

THE INTERNATIONAL DEVELOPMENT ASSOCIATION AND
THE INTERNATIONAL MONETARY FUND

LAO People's Democratic Republic

Joint World Bank/IMF Debt Sustainability Analysis 2007

Prepared by the Staff of the International Development Association
and the International Monetary Fund

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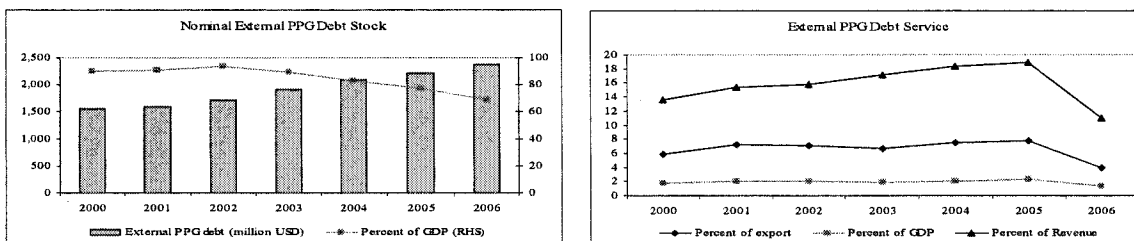
1. **The debt sustainability analysis conducted during the 2007 Article IV consultation discussions indicates that Lao P.D.R. continues to face a high risk of debt distress.**¹ The current DSA points to an improved outlook compared to the previous DSA. The stock indicators are expected to decline faster and the debt service burden is projected to be lower in terms of exports. Moreover, debt service ratios remain relatively low. However, despite these improvements, the debt stock indicators remain well-above the policy-based indicative thresholds and could increase further depending on future macroeconomic performance and the concessionality of external financing.

I. BACKGROUND

2. **Lao's external public and publicly guaranteed debt (PPG) ratios have declined in recent years (Figure 1).** While nominal debt stocks have increased, strong growth has led the nominal debt-to-GDP ratio to steadily decline since 2002. All debt service indicators reversed their upward trends in 2006, reflecting continued strong GDP and export growth helped by high commodity prices.

¹ The last DSA for Lao P.D.R. was prepared in the context of the 2005 Article IV Consultation (SM/06/76).

Figure 1



3. **Despite these positive developments, Lao P.D.R.'s external public debt stock remains at an elevated level.** The total external public debt stock amounted to US\$ 2.4 billion (70 percent of GDP) at end-2006, with a net present value of US\$1.7 billion. At these levels, Lao P.D.R.'s debt stock indicators are significantly above the policy-based indicative thresholds for countries with similar CPIA rating (Text Table 1).²

However, debt service ratios remain below the indicative thresholds due to a high degree of concessionality.

	Indicative thresholds	End-2006
NPV of debt in percent of:		
GDP	30	48
Exports	100	135
Revenue	200	377
Debt services in percent of:		
Exports	15	4
Revenues	25	11

² The low income country debt sustainability framework (LIC DSF) provides indicative levels (thresholds) of debt burdens beyond which a country's risk of debt distress reaches levels that are considered unacceptable. (See IDA/R2004-0253, "Operational Framework for Debt Sustainability Assessments in Low-Income Countries—Further Considerations.") The LIC DSF recognizes that better policies and institutions allow countries to manage higher levels of debt, and thus the threshold levels are policy-dependent. Lao P.D.R.'s policies and institutions, as measured by the World Bank's Country Policy and Institutional Assessment (CPIA), place it as a "weak performer". The relevant indicative thresholds for this category are indicated in Text table 1 above.

4. **About 75 percent of Lao P.D.R.'s external public debt are concessional loans from multilateral creditors, primarily the ADB and IDA (Text Table 2).**^{3,4} Debt to bilateral and commercial creditors amounted to approximately US\$633 million. Traditional bilateral creditors include Russia and Japan. In recent years, neighboring countries, including China, Vietnam, and Thailand, are becoming increasingly active, although information is limited regarding their lending activities. Since the rescheduling agreement with Russia in 2003, Lao P.D.R. has not accumulated any external debt payment arrears.⁵

5. **The size of domestic public debt is negligible.** At the end of 2005/06, the stock of domestic public debt stood at around Kip 560 billion (1 $\frac{3}{4}$ percent of GDP).

Text Table 2: Summary of Public External Debt

	In millions of U.S.	
	dollar	Percent share
Total External Debt	2,371	100.0
Total Multilateral	1,738	73.3
<i>AsDB</i>	938	39.6
<i>IDA</i>	617	26.0
<i>NDF</i>	50	2.1
<i>EIB</i>	46	2.0
<i>IFAD</i>	45	1.9
<i>IMF</i>	26	1.1
<i>OPEC</i>	16	0.7
Total Bilateral	633	26.7
<i>Russia</i>	382	16.1
<i>China</i>	100	4.2
<i>Japan</i>	76	3.2
<i>Thailand</i>	28	1.2
<i>Sweden (SIDA)</i>	15	0.6
<i>France</i>	10	0.4
<i>Korea</i>	9	0.4
<i>Vietnam</i>	7	0.3
<i>Germany</i>	4	0.2
<i>Singapore</i>	4	0.2
<i>Norway (NORAD)</i>	0.1	0.0

II. DEBT SUSTAINABILITY OUTLOOK

6. **The medium-to long-term debt sustainability of Lao, P.D.R. depends on the government's choice of policies to deal with potentially adverse effects of the resource bonanza.** The proactive scenario (baseline) assumes that policies are put in place in anticipation of adverse effects on the non-resource sector (such as greater appreciation of the real exchange rate – See Box 1),⁶ To examine the implications of an alternative policy response, staffs have developed a reactive scenario, where policies are undertaken as the adverse effects materialize (Box 2). Under each scenario, standard stress tests are carried out to check the resilience of the debt outlook in the event of external shocks.

³ Except for two loans for the NT2 project from ADB and EIB for which near-market terms apply.

⁴ The assessment in this annex is based on available information and any debt that has not been identified by the authorities would further increase the risk of debt distress. For example, some sources indicate higher domestic debt due to unaccounted quasi-fiscal liabilities; more research is needed to quantify this component of domestic debt.

⁵ Debt to Russia was rescheduled on a bilateral basis in December 2003, with a 70 percent up-front debt stock reduction and a rescheduling of maturities.

⁶ This also requires the authorities carry out its reform commitment under the NSEDP and continue the fiscal consolidation effort in the medium-term.

Box 1. Macroeconomic Assumptions 2007–27

The assumptions in the baseline scenario are consistent with a proactive policy response to the recent increase in natural resource revenue. In particular, the government is assumed to save a large portion of resource revenue for future use, while pursuing fiscal consolidation of the non-resource budget. Moreover, improvements to the investment climate envisioned in the NSEDP are assumed to be realized.

Real GDP growth is projected to accelerate in the early years fueled by high investment demand in the resource sector, later stabilizing at around 6.5 percent increasingly supported by non-resource sector growth.

Inflation is projected to remain around the recent levels (4.5 percent) as the BoL's enhanced set of market-based tools for conducting monetary policy helps to contain the monetary impact of external surpluses from natural resources.

	2002-06 average	2007-12 average	2013-27 average
Real GDP growth (percent)	6.6	7.2	6.4
Inflation (percent)	10.1	4.4	4.5
Exports growth (percent)	20.6	10.6	11.2
Revenue (percent GDP)	11.8	13.4	13.7
Primary deficit (percent GDP)	2.6	-0.1	1.3
Grant element of new borrowing	...	41.1	43.7

The real exchange rate is expected to appreciate due to the resource sector boom, but only moderately.

Export growth is volatile in the early years reflecting the mining output profile, commodity price changes, and the timing of the start of operations of the NT2 dam project. In the medium-term, nominal export growth stabilizes at around 11 percent, increasingly driven by non-resource exports

Import growth is projected to increase sharply in 2007-08 due to the dam construction projects, then to decline thereafter, stabilizing around 11 percent after 2012.

The **non-interest current account deficit** is projected to stabilize at around one percent of GDP from 2008 onwards as construction-related imports decrease and electricity and non-resource exports increase. **FDI** is assumed to decline from an average of 13.9 percent of GDP in 2007-2011 to 1.9 percent of GDP after 2012 as earlier levels were related to dam construction and mining projects that should be completed by that time.

Fiscal revenues are expected to increase from 12.7 percent of GDP in 2006 to around 13.5 percent of GDP in the long term, while **total expenditures** are assumed to remain roughly constant as a percent of GDP. As a consequence, the **primary fiscal deficit** is assumed to decrease from 3.7 percent of GDP in 2006 to around one percent after 2012.

External financing is assumed to be on highly concessional terms, with a grant element over 40 percent.

Box 2. Reactive Policy Response (Alternative) Scenario

To examine the implications of a different policy response to the boom in natural resource revenues, the staffs have also considered a reactive policy scenario characterized by higher expenditures and slower progress in structural reforms.

Under the reactive policy scenario the government spends all resource revenues, leading to a sharp increase in government expenditures. As a result, its net position with the banking system would remain unchanged. The BoL would take time in developing monetary management tools and inflationary pressures would emerge, exacerbating the appreciation of the exchange rate and adversely affecting the competitiveness of non-resource exports.

Efforts to enhance the business environment are projected to advance only gradually in this scenario, and SOCBs and SOEs continue to pose a fiscal risk and burden to the budget. GDP growth is projected to initially increase to nearly 8 percent, buoyed by higher consumption stimulated by government expenditures. Soon thereafter, however, non-resource exports would start to weaken, which could lead the BoL to loosen monetary policy in an attempt to counter declining activity and maintain consumption. The government is assumed to continue to borrow externally, while avoiding recourse to domestic financing. After an initial rapid growth, real GDP is projected to decelerate to 4–5 percent. Key assumptions of the reactive scenario are summarized in Text Table 4 below.

Text Table 4. Lao P.D.R. Key Macroeconomic Assumptions
(Proactive scenario)

	2002-06 average	2007-12 average	2013-27 average
Real GDP growth (percent)	6.6	6.3	4.5
Inflation (percent)	10.1	7.3	9.0
Exports growth (percent)	20.6	8.7	7.6
Revenue (percent GDP)	11.8	12.6	9.9
Primary deficit (percent GDP)	2.6	0.9	2.8
Grant element of new borrowing	...	41.1	42.3

III. OUTLOOK FOR EXTERNAL PUBLIC AND PUBLICLY GUARANTEED DEBT

Proactive scenario (baseline)

7. **The results of this DSA suggest Lao P.D.R. is still at a high risk of debt distress even with the proactive policy response assumed in the baseline scenario (Figure A1).** However, the debt outlook is expected to improve in the projection period.

- **In the near term, debt stock indicators will remain at elevated levels, but they are projected to steadily decline to below the relevant indicative thresholds within the projection period.** Lao P.D.R. had a high NPV debt-to-GDP ratio of 48 percent at end-2006, which, under the proactive scenario, is projected to decline substantially over time to reach below 20 percent by 2027, crossing the 30 percent indicative threshold by 2014 (Table A1). The NPV of debt-to-exports ratio is projected to decline from 135 percent to below 60 percent toward the end of the projection period.
- **The debt service ratios are expected to remain well below the thresholds.** As a percent of exports or revenue, debt service during the entire projection period is expected to be at comfortable levels.

8. **The standard stress tests indicate that the Lao P.D.R.'s external debt outlook is fairly resilient to exogenous shocks under the baseline scenario (Figure A1 and Table A2).** Except for the simulations based on historical averages, all stress tests lead to higher, but stabilizing ratios below the relevant thresholds. Under the historical trend simulation, the NPV of debt-to-GDP ratio and NPV of debt-to-export ratio would deteriorate to stay above the thresholds throughout the projection period, mainly because the historical averages incorporated little impact from the recent rapid development of mining and hydropower sectors, which are expected to improve Lao's growth and export performance as well as its balance of payments and fiscal balance substantially in the medium-term and beyond. Similarly, the debt service to exports ratio would worsen, although remaining below the thresholds.⁷

Reactive scenario (alternative)

9. **The risk of debt distress—already high in the proactive scenario—would deteriorate further under the reactive scenario.** (Figure A1 and Table A3). Although the debt stock indicators based on GDP and exports are still expected to decline over time, they would approach the relevant thresholds only towards the end of the projection period. The

⁷ Due to the sharp declines in copper price already incorporated in the proactive and reactive scenarios, further temporary shocks to commodity prices will only worsen the external debt indicators modestly. For example, if both the copper and gold prices took the 10-year historical average between 2008–12, the NPV of debt-to-exports ratio would increase by 6 percentage points from the baseline.

debt service burden in terms of exports, despite at a low level, would be higher than that under the proactive scenario. Finally, under the reactive scenario, the NPV of debt to revenue ratio would remain at an unsustainable level and the debt service burden in terms of government revenue would rise in early years, but stabilize at a higher level of around 20 percent toward the end of the projection period.

10. **The standard stress tests under the reactive scenario further highlight the significant risk of debt distress in the event of exogenous shocks.** All stress tests under reactive scenarios will lead the debt stock indicators to be well above the sustainability thresholds. The outlook on the fiscal side is more precarious as the NPV of debt to revenue ratio could rise to more than twice the threshold level. The stress tests will also cause the debt service indicators to rise significantly with the debt service to revenue ratio exceeding sustainable threshold (Figure A1 and Table A4).

Text Table 5: Summary of Debt Sustainability Indicators under Alternative Scenarios
(In percent)

	2007	Proactive (Baseline)			Reactive (Alternative)		
		2017	2027	Average 2007-27	2017	2027	Average 2007-27
NPV of debt-to-GDP	45	25	19	27	31	30	33
NPV of debt-to-exports	140	79	58	86	102	98	107
NPV of debt-to-revenue	338	192	125	203	313	319	306
Debt service-to-exports	6	5	4	5	7	6	6
Debt service-to-revenue	15	12	8	12	21	20	19

IV. OUTLOOK FOR TOTAL PUBLIC AND PUBLICLY GUARANTEED DEBT

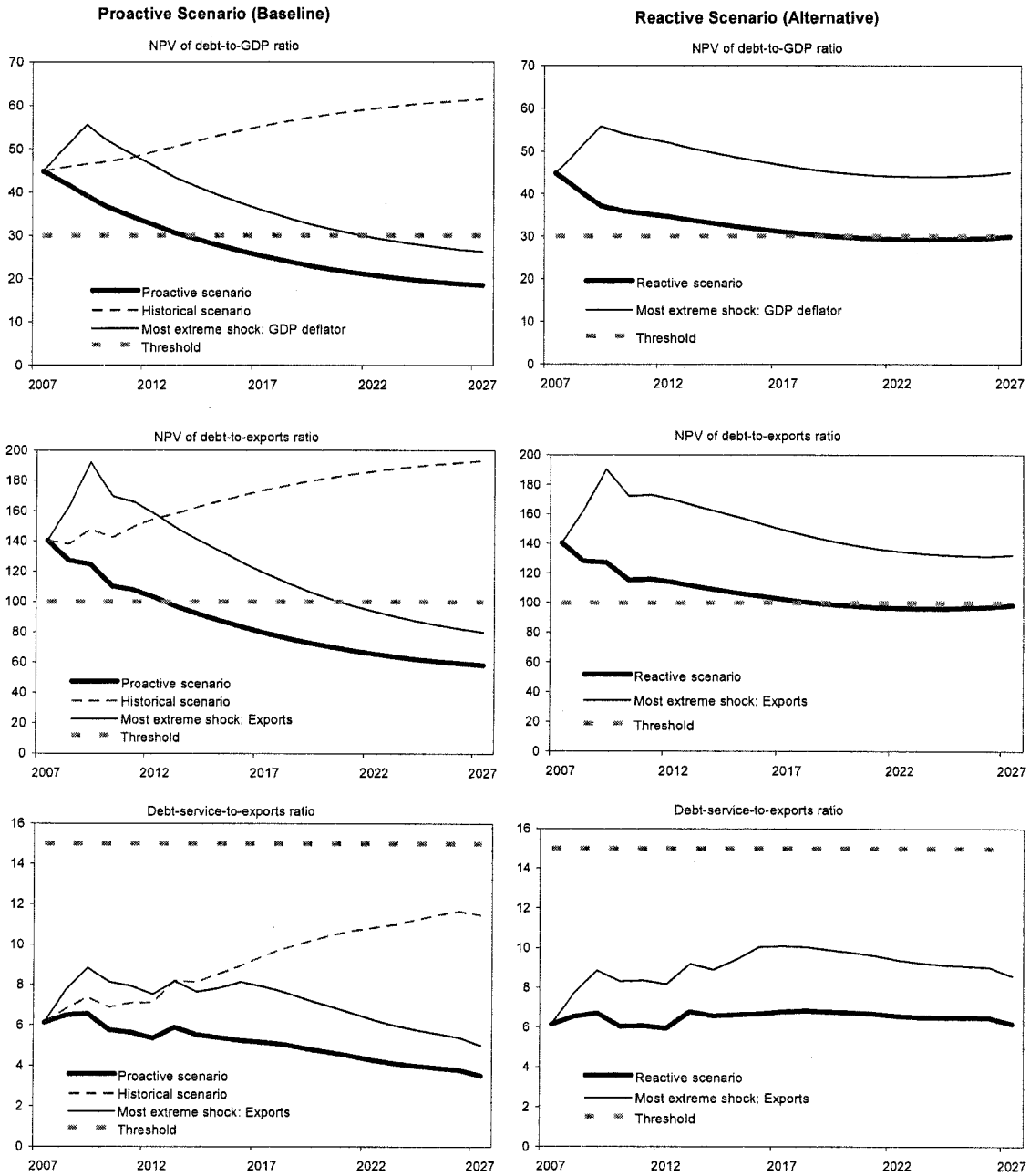
11. **Because the majority of public debt is to external creditors, the public debt trajectory will closely follow the external debt** (Figure A2 and Table A5). Under the proactive scenario (Baseline), both the NPV of public debt to GDP and debt to revenue ratios (51 percent and 345 percent, respectively, at the end of 2005/06) are envisaged to fall steadily to 20 percent of GDP and around 120 percent of GDP, respectively, by 2026/27. The debt service to revenue ratio—which is currently relatively low due to high concessionality—is projected to decline to less than 7 percent by 2026/27.

12. **The public debt outlook will be less benign under the reactive (alternative) scenario** (Table A7 and A8). The NPV of public debt to GDP ratio is projected to decline only moderately through the projection period. The debt service to revenue ratio could even rise in the middle of the 2010s, if the government fails to increase revenues.

V. CONCLUSION

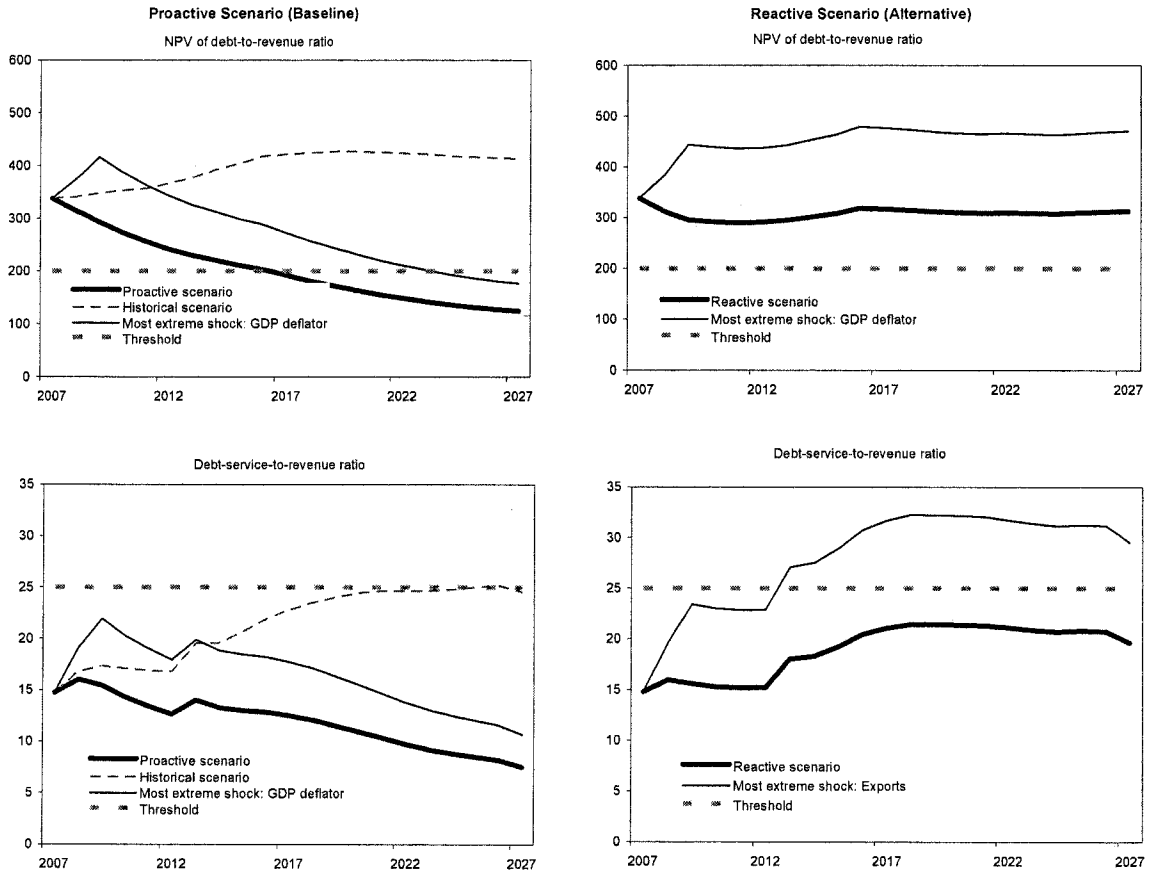
13. **Although Lao's debt ratios continue to improve, the overall debt burden remains elevated and the risk of debt distress is high.** While the debt service ratios are expected to remain below the thresholds, suggesting low risk of a liquidity crisis in the short-term, Lao's debt-stock indicators are expected to remain significantly above their thresholds for a number of years. To mitigate these risks, sound macroeconomic policies need to be put in place and a renewed impetus given to the economic reform effort to raise the growth and export performance of the non-resource sector. The current high risk of debt distress also calls for an extremely prudent approach for future external borrowing. In particular, Lao P.D.R. should continue to rely on grants or highly concessional resources for its development needs.

Figure A1. Lao PDR: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2007-2027



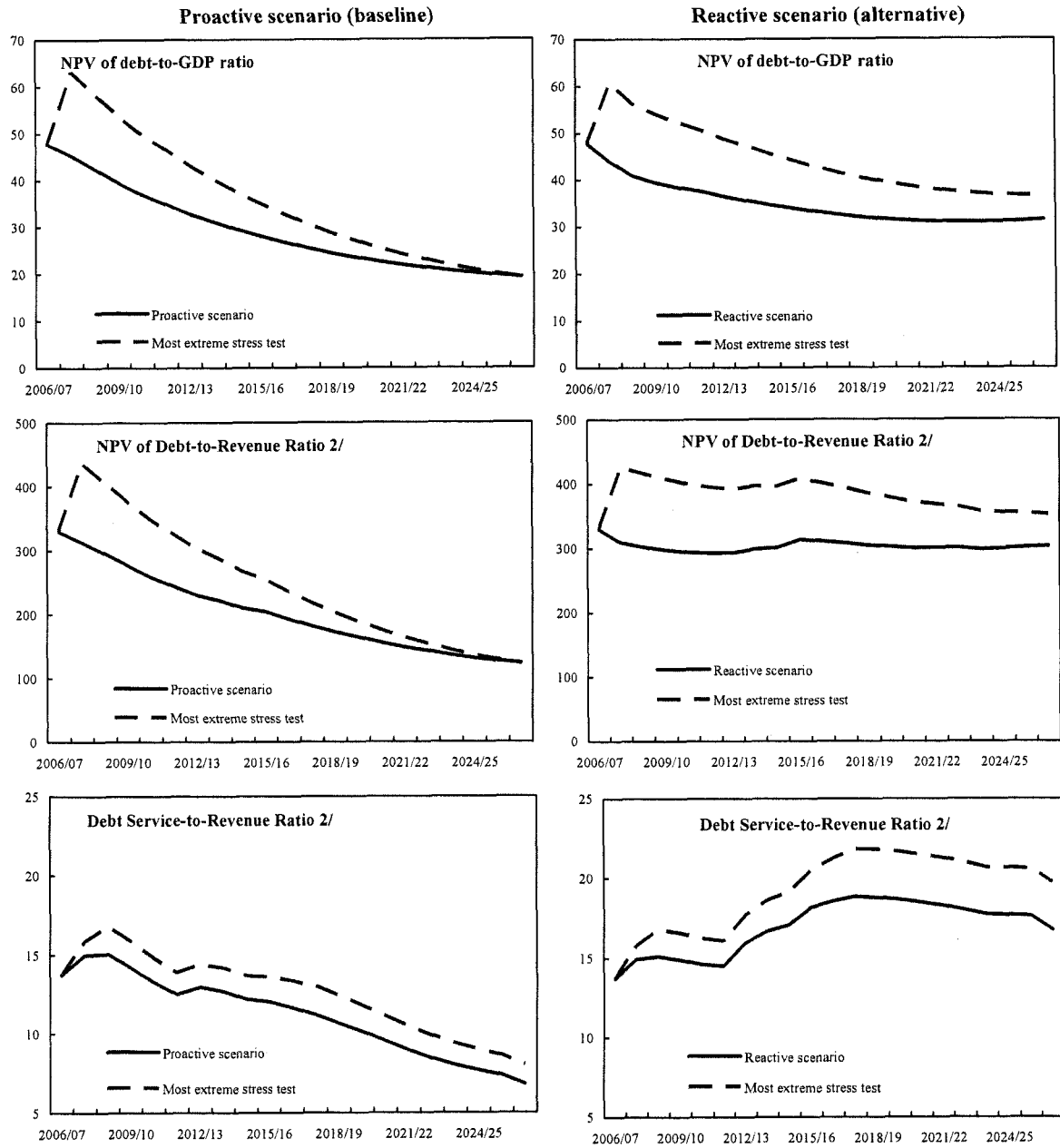
Source: Staff projections and simulations.

Figure A1. Lao PDR: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2007-2027 (Continued)



Source: Staff projections and simulations.

**Figure A2. Lao PDR: Indicators of public and publicly guaranteed debt, 2006/07–2026/27
(In percent)**



Source: Staff projections and simulations.

1/ Most extreme stress test is "one time 30 percent real depreciation in 2007/08" a test that yields highest ratio in 2016/17.

2/ Revenue including grants.

Table A1. Lao P.D.R.: External Debt Sustainability Framework, Proactive Scenario (Baseline), 2007-2027 1/

(In percent of GDP, unless otherwise indicated)

	Actual			Historical		Projections										
	2004	2005	2006	Average 6/	Standard Deviation 6/	2007	2008	2009	2010	2011	2012	2012	Average	2017	2027	2013-27
External debt (nominal) 1/	83.2	77.1	69.0			63.0	58.6	54.0	49.8	46.6	43.7	43.7		34.8	28.4	2013-27
o/w public and publicly guaranteed (PPG)	83.2	77.1	69.0			63.0	58.6	54.0	49.8	46.6	43.7	43.7		34.8	28.4	Average
Change in external debt	-5.9	-6.1	-8.1			-6.0	-4.3	-4.6	-4.2	-3.2	-2.9	-2.9		-1.2	-0.3	
Identified net debt-creating flows	-7.8	-2.8	-8.3			-2.3	-3.0	-3.3	-3.1	-2.4	-3.2	-3.2		-2.6	-2.2	
Non-interest current account deficit	13.4	19.3	12.7	9.4	5.0	22.2	20.4	15.1	9.6	4.1	0.9	0.9		0.8	1.0	0.9
Deficit in balance of goods and services	13.8	13.8	6.3			17.2	15.5	13.2	7.3	4.2	1.2	1.2		1.2	1.2	
Exports	27.4	30.1	36.0			32.0	33.2	31.5	33.1	32.0	31.8	31.8		31.8	31.8	
Imports	41.2	43.9	42.3			49.2	48.7	44.7	40.4	36.2	33.0	33.0		33.0	33.0	
Net current transfers (negative = inflow)	-3.4	-2.9	-4.9			-3.6	-3.3	-3.1	-3.0	-2.8	-2.7	-2.7		-2.7	-2.7	
o/w official	-2.4	-2.0	-3.2			-2.0	-1.7	-1.6	-1.6	-1.5	-1.4	-1.4		-1.4	-1.4	
Other current account flows (negative = net inflow)	3.0	8.4	11.4			8.5	8.1	5.0	5.3	2.8	2.4	2.4		2.3	2.5	
Net FDI (negative = inflow)	-9.3	-12.1	-11.8	-6.2	4.1	-21.0	-19.8	-14.8	-9.6	-4.2	-1.9	-1.9		-1.5	-1.9	-1.9
Endogenous debt dynamics 2/	0.9	0.9	0.5			-3.5	-3.6	-3.6	-3.1	-2.2	-2.2	-2.2		-1.5	-1.2	
Contribution from nominal interest rate	-4.9	-5.2	-4.9			0.7	0.7	0.6	0.6	0.5	0.5	0.5		0.6	0.4	
Contribution from real GDP growth	-7.9	-5.8	-7.4			-4.2	-4.3	-4.3	-3.7	-2.8	-2.7	-2.7		-2.1	-1.6	
Contribution from price and exchange rate changes	1.9	-3.3	0.3			-3.7	-1.3	-1.3	-1.2	-0.8	0.3	0.3		1.4	1.9	
Residual (3-4) 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	
o/w exceptional financing																
NPV of external debt 4/			48.4			44.9	42.2	39.2	36.5	34.5	32.6	32.6		25.2	18.5	
In percent of exports			134.5			140.4	127.2	124.5	110.1	107.6	102.4	102.4		79.2	58.2	
NPV of PPG external debt			48.4			44.9	42.2	39.2	36.5	34.5	32.6	32.6		25.2	18.5	
In percent of exports			134.5			140.4	127.2	124.5	110.1	107.6	102.4	102.4		79.2	58.2	
In percent of government revenues			377.1			338.0	314.0	293.1	273.2	256.1	242.0	242.0		192.0	124.7	
Debt service-to-exports ratio (in percent)			7.5			6.1	6.5	6.6	5.8	5.6	5.3	5.3		5.2	3.5	
PPG debt service-to-exports ratio (in percent)			4.0			6.1	6.5	6.6	5.8	5.6	5.3	5.3		5.2	3.5	
PPG debt service-to-revenue ratio (in percent)			7.7			6.1	6.5	6.6	5.8	5.6	5.3	5.3		5.2	3.5	
Total gross financing need (millions of U.S. dollars)	18.4	18.8	11.1			14.8	16.0	15.5	14.3	13.4	12.6	12.6		12.5	7.5	
Non-interest current account deficit that stabilizes debt ratio	153.0	274.7	168.2			126.4	121.6	120.0	110.1	106.5	47.2	47.2		56.8	46.7	
Key macroeconomic assumptions	19.3	25.4	20.8			28.2	24.7	19.7	13.9	7.3	3.8	3.8		2.0	1.3	
Real GDP growth (in percent)	6.4	7.1	7.6	6.3	1.0	7.1	7.6	8.2	7.6	6.2	6.4	6.4		6.4	6.4	
GDP deflator in US dollar terms (change in percent)	9.7	7.5	10.7	0.9	13.3	8.8	4.5	4.3	4.4	4.5	4.5	4.5		4.5	4.5	
Effective interest rate (percent) 5/	1.2	1.2	0.8	0.8	0.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1		1.9	1.7	
Growth of exports of G&S (US dollar terms, in percent)	14.9	26.5	42.3	12.0	14.0	3.6	16.8	7.1	18.3	7.2	10.5	10.6		11.2	11.2	
Growth of imports of G&S (US dollar terms, in percent)	38.4	22.7	14.7	7.8	17.6	35.7	11.3	3.5	1.6	-0.6	1.4	1.4		8.8	11.2	
Grant element of new public sector borrowing (in percent)						37.1	40.0	42.5	42.3	42.3	42.3	42.3		43.9	43.5	
Grant-equivalent financing (in percent of GDP) 8/						2.0	1.8	1.6	1.4	1.4	1.4	1.4		1.6	1.5	
Grant-equivalent financing (in percent of external financing) 8/						38.6	41.5	44.1	44.0	43.9	43.9	43.9		45.3	44.9	
Memorandum items:																
Nominal GDP (millions of US dollars)	2,508	2,887	3,437			4,008	4,509	5,088	5,716	6,343	7,052	7,052		11,982	34,592	

Source: Staff simulations.

1/ Comprehensive data on private sector external debt are not available.

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

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 NPV of new debt).

Table A2. Lao P.D.R.: Proactive Scenario (Baseline), Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, 2007-27
(in percent)

	Projections							
	2007	2008	2009	2010	2011	2012	2017	2027
NPV of debt-to-GDP ratio								
Baseline	45	42	39	36	34	33	25	19
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2008-27 1/	45	46	46	47	48	49	55	61
A2. New public sector loans on less favorable terms in 2008-27 2/	45	43	41	39	38	36	32	28
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	45	43	41	38	36	34	26	19
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	45	45	46	43	41	38	29	20
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	45	50	56	52	49	46	36	26
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	45	53	56	52	49	46	34	21
B5. Combination of B1-B4 using one-half standard deviation shocks	45	49	54	51	48	45	34	24
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	45	59	55	51	48	46	35	26
NPV of debt-to-exports ratio								
Baseline	140	127	125	110	108	102	79	58
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2007-26 1/	140	138	148	142	150	155	174	193
A2. New public sector loans on less favorable terms in 2007-26 2/	140	130	130	118	117	114	100	89
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	140	127	125	110	108	102	79	58
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	140	163	192	170	166	157	118	80
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	140	127	125	110	108	102	79	58
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	140	159	179	158	154	146	107	66
B5. Combination of B1-B4 using one-half standard deviation shocks	140	147	154	136	133	126	96	68
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	140	127	125	110	108	102	79	58
NPV of debt-to-revenue ratio								
Baseline	338	314	293	273	256	242	192	125
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2007-26 1/	338	341	348	353	356	366	421	414
A2. New public sector loans on less favorable terms in 2007-26 2/	338	322	307	292	279	269	242	190
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	338	321	308	287	269	254	202	131
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	338	338	348	324	303	286	221	131
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	338	374	416	388	363	343	272	177
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	338	392	421	392	367	345	258	140
B5. Combination of B1-B4 using one-half standard deviation shocks	338	367	407	379	355	335	262	163
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	338	440	411	383	359	339	269	175
Debt service-to-exports ratio								
Baseline	6	6	7	6	6	5	5	4
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2008-27 1/	6	7	7	7	7	7	9	11
A2. New public sector loans on less favorable terms in 2008-27 2/	6	6	7	6	6	6	6	5
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	6	6	7	6	6	5	5	4
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	6	8	9	8	8	8	8	5
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	6	6	7	6	6	5	5	4
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	6	6	7	7	7	6	7	4
B5. Combination of B1-B4 using one-half standard deviation shocks	6	7	8	7	7	6	6	4
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	6	6	7	6	6	5	5	4
Debt service-to-revenue ratio								
Baseline	15	16	15	14	13	13	12	8
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2008-27 1/	15	17	17	17	17	17	23	25
A2. New public sector loans on less favorable terms in 2008-27 2/	15	16	15	15	14	13	15	12
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	15	16	16	15	14	13	13	8
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	15	16	16	16	15	14	15	8
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	15	19	22	20	19	18	18	11
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	15	16	17	17	16	15	18	9
B5. Combination of B1-B4 using one-half standard deviation shocks	15	18	20	19	18	17	17	10
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	15	22	22	20	19	18	18	11
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	40	40	40	40	40	40	40	40

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 at 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 A3. Lao P.D.R.: External Debt Sustainability Framework, Reactive Scenario (Alternative) 2007–27 1/
(In percent of GDP, unless otherwise indicated)

	Projections									
	2007	2008	2009	2010	2011	2012	2007-12 Average	2017	2027	2013-27 Average
External debt (nominal) 1/	83.0	56.9	51.1	49.1	47.7	46.4		42.1	44.8	
o/w public and publicly guaranteed (PPG)	63.0	56.9	51.1	49.1	47.7	46.4		42.1	44.8	
Change in external debt	-6.0	-6.1	-5.8	-2.1	-1.4	-1.3		-0.5	0.8	
Identified net debt-creating flows	-2.3	-1.9	-1.7	-0.3	0.5	-0.7		-0.6	-0.8	
Non-interest current account deficit	22.2	20.1	14.8	10.2	5.3	2.4		2.1	2.2	2.2
Deficit in balance of goods and services	17.2	15.4	13.0	7.9	5.1	2.4		2.4	2.4	
Exports	32.0	32.0	29.2	31.2	30.4	30.4		30.4	30.4	
Imports	49.2	47.3	42.2	39.1	35.5	32.8		32.8	32.8	
Net current transfers (negative = inflow)	-3.6	-3.2	-2.9	-2.9	-2.6	-2.6		-2.6	-2.6	
o/w official	-2.0	-1.5	-1.2	-1.0	-1.0	-1.0		-1.0	-1.0	
Other current account flows (negative = net inflow)	8.5	7.9	4.7	5.3	2.8	2.6		2.3	2.4	
Net FDI (negative = inflow)	-21.0	-18.4	-13.4	-8.1	-3.2	-1.7		-1.7	-1.7	-1.7
Endogenous debt dynamics 2/	-3.5	-3.6	-3.1	-2.5	-1.6	-1.4		-1.0	-1.2	
Denominator: 1+g+r+gr	1.2	1.2	1.2	1.1	1.1	1.1		1.1	1.1	
Contribution from nominal interest rate	0.7	0.7	0.6	0.6	0.5	0.5		0.8	0.7	
Contribution from real GDP growth	-4.2	-4.3	-3.7	-3.0	-2.1	-1.9		-1.7	-1.9	
Contribution from price and exchange rate changes	...	...	...	...	...	...		...	...
Residual (3-4) 3/	-3.7	-4.2	-4.0	-1.8	-1.9	-0.6		0.1	1.6	
o/w exceptional financing	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
NPV of external debt 4/	44.9	41.0	37.1	36.0	35.3	34.6		31.0	29.9	
In percent of exports	140.4	128.1	127.2	115.2	115.9	113.7		102.0	98.3	
NPV of PPG external debt	44.9	41.0	37.1	36.0	35.3	34.6		31.0	29.9	
In percent of exports	140.4	128.1	127.2	115.2	115.9	113.7		102.0	98.3	
In percent of government revenues	338.4	312.6	295.5	292.2	290.1	291.3		317.1	312.8	
Debt service-to-exports ratio (in percent)	6.1	6.5	6.7	6.0	6.1	5.9		6.8	6.2	
PPG debt service-to-exports ratio (in percent)	6.1	6.5	6.7	6.0	6.1	5.9		6.8	6.2	
PPG debt service-to-revenue ratio (in percent)	14.8	16.0	15.6	15.3	15.2	15.2		21.1	19.6	
Total gross financing need (millions of U.S. dollars)	126.4	177.1	178.3	233.6	244.2	164.2		234.6	467.8	
Non-interest current account deficit that stabilizes debt ratio	28.2	26.2	20.6	12.3	6.7	3.7		2.6	1.3	
Key macroeconomic assumptions										
Real GDP growth (in percent)	7.1	7.9	7.5	6.4	4.6	4.2	6.3	4.4	4.8	4.5
GDP deflator in US dollar terms (change in percent)	8.8	7.5	7.6	1.4	2.2	2.9	5.1	3.0	3.0	3.0
Effective interest rate (percent) 5/	1.2	1.2	1.2	1.2	1.2	1.1	1.2	1.9	1.7	1.8
Growth of exports of G&S (US dollar terms, in percent)	3.6	15.9	5.6	15.4	4.2	7.1	8.7	7.5	7.9	7.6
Growth of imports of G&S (US dollar terms, in percent)	35.7	11.5	3.1	0.0	-2.9	-0.9	7.8	7.5	7.9	7.6
Grant element of new public sector borrowing (in percent)	37.1	40.0	42.5	42.3	42.3	42.3	41.1	42.3	42.3	42.3
Grant-equivalent financing (in percent of GDP) 8/	3.1	2.6	2.4	2.2	2.2	2.3		2.5	3.0	2.6
Grant-equivalent financing (in percent of external financing) 8/	49.6	52.2	55.6	56.1	56.6	55.2		53.2	49.8	52.2
Memorandum items:										
Nominal GDP (millions of US dollars)	4008.4	4646.1	5372.0	5798.3	6198.9	6647.7		9501.0	20010.8	

Source: Staff simulations

1/ Includes both public and private sector external debt.

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

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 NPV of new debt).

Table A4. Lao P.D.R. : Reactive Scenario (Alternative), Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, 2007-27
(In percent)

	Projections							
	2007	2008	2009	2010	2011	2012	2017	2027
NPV of debt-to-GDP ratio								
Baseline	45	41	37	36	35	35	31	30
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2008-27 1/	45	45	45	45	44	45	47	54
A2. New public sector loans on less favorable terms in 2008-27 2/	45	42	39	38	38	38	39	45
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	45	42	39	38	37	36	32	31
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	45	44	44	42	41	40	35	32
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	45	50	56	54	53	52	47	45
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	45	51	52	51	50	48	41	34
B5. Combination of B1-B4 using one-half standard deviation shocks	45	49	54	52	51	50	44	41
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	45	57	52	50	49	48	43	41
NPV of debt-to-exports ratio								
Baseline	140	128	127	115	116	114	102	98
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2007-26 1/	140	141	155	143	145	147	155	177
A2. New public sector loans on less favorable terms in 2007-26 2/	140	131	133	123	126	127	127	149
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	140	128	127	115	116	114	102	98
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	140	163	190	172	173	170	149	132
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	140	128	127	115	116	114	102	98
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	140	159	180	162	163	159	136	111
B5. Combination of B1-B4 using one-half standard deviation shocks	140	146	152	137	138	135	120	112
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	140	128	127	115	116	114	102	98
NPV of debt-to-revenue ratio								
Baseline	338	313	295	292	290	291	317	313
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2007-26 1/	338	344	359	362	363	376	482	565
A2. New public sector loans on less favorable terms in 2007-26 2/	338	320	310	312	316	324	396	474
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	338	320	309	306	304	305	332	327
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	338	335	347	343	340	341	362	330
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	338	383	444	439	436	438	477	470
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	338	387	417	412	408	409	423	353
B5. Combination of B1-B4 using one-half standard deviation shocks	338	376	428	423	420	421	453	431
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	338	434	410	405	402	404	440	434
Debt service-to-exports ratio								
Baseline	6	7	7	6	6	6	7	6
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2008-27 1/	6	7	8	7	7	7	9	10
A2. New public sector loans on less favorable terms in 2008-27 2/	6	7	7	6	6	6	8	9
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	6	7	7	6	6	6	7	6
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	6	8	9	8	8	8	10	9
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	6	7	7	6	6	6	7	6
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	6	7	7	7	7	7	9	7
B5. Combination of B1-B4 using one-half standard deviation shocks	6	7	8	7	7	7	8	7
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	6	7	7	6	6	6	7	6
Debt service-to-revenue ratio								
Baseline	15	16	16	15	15	15	21	20
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2008-27 1/	15	17	18	18	18	18	28	33
A2. New public sector loans on less favorable terms in 2008-27 2/	15	16	16	16	16	16	24	29
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2008-09	15	16	16	16	16	16	22	21
B2. Export value growth at historical average minus one standard deviation in 2008-09 3/	15	16	16	17	16	16	25	21
B3. US dollar GDP deflator at historical average minus one standard deviation in 2008-09	15	20	23	23	23	23	32	30
B4. Net non-debt creating flows at historical average minus one standard deviation in 2008-09 4/	15	16	17	18	18	18	29	24
B5. Combination of B1-B4 using one-half standard deviation shocks	15	19	21	21	21	21	30	27
B6. One-time 30 percent nominal depreciation relative to the baseline in 2008 5/	15	22	22	21	21	21	29	27
<i>Memorandum item:</i>								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	40	40	40	40	40	40	40	40

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 (implicit 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 A5. Lao P.D.R.: Public Sector Debt Sustainability Framework, Proactive Scenario (Baseline), 2003/04-2026/27
(In percent of GDP, unless otherwise indicated)

	Actual					Projections									
	2003/04	2004/05	2005/06	Historical Average 5/	Standard Deviation 5/	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2006/07-11/12 average	2016/17	2026/27 average	
Public sector debt 1/	88.2	80.9	74.1			66.7	62.2	57.7	53.0	49.5	46.3		36.6	29.4	
o/w foreign-currency denominated	86.2	79.3	72.7			64.9	60.3	55.6	51.2	47.8	44.8		35.7	29.1	
Change in public sector debt	-6.9	-7.3	-6.8			-7.4	-4.5	-4.5	-4.6	-3.6	-3.1		-1.4	-0.3	
Identified debt-creating flows	-8.5	-7.8	-11.3			-9.1	-6.6	-6.5	-6.1	-5.1	-4.5		-1.9	-0.8	
Primary deficit	2.5	3.4	2.9	3.3	1.1	0.5	-0.1	-0.2	-0.4	-0.3	-0.1		1.3	1.8	
Revenue and grants	12.1	13.1	14.8			14.5	14.5	14.4	14.3	14.3	14.3		13.9	15.6	
of which: grants	1.1	1.7	2.1			1.3	1.1	1.0	0.9	0.9	0.8		0.8	0.8	
Primary (noninterest) expenditure	14.6	16.5	17.6			15.0	14.3	14.1	13.9	14.0	14.2		15.2	17.4	
Automatic debt dynamics	-11.0	-11.2	-14.2			-9.6	-6.5	-6.3	-5.7	-4.8	-4.4		-3.2	-2.6	
Contribution from interest rate/growth differential of which: contribution from average real interest rate	-7.2	-7.1	-6.9			-5.4	-5.1	-5.0	-4.5	-3.6	-3.3		-2.4	-2.0	
of which: contribution from real GDP growth	-1.6	-1.4	-1.3			-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		-0.1	-0.2	
Contribution from real exchange rate depreciation	-5.6	-5.7	-5.6			-5.0	-4.6	-4.6	-4.2	-3.2	-3.0		-2.3	-1.8	
Other identified debt-creating flows	-3.8	-4.1	-7.2			-4.2	-1.4	-1.3	-1.2	-1.1	-1.1		...	...
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	1.6	0.5	4.5			1.7	2.2	2.0	1.5	1.5	1.4		0.5	0.5	
NPV of public sector debt	2.0	1.6	50.8			47.7	45.3	42.4	39.4	37.0	34.9		26.7	19.3	
o/w foreign-currency denominated	0.0	0.0	49.5			46.0	43.4	40.3	37.5	35.3	33.4		25.9	19.0	
o/w external	...	...	...			46.0	43.4	40.3	37.5	35.3	33.4		25.9	19.0
NPV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...
Gross financing need 2/	5.2	7.1	6.0			3.2	2.9	2.7	2.3	2.2	2.3		3.3	3.0	
NPV of public sector debt-to-revenue ratio (in percent) 3/	16.1	12.0	344.3			330.0	313.0	295.7	276.2	259.1	244.3		192.4	123.5	
o/w external	...	...	335.3			318.1	300.0	281.1	263.1	247.3	233.8		186.0	121.5
Debt service-to-revenue ratio (in percent) 3/ 4/	14.9	15.8	11.9			13.7	15.0	15.1	14.2	13.3	12.5		11.6	6.8	
Primary deficit that stabilizes the debt-to-GDP ratio	9.4	10.7	9.7			7.9	4.3	4.3	4.3	3.3	3.0		2.7	2.1	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	6.3	6.9	7.5	6.5	0.7	7.2	7.5	8.1	7.8	6.5	6.3		6.4	6.4	
Average nominal interest rate on forex debt (in percent)	1.0	1.2	1.0	0.9	0.2	0.9	1.0	1.1	1.1	1.0	1.0		1.0	1.3	
Average real interest rate on domestic currency debt (in percent)	4.6	1.6	1.4	8.9	18.5	7.4	5.0	5.0	3.9	3.8	3.7		4.8	3.7	
Real exchange rate depreciation (in percent, + indicates depreciation)	-4.3	-5.1	-10.0	-5.6	7.1	-6.2	-2.4	-2.3	-2.4	-2.4	-3.0		0.0	0.0	
Inflation rate (GDP deflator, in percent)	11.6	8.5	5.4	10.1	3.4	4.2	4.4	4.3	4.4	4.5	4.5		4.4	4.5	
Growth of real primary spending (deflated by GDP deflator, in percent)	-14.0	20.5	15.1	4.1	15.2	-8.9	2.8	6.6	5.7	7.3	8.2		7.7	7.6	
Grant element of new external borrowing (in percent)	...	...	...	...	...	...	...	...	...	...	...		...	...

Sources: Lao P.D.R. authorities; and Fund staff estimates and projections.

1/ Gross general government debt.

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 are for 2001/02-2005/06.

Table A6. Lao P.D.R.: Proactive Scenario (Baseline), Sensitivity Analysis for Key Indicators of Public Debt 2006/07–2026/27
(In percent)

	Projections							
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2016/17	2026/27
NPV of Debt-to-GDP Ratio								
Proactive scenario	48	45	42	39	37	35	27	19
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	48	48	47	46	45	44	38	30
A2. Primary balance is unchanged from 2006	48	46	43	40	38	37	27	15
A3. Permanently lower GDP growth 1/	48	45	43	40	37	35	28	21
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	48	46	44	41	39	37	29	23
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	48	48	47	43	41	39	29	20
B3. Combination of B1-B2 using one half standard deviation shocks	48	48	48	44	41	39	30	20
B4. One-time 30 percent real depreciation in 2007	48	63	58	54	50	46	33	19
B5. 10 percent of GDP increase in other debt-creating flows in 2007	48	51	47	44	41	39	29	20
NPV of Debt-to-Revenue Ratio 2/								
Proactive scenario	330	313	296	276	259	244	192	123
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	330	328	326	321	314	307	275	194
A2. Primary balance is unchanged from 2006	330	315	301	284	269	256	195	97
A3. Permanently lower GDP growth 1/	330	313	297	278	261	247	198	136
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	330	318	308	290	273	260	212	145
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	330	330	327	305	286	269	210	130
B3. Combination of B1-B2 using one half standard deviation shocks	330	331	332	309	290	273	213	131
B4. One-time 30 percent real depreciation in 2007	330	437	407	376	349	325	235	123
B5. 10 percent of GDP increase in other debt-creating flows in 2007	330	350	329	307	288	271	211	130
Debt Service-to-Revenue Ratio 2/								
Proactive scenario	14	15	15	14	13	13	12	7
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	14	15	17	16	16	15	15	10
A2. Primary balance is unchanged from 2006	14	15	15	15	14	13	12	6
A3. Permanently lower GDP growth 1/	14	15	15	14	13	13	12	7
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	14	15	16	15	14	13	12	8
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	14	15	17	16	14	13	13	7
B3. Combination of B1-B2 using one half standard deviation shocks	14	15	17	16	14	13	13	7
B4. One-time 30 percent real depreciation in 2007	14	16	17	16	15	14	13	8
B5. 10 percent of GDP increase in other debt-creating flows in 2007	14	15	19	15	14	13	13	7

Sources: Lao P.D.R. 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 the length of the projection period (20)

2/ Revenues are defined inclusive of grants.

Table A7. Lao P.D.R.: Public Sector Debt Sustainability Framework, Reactive Scenario (Alternative), 2006/07–2026/27
(In percent of GDP, unless otherwise indicated)

	Projections									
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2006/07- 11/12 average	2016/17	2026/27	2013/14- 26/27 average
Public sector debt 1/	66.7	60.9	54.5	51.7	49.9	48.4				
o/w foreign-currency denominated	64.9	59.1	52.5	50.0	48.4	47.1		43.5	45.7	
Change in public sector debt	-7.8	-5.7	-6.4	-2.8	-1.8	-1.5		-0.6	0.8	
Identified debt-creating flows	-9.2	-7.0	-5.6	-2.7	-2.2	-2.1		-1.0	0.1	
Primary deficit	0.5	1.3	0.9	0.7	0.7	0.8	0.8	1.4	2.8	1.8
Revenue and grants	14.5	14.2	13.5	13.2	13.1	12.8		10.7	10.4	
of which: grants	1.3	1.0	0.9	0.9	0.9	0.9		0.9	0.9	
Primary (noninterest) expenditure	15.0	15.5	14.5	14.0	13.8	13.6		12.0	13.2	
Automatic debt dynamics	-9.7	-8.3	-6.5	-3.4	-2.9	-2.8		-2.4	-2.7	
Contribution from interest rate/growth differential	-5.5	-5.2	-4.7	-3.8	-2.9	-2.5		-2.0	-2.3	
of which: contribution from average real interest rate	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4		-0.2	-0.3	
of which: contribution from real GDP growth	-5.0	-4.8	-4.3	-3.4	-2.5	-2.1		-1.9	-2.1	
Contribution from real exchange rate depreciation	-4.2	-3.1	-1.8	0.4	0.0	-0.3		...	...
Other identified debt-creating flows	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	
Recognition of implicit or contingent liabilities	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	
Other (specify, e.g. bank recapitalization)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes	1.4	1.3	-0.9	-0.1	0.4	0.6		0.5	0.7	
NPV of public sector debt	47.7	43.9	40.9	39.4	38.4	37.5		33.2	31.4	
o/w foreign-currency denominated	46.0	42.1	38.9	37.7	36.9	36.2		32.5	31.3	
o/w external	46.0	42.1	38.9	37.7	36.9	36.2		32.5	31.3	
NPV of contingent liabilities (not included in public sector debt)	...	...	...	...	...	...		...	...
Gross financing need 2/	3.5	4.3	3.8	3.4	3.2	3.1		3.6	4.6	
NPV of public sector debt-to-revenue ratio (in percent) 3/	330.0	308.9	302.3	297.8	294.1	292.9		310.9	303.3	
o/w external	318.1	295.9	287.3	284.6	282.4	282.4		304.6	301.7	
Debt service-to-revenue ratio (in percent) 3/ 4/	13.7	15.0	15.1	14.9	14.6	14.5		18.6	16.8	
Primary deficit that stabilizes the debt-to-GDP ratio	8.3	7.0	7.4	3.5	2.5	2.2		1.9	2.1	
Key macroeconomic and fiscal assumptions										
Real GDP growth (in percent)	7.2	7.7	7.6	6.7	5.0	4.3	6.4	4.4	4.9	4.5
Average nominal interest rate on forex debt (in percent)	0.9	1.0	1.0	1.1	1.1	1.1	1.0	1.6	1.4	1.5
Average real interest rate on domestic currency debt (in percent)	5.0	3.8	2.0	0.1	-0.4	-1.2	1.6	-1.5	-1.5	-1.5
Real exchange rate depreciation (in percent, + indicates depreciation)	-6.2	-5.2	-3.3	0.8	0.0	-0.7	-2.4	6.9	6.9	6.9
Inflation rate (GDP deflator, in percent)	4.2	5.6	7.4	8.3	8.9	9.8	7.4	10.0	10.0	10.0
Growth of real primary spending (deflated by GDP deflator, in percent)	-1.1	11.6	0.4	3.0	3.4	2.8	3.3	3.9	7.1	4.1
Grant element of new external borrowing (in percent)	...	...	...	...	...	...	...	...	...	...

Sources: Lao P.D.R. authorities; and Fund staff estimates and projections.

1/ Gross general government debt.

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.

Table A8. Lao P.D.R.: Reactive Scenario (Alternative), Sensitivity Analysis for Key Indicators of Public Debt 2006–26

	Projections							
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2016/17	2026/27
NPV of Debt-to-GDP Ratio								
Baseline	48	44	41	39	38	38	33	31
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	48	45	43	43	42	41	36	30
A2. Primary balance is unchanged from 2006	48	44	40	39	38	37	31	23
A3. Permanently lower GDP growth 1/	48	44	41	40	39	38	34	33
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	48	45	43	41	40	40	36	35
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	48	45	44	42	41	40	35	33
B3. Combination of B1-B2 using one half standard deviation shocks	48	46	44	43	41	40	35	33
B4. One-time 30 percent real depreciation in 2007	48	61	56	54	52	51	43	37
B5. 10 percent of GDP increase in other debt-creating flows in 2007	48	49	46	44	43	42	37	33
NPV of Debt-to-Revenue Ratio 2/								
Baseline	330	309	302	298	294	293	311	303
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	330	317	319	321	320	320	340	297
A2. Primary balance is unchanged from 2006	330	306	298	293	288	286	290	221
A3. Permanently lower GDP growth 1/	330	309	303	299	296	296	319	322
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	330	315	314	311	309	309	335	335
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	330	319	324	318	314	313	331	315
B3. Combination of B1-B2 using one half standard deviation shocks	330	320	326	320	316	315	332	315
B4. One-time 30 percent real depreciation in 2007	330	426	416	408	400	395	401	353
B5. 10 percent of GDP increase in other debt-creating flows in 2007	330	347	337	332	328	326	344	322
Debt Service-to-Revenue Ratio 2/								
Baseline	14	15	15	15	15	15	19	17
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	14	15	16	16	16	15	19	16
A2. Primary balance is unchanged from 2006	14	15	15	15	14	14	18	13
A3. Permanently lower GDP growth 1/	14	15	15	15	15	15	19	18
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2007-2008	14	15	16	16	15	15	20	18
B2. Primary balance is at historical average minus one standard deviations in 2007-2008	14	15	16	16	15	15	20	18
B3. Combination of B1-B2 using one half standard deviation shocks	14	15	16	16	15	15	20	18
B4. One-time 30 percent real depreciation in 2007	14	16	17	17	16	16	21	20
B5. 10 percent of GDP increase in other debt-creating flows in 2007	14	15	19	16	15	15	21	18

Sources: Lao P.D.R. 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 the length of the projection period (20).

2/ Revenues are defined inclusive of grants.