

INTERNATIONAL MONETARY FUND



Staff Country Reports

**The Federal Democratic Republic of Ethiopia:
Debt Sustainability Analysis**

This Debt Sustainability Analysis paper for **The Federal Democratic Republic of Ethiopia** was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on **August 25, 2004**. The views expressed in this document are those of the staff team and do not necessarily reflect the views of the government of The Federal Democratic Republic of Ethiopia or the Executive Board of the IMF.

The policy of publication of staff reports and other documents by the IMF allows for the deletion of market-sensitive information.

To assist the IMF in evaluating the publication policy, reader comments are invited and may be sent by e-mail to publicationpolicy@imf.org.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
700 19th Street, N.W. • Washington, D.C. 20431
Telephone: (202) 623 7430 • Telefax: (202) 623 7201
E-mail: publications@imf.org • Internet: <http://www.imf.org>

Price: \$15.00 a copy

**International Monetary Fund
Washington, D.C.**

This page intentionally left blank

INTERNATIONAL MONETARY FUND
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

Debt Sustainability Analysis

Prepared by a staff team from the African, Fiscal Affairs and Policy Development and Review Departments

Approved by Siddharth Tiwari and G. Russell Kincaid

August 25, 2004

External Debt Sustainability Assessment

1. This brief supplement presents a debt sustainability analysis (DSA) using the new framework for low-income countries considered by the Boards of Fund and Bank earlier this year.¹ The macroeconomic scenario underlying this DSA is the baseline scenario discussed in the Article IV Staff Report and described in Section III.A of the report.² The framework takes into account economic developments since the HIPC Completion Point and new information received in the context of the 2004 Article IV consultation discussions, including information received from donors. The salient features of the revised macroframework are lower loan disbursements fully offset by higher grants. Exports of goods and nonfactor services are also higher in the initial years of the projection period, reflecting a strong pick-up in exports in 2003/04.

2. Application of the new methodology for assessing external debt sustainability in low-income countries yields the following results:

- Under the baseline scenario, the ratios of NPV of debt-to-GDP and exports are projected to rise somewhat in the initial years reaching 25 percent and 170 percent respectively in 2008/09 (182 percent of exports using a three-year backward looking average); and are then projected to gradually decline. External debt service absorbs on average about 6 percent of export revenues over the next 15 years, rising to a

¹ *Debt Sustainability in Low-Income Countries—Proposal for an Operational Framework and Policy Implications.*

² *The Federal Democratic Republic of Ethiopia—Staff Report for the 2004 Article IV Consultation and Sixth Review Under the Three-Year Arrangement Under the Poverty Reduction and Growth Facility.*

moderate 8 percent during the last years of the projection period as concessional debt comes to maturity and debt service reduction under the HIPC Initiative is exhausted.³ These results are robust with respect to the choice of the denominator for the NPV of debt-to-exports ratio based on either current year exports (Table 2a) or a three-year average of exports (presented in Appendix I).

- The stress tests however reveal that Ethiopia's external debt and debt service indicators are particularly sensitive to the terms of new borrowing and negative export shocks. Although the NPV of debt-to-exports ratio deteriorates under most stress tests, it is under new borrowing on less favorable terms and under the simulated export shock that the adverse impact is most significant. Under the less favorable financing scenario, the NPV of debt-to-exports ratio increases rapidly by as much as 60-70 percentage points compared to the baseline, while a shock to export growth results in an NPV of debt-to-exports ratio that stays above 200 percent for about 15 years.
- The baseline projections appear fragile to adverse shocks and embody optimistic assumptions relative to Ethiopia's historical trend over the past 10 years. Under both the historic and the most extreme stress scenarios, the ratios of NPV of debt-to-GDP and exports stay above the appropriate upper benchmarks for most of the projection period even though the debt-service ratio remains well within the manageable range. This underscores the importance for the government of Ethiopia to follow a prudent borrowing strategy with new borrowing on highly concessional terms and with an increased reliance on grant financing, as well on a comprehensive debt management strategy to safeguard against a reemergence of an external debt burden.
- The quality of a country's policies and institutions are important for assessing debt sustainability. According to one such measure of policies and institutions, the World Bank's Country Policy and Institutional Assessment (CPIA) index, Ethiopia is in the third quintile and its policies and institutions are thus considered to be of moderate strength. As an illustration, the policy-dependent indicative upper benchmarks for debt sustainability for such a country are: an NPV of debt-to-GDP ratio of 45 percent and NPV of debt-to-exports ratio of 200 percent, with a corresponding debt service-to-exports ratio of 25 percent. Ethiopia's external debt burden indicators remain at or below the relevant World Bank's CPIA-linked

³ Such a situation where an increasing NPV of debt-to-exports ratio in the initial years is accompanied by a low debt service ratio is not uncommon among countries graduating from the HIPC Initiative that have benefited from a rescheduling of their existing obligations and have begun (or are projected) to borrow new funds after their completion points.

indicative policy-based thresholds, with a particularly wide margin for the debt-service ratio.⁴

Decomposition of the Impact of Methodological Changes and Revisions to the Macroframework

3. The estimates of NPV of debt-to-exports ratio obtained under the new methodology are considerably lower than those estimated at the time of the HIPC completion point. The differences are due to methodological differences as well as to changes in economic variables. These changes and the contribution of various factors are considered in this section.

4. The impact of the new DSA methodology was estimated as the difference between the completion point estimate and the estimate obtained when the new methodology is applied to the data set used at completion point. Changes in the macroeconomic framework underlying the Article IV Staff Report relative to the completion point projections account for the remainder. This approach is illustrated in Figure 1 and the decomposition results for 2003/04 are presented in Table 1. As shown in Table 1, methodological changes account for about half of the total reduction in the ratio of NPV of debt-to-exports, of which about 13 percentage points correspond to changes affecting the numerator of the ratio (mainly the use of new parameters to calculate the NPV of debt), and 10 percentage points correspond to changes affecting the denominator (shift from three-year average to current year exports). The revisions to the macroeconomic framework since the completion point account for a reduction of 29 percentage points. Lower loan disbursements than projected at the completion point account for a reduction of about 7 percentage points, while higher than expected exports of goods and non-factor services account for the remainder.

Public Debt Sustainability Assessment

5. The DSA for the public debt reflects the baseline macro and fiscal framework as described in Sections III.A and III.B of the main report.⁵ The framework incorporates a declining trend in the primary fiscal deficit, higher-than-average growth in real GDP, and modest real interest rates for new domestic borrowing. The results of the DSA entail a decline in the ratio of public debt to GDP and revenue, while the debt service-to-revenue ratio is projected to decline comfortably. For instance, the NPV of the public debt to GDP is set to decline from 55 percent to about 35 percent over the projection horizon. Despite these encouraging trends, there remain risks for achieving a sustainable profile in the public debt, particularly if growth remains at the historical average or real interest rates increase for domestic borrowing. The public debt position remains vulnerable to frequent exogenous

⁴ The Executive Board has not yet decided on such thresholds for operational purposes.

⁵ The coverage of public debt includes both public and publicly guaranteed obligations to domestic and external creditors.

shocks in agriculture and to accelerated structural reforms of the financial sector that could raise debt-service commitments for the domestic debt. The stock of domestic debt in Ethiopia is also currently high at about 34 percent of GDP⁶ (Table 3a).⁷

6. The results of applying the new DSA framework for public debt are summarized below:

- The public debt DSA indicates some risk arising from output growth and the primary balance remaining at historical averages (Table 3b, A1). However, the historical average for the primary fiscal balance largely reflects extraordinary factors related to the conflict with Eritrea.
- The key public debt indicators initially rise during 2004/05 under the baseline scenario, in tandem with the external component of the public debt. In contrast, the domestic debt is projected to decline steadily to contain inflationary pressure and provide sufficient credit to facilitate private sector development.
- The stress tests in the alternative scenarios suggest that lower GDP growth represents the principal sensitivity factor. For instance, the results indicate that permanently lower GDP growth relative to the baseline scenario (Table 3b, A3) could modestly increase the NPV of debt-to-GDP and revenue ratios over the 20-year horizon. The return of primary fiscal deficits to the high levels of the late 1990s (about 8-9 percent of GDP) would also contribute negatively to public debt sustainability, particularly in conjunction with GDP growth remaining at the historical average (Table 3b, A1). In this combined scenario, the NPV of the public debt to GDP and revenue would increase sharply by 25 percent and 74 percent, respectively. However, under forward looking scenarios, the public debt indicators follow downward profiles.

⁶ This compares to the NPV of external debt to GDP at about 21 percent.

⁷ Domestic debt differs from external debt in terms of coverage, lending terms, economic impact, rollover risk and other factors.

**Table 1. Ethiopia: Breakdown of the Difference in the NPV of debt-to-exports ratio at end-FY 2003/04 between HIPC Completion Point estimates and 2004 Article IV estimates
(In percentage points, unless otherwise indicated)**

Factors explaining the change in the NPV of debt-to-exports ratio	Impact of methodological changes	Impact of changes of economic variables	Total
(i) Parameters used to calculate the NPV of debt 1/	-15.3	0.0	-15.3
(ii) New borrowing	1.9	-7.2	-5.3
(iiia) Exports of goods and non-factor services (three year average)	0.0	-9.4	-9.4
(iiib) Exports of goods and non-factor services (current year) 2/	-10.0	-21.8	-31.7
Memorandum items:			
	<u>HIPC Completion Point with topping-up</u>	<u>2004 Article IV baseline with topping-up</u>	<u>Total 3/</u>
(a) End-FY 2003/04 NPV of debt-to-exports ratio (in percent)	178.6	148.5	-30.1
(b) End-FY 2003/04 NPV of debt-to-exports ratio (in percent) 2/	...	126.2	-52.4
Exports of goods and non-factor services (millions of U.S. dollars)			
Current	1,168.0	1,369.4	
Three year average	1,096.8	1,163.9	

1/ Corresponds to the impact of using the WEO exchange rate projections and a 5 percent discount rate (as per the Low Income Country DSA methodology) instead of end-June 2003 exchange rates and currency-specific CIRRs (as per the HIPC methodology).
(Subsumes the impact of exchange rate changes since end-FY 2002/03.)

2/ Corresponds to the impact of using current year exports instead of three-year backward looking average.

3/ The difference between the 2004 Article IV baseline and the HIPC Completion Point baseline. Equals the sum of lines (i), (ii) and (iiia) and (iiib), respectively.

Figure 1. Ethiopia: NPV of debt-to-exports ratio (In percent)

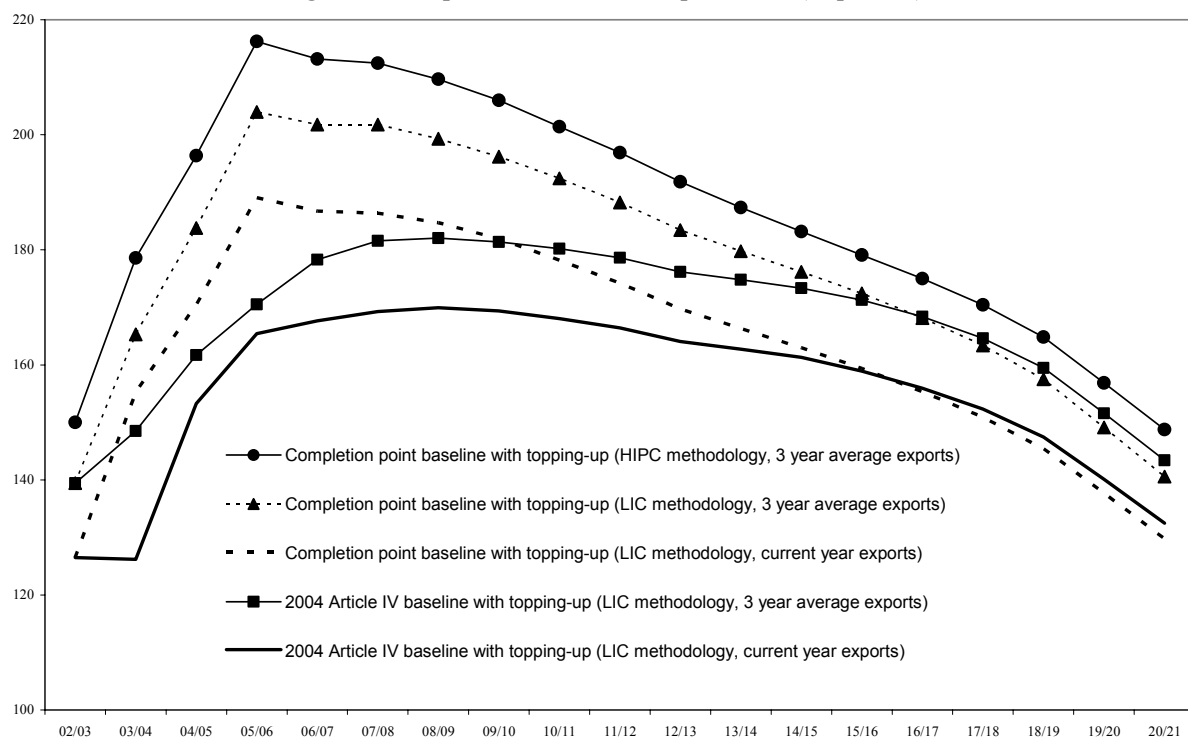


Table 2a. Ethiopia: External Debt Sustainability Framework, Baseline Scenario
(NPV of debt-to-exports ratios based on current year exports; in percent of GDP, unless otherwise indicated)

	Actual		Estimate	Historical Average 6/	Standard Deviation 6/	Projections														
	2001/02	2002/03	2003/04			2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
External debt (nominal) 1/	102.4	98.5	68.7			68.4	69.7	66.9	64.9	62.5	60.0	48.0	45.8	43.7	41.5	39.4	37.4	35.4	33.5	31.6
o/w public and publicly guaranteed (PPG)	102.4	98.5	68.7			68.4	69.7	66.9	64.9	62.5	60.0	48.0	45.8	43.7	41.5	39.4	37.4	35.4	33.5	31.6
Change in external debt	14.2	-3.9	-29.8			-0.3	1.4	-2.8	-2.0	-2.4	-2.5	-2.2	-2.2	-2.1	-2.1	-2.1	-2.0	-2.0	-1.9	-1.9
Identified net debt-creating flows	11.8	-4.4	-13.4			4.5	3.1	-0.6	-0.4	-1.6	-1.8	-0.2	-0.4	-0.5	-0.6	-0.6	-0.5	-0.5	-0.5	-0.6
Non-interest current account deficit	4.9	3.6	3.0	1.8	3.3	8.3	6.9	3.0	3.0	1.8	1.4	3.0	2.9	2.8	2.8	2.7	2.7	2.6	2.5	2.3
Deficit in balance of goods and services	17.9	19.4	19.4			17.9	17.4	15.4	14.9	14.3	14.1	13.5	13.4	13.3	13.1	13.0	12.8	12.7	12.4	12.1
Exports	16.2	17.1	16.9			15.4	15.2	15.1	15.1	15.1	15.0	15.1	15.1	15.1	15.2	15.2	15.2	15.3	15.3	15.4
Imports	34.1	36.5	36.3			33.4	32.6	30.5	30.0	29.4	29.1	28.5	28.5	28.4	28.3	28.2	28.1	27.9	27.7	27.5
Net current transfers (negative = inflow)	-12.9	-15.6	-16.3	-11.6	2.9	-9.5	-10.3	-11.9	-11.3	-11.9	-12.0	-9.8	-9.8	-9.8	-9.7	-9.7	-9.6	-9.6	-9.5	-9.4
o/w official	-7.1	-8.1	-9.0			-4.0	-4.7	-6.6	-6.5	-7.3	-7.6	-6.2	-6.2	-6.3	-6.4	-6.5	-6.5	-6.6	-6.7	-6.7
Other current account flows (negative = net inflow)	-0.2	-0.3	-0.1			-0.1	-0.2	-0.5	-0.5	-0.6	-0.7	-0.7	-0.7	-0.7	-0.6	-0.6	-0.5	-0.5	-0.5	-0.4
Net FDI (negative = inflow)	0.0	-0.2	0.0	-0.5	0.7	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-1.0	-1.0	-1.1	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3
Endogenous debt dynamics 2/	7.0	-7.7	-16.4			-3.2	-3.1	-3.0	-2.7	-2.7	-2.6	-2.2	-2.3	-2.2	-2.1	-2.0	-1.9	-1.8	-1.7	-1.6
Contribution from nominal interest rate	0.9	1.1	1.0			0.3	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2
Contribution from real GDP growth	-1.5	3.7	-9.4			-3.6	-3.6	-3.4	-3.2	-3.1	-3.0	-2.5	-2.5	-2.4	-2.4	-2.3	-2.2	-2.1	-2.0	-1.9
Contribution from price and exchange rate changes	7.6	-12.5	-8.1			...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Residual (including asset changes) 3/	2.4	0.5	-16.3			-4.9	-1.7	-2.2	-1.6	-0.8	-0.6	-2.0	-1.8	-1.7	-1.5	-1.5	-1.5	-1.5	-1.4	-1.3
o/w exceptional financing	-1.5	-2.8	-1.6			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NPV of external debt 4/	...	21.7	21.4			23.7	25.2	25.3	25.6	25.6	25.5	24.3	24.0	23.6	23.1	22.4	21.4	20.2	19.1	18.1
In percent of exports	...	126.5	126.2			153.3	165.4	167.7	169.3	169.9	169.4	161.3	158.9	156.0	152.3	147.4	140.1	132.5	124.9	117.4
NPV of PPG external debt	...	21.7	21.4			23.7	25.2	25.3	25.6	25.6	25.5	24.3	24.0	23.6	23.1	22.4	21.4	20.2	19.1	18.1
In percent of exports	...	126.5	126.2			153.3	165.4	167.7	169.3	169.9	169.4	161.3	158.9	156.0	152.3	147.4	140.1	132.5	124.9	117.4
Debt service-to-exports ratio (in percent)	14.2	15.8	15.0			4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7
PPG debt service-to-exports ratio (in percent)	14.2	15.8	15.0			4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7
Total gross financing need (billions of U.S. dollars)	0.4	0.4	0.4			0.7	0.7	0.3	0.4	0.3	0.2	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
Non-interest current account deficit that stabilizes debt ratio	-9.4	7.5	32.8			8.7	5.6	5.8	5.0	4.2	3.9	5.2	5.1	5.0	4.9	4.8	4.7	4.6	4.4	4.2
Key macroeconomic assumptions																				
Real GDP growth (in percent)	1.6	-3.9	11.6	4.8	4.9	5.7	5.6	5.3	5.1	5.1	5.2	5.4	5.7	5.7	5.9	5.9	5.9	5.9	6.0	6.0
GDP deflator in US dollar terms (change in percent)	-8.0	13.9	9.0	-0.6	7.9	3.2	0.8	2.6	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Effective interest rate (percent) 5/	0.9	1.2	1.3	1.2	0.3	0.5	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8	0.8
Growth of exports of G&S (US dollar terms, in percent)	0.4	16.0	20.2	10.4	16.0	-0.6	5.0	7.2	7.5	7.2	7.3	7.7	8.2	8.2	8.4	8.4	8.4	8.5	8.5	8.6
Growth of imports of G&S (US dollar terms, in percent)	7.1	17.2	20.7	10.5	7.0	0.3	3.9	1.3	5.5	5.4	6.6	7.3	7.6	7.6	7.8	7.7	7.7	7.7	7.4	7.4
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	39.5	35.3	53.3	53.3	53.2	53.2	53.2	53.2	53.1	53.1	53.1	53.1	53.1	53.1	53.1
<i>Memorandum item:</i>																				
Nominal GDP (billions of US dollars)	6.1	6.7	8.1			8.8	9.4	10.1	10.9	11.7	12.6	18.1	19.6	21.1	22.8	24.7	26.7	28.9	31.2	33.8

Source: Staff simulations.

1/ Includes both public and private sector external debt.

2/ Derived as $[r - g - \rho(1+g)] / (1+g+\rho+g\rho)$ 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 NPV 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.

Table 2b. Ethiopia: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt
(NPV of debt-to-exports ratios based on current year exports; in percent)

	Projections														
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NPV of debt-to-GDP ratio															
Baseline	23.7	25.2	25.3	25.6	25.6	25.5	24.3	24.0	23.6	23.1	22.4	21.4	20.2	19.1	18.1
A. Alternative Scenarios															
A1. Key variables at their historical averages in 2004-23 1/	23.7	23.2	23.7	24.3	25.2	26.1	29.7	30.1	30.4	30.8	31.0	30.5	29.9	29.4	28.8
A2. New public sector loans on less favorable terms in 2004-23 2/	23.7	26.3	28.5	29.8	30.7	31.4	32.6	32.5	32.3	32.0	31.4	30.5	29.4	28.3	27.2
B. Bound Tests															
B1. Real GDP growth at historical average minus one standard deviation in 2004-05	23.7	26.6	28.2	28.5	28.5	28.3	27.0	26.7	26.2	25.7	24.9	23.8	22.5	21.3	20.1
B2. Export value growth at historical average minus one standard deviation in 2004-05 3/	23.7	26.0	27.7	27.9	27.8	27.6	25.9	25.5	24.9	24.3	23.5	22.4	21.2	20.0	18.8
B3. US dollar GDP deflator at historical average minus one standard deviation in 2004-05	23.7	27.6	31.0	31.3	31.3	31.1	29.7	29.3	28.8	28.2	27.4	26.1	24.8	23.4	22.1
B4. Net non-debt creating flows at historical average minus one standard deviation in 2004-05 4/	23.7	26.5	28.8	28.9	28.8	28.6	26.6	26.1	25.5	24.9	24.0	22.8	21.6	20.3	19.1
B5. Combination of B1-B4 using one-half standard deviation shocks	23.7	28.1	33.9	34.1	34.0	33.7	31.5	31.0	30.3	29.5	28.5	27.1	25.7	24.2	22.8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2004 5/	23.7	35.9	36.1	36.4	36.4	36.3	34.6	34.1	33.6	32.9	31.9	30.4	28.8	27.3	25.7
NPV of debt-to-exports ratio															
Baseline	153.3	165.4	167.7	169.3	169.9	169.4	161.3	158.9	156.0	152.3	147.4	140.1	132.5	124.9	117.4
A. Alternative Scenarios															
A1. Key variables at their historical averages in 2004-23 1/	153.3	152.1	156.9	160.5	167.3	173.9	197.0	199.4	201.4	203.4	203.8	200.2	195.7	191.5	187.5
A2. New public sector loans on less favorable terms in 2004-23 2/	153.3	172.8	188.6	197.4	204.1	208.7	216.6	215.7	214.0	211.2	206.9	199.8	192.3	184.5	176.7
B. Bound Tests															
B1. Real GDP growth at historical average minus one standard deviation in 2004-05	153.3	165.4	167.7	169.3	169.9	169.4	161.3	158.9	156.0	152.3	147.4	140.1	132.5	124.9	117.4
B2. Export value growth at historical average minus one standard deviation in 2004-05 3/	153.3	189.7	231.4	232.8	233.1	231.8	217.2	213.0	208.1	202.5	195.4	185.2	174.8	164.4	154.3
B3. US dollar GDP deflator at historical average minus one standard deviation in 2004-05	153.3	165.4	167.7	169.3	169.9	169.4	161.3	158.9	156.0	152.3	147.4	140.1	132.5	124.9	117.4
B4. Net non-debt creating flows at historical average minus one standard deviation in 2004-05 4/	153.3	174.1	190.3	191.2	191.1	190.0	176.8	173.1	168.8	164.0	158.0	149.7	141.2	132.7	124.4
B5. Combination of B1-B4 using one-half standard deviation shocks	153.3	174.2	200.9	202.0	202.0	200.9	187.6	183.7	179.4	174.4	168.1	159.3	150.3	141.3	132.5
B6. One-time 30 percent nominal depreciation relative to the baseline in 2004 5/	153.3	165.4	167.7	169.3	169.9	169.4	161.3	158.9	156.0	152.3	147.4	140.1	132.5	124.9	117.4
Debt service ratio															
Baseline	4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7
A. Alternative Scenarios															
A1. Key variables at their historical averages in 2004-23 1/	4.5	6.2	7.1	7.4	7.4	7.5	5.1	5.0	5.5	6.1	7.8	11.7	12.4	12.6	12.5
A2. New public sector loans on less favorable terms in 2004-23 2/	4.5	6.0	3.5	4.9	5.1	5.5	6.9	7.2	7.5	7.6	8.6	10.8	10.9	10.8	10.6
B. Bound Tests															
B1. Real GDP growth at historical average minus one standard deviation in 2004-05	4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7
B2. Export value growth at historical average minus one standard deviation in 2004-05 3/	4.5	6.7	9.0	9.3	9.1	8.9	7.1	6.7	6.9	7.0	8.0	10.7	10.8	10.6	10.2
B3. US dollar GDP deflator at historical average minus one standard deviation in 2004-05	4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7
B4. Net non-debt creating flows at historical average minus one standard deviation in 2004-05 4/	4.5	6.0	7.2	7.5	7.4	7.2	5.9	5.6	5.7	5.8	6.6	8.7	8.8	8.6	8.3
B5. Combination of B1-B4 using one-half standard deviation shocks	4.5	6.2	7.6	8.0	7.8	7.7	6.2	5.9	6.0	6.1	7.0	9.2	9.3	9.1	8.8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2004 5/	4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7
Memorandum item:															
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2

Source: Staff projections and simulations.

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

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

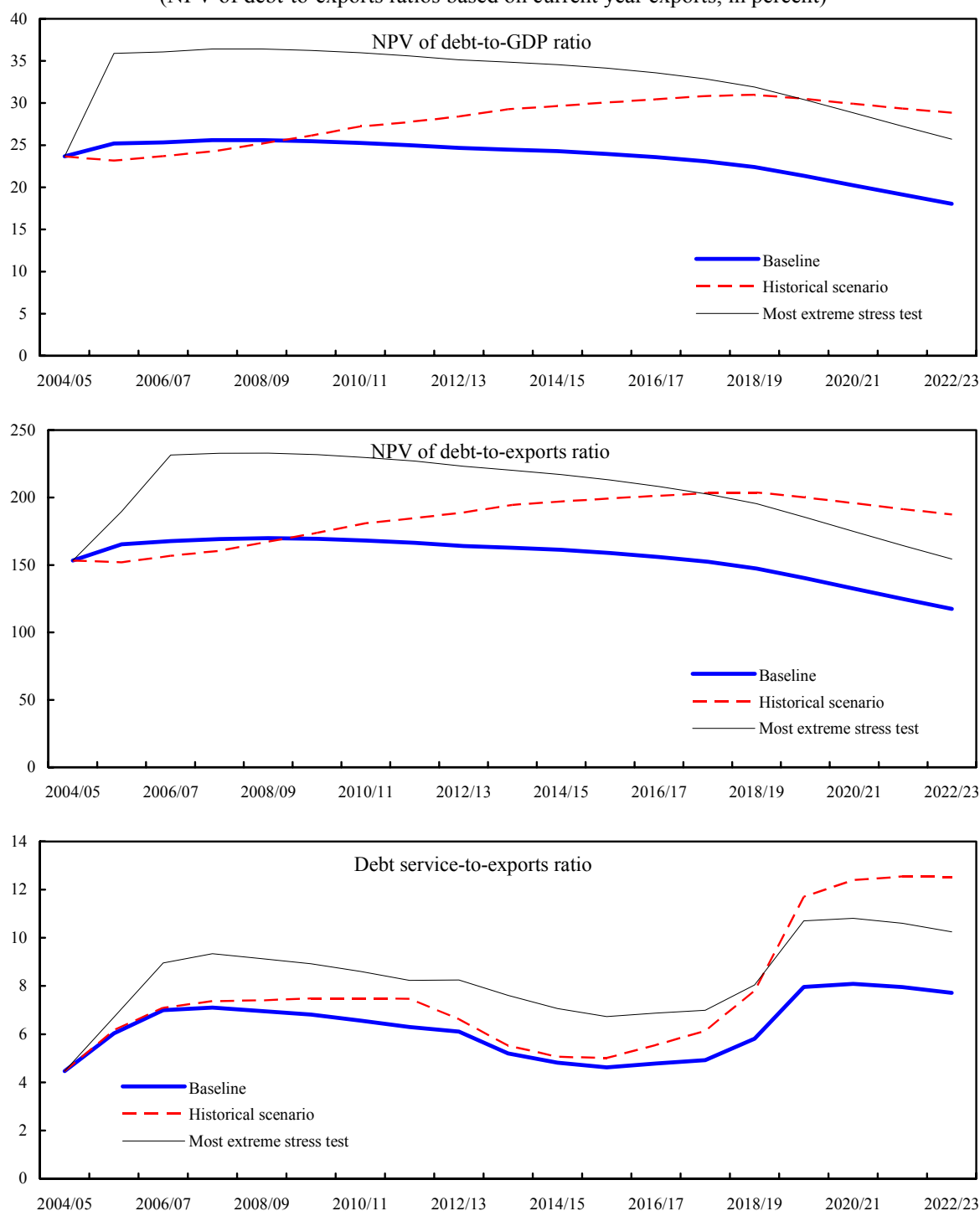
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).

4/ Includes official and private transfers and FDI.

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

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

Figure 2. Ethiopia: Indicators of Public and Publicly Guaranteed External Debt
Under Alternative Scenarios
(NPV of debt-to-exports ratios based on current year exports, in percent)



Source: Staff projections and simulations.

Table 3a. Ethiopia: Public Sector Debt Sustainability Framework, Baseline Scenario
(In percent of GDP, unless otherwise indicated)

	Actual		Estimate	Projections												10-Year Standard Deviation	10-Year Historical Average	Projected Average 2003-08	Projected Average 2009-22
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2010/11	2013/14	2015/16	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23			
I. Baseline Medium-Term Projections																			
Public sector debt 1/	142.3	137.7	102.4	101.3	100.4	96.0	92.7	82.1	72.2	66.5	60.9	58.2	55.6	53.0	50.6	48.3			
o/w foreign-currency denominated	102.7	98.7	68.8	69.6	70.1	67.3	65.2	57.8	50.4	46.0	41.7	39.6	37.6	35.6	33.6	31.7			
Change in public sector debt	15.4	-4.6	-35.3	-1.1	-0.9	-4.4	-3.3	-3.5	-3.1	-2.9	-2.8	-2.7	-2.6	-2.5	-2.4	-2.4			
Identified debt-creating flows	14.8	-5.3	-20.9	-2.7	-4.4	-2.7	-2.0	-2.3	-2.2	-2.2	-2.3	-2.3	-2.5	-2.5	-2.4	-2.3			
Primary deficit	5.5	5.1	1.8	4.6	1.9	3.6	3.6	2.5	2.0	1.7	1.3	1.1	0.7	0.5	0.5	0.5	2.5	6.1	3.1
Revenue and grants	24.7	27.5	26.4	24.3	25.2	25.6	25.5	27.0	26.4	25.8	26.0	26.1	26.2	26.2	26.1	26.1	2.6	23.7	25.5
of which : grants	4.7	8.0	7.8	5.8	7.0	6.9	6.8	7.8	7.1	6.3	6.4	6.5	6.6	6.6	6.7	6.7	1.9	4.9	6.9
Primary (noninterest) expenditure	30.2	32.6	28.2	28.8	27.2	29.1	29.1	29.5	28.3	27.5	27.4	27.2	26.8	26.8	26.6	26.6	2.2	29.8	28.6
Automatic debt dynamics	9.5	-10.5	-21.3	-7.3	-6.3	-6.3	-5.6	-4.8	-4.1	-3.9	-3.6	-3.4	-3.2	-3.0	-2.9	-2.8			
Contribution from interest rate/growth differential	0.3	1.6	-16.0	-6.8	-6.2	-6.0	-5.5	-4.7	-4.1	-3.9	-3.6	-3.4	-3.2	-3.0	-2.9	-2.7			
of which : contribution from average real interest rate	2.3	-4.2	-1.8	-1.3	-0.8	-0.9	-0.8	-0.5	-0.3	-0.2	-0.1	0.0	0.1	0.1	0.1	0.1			
of which : contribution from real GDP growth	-2.0	5.8	-14.3	-5.5	-5.3	-5.1	-4.6	-4.2	-3.8	-3.8	-3.5	-3.4	-3.3	-3.1	-3.0	-2.9			
Contribution from real exchange rate depreciation	9.1	-12.1	-5.2	-0.5	-0.1	-0.3	-0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Other identified debt-creating flows	-0.1	0.0	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Privatization receipts (negative)	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Recognition of implicit or contingent liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Debt relief (HIPC and other)	0.0	0.0	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Other (specify, e.g. bank recapitalization)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Residual, including asset changes	0.6	0.7	-14.4	1.6	3.5	-1.7	-1.3	-1.2	-0.9	-0.7	-0.5	-0.4	-0.1	0.0	0.0	0.0			
Other Sustainability Indicators																			
NPV of public sector debt	39.6	60.7	55.0	55.8	55.6	54.2	53.2	49.7	46.4	44.6	42.4	41.1	39.5	37.8	36.2	34.7			
Gross financing need	26.2	25.1	18.7	17.0	16.2	17.6	17.6	16.3	15.8	15.5	15.0	14.8	14.6	14.4	13.5	13.3			
Public sector debt-to-revenue and grants ratio (in percent)	576	500	388	418	398	375	364	304	274	258	234	223	212	202	194	185			
Key Macroeconomic and Fiscal Assumptions																			
Real GDP growth (in percent)	1.6	-3.9	11.6	5.7	5.6	5.3	5.1	5.2	5.4	5.7	5.9	5.9	5.9	5.9	6.0	6.0	4.3	3.8	6.4
Average nominal interest rate on forex debt (in percent)	0.9	1.1	1.2	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.1	1.0	0.6
Average nominal interest rate on domestic debt (in percent)	2.8	3.0	3.5	3.2	3.0	3.9	4.0	4.5	5.0	5.4	5.7	5.9	6.0	6.2	6.2	6.2	2.3	0.3	3.6
Average real interest rate on domestic debt (in percent)	9.7	-10.0	-4.5	-2.4	0.0	0.4	0.7	1.5	2.0	2.3	2.6	2.8	2.9	3.1	3.1	3.1	7.9	-2.1	-0.8
Average real interest rate on forex debt (in percent)	-1.4	0.0	-0.2	-0.8	-1.3	-1.6	-1.6	-1.5	-1.4	-1.4	-1.3	-1.3	-1.2	-1.1	-1.1	-1.1	0.6	-0.7	-1.2
Nominal depreciation of local currency (percentage change in LC per dollar)	1.2	0.4	0.4	3.7	1.1	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	5.6	5.7	1.3
Real exchange rate depreciation (percentage change, +=depreciation)	10.5	-11.3	-5.9	-0.7	-0.2	-0.4	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	8.0	4.1	-1.3
Inflation rate (GDP deflator, in percent)	-6.3	14.5	8.3	5.7	3.0	3.4	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.1	3.8	4.5
Growth of real primary spending (deflated by GDP deflator, in percent)	17.0	3.8	-2.6	7.6	-0.4	13.3	4.8	5.9	5.0	5.1	5.6	5.3	4.5	5.7	5.2	6.0	9.1	6.0	4.8
II. Stress Tests for Public Debt Ratio																			
Baseline	142	138	102	101	100	96	93	82	72	67	61	58	56	53	51	48			
A. Alternative scenarios																			
A1. Real GDP growth and primary balance are at historical averages	142	138	102	104	109	108	108	109	110	112	113	115	116	118	119				
A2. Primary balance is unchanged from 2003	142	138	102	98	97	91	86	74	64	59	55	53	52	51	50	49			
A3. Permanently lower GDP growth 2/	142	138	102	103	103	100	99	93	90	88	87	87	87	87	87	87			
B. Bound tests																			
B1. Real GDP growth is at historical average minus one std dev in 2004-2005	142	138	102	109	116	114	112	106	99	96	92	90	88	86	84	82			
B2. Primary balance is at historical average minus one std dev in 2004-2005	142	138	102	105	111	106	103	91	80	74	68	65	62	59	57	54			
B3. Combination of B1 and B2 using one half standard deviation shocks	142	138	102	108	116	110	106	92	79	72	65	62	59	56	53	50			
B4. One time 30 percent real depreciation in 2004	142	138	102	131	128	122	117	103	90	83	76	72	69	66	63	60			
B5. 10 percent of GDP increase in other debt-creating flows in 2004	142	138	102	111	110	105	101	89	78	72	65	62	59	57	54	51			
Memorandum items:																			
Nominal debt (in millions of Birr)	73,902	78,583	71,394	78,592	84,846	88,590	92,820	104,900	117,841	128,307	139,444	145,319	151,378	157,663	164,179	170,906			
Gross financing need (in millions of Birr)	13,627	14,319	13,056	13,170	13,669	16,249	17,610	20,814	25,726	29,935	34,428	37,006	39,745	42,751	43,656	47,035			

1/ Public debt presented on a gross basis for the general government, including the federal, regional and district levels. There is a structural break in the 2003/04 data for domestic public debt.

2/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of 20 (i.e., the length of the projection period).

Table 3b. Ethiopia: Sensitivity Analyses for Key Indicators of Public Sector Debt

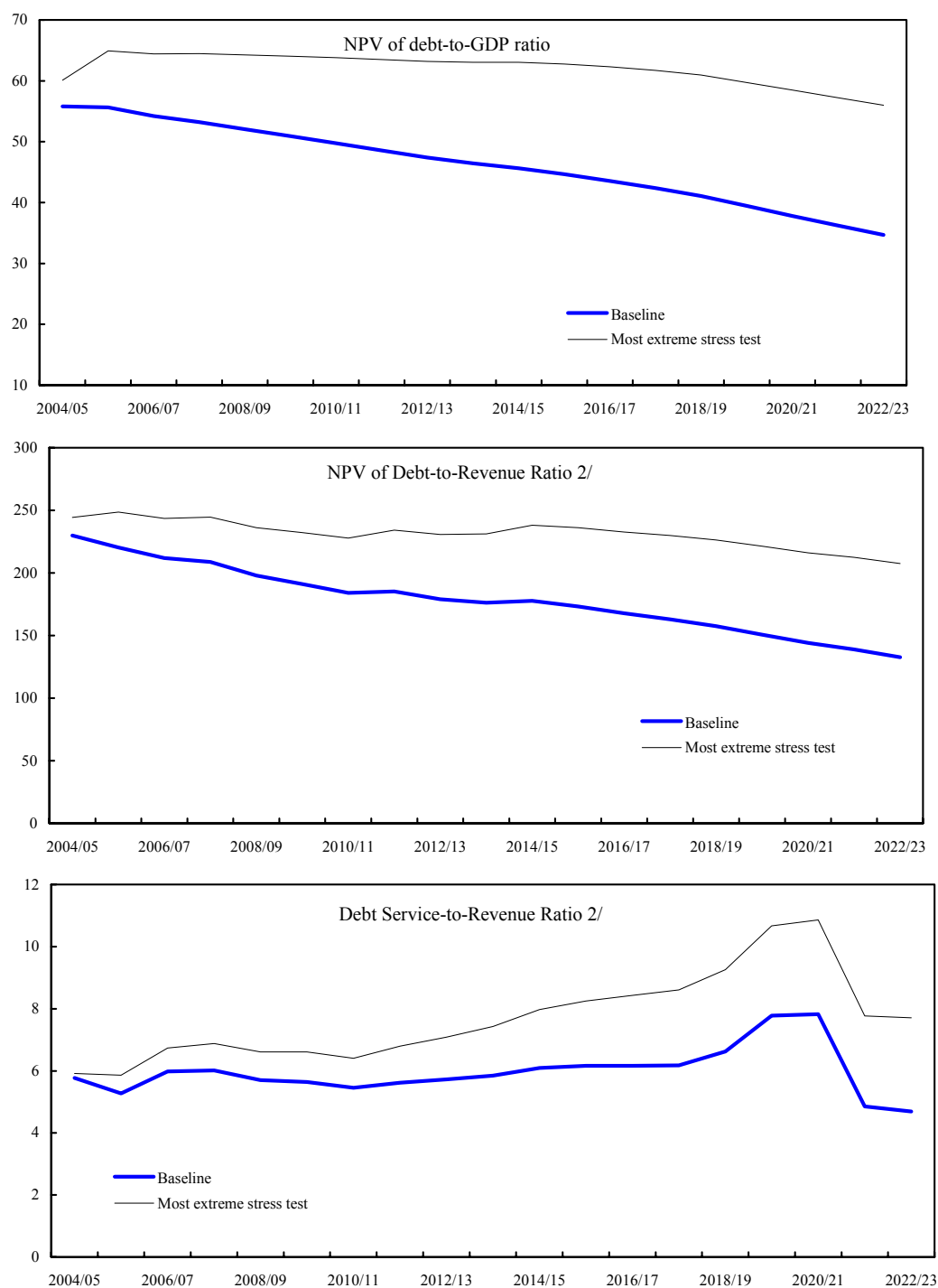
	Estimate	Projections						
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2013/14	2022/23
NPV of Debt-to-GDP Ratio								
Baseline	55	56	56	54	53	52	46	35
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	55	57	61	61	62	63	69	80
A2. Primary balance is unchanged from 2003	55	54	54	51	49	47	41	35
A3. Permanently lower GDP growth 1/	55	56	57	56	56	56	57	59
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviation in 2004-2005	55	60	65	64	64	64	63	56
B2. Primary balance is at historical average minus one standard deviation in 2004-2005	55	58	62	60	58	57	51	39
B3. Combination of B1 and B2 using one half standard deviation shocks	55	59	65	62	60	59	51	36
B4. One time 30 percent real depreciation in 2004	55	64	62	60	59	58	51	39
B5. 10 percent of GDP increase in other debt-creating flows in 2004	55	62	61	59	58	56	50	37
NPV of Debt-to-Revenue Ratio 2/								
Baseline	208	230	220	212	209	198	176	133
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	206	235	238	235	238	233	250	280
A2. Primary balance is unchanged from 2003	206	220	212	199	192	180	157	132
A3. Permanently lower GDP growth 1/	207	231	224	218	218	211	210	216
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviation in 2004-2005	209	244	249	244	245	236	231	208
B2. Primary balance is at historical average minus one standard deviation in 2004-2005	207	240	245	233	229	217	194	147
B3. Combination of B1 and B2 using one half standard deviation shocks	207	242	251	237	231	218	188	136
B4. One time 30 percent real depreciation in 2004	207	264	247	236	231	218	195	149
B5. 10 percent of GDP increase in other debt-creating flows in 2004	207	255	240	229	225	214	189	141
Debt Service-to-Revenue Ratio 2/								
Baseline	12	6	5	6	6	6	6	5
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	12	6	6	7	7	7	8	10
A2. Primary balance is unchanged from 2003	12	6	5	6	6	5	5	4
A3. Permanently lower GDP growth 1/	12	6	5	6	6	6	7	8
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviation in 2004-2005	12	6	6	7	7	7	7	8
B2. Primary balance is at historical average minus one standard deviation in 2004-2005	12	6	6	7	7	6	7	6
B3. Combination of B1 and B2 using one half standard deviation shocks	12	6	6	7	7	6	7	5
B4. One time 30 percent real depreciation in 2004	12	6	6	7	7	6	7	6
B5. 10 percent of GDP increase in other debt-creating flows in 2004	12	6	6	7	6	6	7	5

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

1/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of 20 (i.e., the length of the projection period).

2/ Revenues are defined inclusive of grants.

Figure 3. Ethiopia: Indicators of Public Debt Under Alternative Scenarios 1/
(In percent)



Source: Staff projections and simulations.

1/ Most extreme stress test is test that yields highest ratio in 2013.

2/ Revenue including grants.

Table 1A. Ethiopia: External Debt Sustainability Framework, Baseline Scenario
(NPV of debt-to-exports ratios based on three year backward looking average)
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 6/	Standard Deviation 6/	Projections														
	2001/02	2002/03	2003/04			2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
External debt (nominal) 1/	102.4	98.5	68.7			68.4	69.7	66.9	64.9	62.5	60.0	48.0	45.8	43.7	41.5	39.4	37.4	35.4	33.5	31.6
o/w public and publicly guaranteed (PPG)	102.4	98.5	68.7			68.4	69.7	66.9	64.9	62.5	60.0	48.0	45.8	43.7	41.5	39.4	37.4	35.4	33.5	31.6
Change in external debt	14.2	-3.9	-29.8			-0.3	1.4	-2.8	-2.0	-2.4	-2.5	-2.2	-2.2	-2.1	-2.1	-2.1	-2.0	-2.0	-1.9	-1.9
Identified net debt-creating flows	11.8	-4.4	-13.4			4.5	3.1	-0.6	-0.4	-1.6	-1.8	-0.2	-0.4	-0.5	-0.6	-0.6	-0.5	-0.5	-0.5	-0.6
Non-interest current account deficit	4.9	3.6	3.0	1.8	3.3	8.3	6.9	3.0	3.0	1.8	1.4	3.0	2.9	2.8	2.8	2.7	2.7	2.6	2.5	2.3
Deficit in balance of goods and services	17.9	19.4	19.4			17.9	17.4	15.4	14.9	14.3	14.1	13.5	13.4	13.3	13.1	13.0	12.8	12.7	12.4	12.1
Exports	16.2	17.1	16.9			15.4	15.2	15.1	15.1	15.1	15.0	15.1	15.1	15.1	15.2	15.2	15.2	15.3	15.3	15.4
Imports	34.1	36.5	36.3			33.4	32.6	30.5	30.0	29.4	29.1	28.5	28.5	28.4	28.3	28.2	28.1	27.9	27.7	27.5
Net current transfers (negative = inflow)	-12.9	-15.6	-16.3	-11.6	2.9	-9.5	-10.3	-11.9	-11.3	-11.9	-12.0	-9.8	-9.8	-9.8	-9.7	-9.7	-9.6	-9.6	-9.5	-9.4
o/w official	-7.1	-8.1	-9.0			-4.0	-4.7	-6.6	-6.5	-7.3	-7.6	-6.2	-6.2	-6.3	-6.4	-6.5	-6.5	-6.6	-6.7	-6.7
Other current account flows (negative = net inflow)	-0.2	-0.3	-0.1			-0.1	-0.2	-0.5	-0.5	-0.6	-0.7	-0.7	-0.7	-0.7	-0.6	-0.6	-0.5	-0.5	-0.5	-0.4
Net FDI (negative = inflow)	0.0	-0.2	0.0	-0.5	0.7	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-1.0	-1.0	-1.1	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3
Endogenous debt dynamics 2/	7.0	-7.7	-16.4			-3.2	-3.1	-3.0	-2.7	-2.7	-2.6	-2.2	-2.3	-2.2	-2.1	-2.0	-1.9	-1.8	-1.7	-1.6
Contribution from nominal interest rate	0.9	1.1	1.0			0.3	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2
Contribution from real GDP growth	-1.5	3.7	-9.4			-3.6	-3.6	-3.4	-3.2	-3.1	-3.0	-2.5	-2.5	-2.4	-2.4	-2.3	-2.2	-2.1	-2.0	-1.9
Contribution from price and exchange rate changes	7.6	-12.5	-8.1			...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Residual (including asset changes) 3/	2.4	0.5	-16.3			-4.9	-1.7	-2.2	-1.6	-0.8	-0.6	-2.0	-1.8	-1.7	-1.5	-1.5	-1.5	-1.5	-1.4	-1.3
o/w exceptional financing	-1.5	-2.8	-1.6			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NPV of external debt 4/	...	21.7	21.4			23.7	25.2	25.3	25.6	25.6	25.5	24.3	24.0	23.6	23.1	22.4	21.4	20.2	19.1	18.1
In percent of exports	...	139.4	148.5			161.7	170.5	178.3	181.5	182.0	181.4	173.3	171.3	168.4	164.6	159.5	151.6	143.4	135.2	127.2
NPV of PPG external debt	...	21.7	21.4			23.7	25.2	25.3	25.6	25.6	25.5	24.3	24.0	23.6	23.1	22.4	21.4	20.2	19.1	18.1
In percent of exports	...	139.4	148.5			161.7	170.5	178.3	181.5	182.0	181.4	173.3	171.3	168.4	164.6	159.5	151.6	143.4	135.2	127.2
Debt service-to-exports ratio (in percent)	14.2	15.8	15.0			4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7
PPG debt service-to-exports ratio (in percent)	14.2	15.8	15.0			4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7
Total gross financing need (billions of U.S. dollars)	0.4	0.4	0.4			0.7	0.7	0.3	0.4	0.3	0.2	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
Non-interest current account deficit that stabilizes debt ratio	-9.4	7.5	32.8			8.7	5.6	5.8	5.0	4.2	3.9	5.2	5.1	5.0	4.9	4.8	4.7	4.6	4.4	4.2
Key macroeconomic assumptions																				
Real GDP growth (in percent)	1.6	-3.9	11.6	4.8	4.9	5.7	5.6	5.3	5.1	5.1	5.2	5.4	5.7	5.7	5.9	5.9	5.9	5.9	6.0	6.0
GDP deflator in US dollar terms (change in percent)	-8.0	13.9	9.0	-0.6	7.9	3.2	0.8	2.6	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Effective interest rate (percent) 5/	0.9	1.2	1.3	1.2	0.3	0.5	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8	0.8
Growth of exports of G&S (US dollar terms, in percent)	0.4	16.0	20.2	10.4	16.0	-0.6	5.0	7.2	7.5	7.2	7.3	7.7	8.2	8.2	8.4	8.4	8.4	8.5	8.5	8.6
Growth of imports of G&S (US dollar terms, in percent)	7.1	17.2	20.7	10.5	7.0	0.3	3.9	1.3	5.5	5.4	6.6	7.3	7.6	7.6	7.8	7.7	7.7	7.7	7.4	7.4
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	39.5	35.3	53.3	53.3	53.2	53.2	53.2	53.2	53.1	53.1	53.1	53.1	53.1	53.1	53.1
<i>Memorandum item:</i>																				
Nominal GDP (billions of US dollars)	6.1	6.7	8.1			8.8	9.4	10.1	10.9	11.7	12.6	18.1	19.6	21.1	22.8	24.7	26.7	28.9	31.2	33.8

Source: Staff simulations.

1/ Includes both public and private sector external debt.

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

Table 1B. Ethiopia: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt
(NPV of debt-to-exports ratios based on three year backward looking average)
(In percent)

	Estimate						Projections									
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
NPV of debt-to-GDP ratio																
Baseline	23.7	25.2	25.3	25.6	25.6	25.5	24.3	24.0	23.6	23.1	22.4	21.4	20.2	19.1	18.1	
A. Alternative Scenarios																
A1. Key variables at their historical averages in 2004-23 1/	23.7	23.2	23.7	24.3	25.2	26.1	29.7	30.1	30.4	30.8	31.0	30.5	29.9	29.4	28.8	
A2. New public sector loans on less favorable terms in 2004-23 2/	23.7	26.3	28.5	29.8	30.7	31.4	32.6	32.5	32.3	32.0	31.4	30.5	29.4	28.3	27.2	
B. Bound Tests																
B1. Real GDP growth at historical average minus one standard deviation in 2004-05	23.7	26.6	28.2	28.5	28.5	28.3	27.0	26.7	26.2	25.7	24.9	23.8	22.5	21.3	20.1	
B2. Export value growth at historical average minus one standard deviation in 2004-05 3/	23.7	26.0	27.7	27.9	27.8	27.6	25.9	25.5	24.9	24.3	23.5	22.4	21.2	20.0	18.8	
B3. US dollar GDP deflator at historical average minus one standard deviation in 2004-05	23.7	27.6	31.0	31.3	31.3	31.1	29.7	29.3	28.8	28.2	27.4	26.1	24.8	23.4	22.1	
B4. Net non-debt creating flows at historical average minus one standard deviation in 2004-05 4/	23.7	26.5	28.8	28.9	28.8	28.6	26.6	26.1	25.5	24.9	24.0	22.8	21.6	20.3	19.1	
B5. Combination of B1-B4 using one-half standard deviation shocks	23.7	28.1	33.9	34.1	34.0	33.7	31.5	31.0	30.3	29.5	28.5	27.1	25.7	24.2	22.8	
B6. One-time 30 percent nominal depreciation relative to the baseline in 2004 5/	23.7	35.9	36.1	36.4	36.4	36.3	34.6	34.1	33.6	32.9	31.9	30.4	28.8	27.3	25.7	
NPV of debt-to-exports ratio																
Baseline	161.7	170.5	178.3	181.5	182.0	181.4	173.3	171.3	168.4	164.6	159.5	151.6	143.4	135.2	127.2	
A. Alternative Scenarios																
A1. Key variables at their historical averages in 2004-23 1/	161.7	154.6	161.8	166.6	173.8	180.6	205.3	207.9	210.2	212.3	212.7	209.0	204.4	199.9	195.8	
A2. New public sector loans on less favorable terms in 2004-23 2/	161.7	178.2	200.5	211.7	218.6	223.5	232.7	232.5	231.0	228.2	223.7	216.2	208.1	199.8	191.4	
B. Bound Tests																
B1. Real GDP growth at historical average minus one standard deviation in 2004-05	161.7	170.5	178.3	181.5	182.0	181.4	173.3	171.3	168.4	164.6	159.5	151.6	143.4	135.2	127.2	
B2. Export value growth at historical average minus one standard deviation in 2004-05 3/	161.7	182.2	218.4	239.7	249.7	248.3	233.4	229.6	224.7	218.8	211.3	200.4	189.2	178.0	167.2	
B3. US dollar GDP deflator at historical average minus one standard deviation in 2004-05	161.7	170.5	178.3	181.5	182.0	181.4	173.3	171.3	168.4	164.6	159.5	151.6	143.4	135.2	127.2	
B4. Net non-debt creating flows at historical average minus one standard deviation in 2004-05 4/	161.7	179.5	202.3	205.0	204.8	203.4	190.0	186.5	182.3	177.3	170.9	162.0	152.8	143.7	134.8	
B5. Combination of B1-B4 using one-half standard deviation shocks	161.7	176.6	205.8	213.5	216.4	215.1	201.5	198.0	193.7	188.5	181.8	172.4	162.6	153.0	143.6	
B6. One-time 30 percent nominal depreciation relative to the baseline in 2004 5/	161.7	170.5	178.3	181.5	182.0	181.4	173.3	171.3	168.4	164.6	159.5	151.6	143.4	135.2	127.2	
Debt service ratio																
Baseline	4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7	
A. Alternative Scenarios																
A1. Key variables at their historical averages in 2004-23 1/	4.5	6.2	7.1	7.4	7.4	7.5	5.1	5.0	5.5	6.1	7.8	11.7	12.4	12.6	12.5	
A2. New public sector loans on less favorable terms in 2004-23 2/	4.5	6.0	3.5	4.9	5.1	5.5	6.9	7.2	7.5	7.6	8.6	10.8	10.9	10.8	10.6	
B. Bound Tests																
B1. Real GDP growth at historical average minus one standard deviation in 2004-05	4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7	
B2. Export value growth at historical average minus one standard deviation in 2004-05 3/	4.5	6.7	9.0	9.3	9.1	8.9	7.1	6.7	6.9	7.0	8.0	10.7	10.8	10.6	10.2	
B3. US dollar GDP deflator at historical average minus one standard deviation in 2004-05	4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7	
B4. Net non-debt creating flows at historical average minus one standard deviation in 2004-05 4/	4.5	6.0	7.2	7.5	7.4	7.2	5.9	5.6	5.7	5.8	6.6	8.7	8.8	8.6	8.3	
B5. Combination of B1-B4 using one-half standard deviation shocks	4.5	6.2	7.6	8.0	7.8	7.7	6.2	5.9	6.0	6.1	7.0	9.2	9.3	9.1	8.8	
B6. One-time 30 percent nominal depreciation relative to the baseline in 2004 5/	4.5	6.0	7.0	7.1	7.0	6.8	4.8	4.6	4.8	4.9	5.8	8.0	8.1	8.0	7.7	
Memorandum item:																
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	

Source: Staff projections and simulations.

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

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

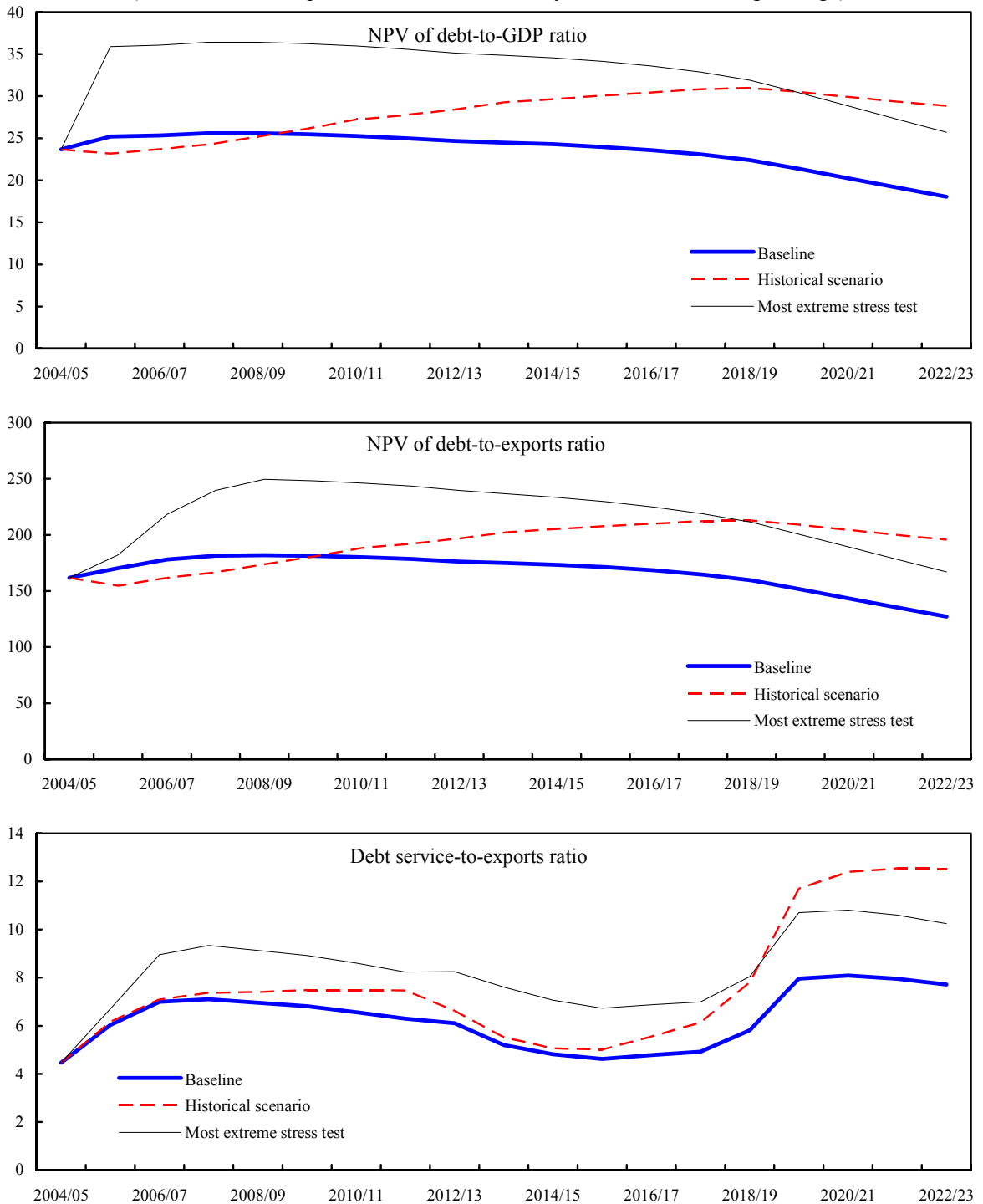
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).

4/ Includes official and private transfers and FDI.

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

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

Figure 1. Ethiopia: Indicators of Public and Publicly Guaranteed External Debt
Under Alternative Scenarios, (in percent)
(NPV of debt-to-exports ratios based on three year backward looking average)



Source: Staff projections and simulations.