INTERNATIONAL MONETARY FUND
INTERNATIONAL DEVELOPMENT ASSOCIATION

BHUTAN

Joint IMF/World Bank Debt Sustainability Analysis 2009[1]

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

Approved by Laura Papi and Dhaneshwar Ghura (IMF)
Carlos Primo Braga and Ernesto May (IDA)

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Bhutan's external and public debt dynamics are analyzed within the IMF-World Bank Debt Sustainability Framework for Low Income Countries (LIC-DSA).[2] Bhutan's rapid hydropower development will lead to a substantial buildup of external debt, with debt ratios breaching some of the country-specific LIC-DSA indicative thresholds. However, given the commercial viability of the hydropower projects, Bhutan's strong track record of project implementation, committed donor support and its high level of international reserves, staff's assessment is that the external debt dynamics continue to be subject to a moderate risk of distress. Nevertheless, the results of the DSA underscore the importance of containing domestically financed fiscal deficits and sustaining economic growth going forward to ensure a declining debt profile.

I. BACKGROUND

1. **Bhutan's public and publicly guaranteed debt declined to 69 percent of GDP at end 2008/09, 19 percentage points of GDP below its 2003/04 peak.**[3],[4] The sharp decline in public debt was driven by the completion of the Tala hydropower project that was financed

[1] This DSA was prepared jointly by the IMF and the World Bank, in consultation with the Asian Development Bank, and in accordance with the Debt Sustainability Framework for low-income countries approved by the Executive Boards of the IMF and the IDA. The data underlying the analysis are from the Bhutanese authorities and IMF and World Bank staff estimates.

[2] See "Debt Sustainability in Low-Income Countries: Proposals for an Operational Framework and Policy Implications" (http://www.imf.org/external/np/pdr/sustain/2004/020304.htm), "Debt Sustainability in Low-Income Countries: Further Considerations on an Operational Framework and Policy Implications" (http://www.imf.org/external/np/pdr/sustain/2004/091004.htm) and reference to "Staff Guidance Note on the Application of the Joint Bank-Fund Debt Sustainability Framework for Low-Income Countries."

[3] Fiscal year starting July 1.

[4] Public debt does not include state-owned enterprise debt, with the exception of hydropower projects loans and the purchase of one aircraft for state-owned Druk Air in 2004/05.

by India, which boosted economic output by 20 percent in 2007, and by the onset of the repayment of the associated rupee debt. Reflecting the favorable fiscal outturns in recent years, domestic debt, all denominated in local currency and held by domestic financial institutions, has also declined.[5] External debt, which accounts for more than 97 percent of total public debt, continues to be dominated by the mostly Indian rupee-denominated hydropower sector debt (36 percent of GDP and 54 percent of external debt). Convertible currency debt, accounting for 44 percent of external debt, declined to 29 percent of GDP.[6] The actual outturn of public debt indicators for 2007/08 and 2008/09 was slightly more favorable than projected in the previous DSA, as better than expected fiscal balances compensated for the more rapid accumulation in rupee debt and the downward revision of historical nominal GDP figures.

Bhutan: Structure of Public Sector Debt
(In percent of GDP)

	03/04	04/05	05/06	06/07	07/08	08/09
Total debt	87.6	87.4	86.8	75.6	66.6	68.7
Domestic debt	6.8	7.8	4.7	3.5	2.7	2.1
External debt	80.9	79.6	82.1	72.0	63.9	66.6
Of which: hydropower projects	55.6	55.9	56.2	47.7	39.2	36.0
Of which: convertible currency debt	33.0	31.5	33.1	30.7	27.3	29.1

Source: Royal Monetary Authority of Bhutan; and staff estimates.

II. Underlying Debt Sustainability Analysis Assumptions

2. **Under the baseline scenario, Bhutan pursues its planned expansion in its power generation capacity.**[7] In addition to the Punatsangchu I and Dagachu projects, included in the 2007 DSA, the baseline scenario incorporates two new hydropower projects, Punatsangchu II and Mangdechu.[8] Both projects will be financed by the Government of India

[5] Domestic debt data compiled by the Royal Government of Bhutan include fixed rate debt relating to the purchase of one airplane for state-owned Druk Air in 2004/05, amounting to about half of total domestic debt.

[6] Convertible currency debt mainly comprises loans from multilateral institutions, including $9½ million commercial debt extended by the IFC, making all external debt public or publicly guaranteed.

[7] The new hydropower development policy of Bhutan outlines 10 potential hydropower projects, which would quintuple Bhutan's power generation capacity by adding further 10,000 MW of installed capacity by 2020 out of the estimated potential capacity of 23,760 MW. However, since most of these projects are at early stages of conception, they are not included in the projections.

[8] Puna II's power generation capacity will be 992 MW, while Mangdechu's will be 672 MW. The financing terms for both projects are yet to be finalized, however they are expected to be similar to Puna I's with 30 percent grants, and 70 percent loan in Indian rupees at 11 percent interest rate from the GOI . Debt service will begin after the commissioning of the projects and will continue for 12 years. Similar to Tala and Puna I, the interest payments accumulated during construction are expected to be repaid after the project completion without being capitalized.

(GOI) through a combination of loans and grants.[9] The intergovernmental agreements are expected to be finalized and signed by end-2009 and project disbursements to begin in 2009/10. Repayments will start after the projects come on stream in 2019. External financing for non-hydropower sector activities is expected to remain predominantly from multilateral and bilateral donors at concessional terms.

Bhutan: Major Hydropower Projects

	Date of Commissioning	Installed Capacity	Total Costs 1/	Financing 2/	Internal Rate of Return 3/
		(MW)	(Percent of GDP)		(In percent)
Chukha	1986, 1988	336	15	GOI: 60 percent grant; 40 percent loan (9 percent interest)	16.9%
Tala	2006	1020	81	GOI: 60 percent grant; 40 percent loan (9 percent interest)	11.9%
Punatsangchu I 4/	2016	1095	68	GOI: 40 percent grant; 60 percent loan (10 percent interest)	13.7%
Mangdechu 4/	2019	672	70	GOI: 30 percent grant; 70 percent loan (11 percent interest)	14.3%
Punatsangchu II	2019	992	97	GOI: 30 percent grant; 70 percent loan (11 percent interest)	11.0%

Sources: Department of Energy; and IMF staff calculations.

1/ In 2007 prices in percent of 2007 GDP.

2/ The financing for Puna II and Mangdechu is yet to be finalized. The table reflects the financing modalities assumed for the purpose of the DSA.

3/ Assuming 10 percent scrap value of total cost at the end of 35 years of commercial operation, annual operation and management cost at 1.5 percent of the total costs with 4 percent annual increase, and 15 percent spared for domestic sales.

4/ The projects' internal rates of return are provided by authorities.

3. **The hydropower sector will also govern the rest of the economy as summarized by the following key baseline macroeconomic assumptions**.

- ***Real sector***: Similar to the spike in real GDP when Tala was commissioned in 2006/07, Puna I, Mangdechu and Puna II will substantially boost economic growth as they come on stream in 2016/17, 2018/19 and 2019/20, respectively. In the interim, growth will be supported by the hydropower construction activities and the commissioning of Dagachu in 2013/14. Real growth excluding hydropower-related activity is projected to hover between 5-6 percent. Inflation is expected to remain in line with price developments in India, with the ngultrum pegged to the Indian rupee.

- ***Fiscal sector***: Upon completion, the hydropower projects will boost the domestic revenue-to-GDP ratio, which also benefits from a gradual broadening of the tax base and improvement in tax administration.[10] External budgetary aid, on the other hand, is

[9] Although strictly speaking the financing of hydropower projects is non-concessional (i.e., below the usual 35% grant element for LICs), there is a certain level of concessionality stemming from the grant portion of financing and the exemption from payment of interest during construction. In addition, as discussed in footnote 11, a higher discount rate to calculate the present value of the rupee loans may be appropriate in view of the higher inflation and risk-free long-term interest rates in India, which would further raise the grant element of these loans.

[10] Measures to broaden the tax base and improve administration include rationalizing sales and customs tax rates, broadening the sales tax base and eventually introducing the VAT. Further domestic revenue improvements could be achieved by harmonizing the direct income tax rates and limiting tax holidays.

projected to decline sharply as a share of GDP as Bhutan's per capita income rises. On average, the overall fiscal deficit remains broadly balanced over the long term.

- ***External sector***: The current account is projected to deteriorate over the medium term due to Tala's debt service and the higher import demand associated with the construction phase of the new hydropower projects. In the long run, as electricity exports more than quadruple, the power sector contributes to balance of payment surpluses.

Key Macroeconomic Assumptions

	Baseline		10 year Historical Average
	2009/10 - 2014/15	2015/16 - 2029/30	
Real GDP growth (percent)	6.6	5.9	8.1
Growth of exports of goods and services (US dollar terms)	3.7	7.0	2.0
Non-interest current account deficit (in percent of GDP)	16.0	-3.1	9.9
Primary deficit (in percent of GDP)	-0.8	-5.1	2.2

III. External Debt Sustainability Analysis

A. Baseline

4. **Bhutan's external debt will continue to trace the cycles of the hydropower sector**. The PV of external debt as a share of GDP is projected to rise by 47 percentage points between 2009/10 and 2014/15 as disbursements for new hydropower projects pick up.[11] The debt ratios remain above the LIC-DSA indicative threshold for strong policy performance countries until 2022/23 for the PV of external debt to GDP, and until 2017/18–2019/20 for the PV of external debt as a share of exports and revenue.[12] The commissioning of the new hydropower projects, which also marks the start of the debt repayment, puts the debt ratios on a steady downward trajectory.

5. **The debt service-to-export ratio is expected to remain below the indicative thresholds for the entire projection period.** The debt service-to-revenue ratio may

[11] The PV of external debt is calculated assuming the standard discount rate of 4 percent for both rupee and convertible currency debt. Using a discount rate for rupee denominated debt of 11.25 percent in view of the higher inflation and risk-free long-term interest rates in India, lowers the various PV of debt ratios substantially: the PV of debt-to-GDP ratio peaks at 89 percent, while the PV of debt-to-revenue ratio peaks at 430 percent in 2014/15. The PV of debt-to-exports ratio remains below the indicative threshold.

[12] Bhutan, with an average 2006-08 Country Policy and Institutional Assessment (CPIA) index of 3.86, is currently classified as a strong performer with regard to its policies and institutions. The indicative thresholds for strong performers are 50, 200 and 300 for the PV of debt in percent of GDP, exports, and revenue respectively, and 25 and 35 for debt service in percent of exports and revenue.

temporarily breach the indicative threshold as Puna II and Mangdechu's debt service begins; however, it is expected to remain below the threshold for the rest of the projection period. The high level of foreign reserves, projected to average 10 months of imports and 50 percent of GDP over the period when indicative thresholds are breached (i.e. 2009/10-2023/24), provides further cushion in the unlikely event of debt repayment difficulties.

B. Sensitivity Analysis

6. **Bhutan's external debt profile is sustainable under most alternative scenarios.** While the debt ratios are most vulnerable to exchange rate and export growth shocks, as well as unfavorable financing terms, under almost all alternative scenarios considered the debt ratios decline over time, and eventually fall below the thresholds. In case of a 30 percent nominal depreciation in 2009/10, the PV of debt rises to more than 170 percent of GDP and 835 percent of revenue. The debt service-to-revenue ratio is also negatively impacted. However, the exchange rate shock overestimates Bhutan's debt vulnerability since a large share of Bhutan's receipts are in Indian rupees which act as a natural hedge to the rupee-denominated debt.[13] The export growth shock and higher financing terms for new public sector borrowing also increase the various debt ratios.

IV. Public Debt Sustainability Analysis

A. Baseline

7. **The baseline public debt dynamics follows closely that of the external debt**. The public debt-to-GDP ratio is expected to rise until the commissioning of the new hydropower projects and then rapidly decline until it reaches 32 percent of GDP by end 2029/30. In light of Bhutan's strong economic performance, external financing is projected to shrink as a share of GDP, making room for domestic financial markets to play a larger role in financing the development agenda. Domestic debt is projected to reach about 11 percent of GDP by 2015/16 and be contained below that level as share of GDP for the remainder of the projection period.

B. Sensitivity Analysis

8. **The public debt ratios remain on a declining path over the long term under various stress tests**. Not surprisingly, given the large share of external debt in total public debt and the analysis above, overall public debt is most vulnerable to shocks to the exchange rate. A one time depreciation results in an upward shift in the various public debt indicators without affecting the shape of the debt indicators' path. However, the sensitivity analysis suggests that under a historical scenario, public sector debt will rise and remain at an elevated

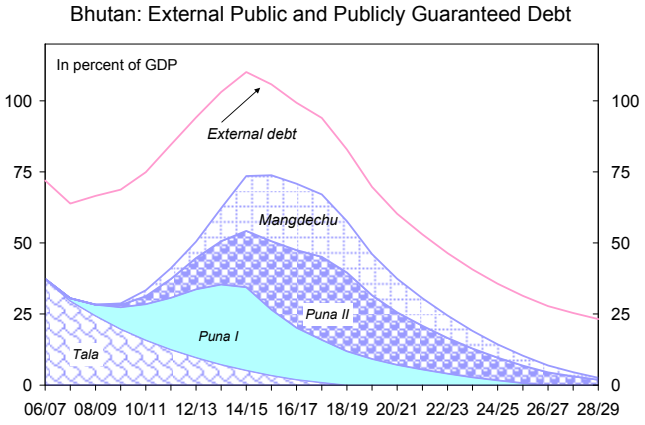
[13] Staff estimates that rupee denominated revenues will account for more than 40 percent of the non-grant fiscal revenue over the projection period.

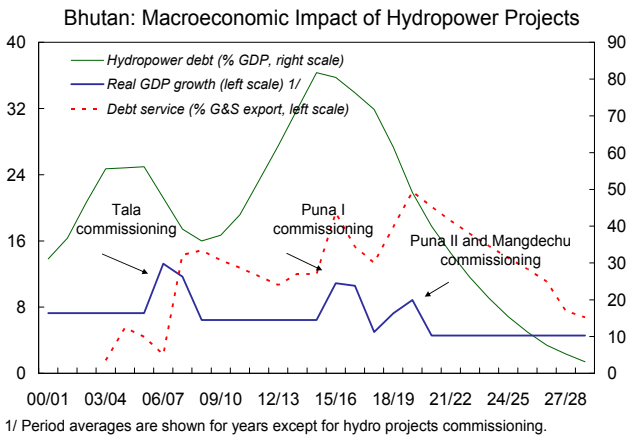
level over the long-term. This scenario, which assumes a constant primary deficit of 2.2 percent of GDP (compared to the projected primary surplus of 3.8 percent of GDP over the 20 year period), underscores the importance of containing fiscal deficits to ensure the sustainability of public debt.

V. Staff Assessment

9. **The assessment made in the 2007 IMF/World Bank Joint DSA—that Bhutan's debt dynamics are sustainable but subject to a moderate risk of distress—still holds**.

- The addition of the two new hydropower projects leads to a substantial build-up in external debt, relative to the analysis in the 2007 DSA. The policy-related LIC-DSA thresholds are breached for several of the indicators and remain breached for a longer period of time compared to the previous analysis. However, the additional projects bring strong economic dividends, boosting average real GDP growth and exports. Real GDP growth and growth of exports of goods and services are projected to average 6.2 percent and 11.2 percent respectively over 2013/14-2027/28, compared to 5.2 percent and 8.6 percent in the 2007 IMF/World Bank Joint DSA.[14] Moreover, despite the large increase in the stock of debt, the addition of the new hydropower projects does not bring in substantial vulnerabilities with regards to debt servicing.





- Furthermore, the mitigating factors that were highlighted in the 2007 assessment remain valid, namely:

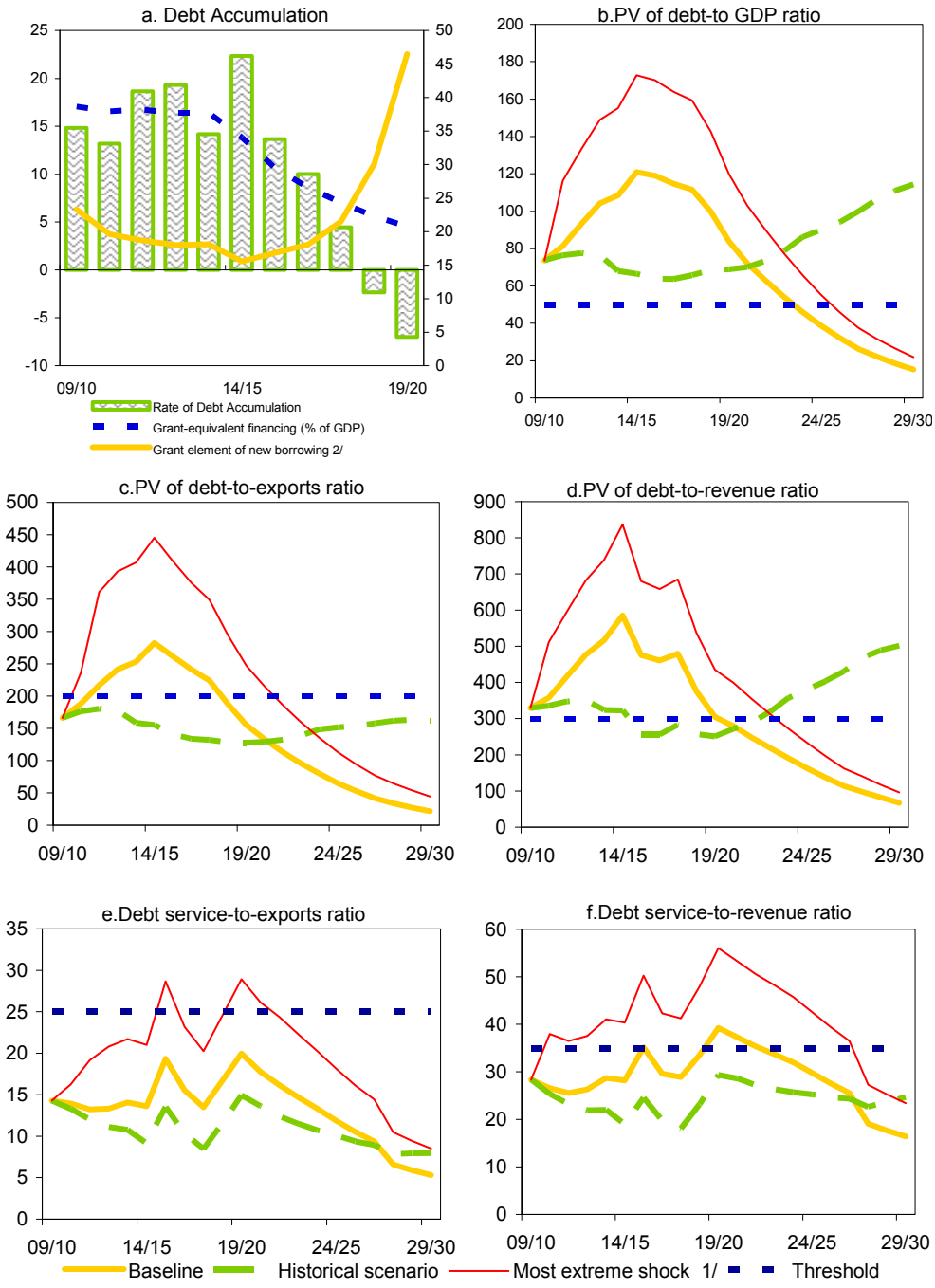
[14] Focusing on the average growth over a 20 year period, which appears little affected by the addition of the new hydropower projects, understates the economic impact of these projects. At commissioning, these projects will generate large spikes in real GDP growth, boost incomes and exports; however, with generation capacity fixed, the impact on growth after commissioning will be limited.

- Bhutan has a strong track record of project implementation as detailed in the 2007 DSA suggesting that the new hydropower projects are subject to low implementation risk.

- The new hydropower projects are commercially viable. Puna I is expected to have smaller real costs of construction than Tala for a larger generation capacity, leading to a higher internal rate of return. Similarly Puna II and Mangdechu are expected to have a solid internal rate of return of about 11-14 percent.

- Bhutan maintains close economic and political ties with India which mitigate the commercial risks of these projects. India has been both the main provider of financing for hydropower projects and the main consumer of the projects' output. Going forward, India's favorable economic outlook and its sizeable power deficit will continue to support the demand for Bhutan's hydropower. This is reflected in India's commitment to developing 10,000 MW of hydropower in Bhutan by the year 2020 and its pledge of Rs 100 billion support over the 10^{th} Plan Period.

Figure I.1. Bhutan: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2009/10-2029/30 1/

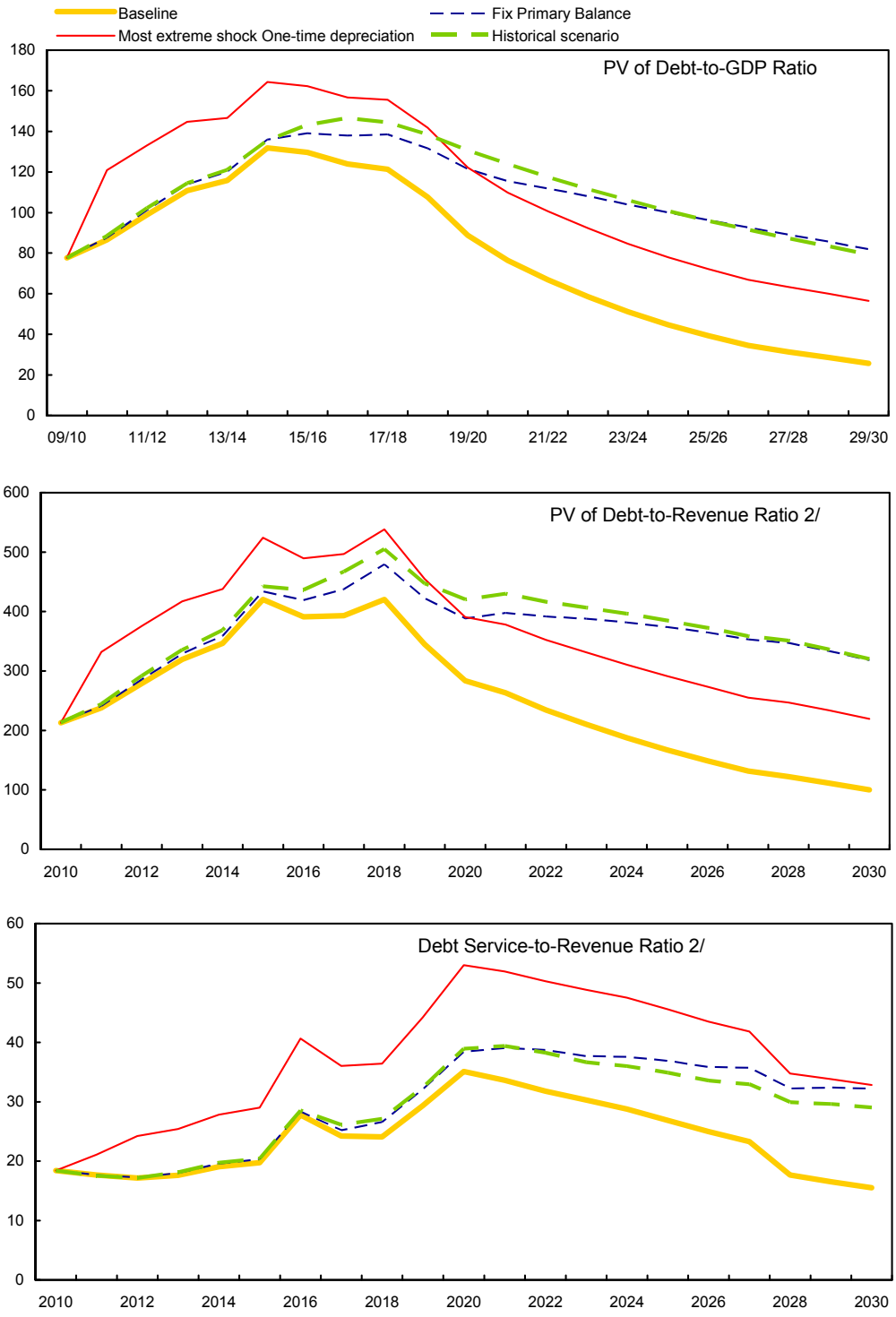


Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2019/20. 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 figure f. to a One-time depreciation shock

2/ The shape of the grant element of new borrowing reflects the composition of new loans. Under the standard DSA assumptions, rupee debt appears nonconcessional since its interest rate of 11 percent exceeds the 4 percent discount rate. Thus, until 2018/19, when rupee disbursements dominate external financing, the grant element seems low. However, it starts rising once the rupee financed hydropower projects are completed, and concessional loans from multilateral and bilateral development partners take stage.

Figure I.2.Bhutan: Indicators of Public Debt Under Alternative Scenarios, 2009/10-2029/30 1/



Sources: Country authorities; and staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest ratio in 2019/20.
2/ Revenues are defined inclusive of grants.

Table I.1. Bhutan: External Debt Sustainability Framework, Baseline Scenario, 2006/07-2029/30 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average	Standard Deviation	Projections									
												2009/10-2014/15			2015/16-2029/30
	2006/07	2007/08	2008/09			2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	Average	2018/19	2029/30	Average
External debt (nominal) 1/	72.0	63.9	66.6			68.8	74.9	84.6	94.1	103.1	110.1		69.7	21.8	
Convertible currency debt	23.0	22.6	29.9			31.3	38.2	44.3	47.0	47.4	44.2		12.1	19.2	
Rupee debt	49.0	41.3	36.6			37.4	36.7	40.2	47.1	55.7	65.9		57.7	2.6	
Power sector debt	56.2	47.7	42.3			42.9	43.7	48.7	57.5	66.4	75.2		61.5	3.2	
Change in external debt	-10.1	-8.2	2.7			2.2	6.1	9.7	9.6	8.9	7.1		-13.2	-1.5	
Identified net debt-creating flows	-35.4	-15.8	13.2			2.1	8.5	14.1	15.7	17.2	16.8		-7.8	-3.6	
Non-interest current account deficit	-15.7	-1.3	7.2	9.9	13.9	4.3	11.3	17.2	19.3	22.3	21.8	16.0	-5.6	-4.0	-3.1
Deficit in balance of goods and services	-4.9	8.7	14.6			15.2	21.4	26.9	28.5	31.0	28.9		-5.7	-4.4	
Exports	62.9	51.0	42.6			44.4	43.3	43.0	43.1	42.9	42.8		54.1	70.6	
Imports	58.0	59.6	57.2			59.6	64.8	69.9	71.7	73.9	71.7		48.4	66.1	
Net current transfers (negative = inflow)	-9.5	-9.1	-7.8	-8.9	1.8	-10.8	-10.2	-9.6	-9.3	-8.9	-6.9		1.0	2.0	0.8
o/w official	-14.8	-12.6	-12.7			-15.8	-15.2	-14.7	-14.3	-13.9	-12.0		-4.2	-3.3	
Other current account flows (negative = net inflow)	-1.3	-0.9	0.4			-0.2	0.1	-0.1	0.0	0.2	-0.2		-1.0	-1.5	
Net FDI (negative = inflow)	-7.3	-2.3	-1.5	-1.4	2.2	-1.4	-1.4	-1.4	-1.4	-1.3	-1.2		-0.8	-0.4	-0.7
Endogenous debt dynamics 2/	-12.4	-12.1	7.5			-0.7	-1.4	-1.7	-2.2	-3.8	-3.7		-1.4	0.8	
Contribution from nominal interest rate	1.3	3.4	3.0			3.2	2.9	2.8	2.6	2.4	2.3		5.2	1.8	
Contribution from real GDP growth	-9.1	-6.6	-3.9			-3.9	-4.3	-4.5	-4.8	-6.2	-6.0		-6.6	-1.0	
Contribution from price and exchange rate changes	-4.6	-8.9	8.5			…	…	…	…	…	…		…	…	
Residual (3-4) 3/	25.3	7.6	-10.6			0.1	-2.3	-4.5	-6.1	-8.3	-9.8		-5.4	2.1	
o/w exceptional financing	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
PV of external debt 4/	...	...	68.4			73.6	81.4	93.3	104.2	108.5	120.9		83.8	15.3	
Convertible currency debt	...	...	21.0			21.3	30.7	36.7	38.1	32.5	39.1		1.7	10.3	
Rupee debt	...	...	47.5			52.3	50.6	56.6	66.1	76.0	81.8		82.1	5.0	
Power sector debt	...	...	51.8			56.9	56.8	64.1	75.4	86.3	90.6		85.9	5.6	
In percent of exports	...	...	160.5			165.8	187.9	216.8	241.5	253.1	282.2		155.0	21.7	
In percent of government revenues	...	...	278.5			329.1	357.9	418.4	476.4	517.0	585.5		304.8	67.1	
Debt service-to-exports ratio (in percent)	3.8	14.2	15.0			14.3	13.9	13.2	13.3	14.1	13.6		20.0	5.3	
PPG debt service-to-revenue ratio (in percent)	10.5	30.4	26.1			28.4	26.6	25.5	26.3	28.7	28.2		39.2	16.4	
Total gross financing need (Millions of U.S. dollars)	-207.6	46.2	144.8			124.2	230.2	332.9	395.1	493.9	521.4		141.9	-40.4	
Non-interest current account deficit that stabilizes debt ratio	-5.7	6.9	4.5			2.0	5.2	7.5	9.7	13.4	14.7		7.6	-2.5	
Key macroeconomic assumptions															
Real GDP growth (in percent)	13.2	11.7	5.7	8.1	2.6	6.6	6.7	6.4	6.2	7.1	6.3	6.6	8.9	4.5	5.9
GDP deflator in US dollar terms (change in percent)	5.9	14.1	-11.7	3.5	7.0	6.2	-0.1	0.8	1.8	1.8	1.8	2.1	1.8	1.8	1.8
Effective interest rate (percent) 5/	1.9	6.0	4.3	2.0	1.8	5.4	4.5	4.0	3.3	2.7	2.4	3.7	7.0	8.3	7.0
Growth of exports of G&S (US dollar terms, in percent)	74.2	3.1	-21.9	18.4	29.0	17.8	4.1	6.5	8.4	8.4	8.1	8.9	12.5	10.5	11.5
Growth of imports of G&S (US dollar terms, in percent)	16.9	31.0	-10.4	15.8	20.4	17.9	15.8	15.9	10.7	12.5	5.1	13.0	6.3	13.6	7.3
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	23.3	19.6	18.7	18.0	18.1	15.6	18.9	46.5	46.5	39.9
Government revenues (excluding grants, in percent of GDP)	22.7	23.8	24.6			22.4	22.7	22.3	21.9	21.0	20.6		27.5	22.8	24.4
Aid flows (in Millions of US dollars) 7/	166.0	184.6	202.3			361.3	411.8	501.5	547.8	621.8	610.0		174.9	276.7	
o/w Grants	135.8	147.0	135.8			191.5	197.0	203.6	214.2	227.8	211.7		122.9	179.2	
o/w Concessional loans	30.2	37.5	66.5			169.8	214.8	297.9	333.6	394.0	398.3		52.0	97.5	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			17.1	16.6	16.7	16.4	16.4	13.8		4.5	3.7	5.0
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			64.0	58.1	51.7	50.1	48.1	44.9		84.1	81.1	75.0
Memorandum items:															
Nominal GDP (Millions of US dollars)	1006.5	1282.4	1196.4			1354.2	1443.7	1548.6	1673.0	1825.6	1976.2		3253.1	6093.9	
Nominal dollar GDP growth	20.0	27.4	-6.7			13.2	6.6	7.3	8.0	9.1	8.2	**8.7**	10.8	6.4	7.8
PV of PPG external debt (in Millions of US dollars)			818.9			996.3	1175.0	1444.2	1743.2	1980.7	2388.5		2726.3	931.7	
(PVt-PVt-1)/GDPt-1 (in percent)						**14.8**	**13.2**	**18.6**	**19.3**	**14.2**	**22.3**	**17.1**	-7.0	-2.3	-1.6

Sources: Country authorities; and staff estimates and projections.

1/ Includes both public and private sector external debt.
2/ Derived as [r - g - ρ(1+g)]/(1+g+ρ+gρ) times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and ρ = growth rate of GDP deflator in U.S. dollar terms.
3/ Includes exceptional financing (i.e., changes in arrears and debt relief); changes in gross foreign assets; and valuation adjustments. For projections also includes contribution from price and exchange rate changes.
4/ Assumes that 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 I.2. Bhutan: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2009/10-2029/30
(In percent)

	Projections							
	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2018/19	2029/30
PV of debt-to GDP ratio								
Baseline	74	81	93	104	108	121	84	15
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009/10-2029/30 1/	74	76	78	77	68	67	69	114
A2. New public sector loans on less favorable terms in 2009/10-2029/30 2	74	85	103	118	125	139	109	38
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010/11-2011/12	74	82	95	106	111	123	85	16
B2. Export value growth at historical average minus one standard deviation in 2010/11-2011/12 3/	74	88	112	122	126	137	96	23
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010/11-2011/12	74	84	101	113	117	131	91	17
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010/11-2011/12 4/	74	87	103	114	118	130	90	19
B5. Combination of B1-B4 using one-half standard deviation shocks	74	85	101	112	116	128	89	18
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010/11 5/	74	116	133	149	155	173	120	22
PV of debt-to-exports ratio								
Baseline	166	188	217	242	253	282	155	22
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009/10-2029/30 1/	166	176	180	177	159	155	128	162
A2. New public sector loans on less favorable terms in 2009/10-2029/30 2	166	197	239	273	292	325	202	53
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010/11-2011/12	166	188	217	242	253	282	155	22
B2. Export value growth at historical average minus one standard deviation in 2010/11-2011/12 3/	166	236	361	393	407	445	247	45
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010/11-2011/12	166	188	217	242	253	282	155	22
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010/11-2011/12 4/	166	200	240	264	275	303	167	27
B5. Combination of B1-B4 using one-half standard deviation shocks	166	196	240	265	276	305	168	26
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010/11 5/	166	188	217	242	253	282	155	22
PV of debt-to-revenue ratio								
Baseline	329	358	418	476	517	586	305	67
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009/10-2029/30 1/	329	336	348	350	324	322	251	501
A2. New public sector loans on less favorable terms in 2009/10-2029/30 2	329	375	460	538	597	674	397	165
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010/11-2011/12	329	362	427	486	527	597	311	68
B2. Export value growth at historical average minus one standard deviation in 2010/11-2011/12 3/	329	386	503	559	599	666	350	100
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010/11-2011/12	329	370	453	515	559	633	330	73
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010/11-2011/12 4/	329	382	464	521	561	629	329	84
B5. Combination of B1-B4 using one-half standard deviation shocks	329	372	453	510	551	619	323	80
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010/11 5/	329	512	598	681	739	837	436	96

Table I.2.Bhutan: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2009/10-2029/30 (continued)
(In percent)

Debt service-to-exports ratio								
Baseline	14	14	13	13	14	14	20	5
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009/10-2029/30 1/	14	13	12	11	11	9	15	8
A2. New public sector loans on less favorable terms in 2009/10-2029/30 2	14	14	13	14	15	15	23	8
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010/11-2011/12	14	14	13	13	14	14	20	5
B2. Export value growth at historical average minus one standard deviation in 2010/11-2011/12 3/	14	16	19	21	22	21	29	8
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010/11-2011/12	14	14	13	13	14	14	20	5
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010/11-2011/12 4/	14	14	14	14	15	14	20	6
B5. Combination of B1-B4 using one-half standard deviation shocks	14	14	14	14	15	15	21	6
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010/11 5/	14	14	13	13	14	14	20	5
Debt service-to-revenue ratio								
Baseline	28	27	26	26	29	28	39	16
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009/10-2029/30 1/	28	25	23	22	22	19	29	25
A2. New public sector loans on less favorable terms in 2009/10-2029/30 2	28	27	26	27	31	32	45	24
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010/11-2011/12	28	27	26	27	29	29	40	17
B2. Export value growth at historical average minus one standard deviation in 2010/11-2011/12 3/	28	27	27	30	32	31	41	19
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010/11-2011/12	28	27	28	28	31	31	42	18
B4. Net non-debt creating flows at historical average minus one standard deviation in 2010/11-2011/12 4/	28	27	26	28	30	30	40	18
B5. Combination of B1-B4 using one-half standard deviation shocks	28	27	26	28	30	30	40	17
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010/11 5/	28	38	37	38	41	40	56	23
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	-5	-5	-5	-5	-5	-5	-5	-5

Sources: Country authorities; and staff estimates and projections.

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. This shock is applied only to non-rupee new borrowing.
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 I.3. Bhutan: Public Sector Debt Sustainability Framework, Baseline Scenario, 2006/07-2029/30
(In percent of GDP, unless otherwise indicated)

	Actual		Est.			Projections								
	2006/07	2007/08	2008/09	Average	Standard Deviation	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2009/10-2014/15 Average	2019/20	2029/30	2015/16-2029/30 Average
Public sector debt 1/	75.6	66.6	68.7			72.9	80.1	90.2	100.7	110.5	121.1		74.6	32.2	
o/w external debt	72.0	63.9	66.6			68.8	74.9	84.6	94.1	103.1	110.1		69.7	21.8	
Change in public sector debt	-11.2	-9.0	2.1			4.2	7.2	10.1	10.5	9.7	10.6		-15.9	-1.0	
Identified debt-creating flows	-15.1	-16.7	2.1			-4.7	-2.8	-4.0	-5.0	-7.2	-6.2		-14.8	-0.9	
Primary deficit	-2.2	-4.3	-5.3	2.2	6.2	0.1	-1.2	-1.4	-1.0	-1.2	-0.1	-0.8	-11.2	-0.8	-5.1
Revenue and grants	36.2	35.3	35.9			36.5	36.4	35.4	34.7	33.5	31.4		31.3	25.7	
of which: grants	13.5	11.5	11.4			14.1	13.6	13.1	12.8	12.5	10.7		3.8	2.9	
Primary (noninterest) expenditure	34.0	31.0	30.7			36.6	35.2	34.0	33.7	32.3	31.2		20.1	24.9	
Automatic debt dynamics	-12.9	-12.4	7.4			-4.7	-1.6	-2.6	-4.0	-6.0	-6.1		-3.6	-0.1	
Contribution from interest rate/growth differential	-10.9	-5.7	-2.1			-1.9	-2.7	-3.2	-4.1	-6.0	-6.1		-3.6	-0.2	
of which: contribution from average real interest rate	-0.8	2.2	1.5			2.3	1.9	1.6	1.1	0.7	0.4		3.7	1.3	
of which: contribution from real GDP growth	-10.1	-7.9	-3.6			-4.3	-4.6	-4.8	-5.2	-6.7	-6.6		-7.4	-1.4	
Contribution from real exchange rate depreciation	-2.0	-6.8	9.5			-2.8	1.1	0.5	0.1	0.0	0.1		...	...	
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	3.9	7.7	0.0			8.8	10.0	14.2	15.6	17.0	16.8		-1.1	0.0	
Other Sustainability Indicators															
PV of public sector debt	3.5	2.7	70.6			77.7	86.5	98.9	110.8	115.9	131.8		88.7	25.7	
o/w external	...	...	68.4			73.6	81.4	93.3	104.2	108.5	120.9		83.8	15.3	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	0.4	3.5	1.6			6.8	5.3	4.7	5.1	5.2	6.0		-0.2	3.2	
PV of public sector debt-to-revenue and grants ratio (in percent)	9.8	7.7	196.5			212.8	237.9	279.0	319.4	346.3	420.4		283.8	100.0	
PV of public sector debt-to-revenue ratio (in percent)	15.6	11.4	287.2			347.4	380.6	443.6	506.5	552.3	638.5		322.7	112.9	
o/w external 3/	…	…	278.5			329.1	357.9	418.4	476.4	517.0	585.5		304.8	67.1	
Debt service-to-revenue and grants ratio (in percent) 4/	7.3	22.0	19.1			18.4	17.7	17.2	17.6	19.1	19.7		35.1	15.5	
Debt service-to-revenue ratio (in percent) 4/	11.6	32.5	27.9			30.1	28.3	27.3	28.0	30.4	30.0		39.9	17.5	
Primary deficit that stabilizes the debt-to-GDP ratio	9.0	4.7	-7.4			-4.1	-8.4	-11.5	-11.5	-10.9	-10.7		4.7	0.2	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	13.2	11.7	5.7	8.1	2.6	6.6	6.7	6.4	6.2	7.1	6.3	6.6	8.9	4.5	5.9
Average nominal interest rate on forex debt (in percent)	1.9	6.0	4.3	2.0	1.8	5.4	4.5	4.0	3.3	2.7	2.4	3.7	7.0	8.3	7.0
Average real interest rate on domestic debt (in percent)	1.2	1.2	1.1	1.1	3.1	1.2	-0.1	-0.5	-0.8	-1.1	-1.1	-0.4	-1.3	-1.3	-1.3
Real exchange rate depreciation (in percent, + indicates depreciation)	-2.7	-10.2	15.4	-1.3	7.5	-4.3	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	4.6	4.2	4.5	4.4	0.5	4.2	4.0	4.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Growth of real primary spending (deflated by GDP deflator, in percent)	0.1	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0
Grant element of new external borrowing (in percent)	...	...	...	…	…	23.3	19.6	18.7	18.0	18.1	15.6	18.9	46.5	46.5	...

Sources: Country authorities; and staff estimates and projections.
1/ Gross public and publicly guaranteed 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 I.4. Bhutan: Sensitivity Analysis for Key Indicators of Public Debt 2009/10-2029/30

	Projections							
	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2019/20	2029/30
PV of Debt-to-GDP Ratio								
Baseline	78	87	99	111	116	132	89	26
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	78	89	102	114	121	136	131	79
A2. Primary balance is unchanged from 2009/10	78	88	101	114	120	136	121	82
A3. Permanently lower GDP growth 1/	78	87	100	113	119	137	99	50
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010/11-2011/12	78	88	101	114	120	136	94	32
B2. Primary balance is at historical average minus one standard deviations in 2010/11-2011/12	78	95	116	127	132	147	100	34
B3. Combination of B1-B2 using one half standard deviation shocks	78	92	110	121	126	141	95	30
B4. One-time 30 percent real depreciation in 2010/11	78	121	133	145	147	164	122	56
B5. 10 percent of GDP increase in other debt-creating flows in 2010/11	78	96	108	119	124	139	94	30
PV of Debt-to-Revenue Ratio 2/								
Baseline	213	238	279	319	346	420	284	100
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	213	244	292	336	369	443	420	320
A2. Primary balance is unchanged from 2009/10	213	241	286	329	359	434	388	318
A3. Permanently lower GDP growth 1/	213	239	282	324	354	432	315	191
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010/11-2011/12	213	240	284	326	355	431	299	126
B2. Primary balance is at historical average minus one standard deviations in 2010/11-2011/12	213	262	327	367	393	468	318	130
B3. Combination of B1-B2 using one half standard deviation shocks	213	254	311	351	377	451	304	115
B4. One-time 30 percent real depreciation in 2010/11	213	332	376	417	438	524	391	220
B5. 10 percent of GDP increase in other debt-creating flows in 2010/11	213	263	304	343	370	445	301	115
Debt Service-to-Revenue Ratio 2/								
Baseline	18	18	17	18	19	20	35	16
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	18	18	17	18	20	20	39	29
A2. Primary balance is unchanged from 2009/10	18	18	17	18	20	20	38	32
A3. Permanently lower GDP growth 1/	18	18	17	18	19	20	37	22
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010/11-2011/12	18	18	17	18	19	20	36	17
B2. Primary balance is at historical average minus one standard deviations in 2010/11-2011/12	18	18	18	20	22	21	38	19
B3. Combination of B1-B2 using one half standard deviation shocks	18	18	18	20	21	21	37	17
B4. One-time 30 percent real depreciation in 2010/11	18	21	24	25	28	29	53	33
B5. 10 percent of GDP increase in other debt-creating flows in 2010/11	18	18	18	20	20	21	37	17

Sources: Country 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 the length of the projection period.
2/ Revenues are defined inclusive of grants.