INTERNATIONAL MONETARY FUND AND
INTERNATIONAL DEVELOPMENT ASSOCIATION

LAO PEOPLE'S DEMOCRATIC REPUBLIC

Joint IMF/World Bank Debt Sustainability Analysis 2008[1]

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the International Development Association

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This document presents the joint IMF-World Bank debt sustainability analysis (DSA) for Lao P.D.R. using the Debt Sustainability Framework for Low-Income Countries (LIC).[2] Lao P.D.R. is currently rated a weak performer with regard to its policies and institutions.[3] This DSA assesses the impact of various exogenous shocks on the sustainability of external and public sector debt under the baseline scenario.

I. Introduction

1. **The LIC DSA for Lao P.D.R. indicates that the country continues to face a high risk of external debt distress.** The public external debt service ratios are expected to remain relatively low, owing to the concessionality of most of Lao P.D.R.'s official external borrowing. However, the public external debt stock indicators are still well above the policy-dependant indicative thresholds, and could increase further depending on the macroeconomic performance and the concessionality of external borrowing.

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[1] This DSA was prepared jointly by the IMF and World Bank. The staffs also consulted with the Asian Development Bank's office in Lao P.D.R. The debt data underlying this exercise were provided by the Lao P.D.R. authorities.

[2] See "Debt Sustainability in Low-Income Countries: Proposal for an Operational Framework and Policy Implications" (http://www.imf.org/external/np/pdr/sustain/2004/020304.htm and IDA/SECM2004/0035, 2/3/04) and "Debt Sustainability in Low-Income Countries: Further Considerations on an Operational Framework, Policy Implications" (http://www.imf.org/external/np/pdr/sustain/2004/091004.htm and IDA/SECM2004/0629, 9/10/04) and "Applying the Debt Sustainability Framework for Low-Income Countries Post Debt Relief," (www.imf.org/external/np/pp/eng/2006/110606.pdf and IDA/SecM2006-0564, 8/11/06).

[3] In the LIC-DSA framework, the quality of a country's policies and institutions is measured by the World Bank's Country Policy and Institutional Assessment (CPIA) index and classified into three categories: strong, medium, and weak.

II. BACKGROUND AND ASSUMPTIONS

2. **Lao P.D.R.'s external public and publicly-guaranteed (PPG) debt stock remains at elevated levels, but debt indicators have become more favorable in recent years**, supported by strong economic growth, a more stable macroeconomic environment, and favorable external conditions. The total stock of external PPG debt in nominal terms was US$2.4 billion at end-2007, or 60 percent of GDP, down from 77 percent at end-2005 and 66 percent at end-2006. It also declined as share of exports of goods and nonfactor services, from an estimated 244 percent at end-2005 to 165 percent at end-2007. At these levels, Lao P.D.R.'s debt stock indicators are still significantly above the policy-based indicative thresholds (Figure 1). However, debt service ratios remain below the indicative thresholds, reflecting the high degree of concessionality (see table below).

3. **Around 70 percent of PPG debt in Lao P.D.R. is held by multilateral creditors** (see table below), mainly the Asian Development Bank (AsDB) and International Development Association (IDA). Slightly more than 25 percent is held by bilateral creditors—mainly Russia, China, and Japan. New emerging market creditors are increasing their presence in Lao P.D.R., necessitating the government ensure appropriate concessionality from these lenders, given its current indebtedness. The remaining 5 percent is estimated to be external debt incurred by public entities on nonconcessional terms and guaranteed by the government, mainly for hydropower development and electricity generation, including to finance equity stakes. In addition, some of this debt reflects financing provided by multilateral and bilateral creditors to the government on concessional terms and on-lent to state enterprises on nonconcessional terms.

Lao P.D.R.: Stock of Public and Publicly-Guaranteed External Debt at End-2007

	In billions of U.S. Dollars	As a Share of Total External Debt	In percent of GDP
Total	2.45	100.0	59.5
Multilateral	1.70	69.7	41.5
Bilateral	0.63	25.6	15.2
Commercial 1/	0.12	4.7	2.8

Sources: Lao P.D.R. authorities; and IMF and World Bank staffs' estimates.

1/ Includes direct borrowing by or on-lent funds to state-owned enterprises on nonconcessional terms.

4. **The size of domestic public debt is comparatively small.** At end-fiscal year 2006/07, the stock of domestic public debt amounted to 1.8 percent of GDP. Total public debt, including both domestic and external, was at 62.6 percent of GDP.

5. **Under the baseline scenario, the main underlying assumptions reflect the continued pursuit in Lao P.D.R. of sound macroeconomic and financial policies and structural reforms in support of growth and poverty reduction, and reduced external vulnerability** (Box 1).

Box 1: Main Assumptions for the Baseline Scenario (2008–28)

- **Real GDP growth** is projected to average 7½ percent a year during 2008–13, with a modest pick-up in nonresource sector growth (mainly from agriculture, light manufactures, and tourism and other services) and continued strong resource sector growth. Over the longer term, growth is projected at 7 percent a year, given an expected leveling off in resource sector growth, but a further rise in nonresource sector growth, including from a broader export base. Growth prospects are predicated on the maintenance of macroeconomic stability; implementation of envisaged financial, trade, and regulatory reforms; and improvements to public infrastructure and services, helping to raise productivity. Prices of key commodities are broadly in line with the current WEO assumptions.[1]

- **The external current account deficit** is projected to decline from 18–19 percent of GDP a year during 2008–10 to 8½ percent by 2013 and further to 1 percent by 2025. Over the medium term, resource project-related imports moderate, world oil prices stabilize, and new hydropower projects (with large exports) come on stream. In the long run, nonresource export and services growth also picks up, although staffs assume after reaching around 30 percent of GDP in 2015, total exports would decline to around 25 percent by 2025, then begin to rise again, based on a conservative forecast of mining output. However, nonresource export growth requires strengthened competitiveness and regional integration, through improving the investment climate, streamlining business regulation, and meeting trade commitments. **The overall external position** is expected to stay reasonably strong reflecting private capital and official inflows. However, foreign direct investment declines significantly starting in 2013, given fewer new mining and hydropower projects, but picks up again in the outer years as foreign investment in the nonresource sector overtakes that in the resource sector.

- **External financing** is assumed to be largely on concessional terms.

  - *Multilateral creditors*: For 2008–09, projected loan disbursements (including existing loans) average around US$80 million. Thereafter, they are assumed to grow (in U.S. dollar terms) at 5 percent a year.

  - *Bilateral creditors*: For 2008–09, projected loan disbursements average around US$125 million a year. During 2010–14, they increase to an average of US$145 million in part to reflect new financing expected for electricity development (see below), but thereafter fall back slightly to an average of US$135 million.

  - *Commercial creditors*: Staffs assume that two-thirds of planned investment in Electricité du Laos's (EDL) *Power Development Plan 2007–2016* will be executed. One-half of the external financing requirement is assumed to be met through government on-lending to EDL's of funds received from bilateral and multilateral creditors. The rest is assumed to be borrowed directly by EDL on nonconcessional terms, but guaranteed by the government. Finally, a small amount of nonconcessional borrowing is assumed for non-EDL related energy sector projects, as well as by non-energy related state enterprises.

- **Macroeconomic stability** is underpinned by a moderate fiscal stance. **The overall deficit** is expected to stay in the range of 1–1½ percent of GDP over the medium term, mostly financed externally (on concessional terms). **Revenue** would rise by about ¾–1 percentage point to around 16 percent of GDP by fiscal year 2012/13 (October–September) on increased tax buoyancy and a broadening of the tax base. Resource revenue is projected to come down slightly and level off at around 3 percent of GDP by 2010/11, but driven increasingly by electricity output and exports. **Grants** would stabilize around 1.2–1.3 percent a years from 2008/09, based on the latest government projections. **Expenditure** would rise slightly over the medium term to around 18¼ percent of GDP—with about one-third as capital outlays.

[1] Copper prices for 2010–13 are assumed to be higher than the current WEO assumptions, based on discussions with mine operators in Lao P.D.R. From 2010, the price per metric ton is kept constant at US$5,000.

III. External Debt Sustainability

6. **Under the baseline scenario, external debt stock indicators will remain at elevated levels over the medium term, but are expected to decline below the relevant indicative thresholds within the projection period** (Figure 1 and Table 1). The net present value (NPV) of public external debt is expected to decrease from 46 percent of GDP at end-2007 to 34 percent at end-2013, and to 14 percent of GDP by 2028, crossing the 30 percent indicative threshold by 2016. The debt service ratios (both as a share of exports and government revenues) are expected to remain well below the indicative thresholds for the entire projection period.

Lao P.D.R.: External Public Debt Indicators at End-2007

	Indicative Thresholds	End-2007
NPV of debt, as a percent of:		
GDP	30	46
Exports	100	129
Revenue	200	318
Debt service, as a percent of:		
Exports	15	5
Revenue	25	13

Source: IMF staff estimates.

7. **External debt sustainability is most vulnerable to real exchange rate and export price shocks** (Tables 2a and 2b). In particular, real exchange rate shocks (including from shocks to the GDP deflator or the nominal exchange rate) have the largest impact on the NPV of debt-to-GDP as well as the NPV of debt-to-revenues ratios.[4] Compared to 2008, a one-time 30 percent nominal depreciation of the kip exchange rate relative to the baseline would raise the NPV of public external debt-to-GDP by 10 percentage points over the medium term, and it would only fall below the 30 percent threshold in 2021. Similarly, a decline in export value growth (including from commodity price shocks) in 2009–10, by one standard deviation below its historical average, would raise the NPV of external debt-to-exports by about 60 percentage points over the medium term before falling back below the threshold in 2021.

8. **Under an alternative scenario, Lao P.D.R.'s external debt situation could deteriorate if expected returns to large resource project-related investments (mainly hydropower) do not fully materialize (Figure 1 and Table 3), especially given the nonconcessional nature of borrowing for this purpose**. Assuming the volume of mining and hydropower exports is 25 percent below the baseline and the value of nonresource exports 10 percent below from 2009 onward, the NPV of public external debt-to-GDP ratio would only

[4] The most extreme stress test is defined as the bound test resulting in the most extreme deterioration of the debt burden indicator after 10 years.

cross the 30 percent indicative threshold by 2019.[5] The achievement of other thresholds would be similarly delayed.

IV. Public Sector Debt Sustainability[6]

9. **The trajectory of public debt is expected to follow closely that of external debt, as much of public debt is from external creditors** (Figure 2 and Table 4). The NPV of public debt-to-GDP ratio is expected to decrease from 50 percent at end-fiscal year 2006/07 to 39 percent at end-2012/13, and to 16 percent by end-2027/28.

10. **Public debt ratios are particularly sensitive to a real kip depreciation** (Figure 2 and Table 5). Compared to 2007/08, a one-time 30 percent real depreciation of the kip exchange rate would raise the NPV of public debt-to-GDP and the NPV of public debt-to-revenue ratios by around 6 and 25 percentage points by 2012/13, respectively. A 10 percent of GDP increase in other debt-creating flows would result in a sustained increase in the NPV of public debt-to-GDP ratio by about 4 percentage points over the medium term.

V. Conclusion

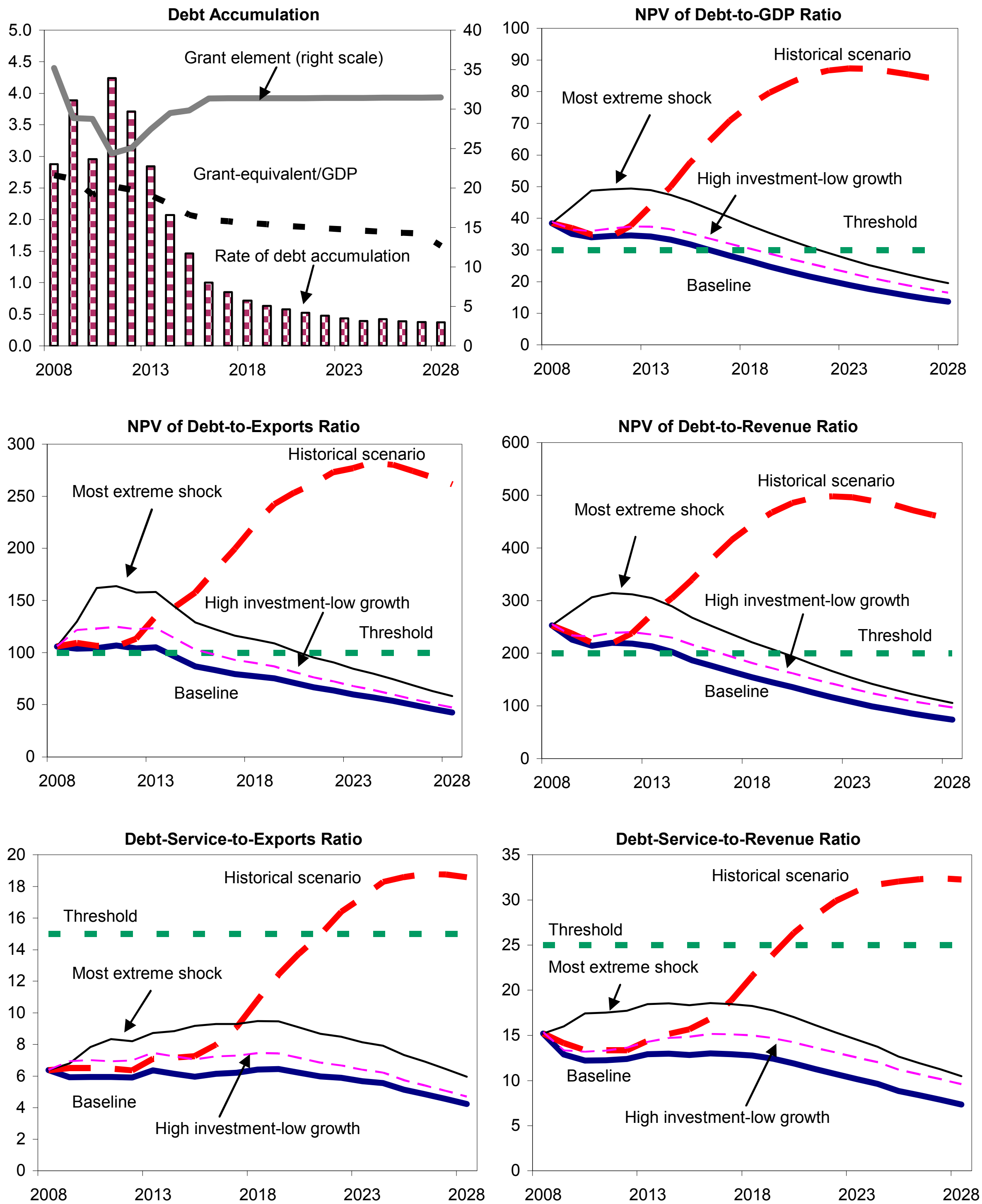
11. **While Lao P.D.R. has made significant progress in reducing its external and public debt burden, it still faces a high risk of debt distress.** This reflects current and planned large-scale investments in hydropower and mining projects that will only deliver returns over the medium term. The outlook is particularly sensitive to changes in export and real GDP growth, highlighting the vulnerability of debt dynamics in Lao P.D.R. to potential shocks and the continued need to maintain macroeconomic stability and deepen structural reforms. Lao P.D.R. could also further guard against these vulnerabilities by ensuring that any external borrowing is obtained on concessional terms and by carefully managing fiscal and quasi-fiscal liabilities.

12. **Continued prudent debt management as well as cautious assessment and monitoring of large-scale projects will be required to mitigate the risks posed to external and public debt sustainability.** Fiscal risk could arise if these projects fail to generate the expected returns, including to the government's own equity stake. Better disclosure of the government's medium-term borrowing plans, including for resource sector activity, would greatly enhance the assessment of debt sustainability.

[5] Nonresource exports are presumed to be affected by similar factors to those that might lower growth in resource exports—lower-than-projected demand for final output; higher-than-expected costs for new projects, reducing their scale and efficiency; fewer improvements to supporting infrastructure; etc.

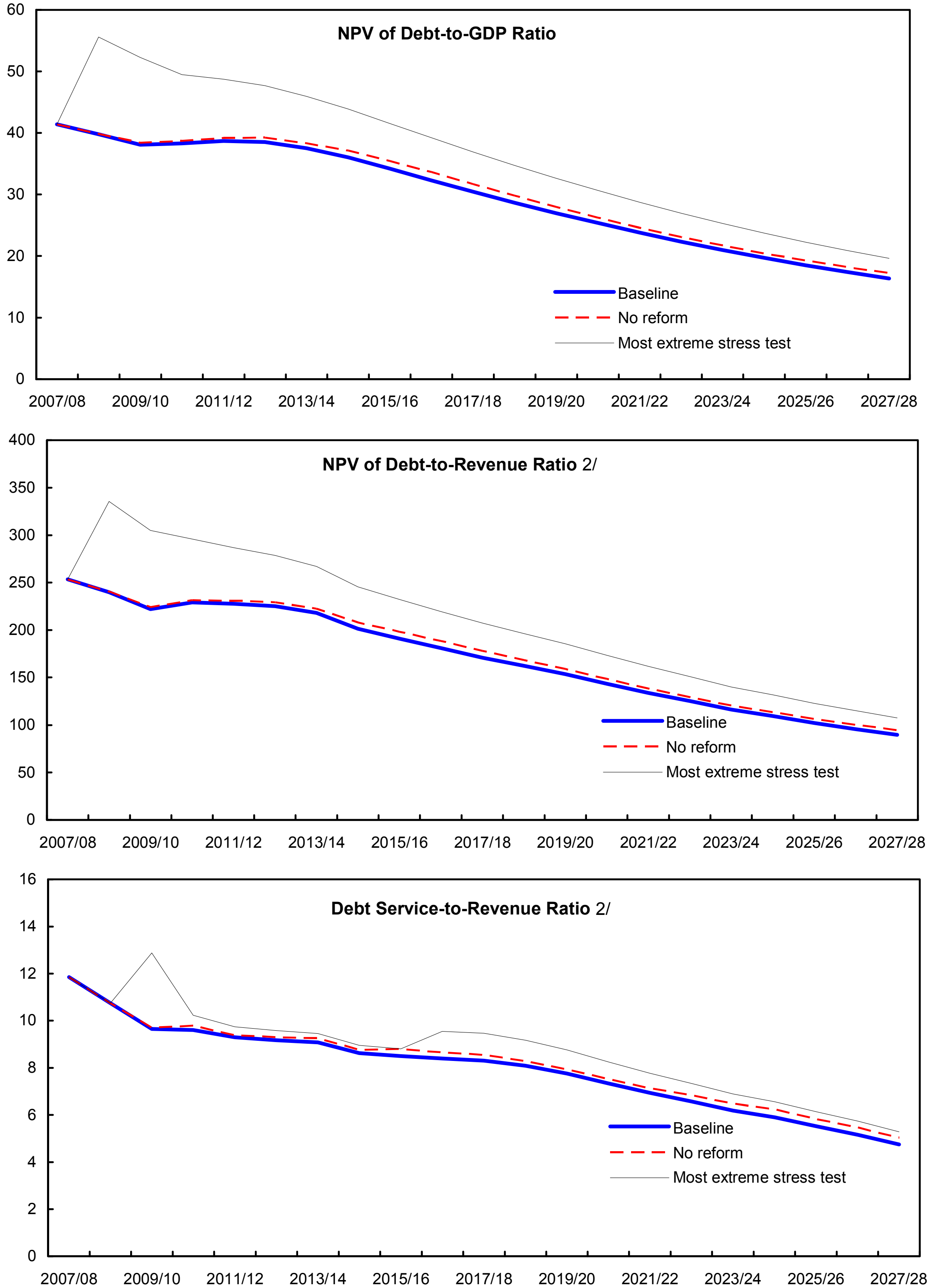
[6] In this section, ratios are stated on the basis of the fiscal year (ending September 30).

Figure 1. Lao P.D.R.: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, Baseline Scenario, 2008–28



Source: Staff projections and simulations.

Figure 2. Lao P.D.R.: Indicators of Public Debt Under Alternative Scenarios, Baseline Scenario, 2007/08–2027/28 1/



Source: Staff projections and simulations.
1/ Most extreme stress test is test that yields highest ratio in 2017/18.
2/ Revenue including grants.

Table 1. Lao P.D.R.: External Debt Sustainability Framework, Baseline Scenario, 2008–28 1/

(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 6/	Standard Deviation 6/	Projections									
	2005	2006	2007			2008	2009	2010	2011	2012	2013	2008–13 Average	2018	2028	2014–28 Average
External debt (nominal) 1/	**105.7**	**97.1**	**104.5**			**96.6**	**97.8**	**101.3**	**104.9**	**103.8**	**98.0**		**53.8**	**17.2**	
Of which: Public and publicly guaranteed (PPG)	76.9	66.0	59.5			49.3	44.7	43.0	43.0	42.9	42.3		32.2	17.0	
Change in external debt	0.1	-8.5	7.4			-7.9	1.2	3.5	3.6	-1.1	-5.8		-8.3	-1.2	
Identified net debt-creating flows	4.9	-11.4	2.4			3.3	4.1	4.8	3.8	-1.7	-5.2		-5.8	-1.4	
Non-interest current account deficit	**16.7**	**9.7**	**16.5**	**10.8**	**5.0**	**16.1**	**17.8**	**15.7**	**13.5**	**11.0**	**5.5**		**-1.6**	**0.6**	-0.5
Deficit in balance of goods and services	14.9	7.9	17.4			15.8	18.0	16.6	14.1	11.7	6.4		-3.7	1.3	
Exports	31.5	39.6	36.0			36.3	33.8	32.6	32.2	33.2	32.6		34.1	31.9	
Imports	46.4	47.4	53.3			52.1	51.8	49.2	46.3	45.0	39.0		30.4	33.2	
Net current transfers (negative = inflow)	-2.2	-4.1	-2.5	-4.7	2.5	-2.5	-2.3	-2.4	-2.4	-2.4	-2.3		-2.3	-2.5	-2.4
o/w official	-1.2	-2.4	-1.3			-1.3	-1.1	-1.2	-1.2	-1.1	-1.1		-1.0	-1.1	
Other current account flows (negative = net inflow)	3.9	6.0	1.7			2.8	2.2	1.5	1.8	1.6	1.5		4.4	1.8	
Net FDI (negative = inflow)	**0.2**	**-2.8**	**-0.6**	**-2.0**	**1.5**	**-8.3**	**-9.0**	**-6.5**	**-4.6**	**-7.7**	**-6.9**		**-2.7**	**-1.3**	-2.2
Endogenous debt dynamics 2/	**-12.0**	**-18.3**	**-13.5**			**-4.4**	**-4.7**	**-4.4**	**-5.1**	**-4.9**	**-3.8**		**-1.5**	**-0.8**	
Contribution from nominal interest rate	1.1	0.8	0.9			1.7	1.3	2.2	2.2	2.6	2.9		2.5	0.4	
Contribution from real GDP growth	-6.6	-7.0	-6.6			-6.2	-6.0	-6.5	-7.3	-7.6	-6.8		-4.0	-1.2	
Contribution from price and exchange rate changes	-6.6	-12.1	-7.9			…	…	…	…	…	…		…	…	
Residual (3–4) 3/	**-4.7**	**2.8**	**4.9**			**-11.2**	**-2.9**	**-1.3**	**-0.2**	**0.6**	**-0.6**		**-2.4**	**0.2**	
Of which: Exceptional financing	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
NPV of external debt 4/	...	...	91.3			85.8	88.2	92.3	96.3	95.5	89.9		48.0	13.9	
In percent of exports	...	...	253.6			236.3	260.8	282.8	299.0	287.2	275.6		140.9	43.5	
NPV of PPG external debt	**...**	**...**	**46.3**			**38.4**	**35.1**	**34.1**	**34.4**	**34.6**	**34.2**		**26.4**	**13.6**	
In percent of exports	**...**	**...**	**128.6**			**105.8**	**103.8**	**104.3**	**106.8**	**104.0**	**104.9**		**77.4**	**42.7**	
In percent of government revenues	**...**	**...**	**318.4**			**252.8**	**225.8**	**214.4**	**220.0**	**218.2**	**213.3**		**154.6**	**74.1**	
Debt service-to-exports ratio (in percent)	**8.1**	**9.3**	**9.2**			**13.3**	**12.3**	**18.8**	**17.9**	**20.4**	**23.5**		**23.2**	**4.7**	
PPG debt service-to-exports ratio (in percent)	**...**	**...**	**...**			**6.4**	**5.9**	**5.9**	**5.9**	**5.9**	**6.4**		**6.4**	**4.2**	
PPG debt service-to-revenue ratio (in percent)	**...**	**...**	**...**			**15.2**	**12.9**	**12.2**	**12.2**	**12.4**	**12.9**		**12.8**	**7.3**	
Total gross financing need (billions of U.S. dollars)	556.1	371.5	791.1			661.2	819.7	1,082.8	1,160.1	876.5	597.2		536.3	323.4	
Non-interest current account deficit that stabilizes debt ratio	16.6	18.2	9.2			23.9	16.7	12.2	9.9	12.0	11.4		6.6	1.8	
Key macroeconomic assumptions															
Real GDP growth (in percent)	7.1	8.1	7.9	6.4	1.2	7.5	7.5	7.5	8.0	8.0	7.1	7.6	7.1	7.1	7.1
GDP deflator in US dollar terms (change in percent)	6.6	12.9	8.8	3.1	12.8	19.0	12.1	4.0	3.1	2.1	2.1	7.1	2.1	2.1	2.1
Effective interest rate (percent) 5/	1.2	0.9	1.1	1.1	0.3	2.1	1.7	2.5	2.4	2.8	3.1	2.4	4.4	2.3	3.5
Growth of exports of G&S (U.S. dollar terms, in percent)	24.9	53.3	6.8	14.5	16.6	29.1	12.2	7.9	9.8	13.8	7.3	13.4	5.0	10.7	9.2
Growth of imports of G&S (U.S. dollar terms, in percent)	19.8	24.7	32.1	13.2	18.2	24.9	19.9	6.2	4.7	7.1	-5.2	9.6	10.3	10.2	8.4
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	35.2	28.8	28.8	24.4	25.1	27.4	28.3	31.4	31.5	31.2
Aid flows (in millions of U.S. dollars) 7/	51.5	68.7	67.8			65.1	74.3	83.1	93.0	105.2	115.5		184.0	401.7	
Of which: Grants	51.5	68.7	67.8			65.1	74.3	83.1	93.0	105.2	115.5		184.0	401.5	
Of which: Concessional loans	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.2	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			2.7	2.6	2.4	2.5	2.5	2.4		1.9	1.6	1.9
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			50.1	42.1	44.2	37.7	39.6	43.5		55.7	60.6	57.2
Memorandum items:															
Nominal GDP (millions of US dollars)	2,865.9	3,498.1	4,108.0			5,256.6	6,334.1	7,081.9	7,886.0	8,693.9	9,505.5		14,840.7	36,175.0	
(NPVt-NPVt-1)/GDPt-1 (in percent)						2.9	3.9	3.0	4.2	3.7	2.8	3.4	0.7	0.4	0.7

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 2a. Lao P.D.R.: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, Baseline Scenario, 2008–28
(In percent)

	Projections							
	2008	2009	2010	2011	2012	2013	**2018**	2028
NPV of debt-to-GDP ratio								
Baseline	38	35	34	34	35	34	**26**	14
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009–28 1/	38	37	35	34	38	44	**76**	83
A2. New public sector loans on less favorable terms in 2009–28 2/	38	36	36	37	38	39	**33**	21
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	38	36	36	36	36	36	**28**	14
B2. Export value growth at historical average minus one standard deviation in 2009–10 3/	38	38	42	42	41	41	**30**	15
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–10	38	44	49	49	49	49	**38**	19
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–10 4/	38	41	44	44	44	43	**32**	15
B5. Combination of B1-B4 using one-half standard deviation shocks	38	42	47	47	47	46	**35**	18
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	38	48	47	47	47	47	**36**	19
NPV of debt-to-exports ratio								
Baseline	106	104	104	107	104	105	**77**	43
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-28 1/	106	109	107	106	113	135	**222**	261
A2. New public sector loans on less favorable terms in 2009-28 2/	106	107	110	116	115	119	**96**	65
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	106	104	104	107	104	105	**77**	43
B2. Export value growth at historical average minus one standard deviation in 2009–10 3/	106	130	162	164	158	158	**113**	58
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–10	106	104	104	107	104	105	**77**	43
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–10 4/	106	122	136	136	131	131	**93**	47
B5. Combination of B1-B4 using one-half standard deviation shocks	106	113	120	122	118	119	**87**	47
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	106	104	104	107	104	105	**77**	43
NPV of debt-to-revenue ratio								
Baseline	253	226	214	220	218	213	**155**	74
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009–28 1/	253	238	219	219	238	274	**444**	454
A2. New public sector loans on less favorable terms in 2009–28 2/	253	233	226	238	242	241	**191**	112
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	253	231	224	230	228	223	**161**	77
B2. Export value growth at historical average minus one standard deviation in 2009–10 3/	253	246	263	266	262	254	**178**	80
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–10	253	280	306	314	312	305	**221**	106
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–10 4/	253	266	279	281	275	267	**185**	81
B5. Combination of B1-B4 using one-half standard deviation shocks	253	273	294	300	297	289	**207**	97
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	253	308	293	300	298	291	**211**	101

Table 2b. Lao P.D.R.: Sensitivity Analyses for Key Indicators of Public and Publicly Guaranteed External Debt, Baseline Scenario, 2008–28 (continued)
(In percent)

	Projections							
	2008	2009	2010	2011	2012	2013	**2018**	2028
Debt service-to-exports ratio								
Baseline	6	6	6	6	6	6	**6**	4
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009–28 1/	6	7	7	6	6	7	**11**	19
A2. New public sector loans on less favorable terms in 2009–28 2/	6	6	6	6	6	7	**8**	6
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	6	6	6	6	6	6	**6**	4
B2. Export value growth at historical average minus one standard deviation in 2009–10 3/	6	7	8	8	8	9	**9**	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–10	6	6	6	6	6	6	**6**	4
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–10 4/	6	6	6	7	7	7	**8**	5
B5. Combination of B1-B4 using one-half standard deviation shocks	6	6	6	7	7	7	**7**	5
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	6	6	6	6	6	6	**6**	4
Debt service-to-revenue ratio								
Baseline	15	13	12	12	12	13	**13**	7
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009–28 1/	15	14	13	13	13	14	**22**	32
A2. New public sector loans on less favorable terms in 2009–28 2/	15	13	12	13	14	14	**15**	10
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2009–10	15	13	13	13	13	13	**13**	8
B2. Export value growth at historical average minus one standard deviation in 2009–10 3/	15	13	13	14	14	14	**15**	8
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009–10	15	16	17	18	18	18	**18**	10
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009–10 4/	15	13	13	14	14	14	**16**	8
B5. Combination of B1-B4 using one-half standard deviation shocks	15	15	16	16	16	17	**17**	10
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	15	18	17	17	17	18	**17**	10
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	29	29	29	29	29	29	**29**	29

Source: Staff projections and simulations.

1/ Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.
2/ Assumes that the interest rate on new borrowing is by 2 percentage points higher than in the baseline., while grace and maturity periods are the same as in the baseline.
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).
4/ Includes official and private transfers and FDI.
5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.
6/ Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.

Table 3. Lao P.D.R.: External Debt Sustainability Framework, Alternative (High Investment–Low Growth) Scenario, 2008–28 1/

(In percent of GDP, unless otherwise indicated)

	Actual			Historical	Standard	Projections									
				Average 6/	Deviation 6/							2008–13			2014–28
	2005	2006	2007			2008	2009	2010	2011	2012	2013	Average	2018	2028	Average
External debt (nominal) 1/	**105.7**	**97.1**	**104.5**			**97.6**	**101.6**	**107.1**	**112.2**	**112.5**	**107.0**		**61.9**	**20.9**	
Of which: Public and publicly guaranteed (PPG)	76.9	66.0	59.5			49.8	46.5	45.5	46.0	46.5	46.2		37.0	20.6	
Change in external debt	0.1	-8.5	7.4			-6.9	4.0	5.4	5.1	0.3	-5.5		-8.5	-1.4	
Identified net debt-creating flows	4.9	-11.4	2.4			4.2	10.2	10.4	8.9	3.1	-1.5		-2.3	2.2	
Non-interest current account deficit	**16.7**	**9.7**	**16.5**	**10.8**	**5.0**	**16.2**	**22.0**	**20.4**	**17.6**	**16.0**	**10.2**		**2.4**	**4.9**	3.6
Deficit in balance of goods and services	14.9	7.9	17.4			16.0	22.9	21.8	19.2	17.1	11.3		1.3	5.4	
Exports	31.5	39.6	36.0			36.7	30.0	29.2	29.5	30.6	30.3		33.7	34.9	
Imports	46.4	47.4	53.3			52.6	52.9	51.0	48.7	47.7	41.6		35.0	40.2	
Net current transfers (negative = inflow)	-2.2	-4.1	-2.5	-4.7	2.5	-2.5	-2.4	-2.6	-2.6	-2.6	-2.6		-2.7	-3.0	-2.8
o/w official	-1.2	-2.4	-1.3			-1.3	-1.2	-1.2	-1.2	-1.2	-1.2		-1.2	-1.3	
Other current account flows (negative = net inflow)	3.9	6.0	1.7			2.8	1.6	1.1	1.0	1.4	1.4		3.7	2.5	
Net FDI (negative = inflow)	**0.2**	**-2.8**	**-0.6**	**-2.0**	**1.5**	**-8.4**	**-9.5**	**-7.0**	**-4.4**	**-9.0**	**-8.4**		**-3.9**	**-1.7**	-3.1
Endogenous debt dynamics 2/	**-12.0**	**-18.3**	**-13.5**			**-3.6**	**-2.4**	**-2.9**	**-4.3**	**-4.0**	**-3.3**		**-0.8**	**-1.0**	
Contribution from nominal interest rate	1.1	0.8	0.9			1.8	1.4	2.3	2.3	2.9	3.2		2.9	0.5	
Contribution from real GDP growth	-6.6	-7.0	-6.6			-5.3	-3.8	-5.2	-6.6	-6.8	-6.5		-3.7	-1.5	
Contribution from price and exchange rate changes	-6.6	-12.1	-7.9			…	…	…	…	…	…		…	…	
Residual (3–4) 3/	**-4.7**	**2.8**	**4.9**			**-11.1**	**-6.1**	**-5.0**	**-3.7**	**-2.8**	**-4.0**		**-6.2**	**-3.6**	
Of which: Exceptional financing	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
NPV of external debt 4/	...	...	91.3			86.7	91.7	97.6	103.0	103.4	98.2		55.3	16.8	
In percent of exports	...	...	253.6			236.3	305.8	333.9	349.1	338.4	324.2		163.9	48.3	
NPV of PPG external debt	**...**	**...**	**46.3**			**38.8**	**36.5**	**36.0**	**36.8**	**37.4**	**37.4**		**30.4**	**16.5**	
In percent of exports	**...**	**...**	**128.6**			**105.8**	**121.7**	**123.2**	**124.7**	**122.5**	**123.4**		**90.1**	**47.4**	
In percent of government revenues	**...**	**...**	**318.8**			**255.0**	**233.8**	**231.9**	**239.2**	**240.0**	**235.9**		**181.5**	**97.0**	
Debt service-to-exports ratio (in percent)	**8.1**	**9.3**	**9.2**			**13.3**	**14.4**	**22.2**	**20.9**	**24.1**	**27.7**		**26.9**	**5.2**	
PPG debt service-to-exports ratio (in percent)	**...**	**...**	**...**			**6.4**	**6.9**	**7.0**	**6.9**	**7.0**	**7.5**		**7.5**	**4.7**	
PPG debt service-to-revenue ratio (in percent)	**...**	**...**	**...**			**15.4**	**13.3**	**13.2**	**13.3**	**13.6**	**14.3**		**15.0**	**9.6**	
Total gross financing need (billions of U.S. dollars)	556.1	371.5	791.1			661.4	1,027.2	1,327.5	1,424.1	1,155.4	887.7		979.0	1,485.7	
Non-interest current account deficit that stabilizes debt ratio	16.6	18.2	9.2			23.1	18.0	14.9	12.4	15.7	15.7		10.9	6.3	
Key macroeconomic assumptions															
Real GDP growth (in percent)	7.1	8.1	7.9	6.4	1.2	6.5	4.5	5.6	6.8	6.6	6.3	6.0	5.7	7.2	6.4
GDP deflator in US dollar terms (change in percent)	6.6	12.9	8.8	3.1	12.8	19.0	12.1	4.0	3.1	2.1	2.1	7.1	2.1	2.1	2.1
Effective interest rate (percent) 5/	1.2	0.9	1.1	1.1	0.3	2.1	1.7	2.5	2.4	2.8	3.1	2.4	4.4	2.3	3.5
Growth of exports of G&S (U.S. dollar terms, in percent)	24.9	53.3	6.8	14.5	16.6	29.1	-4.3	7.2	11.1	12.8	7.5	10.6	5.9	10.9	9.6
Growth of imports of G&S (U.S. dollar terms, in percent)	19.8	24.7	32.1	13.2	18.2	25.0	17.7	6.1	4.9	6.7	-5.3	9.2	10.3	10.2	8.5
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	35.2	28.8	28.8	24.4	25.1	27.4	28.3	31.4	31.5	31.2
Aid flows (in millions of U.S. dollars) 7/	51.5	68.7	67.8			65.1	74.3	83.1	93.0	104.8	113.8		168.5	346.1	
Of which: Grants	51.5	68.7	67.8			65.1	74.3	83.1	93.0	104.8	113.8		168.5	345.9	
Of which: Concessional loans	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.2	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			2.7	2.8	2.5	2.7	2.7	2.6		2.1	1.7	2.1
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			50.1	42.1	44.2	37.7	39.5	43.3		54.3	58.1	55.4
Memorandum items:															
Nominal GDP (millions of US dollars)	2,865.9	3,498.1	4,108.0			5,204.2	6,095.6	6,699.4	7,372.4	8,026.7	8,705.9		12,896.0	29,839.7	
(NPVt-NPVt-1)/GDPt-1 (in percent)						2.9	3.9	3.1	4.5	4.0	3.1	3.6	0.8	0.5	0.8

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 4. Lao PDR: Public Sector Debt Sustainability Framework, Baseline Scenario, 2004/05–2027/28

(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average 5/	Standard Deviation 5/	Estimate	Projections								
	2004/05	2005/06	2006/07			2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2007/08–2012/13 Average	2017/18	2027/28	2014/15–2027/28 Average
Public sector debt 1/	79.7	70.8	62.6			53.3	47.6	45.0	48.5	48.5	48.1		37.5	20.5	
Of which: Foreign-currency denominated	78.1	69.2	60.8			51.5	45.7	43.4	47.1	47.3	46.9		36.9	20.3	
Change in public sector debt	-8.4	-8.9	-8.2			-9.3	-5.7	-2.6	3.5	0.0	-0.5		-2.3	-1.2	
Identified debt-creating flows	-7.3	-12.1	-7.6			-12.2	-6.7	-4.4	-3.3	-3.4	-3.3		-2.3	-1.1	
Primary deficit	3.4	3.0	2.2	3.2	1.2	0.9	0.7	0.4	0.7	0.6	0.5	0.6	0.9	0.6	0.7
Revenue and grants	13.2	14.6	15.7			16.3	16.6	17.1	16.7	17.0	17.1		17.8	18.2	
Of which: Grants	1.7	2.0	1.8			1.3	1.2	1.2	1.2	1.2	1.2		1.2	1.2	
Primary (noninterest) expenditure	16.6	17.6	17.9			17.2	17.3	17.5	17.5	17.6	17.6		18.7	18.9	
Automatic debt dynamics	-10.7	-15.1	-9.8			-13.0	-7.4	-4.8	-4.1	-4.0	-3.8		-3.1	-1.8	
Contribution from interest rate/growth differential	-7.3	-7.3	-6.4			-4.8	-4.0	-3.5	-3.6	-3.8	-3.7		-3.1	-1.8	
Of which: Contribution from average real interest rate	-1.5	-1.5	-1.2			-0.4	-0.3	-0.2	-0.3	-0.2	-0.3		-0.3	-0.2	
Of which: Contribution from real GDP growth	-5.7	-5.8	-5.2			-4.4	-3.7	-3.3	-3.3	-3.6	-3.4		-2.8	-1.5	
Contribution from real exchange rate depreciation	-3.5	-7.8	-3.4			-8.2	-3.4	-1.2	-0.5	-0.2	0.0		...	...	
Other identified debt-creating flows	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Privatization receipts (negative)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recognition of implicit or contingent liabilities	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Debt relief (HIPC and other)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Other (specify, e.g., bank recapitalization)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes	-1.1	3.2	-0.6			2.9	1.0	1.8	6.8	3.4	2.8		-0.1	-0.1	
NPV of public sector debt	...	...	49.5			41.4	39.8	38.1	38.3	38.7	38.5		30.5	16.4	
Of which: Foreign-currency denominated	...	...	47.7			39.6	37.9	36.5	36.9	37.4	37.4		29.8	16.2	
Of which: External	...	...	47.7			39.6	37.9	36.5	36.9	37.4	37.4		29.8	16.2	
NPV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	7.2	6.1	4.7			3.8	3.3	2.7	2.9	2.7	2.5		2.6	1.6	
NPV of public sector debt-to-revenue and grants ratio (in percent)	...	...	315.0			253.5	239.9	222.2	229.2	227.8	225.2		171.0	89.7	
NPV of public sector debt-to-revenue ratio (in percent)	...	...	354.8			274.7	258.2	238.5	246.4	245.2	242.3		183.5	96.1	
Of which: External 3/	...	...	342.0			262.8	245.9	228.3	237.2	237.2	235.2		179.7	94.9	
Debt service-to-revenue and grants ratio (in percent) 4/	15.8	11.9	9.1			11.8	10.7	9.7	9.6	9.3	9.2		8.3	4.7	
Debt service-to-revenue ratio (in percent) 4/	18.1	13.8	10.3			12.8	11.6	10.4	10.3	10.0	9.9		8.9	5.1	
Primary deficit that stabilizes the debt-to-GDP ratio	11.8	11.9	10.5			10.1	6.4	3.0	-2.8	0.6	0.9		3.2	1.8	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	6.9	7.9	8.0	6.8	0.9	7.6	7.5	7.5	7.9	8.0	7.6	7.7	7.5	7.5	7.5
Average nominal interest rate on forex debt (in percent)	1.2	1.1	0.7	0.9	0.2	1.3	1.2	1.2	1.3	1.2	1.2	1.2	1.0	0.8	0.9
Average real interest rate on domestic currency debt (in percent)	2.2	0.0	2.2	7.7	16.8	0.4	0.5	1.7	3.4	4.5	4.8	2.6	4.8	4.8	4.8
Real exchange rate depreciation (in percent, + indicates depreciation)	-4.4	-11.0	-5.4	-5.6	6.6	-14.6	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	7.9	6.9	4.2	9.2	3.7	10.0	10.3	7.6	5.8	4.7	4.5	7.2	4.5	4.5	4.5
Growth of real primary spending (deflated by GDP deflator, in percent)	21.7	14.7	10.1	5.3	15.0	3.2	8.1	8.7	7.6	8.8	7.6	7.3	8.6	7.6	8.0
Grant element of new external borrowing (in percent)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Sources: Lao P.D.R. authorities; and 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 excluding grants.

4/ Debt service is defined as the sum of interest and amortization of medium and long-term debt.

5/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

Table 5. Lao PDR: Sensitivity Analysis for Key Indicators of Public Debt, Baseline Scenario, 2007/08–2027/28

	Projections							
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2017/18	2027/28
NPV of Debt-to-GDP Ratio								
Baseline	41	40	38	38	39	39	30	16
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	41	41	41	43	45	46	44	34
A2. Primary balance is unchanged from 2007/08	41	40	38	39	39	39	32	17
A3. Permanently lower GDP growth 1/	41	40	38	39	39	39	32	19
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2008/09–2009/10	41	40	40	40	41	41	33	20
B2. Primary balance is at historical average minus one standard deviations in 2008/09–2009/10	41	42	42	42	42	42	33	17
B3. Combination of B1-B2 using one half standard deviation shocks	41	42	42	42	42	42	33	17
B4. One-time 30 percent real depreciation in 2008/09	41	56	52	49	49	48	37	20
B5. 10 percent of GDP increase in other debt-creating flows in 2008/09	41	45	43	43	43	42	33	18
NPV of Debt-to-Revenue Ratio 2/								
Baseline	253	240	222	229	228	225	171	90
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	253	249	240	256	264	269	243	185
A2. Primary balance is unchanged from 2007/08	253	240	224	231	231	229	178	95
A3. Permanently lower GDP growth 1/	253	240	223	231	230	228	178	107
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2008/09–2009/10	253	244	230	239	239	237	186	108
B2. Primary balance is at historical average minus one standard deviations in 2008/09–2009/10	253	252	244	250	247	243	184	96
B3. Combination of B1-B2 using one half standard deviation shocks	253	252	245	251	248	245	185	95
B4. One-time 30 percent real depreciation in 2008/09	253	335	305	296	287	279	207	108
B5. 10 percent of GDP increase in other debt-creating flows in 2008/09	253	272	250	255	252	248	187	97
Debt Service-to-Revenue Ratio 2/								
Baseline	12	11	10	10	9	9	8	5
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	12	11	11	11	11	11	11	10
A2. Primary balance is unchanged from 2007/08	12	11	10	10	9	9	9	5
A3. Permanently lower GDP growth 1/	12	11	10	10	9	9	9	5
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2008/09–2009/10	12	11	10	10	10	10	9	6
B2. Primary balance is at historical average minus one standard deviations in 2008/09–2009/10	12	11	11	11	10	10	9	5
B3. Combination of B1-B2 using one half standard deviation shocks	12	11	11	11	10	10	9	5
B4. One-time 30 percent real depreciation in 2008/09	12	11	11	11	11	11	9	5
B5. 10 percent of GDP increase in other debt-creating flows in 2008/09	12	11	13	10	10	10	9	5

Sources: Lao P.D.R. authorities; and staff estimates and projections.
1/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of 20 (i.e., the length of the projection period).
2/ Revenues are defined inclusive of grants.