INTERNATIONAL MONETARY FUND

# SIERRA LEONE

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## REQUEST FOR A THREE-YEAR ARRANGEMENT UNDER THE EXTENDED CREDIT FACILITY—DEBT SUSTAINABILITY ANALYSIS

Approved By
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Prepared by the International Monetary Fund and the World Bank.

*Sierra Leone remains at a moderate risk of debt distress. The resumption of iron ore production with related export receipts, the recovery of non-iron ore growth, and an improved fiscal revenue profile have strengthened economic performance. Under the baseline, none of the debt sustainability framework solvency or liquidity ratios breach their respective thresholds on a protracted basis throughout the projection period (2016–36).[1] At the same time, stress tests highlight distinct vulnerabilities to simulated adverse developments in both domestic and international conditions, with substantial breaches in evidence for most debt indicators—these underpinning the assessment of moderate risk. In addition, there remains a substantial down-side risk to the macroeconomic framework underlying this DSA, particularly the revenue and growth projections. The authorities should continue to remain prudent about their borrowing plans and step up efforts to improve revenue mobilization and public financial management.*

[1] Sierra Leone's capacity to monitor debt is adequate. The average CPIA debt policy rating (3a/3b) is 3.5. The World Bank's Country Policy and Institutions Assessment (CPIA) ranks Sierra Leone as a medium performer in terms of the quality of policy and institutions (the annual CPIA in 2013–15 has been stable at 3.27). Thus, the external debt burden thresholds for Sierra Leone are (i) PV of debt-to-GDP ratio: 40 percent; (ii) PV of debt-to-exports ratio: 150 percent; (iii) PV of debt-to-revenue ratio: 250 percent; (iv) debt service-to-exports ratio: 20 percent: and (v) debt service-to-revenue ratio: 20 percent.

# RECENT DEBT DEVELOPMENTS

**1. The stock of public and publicly guaranteed (PPG) external debt amounted to US$1.53 billion at end-2016, and was mostly owed to multilateral creditors**. It increased from 21.3 percent of GDP at end-2013 to 41.3 percent of GDP at end-2016, mainly due to debt contracted for post-Ebola recovery and infrastructure construction need. Multilateral creditors account for the largest share, about 85 percent, of public and publicly guaranteed external debt; and debt to commercial creditors, estimated at US$195 million (15 percent of total external debt) as of end 2016, mostly consists of arrears accumulated prior to and during the civil conflict. In July 2016, the government of Sierra Leone (GOSL) assumed responsibility for a debt of US$12 million obligation owed to Securiport, an airport security management company.[1] GOSL has paid $3 million in August 2016 and converted about $7.5 million to domestic debt. The authorities are in negotiation with Securiport to reschedule the remaining $1.5 million that should have been paid in January. On the legacy civil conflict-related arrears, the authorities have already entered into a collaborative process with creditors, and are leveraging World Bank technical assistance to help clear them. The company Securiport has agreed to rescheduling and the details are being worked out. Staff assesses that the authorities are making good-faith efforts to resolve the issue of private external arrears.

**2. Domestic debt amounted to 14.6 percent of GDP at end-2016, which is about 26.2 percent of total public and publicly guaranteed debt**. The ratio of domestic debt in relation to total debt has been generally stable in recent years, with the portfolio concentrating in treasury securities, which accounts for about 10 percent of total domestic debt at end–2016.[2] The remaining domestic debt is comprised of the Government's overdraft facility at the Bank of Sierra Leone (BSL), verified domestic payments arrears, and non-negotiable, non-interest bearing securities held by the BSL. The fiscal deficit in 2016 was estimated to be 3.1 percent of GDP higher than projected in the 6th Review of the previous Extended Credit Facility (ECF). This additional deficit was financed by increased borrowing from the BSL via secondary market purchases, and the government's forced financing via domestic arrears in the form of unpaid checks worth 1.9 percent of GDP.

# KEY ASSUMPTIONS UNDER THE BASELINE SCENARIO[3]

**3. The macroeconomic outlook is expected to improve gradually (Text Table 1)**. Overall growth in 2016 was 6.1 percent, better than projected previously in EBS/16/119. Non-iron ore growth is estimated to have been 4.3 percent in 2016, mostly led by better-than-expected outturns for tourism, services, and commerce. Iron ore growth is also recovering, with the main company

[1] The original contract signed by GOSL with Securiport in March 2012 only required GOSL to pass a directive requiring airlines operating at the international airport to collect a fee from passengers which would cover the costs of services provided by Securiport, and did not create a debt obligation for the government. However, the inability of the line ministry to enforce fee collection by the airlines led to the accumulation of arrears to Securiport. For details, see the Letter of Intent for the 6th Review of the previous ECF, Country Report 16/378.

[2] 2016 data are estimates based on best information available as of the time of this DSA.

[3] All percentage figures are expressed as a share of GDP.

operating with moderate profit. Both real GDP growth and non-iron ore GDP growth are expected to gradually increase to above 7 percent over the medium term. Strong revenue mobilization measures are expected to increase revenue to GDP ratios over the 2017–19 ECF program period and beyond. Nevertheless, the primary deficit is projected to deteriorate in 2017 relative to the previous estimate, mostly due to a faster speed of capital project implementation and additional spending since the second half of 2016. External public and publicly guaranteed debt (PPG) as a share of GDP is higher than in the July 2016 update due to the contracting of a few debts for infrastructure projects, expected IMF loans, and the impact of the further depreciated exchange rate.[4] External debt in dollar terms is expected to peak in 2017 and gradually decline from then onwards, helped by a lower current account deficit and stronger FDI inflows. However, the possibility of continued depreciation could mean a slower improvement in the debt to GDP ratio.

**4. The baseline macroeconomic assumptions underlying this DSA update are**:

- Economic growth is expected to average about 6½ percent during 2017–21, driven largely by the non-iron ore sectors. Increased government spending on capital projects will carry a direct boost to growth, with a multiplier effect across sectors, including agriculture, energy, transportation, and construction. Higher social spending will also help support demand and aid the ongoing post-Ebola recovery. Iron ore production is expected to continue its recovery. The main iron ore company has reduced its production costs and expects to increase output. The mining of diamonds and rutile, which accounts for almost half of mineral exports, is projected to increase steadily in the next few years. Over the longer term, growth is expected to stabilize around 7 percent, supported by stepped up efforts aimed at economic diversification and to improving the business environment, which is a key pillar of the new ECF arrangement.

- Inflation is projected to decline gradually over the medium term and stabilize at about 5 percent in the long term under strengthened monetary policy framework.

- The spending pressures that emerged in late 2016 resulted in a projected 2017 primary fiscal deficit of 4 percent of GDP,[5] relative to 2.6 percent forecast in EBS/16/119. The new ECF program targets a reduction in the domestic primary balance of about one and a half percent of GDP by the end of the program period. The primary deficit will continue to improve over the long term, decreasing to about 2 percent by 2021. It is forecast to ease further in the long term, as a result of strengthened revenue mobilization measures and rationalization of public expenditures.

- The current account deficit is projected to decline from about 21 percent in 2017 to about 18.7 percent at the end of the program, and continue declining over the medium to

[4] Additional external debt, together with the last disbursement of IMF loans and currency depreciation, has resulted in the nominal value of external debt in 2016 to increase from 34.2 percent of GDP in the previous DSA to about 41.3 percent of GDP in the current DSA.

[5] Including grants.

long term. This path is consistent with the projected increase in imports and exports, with the former driven by higher development needs for capital investment and social projects, and the latter driven by higher mineral exports in the near to medium term and higher agricultural exports in the long term, and the. In the long term, projected current account dynamics reflect the expected overall real GDP growth and improved economic diversification that contributes to a smaller current account deficit.

- FDI is estimated to increase significantly from 6 percent of GDP in 2015 to around 13½ percent in 2016 as most FDI projects halted during Ebola are expected to restart. FDI is projected to remain at about 15 percent in the medium term given the investment plans laid out by the mineral companies and agricultural businesses.

- External debt is projected to increase modestly from 41.3 percent of GDP in 2016 to 45.5 percent in 2017. External debt will still stabilize at around 31 percent of GDP in the long run. This assumes the authorities use 90 percent of the US$140 million debt ceiling (in NPV terms) as specified in the program conditionality, which is consistent with the authorities' borrowing practice during the previous ECF program.

- Domestic debt is projected to rise from 12.6 percent of GDP in 2015, to around 13.7 percent by 2021, mainly reflecting increased domestic borrowing to finance public investment. It will then decline to about 5 percent of GDP in the long term.

**Text Table 1. Selected Economic Indicators, 2015–36**

(Percent of GDP, unless otherwise indicated)[1]

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Long term 2/ |
|---|---|---|---|---|---|---|---|---|
| Real GDP growth (in percent) | | | | | | | | |
| Current DSA | -20.5 | 6.1 | 6.0 | 6.1 | 6.8 | 6.8 | 7.1 | 6.1 |
| Previous DSA | -21.1 | 4.3 | 5.0 | 5.8 | 6.2 | 6.6 | 6.5 | 5.4 |
| Primary fiscal deficit | | | | | | | | |
| Current DSA | 3.9 | 7.2 | 3.9 | 2.6 | 2.0 | 2.0 | 2.0 | 1.0 |
| Previous DSA | 3.8 | 3.6 | 1.7 | 1.3 | 1.3 | 1.4 | 1.5 | 0.9 |
| Central government revenue | | | | | | | | |
| Current DSA | 10.8 | 12.1 | 12.7 | 14.0 | 15.1 | 15.8 | 16.0 | 18.0 |
| Previous DSA | 10.4 | 10.6 | 11.7 | 12.2 | 12.8 | 13.4 | 13.8 | 16.7 |
| Current account deficit | | | | | | | | |
| Current DSA | 17.4 | 19.5 | 20.9 | 18.2 | 18.4 | 18.4 | 17.1 | 11.0 |
| Previous DSA | 15.5 | 16.0 | 15.3 | 14.8 | 14.7 | 14.0 | 14.2 | 8.0 |
| Foreign direct investment | | | | | | | | |
| Current DSA | 6.2 | 13.4 | 14.6 | 14.6 | 15.6 | 15.6 | 14.9 | 8.1 |
| Previous DSA | 6.0 | 12.1 | 12.6 | 12.6 | 12.7 | 12.9 | 13.1 | 8.3 |
| External debt | | | | | | | | |
| Current DSA | 32.7 | 41.3 | 46.0 | 47.4 | 48.3 | 48.4 | 47.5 | 30.6 |
| Previous DSA | 31.6 | 34.2 | 32.9 | 31.5 | 30.2 | 28.7 | 27.0 | 21.0 |
| Domestic debt | | | | | | | | |
| Current DSA | 12.6 | 14.6 | 13.2 | 13.3 | 13.6 | 13.7 | 13.7 | 5.1 |
| Previous DSA | 12.2 | 14.0 | 14.4 | 14.3 | 14.4 | 14.4 | 14.6 | 8.7 |

Sources: the Sierra Leone authorities, and IMF staff projections.

1/ GDP includes iron ore activity.

2/ The long term covers the period from 2022 to 2036.

# EXTERNAL AND PUBLIC DEBT SUSTAINABILITY

## A. External Debt Sustainability Analysis

**5. The external DSA indicates that Sierra Leone's debt sustainability remains at moderate risk of debt distress in the baseline scenario**. The dynamics of external debt accumulation are similar to the July 2016 update. The resumption of iron ore production in 2016 and associated export revenues have improved the PV of debt-to-exports and debt service-to-exports ratios. Both indicators remain well below their respective policy-dependent indicative thresholds throughout the projection period (2016–36) (Figure 1).

**6. Indicators related to fiscal revenue have moved closer to the thresholds**. A combination of factors, including additional external borrowing in late 2016, planned new loans to be contracted in 2017, and a more depreciated exchange rate, have all contributed to an increase of the PV of debt-to-revenue and debt service-to-revenue ratios. The former indicator will reach the threshold in 2017. This breach, which is marginal, is temporary and largely attributable to the subdued revenue to GDP ratio caused by the twin external shocks.[6] The debt and debt service indicators are projected to decline steadily and stabilize in the medium term. However, there remains a substantial downside risk, particularly related to revenue and GDP growth projections.

**7. A downside scenario is constructed to illustrate the impact of lower revenue and growth rate on debt sustainability (Text Table 2)**. In the downside scenario that the risk of policy slippage materializes, government revenue not only fails to strengthen but rather remains at about 12 percent of GDP, as the level in 2016 when the revenue collection was weak. Additionally, the economy grows at a much lower speed—about 1.5 percentage points below the baseline growth rates throughout the program period—mainly through the channel of much lower public investment. Other assumptions remain unchanged. These two assumptions are chosen due to their stronger impact on Sierra Leone's debt sustainability than other economic variables, and the magnitude of adjustment is calibrated to create a severe downside scenario using historical values as reference. The results show that the PV of debt-to-revenue ratio deteriorates substantially in 2017 and stays above the threshold over the medium term. The downside scenario clearly points to a risk of external debt distress (Figure 2).

[6] The iron ore export collapse and the Ebola Virus Disease (EVD) epidemic since mid-2014 until about 2016.

**Text Table 2. Key Assumptions in Downside scenario, 2017–19**

| | | 2017 | 2018 | 2019 |
|---|---|---|---|---|
| Government revenues excluding grants in percent of GDP | | | | |
| | Baseline scenario | 12.7% | 14.0% | 15.1% |
| | Downside scenario | 12.0% | 12.0% | 12.6% |
| Real GDP growth | | | | |
| | Baseline scenario | 6.0% | 6.1% | 6.8% |
| | Downside scenario | 4.3% | 4.5% | 5.5% |

Sources: the Sierra Leone authorities, and IMF staff projections.

8. **Continued fiscal and borrowing prudence is warranted**. The current rating of the risk of debt distress hinges on the continuation of iron ore-related exports and the realization of fiscal revenue measures envisaged for the new program. Any remaining borrowing room should be used wisely to support development strategy while preserving debt sustainability. Finally, even with this improvement in the debt dynamics, it will be imprudent to contract debt—even concessional debt—for the construction of Mamamah Airport, given the size of the project.

9. **The external DSA shows that the debt outlook remains vulnerable to adverse shocks to several macroeconomic variables, underscoring the assessment of moderate risk**. Shocks from stress tests which simulate lower exports, nominal currency depreciation, and a combination of shocks could lead to significant breaches of several thresholds in the short to medium run on a protracted basis. Despite all stress-test ratios eventually falling below thresholds in the longer run, the realization of an adverse shock could lead to high risk of debt distress.

## B. Public Debt Sustainability Analysis

10. **The public DSA shows similar debt dynamics to the external DSA**. Domestic debt is projected to increase only marginally from 13.2 percent of GDP in 2017 to 13.7 percent by 2021, which reflects some additional domestic borrowing to finance public investment but this borrowing space is constrained due to limited liquidity in domestic banks. In the baseline scenario, the PV of the debt-to-GDP ratio is below the threshold, and the PV of debt to revenue ratio declines over the medium to long run from their peak in 2016. This is largely driven by improved revenue and GDP profiles. The debt service-to-revenue ratio remains above 25 percent until 2025, as nearly all external debt is publicly-owned and large repayments come due during this time (Figure 3).

11. **In the alternative scenarios, most ratios are projected to continue to fall in the long run**. If all macroeconomic variables remained at their historic averages, the sustainability of public debt would improve significantly by the end of the forecast horizon. However, should the primary fiscal balance as a share of GDP be kept constant at 2016 level, all three ratios will be higher than in the baseline. Finally, in cases of the PV of debt-to-GDP and debt service-to-revenue ratios, a growth

shock generates the largest impact on these two indicators and the realization of such a shock could lead to high risk of debt distress.[7]

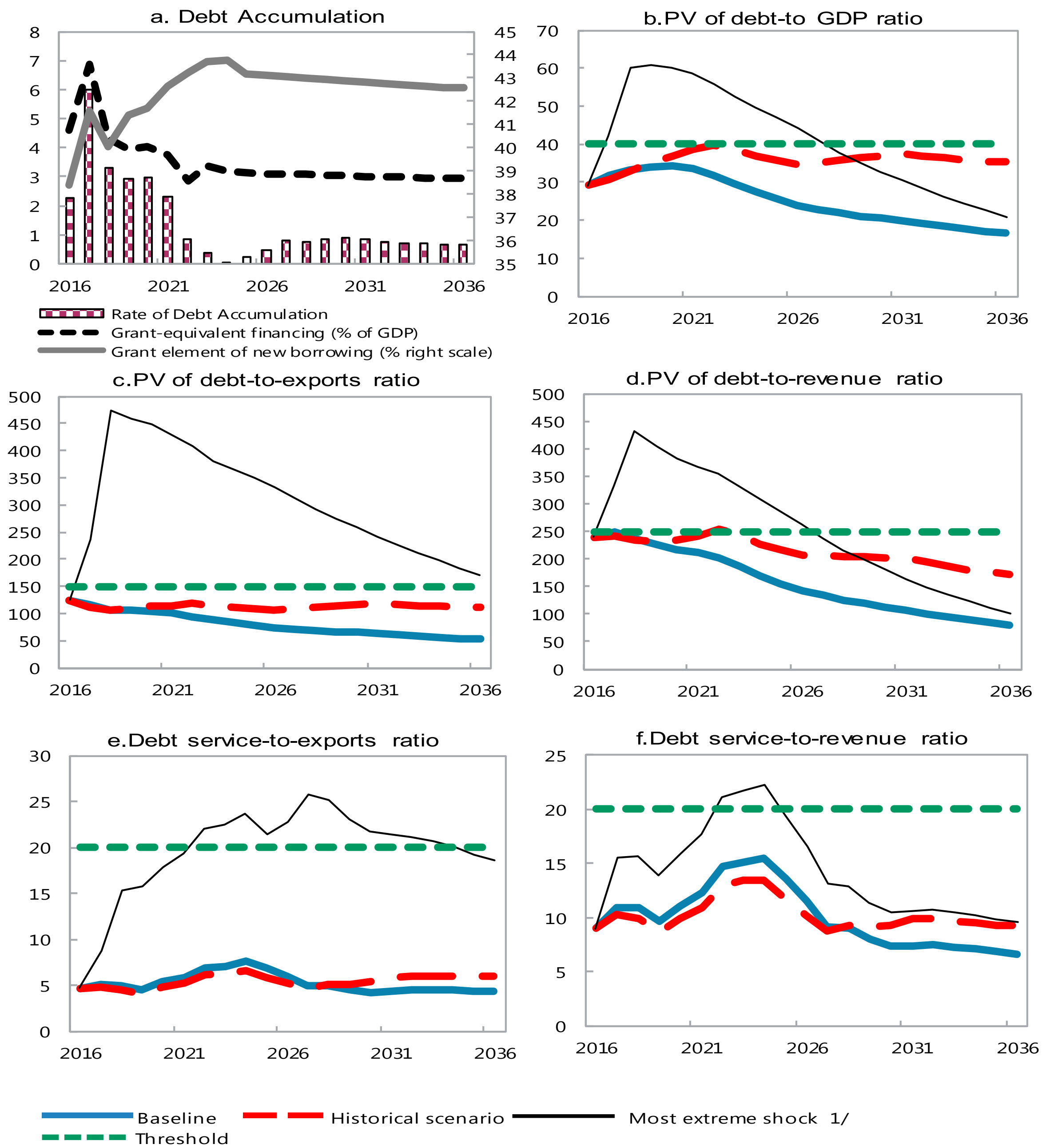
**12. Authorities' view**. The authorities concur with the staff assessment. They recognize the need to maintain prudent borrowing policy and continue improving debt management capacity. They plan to use Sierra Leone's limited borrowing space for high-priority infrastructure and social projects as determined by their structured prioritization plan, and noted that they would seek alternative, non-debt creating arrangements for the construction of Mamamah Airport.

# CONCLUSION

**13. Given the moderate risk of debt distress, the authorities should remain prudent in their borrowing policies**. The macroeconomic outlook, though improving, hinges on the implementation of sound policies in the program period and ahead. In addition, the economic diversification strategy will take time to yield fruits. Therefore, staff reiterates the need for prudent borrowing policies grounded in sound debt management practices, continued revenue enhancement and expenditure rationalization, sustained efforts to improve public financial management, continued implementation of growth-enhancing structural reforms, and promotion of economic diversification.

[7] The growth shock is defined as setting the real growth rates in 2017 and 2018 to be at the historical average minus one standard deviation of the growth rate over the same historical time period (2006–15).

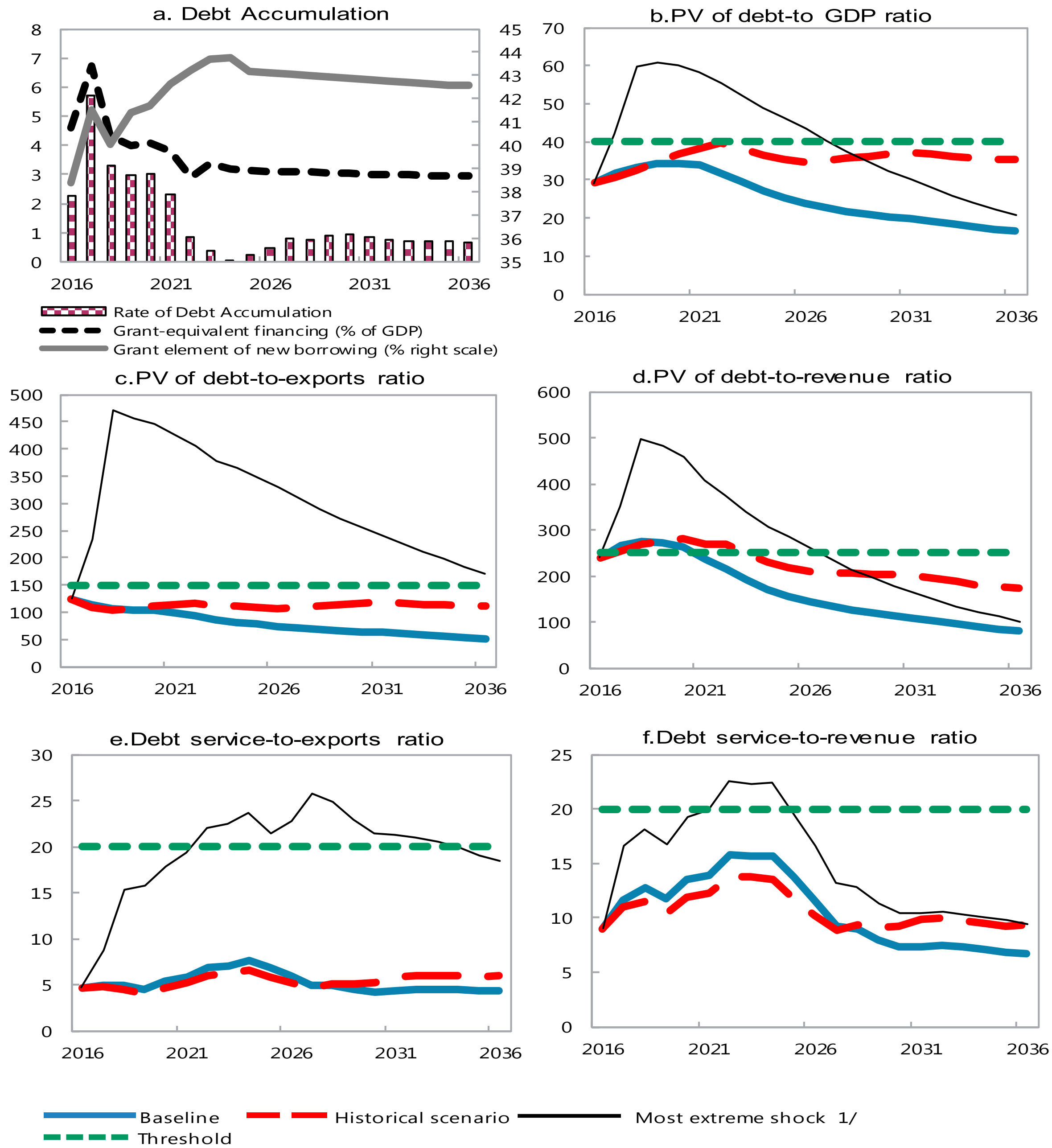
**Figure 1. Sierra Leone: Indicators of Public and Publicly Guaranteed External Debt: Baseline Scenarios, 2016–36[1]**




Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio on or before 2026. In figure b. it corresponds to a Combination shock; in c. to a Exports shock; in d. to a Combination shock; in e. to a Exports shock and in figure f. to a One-time depreciation shock

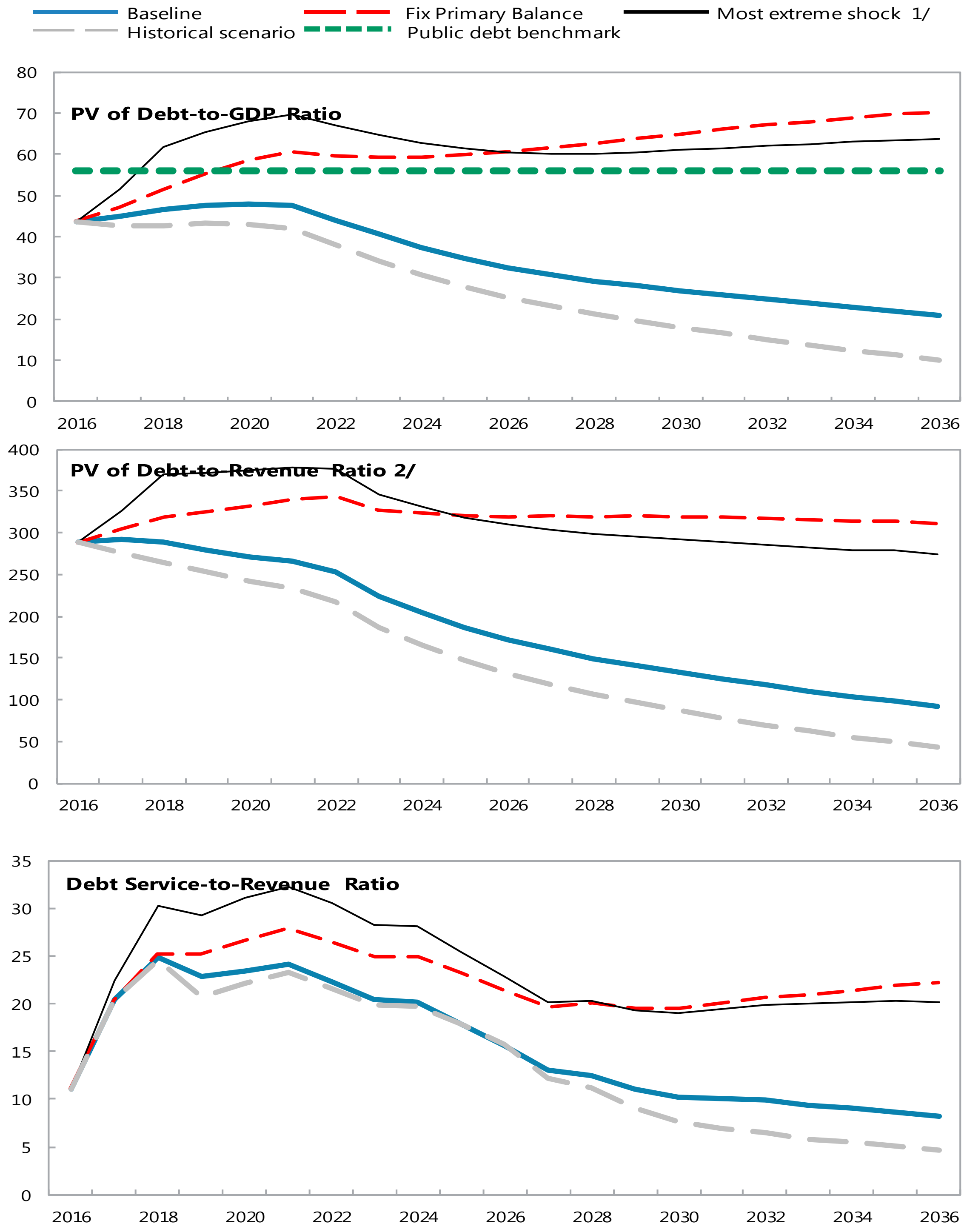
## Figure 2. Sierra Leone: Indicators of Public and Publicly Guaranteed External Debt: Downside Scenarios, 2016–36[1]




Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio on or before 2026. In figure b. it corresponds to a Combination shock; in c. to a Exports shock; in d. to a Combination shock; in e. to a Exports shock and in figure f. to a One-time depreciation shock

**Figure 3. Sierra Leone: Indicators of Public Debt: Baseline Scenarios, 2016–36[1]**




Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio on or before 2026.

2/ Revenues are defined inclusive of grants.

## Table 1. Sierra Leone: External Debt Sustainability Framework, Baseline Scenario, 2013–36[1]

(Percent of GDP, unless otherwise indicated)

| | Actual | | | Historical [6/] | Standard [6/] | Projections | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Average | Deviation | | | | | | | 2016-2021 | | | 2022-2036 |
| | 2013 | 2014 | 2015 | | | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Average | 2026 | 2036 | Average |
| **External debt (nominal) 1/** | **21.3** | **24.6** | **32.7** | | | **41.3** | **46.0** | **47.4** | **48.3** | **48.4** | **47.5** | | **33.2** | **22.9** | |
| *of which: public and publicly guaranteed (PPG)* | 21.3 | 24.6 | 32.7 | | | 41.3 | 46.0 | 47.4 | 48.3 | 48.4 | 47.5 | | 33.2 | 22.9 | |
| Change in external debt | -4.8 | 3.3 | 8.0 | | | 8.6 | 4.8 | 1.4 | 0.9 | 0.1 | -0.9 | | -2.2 | -0.7 | |
| Identified net debt-creating flows | 4.2 | 10.1 | 15.7 | | | 4.1 | 4.1 | 1.2 | 0.1 | 0.0 | -0.6 | | 2.5 | 1.6 | |
| **Non-interest current account deficit** | **17.5** | **18.2** | **17.4** | **17.1** | **13.1** | **19.5** | **20.9** | **18.2** | **18.4** | **18.4** | **17.1** | | **13.5** | **7.9** | 11.0 |
| Deficit in balance of goods and services | 10.3 | 27.3 | 26.0 | | | 25.5 | 24.2 | 22.7 | 22.4 | 22.1 | 20.6 | | 13.3 | 7.8 | |
| Exports | 35.9 | 30.2 | 17.8 | | | 23.3 | 27.7 | 30.9 | 32.3 | 32.9 | 33.6 | | 32.5 | 31.8 | |
| Imports | 46.2 | 57.4 | 43.8 | | | 48.8 | 51.9 | 53.6 | 54.7 | 55.0 | 54.2 | | 45.8 | 39.6 | |
| Net current transfers (negative = inflow) | -4.1 | -16.6 | -11.2 | -7.5 | 3.9 | -9.0 | -7.1 | -7.2 | -5.9 | -5.8 | -5.6 | | -4.8 | -3.9 | -4.5 |
| *of which: official* | -1.0 | -14.0 | -8.2 | | | -5.6 | -3.6 | -3.8 | -2.5 | -2.4 | -2.3 | | -1.8 | -1.2 | |
| Other current account flows (negative = net inflow) | 11.3 | 7.5 | 2.6 | | | 3.0 | 3.8 | 2.7 | 1.9 | 2.0 | 2.1 | | 5.1 | 4.0 | |
| **Net FDI (negative = inflow)** | **-7.3** | **-7.7** | **-6.2** | **-10.1** | **10.4** | **-13.4** | **-14.6** | **-14.6** | **-15.6** | **-15.6** | **-14.9** | | **-9.4** | **-5.3** | -8.1 |
| **Endogenous debt dynamics 2/** | **-5.9** | **-0.4** | **4.4** | | | **-2.0** | **-2.1** | **-2.4** | **-2.7** | **-2.7** | **-2.8** | | **-1.7** | **-1.0** | |
| Contribution from nominal interest rate | 0.0 | 0.0 | 0.0 | | | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | | 0.3 | 0.3 | |
| Contribution from real GDP growth | -4.2 | -1.0 | 5.9 | | | -2.3 | -2.4 | -2.7 | -3.0 | -3.0 | -3.2 | | -2.0 | -1.3 | |
| Contribution from price and exchange rate changes | -1.7 | 0.6 | -1.6 | | | ... | ... | ... | ... | ... | ... | | ... | ... | |
| **Residual (3-4) 3/** | **-9.0** | **-6.8** | **-7.6** | | | **4.6** | **0.6** | **0.2** | **0.8** | **0.1** | **-0.4** | | **-4.6** | **-2.3** | |
| *of which: exceptional financing* | 0.0 | 0.0 | -0.7 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| PV of external debt 4/ | ... | ... | 22.6 | | | 29.0 | 31.9 | 33.1 | 34.1 | 34.3 | 33.7 | | 24.0 | 16.5 | |
| In percent of exports | ... | ... | 127.2 | | | 124.9 | 114.9 | 107.0 | 105.4 | 104.4 | 100.4 | | 73.8 | 51.8 | |
| **PV of PPG external debt** | **...** | **...** | **22.6** | | | **29.0** | **31.9** | **33.1** | **34.1** | **34.3** | **33.7** | | **24.0** | **16.5** | |
| **In percent of exports** | **...** | **...** | **127.2** | | | **124.9** | **114.9** | **107.0** | **105.4** | **104.4** | **100.4** | | **73.8** | **51.8** | |
| **In percent of government revenues** | **...** | **...** | **209.8** | | | **239.8** | **249.9** | **237.3** | **226.0** | **217.4** | **210.6** | | **142.7** | **79.9** | |
| **Debt service-to-exports ratio (in percent)** | **0.0** | **0.0** | **0.0** | | | **4.7** | **5.0** | **4.9** | **4.5** | **5.3** | **5.9** | | **6.0** | **4.3** | |
| **PPG debt service-to-exports ratio (in percent)** | **0.0** | **0.0** | **0.0** | | | **4.7** | **5.0** | **4.9** | **4.5** | **5.3** | **5.9** | | **6.0** | **4.3** | |
| **PPG debt service-to-revenue ratio (in percent)** | **0.0** | **0.0** | **0.0** | | | **9.0** | **10.9** | **10.9** | **9.7** | **11.1** | **12.4** | | **11.6** | **6.7** | |
| Total gross financing need (Billions of U.S. dollars) | 0.5 | 0.5 | 0.5 | | | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | | 0.5 | 0.7 | |
| Non-interest current account deficit that stabilizes debt ratio | 22.3 | 14.9 | 9.4 | | | 10.9 | 16.1 | 16.8 | 17.5 | 18.2 | 18.1 | | 15.7 | 8.6 | |
| **Key macroeconomic assumptions** | | | | | | | | | | | | | | | |
| Real GDP growth (in percent) | 20.7 | 4.6 | -20.5 | 5.2 | 10.6 | 6.1 | 6.0 | 6.1 | 6.8 | 6.8 | 7.1 | 6.5 | 6.0 | 5.9 | 6.1 |
| GDP deflator in US dollar terms (change in percent) | 7.1 | -2.6 | 6.8 | 5.1 | 5.8 | -17.6 | -1.1 | -0.6 | -0.8 | 1.2 | 1.3 | -2.9 | 1.8 | 1.8 | 1.8 |
| Effective interest rate (percent) 5/ | 0.0 | 0.0 | 0.0 | 0.5 | 0.4 | 0.7 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 0.7 | 1.0 | 1.2 | 1.0 |
| Growth of exports of G&S (US dollar terms, in percent) | 43.7 | -14.5 | -49.9 | 17.5 | 46.1 | 14.1 | 25.0 | 17.8 | 10.6 | 9.9 | 10.9 | 14.7 | 7.1 | 8.1 | 7.6 |
| Growth of imports of G&S (US dollar terms, in percent) | -8.9 | 26.7 | -35.2 | 21.0 | 40.7 | -2.7 | 11.6 | 9.0 | 8.1 | 8.6 | 7.0 | 6.9 | 4.9 | 7.0 | 5.7 |
| Grant element of new public sector borrowing (in percent) | ... | ... | ... | ... | ... | 38.4 | 41.6 | 40.1 | 41.4 | 41.7 | 42.6 | 40.9 | 43.1 | 42.6 | 43.0 |
| Government revenues (excluding grants, in percent of GDP) | 10.7 | 9.8 | 10.8 | | | 12.1 | 12.7 | 14.0 | 15.1 | 15.8 | 16.0 | | 16.8 | 20.6 | 18.0 |
| Aid flows (in Billions of US dollars) 7/ | 0.2 | 0.3 | 0.5 | | | 0.2 | 0.4 | 0.2 | 0.2 | 0.3 | 0.3 | | 0.3 | 0.6 | |
| *of which: Grants* | 0.1 | 0.2 | 0.2 | | | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | 0.2 | 0.3 | |
| *of which: Concessional loans* | 0.1 | 0.1 | 0.2 | | | 0.1 | 0.3 | 0.1 | 0.1 | 0.2 | 0.2 | | 0.1 | 0.3 | |
| Grant-equivalent financing (in percent of GDP) 8/ | ... | ... | ... | | | 4.6 | 6.9 | 4.3 | 3.9 | 4.0 | 3.8 | | 3.1 | 2.9 | 3.0 |
| Grant-equivalent financing (in percent of external financing) 8/ | ... | ... | ... | | | 64.8 | 54.0 | 57.3 | 59.1 | 57.4 | 59.5 | | 71.7 | 70.7 | 70.9 |
| *Memorandum items:* | | | | | | | | | | | | | | | |
| Nominal GDP (Billions of US dollars) | 4.9 | 5.0 | 4.3 | | | 3.7 | 3.9 | 4.1 | 4.4 | 4.7 | 5.1 | | 7.6 | 16.1 | |
| Nominal dollar GDP growth | 29.3 | 1.9 | -15.1 | | | -12.6 | 4.9 | 5.5 | 5.9 | 8.1 | 8.5 | 3.4 | 8.0 | 7.8 | 8.0 |
| PV of PPG external debt (in Billions of US dollars) | | | 0.9 | | | 1.0 | 1.2 | 1.3 | 1.4 | 1.6 | 1.7 | | 1.8 | 2.6 | |
| (PVt-PVt-1)/GDPt-1 (in percent) | | | | | | 2.3 | 6.0 | 3.3 | 2.9 | 3.0 | 2.3 | 3.3 | 0.5 | 0.7 | 0.6 |
| Gross workers' remittances (Billions of US dollars) | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | | 0.1 | 0.1 | |
| PV of PPG external debt (in percent of GDP + remittances) | ... | ... | 22.4 | | | 28.7 | 31.5 | 32.7 | 33.7 | 33.9 | 33.4 | | 23.8 | 16.4 | |
| PV of PPG external debt (in percent of exports + remittances) | ... | ... | 120.2 | | | 118.9 | 110.2 | 103.1 | 101.9 | 101.2 | 97.6 | | 72.2 | 51.1 | |
| Debt service of PPG external debt (in percent of exports + remittanc | ... | ... | 0.0 | | | 4.5 | 4.8 | 4.7 | 4.4 | 5.2 | 5.7 | | 5.9 | 4.3 | |

Sources: Country authorities; and staff estimates and projections.

1/ Includes both public and private sector external debt.

2/ Derived as [r - g - ρ(1+g)]/(1+g+ρ+gρ) times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and ρ = growth rate of GDP deflator in U.S. dollar terms.

3/ Includes exceptional financing (i.e., changes in arrears and debt relief); changes in gross foreign assets; and valuation adjustments. For projections also includes contribution from price and exchange rate changes.

4/ Assumes that PV of private sector debt is equivalent to its face value.

5/ Current-year interest payments divided by previous period debt stock.

6/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

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

8/ Grant-equivalent financing includes grants provided directly to the government and through new borrowing (difference between the face value and the PV of new debt).

## Table 2. Sierra Leone: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt: Baseline Scenario, 2016–36

(Percent)

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | **2026** | 2036 |
| **PV of debt-to GDP ratio** | | | | | | | | |
| **Baseline** | 29 | 32 | 33 | 34 | 34 | 34 | **24** | 16 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 29 | 31 | 33 | 35 | 37 | 39 | **35** | 35 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 29 | 33 | 35 | 37 | 38 | 39 | **31** | 25 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 29 | 34 | 40 | 41 | 42 | 41 | **30** | 20 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 29 | 37 | 51 | 51 | 51 | 50 | **37** | 19 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 29 | 30 | 32 | 33 | 33 | 33 | **23** | 16 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 29 | 41 | 53 | 54 | 54 | 52 | **39** | 19 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 29 | 42 | 60 | 61 | 60 | 59 | **44** | 21 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 29 | 44 | 46 | 47 | 48 | 47 | **34** | 23 |
| **PV of debt-to-exports ratio** | | | | | | | | |
| **Baseline** | 125 | 115 | 107 | 105 | 104 | 100 | **74** | 52 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 125 | 111 | 106 | 108 | 113 | 115 | **107** | 111 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 125 | 117 | 113 | 114 | 116 | 115 | **95** | 79 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 125 | 110 | 103 | 102 | 101 | 97 | **72** | 51 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 125 | 236 | 472 | 459 | 448 | 428 | **332** | 171 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 125 | 110 | 103 | 102 | 101 | 97 | **72** | 51 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 125 | 149 | 173 | 168 | 163 | 156 | **121** | 60 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 125 | 196 | 302 | 293 | 285 | 272 | **212** | 102 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 125 | 110 | 103 | 102 | 101 | 97 | **72** | 51 |
| **PV of debt-to-revenue ratio** | | | | | | | | |
| **Baseline** | 240 | 250 | 237 | 226 | 217 | 211 | **143** | 80 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 240 | 242 | 235 | 232 | 234 | 241 | **207** | 172 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 240 | 255 | 251 | 245 | 242 | 241 | **184** | 121 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 240 | 267 | 288 | 274 | 265 | 257 | **176** | 99 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 240 | 293 | 363 | 341 | 324 | 311 | **222** | 92 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 240 | 237 | 228 | 218 | 210 | 204 | **140** | 78 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 240 | 323 | 383 | 359 | 340 | 327 | **234** | 93 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 240 | 331 | 431 | 403 | 381 | 366 | **263** | 101 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 240 | 342 | 329 | 314 | 302 | 293 | **201** | 113 |

## Table 2. Sierra Leone: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt: Baseline Scenario, 2016–36 (Concluded)

(Percent)

**Debt service-to-exports ratio**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Baseline** | 5 | 5 | 5 | 5 | 5 | 6 | **6** | 4 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 5 | 5 | 4 | 4 | 5 | 5 | **5** | 6 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 5 | 5 | 5 | 5 | 6 | 7 | **8** | 6 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 5 | 5 | 5 | 5 | 5 | 6 | **6** | 4 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 5 | 9 | 15 | 16 | 18 | 19 | **23** | 19 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 5 | 5 | 5 | 5 | 5 | 6 | **6** | 4 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 5 | 5 | 6 | 6 | 6 | 7 | **9** | 7 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 5 | 7 | 9 | 10 | 11 | 11 | **15** | 12 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 5 | 5 | 5 | 5 | 5 | 6 | **6** | 4 |

**Debt service-to-revenue ratio**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Baseline** | 9 | 11 | 11 | 10 | 11 | 12 | **12** | 7 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 9 | 10 | 10 | 9 | 10 | 11 | **10** | 9 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 9 | 11 | 12 | 11 | 13 | 15 | **15** | 10 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 9 | 12 | 14 | 12 | 14 | 16 | **15** | 8 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 9 | 11 | 12 | 12 | 13 | 14 | **15** | 10 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 9 | 11 | 11 | 10 | 11 | 12 | **12** | 7 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 9 | 11 | 12 | 12 | 13 | 14 | **17** | 10 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 9 | 11 | 13 | 13 | 14 | 15 | **18** | 12 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 9 | 16 | 16 | 14 | 16 | 18 | **17** | 10 |
| *Memorandum item:* | | | | | | | | |
| Grant element assumed on residual financing (i.e., financing required above baseline) 6/ | 41 | 41 | 41 | 41 | 41 | 41 | **41** | 41 |

Sources: Country authorities; and staff estimates and projections.

1/ Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.

2/ Assumes that the interest rate on new borrowing is by 2 percentage points higher than in the baseline., while grace and maturity periods are the same as in the baseline.

3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming

an offsetting adjustment in import levels).

4/ Includes official and private transfers and FDI.

5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.

6/ Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.

## Table 3. Sierra Leone: Public Sector Debt Sustainability Framework: Baseline Scenario, 2016–36

(Percent of GDP, unless otherwise indicated)

| | Actual | | | | | Estimate | Projections | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | Average 5/ | Standard Deviation 5/ | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2016-21 Average | 2026 | 2036 | 2022-36 Average |
| **Public sector debt 1/** | 30.5 | 35.0 | 45.3 | | | 55.9 | 59.2 | 60.8 | 61.9 | 62.1 | 61.2 | | 41.6 | 27.3 | |
| *of which: foreign-currency denominated* | 21.3 | 24.6 | 32.7 | | | 41.3 | 46.0 | 47.4 | 48.3 | 48.4 | 47.5 | | 33.2 | 22.9 | |
| Change in public sector debt | -6.2 | 4.4 | 10.3 | | | 10.6 | 3.3 | 1.5 | 1.1 | 0.2 | -0.9 | | -2.9 | -1.2 | |
| Identified debt-creating flows | -5.7 | 5.0 | 10.4 | | | 11.8 | -1.7 | 0.9 | 0.5 | -0.7 | -1.0 | | -1.7 | -0.7 | |
| Primary deficit | 0.4 | 2.9 | 3.9 | -0.3 | 7.7 | 7.2 | 3.9 | 2.6 | 2.0 | 2.0 | 2.0 | 3.3 | 0.6 | 0.7 | 1.0 |
| Revenue and grants | 13.3 | 14.0 | 16.2 | | | 15.2 | 15.5 | 16.1 | 17.1 | 17.7 | 17.9 | | 19.0 | 22.6 | |
| *of which: grants* | 2.6 | 4.2 | 5.4 | | | 3.0 | 2.7 | 2.2 | 2.0 | 1.9 | 1.9 | | 2.2 | 2.0 | |
| Primary (noninterest) expenditure | 13.6 | 16.9 | 20.1 | | | 22.3 | 19.4 | 18.7 | 19.1 | 19.7 | 19.9 | | 19.6 | 23.4 | |
| Automatic debt dynamics | -6.0 | 2.3 | 6.5 | | | 4.7 | -5.3 | -1.8 | -1.6 | -2.8 | -3.0 | | -2.3 | -1.4 | |
| Contribution from interest rate/growth differential | -5.0 | -0.5 | 7.7 | | | -2.7 | -4.0 | -2.5 | -2.8 | -3.0 | -3.2 | | -2.3 | -1.5 | |
| *of which: contribution from average real interest rate* | 1.3 | 0.8 | -1.3 | | | -0.1 | -0.8 | 0.9 | 1.1 | 0.9 | 0.9 | | 0.2 | 0.1 | |
| *of which: contribution from real GDP growth* | -6.3 | -1.3 | 9.0 | | | -2.6 | -3.2 | -3.4 | -3.8 | -3.9 | -4.1 | | -2.5 | -1.6 | |
| Contribution from real exchange rate depreciation | -1.0 | 2.8 | -1.2 | | | 7.4 | -1.3 | 0.7 | 1.2 | 0.2 | 0.2 | | ... | ... | |
| Other identified debt-creating flows | -0.1 | -0.2 | -0.1 | | | 0.0 | -0.3 | 0.1 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Privatization receipts (negative) | -0.1 | -0.1 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Recognition of implicit or contingent liabilities | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Debt relief (HIPC and other) | 0.0 | -0.1 | -0.1 | | | 0.0 | -0.3 | 0.1 | 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 | -0.5 | -0.6 | -0.1 | | | -1.2 | 5.0 | 0.6 | 0.7 | 0.9 | 0.1 | | -1.2 | -0.5 | |
| **Other Sustainability Indicators** | | | | | | | | | | | | | | | |
| **PV of public sector debt** | ... | ... | 35.3 | | | 43.7 | 45.1 | 46.5 | 47.7 | 48.0 | 47.4 | | 32.4 | 20.9 | |
| *of which: foreign-currency denominated* | ... | ... | 22.6 | | | 29.0 | 31.9 | 33.1 | 34.1 | 34.3 | 33.7 | | 24.0 | 16.5 | |
| *of which: external* | ... | ... | 22.6 | | | 29.0 | 31.9 | 33.1 | 34.1 | 34.3 | 33.7 | | 24.0 | 16.5 | |
| PV of contingent liabilities (not included in public sector debt) | ... | ... | ... | | | ... | ... | ... | ... | ... | ... | | ... | ... | |
| Gross financing need 2/ | 1.6 | 3.7 | 4.5 | | | 8.9 | 7.0 | 6.6 | 6.0 | 6.2 | 6.3 | | 3.6 | 2.6 | |
| PV of public sector debt-to-revenue and grants ratio (in percent) | ... | ... | 217.8 | | | 288.0 | 291.3 | 288.4 | 279.0 | 271.4 | 265.4 | | 171.0 | 92.1 | |
| PV of public sector debt-to-revenue ratio (in percent) | ... | ... | 326.6 | | | 360.5 | 353.4 | 333.0 | 316.3 | 304.0 | 296.2 | | 193.1 | 101.2 | |
| *of which: external 3/* | ... | ... | 209.8 | | | 239.8 | 249.9 | 237.3 | 226.0 | 217.4 | 210.6 | | 142.7 | 79.9 | |
| Debt service-to-revenue and grants ratio (in percent) 4/ | 9.4 | 5.7 | 3.9 | | | 11.1 | 20.4 | 24.8 | 22.9 | 23.4 | 24.1 | | 15.6 | 8.2 | |
| Debt service-to-revenue ratio (in percent) 4/ | 11.7 | 8.2 | 5.8 | | | 13.9 | 24.7 | 28.6 | 25.9 | 26.2 | 26.9 | | 17.6 | 9.0 | |
| Primary deficit that stabilizes the debt-to-GDP ratio | 6.6 | -1.6 | -6.4 | | | -3.5 | 0.6 | 1.1 | 0.9 | 1.9 | 2.9 | | 3.5 | 2.0 | |
| **Key macroeconomic and fiscal assumptions** | | | | | | | | | | | | | | | |
| Real GDP growth (in percent) | 20.7 | 4.6 | -20.5 | 5.2 | 10.6 | 6.1 | 6.0 | 6.1 | 6.8 | 6.8 | 7.1 | 6.5 | 6.0 | 5.9 | 6.1 |
| Average nominal interest rate on forex debt (in percent) | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.7 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 0.7 | 1.0 | 1.2 | 1.0 |
| Average real interest rate on domestic debt (in percent) | 7.8 | 7.3 | -11.6 | -0.2 | 6.0 | 1.0 | -1.3 | 12.4 | 13.6 | 11.3 | 11.2 | 8.0 | 6.4 | 5.8 | 6.3 |
| Real exchange rate depreciation (in percent, + indicates depreciation | -4.5 | 13.7 | -3.8 | -1.7 | 9.7 | 24.1 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Inflation rate (GDP deflator, in percent) | 6.9 | 1.8 | 19.6 | 11.2 | 5.6 | 4.2 | 16.4 | 8.0 | 6.4 | 8.0 | 7.6 | 8.4 | 5.6 | 4.9 | 5.4 |
| Growth of real primary spending (deflated by GDP deflator, in percer | -11.8 | 29.7 | -5.3 | 1.3 | 10.7 | 17.7 | -8.1 | 2.7 | 9.0 | 10.0 | 8.0 | 6.6 | 7.7 | 6.8 | 7.2 |
| Grant element of new external borrowing (in percent) | ... | ... | ... | ... | ... | 38.4 | 41.6 | 40.1 | 41.4 | 41.7 | 42.6 | 40.9 | 43.1 | 42.6 | ... |

Sources: Country authorities; and 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 excluding grants.

4/ Debt service is defined as the sum of interest and amortization of medium and long-term debt.

5/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

## Table 4. Sierra Leone: Sensitivity Analysis for Key Indicators of Public Debt: Baseline Scenario, 2016–36

| | | Projections | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2026 | 2036 |
| **PV of Debt-to-GDP Ratio** | | | | | | | | |
| **Baseline** | 44 | 45 | 46 | 48 | 48 | 47 | 32 | 21 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 44 | 43 | 43 | 43 | 43 | 42 | 25 | 10 |
| A2. Primary balance is unchanged from 2016 | 44 | 47 | 51 | 55 | 58 | 61 | 61 | 70 |
| A3. Permanently lower GDP growth 1/ | 44 | 46 | 49 | 52 | 54 | 56 | 53 | 87 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2017-20 | 44 | 51 | 62 | 65 | 68 | 69 | 60 | 64 |
| B2. Primary balance is at historical average minus one standard deviations in 2017-201 | 44 | 47 | 51 | 52 | 52 | 52 | 36 | 23 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 44 | 47 | 52 | 55 | 56 | 57 | 45 | 41 |
| B4. One-time 30 percent real depreciation in 2017 | 44 | 56 | 57 | 57 | 57 | 55 | 39 | 25 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2017 | 44 | 51 | 52 | 53 | 53 | 53 | 37 | 23 |
| **PV of Debt-to-Revenue Ratio 2/** | | | | | | | | |
| **Baseline** | 288 | 291 | 288 | 279 | 271 | 265 | 171 | 92 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 288 | 276 | 265 | 252 | 242 | 233 | 131 | 43 |
| A2. Primary balance is unchanged from 2016 | 288 | 304 | 318 | 324 | 331 | 339 | 319 | 310 |
| A3. Permanently lower GDP growth 1/ | 288 | 298 | 303 | 303 | 305 | 310 | 269 | 368 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2017-20 | 288 | 326 | 370 | 372 | 374 | 379 | 309 | 275 |
| B2. Primary balance is at historical average minus one standard deviations in 2017-201 | 288 | 305 | 319 | 307 | 297 | 290 | 190 | 100 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 288 | 303 | 319 | 316 | 314 | 314 | 234 | 180 |
| B4. One-time 30 percent real depreciation in 2017 | 288 | 363 | 351 | 335 | 320 | 310 | 205 | 111 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2017 | 288 | 331 | 326 | 312 | 302 | 295 | 194 | 102 |
| **Debt Service-to-Revenue Ratio 2/** | | | | | | | | |
| **Baseline** | 11 | 20 | 25 | 23 | 23 | 24 | 16 | 8 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 11 | 21 | 25 | 21 | 22 | 23 | 16 | 5 |
| A2. Primary balance is unchanged from 2016 | 11 | 20 | 25 | 25 | 27 | 28 | 21 | 22 |
| A3. Permanently lower GDP growth 1/ | 11 | 21 | 26 | 24 | 26 | 27 | 22 | 24 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2017-20 | 11 | 22 | 30 | 29 | 31 | 32 | 23 | 20 |
| B2. Primary balance is at historical average minus one standard deviations in 2017-201 | 11 | 20 | 25 | 25 | 26 | 25 | 16 | 9 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 11 | 21 | 27 | 25 | 26 | 28 | 19 | 14 |
| B4. One-time 30 percent real depreciation in 2017 | 11 | 23 | 29 | 27 | 29 | 30 | 22 | 13 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2017 | 11 | 20 | 26 | 28 | 24 | 25 | 16 | 9 |

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 5. Sierra Leone: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt: Downside Scenarios, 2016–36

(Percent)

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | **2026** | 2036 |
| **PV of debt-to GDP ratio** | | | | | | | | |
| **Baseline** | 29 | 32 | 33 | 34 | 34 | 34 | **24** | 16 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 29 | 31 | 32 | 35 | 37 | 38 | **35** | 35 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 29 | 32 | 35 | 37 | 38 | 39 | **31** | 25 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 29 | 33 | 39 | 40 | 41 | 40 | **28** | 20 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 29 | 37 | 51 | 52 | 51 | 50 | **37** | 19 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 29 | 30 | 33 | 34 | 34 | 33 | **24** | 16 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 29 | 41 | 54 | 55 | 54 | 53 | **39** | 19 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 29 | 42 | 60 | 61 | 60 | 58 | **44** | 21 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 29 | 43 | 46 | 47 | 48 | 47 | **33** | 23 |
| **PV of debt-to-exports ratio** | | | | | | | | |
| **Baseline** | 125 | 114 | 106 | 105 | 104 | 100 | **73** | 52 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 125 | 109 | 104 | 106 | 111 | 113 | **106** | 111 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 125 | 116 | 112 | 113 | 115 | 114 | **94** | 79 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 125 | 109 | 102 | 101 | 100 | 97 | **72** | 51 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 125 | 234 | 470 | 456 | 446 | 426 | **330** | 171 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 125 | 109 | 102 | 101 | 100 | 97 | **72** | 51 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 125 | 148 | 172 | 167 | 163 | 155 | **120** | 60 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 125 | 195 | 301 | 291 | 284 | 271 | **211** | 102 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 125 | 109 | 102 | 101 | 100 | 97 | **72** | 51 |
| **PV of debt-to-revenue ratio** | | | | | | | | |
| **Baseline** | 240 | 265 | 275 | 272 | 262 | 236 | **143** | 80 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 240 | 255 | 270 | 276 | 280 | 268 | **208** | 172 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 240 | 270 | 290 | 295 | 292 | 269 | **184** | 121 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 240 | 279 | 323 | 321 | 309 | 279 | **171** | 96 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 240 | 311 | 423 | 412 | 391 | 350 | **223** | 92 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 240 | 255 | 270 | 268 | 259 | 233 | **143** | 80 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 240 | 344 | 446 | 435 | 412 | 368 | **235** | 93 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 240 | 350 | 497 | 483 | 457 | 408 | **262** | 101 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 240 | 361 | 379 | 376 | 363 | 327 | **200** | 112 |

## Table 5. Sierra Leone: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt: Downside Scenarios, 2016–36 (Concluded)

(Percent)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Debt service-to-exports ratio** | | | | | | | | |
| **Baseline** | 5 | 5 | 5 | 5 | 5 | 6 | **6** | 4 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 5 | 5 | 4 | 4 | 5 | 5 | **5** | 6 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 5 | 5 | 5 | 5 | 6 | 7 | **7** | 6 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 5 | 5 | 5 | 4 | 5 | 6 | **6** | 4 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 5 | 9 | 15 | 16 | 18 | 19 | **23** | 18 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 5 | 5 | 5 | 4 | 5 | 6 | **6** | 4 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 5 | 5 | 5 | 6 | 6 | 7 | **9** | 7 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 5 | 7 | 9 | 10 | 11 | 11 | **15** | 12 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 5 | 5 | 5 | 4 | 5 | 6 | **6** | 4 |
| **Debt service-to-revenue ratio** | | | | | | | | |
| **Baseline** | 9 | 12 | 13 | 12 | 13 | 14 | **12** | 7 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2016-2036 1/ | 9 | 11 | 11 | 10 | 12 | 12 | **10** | 9 |
| A2. New public sector loans on less favorable terms in 2016-2036 2/ | 9 | 12 | 14 | 14 | 16 | 17 | **15** | 10 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2017-2018 | 9 | 13 | 15 | 14 | 16 | 17 | **14** | 8 |
| B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/ | 9 | 12 | 14 | 14 | 16 | 16 | **15** | 10 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018 | 9 | 12 | 13 | 12 | 14 | 14 | **12** | 7 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/ | 9 | 12 | 14 | 15 | 16 | 16 | **17** | 10 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 9 | 12 | 15 | 16 | 17 | 17 | **18** | 11 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/ | 9 | 17 | 18 | 17 | 19 | 20 | **17** | 9 |
| *Memorandum item:* | | | | | | | | |
| Grant element assumed on residual financing (i.e., financing required above baseline) 6/ | 41 | 41 | 41 | 41 | 41 | 41 | **41** | 41 |

Sources: Country authorities; and staff estimates and projections.

1/ Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.

2/ Assumes that the interest rate on new borrowing is by 2 percentage points higher than in the baseline., while grace and maturity periods are the same as in the baseline.

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

4/ Includes official and private transfers and FDI.

5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.

6/ Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.