INTERNATIONAL DEVELOPMENT ASSOCIATION
INTERNATIONAL MONETARY FUND

TONGA

Joint Bank/Fund Debt Sustainability Analysis 2009[1]

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

Approved by Carlos Primo Braga and Vikram Nehru (IDA)
and Joshua Felman and Anthony Boote (IMF)

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The Low Income Country Debt Sustainability Analysis (LIC DSA) indicates that Tonga remains at a high risk of debt distress. Under the baseline scenario, the NPV-of-debt to GDP as well as the NPV-of-debt to export ratios remain above the country-specific indicative thresholds for a prolonged period. At the same time, Tonga benefits from very high remittance inflows (over 30 percent of GDP), which are by far the largest source of foreign exchange earnings and help mitigate liquidity risks. Tonga's overall public sector debt indicators, while elevated over the short term, shows a decreasing trend over the longer run. Taking into account the cushion provided to the economy by the large workers' remittances, the projected debt profile is consistent with manageable—if high risk—debt dynamics.

The results of the debt sustainability analysis underscore the importance of maintaining broadly balanced budgets following the completion of reconstruction borrowing and sustaining growth near historical averages. Both are key to maintaining stable debt levels in the medium term and declining debt levels in the long term.

I. Background

1. **The external and public debt sustainability analyses are based on the standard LIC DSA framework.**[2] The DSA presents the projected path of Tonga's external and public

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[1]This DSA was prepared jointly with the World Bank in accordance with the Debt Sustainability Framework for low-income countries approved by the Executive Boards of the IMF and IDA. The debt data underlying this exercise were provided by the Tongan authorities.

[2]See "Debt Sustainability in Low-Income Countries: Proposal for an Operational Framework and Policy Implications" (http://siteresources.worldbank.org/INTDEBTDEPT/PublicationsAndReports/20261908/debtSust-complete%20paper.pdf) and (http://www.imf.org/external/np/pdr/sustain/2004/020304.htm, 2/3/04), "Debt Sustainability in Low-Income Countries: Further Considerations on an Operational Framework and Policy Implications" (http://siteresources.worldbank.org/INTDEBTDEPT/PolicyPapers/20279458/DSfullpapersept.pdf and

(continued)

sector debt burden indicators, and draws some conclusions on the forward-looking sustainability of debt.

2. **Tonga's total public sector debt stock (including publicly guaranteed debt) declined to 34 percent of GDP in FY07/08 from 40 percent of GDP in 2005/06.** External debt to GDP fell as donor financing declined in real terms, while fiscal consolidation to limit domestic budget financing also contributed to a downward trend in domestic public debt to GDP.

3. **Following the civil unrest in November of 2006, the government made a significant effort toward securing financing for the reconstruction of the capital city of Nuku'alofa.** This includes donor grants of about US$15 million, to be channeled through designated banks to business entities affected by the riots in the form of off-budget, low interest rate loans in the second half of 2007/08. The government also signed a long-term reconstruction loan from the EXIM Bank of China in November 2007. Disbursements of this loan were postponed, as the government sought to ensure it was used productively and negotiated for use of local inputs. The first drawdown was made in April 2009. Loan proceeds will be used in broadly equal measure to finance public works in the capital and to lend to the private sector for office and retail construction. The loan, which bears a 2 percent interest rate will be repaid over 20 years with a 5 year grace period.

4. **The 2009 DSA reinforces the findings of the previous analysis.** The main changes from the 2008 DSA are the lower short-term growth outlook as a result of the global economic crisis and more rapid assumed drawdowns of the EXIM Bank loan. In addition, the DSA incorporates the authorities' new GDP statistics. The new series has improved coverage and , includes estimates of the informal sector. This increases the level of GDP by 15–20 percent and causes some changes to historic growth rates. While the increase in the level of GDP reduces historic debt ratios, it has not led to a change in the assessment of Tonga's risk of debt distress.

Key Macroeconomic Assumptions

	Baseline		10 year
	2008/09	2014/15	Historical
	2013-14	2028/29	Average
Real GDP growth (percent)	1.4	1.7	1.8
Growth of exports of goods and services (U.S. dollar terms)	1.8	4.7	5.0
Non-interest current account balance (in percent of GDP)	8.8	6.2	3.6
GDP deflator in U.S. dollar terms (annual percent change)	0.8	2.9	3.6
Primary deficit (in percent of GDP)	0.3	-0.4	-0.5

(http://www.imf.org/external/np/pdr/sustain/2004/091004.htm , 9/10/04), and reference to "Staff Guidance Note on the Application of the Joint Bank-Fund Debt Sustainability."

II. Baseline

5. **Tonga's DSA builds on the baseline scenario assumptions presented in Box 1.** It assumes that the real GDP growth rate will revert close to its historical average following a slowdown in 2008/09 and 2009/10. The reconstruction loan will be drawn down over four years. Excluding reconstruction spending, public spending will be broadly limited to projected revenues and grants over the medium term, and will, thus, minimize additional external borrowing. Although exports are expected to remain constrained, remittances, which are the largest source of foreign exchange earnings (one half of Tongans live abroad, mostly in Australia, New Zealand, and United States), are expected to remain an important external cushion over the medium term.

Box 1: Key Assumptions

- Real GDP growth is projected to average 1.2 percent over the period 2009/10–2014/15, reflecting a slowdown from the global financial crisis in the first two years and an average of 1¾ percent thereafter. This modest long-run growth outlook is in line with Tonga's historic growth rates, reflecting structural impediments, which will continue to constrain growth potential.
- Inflation as measured by the GDP deflator is projected to average 5 percent over the projection period 2009/10–2014/15.
- The non-reconstruction public sector budget is projected to remain broadly balanced. Fiscal revenue is projected to grow steadily before it stabilizes at around 26 percent of GDP, as improvements in tax administration bed in and compliance improves.
- Grants are projected to decline from current high levels, but remain significant at around 2 percent of GDP over the medium term. This reflects the importance of donor commitments given the relatively small size of the Tongan economy. The EXIM Bank reconstruction loan is assumed to be fully drawn down by 2012/13 and no major further infrastructure lending is assumed.
- Total expenditure is projected to remain below revenues and grants, yielding primary surpluses of around 1 percent of GDP, somewhat smaller than recent outturns.
- The external current account balance is projected to decline this year to 7.9 percent of GDP from 10 percent of GDP in 2007/08 driven largely by the drop in food and fuel prices. Over the medium term, the deficit should stabilize around 6 percent of GDP.
- FDI is projected to stabilize below recent levels at around 6–7 percent of GDP.
- The export base is projected to remain narrow and relatively undiversified, while remittances have recently dropped as a result of the decline in economic activity in the United States and New Zealand, from which the greater part of remittances emanate. They are, however, expected to recover as these economies rebound from the impact of the global economic slowdown, including seasonal worker programs in Australia and New Zealand.

III. External DSA

Baseline

6. **Under the baseline, the external debt trajectory breaches the policy-dependent threshold in 2009/10 before receding to below the threshold in 2018/19.** Public and publicly guaranteed (PPG) external debt averaged over 30 percent of GDP from 1998 to 2006, the indicative threshold level, but has decreased in recent years reflecting growth in nominal GDP and fiscal prudence. However, with the drawdown of the reconstruction loan the PV of PPG external debt is projected to increase to about 42 percent of GDP by 2012/13, 12 percent above the threshold, before dropping under the threshold in 2017 and declining to 11 percent of GDP by the end of the projection period.

7. **External debt remains well above the PV of debt-to-export distress threshold.** Reflecting Tonga's low exports, the NPV of PPG external debt-to-exports ratio is 243 percent, well above the indicative threshold of 100 percent, and is projected to remain above the threshold for an extended period. However, this is mitigated in part by the large remittances, which are the largest source of foreign exchange earnings (one half of Tongans live abroad, mostly in Australia, New Zealand, and the United States) and which have a countervailing effect by helping to reduce liquidity risks.

Tonga: External Public Debt Indicators

	Indicative Thresholds 1/	2008/09
NPV of external debt		
In percent of GDP	30	31
In percent of exports	100	243
In percent of revenues	200	141
Debt service		
In percent of exports	15	11
In percent of revenues	25	6

1/ Represents Low Income Country DSA indicative thresholds for Tonga that is classified as a poor performer under the World Bank's Country Policy and Institutional assessment.

8. **Debt and debt service are expected to stay above the exports threshold for the majority of the projection period.** The impact of the global economic crisis will make it harder for Tonga to expand its very narrow export base in the short term, aggravating solvency and liquidity risks. Remittances will decline in the short term, but they are expected

to recover and stabilize at around 25 percent of GDP over the medium term, considerably below historical highs, but still providing a vital cushion against external debt distress and liquidity risks. Moreover, the ratio of debt and debt service to revenue remain well below the thresholds of 200 percent and 25 percent, respectively, throughout the projection period (Figure 1a), albeit with a deterioration in the short- to medium term.

Alternative scenario and stress tests

9. **Stress tests show the vulnerability of the debt position to a slowdown in exports or a significant depreciation.** The export shock stress test causes the present value of debt to reach 600 percent of exports and remain above the 100 percent threshold for the entire projection period. Similarly debt service to exports ratios rise even further above the 15 percent threshold, reaching over 40 percent in 2015. A one time depreciation causes the present value of debt to rise to 60 percent of GDP and remain above the 30 percent threshold until 2022. It also causes the present value of debt to revenue ratio to briefly breach threshold. Similarly public sector borrowing on less favorable terms would see debt levels remain above the indicative GDP threshold for a prolonged period and approach the revenue threshold.

IV. PUBLIC SECTOR DSA

Baseline

10. **The public sector DSA reinforces the conclusions of the external DSA**. In the last two fiscal years, Tonga's public debt to GDP ratio has declined to around 34 percent of GDP. However, the resumption of large scale public sector borrowing for reconstruction of the capital reversed the trend, with debt building up to 44 percent of GDP in 2010/11 before declining steadily thereafter under the baseline scenario. This reflects the importance of fiscal prudence, and a continued commitment to limit new public borrowing.

Alternative scenario and stress tests

11. **Stress tests reflect that vulnerabilities remain throughout the projection period, particularly to low GDP growth**. Among the stress tests performed, the permanent decline in GDP growth and a one-standard deviation decline in GDP growth show the strongest deterioration, with the PV of debt to GDP ratio rising above 50 percent of GDP in both cases. Further, the alternative scenario in the public sector DSA shows that the additional large public sector borrowing for infrastructure currently being envisaged causes prolonged increases in debt levels.

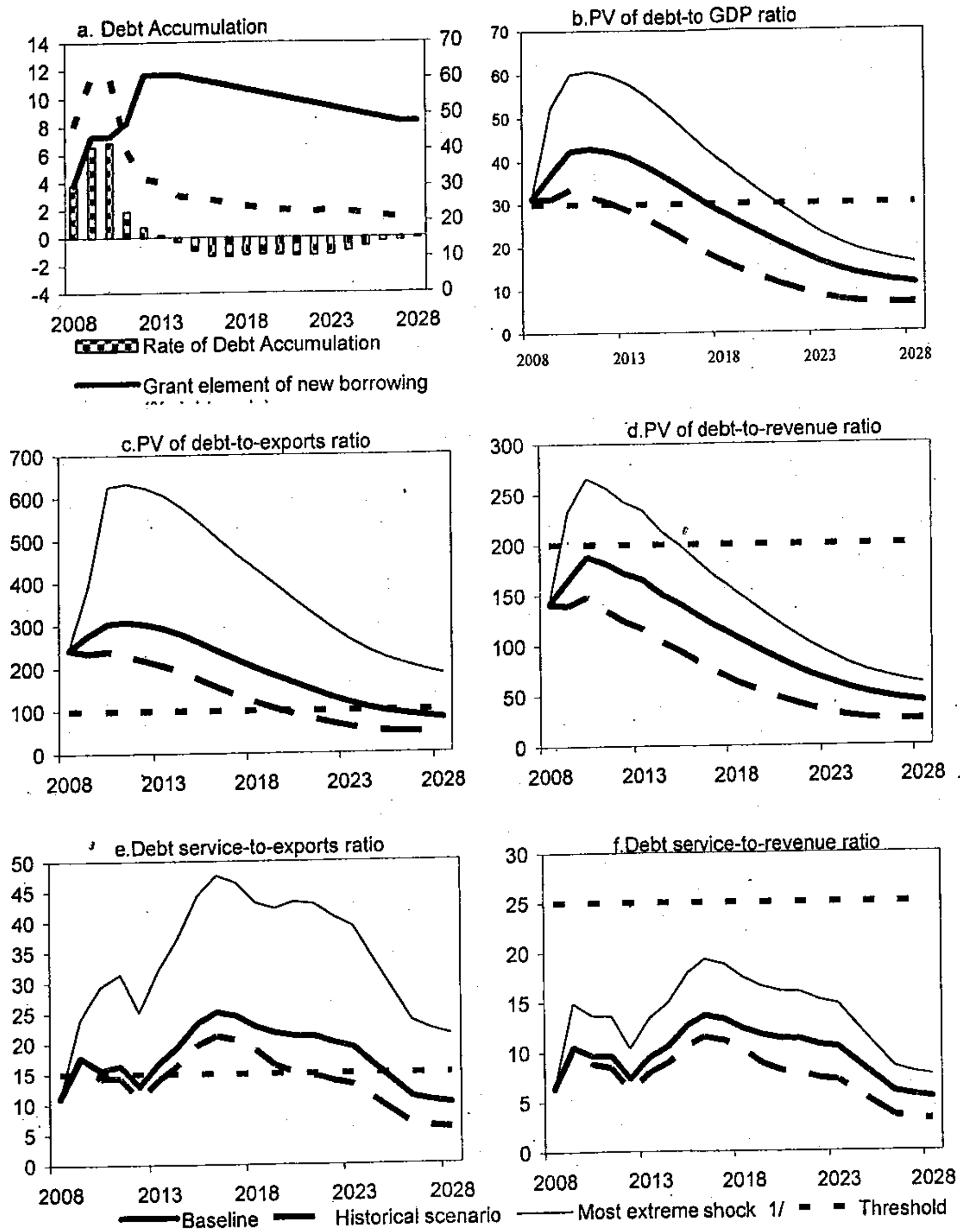
V. STAFF ASSESSMENT

12. **Tonga remains at a high risk of external debt distress.** At the same time, Tonga benefits from very high remittance inflows, which are the largest source of foreign exchange

earnings and have a countervailing effect by helping to mitigate liquidity risks. Moreover, Tonga's overall public sector debt dynamics, while elevated over the short term, shows a decreasing trend over the longer run, suggesting that debt dynamics are manageable, but at high risk.

13. **Stress tests highlight key vulnerabilities to debt sustainability over the medium term, including lower GDP growth**, major external shocks, and borrowing on less concessional terms. This underscores the importance of sound macroeconomic policies to improve growth potential on a sustainable basis, export diversification, and continued efforts in fiscal consolidation. Moreover, increased utilization of donor grants and limiting recourse to concessional financing is necessary to maintain manageable public debt dynamics and reduce the risk of external debt distress. Sound public debt management, anchored in a medium-term debt management strategy (MTDS) and in line with the medium-term fiscal framework, is also essential to guide future development financing in Tonga. Priority should be given to projects, which would help generate high growth and employment to help ensure debt service capacity in the future.

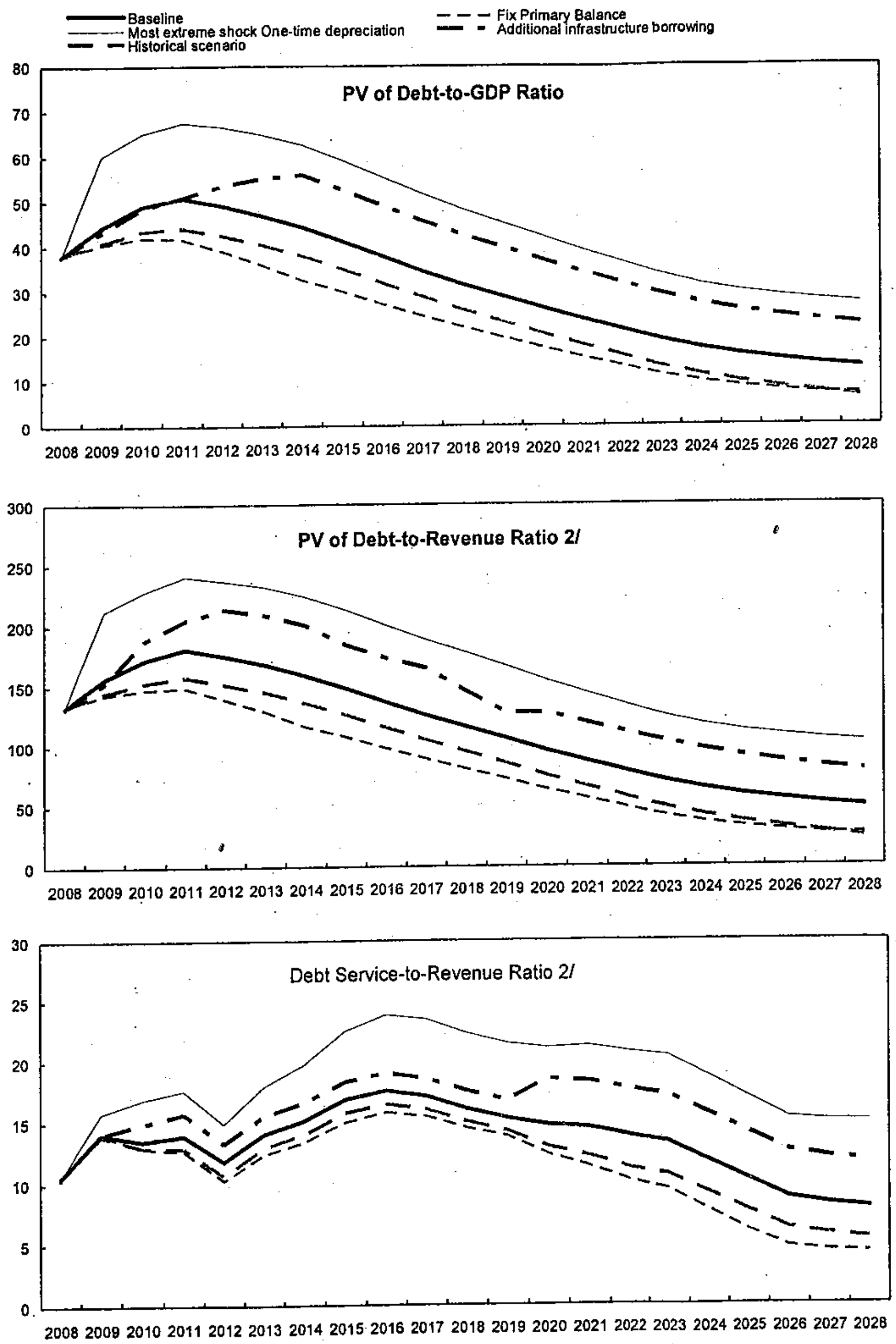
Figure 1. Tonga: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2008-2028 1/



Source: Staff projections and simulations.

1/ The most extreme stress test is the test that yields the highest ratio in 2018. In figure b. it corresponds to a One-time depreciation shock; in c. to a Exports shock; in d. to a One-time depreciation shock; in e. to a Exports shock and in picture f. to a One-time depreciation shock

Figure 2. Tonga: Indicators of Public Debt Under Alternative Scenarios, 2008–28 1/



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

1/ The most extreme stress test is the test that yields the highest ratio in 2018.

2/ Revenues are defined inclusive of grants.

Table 1a.: External Debt Sustainability Framework, Baseline Scenario, 2005-2028 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical 0 Average	Standard 0 Deviation	Projections									
	2005	2006	2007			2008	2009	2010	2011	2012	2013	2008-2013 Average	2023	2028	2014-2028 Average
External debt (nominal) 1/	35.7	32.6	28.9			30.8	33.6	36.1	35.4	33.2	30.6		15.7	14.5	
o/w public and publicly guaranteed (PPG)	29.1	27.4	25.4			28.3	32.3	36.1	35.4	33.2	30.6		15.7	14.5	
Change in external debt	-3.3	-3.1	-3.6			1.9	2.7	2.6	-0.7	-2.2	-2.6		-0.6	0.0	
Identified net debt-creating flows	-0.7	1.5	-2.1			-2.9	10.6	5.2	3.1	0.3	-0.1		-0.4	-0.6	
Non-interest current account deficit	7.7	8.3	8.7	3.6	5.0	5.9	14.2	11.5	9.7	5.9	5.6		6.3	6.4	6.2
Deficit in balance of goods and services	39.9	37.9	37.8			38.8	36.7	35.4	34.0	30.1	29.8		29.8	29.8	
Exports	14.2	11.0	14.4			12.9	13.3	13.9	13.9	13.9	13.9		13.9	13.9	
Imports	54.0	48.9	52.3			51.7	50.0	49.3	47.9	44.0	43.7		43.7	43.7	
Net current transfers (negative = inflow)	-30.9	-28.2	-27.8	-27.9	5.6	-23.5	-20.6	-21.7	-22.0	-22.0	-22.0		-21.8	-21.8	-21.8
o/w official	0.0	0.0	-0.1			-0.3	-0.3	-0.3	-0.2	-0.2	-0.2		0.0	0.0	
Other current account flows (negative = net inflow)	-1.2	-1.4	-1.4			-9.4	-1.9	-2.1	-2.3	-2.2	-2.2		-1.7	-1.6	
Net FDI (negative = inflow)	-4.9	-5.7	-7.1	-3.5	3.4	-9.3	-4.1	-6.5	-7.0	-6.0	-6.1		-6.9	-7.2	-6.7
Endogenous debt dynamics 2/	-3.5	-1.1	-3.7			0.4	0.5	0.1	0.4	0.4	0.4		0.2	0.1	
Contribution from nominal interest rate	0.2	0.2	0.4			0.5	0.6	0.9	1.0	1.0	1.0		0.5	0.4	
Contribution from real GDP growth	-0.1	0.6	-0.7			-0.1	-0.1	-0.7	-0.6	-0.6	-0.6		-0.3	-0.2	
Contribution from price and exchange rate changes	-3.6	-1.9	-3.3			1.1	-0.7	-0.3	-0.5	-0.6	-0.6		-0.4	...	
Residual (3-4) 3/	-2.5	-4.6	-1.5			4.8	-7.9	-2.6	-3.7	-2.5	-2.5		-0.2	0.6	
o/w exceptional financing	-2.9	-4.7	-2.6			-11.6	-12.9	-12.8	-7.0	-5.8	-5.3		-3.5	-3.6	
PV of external debt 4/	...	...	30.0			33.8	38.2	42.4	42.9	42.1	40.8		16.5	11.3	
In percent of exports	...	...	207.8			262.1	286.8	304.0	307.7	302.5	293.1		118.4	80.9	
PV of PPG external debt	...	...	26.5			31.3	36.9	42.4	42.9	42.1	40.8		16.5	11.3	
In percent of exports	...	...	183.5			242.7	277.4	304.0	307.7	302.5	293.1		118.4	80.9	
In percent of government revenues	...	...	105.2			140.9	164.6	187.6	181.4	171.4	165.3		64.2	43.4	
Debt service-to-exports ratio (in percent)	19.8	24.7	17.5			19.6	26.0	23.2	23.6	20.0	23.6		23.6	13.4	
PPG debt service-to-exports ratio (in percent)	10.8	13.4	10.0			11.0	17.8	15.6	16.3	13.0	16.7		19.3	10.0	
PPG debt service-to-revenue ratio (in percent)	6.1	5.9	5.7			6.4	10.5	9.6	9.6	7.3	9.4		10.4	5.4	
Total gross financing need (Billions of U.S. dollars)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Non-interest current account deficit that stabilizes debt ratio	11.0	11.4	12.3			4.1	11.4	8.9	10.4	8.1	8.2		6.9	6.4	
Key macroeconomic assumptions															
Real GDP growth (in percent)	0.3	-1.7	2.6	1.8	2.0	0.4	0.3	2.3	1.7	1.7	1.7	1.4	1.7	1.7	1.7
GDP deflator in US dollar terms (change in percent)	10.3	5.7	11.3	3.6	9.7	-3.7	2.4	1.0	1.4	1.8	1.9	0.8	2.9	2.9	2.9
Effective interest rate (percent) 5/	0.7	0.7	1.2	1.0	0.3	1.8	2.0	2.7	2.9	2.8	3.0	2.5	3.0	2.7	2.9
Growth of exports of G&S (US dollar terms, in percent)	2.6	-19.8	50.6	5.0	26.4	-13.6	5.8	8.2	3.2	3.5	3.6	1.8	4.7	4.7	4.7
Growth of imports of G&S (US dollar terms, in percent)	11.7	-6.1	22.1	7.5	17.5	-4.3	-0.7	1.9	0.3	-4.8	2.9	-0.8	4.7	4.7	4.7
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	30.4	43.9	44.0	47.8	61.0	61.0	48.0	52.0	48.0	54.0
Government revenues (excluding grants, in percent of GDP)	25.1	24.8	25.2			22.2	22.4	22.6	23.6	24.6	24.7		25.7	26.0	25.9
Grant-equivalent financing (in percent of GDP) 8/	...	3.8	1.3			8.0	11.6	11.5	6.3	4.3	4.0		2.1	1.4	2.1
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			67.5	61.5	62.0	75.4	90.2	89.5		74.3	60.0	74.8
Memorandum items:															
Nominal GDP (Billions of US dollars)	0.3	0.3	0.3			0.3	0.3	0.3	0.4	0.4	0.4		0.6	0.8	
Nominal dollar GDP growth	10.7	3.9	14.2			-3.2	2.6	3.3	3.2	3.5	3.6	2.2	4.7	4.7	4.7

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 PV of private sector debt is equivalent to its face value.
5/ Current-year interest payments divided by previous period debt stock.
6/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.
7/ Defined as grants, concessional loans, and debt relief.
8/ Grant-equivalent financing includes grants provided directly to the government and through new borrowing (difference between the face value and the PV of new debt).

Table 1b.Tonga: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2008-2028
(In percent)

						Projections						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2028
PV of debt-to GDP ratio												
Baseline	31	37	42	43	42	41	39	36	33	30	28	11
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2008-2028 1/	31	31	33	32	30	29	27	24	21	19	17	7
A2. New public sector loans on less favorable terms in 2008-2028 2	31	41	50	52	51	50	48	46	44	41	39	25
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	31	37	44	44	43	42	40	37	34	31	29	12
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	31	38	47	47	47	45	43	41	38	35	32	14
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	31	40	50	50	49	48	45	42	39	36	33	13
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	31	38	46	47	46	45	43	40	37	34	32	13
B5. Combination of B1-B4 using one-half standard deviation shocks	31	38	49	49	49	47	45	42	39	36	33	14
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	31	52	60	61	60	58	55	51	47	43	39	16
PV of debt-to-exports ratio												
Baseline	243	277	304	308	302	293	278	259	238	218	199	81
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2008-2028 1/	243	235	240	228	218	205	190	173	153	135	118	48
A2. New public sector loans on less favorable terms in 2008-2028 2	243	310	358	371	369	362	348	331	313	295	278	181
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	243	277	304	308	303	293	278	259	238	218	200	81
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	243	390	625	632	623	606	577	542	503	465	431	184
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	243	277	304	308	303	293	278	259	238	218	200	81
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	243	286	332	336	331	321	306	287	266	246	227	96
B5. Combination of B1-B4 using one-half standard deviation shocks	243	322	446	452	445	432	411	385	357	329	304	129
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	243	277	304	308	303	293	278	259	238	218	200	81
PV of debt-to-revenue ratio												
Baseline	141	165	188	181	171	165	151	140	129	118	108	43
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2008-2028 1/	141	139	148	134	123	116	103	93	83	73	64	26
A2. New public sector loans on less favorable terms in 2008-2028 2	141	184	221	219	209	204	188	179	169	160	151	97
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	141	165	193	187	176	170	155	144	133	122	111	45
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	141	172	208	201	190	184	168	158	147	136	126	53
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	141	179	220	213	201	194	177	164	151	139	127	51
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	141	170	205	198	187	181	166	155	144	133	123	52
B5. Combination of B1-B4 using one-half standard deviation shocks	141	171	217	209	198	192	175	164	152	140	130	54
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	141	233	266	257	243	234	213	199	183	167	153	62

Table 1b.Tonga: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2008-2028 (continued)
(In percent)

	Debt service-to-exports ratio											
Baseline	11	18	16	16	13	17	20	23	25	25	23	10
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2008-2028 1/	11	17	14	14	11	14	16	20	21	21	19	6
A2. New public sector loans on less favorable terms in 2008-2028 2	11	18	17	20	17	21	27	27	25	27	27	16
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	11	18	16	16	13	17	20	23	25	25	23	10
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	11	24	29	31	25	32	37	44	48	46	43	21
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	11	18	16	16	13	17	20	23	25	25	23	10
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	11	18	16	17	13	17	20	24	26	25	23	11
B5. Combination of B1-B4 using one-half standard deviation shocks	11	20	21	23	18	23	27	32	35	34	31	15
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	11	18	16	16	13	17	20	23	25	25	23	10
	Debt service-to-revenue ratio											
Baseline	6	11	10	10	7	9	11	13	14	13	12	5
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2008-2028 1/	6	10	9	8	6	8	9	11	11	11	10	3
A2. New public sector loans on less favorable terms in 2008-2028 2	6	11	11	12	10	12	14	15	14	15	15	8
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	6	11	10	10	8	10	11	13	14	14	13	6
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	6	11	10	10	8	10	11	13	14	14	13	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	6	11	11	11	9	11	12	15	16	16	14	6
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	6	11	10	10	8	10	11	13	14	14	13	6
B5. Combination of B1-B4 using one-half standard deviation shocks	6	11	10	11	8	10	12	14	15	14	13	6
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	6	15	14	14	10	13	15	18	19	19	17	8
Memorandum item:												
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	54	54	54	54	54	54	54	54	54	54	54	54

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 2a.Tonga: Public Sector Debt Sustainability Framework, Baseline Scenario, 2005-2028
(In percent of GDP, unless otherwise indicated)

	Actual			Average	Standard Deviation	Estimate	Projections							
	2005	2006	2007			2008	2009	2010	2011	2012	2013	2008-13 Average	2028	2014-28 Average
Public sector debt 1/	39.8	37.3	34.4			36.4	39.8	43.3	43.9	40.9	37.6		16.5	
o/w foreign-currency denominated	29.1	27.4	25.4			28.3	32.3	36.1	35.4	33.2	30.6		14.5	
Change in public sector debt	-3.4	-2.5	-3.0			2.0	3.5	3.5	0.6	-3.0	-3.3		-0.2	
Identified debt-creating flows	-0.8	-4.0	-4.5			-2.8	4.1	1.8	0.7	-0.9	-1.0		-0.3	
Primary deficit	2.3	-1.5	-2.4	-0.5	1.6	-2.3	2.7	2.0	0.7	-0.5	-0.7	0.3	-0.1	-0.4
Revenue and grants	26.8	28.6	26.5			28.6	28.3	28.5	28.0	28.1	28.0		26.5	
of which: grants	1.7	3.8	1.3			6.3	5.9	6.0	4.4	3.5	3.3		0.5	1.3
Primary (noninterest) expenditure	29.1	27.1	24.1			26.3	31.0	30.6	28.7	27.6	27.3		26.4	
Automatic debt dynamics	-3.3	-2.5	-2.1			-0.5	1.4	-0.2	0.1	-0.4	-0.3		-0.2	
Contribution from interest rate/growth differential	-1.9	0.3	-1.1			0.0	0.3	-0.3	-0.1	-0.4	-0.2		0.1	
of which: contribution from average real interest rate	-1.8	-0.4	-0.2			0.2	0.4	0.6	0.6	0.4	0.5		0.4	
of which: contribution from real GDP growth	-0.1	0.7	-0.9			-0.2	-0.1	-0.9	-0.7	-0.8	-0.7		-0.3	
Contribution from real exchange rate depreciation	-1.4	-2.8	-1.0			-0.6	1.1	0.1	0.2	0.0	-0.1		...	
Other identified debt-creating flows	0.2	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	
Recognition of implicit or contingent liabilities	0.2	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	
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	
Residual, including asset changes	-2.6	1.5	1.5			4.8	-0.6	1.6	-0.1	-2.1	-2.4		0.1	
Other Sustainability Indicators														
PV of public sector debt	10.7	10.0	36.1			37.9	44.3	49.1	50.8	49.2	47.0		13.0	
o/w foreign-currency denominated	0.0	0.0	27.2			29.9	36.8	41.9	42.3	41.5	40.0		11.1	
o/w external	...	...	27.2			29.9	36.8	41.9	42.3	41.5	40.0		11.1	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	
Gross financing need 2/	5.4	1.4	0.5			0.7	6.7	5.9	4.6	2.8	3.2		2.0	
PV of public sector debt-to-revenue and grants ratio (in percent)	40.1	34.9	136.1			132.6	156.4	171.9	181.1	174.9	167.9		49.2	
PV of public sector debt-to-revenue ratio (in percent)	42.8	40.2	143.3			170.5	197.6	217.3	214.9	200.1	190.2		50.2	
o/w external 3/	...	...	107.9			134.4	164.1	185.6	179.2	168.7	162.0		42.7	
Debt service-to-revenue and grants ratio (in percent) 4/	11.4	10.3	10.9			10.4	14.0	13.5	13.9	11.8	14.1		7.9	
Debt service-to-revenue ratio (in percent) 4/	12.2	11.9	11.5			13.4	17.7	17.0	16.5	13.5	15.9		8.1	
Primary deficit that stabilizes the debt-to-GDP ratio	5.7	0.9	0.6			-4.3	-0.8	-1.4	0.1	2.5	2.6		0.1	
Key macroeconomic and fiscal assumptions														
Nominal GDP (local currency)	0.6	0.6	0.6			0.7	0.7	0.8	0.8	0.8	0.9		2.8	
Real GDP growth (in percent)	0.3	-1.7	2.6	1.8	2.0	0.4	0.3	2.3	1.7	1.7	1.7	1.4	1.7	1.7
Average nominal interest rate on forex debt (in percent)	0.9	0.9	1.5	1.1	0.2	2.1	2.2	2.8	2.9	2.8	3.0	2.6	2.7	2.9
Average real interest rate on domestic debt (in percent)	-10.7	-2.9	-1.8	-3.0	4.6	-0.2	3.6	5.1	4.8	1.6	2.9	3.0	5.4	4.4
Real exchange rate depreciation (in percent, + indicates depreciation)	-4.6	-9.3	-3.8	-2.9	12.2	-2.2	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	14.3	5.4	5.8	6.9	3.5	5.6	3.0	3.3	4.0	5.0	6.0	4.5	6.0	6.0
Growth of real primary spending (deflated by GDP deflator, in percent)	0.4	-0.1	-0.1	0.0	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grant element of new external borrowing (in percent)	...	...	...	...	...	30.4	43.9	44.0	47.8	61.0	61.0	48.0	48.0	...

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

1/ [Indicate coverage of public sector, e.g., general government or nonfinancial public sector. Also whether net or gross debt is used.]

2/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period.

3/ Revenues excluding grants.

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

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

Table 2b. Tonga: Sensitivity Analysis for Key Indicators of Public Debt 2008-2028

	Projections							
	2008	2009	2010	2011	2012	2013	2018	2028
PV of Debt-to-GDP Ratio								
Baseline	38	44	49	51	49	47	32	13
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	38	41	44	44	43	41	26	6
A2. Primary balance is unchanged from 2008	38	41	42	42	39	36	22	7
A3. Permanently lower GDP growth 1/	38	45	50	52	51	49	38	36
A4. Alternative Scenario :Additional infrastructure borrowing	38	43	49	51	54	55	43	23
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	38	45	51	54	53	51	38	26
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	38	43	47	49	47	45	29	11
B3. Combination of B1-B2 using one half standard deviation shocks	38	42	46	48	46	44	30	13
B4. One-time 30 percent real depreciation in 2009	38	60	65	68	67	65	48	27
B5. 10 percent of GDP increase in other debt-creating flows in 2009	38	53	58	60	58	56	41	22
PV of Debt-to-Revenue Ratio 2/								
Baseline	133	156	172	181	175	168	116	49
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	133	145	153	158	152	145	95	24
A2. Primary balance is unchanged from 2008	133	143	147	149	139	129	81	25
A3. Permanently lower GDP growth 1/	133	157	174	185	181	176	140	135
A4. Alternative Scenario :Additional infrastructure borrowing	133	153	188	205	214	209	145	79
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	133	157	178	190	186	181	140	97
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	133	152	165	173	167	160	108	41
B3. Combination of B1-B2 using one half standard deviation shocks	133	148	160	170	164	158	109	50
B4. One-time 30 percent real depreciation in 2009	133	212	228	241	237	232	177	103
B5. 10 percent of GDP increase in other debt-creating flows in 2009	133	188	203	213	208	201	150	82
Debt Service-to-Revenue Ratio 2/								
Baseline	10	14	13	14	12	14	16	8
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	10	14	13	13	11	13	15	5
A2. Primary balance is unchanged from 2008	10	14	13	13	10	12	14	4
A3. Permanently lower GDP growth 1/	10	14	14	14	12	14	17	13
A4. Alternative Scenario :Additional infrastructure borrowing	10	14	15	16	13	16	18	12
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	10	14	14	14	12	15	17	11
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	10	14	13	14	11	14	16	7
B3. Combination of B1-B2 using one half standard deviation shocks	10	14	13	13	11	14	16	7
B4. One-time 30 percent real depreciation in 2009	10	16	17	18	15	18	22	15
B5. 10 percent of GDP increase in other debt-creating flows in 2009	10	14	15	16	13	16	18	12

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

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

2/ Revenues are defined inclusive of grants.