

INTERNATIONAL DEVELOPMENT ASSOCIATION
INTERNATIONAL MONETARY FUND

ZAMBIA

**Joint Bank/Fund Debt Sustainability Analysis 2009 Under the
Debt Sustainability Framework for Low Income Countries**

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Based on the Joint Bank- Fund Debt Sustainability Framework for Low-income Countries (LIC DSA), Zambia's risk of external debt distress remains low as all debt indicators stay well below the indicative policy thresholds throughout the projection period (2009–29).¹ Due to the authorities' conservative debt policy and strategy, the debt level has remained broadly unchanged since Zambia received debt relief under HIPC and MDRI in early 2006. The authorities have received technical assistance from the Bank and the Fund to further improve on debt management practices.² While this favorable situation leaves some room for new borrowing, particularly to invest in much needed projects in the energy sector,³ the authorities' intention to contract substantial amounts of new non-concessional external debt bears close monitoring, to ensure that projects so financed are viable, that debt remains properly managed, and that debt burden indicators do not start increasing sharply. While some of this financing should preferably come in the form of FDI, it is prudent to assume at this stage that it will be in the form of non-concessional borrowing. For this reason, this DSA incorporates an amount for such anticipated borrowing in the baseline scenario, even if the debt has not been contracted.

¹ Previous LIC DSAs in 2005 and 2007 (EBS/05/199, Appendix VI, and SM/07/373, Supplement 2) indicated that Zambia is at a low risk of debt distress.

² At the request of the Ministry of Finance and National Planning, a joint World Bank-IMF mission visited Lusaka, August 26–September 7, 2009, to provide technical assistance in debt management strategy formulation and feedback on the authorities' existing debt management strategy.

³ Preliminary estimates indicate that the construction of three hydropower plants (Itezhi Tezhi, Kariba North, and Lower Kafue Gorge) during 2010–16, would require financing in the order of US\$1.7 billion.

I. BACKGROUND

1. **Zambia's stock of external debt declined substantially with the advent of the HIPC Initiative and MDRI;** external debt-to-GDP declined from about 86 percent in 2005 to around 9 percent in 2006. The debt ratio increased marginally to 11.5 percent of GDP in 2008, most of which is public and publicly guaranteed debt (PPG).⁴

Zambia: Public External Debt

	In percent of GDP			In percent of goods and services exports	
	2005	2006	2008	2006	2008
Gross external debt	86.0	8.8	11.0	24.5	23.9
Medium- and long-term debt	86.0	8.8	11.0	24.5	23.9
Multilateral	49.1	5.5	5.3	13.5	14.8
IMF	8.1	0.4	0.6	0.8	1.8
Other	41.0	5.1	4.7	12.7	13.0
Bilateral official	35.9	2.7	1.0	9.5	2.9
Paris Club	32.8	1.9	0.9	5.1	2.5
Other	3.0	0.9	0.1	4.4	0.4
Suppliers and other	1.0	0.6	4.7	1.5	6.3

Sources: Bank of Zambia; and staff estimates.

2. **At end 2005, public debt was about 105 percent of GDP, 18 percent of which was domestic debt.** After extensive debt relief from foreign creditors, Zambia's public debt decreased to 27 percent of GDP in 2006 and further to 26 percent in 2009. The share of domestic debt is now just below 60 percent. Treasury bills and bonds comprise 95 percent of domestic debt. Around 15 percent of the total is held by foreigners.⁵

Zambia: Structure of Public Sector Debt

	2005	2006	2008
Public debt	100.0	100.0	100.0
External debt	81.8	32.2	41.7
Domestic debt	18.2	67.8	58.3

Sources: Bank of Zambia; and staff estimates.

⁴ Statutory obligations attributed to state owned enterprises are accounted for under PPG as contingent liabilities. While private debt constitutes debt of non-mining private companies, some of it stems from former state owned enterprises operating under the commercial code.

⁵ Contingent liabilities in kwacha are excluded, estimated at 6 percent of GDP.

II. MACROECONOMIC ASSUMPTIONS⁶

3. **While Zambia was negatively affected by the global economic downturn, the medium-term outlook remains relatively favorable due to productivity increases in recent years on account of high investment in the mining sector.** The mining sector, which was hit hard in the fourth quarter of 2008 due to a steep drop in copper prices, recovered promptly as copper prices recovered in the first half of 2009. Lasting recovery, however, will depend on sustained growth in the sector and the resumption of capital inflows, both of which hinge on the resumption of global demand. Fiscal policy aims to safeguard macroeconomic stability while prioritizing infrastructure development. In concert, monetary policy aims at keeping inflation on a downward path while providing much needed support for growth. Although the balance of payments position has been temporarily weakened by the crisis, full recovery is expected in the medium term. Over time the Zambian economy is expected to diversify as nonmining activity expands in response to improvements in the business environment and infrastructure. There is considerable untapped potential in agriculture and tourism but much remains to be done with respect to investment in infrastructure, particularly in the energy sector.

The baseline scenario incorporates the following assumptions:

- Economic growth: Real GDP is estimated at 5.3 percent in 2009, 5.5 percent in 2010, 6.0 percent by 2011, and 6.4 percent by 2014, supported primarily by activity in mining and construction. While investment in energy is expected to benefit all sectors over time, the mining industry is expected to be the immediate beneficiary. Diversification is, however, necessary in order to make up for the eventual decline in mining activity, as this non-renewable resource will ultimately be depleted. But investment in tourism and agriculture are not expected to be as resource intensive as mining and energy. Hence, once the near-term investment and construction impact slows, growth is expected to stabilize at a rate slightly below 6 percent in the long-run. An average growth rate in the order of 5.4 percent in the period 2015–19 is envisaged.⁷

⁶ For more details on the macroeconomic framework see Zambia - 2009 Staff Report for the Article IV Consultation and Third Review Under the PRGF (SM/09/xx)

⁷ The growth story is broadly unchanged since the 2007 DSA: It stated that, real GDP would continue to grow at 6–6½ percent a year through 2012, supported primarily by developments in the copper and construction sectors. Over time, however, the Zambian economy would be expected to diversify as noncopper sectors expand in response to an improved business environment and infrastructure. Hence, long run growth was expected to stabilize at 4½ percent.

- Inflation: The current objective of monetary policy is to reduce inflation to 12 percent by end-2009 and to single digits thereafter. Prudent monetary and fiscal policies should make it possible to reduce inflation to around 5 percent in the medium term.
- External sector: Long-term mining volume is expected to grow in line with GDP. While copper will undoubtedly remain Zambia's most important export, its share in total exports is expected to decline gradually over time. Foreign direct investment peaked at 12 percent of GDP in 2007. It is expected to decline to around 3 percent of GDP by 2014,⁸ as investment in the mining sector slows due to capacity constraints. Diversification into other industries such as agriculture and tourism is unlikely to be as resource intensive as mining.
- Government revenue and expenditure: Government revenues would rise gradually from 15.6 percent of GDP in 2009 to 19 percent by 2029, mainly from improvements in tax administration; no change in the tax system is assumed. Expenditures would rise gradually and stay at about 22 percent of GDP.
- Financing: Grant equivalent external financing is 5.5 percent of GDP in 2009, declines to about 3 percent of GDP over the medium term, and stabilizes at about 2 percent thereafter. Domestic financing is 2.2 percent of GDP in 2009 and declines to around 1 percent of GDP by 2015 where it stabilizes thereafter.
- The baseline scenario assumes new public borrowing for energy projects on commercial terms in the order of US\$1.7 billion in 2010-2016. At this relatively modest level, commercial borrowing would not pose any threat to external debt sustainability. It is assumed that commercial debt will continue to grow thereafter, albeit at a slower pace. The average grant element of new borrowing declines thus from 27 percent in 2009 to about 10 percent in 2010–16, and rises thereafter to 21 percent.

III. EXTERNAL DEBT SUSTAINABILITY

Baseline scenario

4. **Although external debt burden indicators rise in the medium term, they are expected to remain well below the indicative policy thresholds over the projection period (Figure 1 and Table 1).**⁹ The stock of external debt is expected to remain around 12–17 percent

⁸ The 2007 DSA concluded in comparison that annual foreign direct investment would decline to an average of 2½ percent for 2008–12 and to 1½ percent of GDP over the long run.

⁹ The World Bank's Country Policy and Institutions Assessment (CPIA) ranks Zambia as a medium performer (the average 2006-08 CPIA totals 3.46). Thus, the external debt burden thresholds for Zambia are (i) PV of debt-to-GDP: 40 percent; (ii) PV of debt-to-exports: 150 percent; (iii) PV of debt-to-revenue: 250 percent; (iv) debt service to exports: 20 percent; and (v) debt service to revenue: 30 percent.

of GDP through 2014 and decline thereafter. The present value (PV) of public and publicly guaranteed (PPG) debt to GDP is in the 8–13 percent range through 2014, well below the 40 percent threshold, and declines thereafter. The PV of debt to exports increases from 21 percent in 2008 to 44 percent by 2014, well below the 150 percent threshold, and declines thereafter. PV of public and publicly guaranteed (PPG) debt to revenue increases from 41 in 2008 to around 80 in 2012–14 after which it declines. This compares to a threshold of 250. Debt service in percent of exports increases from 1.5 in 2008 to 5 by 2014, compared to the 20 percent threshold. PPG debt service in percent of revenue is in the 2.5-9.0 range through 2014 and declines thereafter, as compared to a threshold of 30.

Stress tests and alternative scenarios

5. **The standard sensitivity analysis points to a low risk of debt distress in absolute an relative terms, particularly as compared to the situation prior to debt relief** (Table 3). Under the historical scenario, debt burden indicators rise significantly over time without, however, breaching the indicative thresholds. This scenario reflects the poor performance of the Zambian economy from 1999 through 2002. Under this scenario, the external non-interest current account deficit remains at 10.1 percent of GDP from 2009 to 2029—significantly higher than the deficit assumed in the baseline scenario (2.4 percent by 2019). As a result, the PV of debt-to-revenue ratio rises steadily from 53 percent in 2009 to 158 by 2019 and 170 by 2029, as compared to the threshold of 250. Similar trajectories are experienced for other solvency indicators, but in all cases the thresholds are not breached.

6. The most extreme stress test reflects the one standard deviation shock to exports of goods and services assumed to occur in 2010 and 2011 before returning to baseline growth rates. As a result of this shock, the PV of debt-to-exports rises from 24 percent in 2009 to its peak of 118 percent in 2013 and dissipates thereafter. This compares to a threshold of 150 percent of GDP. All bound tests result in stable ratios higher than the baseline, but well below the thresholds. Thus, even under difficult circumstances, Zambia’s risk of debt distress is low. The scenario based on historical averages points to the need to diversify Zambia’s exports away from copper as a means to make it even more resilient to external shocks.

IV. PUBLIC DEBT SUSTAINABILITY

Baseline scenario

7. **Zambia’s public debt remains stable over the projection period** (Table 2 and Figure 2). It increases marginally from 26 percent of GDP in 2008 to 28 percent by 2011 and declines thereafter to 18 percent by 2019. Thus, public debt is relatively modest and manageable.

Stress tests and alternative scenarios

8. **The standard sensitivity analysis shows that Zambia's public debt is also resilient to shocks** (Table 4). The alternative scenarios and bound tests show that the outlook for public debt sustainability is benign. In an alternative scenario where the primary balance is unchanged from 2009, the PV of debt-to-GDP reaches 21 percent in 2019, as compared to 15 in the baseline. This ratio increases marginally to 22 percent under the bound tests (real GDP growth is at historical average minus one standard deviations in 2010–11; and 10 percent of GDP increase in other debt-creating flows in 2010). In contrast, the PV of debt-to-revenue ratio appears to be under some stress in the medium term. It peaks at 185 in 2011, as compared to the baseline of 132, under one alternative bound test (10 percent of GDP increase in other debt creating flows in 2010). This underscores the importance of macroeconomic stability.

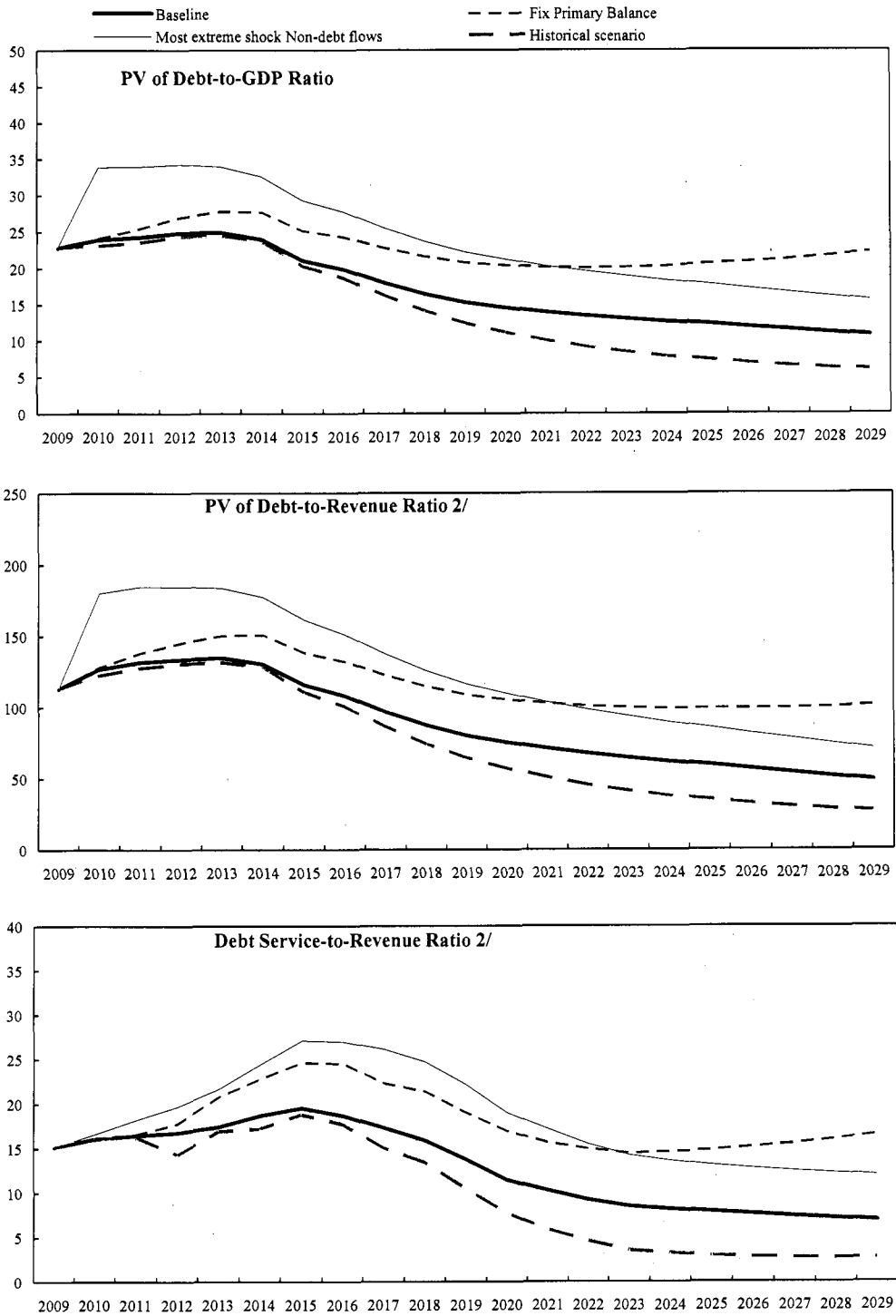
V. CONCLUSION

9. **The application of the Joint Fund-Bank LIC DSA indicates that Zambia's debt outlook remains strong resulting in a low risk of external debt distress rating.** The external debt indicators remain well below the thresholds in the alternative scenarios and the bound stress tests. The risks to public debt are also low. In order to preserve debt sustainability going forward, the authorities will have to continue the practice of constraining external borrowing on non-concessional terms while being mindful that the room for domestic debt accumulation is constrained by high domestic interest rates.

Attachments

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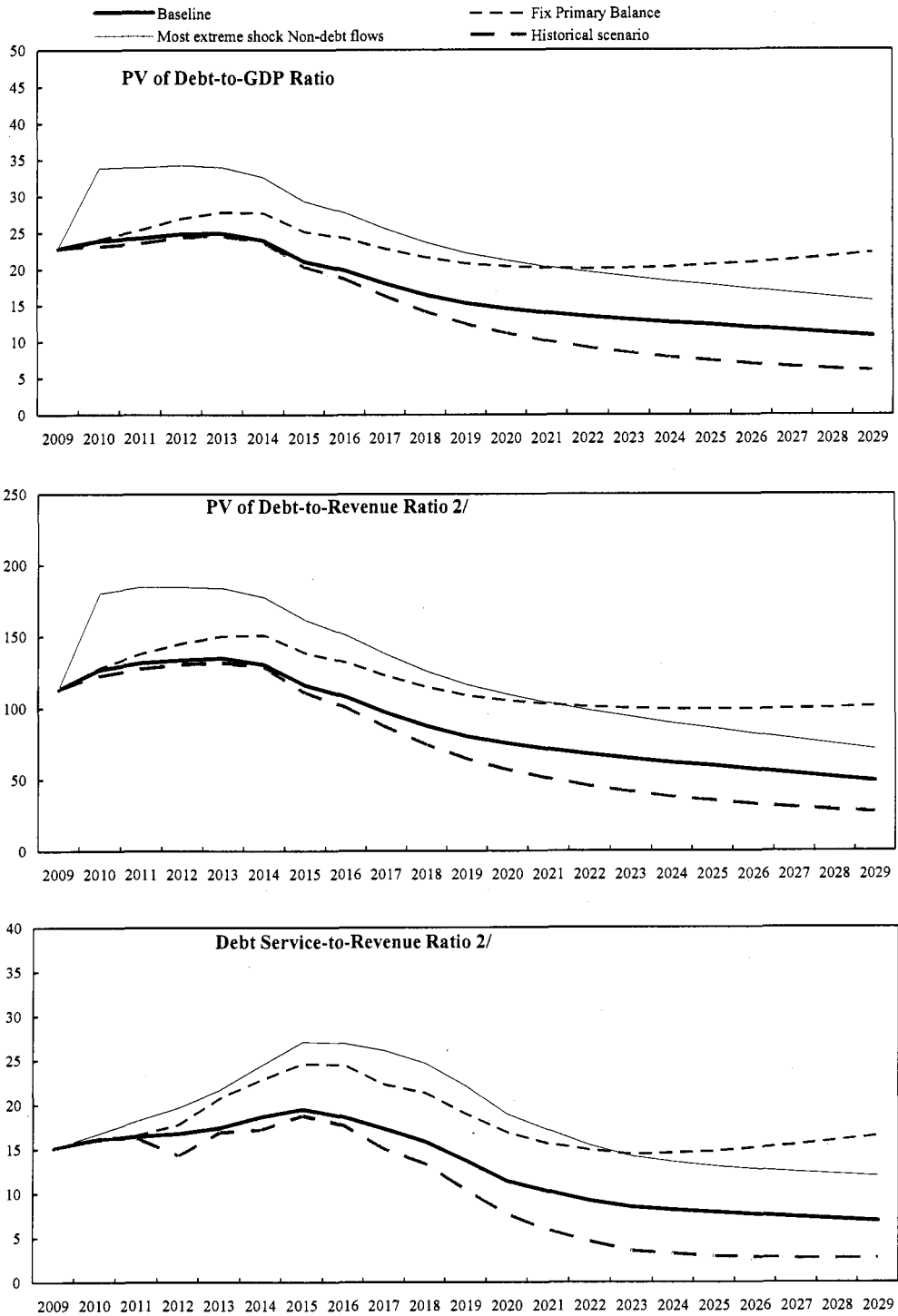


Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2019.

2/ Revenues are defined inclusive of grants.

Figure 2. Zambia: Indicators of Public Debt Under Alternative Scenarios, 2009-2029 1/



Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2019.

2/ Revenues are defined inclusive of grants.

Table 1: External Debt Sustainability Framework, Baseline Scenario, 2006-2029 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical		Projections									
	2006	2007	2008	Average	Standard Deviation	2009	2010	2011	2012	2013	2014	2009-2014 Average	2019	2029	2015-2029 Average
External debt (nominal) 1/	8.8	9.4	11.5			12.3	14.4	15.4	16.5	17.0	16.5		11.1	7.8	
o/w public and publicly guaranteed (PPG)	8.8	9.2	11.0			11.8	13.9	15.0	16.0	16.5	16.0		10.6	7.3	
Change in external debt	-80.0	0.6	2.1			0.8	2.1	1.0	0.5	-0.5	0.2		-0.9	-0.3	
Identified net debt-creating flows	-33.8	-5.4	-1.3			-2.0	-0.8	-0.9	-0.3	0.2	0.2		-0.6	-1.2	
Non-interest current account deficit	-0.2	6.5	7.0	10.1	5.2	4.0	3.7	3.7	3.7	3.8	3.9		2.4	0.2	1.7
Deficit in balance of goods and services	-8.0	-2.2	1.4			2.2	1.1	0.6	0.8	1.3	1.8		1.2	0.1	
Exports	37.5	41.4	35.8			35.1	33.4	33.3	33.9	32.2	32.0		30.2	30.8	
Imports	29.6	39.2	37.3			37.3	34.5	33.9	32.2	32.0	31.8		31.4	30.9	
Net current transfers (negative = inflow)	-2.4	-4.6	-3.8	-4.4	1.2	-3.2	-2.6	-2.8	-2.5	-2.3	-2.1		-1.5	-0.8	-1.3
o/w official	-3.1	-2.6	-2.2			-2.1	-1.6	-1.6	-1.4	-1.3	-1.2		-0.9	-0.5	
Other current account flows (negative = net inflow)	10.2	13.3	9.4			4.9	5.2	5.8	5.4	4.7	4.2		2.6	1.0	
Net FDI (negative = inflow)	-4.3	-11.5	-6.4	-6.1	2.7	-5.5	-4.1	-4.1	-3.4	-3.1	-3.2		-2.6	-1.3	-2.3
Endogenous debt dynamics 2/	-29.4	-0.4	-1.9			-0.5	-0.4	-0.6	-0.6	-0.5	-0.5		-0.4	-0.2	
Contribution from nominal interest rate	0.2	0.1	0.2			0.2	0.1	0.2	0.3	0.4	0.5		0.3	0.2	
Contribution from real GDP growth	-3.7	-0.5	-0.4			-0.7	-0.5	-0.8	-0.9	-0.9	-1.0		-0.6	-0.3	
Contribution from price and exchange rate changes	-25.8	0.0	-1.6			...	...	...	...	...	...		...	...
Residual (3-4) 3/	-46.2	6.0	3.4			2.8	2.9	1.9	1.3	0.3	-0.7		-0.3	0.9	
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/	...	...	8.1			8.9	11.0	12.1	13.4	14.1	13.7		8.6	6.3	
In percent of exports	...	...	22.6			25.3	32.9	36.4	42.5	46.0	45.8		28.5	20.5	
PV of PPG external debt	...	...	7.6			8.3	10.5	11.6	12.9	13.6	13.2		8.1	5.8	
In percent of exports	...	...	21.3			23.7	31.4	35.0	41.0	44.4	44.2		26.9	18.9	
In percent of government revenues	...	...	41.1			53.0	66.1	73.4	78.9	82.5	79.8		47.1	29.5	
Debt service-to-exports ratio (in percent)	60.4	1.4	1.5			1.5	1.5	2.2	3.3	4.2	5.2		4.3	2.1	
PPG debt service-to-exports ratio (in percent)	60.4	1.2	1.2			1.2	1.2	1.9	2.9	3.8	4.8		3.9	1.7	
PPG debt service-to-revenue ratio (in percent)	105.7	2.8	2.3			2.6	2.4	3.9	5.6	7.1	8.7		6.9	2.7	
Total gross financing need (Billions of U.S. dollars)	2.0	-0.5	0.2			-0.1	0.0	0.1	0.2	0.4	0.5		0.4	-0.3	
Non-interest current account deficit that stabilizes debt ratio	79.8	5.8	4.9			3.2	1.6	2.7	2.6	3.3	4.4		3.3	0.6	
Key macroeconomic assumptions															
Real GDP growth (in percent)	6.2	6.2	5.7	4.8	1.3	5.3	5.5	6.0	6.2	6.3	6.4		6.0	5.7	4.5
GDP deflator in US dollar terms (change in percent)	41.0	-0.2	20.3	11.8	14.8	-18.6	17.7	0.8	3.5	3.3	3.4		1.7	3.0	3.0
Effective interest rate (percent) 5/	0.3	0.9	2.1	1.7	0.7	1.4	1.2	1.8	2.3	2.8	3.1		2.1	2.5	2.2
Growth of exports of G&S (US dollar terms, in percent)	66.8	17.0	9.9	21.3	25.7	-16.1	18.4	6.4	3.9	7.1	7.5		4.5	9.1	7.9
Growth of imports of G&S (US dollar terms, in percent)	22.4	40.4	20.9	16.7	14.0	-14.2	14.9	5.0	4.5	9.1	9.2		4.8	8.7	7.5
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	27.6	12.1	13.1	6.7	6.6	11.1		12.9	23.0	17.9
Government revenues (excluding grants, in percent of GDP)	21.5	18.4	18.6	...	...	15.7	15.9	15.9	16.4	16.5	16.6		17.2	19.8	18.0
Aid flows (in Billions of US dollars) 7/	0.7	0.7	0.8			0.6	0.5	0.5	0.5	0.5	0.5		0.8	1.8	
o/w Grants	0.6	0.5	0.6			0.6	0.5	0.4	0.4	0.4	0.4		0.7	1.7	
Grant-equivalent financing (in percent of GDP) 8/	0.1	0.2	0.2			0.1	0.1	0.1	0.1	0.1	0.1		0.1	0.1	
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			5.5	3.3	2.9	2.4	2.2	2.0		2.1	2.3	2.2
<i>Memorandum items:</i>						68.6	56.1	55.6	46.1	45.7	51.9		73.1	81.3	73.3
Nominal GDP (Billions of US dollars)	10.9	11.5	14.7			12.6	15.6	16.7	18.4	20.2	22.2		34.6	76.5	
Nominal dollar GDP growth	49.8	6.0	27.1			-14.2	24.2	6.8	10.0	9.8	10.1		7.8	8.9	7.7
PV of PPG external debt (in Billions of US dollars)	...	...	0.9			1.2	1.6	1.9	2.3	2.7	2.9		2.9	4.8	
(PV1-PVt-1)/GDPt-1 (in percent)	...	...	...			2.1	3.1	2.2	2.6	2.1	1.0		2.2	-0.1	0.3

Sources: Country authorities; and staff estimates and projections.

1/ Includes both public and private sector external debt.

2/ Derived as $[r - \rho(1+g)] / (1+g+ppg)$ 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, 2006-2029
(In percent of GDP, unless otherwise indicated)

	Actual			Estimate			Projections					2015-29 Average		
	2006	2007	2008	Average	Standard Deviation	2009	2010	2011	2012	2013	2014		2009-14 Average	2019	2029
Public sector debt 1/	27.4	25.8	26.5			26.3	27.4	27.6	27.9	27.8	26.8		17.9	12.2
o/w foreign-currency denominated	8.8	9.2	11.0			11.8	13.9	15.0	16.0	16.5	16.0		10.6	7.3
Change in public sector debt	-77.8	-1.6	0.7			-0.2	1.1	0.2	0.3	-0.1	-1.1		-1.2	-0.5
Identified debt-creating flows	-30.2	-2.4	-0.7			-2.0	-0.3	-1.4	-1.5	-1.3	-1.5		-0.5	-0.7
Primary deficit	-0.2	-0.3	-0.4	-0.3	1.1	0.9	0.7	-0.1	-0.1	0.0	-0.1	0.2	0.3	-0.3
Revenue and grants	27.1	23.0	22.3			20.2	18.8	18.4	18.6	18.5	18.4		19.1	22.0
of which: grants	5.7	4.6	3.8			4.5	2.9	2.5	2.2	2.0	1.8		1.9	2.2
Primary (noninterest) expenditure	26.9	22.7	21.9			21.1	19.5	18.3	18.5	18.6	18.3		19.5	21.7
Automatic debt dynamics	-30.0	-2.1	-0.3			-2.8	-0.9	-1.3	-1.4	-1.4	-1.4		-0.8	-0.4
Contribution from interest rate/growth differential	-8.9	-2.0	-1.5			-1.4	-1.1	-1.0	-1.1	-1.1	-1.1		-0.6	-0.3
of which: contribution from average real interest rate	-2.8	-0.4	-0.1			-0.1	0.2	0.5	0.5	0.6	0.6		0.4	0.2
of which: contribution from real GDP growth	-6.2	-1.6	-1.4			-1.3	-1.4	-1.5	-1.6	-1.6	-1.7		-1.0	-0.6
Contribution from real exchange rate depreciation	-21.1	-0.1	1.2			-1.4	0.2	-0.3	-0.3	-0.3	-0.3		...	...
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 (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	-47.6	0.8	1.4			1.7	1.4	1.6	1.9	1.2	0.4		-0.8	0.2
Other Sustainability Indicators														
PV of public sector debt	18.5	16.6	23.1			22.8	23.9	24.3	24.8	24.9	24.0		15.3	10.8
o/w foreign-currency denominated	0.0	0.0	7.6			8.3	10.5	11.6	12.9	13.6	13.2		8.1	5.8
o/w external	...	...	7.6			8.3	10.5	11.6	12.9	13.6	13.2		8.1	5.8
PV of contingent liabilities (not included in public sector debt)	29.0	6.4	7.2			9.7	9.9	8.8	8.5	8.5	8.3		5.7	3.1
Gross financing need 2/	68.3	72.2	103.5			112.9	127.0	131.8	133.7	134.8	130.3		80.1	49.1
PV of public sector debt-to-revenue and grants ratio (in percent)	86.4	90.0	124.5			145.5	150.5	152.9	152.0	151.2	144.5		89.0	54.5
o/w external 3/	...	...	41.1			53.0	66.1	73.4	78.9	82.5	79.8		47.1	29.5
Debt service-to-revenue and grants ratio (in percent) 4/	90.0	8.7	15.5			15.1	16.1	16.5	16.8	17.4	18.7		13.7	6.9
Debt service-to-revenue ratio (in percent) 4/	113.8	10.9	18.6			19.5	19.0	19.1	19.0	19.5	20.7		15.2	7.7
Primary deficit that stabilizes the debt-to-GDP ratio	77.6	1.3	-1.1			1.1	-0.4	-0.3	-0.5	0.1	1.0		1.6	0.2
Key macroeconomic and fiscal assumptions														
Real GDP growth (in percent)	6.2	6.2	5.7	4.8	1.3	5.3	5.5	6.0	6.2	6.3	6.4	6.0	5.7	4.5
Average nominal interest rate on forex debt (in percent)	0.3	0.7	1.8	1.7	0.7	1.3	1.0	1.7	2.1	2.7	3.0	2.0	2.4	2.0
Average real interest rate on domestic debt (in percent)	-2.4	-1.3	-0.4	-5.1	3.9	-0.4	2.2	3.9	4.1	4.1	4.3	3.0	4.8	4.7
Real exchange rate depreciation (in percent, + indicates depreciation)	-26.8	-1.0	13.7	-7.0	12.6	-13.6	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	13.8	10.9	12.9	19.1	5.5	12.4	10.7	8.3	7.3	7.2	7.3	8.9	6.8	6.8
Growth of real primary spending (deflated by GDP deflator, in percent)	0.1	-0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1
Grant element of new external borrowing (in percent)	...	...	...	...	...	27.6	12.1	13.1	6.7	6.6	11.1	12.9	23.0	17.9

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 3. Zambia: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2009-2029
(In percent)

	Projections											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019-2029	
PV of debt-to-GDP ratio												
Baseline	8	11	12	13	14	13	12	12	10	9	8	6
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2009-2029 1/	8	14	19	22	24	25	26	26	27	27	27	34
A2. New public sector loans on less favorable terms in 2009-2029 2	8	10	12	14	16	16	15	15	14	13	12	11
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	8	10	12	13	14	14	13	12	11	9	9	7
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	8	16	26	26	26	25	24	23	20	18	16	8
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	8	12	14	16	17	17	16	15	13	11	10	8
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010-2011 4/	8	10	11	13	14	13	12	12	10	9	8	6
B5. Combination of B1-B4 using one-half standard deviation shocks	8	13	16	17	18	18	17	16	14	12	11	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	8	13	15	17	18	18	17	16	14	12	11	9
PV of debt-to-exports ratio												
Baseline	24	31	35	41	44	44	41	39	34	30	27	19
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2009-2029 1/	24	43	56	70	78	83	85	87	88	89	90	109
A2. New public sector loans on less favorable terms in 2009-2029 2	24	30	37	45	51	53	52	50	46	43	40	36
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	24	30	34	40	44	44	41	39	34	30	27	21
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	24	59	107	115	118	116	110	104	93	83	75	36
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	24	30	34	40	44	44	41	39	34	30	27	21
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010-2011 4/	24	30	35	41	44	44	42	39	34	30	28	21
B5. Combination of B1-B4 using one-half standard deviation shocks	24	39	47	53	57	56	53	50	44	39	35	23
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	24	30	34	40	44	44	41	39	34	30	27	21
PV of debt-to-revenue ratio												
Baseline	53	66	73	79	83	80	76	70	61	53	47	29
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2009-2029 1/	53	91	117	134	145	149	157	158	158	158	158	170
A2. New public sector loans on less favorable terms in 2009-2029 2	53	63	78	87	95	96	95	91	83	76	71	56
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	53	64	75	81	85	83	79	74	64	56	50	34
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	53	101	163	161	160	152	146	136	121	107	95	41
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	53	76	91	98	103	100	96	89	77	68	61	41
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010-2011 4/	53	63	72	78	82	80	76	71	62	54	48	32
B5. Combination of B1-B4 using one-half standard deviation shocks	53	85	102	107	110	106	102	95	83	73	65	38
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	53	84	96	104	110	107	102	95	82	72	65	43
(In percent)												
Debt service-to-exports ratio												
Baseline	1	1	2	3	4	5	6	6	6	5	4	2
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2009-2029 1/	1	1	2	3	4	5	6	6	6	6	5	6
A2. New public sector loans on less favorable terms in 2009-2029 2	1	1	2	2	3	3	3	4	4	4	4	2
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	1	1	2	3	4	5	6	6	6	5	4	2
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	1	1	3	6	7	9	10	10	10	11	9	4
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	1	1	2	3	4	5	6	6	6	5	4	2
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010-2011 4/	1	1	2	3	4	5	6	6	6	5	4	2
B5. Combination of B1-B4 using one-half standard deviation shocks	1	1	2	3	4	5	7	7	7	6	5	2
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	1	1	2	3	4	5	6	6	6	5	4	2
Debt service-to-revenue ratio												
Baseline	3	2	4	6	7	9	11	11	10	9	7	3
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2009-2029 1/	3	3	5	7	8	9	11	11	10	10	9	9
A2. New public sector loans on less favorable terms in 2009-2029 2	3	2	4	4	5	5	5	6	8	8	7	4
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	3	2	4	6	7	9	12	11	10	9	7	3
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	3	2	5	9	10	11	14	13	13	14	12	5
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	3	3	5	7	9	11	14	14	12	11	9	3
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010-2011 4/	3	2	4	6	7	9	11	11	10	9	7	3
B5. Combination of B1-B4 using one-half standard deviation shocks	3	3	5	7	9	10	13	13	12	11	9	4
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	3	3	5	8	9	12	15	15	13	12	9	4
Memorandum item:												
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	6	6	6	6	6	6	6	6	6	6	6	6

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 (implies 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 2009-2029

	Projections							
	2009	2010	2011	2012	2013	2014	2019	2029
PV of Debt-to-GDP Ratio								
Baseline	23	24	24	25	25	24	15	11
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	23	23	24	24	24	24	12	6
A2. Primary balance is unchanged from 2009	23	24	25	27	28	28	21	22
A3. Permanently lower GDP growth 1/	23	24	25	25	26	25	18	20
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010-2011	23	25	26	28	28	28	22	23
B2. Primary balance is at historical average minus one standard deviations in 2010-2011	23	24	25	26	26	25	16	11
B3. Combination of B1-B2 using one half standard deviation shocks	23	24	25	26	27	26	19	19
B4. One-time 30 percent real depreciation in 2010	23	28	28	28	28	27	19	15
B5. 10 percent of GDP increase in other debt-creating flows in 2010	23	34	34	34	34	33	22	16
PV of Debt-to-Revenue Ratio 2/								
Baseline	113	127	132	134	135	130	80	49
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	113	123	128	130	131	128	64	27
A2. Primary balance is unchanged from 2009	113	128	138	145	150	151	109	101
A3. Permanently lower GDP growth 1/	113	128	133	136	138	135	94	92
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010-2011	113	131	142	148	152	151	113	102
B2. Primary balance is at historical average minus one standard deviations in 2010-2011	113	128	137	139	140	135	84	51
B3. Combination of B1-B2 using one half standard deviation shocks	113	126	135	140	143	141	101	85
B4. One-time 30 percent real depreciation in 2010	113	148	152	153	154	149	101	70
B5. 10 percent of GDP increase in other debt-creating flows in 2010	113	180	185	184	184	177	116	71
Debt Service-to-Revenue Ratio 2/								
Baseline	15	16	16	17	17	19	14	7
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	15	16	16	14	17	17	10	3
A2. Primary balance is unchanged from 2009	15	16	17	18	21	23	19	17
A3. Permanently lower GDP growth 1/	15	16	17	17	18	19	16	15
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010-2011	15	16	17	19	21	23	20	17
B2. Primary balance is at historical average minus one standard deviations in 2010-2011	15	16	17	18	20	19	14	7
B3. Combination of B1-B2 using one half standard deviation shocks	15	16	17	16	19	20	18	13
B4. One-time 30 percent real depreciation in 2010	15	17	18	20	22	24	22	12
B5. 10 percent of GDP increase in other debt-creating flows in 2010	15	16	21	46	23	35	18	12

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.