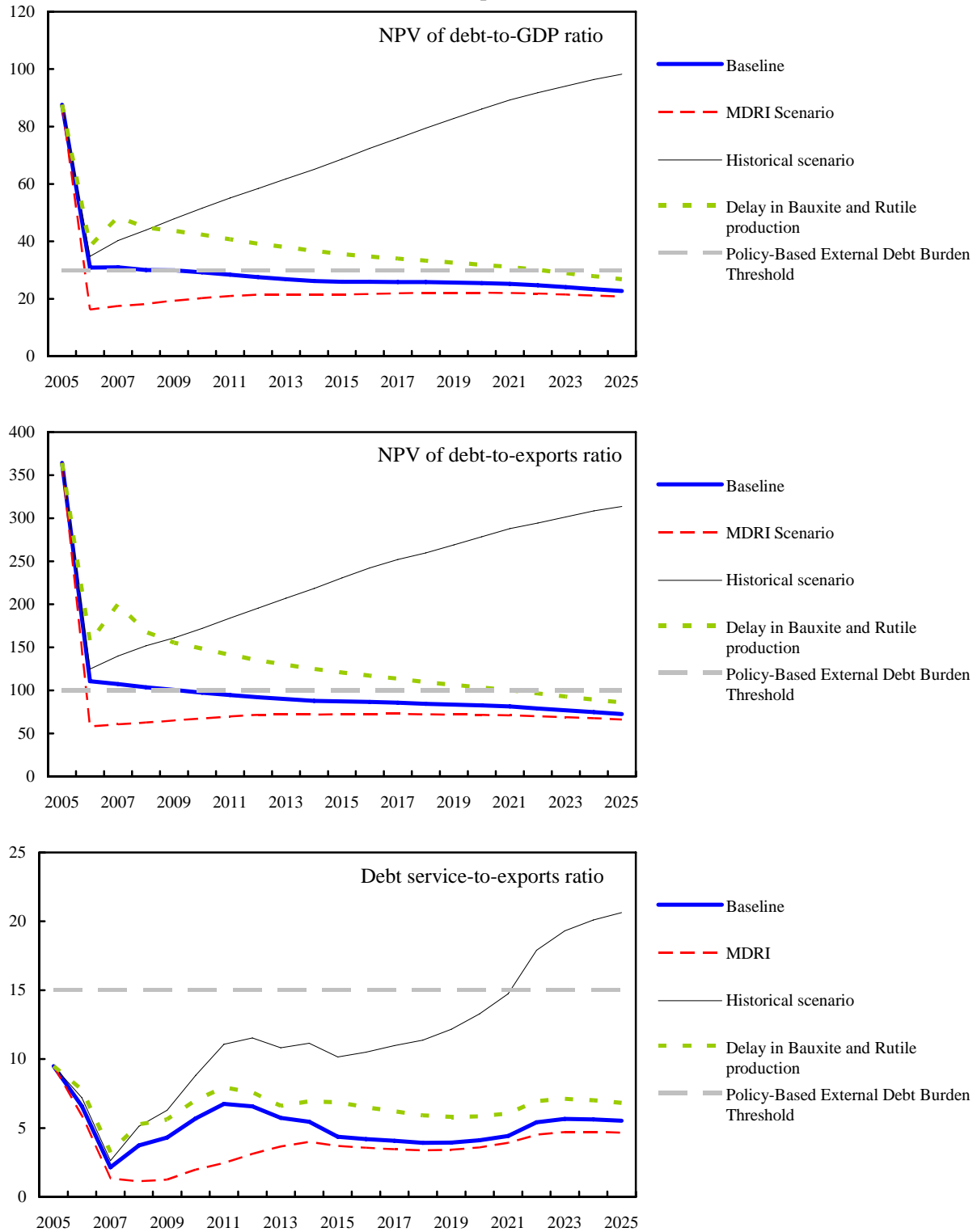
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).

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/ 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.

Figure 1. Sierra Leone: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2005-2025  
(In percent)



Source: IMF and WB Staff projections and simulations.

Table 5. Sierra Leone: Public Sector Debt Sustainability Framework, Baseline Scenario, 2005-2025  
(In percent of GDP, unless otherwise indicated)

	Actual			Estimate						Projections			
	2004	Historical Average 5/	Standard Deviation 5/	2005	2006	2007	2008	2009	2010	2005-10 Average	2015	2025	2011-25 Average
<b>Public sector debt 1/</b>	237.4	222.0	35.4	203.8	182.6	143.4	126.9	111.6	97.1	144.2	65.4	43.8	59.9
o/w foreign-currency denominated	204.7	177.9	30.5	176.2	159.5	123.3	109.3	97.3	86.5	125.3	63.0	39.2	56.6
Change in public sector debt	16.0	13.2	43.4	-33.6	-21.2	-39.2	-16.5	-15.3	-14.5	-23.4	-4.7	-0.9	-3.6
Identified debt-creating flows	-20.8	-20.9	41.5	-29.5	-16.7	-17.7	-11.7	-9.6	-8.1	-15.6	-1.3	0.4	-0.6
Primary deficit	1.2	4.7	1.7	-1.6	1.0	1.4	1.6	1.6	2.0	1.0	2.7	2.0	2.3
Revenue and grants	18.1	14.1	4.3	18.9	18.5	18.3	18.4	18.3	18.4	18.5	18.1	17.9	18.1
of which : grants	5.7	3.3	2.1	6.8	5.8	5.2	4.7	4.6	4.4	5.2	3.7	2.8	3.5
Primary (noninterest) expenditure	19.3	18.9	4.8	17.3	19.5	19.7	19.9	19.9	20.5	19.5	20.7	19.9	20.4
Automatic debt dynamics	-22.0	-25.5	41.4	-27.9	-17.4	-18.6	-12.8	-10.9	-9.8	-16.2	-3.9	-1.6	-2.9
Contribution from interest rate/growth differential	-19.2	-28.3	20.2	-23.0	-16.1	-11.7	-8.1	-7.5	-7.1	-12.2	-4.3	-2.1	-3.6
of which : contribution from average real interest rate	-4.0	-4.9	6.1	-6.9	-2.1	-0.5	0.1	-0.2	-0.2	-1.6	-0.4	0.1	-0.2
of which : contribution from real GDP growth	-15.2	-7.2	25.6	-16.0	-14.0	-11.2	-8.2	-7.3	-6.9	-10.6	-3.8	-2.2	-3.4
Contribution from real exchange rate depreciation	-2.8	2.8	32.9	-4.9	-1.3	-7.0	-4.7	-3.4	-2.7	-4.0	...	...	1.2
Other identified debt-creating flows	0.0	-0.1	0.1	0.0	-0.4	-0.5	-0.5	-0.3	-0.3	-0.3	0.0	0.0	0.0
Privatization receipts (negative)	0.0	-0.1	0.1	0.0	-0.4	-0.5	-0.5	-0.3	-0.3	-0.3	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	0.0	0.0
Debt relief (HIPC and other)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0
Residual, including asset changes	36.7	34.1	30.0	-4.1	-4.5	-21.4	-4.8	-5.7	-6.4	-7.8	-3.4	-1.3	-3.0
<b>NPV of public sector debt</b>	125.0	53.3	29.6	115.2	53.9	51.1	47.6	44.2	39.8	58.6	28.3	27.3	28.8
o/w foreign-currency denominated	92.3	9.2	29.2	87.6	30.8	31.0	30.0	29.9	29.2	39.8	26.0	22.7	25.6
NPV of contingent liabilities (not included in public sector debt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gross financing need 2/	20.6	22.0	9.0	14.1	14.8	14.1	12.9	10.8	9.8	12.8	3.3	6.6	4.3
NPV of public sector debt-to-revenue ratio (in percent)													
Base is Revenues and grants 3/	692.1	415.5	263.7	608.3	291.0	278.9	259.3	241.3	216.1	315.8	157.0	152.1	159.8
Base is Revenues excluding grants (as used in external DSA table)	1013.4	542.9	328.3	946.2	424.3	388.1	349.8	321.5	283.6	452.2	197.5	180.5	198.0
o/w external	..	..	..	719.2	242.7	235.4	220.6	217.3	208.2	307.2	180.9	150.3	175.5
Debt service-to-revenue ratio (in percent) 4/													
Base is Revenues and grants 3/	27.2	49.5	22.5	21.1	19.0	19.3	17.4	10.9	13.3	16.8	10.8	13.9	10.9
Base is Revenues excluding grants (as used in external DSA table)	39.9	64.6	29.3	32.8	27.6	26.9	23.5	14.5	17.5	23.8	13.6	16.5	13.5
Primary deficit that stabilizes the debt-to-GDP ratio 6/	-14.8	7.4	25.3	32.0	22.2	40.6	18.1	16.9	16.5	24.4	7.3	2.9	5.9
<b>Key macroeconomic and fiscal assumptions</b>													
Real GDP growth (in percent)	7.4	3.8	13.2	7.2	7.4	6.5	6.1	6.1	6.6	6.6	5.8	5.1	5.5
Average nominal interest rate on forex debt (in percent)	0.7	0.9	0.5	0.2	0.4	0.5	0.7	0.3	0.5	0.4	0.8	1.3	0.9
Average real effective interest rate on domestic currency debt (in percent) 7/	-4.4	-3.8	10.4	-2.6	3.3	7.7	8.4	8.9	8.7	5.7	11.8	9.1	11.7
Real exchange rate depreciation (in percent, + indicates depreciation)	-1.7	5.2	19.8	-2.6	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	16.0	15.5	12.1	13.3	13.1	8.7	8.0	7.1	6.8	9.5	5.8	5.0	5.5
Growth of real primary spending (deflated by GDP deflator, in percent)	-5.1	7.7	27.9	-3.9	21.4	7.5	7.2	6.1	9.4	7.9	6.4	4.7	5.3
Grant element of new external borrowing (in percent)	0.0	0.0	0.0	43.9	39.5	42.7	42.8	45.0	47.5	43.6	47.1	47.0	...

Sources: Country authorities; and Fund staff estimates and projections.

1/ [Indicate coverage of public sector, e.g., general government or nonfinancial public sector. Also whether net or gross debt is used.]

2/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period.

3/ Revenues including 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 (1995-2004), subject to data availability.

6/ Calculated to show what is required for stabilization at the level of each preceding year.

7/ Inferred from the total stock of domestic debt including non-interest bearing asset in the BSL balance sheet.

Table 6. Sierra Leone: Sensitivity Analysis for Key Indicators of Public Debt 2005-2025

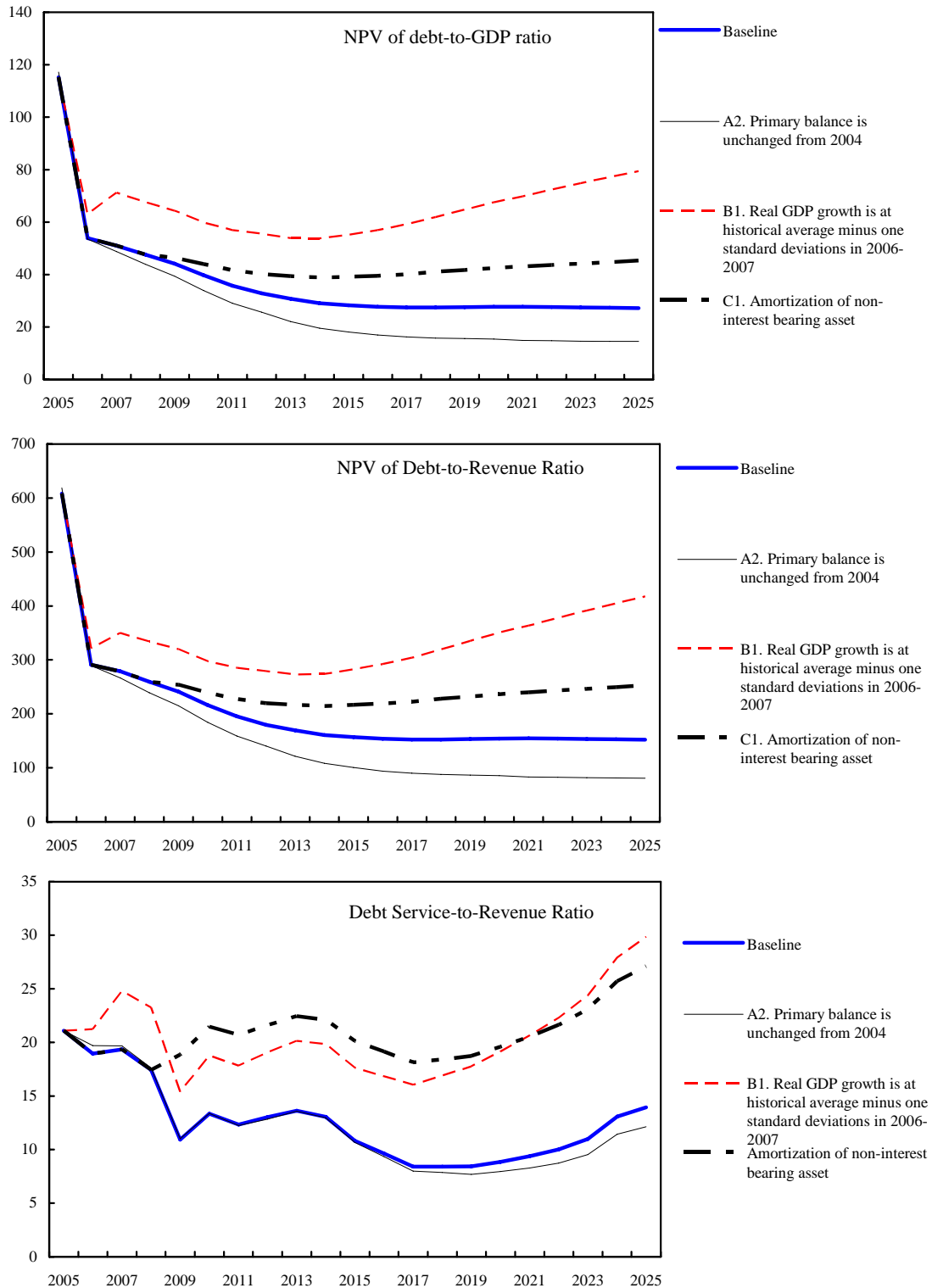
	Estimate		Projections					
	2005	2006	2007	2008	2009	2010	2015	2025
<b>NPV of Debt-to-GDP Ratio</b>								
<b>Baseline</b>	115	54	51	48	44	40	28	27
<b>A. Alternative scenarios</b>								
A1. Real GDP growth and primary balance are at historical averages	115	56	55	52	50	47	39	51
A2. Primary balance is unchanged from 2004	117	54	49	44	39	34	18	15
A3. Permanently lower GDP growth 1/	115	54	51	48	46	42	42	101
<b>B. Bound tests</b>								
B1. Real GDP growth is at historical average minus one standard deviations in 2006-2007	115	63	71	68	64	60	55	79
B2. Primary balance is at historical average minus one standard deviations in 2006-2007	115	55	54	48	43	38	25	25
B3. Combination of B1-B2 using one half standard deviation shocks	115	60	63	55	49	42	23	19
B4. One-time 30 percent real depreciation in 2006	115	67	71	65	60	55	38	35
B5. 10 percent of GDP increase in other debt-creating flows in 2006	115	59	53	48	43	38	25	24
C1. Amortization of non-interest bearing BSL asset.	115	54	51	48	46	44	39	45
<b>NPV of Debt-to-Revenue Ratio 2/</b>								
<b>Baseline</b>	608	291	279	259	241	216	157	152
<b>A. Alternative scenarios</b>								
A1. Real GDP growth and primary balance are at historical averages	608	299	293	278	266	244	206	265
A2. Primary balance is unchanged from 2004	619	289	267	239	215	184	100	81
A3. Permanently lower GDP growth 1/	608	286	273	256	242	222	217	502
<b>B. Bound tests</b>								
B1. Real GDP growth is at historical average minus one standard deviations in 2006-2007	608	322	350	334	320	298	283	418
B2. Primary balance is at historical average minus one standard deviations in 2006-2007	608	299	294	262	237	207	138	138
B3. Combination of B1-B2 using one half standard deviation shocks	608	315	323	286	255	219	124	103
B4. One-time 30 percent real depreciation in 2006	608	363	390	356	330	297	210	193
B5. 10 percent of GDP increase in other debt-creating flows in 2006	608	316	288	259	235	205	136	137
C1. Amortization of non-interest bearing BSL asset.	608	291	279	259	254	239	217	253
<b>Debt Service-to-Revenue Ratio 2/</b>								
<b>Baseline</b>	21	19	19	17	11	13	11	14
<b>A. Alternative scenarios</b>								
A1. Real GDP growth and primary balance are at historical averages	21	19	21	20	13	16	15	24
A2. Primary balance is unchanged from 2004	21	20	20	18	11	13	11	12
A3. Permanently lower GDP growth 1/	21	19	20	19	12	15	15	33
<b>B. Bound tests</b>								
B1. Real GDP growth is at historical average minus one standard deviations in 2006-2007	21	21	25	23	15	19	18	30
B2. Primary balance is at historical average minus one standard deviations in 2006-2007	21	19	20	19	12	14	12	15
B3. Combination of B1-B2 using one half standard deviation shocks	21	20	23	21	13	16	13	15
B4. One-time 30 percent real depreciation in 2006	21	20	21	20	12	15	12	16
B5. 10 percent of GDP increase in other debt-creating flows in 2006	21	19	21	18	12	14	12	15
C1. Amortization of non-interest bearing BSL asset.	21	19	19	17	19	21	20	27

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.

Figure 2. Sierra Leone: Indicators of Public Debt Under Alternative Scenarios, 2005-2025



Source: IMF and WB Staff projections and simulations.