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# BOLIVIA

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## STAFF REPORT FOR THE 2013 ARTICLE IV CONSULTATION—DEBT SUSTAINABILITY ANALYSIS

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*Bolivia's public debt declined sharply following MDRI debt relief in 2006–07 and debt sustainability has continued to improve, supported by overall fiscal surpluses since then. Under the baseline scenario, debt ratios continue to display ample margins with respect to risk thresholds and are expected to decline further in the medium to long term. Debt service is projected to remain low, reflecting predominantly long maturities of both domestic and foreign debt. The path of debt ratios deteriorates under standard stress tests, especially for total public debt, but would remain well below indicative thresholds. The risk of debt distress remains low. An alternative scenario was also prepared, which assumes no augmentation of current natural gas reserves and thus a shorter resource horizon compared to the baseline. Under this alternative scenario, debt ratios would start to climb after the mid-2020s when current proven gas reserves are expected to be exhausted.*

# BACKGROUND

1. **Bolivia's gross public debt declined sharply following MDRI debt relief and has continued to fall owing to consecutive years of overall fiscal surpluses and strong economic growth.** Gross debt dropped from 95.7 percent of GDP in 2003 to 40.5 percent in 2007 and subsequently to 33.4 percent in 2012. The decline in external public debt—to 14.8 percent of GDP in 2011 from 65.0 percent in 2003—reversed in 2012 to 15.7 percent of GDP as Bolivia issued the first international bond since the 1920s of US$ 0.5 billion. External public debt is projected to increase further in 2013 following the second issuance of an international bond of US$0.5 billion in August 2013.

2. **Bolivia's changing debt structure and the accumulation of significant public sector deposits at the central bank have further reduced debt vulnerabilities.** With the reduction in external debt and the shift to domestic debt in Bolivianos, foreign currency exposure has been reduced since 2005. In addition, almost all domestic debt had maturities exceeding five years at end-2012, compared to only about ⅔ in 2005, and 87.7 percent of external public debt had maturities exceeding eleven years. With the accumulation of net deposits of the non-financial public sector at the Central Bank, net public debt (i.e., gross debt minus net central bank credit) declined to 11.1 percent of GDP in 2012 from 87.8 percent in 2003. The effective interest rate of the total public debt was 3.4 percent in 2012.

# BASELINE AND ALTERNATIVE SCENARIOS

3. **The main assumptions of the baseline scenario for the period of 2013–2033 are:**

- ***Average annual real GDP growth***: 6.7 percent in 2013, 5.4 percent in 2014, 5 percent until 2018 and 4 percent thereafter.

- ***Inflation*** (CPI, period average): 5.9 percent in 2013, 6.8 percent in 2014, and 5 percent in 2015–2033. Reflecting the food supply shocks of mid-2013, inflation assumptions for 2013–14 are higher than in last year's DSA.

- ***External sector***: in line with the medium term staff projections through 2018, and based on stable import and export ratios to GDP over the long term. Net FDI is assumed to remain stable at 3 percent of GDP through 2020, and decline gradually over the long term, mainly influenced by foreign investment in the natural resource sector.

- ***Fiscal assumptions and financing strategy***: in line with the medium term staff projections until 2018. For 2019–33, a primary surplus of 0.3 percent of GDP is assumed for the non-financial public sector (a surplus of 0.4 percent of GDP on average over 2018–32 in the previous DSA), on the basis of stable international oil prices and public expenditure as a share of GDP. CAF is expected to remain the largest external lender.

- ***Average concessionality of public external debt***: around 27 percent in the medium term, based on projected disbursements of official loans and the concessional financing conditions.

**4. To assess the impact of the exhaustion of natural gas reserves, the following assumptions are made under an alternative scenario with a shorter resource horizon**:

- ***Natural resource horizon***: The authorities have increased efforts to develop new gas exploration areas. Given the uncertainty and length of this process, an alternative scenario assesses the debt sustainability implications of a shorter resource horizon based only on current proven gas reserves. In line with the current reserves and staff's medium term production assumptions, the resource horizon is assumed to last through 2025.

- ***Fiscal assumptions***: With the assumed loss of hydrocarbon related revenues, the primary balance of non-financial public sector is projected to worsen to a deficit of around 8 percent of GDP on average in 2026–33.

**5. Under the baseline scenario, Bolivia's public and external debt are expected to remain sustainable throughout the projection period.**[1] Bolivia is classified as medium performer in terms of its policy and institutional capacity, measured by the three year average of the World Bank's Country Policy and Institutional Assessment (CPIA) scores. The gross non-financial sector public debt is projected to decline to 22 percent of GDP by 2018 from 33 percent in 2012, then to 11 percent by 2033. Total external debt (including private) is projected to decline to 16 percent in 2018 and 10 percent by 2033, from 20 percent in 2012. All the debt burden indicators for Bolivia are well below the specific indicative thresholds for medium performers.

**6. Under the shorter resource horizon scenario, the debt trajectory starts to worsen from mid-2020, reflecting the assumed exhaustion of current proven gas reserves.** The public debt-to-GDP ratio is projected to bottom out at 21 percent in 2020 and increase to 32 percent by 2025. With the larger primary deficit, public debt could rise to around 61 percent of GDP by 2033.

# STRESS TEST

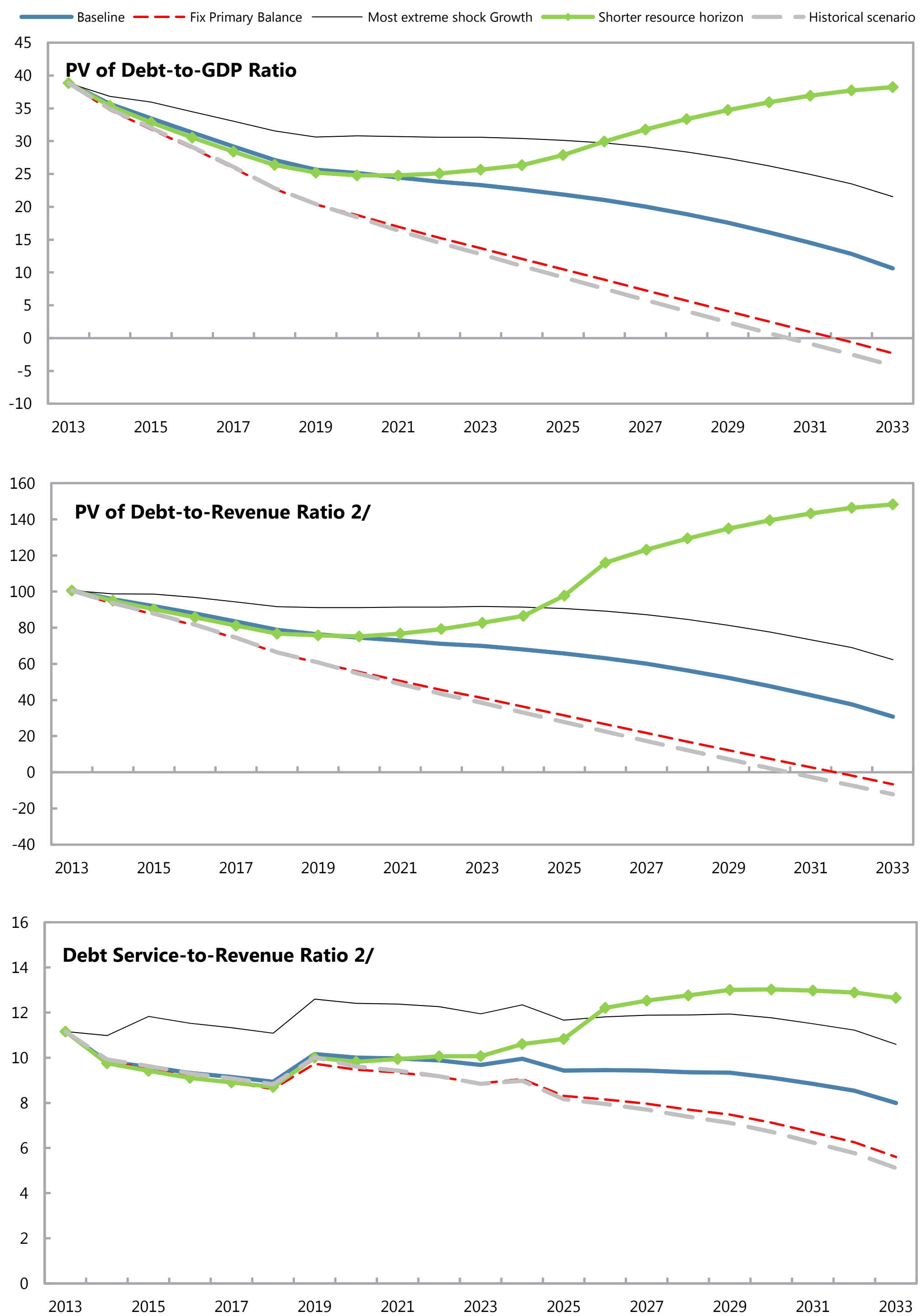
**7. Standard stress tests on the baseline scenario suggest that Bolivia's low public and external indebtedness is resilient to a series of shocks.** Under the most extreme stress test to external debt—one time 30 percent nominal depreciation relative to the baseline in 2014—the ratio of the PV of debt to GDP deteriorates by around 8½ percentage points on impact, but converges to the trajectory under the baseline scenario in the medium to long term. All the external debt indicators remain well below the

[1] Remittances in Bolivia represent about 4 percent of GDP and 9 percent of goods and services exports. If we take remittances into account, there are no breaches of (modified) thresholds under the baseline or stress tests in the DSA. The inclusion of remittances does not lead to a change in the risk rating, which remains low.

threshold in extreme stress scenarios. For public debt, the most extreme risk arises from a temporary shock to real GDP growth, but the stress tests indicate that debt ratios remain well below indicative thresholds.

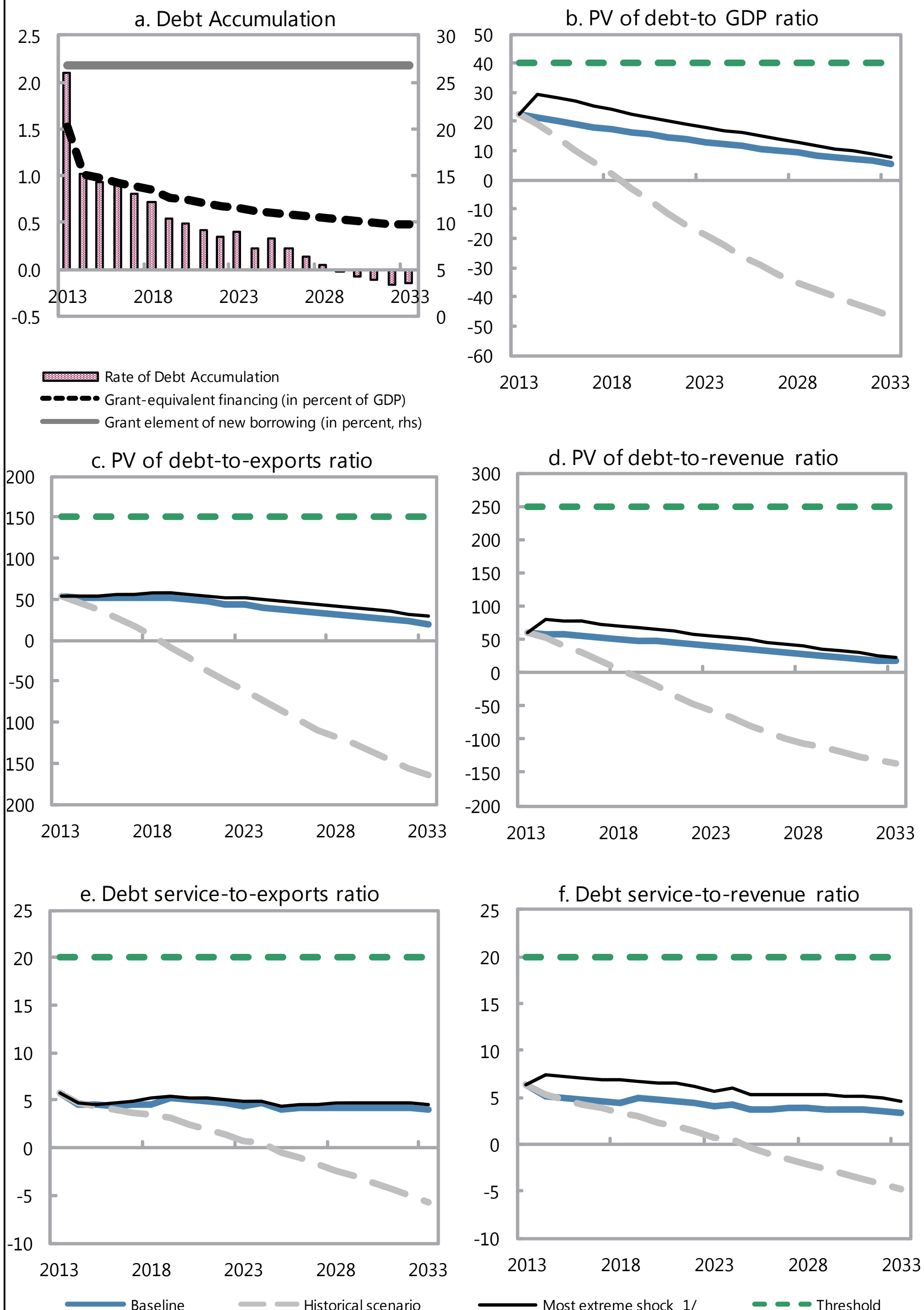
**8. Bolivia's risk of debt distress is low.** Based on the analysis under the baseline and the most extreme stress test, staff and the authorities concurred that Bolivia's risk of debt distress is low, and its debt is expected to be sustainable over the medium and long term. The authorities highlighted that they have successfully reduced the public debt-to-GDP ratio to one of the lowest in the region. Moreover, they noted that the improvement in the maturity structure and the systemic decline in external debt service indicators pointed to limited liquidity risks.

**Figure 1. Bolivia: Indicators of Public Debt Under Alternative Scenarios, 2013-2033 1/**




Sources: National authorities and Fund staff calculations.
1/ The most extreme stress test is the test that yields the highest ratio in 2023.
2/ Revenues are defined inclusive of grants.

**Figure 2. Bolivia: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2013-2033 1/**




Sources: National authorities and Fund staff calculations.

1/ The most extreme stress test is the test that yields the highest ratio in 2023. In Figure b, it corresponds to a one-time depreciation shock; in c, to a terms shock; in d, to a one-time depreciation shock; in e, to a terms shock; and in Figure f, to a one-time depreciation shock.

## Table 1a. Bolivia: Public Sector Debt Sustainability Framework, Baseline Scenario, 2010-2033

(In percent of GDP, unless otherwise indicated)

| | Actual | | | | | Estimate | Projections | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | Average 6/ | Standard Deviation 6/ | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2013-18 Average | 2023 | 2033 | 2019-33 Average |
| **Public sector debt 1/** | 38.5 | 34.7 | 33.4 | | | 32.5 | 29.7 | 27.8 | 25.9 | 24.1 | 22.3 | | 19.7 | 11.3 | |
| *of which: foreign-currency denominated* | 19.4 | 18.2 | 18.7 | | | 19.1 | 17.7 | 16.8 | 15.9 | 15.0 | 14.1 | | 11.2 | 7.3 | |
| Change in public sector debt | -1.5 | -3.8 | -1.3 | | | -0.9 | -2.8 | -2.0 | -1.9 | -1.8 | -1.7 | | -0.3 | -1.8 | |
| Identified debt-creating flows | -6.4 | -7.6 | -5.6 | | | -3.5 | -3.0 | -2.4 | -2.3 | -2.0 | -1.5 | | -0.3 | -1.8 | |
| Primary deficit | -3.1 | -2.1 | -2.8 | -1.9 | 3.7 | -1.7 | -0.4 | -0.7 | -0.6 | -0.3 | 0.1 | -0.6 | 0.2 | -1.5 | -0.3 |
| Revenue and grants | 33.2 | 36.2 | 37.9 | | | 38.6 | 37.3 | 36.4 | 35.6 | 35.0 | 34.4 | | 33.3 | 34.6 | |
| *of which: grants* | 1.1 | 0.8 | 0.7 | | | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | | 0.4 | 0.4 | |
| Primary (noninterest) expenditure | 30.1 | 34.1 | 35.1 | | | 36.9 | 36.8 | 35.7 | 35.0 | 34.7 | 34.5 | | 33.5 | 33.1 | |
| Automatic debt dynamics | -3.3 | -5.5 | -2.8 | | | -1.8 | -2.5 | -1.7 | -1.7 | -1.7 | -1.6 | | -0.4 | -0.3 | |
| Contribution from interest rate/growth differential | -1.9 | -3.3 | -2.0 | | | -1.6 | -1.8 | -1.4 | -1.3 | -1.3 | -1.2 | | -0.1 | -0.2 | |
| *of which: contribution from average real interest rate* | -0.3 | -1.4 | -0.3 | | | 0.5 | -0.1 | 0.0 | 0.0 | 0.0 | -0.1 | | 0.6 | 0.4 | |
| *of which: contribution from real GDP growth* | -1.6 | -1.9 | -1.7 | | | -2.1 | -1.7 | -1.4 | -1.3 | -1.2 | -1.1 | | -0.8 | -0.5 | |
| Contribution from real exchange rate depreciation | -1.4 | -2.2 | -0.8 | | | -0.2 | -0.8 | -0.4 | -0.4 | -0.4 | -0.4 | | ... | ... | |
| Other identified debt-creating flows | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Privatization receipts (negative) | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Recognition of implicit or contingent liabilities | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Debt relief (HIPC and other) | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Other | 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 2/ | 4.9 | 3.7 | 4.3 | | | 2.6 | 0.1 | 0.5 | 0.4 | 0.2 | -0.2 | | 0.0 | 0.0 | |
| **Other Sustainability Indicators** | | | | | | | | | | | | | | | |
| **PV of public sector debt** | ... | ... | 40.4 | | | 38.9 | 35.7 | 33.5 | 31.3 | 29.2 | 27.1 | | 23.3 | 10.6 | |
| *of which: foreign-currency denominated* | ... | ... | 25.7 | | | 25.4 | 23.7 | 22.5 | 21.3 | 20.1 | 18.9 | | 14.8 | 6.5 | |
| *of which: external* | ... | ... | 22.7 | | | 22.7 | 21.2 | 20.2 | 19.2 | 18.2 | 17.2 | | 13.0 | 5.7 | |
| PV of contingent liabilities (not included in public sector debt) | ... | ... | ... | | | ... | ... | ... | ... | ... | ... | | ... | ... | |
| Gross financing need 3/ | 2.0 | 2.3 | 1.7 | | | 3.0 | 3.6 | 3.2 | 3.1 | 3.3 | 3.5 | | 3.7 | 1.6 | |
| PV of public sector debt-to-revenue and grants ratio (in percent) | ... | ... | 106.7 | | | 100.6 | 95.7 | 91.9 | 87.9 | 83.4 | 78.9 | | 69.9 | 30.8 | |
| PV of public sector debt-to-revenue ratio (in percent) | ... | ... | 108.6 | | | 101.9 | 97.0 | 93.1 | 89.1 | 84.5 | 79.9 | | 70.8 | 31.1 | |
| *of which: external 4/* | ... | ... | 61.0 | | | 59.5 | 57.6 | 56.3 | 54.8 | 52.8 | 50.6 | | 39.6 | 16.7 | |
| Debt service-to-revenue and grants ratio (in percent) 5/ | 10.3 | 10.2 | 10.9 | | | 11.2 | 9.8 | 9.6 | 9.3 | 9.1 | 8.9 | | 9.7 | 8.0 | |
| Debt service-to-revenue ratio (in percent) 5/ | 10.6 | 10.5 | 11.1 | | | 11.3 | 10.0 | 9.7 | 9.5 | 9.3 | 9.1 | | 9.8 | 8.1 | |
| Primary deficit that stabilizes the debt-to-GDP ratio | -1.6 | 1.8 | -1.5 | | | -0.8 | 2.4 | 1.3 | 1.3 | 1.5 | 1.8 | | 0.4 | 0.3 | |
| **Key macroeconomic and fiscal assumptions** | | | | | | | | | | | | | | | |
| Real GDP growth (in percent) | 4.1 | 5.2 | 5.2 | 4.5 | 1.0 | 6.7 | 5.4 | 5.0 | 5.0 | 5.0 | 5.0 | 5.4 | 4.0 | 4.0 | 4.0 |
| Average nominal interest rate on forex debt (in percent) | 2.7 | 2.7 | 2.2 | 3.1 | 1.0 | 2.6 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 5.1 | 4.1 | 4.9 |
| Average real interest rate on domestic debt (in percent) | -3.1 | -8.2 | -2.2 | -0.4 | 6.1 | 2.0 | -1.4 | 0.4 | 0.0 | -0.2 | -0.4 | 0.1 | 3.5 | 3.9 | 3.5 |
| Real exchange rate depreciation (in percent, + indicates depreciation | -7.2 | -11.9 | -4.8 | -5.8 | 5.7 | -1.1 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Inflation rate (GDP deflator, in percent) | 8.8 | 14.6 | 6.9 | 7.9 | 4.7 | 2.5 | 6.0 | 4.2 | 4.6 | 4.8 | 5.0 | 4.5 | 4.5 | 4.5 | 4.5 |
| Growth of real primary spending (deflated by GDP deflator, in percer | -0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| Grant element of new external borrowing (in percent) | ... | ... | ... | ... | ... | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | ... |

Sources: National authorities and Fund staff calculations.

1/ Non financial public sector gross debt.

2/ The large residual for 2013 reflects the issuance of the sovereign bond.

3/ 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.

4/ Revenues excluding grants.

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

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

**Table 2a. Bolivia: Sensitivity Analysis for Key Indicators of Public Debt 2013-2033**

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2023 | 2033 |
| **PV of Debt-to-GDP Ratio** | | | | | | | | |
| **Baseline** | 39 | 36 | 33 | 31 | 29 | 27 | 23 | 11 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 39 | 35 | 32 | 29 | 26 | 23 | 13 | -4 |
| A2. Primary balance is unchanged from 2013 | 39 | 35 | 32 | 29 | 26 | 23 | 14 | -2 |
| A3. Permanently lower GDP growth 1/ | 39 | 36 | 34 | 32 | 30 | 28 | 26 | 19 |
| A4. Alternative Scenario : Shorter resource horizon | 39 | 35 | 33 | 31 | 28 | 26 | 26 | 38 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2014-20 | 39 | 37 | 36 | 34 | 33 | 32 | 31 | 22 |
| B2. Primary balance is at historical average minus one standard deviations in 2014-201 | 39 | 37 | 37 | 35 | 32 | 30 | 26 | 12 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 39 | 36 | 35 | 33 | 32 | 30 | 28 | 18 |
| B4. One-time 30 percent real depreciation in 2014 | 39 | 46 | 43 | 40 | 37 | 34 | 29 | 13 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2014 | 39 | 43 | 41 | 38 | 35 | 33 | 28 | 13 |
| **PV of Debt-to-Revenue Ratio 2/** | | | | | | | | |
| **Baseline** | 101 | 96 | 92 | 88 | 83 | 79 | 70 | 31 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 101 | 94 | 88 | 82 | 74 | 66 | 38 | -12 |
| A2. Primary balance is unchanged from 2013 | 101 | 93 | 87 | 81 | 74 | 66 | 41 | -7 |
| A3. Permanently lower GDP growth 1/ | 101 | 96 | 93 | 89 | 85 | 82 | 78 | 56 |
| A4. Alternative Scenario : Shorter resource horizon | 101 | 95 | 90 | 86 | 81 | 77 | 83 | 148 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2014-20 | 101 | 99 | 99 | 97 | 94 | 92 | 92 | 62 |
| B2. Primary balance is at historical average minus one standard deviations in 2014-201 | 101 | 100 | 101 | 97 | 92 | 87 | 77 | 34 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 101 | 98 | 96 | 94 | 91 | 88 | 85 | 53 |
| B4. One-time 30 percent real depreciation in 2014 | 101 | 123 | 117 | 111 | 105 | 99 | 86 | 39 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2014 | 101 | 116 | 111 | 107 | 101 | 96 | 84 | 38 |
| **Debt Service-to-Revenue Ratio 2/** | | | | | | | | |
| **Baseline** | 11 | 10 | 10 | 9 | 9 | 9 | 10 | 8 |
| **A. Alternative scenarios** | | | | | | | | |
| A1. Real GDP growth and primary balance are at historical averages | 11 | 10 | 10 | 9 | 9 | 9 | 9 | 5 |
| A2. Primary balance is unchanged from 2013 | 11 | 10 | 10 | 9 | 9 | 9 | 9 | 6 |
| A3. Permanently lower GDP growth 1/ | 11 | 10 | 10 | 9 | 9 | 9 | 10 | 9 |
| A4. Alternative Scenario : Shorter resource horizon | 11 | 10 | 9 | 9 | 9 | 9 | 10 | 13 |
| **B. Bound tests** | | | | | | | | |
| B1. Real GDP growth is at historical average minus one standard deviations in 2014-20 | 11 | 10 | 10 | 10 | 10 | 10 | 11 | 10 |
| B2. Primary balance is at historical average minus one standard deviations in 2014-201 | 11 | 10 | 10 | 10 | 9 | 9 | 10 | 8 |
| B3. Combination of B1-B2 using one half standard deviation shocks | 11 | 10 | 10 | 10 | 9 | 9 | 10 | 9 |
| B4. One-time 30 percent real depreciation in 2014 | 11 | 11 | 12 | 12 | 11 | 11 | 12 | 11 |
| B5. 10 percent of GDP increase in other debt-creating flows in 2014 | 11 | 10 | 10 | 10 | 10 | 9 | 10 | 9 |

Sources: National authorities and Fund staff calculations.

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 3a. Bolivia: External Debt Sustainability Framework, Baseline Scenario, 2010-2033 1/**

(In percent of GDP, unless otherwise indicated)

| | Actual | | | Historical [6/] | Standard [6/] | Projections | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Average | Deviation | | | | | | | 2013-2018 | | | 2019-2033 |
| | 2010 | 2011 | 2012 | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Average | 2023 | 2033 | Average |
| **External debt (nominal) 1/** | **21.2** | **18.7** | **19.6** | | | **20.2** | **19.1** | **18.4** | **17.7** | **17.0** | **16.3** | | **13.4** | **10.3** | |
| *of which: public and publicly guaranteed (PPG)* | 15.4 | 14.8 | 15.7 | | | 16.4 | 15.2 | 14.5 | 13.8 | 13.1 | 12.4 | | 9.5 | 6.4 | |
| Change in external debt | -0.2 | -2.5 | 0.9 | | | 0.6 | -1.1 | -0.7 | -0.7 | -0.7 | -0.7 | | -0.5 | -0.3 | |
| Identified net debt-creating flows | -9.8 | -7.7 | -13.8 | | | -8.7 | -7.1 | -5.8 | -5.2 | -4.9 | -4.7 | | -2.5 | -0.6 | |
| **Non-interest current account deficit** | **-4.2** | **-0.6** | **-8.1** | **-6.8** | **4.4** | **-4.4** | **-3.4** | **-2.2** | **-1.6** | **-1.3** | **-1.1** | | **-0.5** | **0.0** | -0.3 |
| Deficit in balance of goods and services | -2.8 | -0.3 | -9.1 | | | -6.3 | -4.9 | -3.7 | -3.0 | -2.8 | -2.5 | | -0.8 | 0.7 | |
| Exports | 36.2 | 38.3 | 44.7 | | | 42.1 | 40.9 | 39.1 | 37.3 | 35.4 | 33.0 | | 30.7 | 28.2 | |
| Imports | 33.5 | 38.0 | 35.6 | | | 35.9 | 36.0 | 35.5 | 34.3 | 32.6 | 30.5 | | 29.9 | 28.9 | |
| Net current transfers (negative = inflow) | -5.5 | -4.9 | -4.6 | -6.4 | 1.5 | -4.2 | -3.9 | -3.7 | -3.6 | -3.4 | -3.2 | | -2.4 | -1.5 | -2.1 |
| *of which: official* | -0.8 | -0.8 | -0.8 | | | -0.7 | -0.7 | -0.7 | -0.7 | -0.6 | -0.6 | | -0.3 | -0.1 | |
| Other current account flows (negative = net inflow) | 4.0 | 4.5 | 5.7 | | | 6.0 | 5.5 | 5.2 | 5.0 | 4.9 | 4.6 | | 2.7 | 0.8 | |
| **Net FDI (negative = inflow)** | **-3.4** | **-3.6** | **-3.9** | **-2.2** | **2.0** | **-3.5** | **-3.0** | **-3.0** | **-3.0** | **-3.0** | **-3.0** | | **-2.0** | **-0.5** | -1.4 |
| **Endogenous debt dynamics 2/** | **-2.2** | **-3.5** | **-1.9** | | | **-0.8** | **-0.7** | **-0.6** | **-0.6** | **-0.6** | **-0.5** | | **0.0** | **-0.1** | |
| Contribution from nominal interest rate | 0.3 | 0.3 | 0.3 | | | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | | 0.5 | 0.3 | |
| Contribution from real GDP growth | -0.8 | -0.9 | -0.9 | | | -1.2 | -1.0 | -0.9 | -0.8 | -0.8 | -0.8 | | -0.5 | -0.4 | |
| Contribution from price and exchange rate changes | -1.7 | -2.9 | -1.3 | | | ... | ... | ... | ... | ... | ... | | ... | ... | |
| **Residual (3-4) 3/** | **9.5** | **5.2** | **14.8** | | | **9.4** | **5.9** | **5.1** | **4.5** | **4.2** | **3.9** | | **2.0** | **0.3** | |
| *of which: exceptional financing* | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| PV of external debt 4/ | ... | ... | 26.6 | | | 26.6 | 25.1 | 24.1 | 23.1 | 22.1 | 21.1 | | 16.9 | 9.6 | |
| In percent of exports | ... | ... | 59.5 | | | 63.1 | 61.3 | 61.7 | 62.1 | 62.6 | 63.8 | | 55.2 | 34.0 | |
| **PV of PPG external debt** | **...** | **...** | **22.7** | | | **22.7** | **21.2** | **20.2** | **19.2** | **18.2** | **17.2** | | **13.0** | **5.7** | |
| **In percent of exports** | **...** | **...** | **50.8** | | | **53.9** | **51.8** | **51.7** | **51.6** | **51.6** | **52.0** | | **42.5** | **20.2** | |
| **In percent of government revenues** | **...** | **...** | **61.0** | | | **59.5** | **57.6** | **56.3** | **54.8** | **52.8** | **50.6** | | **39.6** | **16.7** | |
| **Debt service-to-exports ratio (in percent)** | **5.8** | **4.0** | **5.4** | | | **7.2** | **6.0** | **6.0** | **6.0** | **6.1** | **6.3** | | **6.3** | **6.0** | |
| **PPG debt service-to-exports ratio (in percent)** | **4.2** | **2.5** | **4.1** | | | **5.8** | **4.6** | **4.5** | **4.4** | **4.5** | **4.5** | | **4.4** | **4.0** | |
| **PPG debt service-to-revenue ratio (in percent)** | **4.8** | **2.7** | **4.9** | | | **6.4** | **5.1** | **4.9** | **4.7** | **4.6** | **4.4** | | **4.1** | **3.3** | |
| Total gross financing need (Billions of U.S. dollars) | -0.8 | -0.3 | -2.3 | | | -1.1 | -0.9 | -0.6 | -0.5 | -0.4 | -0.4 | | 0.5 | 4.2 | |
| Non-interest current account deficit that stabilizes debt ratio | -4.0 | 1.9 | -9.0 | | | -5.1 | -2.2 | -1.4 | -0.9 | -0.6 | -0.4 | | 0.0 | 0.3 | |
| **Key macroeconomic assumptions** | | | | | | | | | | | | | | | |
| Real GDP growth (in percent) | 4.1 | 5.2 | 5.2 | 4.5 | 1.0 | 6.7 | 5.4 | 5.0 | 5.0 | 5.0 | 5.0 | 5.4 | 4.0 | 4.0 | 4.0 |
| GDP deflator in US dollar terms (change in percent) | 8.8 | 15.9 | 7.3 | 8.5 | 6.7 | 2.5 | 6.0 | 4.2 | 4.6 | 4.8 | 5.0 | 4.5 | 4.5 | 4.5 | 4.5 |
| Effective interest rate (percent) 5/ | 1.7 | 1.7 | 1.7 | 2.2 | 0.7 | 2.1 | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.6 | 3.6 | 2.6 | 3.3 |
| Growth of exports of G&S (US dollar terms, in percent) | 31.0 | 28.8 | 31.8 | 24.3 | 17.7 | 3.0 | 8.6 | 4.6 | 4.6 | 4.3 | 3.0 | 4.7 | 7.3 | 7.4 | 7.6 |
| Growth of imports of G&S (US dollar terms, in percent) | 25.7 | 38.6 | 5.6 | 17.6 | 15.2 | 10.3 | 12.2 | 7.8 | 6.0 | 4.7 | 3.2 | 7.4 | 8.3 | 8.4 | 8.3 |
| Grant element of new public sector borrowing (in percent) | ... | ... | ... | ... | ... | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 |
| Government revenues (excluding grants, in percent of GDP) | 32.0 | 35.4 | 37.2 | | | 38.1 | 36.8 | 35.9 | 35.2 | 34.5 | 34.0 | | 32.9 | 34.2 | 33.2 |
| Aid flows (in Billions of US dollars) 7/ | 0.3 | 0.3 | 0.3 | | | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | | 0.3 | 0.6 | |
| *of which: Grants* | 0.2 | 0.2 | 0.2 | | | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | | 0.3 | 0.6 | |
| *of which: Concessional loans* | 0.1 | 0.1 | 0.1 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Grant-equivalent financing (in percent of GDP) 8/ | ... | ... | ... | | | 1.5 | 1.0 | 1.0 | 0.9 | 0.9 | 0.8 | | 0.7 | 0.5 | 0.6 |
| Grant-equivalent financing (in percent of external financing) 8/ | ... | ... | ... | | | 35.4 | 41.4 | 41.8 | 42.3 | 42.8 | 43.5 | | 49.3 | 62.0 | 53.1 |
| *Memorandum items:* | | | | | | | | | | | | | | | |
| Nominal GDP (Billions of US dollars) | 19.8 | 24.1 | 27.2 | | | 29.8 | 33.3 | 36.4 | 40.0 | 44.0 | 48.5 | | 73.6 | 169.8 | |
| Nominal dollar GDP growth | 13.3 | 21.9 | 12.9 | | | 9.4 | 11.7 | 9.4 | 9.8 | 10.0 | 10.3 | 10.1 | 8.7 | 8.7 | 8.7 |
| PV of PPG external debt (in Billions of US dollars) | | | 6.2 | | | 6.8 | 7.1 | 7.4 | 7.7 | 8.0 | 8.3 | | 9.6 | 9.7 | |
| (PVt-PVt-1)/GDPt-1 (in percent) | | | | | | 2.1 | 1.0 | 0.9 | 0.9 | 0.8 | 0.7 | 1.1 | 0.4 | -0.2 | 0.2 |
| Gross workers' remittances (Billions of US dollars) | 0.9 | 1.0 | 1.0 | | | 1.1 | 1.1 | 1.1 | 1.2 | 1.2 | 1.3 | | 1.5 | 2.3 | |
| PV of PPG external debt (in percent of GDP + remittances) | ... | ... | 21.9 | | | 21.9 | 20.5 | 19.6 | 18.7 | 17.7 | 16.8 | | 12.8 | 5.6 | |
| PV of PPG external debt (in percent of exports + remittances) | ... | ... | 46.8 | | | 49.7 | 48.0 | 47.9 | 47.9 | 47.8 | 48.2 | | 39.8 | 19.3 | |
| Debt service of PPG external debt (in percent of exports + remittance | ... | ... | 3.8 | | | 5.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4.2 | | 4.1 | 3.8 | |

Sources: National authorities and Fund staff calculations.

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. The high levels of residuals over the projection period are explained by the accumulation of foreign exchange reserves, and increase in foreign assets related to FINPRO and management of bank reserve requirement on foreign currency deposits.

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 3b. Bolivia: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2013-2033**

(In percent)

| | Projections | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | **2023** | 2033 |
| **PV of debt-to GDP ratio** | | | | | | | | |
| **Baseline** | 23 | 21 | 20 | 19 | 18 | 17 | **13** | 6 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2013-2033 1/ | 23 | 19 | 15 | 10 | 6 | 2 | **-19** | -47 |
| A2. New public sector loans on less favorable terms in 2013-2033 2 | 23 | 22 | 21 | 20 | 20 | 19 | **16** | 9 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2014-2015 | 23 | 22 | 21 | 20 | 19 | 18 | **13** | 6 |
| B2. Export value growth at historical average minus one standard deviation in 2014-2015 3/ | 23 | 22 | 21 | 20 | 19 | 18 | **13** | 6 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2014-2015 | 23 | 22 | 22 | 21 | 19 | 18 | **14** | 6 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2014-2015 4/ | 23 | 23 | 23 | 22 | 21 | 19 | **15** | 6 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 23 | 20 | 14 | 13 | 13 | 12 | **9** | 5 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/ | 23 | 30 | 28 | 27 | 25 | 24 | **18** | 8 |
| **PV of debt-to-exports ratio** | | | | | | | | |
| **Baseline** | 54 | 52 | 52 | 52 | 52 | 52 | **42** | 20 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2013-2033 1/ | 54 | 46 | 37 | 28 | 17 | 6 | **-62** | -165 |
| A2. New public sector loans on less favorable terms in 2013-2033 2 | 54 | 53 | 54 | 55 | 56 | 57 | **51** | 30 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2014-2015 | 54 | 52 | 52 | 52 | 52 | 52 | **42** | 20 |
| B2. Export value growth at historical average minus one standard deviation in 2014-2015 3/ | 54 | 54 | 53 | 53 | 53 | 53 | **44** | 20 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2014-2015 | 54 | 52 | 52 | 52 | 52 | 52 | **42** | 20 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2014-2015 4/ | 54 | 55 | 58 | 58 | 58 | 59 | **48** | 21 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 54 | 45 | 30 | 30 | 30 | 30 | **24** | 14 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/ | 54 | 52 | 52 | 52 | 52 | 52 | **42** | 20 |
| **PV of debt-to-revenue ratio** | | | | | | | | |
| **Baseline** | 59 | 58 | 56 | 55 | 53 | 51 | **40** | 17 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2013-2033 1/ | 59 | 51 | 41 | 29 | 17 | 6 | **-58** | -136 |
| A2. New public sector loans on less favorable terms in 2013-2033 2 | 59 | 59 | 59 | 58 | 57 | 56 | **47** | 25 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2014-2015 | 59 | 59 | 58 | 57 | 55 | 52 | **41** | 17 |
| B2. Export value growth at historical average minus one standard deviation in 2014-2015 3/ | 59 | 59 | 58 | 56 | 54 | 52 | **41** | 17 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2014-2015 | 59 | 60 | 60 | 58 | 56 | 54 | **42** | 18 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2014-2015 4/ | 59 | 61 | 63 | 62 | 59 | 57 | **45** | 18 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 59 | 54 | 39 | 38 | 37 | 35 | **27** | 14 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/ | 59 | 80 | 79 | 76 | 74 | 71 | **55** | 23 |

**Table 3b. Bolivia: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2013-2033 (Concluded)**

(In percent)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Debt service-to-exports ratio** | | | | | | | | |
| **Baseline** | 6 | 5 | 5 | 4 | 4 | 5 | **4** | 4 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2013-2033 1/ | 6 | 5 | 4 | 4 | 4 | 4 | **1** | -6 |
| A2. New public sector loans on less favorable terms in 2013-2033 2 | 6 | 5 | 5 | 5 | 5 | 5 | **5** | 4 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2014-2015 | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| B2. Export value growth at historical average minus one standard deviation in 2014-2015 3/ | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2014-2015 | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2014-2015 4/ | 6 | 5 | 5 | 5 | 5 | 5 | **5** | 4 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 6 | 4 | 4 | 4 | 4 | 4 | **3** | 3 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/ | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| **Debt service-to-revenue ratio** | | | | | | | | |
| **Baseline** | 6 | 5 | 5 | 5 | 5 | 4 | **4** | 3 |
| **A. Alternative Scenarios** | | | | | | | | |
| A1. Key variables at their historical averages in 2013-2033 1/ | 6 | 5 | 5 | 4 | 4 | 3 | **1** | -5 |
| A2. New public sector loans on less favorable terms in 2013-2033 2 | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| **B. Bound Tests** | | | | | | | | |
| B1. Real GDP growth at historical average minus one standard deviation in 2014-2015 | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 3 |
| B2. Export value growth at historical average minus one standard deviation in 2014-2015 3/ | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 3 |
| B3. US dollar GDP deflator at historical average minus one standard deviation in 2014-2015 | 6 | 6 | 6 | 5 | 5 | 5 | **4** | 4 |
| B4. Net non-debt creating flows at historical average minus one standard deviation in 2014-2015 4/ | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 4 |
| B5. Combination of B1-B4 using one-half standard deviation shocks | 6 | 5 | 5 | 5 | 5 | 5 | **4** | 3 |
| B6. One-time 30 percent nominal depreciation relative to the baseline in 2014 5/ | 6 | 7 | 7 | 7 | 7 | 7 | **6** | 5 |
| *Memorandum item:* | | | | | | | | |
| Grant element assumed on residual financing (i.e., financing required above baseline) 6/ | 26 | 26 | 26 | 26 | 26 | 26 | **26** | 26 |

Sources: National authorities and Fund staff calculations.

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.