

## **The Federal Democratic Republic of Ethiopia: Joint Bank-Fund Debt Sustainability Analysis**

- Ethiopia's risk of debt distress is moderate.** Ethiopia's external debt burden indicators under the baseline scenario remain below the relevant policy-dependent indicative thresholds. However, as illustrated by the "historic scenario", the favorable evolution of the debt indicators under the baseline is contingent on a strong performance compared to the country's historic track-record. Furthermore, stress tests reveal that the favorable outlook under the baseline does not provide sufficient comfort against adverse developments, in particular to less favorable terms for external financing and to exports shocks. This assessment remains valid when domestic debt is incorporated in the analysis
- This Debt Sustainability Analysis (DSA) has been prepared jointly by IDA and IMF staff using the debt sustainability framework for low income countries approved by the Boards of both institutions.**<sup>1</sup> The framework takes into account revised data for 2004/05, along with new information received in the context of the IMF 2005 Article IV consultation discussions, including revised GDP data, strong exports growth, and information received from donors. Political tensions have introduced a greater than usual degree of uncertainty to current projections, including for donor support levels. The macroeconomic scenario underlying this DSA is the baseline scenario presented in detail in Box 1. Estimated debt outstanding and disbursed as of end-FY2004/05, provides the basis for debt projections<sup>2</sup>. The DSA assumes full delivery of debt relief under the Enhanced HIPC Initiative, including topping up, and takes into account IMF debt relief to Ethiopia under the MDRI.<sup>3</sup> The baseline does not incorporate debt relief under the MDRI by IDA and AfDF as the Boards of both institutions have yet to approve its implementation. However, an alternative baseline explores the impact of the delivery of MDRI debt relief by the three institutions. The results of the alternative baseline suggest that the MDRI debt relief from IDA and the AfDB would lead to a sharp reduction of Ethiopia's debt burden indicators which may warrant a reassessment of Ethiopia's risk of debt distress once the Boards of these institutions approve the delivery of MDRI.
- The salient features of the revised macro framework are the revision of the GDP series as well as a strong growth in exports revenue.**

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<sup>1</sup> A debt sustainability analysis for Ethiopia using the LIC DSA template was presented in the context of the 2005 CAS Progress Report (IDA/ Report No. 29768-ET).

<sup>2</sup> For IDA and the IMF, actual end-FY2004/05 debt figures were used. For all other creditors, end-FY2004/05 estimates are based on the end-FY2002/03 debt outstanding and disbursed –which was reconciled at the time of the completion point– updated for actual disbursements and repayments over FY2003/04 – FY2004/05.

<sup>3</sup> IMF debt relief to Ethiopia under the MDRI amounts to US\$114 million excluding remaining assistance under the Enhanced HIPC Initiative. The implementation of the MDRI by the IMF is described in SM/05/353, EBS/05/158, and EBS/05/174.

## I. External Debt Sustainability Analysis<sup>4</sup>

4. **Ethiopia's NPV of debt-to-exports ratio as of end-2004/05 is estimated at 108 percent.** This represents a reduction of 45 percentage points compared to projections made for the 2005 CAS Progress Report (Text Table 1). Most of the decrease (about 37 percentage points) is due to higher growth in exports (exports of goods and services increased by 31 percent in 2003-04 compared to 20 percent estimated in the 2005 CAS Progress Report and grew by 22 percent in 2004-05 while the 2005 CAS Progress Report projected a decline of about ½ percent). This increase in exports is due to both a rebound in export prices (Ethiopian export prices increased by 25 percent in 2004/05 driven largely by a 46 percent increase in coffee prices) coupled by a pick up in exports volume thanks to a good performance of agricultural production in both 2003/04 and 2004/05. Debt relief provided by the IMF under the MDRI is estimated to have reduced the ratio of about 7 percentage points. On the other hand, unanticipated new borrowing would have increased the ratio by about 8 percentage points, most of this was due to higher than expected disbursements.

**Table 1. Ethiopia: NPV of debt-to-exports ratio as of end-FY 2004/2005** <sup>1/ 2/</sup>  
(in percentage points)

2005 CAS Progress Report	Projection 3/	153.3
<b>Total change</b>	(+) increase (-) decrease	<b>-45.5</b>
1. Due to changes in exchange rates		-7.3
2. Due to unanticipated new borrowing		8.4
o/w due to higher disbursements		5.4
o/w due to lower concessionality		3.0
3. Due to provision of MDRI by the IMF		-6.6
4. Due to unanticipated changes in exports		-37.1
5. Other factors 4/		-2.9
<b>Actual</b>		<b>107.8</b>
Memorandum item:		
Decrease due to provision of MDRI by IDA and the AfDB		-57.8

Source: World Bank staff estimates

1/ Refers to medium and long-term public and publicly guaranteed external debt and current year exports of goods and services.

2/ Refers to the Ethiopian fiscal year that runs from July 7 to July 6.

3/ IDA/ Report No. 29768-ET

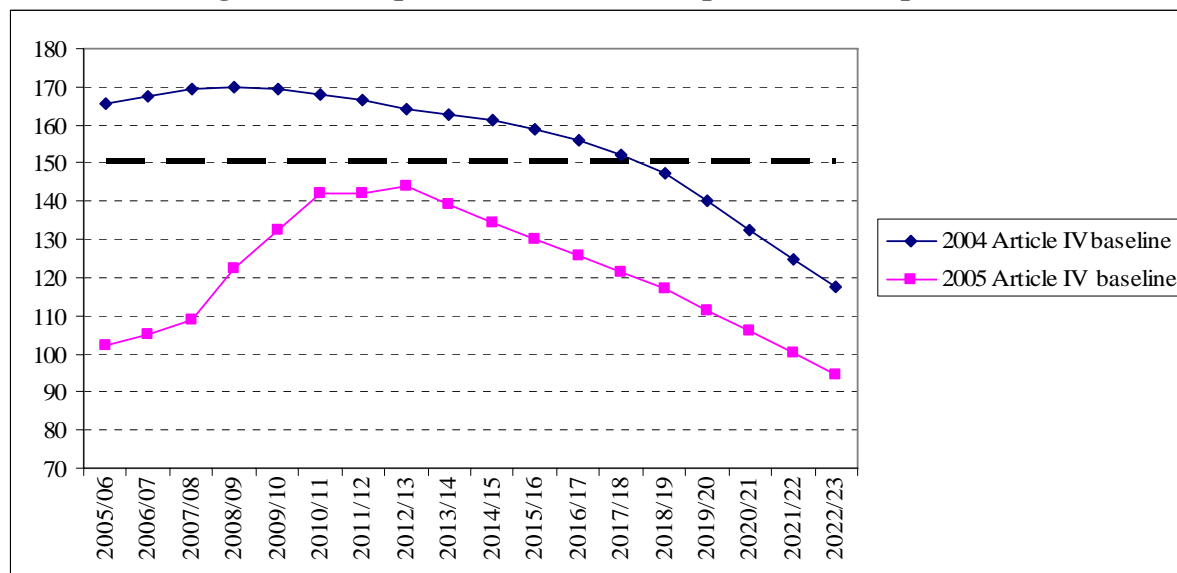
4/ Captures updates on the schedule for the delivery of debt relief under the HIPC Initiative and differences between actual and projected repayments during 2003/04 - 2004/05.

5. **Under the baseline scenario, Ethiopia's debt burden indicators remain below the relevant policy-dependent indicative thresholds.**<sup>5</sup> The main results of the external DSA are as follows (Table 1 and Figure 1):

<sup>4</sup> All the figures presented in the external DSA correspond to medium and long-term public and publicly guaranteed debt.

- Although lower than projected in the 2005 CAS Progress Report, the NPV of debt-to-GDP and the NPV of debt-to-exports ratios are expected to rise somewhat in the initial years.** They would reach 29 percent and 144 percent in 2012/13, respectively; and are then projected to gradually decline. External debt service absorbs on average about 6 percent of export revenues over the next 20 years. It increases from 5 percent to about 8 percent in 2011/12 – 2013-14 before declining to 5 percent at the end of the projection period. These patterns is largely driven by the impact on the debt service of the USD 1.2 billion loan contracted by Ethiopian Airlines for the purchase of aircrafts and by the significant “front-loading” of the debt service reduction to Ethiopia under different debt relief initiatives (Enhanced HIPC, additional bilateral debt relief and IMF relief under the MDRI).

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



- The favorable evolution of Ethiopia’s debt indicators under the baseline scenario is contingent upon a relatively ambitious macroeconomic performance** Under the “historic scenario”, all debt indicators show a significant deterioration compared to the baseline. Despite the significant debt reduction achieved in recent years, the NPV of debt-to-exports ratios would breach its indicative threshold within the next five years and remain above

<sup>5</sup> According to the latest World Bank’s Country Policy and Institutional Assessment (CPIA), Ethiopia ranks as a “medium performer”. The relevant indicative thresholds for this category are: 40 percent for the NPV of debt-to-GDP ratio, 150 percent for the NPV of debt-to-exports ratio, 250 percent for the NPV of debt-to-revenue ratio, 20 percent for the debt service-to-exports ratio and 30 percent for the debt service-to-revenue ratio. These thresholds are applicable to public and publicly guaranteed external debt.

that level thereafter. Although rising quickly, the ratio of NPV of debt-to-GDP would only breach its indicative threshold in 2014/15.

- **The stress tests also reveal that Ethiopia's external debt indicators are particularly sensitive to the terms of new borrowing<sup>6</sup> and negative export shocks.<sup>7</sup>** Although the NPV of debt-to-exports ratio deteriorates under most stress tests, it is when new borrowing is assumed to be contracted 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 55-60 percentage points compared to the baseline and is above the appropriate indicative benchmark within the next five years. A shock to exports, whereby exports would grow one standard deviation below its historical average during 2006/07 and 2007/08, could result in a NPV of debt-to-exports ratio above 200 percent by 2014/15. Given Ethiopia's historical vulnerability, such a shock has a non-negligible probability of occurrence.<sup>8</sup>

6. **These results underscore the importance Ethiopia to follow a comprehensive debt management strategy and prudent borrowing policies.** New borrowing should be on highly concessional terms and with an increased reliance on grant financing. This will be crucial to keep Ethiopia's risk of debt distress within acceptable levels. In that regard, it will be important to monitor closely the evolution of Ethiopia's debt burden indicators to ensure that the terms of external financing are consistent with the country's repayment capacity and take into consideration its vulnerability to external shocks. Additionally, achieving debt sustainability will require a continued focus on a prioritization of public investment, and fostering growth and diversified exports.

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<sup>6</sup> Under this scenario, external financing is assumed to be provided in less concessional terms than in the baseline. This scenario could also be assimilated to a sharp decline in grant financing that is compensated by loans.

<sup>7</sup> The standard stress tests performed under the framework for low income countries consider only a first order impact on macroeconomic variables. Therefore, the projected path of the debt burden indicators under the tests does not reflect a fully consistent macroeconomic scenario.

<sup>8</sup> The standard stress tests performed under the framework for low-income countries have been calibrated to represent a 20 percent of occurrence 10 years after the period where the shocks are assumed.

### Box 1. Ethiopia: Macroeconomic Assumptions Underlying the DSA

**Real GDP growth** is projected to average about 5.4 percent during 2005/06-2024/25. This is higher than the historical average of 4.1 percent during 1991/92-2004/05.

- The baseline projection assumes that implementation of the authorities' PRSP (policies to raise agriculture productivity; improve the environment for private sector participation, and build physical infrastructure) succeeds in raising real output growth. Consequently, real output growth in agriculture production is projected to rise from 2.9 percent (1991/92-2004/05) to 3.9 percent during 2005/06-2024/25, while growth in non-agriculture GDP is projected to rise from 5.1 percent to 6.4 percent.
- From a growth accounting framework perspective, the emphasis on improving Ethiopia's physical infrastructure, particularly electricity generation, roads and telecommunications, raises the ratio of public investment to GDP by more than 6 percentage points. The contribution by investment to growth is thus projected to rise to 2.2 percentage points from 1.5 percentage points during 1991/92-2004/05. Total factor productivity growth is projected to contribute 1.0 percentage point, compared with 0.5 percent historically. Given already significant achievements in the past, the contribution by labor to growth is projected to remain around 2.2 percentage points.

**Inflation** is projected to rise to 10.8 percent in 2005/06, driven by both higher increases in food and nonfood inflation, the latter partly on account of higher petroleum prices. Consistent with the authorities' PRSP, inflation is then projected to decline to an average of 6 percent in 2006/07, and remain at that level thereafter. The real exchange rate, relative to the U.S. dollar is projected to remain broadly unchanged, consistent with the authorities' stated policy of allowing the nominal exchange rate to depreciate in line with the expected inflation differential between Ethiopia and the U.S.

**Export (goods and services) growth** in 2005-10, is projected to increase by 12 percent which is 2 points higher than the average growth registered during the past 10 years. This marks a decline from an average growth of 27 percent growth per year in 2003/04-2004/05. However, caution is needed in comparing averages due to the very large extremely volatility experienced in the past due in part to the impact of droughts and the war with Eritrea. Thereafter, exports is expected to increase on average at 10 percent annually, which is slightly higher than the increase in nominal GDP growth reflecting the impact of government policies in particular the effort to diversify export bases and improving infrastructures.

**The external current account deficit** is expected to continue its decrease from its peak level of 2004/05 (9 percent of GDP) to an average of 4 ½ percent of GDP in 2005/06 - 2009/10 and 2 percent in 2005/06 - 2025/26. The reduction in the deficit is due to the increase in services balance surplus and in transfers (private and public) despite the growing trade deficit.

**External financing.** After a decline in aid flows in 2005-06, the baseline assumes that sufficient progress is made in addressing donors' concerns to allow a resumption in aid flows in 2006/07 and a return to the levels originally budgeted for in 2005-06. Despite the increasing share of grants in total external financing, disbursements are projected to account for 4.0 percent to GDP over 2006/07 – 2015-26 compared to 3.9 in the past 10 years.

**Fiscal policy.** The primary deficit (including debt relief from the IMF under the MDRI) is projected to decline from 4.9 to 1.5 percent of GDP between 2005/06 and 2025/26. The lower primary deficit is driven by higher revenue and grants totaling 1.1 percent of GDP and lower primary spending by about 1½ percent of GDP. The increase in revenue and grants reflects a projected increase in grants by 1.7 percent of GDP (including MDRI from the IMF) as higher tax revenue is more than offset by a decline in nontax revenue. Lower primary spending is achieved by a continued adjustment in defense and non-priority outlays as a share of GDP to safeguard pro-poor recurrent expenditures, and adjusting public investment in line with available resources. The interest bill also remains well contained given the gradual increase in projected real borrowing rates.

## II. Public Debt Sustainability Analysis

7. **The baseline fiscal framework is consistent with lower total public debt and comfortable debt-service ratios.** The NPV of the public debt falls from 51.1 to 39.2 percent of GDP over the twenty-year projection horizon. A decline in the domestic debt by 15.4 percent of GDP is partly offset by an increase in the NPV of external liabilities by about 3.5 percent of GDP. Debt-service ratios absorb an increasing share of revenue in line with the gradual increase in projected real borrowing rates, and the high initial level of domestic debt at 33 percent of GDP. However, debt service remains at manageable levels.

8. **The public DSA demonstrates that the principal risks to the scenario include lower average growth and elevated primary deficits** as described below:

- **The main risk to public debt sustainability is permanently lower GDP growth** by one standard deviation relative to the baseline path. This alternative scenario would result in a higher NPV of public debt by about 25 percent of GDP compared to 2005/06. Moreover, debt service would also reach 13 percent of revenue in 2025/26 compared to just 8 percent in the baseline.
- **Debt sustainability prospects would also be adversely affected if average growth and the primary deficit remain at historical levels.** In this scenario, the NPV of the public debt increases by 7 percent of GDP compared to 2005/06, and debt service reaches 11 percent of revenue.
- **The bound tests confirm the sensitivity of public debt sustainability to lower growth.** The NPV of public debt as a share of GDP decreases by 2025/26 in each bound test except the case of a transitory shock in real GDP growth during 2006/07 and 2007/08<sup>9</sup> In this case, the NPV of public debt as a share of GDP peaks at 75 percent in 2015/16 after increasing 24 percent of GDP, and debt service reaches 13 percent of revenue compared to 8 percent in the baseline. This example highlights the challenge of maintaining a sustainable public debt given Ethiopia's vulnerability to severe climatic shocks that result in volatile growth swings.

9. **The results of the public DSA reiterate the importance of developing a comprehensive public debt strategy.** The strategy should develop separate targets and adjustment paths for the domestic and external debt based on a range of fiscal indicators. In this manner, medium-term budget planning should be anchored by the public debt strategy. Contingency plans should play an integral role in the strategy to ensure that the public debt remains sustainable following severe shocks. In this context, lowering the domestic debt should be a priority to provide scope for higher borrowing to absorb the fiscal impact of macroeconomic shocks.

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<sup>9</sup> The bound test for lower real GDP growth is calculated by reducing projected growth by one standard deviation in 2006/07 and 2007/08. This corresponds to a contraction in real GDP by 0.9 percent compared to the baseline growth projection of 5.7 percent.

### III. Impact of the full delivery of debt relief under the MDRI

10. **Delivery of MDRI debt relief from IDA and the AfDB would improve Ethiopia's debt sustainability outlook by leading to a sharp reduction of Ethiopia's debt burden indicators** (Text Table 2).<sup>10</sup> The NPV of debt-to export ratio would decrease by about 50 percentage points in the initial year compared to the baseline, and would remain comfortably below the indicative threshold throughout the projection period. Similarly, the NPV of debt-to-GDP would decrease by 6 percentage points on average compared to the baseline. Under the full MDRI scenario, the debt service would average 5.3 percent, increasing from 3.9 percent in 2006/07 to 7.7 percent in 2012/13 to then decline to about 4.0 percent by the end of the projection period. Albeit the sharp initial impact of MDRI debt relief, all debt burden indicators converge over time to the pre-MDRI situation, with the NPV of debt-to-GDP ratio at the end of the projection period above its initial levels.

**Table 2. Ethiopia: Impact of full provision of MDRI debt relief on the baseline scenario**

	2005/06	2009/10	2012/13	2015/16	2025/26
NPV of debt-to-GDP ratio					
Before MDRI 1/	17.6	25.7	29.2	27.7	21.5
After MDRI	9.0	18.1	22.5	21.7	19.2
NPV of exports-to-GDP ratio					
Before MDRI 1/	102.2	132.3	144.0	130.1	78.6
After MDRI	51.9	93.0	110.9	102.2	70.5
Debt service ratio					
Before MDRI 1/	5.2	5.2	8.2	6.9	5.0
After MDRI	5.2	4.7	7.7	6.5	3.9

1/ Includes the IMF debt relief under the MDRI.

11. **Under the current CPIA classification, and contingent on a strong economic performance, a reassessment of Ethiopia's risk of debt distress could be needed once MDRI from IDA and the AfDB is approved.**

<sup>10</sup> This alternative baseline assumes that MDRI debt relief from IDA is implemented starting in July 2006 through the forgiveness of the debt service payments on the debt outstanding and disbursed (DOD) as of end-December 2003. As for the African Development Fund, it is assumed that debt service payments on the DOD as of end-December 2004 with retroactive application to January-2006. Under those assumptions, IDA and the AfDB would deliver MDRI debt relief in the amount of approximately SDR1.6 billion (equivalent to US\$[2.3] billion at the exchange rate prevailing at end-December 2005) and US\$0.9 billion, respectively.

Table 1a. Ethiopia: External Debt Sustainability Framework: Baseline Scenario, 2002-2025 1/  
(In percent of GDP, unless otherwise indicated)

	Actual			Estimate		Historical Average 6/	Standard Deviation 6/	Projections									
	2002/03	2003/04	2004/05	2004/05	2004/05			2005/06	2006/07	2007/08	2008/09	2009/10	2012/13	2013/14	2014/15	2015/16	2016/17
<b>External debt (nominal) 1/</b>	85.4	75.7	53.9	53.9	53.9	47.4	48.1	47.5	46.0	45.3	42.6	41.6	40.7	39.9	39.1	31.1	30.0
o/w public and publicly guaranteed (PPG)	1.9	-9.7	-21.8	-21.8	-21.8	-6.5	0.7	-0.6	-1.5	-0.7	-1.1	-1.0	-0.9	-0.8	-0.8	-1.0	-1.0
Change in external debt	-5.6	-11.6	-2.0	-2.0	-2.0	3.7	0.5	-0.9	-0.1	0.3	-0.8	-2.2	-2.8	-2.8	-2.7	-1.2	-1.6
Identified net debt-creating flows	1.3	4.5	8.6	8.6	8.6	7.0	3.8	2.5	3.1	3.4	1.7	0.2	-0.4	-0.5	-0.5	0.5	0.1
<b>Non-interest current account deficit</b>	15.2	17.2	22.7	22.7	22.7	20.4	19.1	18.7	19.3	19.1	17.0	15.4	14.6	14.4	14.3	15.8	15.9
Deficit in balance of goods and services	14.4	15.4	16.4	16.4	16.4	17.3	18.4	19.0	19.2	19.4	20.3	20.6	20.9	21.3	21.7	26.5	27.3
Exports	29.5	32.6	39.1	39.1	39.1	37.7	37.5	37.7	38.5	38.5	37.3	36.0	35.5	35.6	36.0	42.3	43.2
Imports	-13.8	-12.7	-14.0	-14.0	-14.0	-13.1	-14.9	-15.8	-15.3	-15.3	-14.7	-14.4	-14.1	-13.9	-13.7	-14.2	-14.8
Net current transfers (negative = inflow)	-0.1	0.0	-0.1	-0.1	-0.1	-0.3	-0.3	-0.4	-0.3	-0.4	-0.6	-0.8	-0.9	-1.0	-1.0	-1.1	-1.1
Other current account flows (negative = net inflow)	-1.4	-1.0	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.2	-1.0	-1.0	-1.0	-0.9	-0.8	-0.5	-0.5
<b>Net FDI (negative = inflow)</b>	-5.5	-15.1	-9.3	-9.3	-9.3	-2.0	-2.0	-2.0	-2.0	-1.8	-1.5	-1.4	-1.4	-1.4	-1.4	-1.2	-1.2
<b>Endogenous debt dynamics 2/</b>	0.9	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.7	0.7	0.7	0.6	0.6	0.4	0.4
Contribution from nominal interest rate	2.5	-7.7	-5.8	-5.8	-5.8	-2.4	-2.4	-2.5	-2.4	-2.3	-2.2	-2.1	-2.1	-2.0	-2.0	-1.6	-1.6
Contribution from real GDP growth	7.5	2.0	-19.8	-19.8	-19.8	-10.2	0.2	0.3	-1.4	-1.0	-0.3	1.2	1.9	2.0	1.9	0.2	0.6
Contribution from price and exchange rate changes	-0.9	-0.8	-0.8	-0.8	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Residual (3-4) 3/</b>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
o/w exceptional financing	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
NPV of external debt 4/	...	...	17.6	17.6	17.6	17.6	19.3	20.7	23.5	25.7	29.2	28.6	28.1	27.7	27.2	22.2	21.5
In percent of exports	...	...	107.8	107.8	107.8	102.2	105.1	108.8	122.4	132.3	144.0	139.0	134.4	130.1	125.6	83.8	78.6
<b>NPV of PPG external debt</b>	...	...	17.6	17.6	17.6	17.6	19.3	20.7	23.5	25.7	29.2	28.6	28.1	27.7	27.2	22.2	21.5
In percent of exports	...	...	107.8	107.8	107.8	102.2	105.1	108.8	122.4	132.3	144.0	139.0	134.4	130.1	125.6	83.8	78.6
Debt service-to-exports ratio (in percent)	15.2	12.3	7.1	7.1	7.1	5.2	4.4	4.2	4.0	5.2	8.2	8.1	7.3	6.9	6.7	5.2	5.0
<b>PPG debt service-to-exports ratio (in percent)</b>	15.2	12.3	7.1	7.1	7.1	5.2	4.4	4.2	4.0	5.2	8.2	8.1	7.3	6.9	6.7	5.2	5.0
Total gross financing need (billions of U.S. dollars)	0.2	0.5	0.9	0.9	0.9	0.8	0.4	0.3	0.4	0.5	0.5	0.2	0.0	0.0	0.0	0.7	0.5
Non-interest current account deficit that stabilizes debt ratio	-0.6	14.2	30.5	30.5	30.5	13.5	3.1	3.1	4.7	4.1	2.8	1.2	0.5	0.3	0.4	1.5	1.1
<b>Key macroeconomic assumptions</b>																	
Real GDP growth (in percent)	-3.3	11.1	8.8	8.8	8.8	5.2	5.4	5.5	5.5	5.5	5.4	5.4	5.4	5.3	5.4	5.4	5.4
GDP deflator in US dollar terms (change in percent)	12.0	10.3	5.5	5.5	5.5	8.8	-0.1	1.7	2.4	2.2	2.4	2.4	2.3	2.0	1.9	1.7	1.7
Effective interest rate (percent) 5/	1.2	0.9	0.7	0.7	0.7	1.0	0.9	1.0	1.0	1.3	1.8	1.9	1.7	1.6	1.5	1.2	1.2
Growth of exports of G&S (US dollar terms, in percent)	16.0	31.5	22.1	22.1	22.1	20.7	12.3	10.8	9.1	9.0	9.4	9.5	9.5	9.2	9.3	10.4	10.5
Growth of imports of G&S (US dollar terms, in percent)	13.2	35.1	37.7	37.7	37.7	10.3	4.7	7.9	10.3	8.0	8.6	4.3	6.2	7.8	8.4	9.7	9.6
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	41.8	47.6	49.6	37.4	35.4	35.8	49.7	49.9	50.0	50.2	51.6	51.8
<i>Memorandum items:</i>																	
Nominal GDP (billions of US dollars)	7.9	9.7	11.2	11.2	11.2	12.8	13.5	14.5	15.6	16.8	21.2	22.8	24.6	26.4	28.4	49.1	52.6

Source: Staff simulations.

1/ Includes both public and private sector external debt.

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

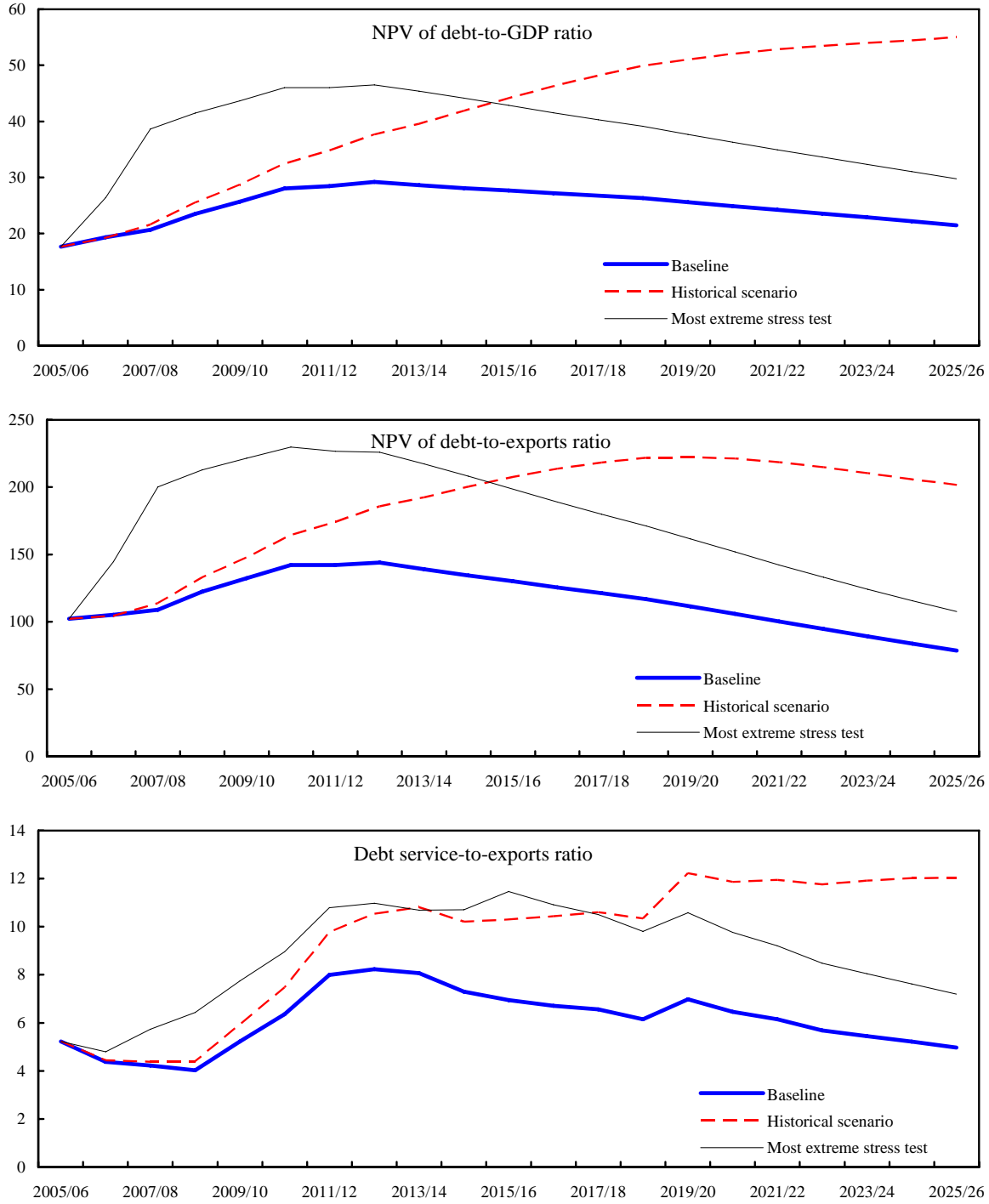
5/ Current-year interest payments divided by previous period debt stock.

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, 2005-25  
(In percent)

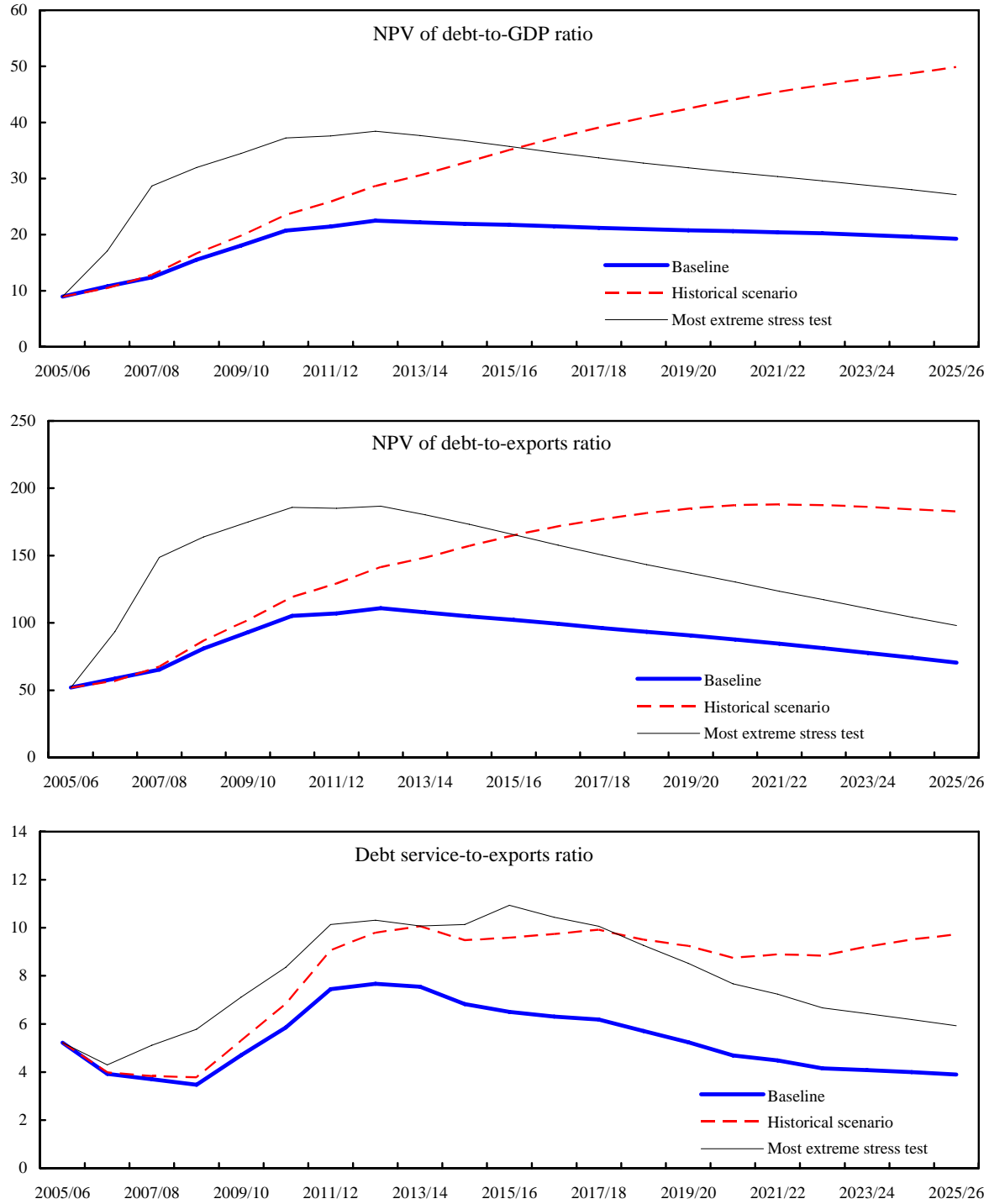
	Estimate						Projections							
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2024/25	2025/26
<b>NPV of debt-to-GDP ratio</b>														
<b>Baseline</b>	17.6	19.3	20.7	23.5	25.7	28.1	28.4	29.2	28.6	28.1	27.7	27.2	22.2	21.5
<b>A. Alternative Scenarios</b>														
A1. Key variables at their historical averages in 2006-25 1/	17.6	19.2	21.6	25.5	28.7	32.5	34.8	37.7	39.6	41.9	44.2	46.3	54.4	55.0
A2. New public sector loans on less favorable terms in 2006-25 2/	17.6	20.6	23.2	28.1	32.0	36.2	37.7	39.8	39.8	39.9	39.9	39.9	36.5	35.8
<b>B. Bound Tests</b>														
B1. Real GDP growth at historical average minus one standard deviation in 2006-07	17.6	20.6	23.5	26.7	29.3	31.9	32.4	33.2	32.6	32.0	31.5	31.0	25.2	24.4
B2. Export value growth at historical average minus one standard deviation in 2006-07 3/	17.6	20.9	25.1	27.7	29.8	32.0	32.2	32.8	32.1	31.4	30.7	30.0	23.6	22.7
B3. US dollar GDP deflator at historical average minus one standard deviation in 2006-07	17.6	21.1	25.1	28.5	31.2	34.1	34.5	35.5	34.7	34.1	33.6	33.0	26.9	26.0
B4. Net non-debt creating flows at historical average minus one standard deviation in 2006-07 4/	17.6	24.4	31.2	33.6	35.4	37.4	37.4	37.9	37.0	36.0	34.9	33.9	25.5	24.5
B5. Combination of B1-B4 using one-half standard deviation shocks	17.6	26.4	38.7	41.5	43.7	46.0	46.0	46.5	45.4	44.2	42.9	41.6	31.1	29.8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2006 5/	17.6	27.7	29.6	33.6	36.7	40.1	40.6	41.7	40.9	40.1	39.5	38.9	31.7	30.7
<b>NPV of debt-to-exports ratio</b>														
<b>Baseline</b>	102.2	105.1	108.8	122.4	132.3	142.3	142.2	144.0	139.0	134.4	130.1	125.6	83.8	78.6
<b>A. Alternative Scenarios</b>														
A1. Key variables at their historical averages in 2006-25 1/	102.2	104.6	113.8	132.9	147.8	164.6	174.2	185.8	192.4	200.5	207.7	213.7	205.8	201.7
A2. New public sector loans on less favorable terms in 2006-25 2/	102.2	111.9	122.2	146.2	164.8	183.4	188.6	196.1	193.7	190.9	187.8	184.1	138.0	131.4
<b>B. Bound Tests</b>														
B1. Real GDP growth at historical average minus one standard deviation in 2006-07	102.2	105.1	108.8	122.4	132.3	142.3	142.2	144.0	139.0	134.4	130.1	125.6	83.8	78.6
B2. Export value growth at historical average minus one standard deviation in 2006-07 3/	102.2	133.8	180.4	197.4	209.6	221.7	220.3	221.5	213.4	205.6	197.7	189.6	121.9	114.0
B3. US dollar GDP deflator at historical average minus one standard deviation in 2006-07	102.2	105.1	108.8	122.4	132.3	142.3	142.2	144.0	139.0	134.4	130.1	125.6	83.8	78.6
B4. Net non-debt creating flows at historical average minus one standard deviation in 2006-07 4/	102.2	132.6	163.9	174.8	182.2	186.8	187.2	186.8	179.7	172.2	164.4	156.6	96.4	89.7
B5. Combination of B1-B4 using one-half standard deviation shocks	102.2	144.7	200.3	212.9	221.5	229.8	226.7	225.9	217.3	208.2	198.5	188.9	115.6	107.5
B6. One-time 30 percent nominal depreciation relative to the baseline in 2006 5/	102.2	105.1	108.8	122.4	132.3	142.3	142.2	144.0	139.0	134.4	130.1	125.6	83.8	78.6
<b>Debt service ratio</b>														
<b>Baseline</b>	5.2	4.4	4.2	4.0	5.2	6.4	8.0	8.2	8.1	7.3	6.9	6.7	5.2	5.0
<b>A. Alternative Scenarios</b>														
A1. Key variables at their historical averages in 2006-25 1/	5.2	4.4	4.4	4.4	5.9	7.5	9.8	10.5	10.8	10.2	10.3	10.4	12.0	12.0
A2. New public sector loans on less favorable terms in 2006-25 2/	5.2	4.4	4.4	4.7	5.7	6.3	7.4	7.8	8.0	8.3	10.2	9.7	9.2	8.8
<b>B. Bound Tests</b>														
B1. Real GDP growth at historical average minus one standard deviation in 2006-07	5.2	4.4	4.2	4.0	5.2	6.4	8.0	8.2	8.1	7.3	6.9	6.7	5.2	5.0
B2. Export value growth at historical average minus one standard deviation in 2006-07 3/	5.2	5.2	6.0	6.2	7.8	9.3	11.5	11.8	11.5	10.8	10.9	10.5	7.8	7.4
B3. US dollar GDP deflator at historical average minus one standard deviation in 2006-07	5.2	4.4	4.2	4.0	5.2	6.4	8.0	8.2	8.1	7.3	6.9	6.7	5.2	5.0
B4. Net non-debt creating flows at historical average minus one standard deviation in 2006-07 4/	5.2	4.4	4.9	5.3	6.4	7.5	9.0	9.2	8.9	9.0	9.4	9.0	6.3	6.0
B5. Combination of B1-B4 using one-half standard deviation shocks	5.2	4.8	5.7	6.4	7.7	9.0	10.8	11.0	10.7	10.7	11.5	10.9	7.6	7.2
B6. One-time 30 percent nominal depreciation relative to the baseline in 2006 5/	5.2	4.4	4.2	4.0	5.2	6.4	8.0	8.2	8.1	7.3	6.9	6.7	5.2	5.0
<b>Memorandum item:</b>														
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7
<b>Source:</b> 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 2a. Ethiopia: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2005/06-2025/26 (In percent)



Source: Staff projections and simulations.

Figure 2b. Ethiopia: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios After full MDRI, 2005/06-2025/26 (In percent)



Source: Staff projections and simulations.

**Table 2a. Ethiopia: Public Sector Debt Sustainability Framework, Baseline Scenario, 2002/3-2025/26**  
(In percent of GDP, unless otherwise indicated)

	Actual					Estimate					Projections				
	2002/3	2003/4	2004/5	Historical Average 5/	Standard Deviation 5/	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2010/11 Average	2015/16	2025/26	2011/12-2025/26 Average
<b>Public sector debt 1/</b>	124.5	110.9	88.8			82.0	81.9	81.1	79.0	77.8	76.1	76.1	67.3	47.9	
o/w foreign-currency denominated	85.6	75.9	54.0			49.2	49.1	48.4	46.9	46.2	45.4	45.4	40.7	30.6	
Change in public sector debt	1.3	-13.6	-22.1			-6.8	-0.1	-0.8	-2.1	-1.1	-1.7	-1.7	-1.6	-1.9	
Identified debt-creating flows	-4.2	-20.6	-10.8			-5.9	-1.9	-2.4	-1.9	-1.5	-2.1	-2.1	-1.6	-1.1	
Primary deficit	5.2	1.8	3.9	4.0	2.4	4.0	4.5	3.7	3.6	3.5	3.0	3.7	2.2	1.5	1.9
Revenue and grants	23.0	21.4	20.7			23.5	22.1	21.9	22.8	23.2	23.8	23.8	24.4	24.6	
of which: grants	6.7	4.8	4.7			5.4	5.3	5.4	6.3	6.7	7.2	7.2	7.4	7.2	
Primary (noninterest) expenditure	28.3	23.2	24.6			27.5	26.5	25.5	26.3	26.6	26.8	26.6	26.6	26.1	
Automatic debt dynamics	-8.6	-21.6	-13.6			-9.0	-5.5	-5.2	-5.4	-5.0	-5.1	-5.1	-3.8	-2.6	
Contribution from interest rate/growth differential	-0.4	-16.8	-11.5			-7.7	-5.6	-5.5	-5.6	-5.1	-5.0	-5.0	-3.8	-2.7	
of which: contribution from average real interest rate	-4.3	-3.2	-2.6			-3.2	-1.3	-1.0	-1.2	-0.9	-1.0	-1.0	-0.4	-0.1	
of which: contribution from real GDP growth	3.9	-13.6	-8.9			-4.5	-4.4	-4.4	-4.4	-4.2	-4.1	-4.1	-3.5	-2.6	
Contribution from real exchange rate depreciation	-8.3	-4.8	-2.1			-1.4	0.1	0.3	0.1	0.2	0.1	0.2	...	...	
Other identified debt-creating flows	-0.8	-0.8	-1.0			-0.9	-0.9	-0.9	0.0	0.0	0.0	0.0	0.0	0.0	
Privatization receipts (negative)	0.0	0.0	-0.2			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	
Debt relief (HIPC and other) 6/	-0.8	-0.8	-0.8			-0.9	-0.9	-0.9	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	
Residual, including asset changes	5.5	6.9	-11.3			-0.9	1.9	1.6	-0.3	0.4	0.4	0.4	-0.1	-0.8	
<b>NPV of public sector debt</b>	39.0	35.0	52.5			51.1	52.6	53.8	56.1	57.9	59.3	59.3	54.8	39.2	
o/w foreign-currency denominated	13.0	12.6	17.7			18.3	19.7	21.1	23.9	26.2	28.6	28.6	28.2	21.9	
Gross financing need 2/	22.1	22.6	23.6			24.5	26.1	26.6	26.3	26.8	26.7	25.4	25.4	18.5	
NPV of public sector debt-to-revenue ratio (in percent) 3/	169.1	163.9	253.3			217.0	238.1	246.0	246.3	249.7	249.7	249.7	224.9	159.2	
o/w external	...	...	85.3			77.9	89.4	96.4	105.2	113.0	120.4	115.6	115.6	88.9	
Debt service-to-revenue ratio (in percent) 3/4/	11.3	10.7	9.3			8.8	9.8	10.5	6.6	7.1	7.3	7.3	8.5	7.9	
Primary deficit that stabilizes the debt-to-GDP ratio	3.9	15.4	26.0			10.8	4.5	4.5	5.7	4.6	4.8	4.8	3.9	3.4	
<b>Key macroeconomic and fiscal assumptions</b>															
Real GDP growth (in percent)	-3.1	12.3	8.7	5.0	5.9	5.3	5.7	5.7	5.7	5.7	5.5	5.5	5.6	5.3	5.4
Average nominal interest rate on forex debt (in percent)	1.1	0.9	0.8	0.9	0.2	1.0	1.0	0.9	0.5	0.5	0.5	0.5	0.7	0.5	0.6
Average real interest rate on domestic currency debt (in percent)	-9.3	-6.6	-4.2	-1.0	7.3	-8.2	-2.6	-1.7	-1.5	-0.9	-1.1	-2.7	0.8	1.6	1.0
Real exchange rate depreciation (in percent, + indicates depreciation)	-9.6	-6.3	-3.1	3.1	8.2	-2.7	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	13.0	9.4	6.2	2.5	5.9	11.6	5.8	5.3	5.7	5.5	6.2	6.7	5.9	5.6	5.9
Growth of real primary spending (deflated by GDP deflator, in percent)	2.5	-7.9	15.1	10.4	13.9	18.0	1.6	1.9	9.5	7.4	6.4	7.5	4.2	5.3	5.2
Grant element of new external borrowing (in percent)	...	...	...	...	...	41.8	47.6	49.6	37.4	35.4	30.1	40.3	50.0	51.8	...

Sources: Country authorities; and Fund staff estimates and projections.  
1/ Public sector debt corresponds to the general government gross debt, including publicly guaranteed debt to the public enterprises and the external debt of Ethiopia Airlines. The fiscal year ends on July 7.

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 including 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.

6/ External debt service is presented before debt relief until 2007 for comparability with the authorities' medium-term fiscal framework.

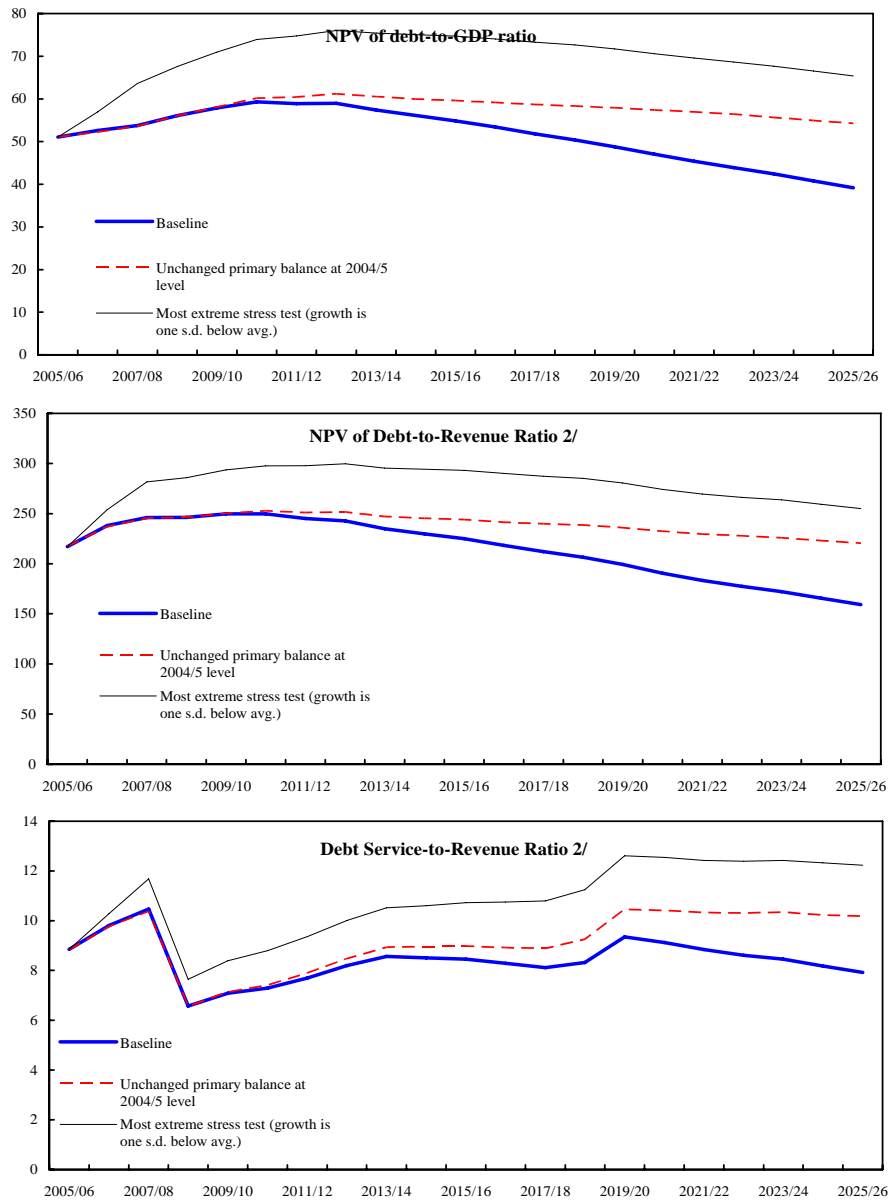
Table 2b.Ethiopia: Sensitivity Analysis for Key Indicators of Public Debt 2005/6-2025/26

	Estimate		Projections					
	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2015/16	2025/26
<b>NPV of Debt-to-GDP Ratio</b>								
<b>Baseline</b>	51	53	54	56	58	59	55	39
<b>A. Alternative scenarios</b>								
A1. Real GDP growth and primary balance are at historical averages	51	53	54	57	60	62	63	58
A2. Primary balance is unchanged from 2004/5	51	52	54	56	58	60	60	54
A3. Permanently lower GDP growth 1/	51	53	56	59	62	65	70	77
<b>B. Bound tests</b>								
B1. Real GDP growth is at historical average minus one standard deviations in 2006/7-2007/8	51	57	64	68	71	74	75	65
B2. Primary balance is at historical average minus one standard deviations in 2006/7-2007/8	51	54	57	59	60	62	57	41
B3. Combination of B1-B2 using one half standard deviation shocks	51	55	59	61	62	63	57	38
B4. One-time 30 percent real depreciation in 2006/7	51	60	61	64	66	68	62	44
B5. 10 percent of GDP increase in other debt-creating flows in 2006/7	51	60	60	62	63	64	59	42
<b>NPV of Debt-to-Revenue Ratio 2/</b>								
<b>Baseline</b>	217	238	246	246	250	250	225	159
<b>A. Alternative scenarios</b>								
A1. Real GDP growth and primary balance are at historical averages	218	239	249	251	256	259	253	230
A2. Primary balance is unchanged from 2004/5	217	237	245	246	250	253	244	220
A3. Permanently lower GDP growth 1/	217	241	253	256	264	269	275	290
<b>B. Bound tests</b>								
B1. Real GDP growth is at historical average minus one standard deviations in 2006/7-2007/8	217	254	282	286	294	298	293	255
B2. Primary balance is at historical average minus one standard deviations in 2006/7-2007/8	217	246	262	258	260	259	235	167
B3. Combination of B1-B2 using one half standard deviation shocks	217	247	266	261	262	260	228	151
B4. One-time 30 percent real depreciation in 2006/7	217	274	280	281	285	286	254	181
B5. 10 percent of GDP increase in other debt-creating flows in 2006/7	217	274	275	270	271	269	241	169
<b>Debt Service-to-Revenue Ratio 2/</b>								
<b>Baseline</b>	9	10	10	7	7	7	8	8
<b>A. Alternative scenarios</b>								
A1. Real GDP growth and primary balance are at historical averages	9	10	10	7	7	8	9	11
A2. Primary balance is unchanged from 2004/5	9	10	10	7	7	7	9	10
A3. Permanently lower GDP growth 1/	9	10	11	7	8	8	10	13
<b>B. Bound tests</b>								
B1. Real GDP growth is at historical average minus one standard deviations in 2006/7-2007/8	9	10	12	8	8	9	11	12
B2. Primary balance is at historical average minus one standard deviations in 2006/7-2007/8	9	10	11	7	8	8	9	8
B3. Combination of B1-B2 using one half standard deviation shocks	9	10	11	7	8	8	9	8
B4. One-time 30 percent real depreciation in 2006	9	10	11	7	8	8	9	9
B5. 10 percent of GDP increase in other debt-creating flows in 2006/7	9	10	12	8	8	8	9	9

Sources: Country authorities; and Fund staff estimates and projections. The fiscal year ends July 7.

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. Debt service ratios are presented before HIPC debt relief until 2007/8 for comparability with the authorities' medium-term fiscal framework. As a result, the ratios drop in 2008/9 once external debt service is expressed net of all debt relief.

Figure 3.Ethiopia: Indicators of Public Debt Under Alternative Scenarios, 2005/6-2025/26 1/



Source: Staff projections and simulations.

1/ Most extreme stress test is test that yields highest ratio in 2015/16.

2/ Revenues are defined inclusive of grants. Debt service ratios are presented gross of HIPC debt relief until 2007/8 for comparability with the authorities' medium-term fiscal framework. As a result, the ratios drop in 2008/9 once external debt service is expressed net of all debt relief.