ZAMBIA

STAFF REPORT FOR THE 2012 ARTICLE IV CONSULTATION—DEBT SUSTAINABILITY ANALYSIS

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Based on the Joint Fund-Bank Debt Sustainability Framework for Low-income Countries (LIC DSA), Zambia's risk of external debt distress remains low as all debt indicators stay below the indicative policy thresholds throughout the projection period (2012–32). Under the baseline and alternative scenarios, all external debt sustainability indicators remain below their relevant thresholds. The public DSA suggests that Zambia's overall public sector debt dynamics are sustainable in light of the current size and the evolution of the domestic debt stock. However, besides sound macroeconomic policies, both strong debt management and project appraisal capacity are needed to maintain debt sustainability in the face of access to international capital markets and a gradual increase in non-concessional borrowing.

BACKGROUND

1.   Zambia's stock of external and public debt remains relatively low. External public and publicly guarantee debt was about 11.6 percent of GPD in 2011 (US$ 2.1 billion).[1] Most of the public external debt is multilateral (around 70 percent) and contracted with concessional terms. In 2011, the Government of Zambia guaranteed the contracting of external debt for US$ 285 million (about 1.5 percent of GDP) mainly related to ZESCO (the government owned electric power utility company). Zambia's total public sector debt also remains low at about 28 percent of GDP at end-2011. As for the composition, the share of domestic debt is about 60 percent. In 2012, authorities plan to issue an international sovereign bond.

UNDERLYING DSA ASSUMPTIONS

2.   The Zambia's strong economic performance is expected to continue in 2012. GDP is projected to expand by 7.7 percent, reflecting strong growth in copper production (an increase of 23 percent in mining output compared to a decline of 5 percent in 2011) and non-maize agriculture, and an expansionary fiscal policy (increase in public investment of 1 percentage point of GDP). Inflation is projected to remain around 6 percent, in line with the authorities' stated objective. The external current account surplus is projected to be just above 1 percent of GDP (compared to 1.3 percent of GDP in 2011), reflecting both higher export volumes of copper and higher non-traditional exports. However, international reserves are projected to rise to 3.3 months of prospective imports, reflecting a continued current account surplus and strong capital inflows, including a debut US$500

international sovereign bond issue. The baseline scenario assumes prudent economic policies to provide fiscal space for growth-enhancing expenditure while safeguarding macroeconomic stability. The medium-term assumptions are summarized in Box 1.

3.   The baseline scenario assumes new public external borrowing in the order of US$2.8 billion in 2012–17 (US$2.3 billion without the proceeds of the international bond; i.e.; between 1.3 and 1.6 percent of GDP). Of this, US$ 970 million would be in non-concessional terms (US$470 million without the proceeds of the international bond). It is assumed that the proportion of non-concessional borrowing would gradually increase from 26 percent of total disbursements in 2013 to around 50 percent by 2032.

4.   The baseline scenario includes potential contingent liabilities arising from the public sector pension fund (PSPF). Currently, without any policy or reform adjustment, the PSPF would barely manage to cover half its expenses with contributions over the next twenty years, registering an actuarial deficit between 0.3 and 0.4 percent of GDP annually until 2030. Staff

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[1] Zambia's stock of external debt declined substantially from about 86 percent of GDP in 2005 to around 9 percent in 2006 as a result of debt cancellation under the HIPC Initiative and MDRI.

estimates that budget transfers to fill the funding gap for pension benefits payable from this fund together with the normal pension contributions of the government would reach 0.9 percent of GDP in 2012 and, in the absence of reforms, could rise to 2 percent of GDP by 2012. This underscores the need of a reform to ensure that the pension scheme does not jeopardize fiscal sustainability.

Public Investment and Growth

5.   The impact of new borrowing to finance public infrastructure investment on debt sustainability depends critically on its impact on growth. A number of empirical studies generally find a positive impact of public investment on growth both through a direct impact on economic activity and through spillover effects on private investment.[2] Among these studies, Burnside and Dollar (1997) found that a sustained increase in grant-financed investment by one percent of GDP raised real GDP growth in low-income countries with good policy implementation on a sustained basis by about 0.4 percentage points.[3] Gupta et al. (2011) find that the unadjusted output elasticity of public capital would be 0.25 (however, the marginal product of (unadjusted) capital would be around 0.5).[4] Also, the growth impact of public investment on growth is affected by how it is financed. Aschauer (2000) found that external debt financing of public investment could reduce the impact on growth, depending on the quality

and effective use of the investment, as well as the financing costs.

6.   The baseline scenario projects an increase in capital expenditure in the medium term. The capital expenditure ratio to GDP would increase from 5.8 percent in 2011 to 9.4 percent in 2016. Between 20 and 35 percent of such increase would be financed with external borrowing, a mix between concessional and non-concessional resources. Based on the empirical studies mentioned above, it would be expected that the projected increase in capital expenditure would raise real GDP growth between 1.25 and 1.75 percentage points over the medium term.

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[2] Romp, W. and J. de Haan (2007), "Public Capital and Economic Growth: A Critical Survey," Perspektiven der Wirtschaftspolitik 8, 1–140 presents a survey on this topic.

[3] Burnside, Craig, and David Dollar (1997), "Aid Spurs Growth in a Sound Policy Environment." Finance and Development, December 1997.

[4] The authors present an alternative measure of efficiency-adjusted capital for which the output elasticity would be around 0.15.

Box 1: Baseline Macroeconomic Assumptions

Economic growth: Real GDP growth is assumed to pick up to about 8 percent in the medium term supported by mining activity (copper production would double by 2016, from 0.7 million tons to 1.4 million tons, giving current production and investment plans), large infrastructure investment (capital expenditures would increase from 5.8 percent of GDP in 2011 to 9.4 percent of GDP in 2016) and increased electricity generation capacity. In the long run, the mining sector remains to be important, but economic diversification is also assumed in other areas such as electricity generation, agriculture, and tourism, and the economy is expected to grow at around 6.5 percent annually.

Inflation: The current objective of monetary policy is to reduce inflation to below 7 percent by end-2012 and maintain single digits thereafter. Prudent monetary and fiscal policies are expected to reduce annual inflation to around 5 percent in the medium term.

External sector: Mining output is expected to remain strong over the medium term, and the copper price growth is assumed to stabilize at around US$ 3.3 per pound in the long run. Copper, whose exports have been particularly strong in 2010 and 2011, will remain Zambia's most important export (around 75 percent of total exports). However, nontraditional exports would increase their rate of growth in the medium term (between 16–18 percent) consistent with higher non-mining output growth and infrastructure expenditure that would positively impact on economic diversification and then stabilize at around 10 percent for the rest of the period.

Foreign direct investment (FDI) is expected to rise in the medium term to around 5.5 percent of GDP, especially in mining, manufacturing and transport sectors, but stabilize in the long run at around 3.5 percent of GDP. The current account surplus is expected to increase in the medium-term (at around 3.5 percent of GDP) and then gradually decline (a current account deficit of 0.2 percent of GDP at the end of the period) as the growth rate of copper production decelerates from around 15 percent in the medium term to around 7.5 percent.

Government revenue and expenditure: Fiscal policy will be geared at creating space for spending needs to enhance the economic diversification of Zambia. To this end, higher revenue will be mobilized through improvements in tax administration, especially with respect to the VAT and mining taxes, and new tax policy measures that would broaden the tax base (reduction of tax incentives and exemptions and introducing new taxes). As a result, revenues would rise gradually from 22 percent of GDP in 2012 to 26 percent by 2032. Expenditures would stay at an elevated level in the near term mainly due to the growth-critical infrastructure investment and spending on education and health, but are expected to remain at about 26 percent of GDP, with current spending contained.

Government financing: External financing is expected to be between 1.3 and 1.6 percent of GDP (excluding the sovereign bond in 2012) in the medium term to finance social and capital spending. However, external financing is expected to decline to about 1 percent of GDP over the long term.

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[5] In 2012, the proportion of non-concessional borrowing would be around 40 percent.

EXTERNAL DEBT SUSTAINABILITY

Baseline scenario

7.   External debt burden indicators rise in the medium term, but are expected to remain below the indicative policy thresholds (Figure 1 and Table 1).[6] The stock of external public and publicly guaranteed (PPG) debt is expected to rise to around 13 percent of GDP by 2017 but gradually decline thereafter. The present value (PV) of PPG debt to GDP increases to 11 percent by 2016 before declining to around 6 percent by 2032, well below the 40 percent threshold. The PV of debt to exports increases to 23 percent by 2013, and falls gradually thereafter, remaining well below the threshold of 150 percent. The PV of PPG debt to revenue increases from 24 percent in 2011 to about 44 percent in 2016, falling thereafter, but it is below the threshold of 250 percent.[7]

Stress test

8.   External debt sustainability is maintained under an array of stress tests. The standard sensitivity analysis points to a low risk of debt distress (Table 3 and Figure 1), where debt burden indicators remain below their thresholds

after the shocks. In particular, under the historical scenario (which uses the historical average of the non-interest current account, FDI flows, real GDP growth, and the GDP deflator for the complete period) the ratio of the PV of debt-to-GDP would increase significantly, but would still remain below the threshold. In addition, regarding the bound tests, the most extreme stress test for the debt burden indicators assumes an export value growth equivalent to its historical average minus one standard deviation in 2013–14.[8] This shock scenario illustrates Zambia's vulnerability to copper price volatility and the need to diversify its export base. Under this scenario, the ratio of the PV of debt-to-GDP doubles by 2014, but would still remain below the threshold.

9.   External debt indicators would deteriorate, but remain below their respective thresholds under an alternative high investment-low growth scenario. This scenario assumes that there are constraints in the appraisal, selection and project implementation capacity of public investment projects in the medium term, which are not mitigated through the implementation of PFM reforms. In this context and based on the discussion provided in paragraphs 5 and 6, real GDP growth would remain about 1 percentage point below the baseline in the medium term (around 7 percent) and about ½ percentage points in the longer term (around 6 percent). In addition, we assume that the decline in GDP growth will have a negative impact on exports growth, in particular to non-traditional exports, due to lower

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[6] The World Bank's Country Policy and Institutions Assessment (CPIA) ranks Zambia as a medium performer (the average 2008–10 CPIA is 3.46). Thus, the external debt burden thresholds for Zambia are (i) a PV of debt-to-GDP at: 40 percent; (ii) a PV of debt-to-exports at: 150 percent; (iii) a PV of debt-to-revenue at: 250 percent; (iv) a debt service-to-exports at: 20 percent: and (v) a debt service-to-revenue at: 30 percent.

[7] The large residuals in Table 1 are caused by the fact that the official balance of payments for Zambia show the (mostly foreign owned) mining companies as keeping a large share of their mining export proceeds as rapidly increasing deposits abroad.

[8] The most extreme stress test is defined as the test that yields the highest ratio in 2022.

infrastructure capacity (for the purpose of this exercise it is assumed that the calculated decline in GDP growth would reduce the exports-to-GDP ratio by two percentage points in the medium term and one percentage point in the long term). The lower growth would result in lower domestic revenues and a higher financing requirement that are assumed to be met by additional external borrowing on commercial terms. The additional financing would rise to about 2 percent of GDP in the medium term. By the end of the forecast period, the domestic primary balance would deteriorate by about 1 percent of GDP compared to the baseline. Under this scenario, the ratio of the PV of debt-to-GDP increases by around 13 percentage points by 2022 compared to the baseline, but would still be below the threshold.

PUBLIC DEBT SUSTAINABILITY

Baseline scenario

10.   Zambia's public debt rises slightly in the medium term, but declines gradually over time. Under the baseline assumptions, the PV of public debt to GDP ratio would reach 24 percent in 2015 and comes down thereafter to about 16 percent by 2032.

Stress test

11.   Risks to public debt dynamics would mainly come from a deterioration of the fiscal position and negative shocks to GDP growth. Under the alternative scenarios, the results under the fixed primary balance scenario (fixing the primary balance unchanged from 2012) underscore the negative effects of not continuing to maintain fiscal discipline over the medium term to maintain public debt sustainability (Figure 2 and Table 4). Under this scenario, PV of debt-to-GDP ratio and PV of debt-to-revenue ratio keep rising over time. Regarding the bound tests, risk would mainly come from lower GDP growth. The latter underscore both the need for Zambia to diversify its production structure to mitigate vulnerabilities related to potential declines in mining production in the long term and to improve public investment management in order to ensure productivity-enhancing investments.

CONCLUSIONS

12.   Zambia is considered at low risk of debt distress. The external debt indicators remain below their thresholds in the baseline scenario and bound tests. The public debt DSA also suggests that Zambia's overall public sector debt dynamics is sustainable in light of the current size and the evolution of the domestic debt stock in the baseline scenario. On the other hand, the fixed primary balance scenario demonstrates the need for an improved fiscal position. Finally, in addition to sound macroeconomic policies, strengthening debt management and developing project appraisal capacity are needed in order to maintain debt sustainability and productivity-enhancing investments in the face of access to international markets and a gradual increase in non-concessional borrowing.

Figure 1. Zambia: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2012-2032 1/

a. Debt Accumulation

Legend:
- Rate of Debt Accumulation
- Grant-equivalent financing (% of GDP)
- Grant element of new borrowing (% right scale)

b.PV of debt-to GDP ratio

c.PV of debt-to-exports ratio

d.PV of debt-to-revenue ratio

e.Debt service-to-exports ratio

f.Debt service-to-revenue ratio

Legend:
- Baseline
- Historical scenario
- Most extreme shock 1/
- Threshold
- High investment-low growth
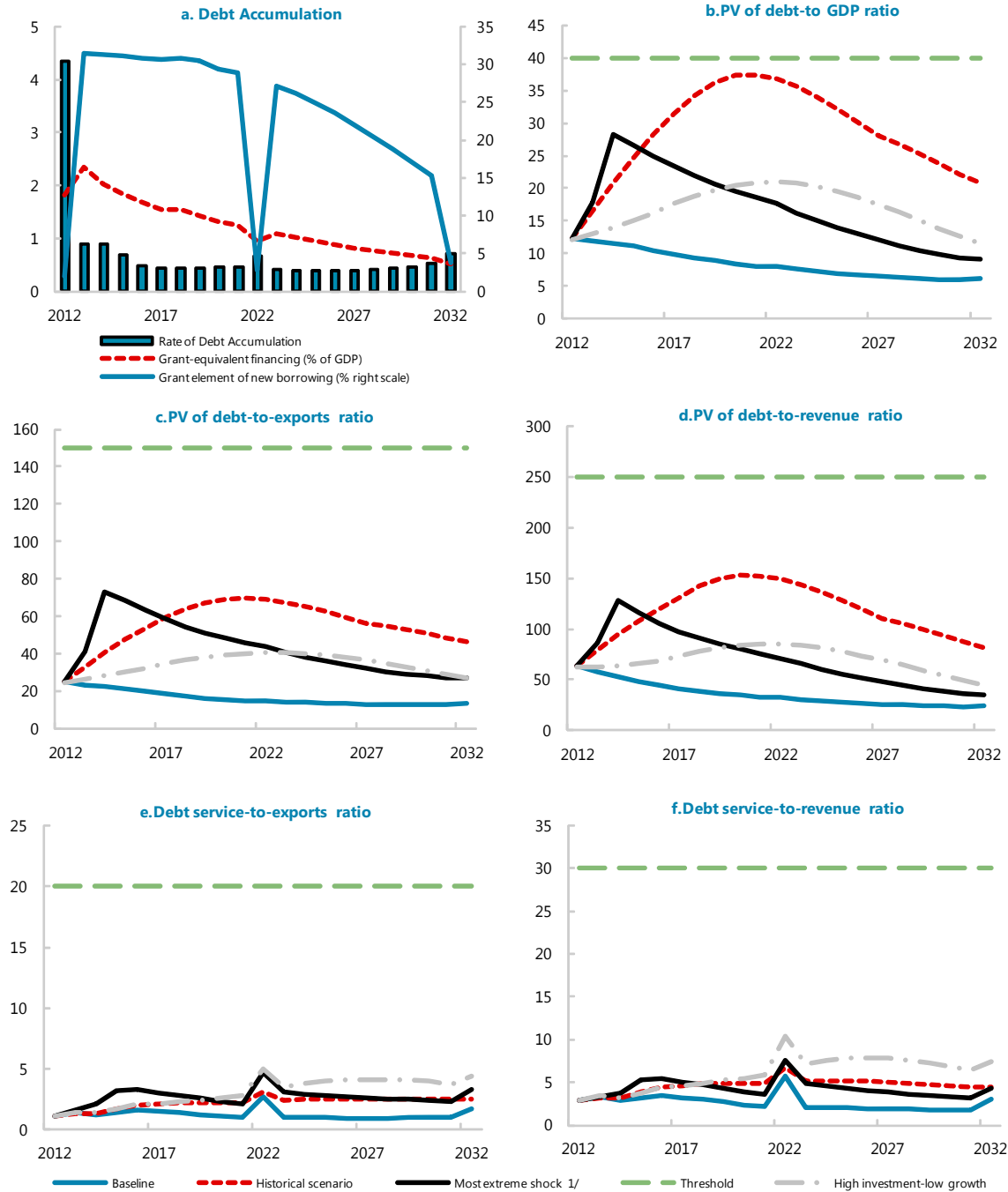
Sources: Country authorities; and staff estimates and projections.

1/ With respect to bound tests, the most extreme stress test that yields the highest ratio in 2022 corresponds to an export shock (figures b, c, and d).

Figure 2. Zambia: Indicators of Public Debt Under Alternative Scenarios, 2012-2032 1/
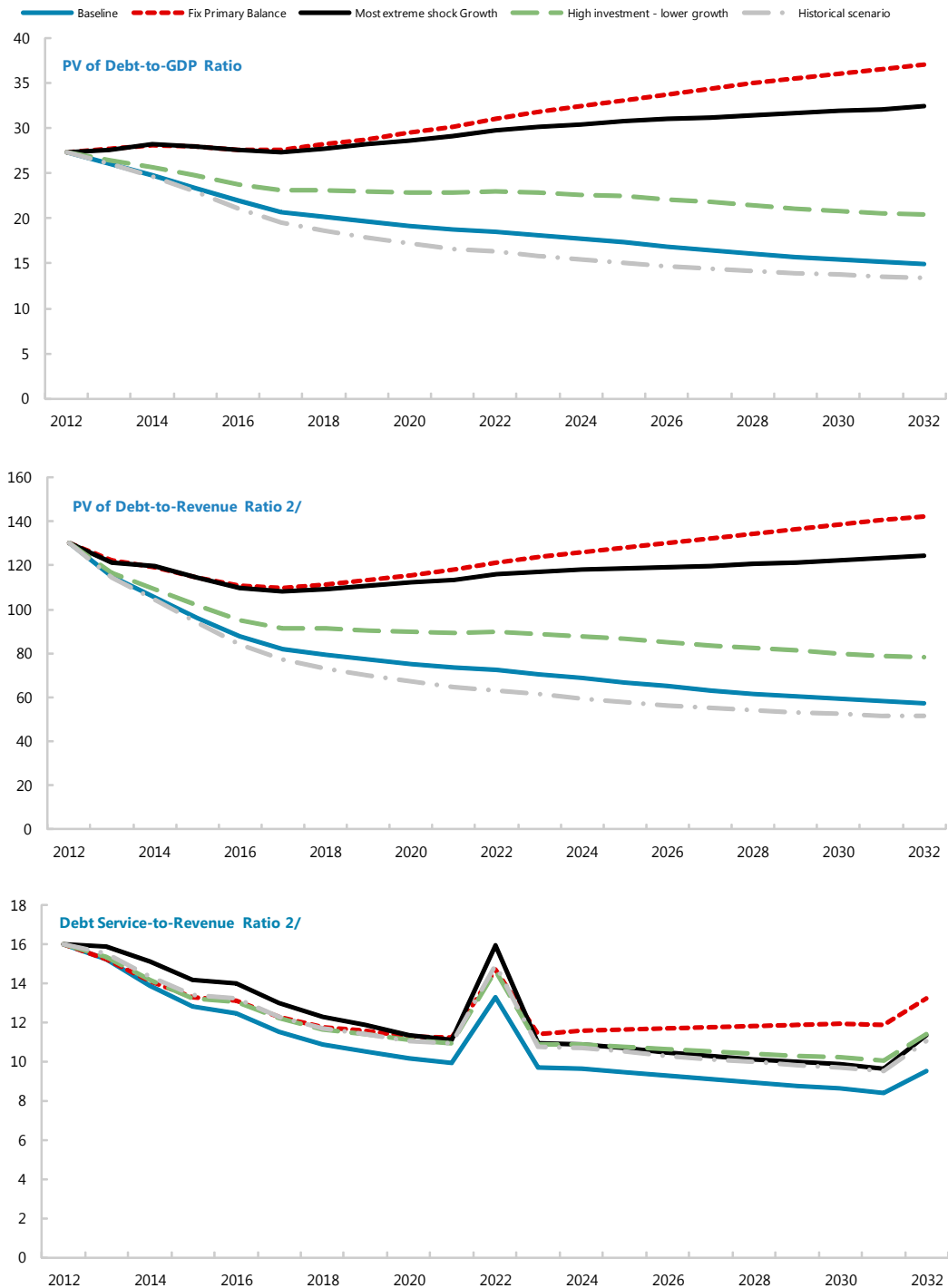

Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2022.

2/ Revenues are defined inclusive of grants.

Table 1.: External Debt Sustainability Framework, Baseline Scenario, 2009-2032 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 6/	Standard Deviation 6/	Projections						2012-2017 Average			2018-2032 Average
	2009	2010	2011			2012	2013	2014	2015	2016	2017		2022	2032	
External debt (nominal) 1/	**11.7**	**10.5**	**12.1**			**14.8**	**14.6**	**14.5**	**14.1**	**13.5**	**13.0**		**10.8**	**8.2**	
o/w public and publicly guaranteed (PPG)	11.1	10.0	11.6			14.4	14.2	14.0	13.6	13.1	12.5		10.4	7.9	
Change in external debt	0.1	-1.2	1.6			2.8	-0.2	-0.2	-0.4	-0.6	-0.5		-0.4	0.0	
Identified net debt-creating flows	-5.8	-13.4	-7.1			-6.8	-8.8	-9.1	-9.3	-9.8	-9.9		-6.7	-3.5	
Non-interest current account deficit	**-4.4**	**-7.2**	**-1.4**	**4.6**	**7.4**	**-1.4**	**-2.9**	**-3.3**	**-3.5**	**-3.8**	**-4.0**		**-1.6**	**0.1**	**-1.2**
Deficit in balance of goods and services	-3.4	-12.8	-7.5			-7.0	-8.2	-8.5	-8.7	-9.0	-9.2		-8.5	-3.7	
Exports	35.6	47.7	48.1			49.3	50.6	51.1	51.6	52.6	53.1		53.4	44.6	
Imports	32.2	34.9	40.5			42.3	42.4	42.6	42.9	43.6	43.9		44.9	40.9	
Net current transfers (negative = inflow)	-4.0	-2.7	-2.0	-3.9	1.4	-1.8	-1.9	-1.7	-1.6	-1.5	-1.4		-1.0	-0.5	-0.8
o/w official	-2.4	-1.5	-0.8			-0.6	-0.7	-0.7	-0.6	-0.6	-0.6		-0.4	-0.2	
Other current account flows (negative = net inflow)	3.1	8.3	8.2			7.4	7.2	7.0	6.8	6.7	6.6		7.8	4.3	
Net FDI (negative = inflow)	**-3.3**	**-3.9**	**-4.4**	**-6.2**	**2.5**	**-4.7**	**-5.1**	**-5.2**	**-5.3**	**-5.4**	**-5.4**		**-4.7**	**-3.3**	**-4.3**
Endogenous debt dynamics 2/	**1.9**	**-2.3**	**-1.3**			**-0.7**	**-0.7**	**-0.7**	**-0.6**	**-0.6**	**-0.5**		**-0.4**	**-0.3**	
Contribution from nominal interest rate	0.2	0.1	0.1			0.2	0.4	0.4	0.5	0.4	0.4		0.3	0.2	
Contribution from real GDP growth	-0.8	-0.7	-0.6			-0.9	-1.1	-1.0	-1.0	-1.0	-0.9		-0.7	-0.5	
Contribution from price and exchange rate changes	2.5	-1.7	-0.9			...	...	...	...	...	...		...	...	
Residual (3-4) 3/	**5.9**	**12.2**	**8.7**			**9.6**	**8.5**	**8.9**	**8.9**	**9.2**	**9.4**		**6.3**	**3.5**	
o/w 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/	...	...	9.6			12.7	12.3	12.0	11.5	10.9	10.3		8.3	6.4	
In percent of exports	...	...	19.9			25.9	24.4	23.5	22.3	20.7	19.4		15.6	14.3	
PV of PPG external debt	**...**	**...**	**9.1**			**12.3**	**11.9**	**11.6**	**11.1**	**10.5**	**9.9**		**8.0**	**6.1**	
In percent of exports	**...**	**...**	**19.0**			**25.0**	**23.5**	**22.7**	**21.5**	**19.9**	**18.6**		**14.9**	**13.7**	
In percent of government revenues	**...**	**...**	**42.9**			**63.9**	**57.0**	**52.7**	**48.3**	**44.2**	**41.1**		**32.2**	**24.0**	
Debt service-to-exports ratio (in percent)	**11.4**	**2.5**	**1.8**			**4.4**	**3.7**	**3.3**	**3.4**	**2.8**	**3.3**		**4.3**	**2.7**	
PPG debt service-to-exports ratio (in percent)	**1.2**	**0.6**	**0.4**			**1.1**	**1.4**	**1.2**	**1.4**	**1.6**	**1.5**		**2.7**	**1.7**	
PPG debt service-to-revenue ratio (in percent)	**2.7**	**1.7**	**1.0**			**2.9**	**3.4**	**2.8**	**3.2**	**3.5**	**3.2**		**5.8**	**3.0**	
Total gross financing need (Billions of U.S. dollars)	-0.5	-1.6	-0.9			-0.8	-1.4	-1.7	-1.9	-2.4	-2.6		-2.2	-2.9	
Non-interest current account deficit that stabilizes debt ratio	-4.5	-6.0	-2.9			-4.2	-2.7	-3.1	-3.1	-3.2	-3.5		-1.2	0.1	
Key macroeconomic assumptions															
Real GDP growth (in percent)	6.4	7.6	6.6	5.8	1.1	7.7	8.3	7.8	8.0	7.9	7.7	7.9	6.9	6.7	6.9
GDP deflator in US dollar terms (change in percent)	-17.8	17.5	9.2	12.5	16.3	-0.1	2.2	2.5	2.6	2.7	2.8	2.1	3.0	3.1	3.0
Effective interest rate (percent) 5/	1.6	1.1	1.4	1.4	0.5	1.8	2.8	2.9	3.5	3.5	3.4	3.0	3.1	3.1	3.1
Growth of exports of G&S (US dollar terms, in percent)	-13.3	69.4	17.2	27.3	29.6	10.3	13.7	11.7	11.7	12.9	11.8	12.0	9.6	8.0	8.9
Growth of imports of G&S (US dollar terms, in percent)	-24.7	37.2	35.2	18.5	20.0	12.2	10.9	11.1	11.6	12.5	11.4	11.6	10.2	8.5	9.6
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	2.0	31.5	31.3	31.1	30.9	30.7	26.3	2.9	3.8	21.5
Government revenues (excluding grants, in percent of GDP)	16.0	17.8	21.3			19.3	20.9	22.0	22.9	23.7	24.0		24.7	25.5	25.0
Aid flows (in Billions of US dollars) 7/	0.4	0.3	0.3			0.7	0.7	0.7	0.7	0.7	0.7		0.9	1.3	
o/w Grants	0.4	0.3	0.3			0.4	0.4	0.4	0.4	0.4	0.4		0.5	0.7	
o/w Concessional loans	0.0	0.0	0.0			0.3	0.3	0.3	0.3	0.3	0.3		0.4	0.7	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			1.8	2.3	2.0	1.8	1.7	1.6		1.0	0.5	1.0
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			29.9	68.3	66.6	66.0	65.6	65.5		35.5	30.0	55.8
Memorandum items:															
Nominal GDP (Billions of US dollars)	12.8	16.2	18.8			20.3	22.4	24.8	27.5	30.4	33.7		55.3	143.1	
Nominal dollar GDP growth	-12.5	26.4	16.3			7.6	10.7	10.5	10.8	10.8	10.6	10.2	10.2	10.0	10.1
PV of PPG external debt (in Billions of US dollars)			1.6			2.5	2.6	2.8	3.0	3.2	3.3		4.4	8.7	
(PVt-PVt-1)/GDPt-1 (in percent)						4.4	0.9	0.9	0.7	0.5	0.5	1.3	0.7	0.7	0.5
Gross workers' remittances (Billions of US dollars)	0.0	0.0	0.0			0.1	0.1	0.1	0.1	0.1	0.1		0.1	0.2	
PV of PPG external debt (in percent of GDP + remittances)	...	...	9.1			12.3	11.9	11.6	11.1	10.4	9.8		7.9	6.1	
PV of PPG external debt (in percent of exports + remittances)	...	...	18.9			24.9	23.4	22.5	21.4	19.8	18.5		14.8	13.7	
Debt service of PPG external debt (in percent of exports + remittances)	...	...	0.4			1.1	1.4	1.2	1.4	1.6	1.5		2.7	1.7	

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. Zambia: Public Sector Debt Sustainability Framework Baseline Scenario, 2009–32
(In percent of GDP, unless otherwise indicated)

	Actual			Average 5/	Standard Deviation 5/	Estimate	Projections					2012-17 Average			2018-32 Average
	2009	2010	2011			2012	2013	2014	2015	2016	2017		2022	2032	
Public sector debt 1/	28.1	26.6	27.7			29.5	28.4	27.2	26.0	24.5	23.4		21.0	16.8	
o/w foreign-currency denominated	11.1	10.0	11.6			14.4	14.2	14.0	13.6	13.1	12.5		10.4	7.9	
Change in public sector debt	2.9	-1.4	1.1			1.8	-1.1	-1.1	-1.3	-1.4	-1.2		-0.4	-0.3	
Identified debt-creating flows	-1.4	-1.0	0.5			1.2	-0.5	-0.3	-0.1	-0.2	-0.2		-0.2	-0.4	
Primary deficit	0.9	1.4	2.4	-0.2	1.5	2.5	0.5	0.5	0.8	0.7	0.6	0.9	0.4	0.2	0.3
Revenue and grants	18.9	19.6	22.7			21.0	22.7	23.5	24.3	25.0	25.2		25.6	26.0	
of which: grants	2.9	1.8	1.4			1.7	1.8	1.6	1.4	1.3	1.2		0.9	0.5	
Primary (noninterest) expenditure	19.7	20.9	25.1			23.5	23.2	24.0	25.1	25.7	25.8		26.0	26.2	
Automatic debt dynamics	-2.6	-2.7	-2.3			-1.7	-1.4	-1.2	-1.3	-1.2	-1.1		-0.8	-0.6	
Contribution from interest rate/growth differential	-1.3	-2.0	-2.1			-1.4	-1.2	-1.0	-1.1	-1.0	-0.9		-0.6	-0.4	
of which: contribution from average real interest rate	0.2	-0.1	-0.5			0.6	1.1	1.1	1.0	0.9	0.9		0.8	0.7	
of which: contribution from real GDP growth	-1.5	-2.0	-1.6			-2.0	-2.2	-2.1	-2.0	-1.9	-1.7		-1.4	-1.1	
Contribution from real exchange rate depreciation	-1.3	-0.7	-0.1			-0.3	-0.3	-0.2	-0.2	-0.2	-0.2		...	...	
Other identified debt-creating flows	0.3	0.3	0.4			0.4	0.4	0.4	0.4	0.3	0.3		0.3	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	0.3	0.3	0.4			0.4	0.4	0.4	0.4	0.3	0.3		0.3	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 (specify, e.g. bank recapitalization)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes	4.3	-0.4	0.5			0.6	-0.6	-0.8	-1.1	-1.3	-1.0		-0.3	0.1	
Other Sustainability Indicators															
PV of public sector debt	...	...	25.2			27.4	26.1	24.8	23.4	21.9	20.7		18.5	15.0	
o/w foreign-currency denominated	...	...	9.1			12.3	11.9	11.6	11.1	10.5	9.9		8.0	6.1	
o/w external	...	...	9.1			12.3	11.9	11.6	11.1	10.5	9.9		8.0	6.1	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	8.3	9.6	9.7			10.4	7.9	7.9	7.7	7.4	6.9		6.9	5.3	
PV of public sector debt-to-revenue and grants ratio (in percent)	...	...	111.2			130.3	115.0	105.4	96.2	87.8	82.2		72.4	57.6	
PV of public sector debt-to-revenue ratio (in percent)	...	...	118.3			142.1	125.1	112.9	102.1	92.5	86.3		75.1	58.6	
o/w external 3/	...	...	42.9			63.9	57.0	52.7	48.3	44.2	41.1		32.2	24.0	
Debt service-to-revenue and grants ratio (in percent) 4/	15.9	16.6	11.8			16.0	15.2	13.9	12.8	12.5	11.5		13.3	9.5	
Debt service-to-revenue ratio (in percent) 4/	18.8	18.2	12.5			17.4	16.6	14.9	13.6	13.1	12.1		13.8	9.7	
Primary deficit that stabilizes the debt-to-GDP ratio	-2.1	2.8	1.4			0.7	1.6	1.7	2.0	2.1	1.8		0.8	0.5	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	6.4	7.6	6.6	5.8	1.1	7.7	8.3	7.8	8.0	7.9	7.7	7.9	6.9	6.7	6.9
Average nominal interest rate on forex debt (in percent)	1.0	0.6	0.9	1.2	0.6	1.4	2.6	2.6	2.6	2.6	2.7	2.4	2.6	2.9	2.6
Average real interest rate on domestic debt (in percent)	1.7	0.0	-2.5	-2.5	2.5	3.4	6.0	6.5	6.0	6.4	6.3	5.8	6.0	6.0	6.0
Real exchange rate depreciation (in percent, + indicates depreciation)	-12.4	-6.4	-1.5	-7.1	11.5	-2.7	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	10.7	11.7	10.6	14.9	4.2	6.8	4.8	4.6	4.5	4.6	4.7	5.0	5.0	5.0	5.0
Growth of real primary spending (deflated by GDP deflator, in percent)	-0.1	0.1	0.3	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Grant element of new external borrowing (in percent)	...	...	...	...	...	2.0	31.5	31.3	31.1	30.9	30.7	26.3	2.9	3.8	...

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.

Table3. Zambia: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2012–32
(In percent)

	Projections							
	2012	2013	2014	2015	2016	2017	**2022**	2032
PV of debt-to GDP ratio								
Baseline	12	12	12	11	10	10	**8**	6
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2012-2032 1/	12	17	21	25	28	31	**37**	21
A2. New public sector loans on less favorable terms in 2012-2032 2	12	13	13	13	12	12	**11**	10
A3. Alternative Scenario : High investment-low growth	12	13	14	15	16	18	**21**	11
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2013-2014	12	12	12	12	11	10	**8**	6
B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/	12	18	28	27	25	23	**18**	9
B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014	12	13	13	12	12	11	**9**	7
B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/	12	12	13	12	11	11	**9**	6
B5. Combination of B1-B4 using one-half standard deviation shocks	12	11	10	10	9	9	**7**	6
B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/	12	17	16	16	15	14	**11**	9
PV of debt-to-exports ratio								
Baseline	25	24	23	22	20	19	**15**	14
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2012-2032 1/	25	33	41	48	54	59	**69**	47
A2. New public sector loans on less favorable terms in 2012-2032 2	25	25	25	25	24	23	**20**	23
A3. Alternative Scenario : High investment-low growth	25	27	28	30	32	35	**41**	27
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2013-2014	25	23	22	21	20	18	**15**	14
B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/	25	41	73	69	63	59	**44**	27
B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014	25	23	22	21	20	18	**15**	14
B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/	25	25	25	24	22	20	**16**	14
B5. Combination of B1-B4 using one-half standard deviation shocks	25	23	20	19	18	16	**13**	13
B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/	25	23	22	21	20	18	**15**	14
PV of debt-to-revenue ratio								
Baseline	64	57	53	48	44	41	**32**	24
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2012-2032 1/	64	80	95	108	119	131	**149**	81
A2. New public sector loans on less favorable terms in 2012-2032 2	64	61	59	56	53	51	**44**	40
A3. Alternative Scenario : High investment-low growth	63	62	64	65	69	74	**85**	45
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2013-2014	64	58	56	51	47	43	**34**	25
B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/	64	86	128	116	105	98	**71**	35
B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014	64	60	59	54	49	46	**36**	27
B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/	64	60	58	53	48	45	**35**	25
B5. Combination of B1-B4 using one-half standard deviation shocks	64	54	47	43	40	37	**29**	23
B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/	64	80	74	68	62	58	**45**	33

Table3. Zambia: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2012–32 (continued)
(In percent)

Debt service-to-exports ratio								
Baseline	1	1	1	1	2	1	**3**	2
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2012-2032 1/	1	1	1	2	2	2	**3**	3
A2. New public sector loans on less favorable terms in 2012-2032 2	1	1	1	1	1	1	**1**	1
A3. Alternative Scenario : High investment-low growth	1	1	1	2	2	2	**5**	4
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2013-2014	1	1	1	1	2	1	**3**	2
B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/	1	2	2	3	3	3	**5**	3
B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014	1	1	1	1	2	1	**3**	2
B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/	1	1	1	1	2	2	**3**	2
B5. Combination of B1-B4 using one-half standard deviation shocks	1	1	1	1	2	1	**3**	2
B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/	1	1	1	1	2	1	**3**	2
Debt service-to-revenue ratio								
Baseline	3	3	3	3	4	3	**6**	3
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2012-2032 1/	3	3	3	4	4	5	**7**	4
A2. New public sector loans on less favorable terms in 2012-2032 2	3	3	2	3	3	3	**2**	2
A3. Alternative Scenario : High investment-low growth	3	3	3	4	4	5	**10**	7
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2013-2014	3	3	3	3	4	3	**6**	3
B2. Export value growth at historical average minus one standard deviation in 2013-2014 3/	3	3	4	5	5	5	**8**	4
B3. US dollar GDP deflator at historical average minus one standard deviation in 2013-2014	3	4	3	4	4	4	**7**	3
B4. Net non-debt creating flows at historical average minus one standard deviation in 2013-2014 4/	3	3	3	3	4	3	**6**	3
B5. Combination of B1-B4 using one-half standard deviation shocks	3	3	3	3	3	3	**6**	3
B6. One-time 30 percent nominal depreciation relative to the baseline in 2013 5/	3	5	4	4	5	5	**8**	4
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	14	14	14	14	14	14	**14**	14

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 4. Zambia: Sensitivity Analysis for Key Indicators of Public Debt, 2012–32

				Projections				
	2012	2013	2014	2015	2016	2017	2022	2032
PV of Debt-to-GDP Ratio								
Baseline	27	26	25	23	22	21	19	15
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	27	26	25	23	21	20	16	13
A2. Primary balance is unchanged from 2012	27	28	28	28	28	28	31	37
A3. Permanently lower GDP growth 1/	27	26	25	24	23	22	21	23
A4. Alternative Scenario : High investment-lower growth	27	26	26	25	24	23	23	20
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2013-2014	27	28	28	28	28	27	30	32
B2. Primary balance is at historical average minus one standard deviations in 2013-2014	27	27	26	25	23	22	19	15
B3. Combination of B1-B2 using one half standard deviation shocks	27	27	26	26	25	25	27	29
B4. One-time 30 percent real depreciation in 2013	27	31	29	27	25	24	21	17
B5. 10 percent of GDP increase in other debt-creating flows in 2013	27	35	33	31	29	27	23	17
PV of Debt-to-Revenue Ratio 2/								
Baseline	130	115	105	96	88	82	72	58
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	130	115	105	94	84	77	63	51
A2. Primary balance is unchanged from 2012	130	122	119	115	111	110	121	142
A3. Permanently lower GDP growth 1/	130	115	106	98	90	86	83	90
A4. Alternative Scenario : High investment-lower growth	130	117	109	102	95	92	90	78
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2013-2014	130	121	120	115	110	108	116	124
B2. Primary balance is at historical average minus one standard deviations in 2013-2014	130	118	111	101	92	86	75	59
B3. Combination of B1-B2 using one half standard deviation shocks	130	118	111	106	101	99	105	111
B4. One-time 30 percent real depreciation in 2013	130	137	124	113	102	95	81	65
B5. 10 percent of GDP increase in other debt-creating flows in 2013	130	153	140	127	116	108	91	67
Debt Service-to-Revenue Ratio 2/								
Baseline	16	15	14	13	12	12	13	10
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	16	16	14	13	13	12	15	11
A2. Primary balance is unchanged from 2012	16	15	14	13	13	12	15	13
A3. Permanently lower GDP growth 1/	16	15	14	13	13	12	14	11
A4. Alternative Scenario : High investment-lower growth	16	15	14	13	13	12	15	11
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2013-2014	16	16	15	14	14	13	15	13
B2. Primary balance is at historical average minus one standard deviations in 2013-2014	16	15	14	13	13	12	13	10
B3. Combination of B1-B2 using one half standard deviation shocks	16	16	15	13	13	12	15	12
B4. One-time 30 percent real depreciation in 2013	16	16	15	14	14	13	16	11
B5. 10 percent of GDP increase in other debt-creating flows in 2013	16	15	15	14	13	12	14	10

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.