FOR AGENDA

SM/09/296
Supplement 1

December 23, 2009

To: Members of the Executive Board

From: The Secretary

Subject: **Republic of Yemen—Staff Report for the 2009 Article IV Consultation—Debt Sustainability Analysis**

The attached debt sustainability analysis for the Republic of Yemen, prepared jointly by the staffs of the Fund and the World Bank, is being issued as a supplement to the staff report for the 2009 Article IV consultation with the Republic of Yemen (SM/09/296, 12/23/09), which is tentatively scheduled for discussion on **Friday, January 8, 2010**. At the time of circulation of this paper to the Board, the Secretary's Department has not received a communication from the authorities of the Republic of Yemen indicating whether or not they consent to the Fund's publication of this paper; such communication may be received after the authorities have had an opportunity to read the paper.

Questions may be referred to Mr. Schneider (ext. 35662) and Ms. Ostojic (ext. 37551) in MCD.

Unless the Documents Section (ext. 36760) is otherwise notified, the document will be transmitted, in accordance with the procedures approved by the Executive Board and with the appropriate deletions, to the Arab Monetary Fund and the Islamic Development Bank, following its consideration by the Executive Board.

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INTERNATIONAL MONETARY FUND

REPUBLIC OF YEMEN

Joint World Bank/IMF Debt Sustainability Analysis

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

Approved by Alan MacArthur and David Marston (IMF)
and Carlos Primo Braga and Ritva Reinikka (IDA)

December 22, 2009

This joint Bank-Fund debt sustainability analysis for low-income countries (LIC DSA) finds that Yemen remains at high risk of debt distress. *Although debt ratios are currently below most of the indicative policy-dependent thresholds, dwindling oil production presents significant risks over the medium and long term. Even assuming the authorities implement comprehensive macroeconomic and structural reforms, the present value (PV) of debt-to-exports threshold is breached over the long term. Standard DSA stress tests indicate that debt sustainability is also vulnerable to a range of potential adverse shocks—including lower export growth, less favorable financing terms, and weaker fiscal performance. The high risk of debt distress underscores the importance of implementing measures to improve the debt outlook in the medium and long term, as well as the need for continued external assistance on concessional terms.*

I. INTRODUCTION

1. **This DSA is based on the debt sustainability framework for low-income countries**. Debt sustainability is assessed in relation to policy-dependent debt burden thresholds. According to the 2006–08 average Country Policy and Institutional Assessment (CPIA) index, Yemen is classified as a weak performer in terms of policies and institutions.[1]

2. **This DSA updates the 2009 DSA (SM/09/18 Supp. 1; 1/22/09)**. It incorporates more recent macroeconomic data including on the liquefied natural gas (LNG) production and export, domestic oil production, actual 2008 debt data, new SDR allocations in the amount of $281.6 million at end-August and $36.3 million at end-September 2009, and recent WEO projections of key economic variables, including international oil and gas prices.

[1] The recent three-year backward-looking average was 3.22. For a weak performer, the following indicative thresholds for external debt sustainability apply: a PV of debt-to-exports ratio of 100 percent, a PV of debt-to-GDP ratio of 30 percent, a PV of debt-to-revenue ratio of 200 percent, a debt service-to-exports ratio of 15 percent, and a debt service-to-revenue ratio of 25 percent.

3. **The Yemeni authorities' largely agreed with the staff appraisal of potential risks, but expressed reservations about the "high risk" assessment** given the relatively low current levels of debt ratios. The staff emphasized the forward-looking nature of the DSA (including the path of debt indicators over the medium and long term), the recent sharp decline in oil revenues and attendant deterioration in the fiscal and external accounts, as well as other risks to the macroeconomic outlook. In addition to the high vulnerability to adverse economic developments highlighted by the stress tests, the staff also underscored that the baseline macroeconomic framework assumes an ambitious level of reform and policy adjustment—achievement of which would require a sustained political commitment and continued external support.

II. BACKGROUND

4. **Yemen's public debt dynamics centered around external debt during most of the country's early history**. In 1995 external debt was roughly 184 percent of GDP and external debt service was equivalent to about 42 percent of export receipts. As part of an adjustment and stabilization program, Yemen sought to reduce its debt burden through a series of Paris Club operations and some debt-forgiveness. The authorities have also pursued since that time a careful policy on contracting of non-concessional debt. Domestic debt (until recently all in the form of Treasury-bills) has predominantly been used as an instrument for monetary control (a means of mopping up excess liquidity created through spending of oil revenues), and has been relatively small as a ratio to GDP.

5. **The nominal stock of public debt increased slightly in 2008 but fell as a share of GDP.** According to data from the Central Bank of Yemen (CBY) and Ministry of Finance (MOF), total net public debt (domestic and external) decreased from 35.2 percent of GDP in 2007 to 31.4 percent in 2008. The decrease relative to GDP was due mainly to high nominal GDP growth fueled by record oil prices and a surge in inflation. The 2008 fiscal deficit (3.4 percent of GDP, cash basis) was financed mainly by domestic sources (2.8 percent of GDP). As a result, net domestic debt increased from 8.3 percent of GDP in 2007 to 9.5 percent of GDP in 2008. The non-bank sector (predominantly public pension funds) accounted for the lion's share of new domestic financing. On the external side, the current account deficit improved in 2008 to 4.1 percent, compared to 7.0 percent in 2007, reflecting an increase in hydrocarbon export receipts fueled by record high oil prices. In nominal terms, external debt rose slightly from $5.8 billion to $5.9 billion, but declined from 26.9 percent of GDP to 21.9 percent of GDP.

External debt composition

6. **External debt is owed mostly to official creditors and is on concessional terms.** Slightly over half of $6 billion of external debt[2] was owed to multilateral creditors

[2] Data as of September 2009.

($2.2 billion to the World Bank, $0.6 billion to the Arab Fund for Social and Economic Development (AFESD), and $64 million outstanding to the IMF). The other half was owed to bilateral creditors, with the largest creditors being Russia ($1.2 billion), Saudi Arabia ($0.4 billion), and Japan ($0.3 billion). Yemen has benefitted from a series of rescheduling agreements under the Paris Club in 1996, 1997, and 2001.

7. **Yemen does not have access to international capital markets.** Private external debt is believed to be relatively small compared with public debt and linked mainly to trade finance and selected projects.[3] Official donor support in the form of grants and concessional loans is expected to continue in the medium and long term. Donors pledged concessional loans of about $2 billion (and grants of about $3 billion) at the Consultative Group meeting in London in 2006. There have been some reported delays in translating these pledges into actual commitments. New loan agreements of about $70 million were signed in 2008 and for about $100 million in 2009 (as of September).

Domestic debt composition

8. **Domestic debt at the end of 2008 consisted almost entirely of Treasury bills (T-bills), held by domestic bank and non-bank investors.** Non-securitized debt as a share of total domestic debt increased from 21.1 percent in 2007 to 35.5 percent in 2008. The volume of T-bills outstanding also increased, reaching 11.1 percent of GDP at the end of 2008. Virtually all domestic debt at end-2008 was short term—T-bills having a maximum maturity of 1 year. Within the overall stock of T-bills, the share of 3 month T-bills was significantly higher than the 6 and 12 month maturities. The weighted interest rate on T-bills was about 14 percent in 2008, but has subsequently declined to about 13 percent as of September 2009, reflecting a central bank decision to lower the benchmark interest rate from 13 percent to 10 percent during January–May. New issues of T-bills in 2008 were mostly acquired by non-bank investors, bringing the share of gross domestic debt held by non-bank investors above 50 percent in 2008.

III. Macroeconomic Assumptions

9. **The DSA is based on the macroeconomic framework discussed with the authorities during the 2009 Article IV Consultations (SM/09/xx, 12/xx/09)**. It assumes a sustained, front-loaded fiscal adjustment based on expenditure and revenue reforms in response to falling oil production. Beyond the medium term, it is assumed that the reform process would continue in the long term to facilitate adjustment to the expected exhaustion of oil reserves (projected to occur around 2021). The debt dynamics under this scenario are subjected to stress tests to assess vulnerability to less favorable developments in key economic variables, including the consequences of maintaining current macroeconomic policies (a "nonadjustment" scenario).

[3] The current external DSA does not incorporate estimates of private debt.

10. **The macroeconomic framework underlying the DSA assumes that the authorities respond to falling oil production by reform of public finances and structural adjustment.** [4] Specific elements of this reform effort are discussed in Box 1.

11. **In terms of growth prospects**, the framework assumes 4.4 percent real GDP growth over the long term. While generally in line with historical averages, specific elements underlying this projection include:

- Implementation of the Third Socio-Economic Development Plan for Poverty Reduction (DPPR) for acceleration of economic growth. The plan focuses on, among other elements: good governance; development of productive and promising sectors (agriculture, fisheries, and tourism); water, environment, and basic infrastructure; human development; government services; social protection and social security; and women's empowerment.

- Implementation of reforms outlined in National Reform Agenda and the Public Investment Program, which focus on the following issues: (i) judicial reform; (ii) administrative reforms and civil service modernization; (iii) investment and business climate; (iv) anticorruption, transparency, and accountability; and (iv) political reforms.

IV. DEBT ANALYSIS

A. Public Debt Sustainability

Baseline

12. **Even assuming a sustained reform effort, public debt indicators raise concerns about long-term sustainability.** Net public debt at end-2008 stood at 31.4 percent of GDP—about 4 percent lower than its end-2007 level. Nevertheless, this ratio is still relatively large in view of potential vulnerabilities inherent in the shift to a non-oil economy and the government's low revenue mobilization capacity[5]. Despite the slight decrease in 2008, the debt-to-GDP ratio is expected to rise close to 50 percent level in the long term due to expected decline in oil revenues. The PV of public debt stood at 27 percent of GDP and 73 percent of revenue (excluding grants) in 2008. These indicators are expected to increase to 45.5 percent of GDP and over 230 percent of revenue by 2029.

[4] The adjustment scenario is based at policy discussions during the Article IV mission. Measures are illustrative without precise agreement on the sequencing of reforms.

[5] Non-hydrocarbon revenue was only 8.7 percent of GDP in 2008, of which tax revenue was only 6.8 percent.

Stress tests and alternative scenarios

13. **Standard stress tests highlight Yemen's vulnerability to adverse economic developments,** including weaker fiscal adjustment, lower economic growth, and less favorable financing terms.

- If the primary deficit remained unchanged from the estimated 2009 level (i.e., -6.6 percent of GDP), by 2029 the debt-GDP ratio would approach 150 percent, the debt-revenue ratio would exceed 735 percent, and the debt service would be equivalent to 271 percent of fiscal revenue (against 16 percent in the baseline). This highlights the need to reduce the primary deficit to avoid spiraling debt.

- If real GDP grew by 3.1 percent in 2010–11 (below the baseline projections of 7.8 and 3.8 percent, respectively), the PV of debt-to-GDP ratio would rise to about 72 percent (against 45 percent in the baseline) and the PV of debt-to-revenue ratio would approach 356 percent by 2029 (against 225 percent in the baseline). This highlights the sensitivity of the sustainability projections to near-term growth rates, which rest heavily on the coming on-stream of the Yemen LNG project.

- Permanently lower growth over the entire projection period by 0.25 percentage point of GDP would result in debt-to-GDP and debt-to-revenue ratio close to 58 percent and 285 percent, respectively, by 2029.

- Under less favorable financing terms (defined as an interest rate on external borrowing some 2 percentage points higher than the baseline scenario during 2009–29), the PV of debt-to-exports and debt-to-revenue would reach 108 and 87 percent, respectively, by 2019;

- An oil price $20 below baseline projections in 2009–14 would have a relatively modest impact on debt sustainability indicators, reflecting the decline in domestic oil production and the gradual shift to being a net fuel importer.

Box 1. Assumptions for the Macroeconomic Framework

The macroeconomic framework underlying the DSA encompasses a range of policy and structural reforms to adjust to the expected steady decline of oil production over the medium and long term. As crude oil production declines and reserves are eventually depleted, government hydrocarbon revenues are projected to drop from about 75 percent of total revenues and 88 percent of total exports in 2008 to 17 percent (from LNG exports and domestic gas sales) and to 20 percent of total merchandise exports. GDP growth is expected to accelerate in 2010 with the start of LNG production and subsequent increase in hydrocarbon sector growth.

In the **medium term (2009-14),** annual real GDP growth is projected to average 4.8 percent, reflecting the consequences of the financial crisis and gradual global recovery. Reforms will center on a significant fiscal adjustment and reduction of primary deficit from 6.6 percent of GDP in 2009 to 0.9 percent of GDP in 2014. Key spending reforms include elimination of fuel subsidies, reducing the overall size of the civil service wage bill, better expenditure management, and increased, but better targeted social spending, to protect the poor from the adverse effects of removing fuel subsidies. Development spending would gradually increase to create pillars for stronger non-oil sector. On the revenue side, tax revenues would be enhanced by around 0.5 percentage point of GDP per year by: implementing fully the General Sales Tax (GST); improving customs and tax administration; eliminating exemptions in the customs, income tax, and investment laws; and introducing possibly introduction of excise taxes over the long term. Fiscal consolidation, together with structural reforms to enhance competitiveness is expected to help narrow the current account deficit and boost the non-oil sector growth.

The long-term projections are based on the following policy assumptions:

- **Moderate real GDP growth, averaging 4.4 percent from 2015 to 2029,** with nonhydrocarbon growth close to 4.8 percent offsetting the decline in oil output. These assumptions are in line with the historical experience: the non-oil sector grew at an average rate of 5.2 percent during 1991–2007. Continued nonhydrocarbon growth will depend on sustained fiscal, financial sector, and structural reforms to improve the investment environment, more flexible exchange rate arrangement, and sizeable donor-funded public investment.
- **Continued non-hydrocarbon revenue mobilization efforts**, notably through full implementation of the GST and strengthening of tax and customs administration to improve the efficiency of both direct and indirect tax collection (GST, customs duties, excises on petroleum products, and income tax).
- **Additional expenditure restraint**—including a concerted effort to reduce the public wage bill to around 6 percent of GDP by 2029—would also provide the fiscal space for the social welfare expenditures required to smooth the transition to a predominantly non-oil economy.
- Continued flexibility in the Yemeni rial would facilitate adjustment in the current account and allow for some accumulation of **external reserves** in outer years to smooth the impact of the end of oil production in 2021.
- Official creditors are expected to **continue to provide external financing on concessional terms**. Domestic financing, driven by the evolution of the fiscal balance, is projected to be provided from the bank and non-bank sector at positive real interest rates.

Under these assumptions, the **overall fiscal balance** would move sharply into deficit with the loss of oil revenues (about 6.7 percent of GDP in 2022), but would improve thereafter as reforms take hold. The **non-interest current account deficit** would be financed by a combination of FDI, remittances, and external borrowing.

14. To highlight the critical need for adjustment, debt dynamics were also evaluated under unchanged policies (a non-adjustment scenario). In the absence of the structural and fiscal reforms outlined in Box 1, the PV of public debt would exceed 140 percent of GDP and debt service would absorb slightly more than half of fiscal revenues by 2029.

B. External Debt Sustainability

Baseline

15. **Under the baseline scenario, Yemen's external debt dynamics signal a high risk of debt distress.** Although all indicators remain below their policy-dependent thresholds in the medium term, the PV of debt-to-exports ratio is projected to breach its threshold substantially over the long term (by over 30 percentage points annually during 2022–29). While the other indicators remain below their respective thresholds, the outlook is expected to worsen as debt accumulates and resources to service it decline due to the loss of oil exports.

Stress tests and alternative scenarios

16. **The baseline outcome is highly vulnerable to adverse shocks.** The outlook is particularly vulnerable to deterioration in export performance and less favorable lending terms. Under stress tests, the PV of debt-to-export ratio breaches the threshold in 2010, while the debt service-to-exports ratios are projected to exceed their respective thresholds starting in 2022 until the end of the projection period. If export growth remained one standard deviation below its historical average in 2010–11, the PV of debt would reach 210 percent of exports and 84 percent of fiscal revenue in 2029, while external debt service would reach 16 percent of exports. If interest rates on new external borrowing were 2 percent higher than in the baseline, the PV of debt would approach 190 percent of exports in 2029.

17. **Under the non-adjustment scenario, external debt becomes rapidly unsustainable.** Even assuming that financing would continue to be available on favorable terms, all but one of the thresholds (debt service-to-revenue ratio) are breached. Over the longer term, these ratios exceed their respective sustainability thresholds by a considerable margin. Under these conditions, little room would be left to absorb shocks associated with the projected end of oil production.

V. CONCLUSION

18. **The joint Bank-Fund debt sustainability analysis suggests that risk of debt distress in Yemen remains high**. Despite currently low debt ratios, dwindling oil production presents a significant adjustment to both the fiscal and external account over the medium and long term. Implementation of a comprehensive macroeconomic adjustment, a set of structural reforms to boost financial management and growth, and supporting financial flows (remittances, non-hydrocarbon FDI, and continued donor funding) will be essential to maintaining debt ratios below indicative thresholds over the long term (with the exception of the PV of debt-to-exports ratio, which breaches the sustainability threshold even with adjustment). However, given Yemen's relatively low level of development, significant resource and capacity constraints, the outlook for such a sustained adjustment effort is subject to numerous risks.

19. **Even assuming full implementation of macroeconomic and structural reforms, Yemen's debt sustainability is also vulnerable to a range of potential adverse shocks, such as lower export growth and less favorable financing terms**. Overall, the findings in this DSA echo the results reported in the previous year's DSA. The high risk of debt distress underscores the importance of implementing measures to improve the debt outlook in the medium and long term, as well as the need for continued external assistance on concessional terms.

Table 1.Yemen: Public Sector Debt Sustainability Framework, Baseline Scenario, 2006-2029
(In percent of GDP, unless otherwise indicated)

	Actual					Estimate			Projections						
	2006	2007	2008	Average	Standard Deviation	2009	2010	2011	2012	2013	2014	2009-14 Average	2019	2029	2015-29 Average
Public sector debt 1/	33.0	35.2	31.4			41.3	40.3	41.5	40.9	41.1	41.2		38.1	49.1	
o/w foreign-currency denominated	28.9	26.9	21.9			23.3	19.8	19.7	20.2	20.6	20.8		21.5	18.2	
Change in public sector debt	-4.1	2.2	-3.8			10.0	-1.0	1.2	-0.7	0.2	0.1		-0.5	-0.3	
Identified debt-creating flows	-7.3	1.8	-3.2			9.5	-1.8	1.4	-1.0	-0.1	-0.1		-0.6	-0.4	
Primary deficit	-3.6	4.9	2.1	-1.3	4.0	6.6	4.7	3.4	0.8	0.9	0.9	2.9	0.3	1.2	1.5
Revenue and grants	38.6	33.2	36.7			27.7	26.3	24.8	24.0	23.7	23.1		24.0	20.2	
of which: grants	0.4	0.3	0.3			1.5	0.5	0.6	0.8	0.7	0.7		0.5	0.5	
Primary (noninterest) expenditure	35.0	38.0	38.8			34.4	31.0	28.2	24.8	24.6	24.1		24.4	21.4	
Automatic debt dynamics	-3.7	-3.1	-5.3			2.9	-6.6	-2.0	-1.7	-0.9	-1.0		-0.9	-1.6	
Contribution from interest rate/growth differential	-1.4	-1.2	-1.5			0.5	-4.3	-1.5	-1.5	-1.1	-1.1		-1.3	-1.4	
of which: contribution from average real interest rate	-0.3	-0.1	-0.2			1.6	-1.3	0.0	0.2	0.7	0.7		0.4	0.7	
of which: contribution from real GDP growth	-1.1	-1.1	-1.2			-1.1	-3.0	-1.5	-1.7	-1.7	-1.8		-1.7	-2.1	
Contribution from real exchange rate depreciation	-2.3	-1.9	-3.9			2.4	-2.3	-0.5	-0.2	0.1	0.1		0.4	-0.2	
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	3.2	0.5	-0.6			0.4	0.8	-0.2	0.3	0.3	0.2		0.1	0.1	
Other Sustainability Indicators															
PV of public sector debt	4.1	8.3	26.7			36.5	36.3	37.5	36.7	36.7	36.7		33.4	45.5	
o/w foreign-currency denominated	...	...	17.2			18.5	15.8	15.7	16.1	16.2	16.3		16.8	14.6	
o/w external	...	...	17.2			18.5	15.8	15.7	16.1	16.2	16.3		16.8	14.6	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	-0.3	8.1	5.3			9.4	7.6	6.5	3.8	4.0	4.1		2.7	4.5	
PV of public sector debt-to-revenue and grants ratio (in percent)	…	…	72.7			131.6	138.2	151.3	152.6	155.1	158.6		139.0	225.3	
PV of public sector debt-to-revenue ratio (in percent)	…	…	73.2			139.3	140.7	154.7	157.6	159.9	163.3		141.6	230.4	
o/w external 3/	…	…	47.2			70.5	61.2	64.6	69.0	70.6	72.5		71.4	73.9	
Debt service-to-revenue and grants ratio (in percent) 4/	8.4	9.9	8.6			9.9	11.1	12.5	12.4	13.2	13.5		9.8	16.3	
Debt service-to-revenue ratio (in percent) 4/	8.4	10.0	8.7			10.4	11.3	12.8	12.8	13.7	14.0		10.0	16.7	
Primary deficit that stabilizes the debt-to-GDP ratio	0.5	2.6	6.0			-3.3	5.7	2.2	1.4	0.7	0.8		0.8	1.6	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	3.2	3.3	3.6	4.1	1.0	3.8	7.8	3.8	4.2	4.5	4.6	4.8	4.5	4.5	4.4
Average nominal interest rate on forex debt (in percent)	1.3	1.2	1.2	1.2	0.3	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.1	1.0	1.0
Average real interest rate on domestic debt (in percent)	5.0	7.7	-0.5	0.9	9.5	18.0	-7.0	0.6	1.5	4.4	4.3	3.6	3.6	3.1	3.8
Real exchange rate depreciation (in percent, + indicates depreciation)	-7.5	-6.9	-15.1	-6.3	5.8	11.6	...	...	...	...	...	…	…	…	…
Change in inflation rate (GDP deflator, in percent)	13.6	10.9	20.4	16.1	9.6	-5.5	19.9	10.1	8.4	6.6	6.8	7.7	6.4	5.2	5.7
Growth of real primary spending (deflated by GDP deflator, in percent)	0.1	0.1	0.1	0.1	0.1	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
Grant element of new external borrowing (in percent)	...	...	...	…	…	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	...

Sources: Country authorities; and 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 2.Yemen: Sensitivity Analysis for Key Indicators of Public Debt 2009-2029

	Projections							
	2009	2010	2011	2012	2013	2014	2019	2029
PV of Debt-to-GDP Ratio								
Baseline	36	36	38	37	37	37	33	45
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	36	32	28	25	23	21	10	…
A2. Primary balance is unchanged from 2009	36	39	43	48	54	60	89	149
A3. Permanently lower GDP growth 1/	36	37	38	38	38	39	38	58
A4. Non-adjustment scenario	37	40	47	55	64	72	94	143
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010-2011	36	40	43	43	44	46	49	72
B2. Primary balance is at historical average minus one standard deviations in 2010-2011	36	35	35	35	35	35	32	43
B3. Combination of B1-B2 using one half standard deviation shocks	36	34	33	33	34	35	37	57
B4. One-time 30 percent real depreciation in 2010	36	44	45	44	43	43	40	54
B5. 10 percent of GDP increase in other debt-creating flows in 2010	36	47	48	48	48	48	45	57
B6. Oil price $20 below baseline projection in 2009–14	33	36	40	42	45	48	60	69
PV of Debt-to-Revenue Ratio 2/								
Baseline	132	138	151	153	155	159	139	225
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	132	121	114	…	…	…	…	…
A2. Primary balance is unchanged from 2009	132	147	175	202	230	261	369	739
A3. Permanently lower GDP growth 1/	132	140	155	158	162	168	158	285
A4. Non-adjustment scenario	133	156	189	215	265	306	418	722
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010-2011	132	150	172	179	188	198	202	356
B2. Primary balance is at historical average minus one standard deviations in 2010-2011	132	132	142	144	147	151	132	214
B3. Combination of B1-B2 using one half standard deviation shocks	132	129	131	…	…	151	152	284
B4. One-time 30 percent real depreciation in 2010	132	167	180	181	184	187	168	267
B5. 10 percent of GDP increase in other debt-creating flows in 2010	132	178	194	198	202	207	186	283
B6. Oil price $20 below baseline projection in 2009–14	119	153	172	186	205	218	277	323
Debt Service-to-Revenue Ratio 2/								
Baseline	10	11	12	12	13	14	10	16
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	10	11	10	…	…	…	…	…
A2. Primary balance is unchanged from 2009	10	11	14	21	30	49	108	271
A3. Permanently lower GDP growth 1/	10	11	13	13	14	15	14	38
A4. Non-adjustment scenario	10	13	16	18	26	30	38	52
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2010-2011	10	12	14	18	20	25	33	74
B2. Primary balance is at historical average minus one standard deviations in 2010-2011	10	11	11	4	8	5	4	9
B3. Combination of B1-B2 using one half standard deviation shocks	10	12	11	…	…	1	9	38
B4. One-time 30 percent real depreciation in 2010	10	12	14	15	17	18	18	37
B5. 10 percent of GDP increase in other debt-creating flows in 2010	10	11	18	50	22	49	25	41
B6. Oil price $20 below baseline projection in 2009–14	12	16	17	18	19	18	22	26

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.

Table 3.: External Debt Sustainability Framework, Baseline Scenario, 2006-2029 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average	Standard Deviation	Projections									
	2006	2007	2008			2009	2010	2011	2012	2013	2014	2009-2014 Average	2019	2029	2015-2029 Average
External debt (nominal) 1/	**28.9**	**26.9**	**21.9**			**23.3**	**19.8**	**19.7**	**20.2**	**20.6**	**20.8**		**21.5**	**18.2**	
o/w public and publicly guaranteed (PPG)	28.9	26.9	21.9			23.3	19.8	19.7	20.2	20.6	20.8		21.5	18.2	
Change in external debt	-2.5	-1.9	-5.0			1.4	-3.5	-0.1	0.6	0.4	0.2		-0.2	-0.8	
Identified net debt-creating flows	-10.8	-1.8	-2.9			5.3	3.6	4.7	3.6	3.2	2.7		0.6	0.4	
Non-interest current account deficit	**-1.4**	**6.7**	**3.9**	**-2.8**	**6.1**	**6.0**	**2.9**	**3.6**	**3.3**	**2.9**	**2.6**		**1.6**	**2.1**	3.2
Deficit in balance of goods and services	-0.4	7.3	4.8			7.8	2.1	3.9	4.6	5.5	6.3		5.5	10.5	
Exports	41.3	35.9	36.1			24.0	26.9	24.4	23.1	22.0	20.8		18.9	11.0	
Imports	40.8	43.2	41.0			31.9	29.0	28.3	27.7	27.5	27.1		24.4	21.5	
Net current transfers (negative = inflow)	-7.1	-6.6	-8.1	-11.1	3.8	-6.2	-5.2	-5.5	-6.3	-7.2	-8.2		-8.0	-9.9	-9.0
o/w official	-0.6	-0.7	-3.0			-1.2	-0.5	-0.6	-0.8	-0.8	-0.7		-0.5	-0.5	
Other current account flows (negative = net inflow)	6.1	5.9	7.1			4.3	6.0	5.2	5.0	4.5	4.6		4.1	1.5	
Net FDI (negative = inflow)	**-5.9**	**-5.3**	**-1.7**	**-1.0**	**3.0**	**-0.1**	**1.9**	**1.6**	**0.8**	**0.9**	**0.7**		**-0.3**	**-1.1**	-1.0
Endogenous debt dynamics 2/	**-3.5**	**-3.1**	**-5.0**			**-0.6**	**-1.2**	**-0.5**	**-0.5**	**-0.6**	**-0.6**		**-0.7**	**-0.6**	
Contribution from nominal interest rate	0.4	0.3	0.3			0.3	0.3	0.2	0.2	0.2	0.2		0.2	0.2	
Contribution from real GDP growth	-0.9	-0.8	-0.8			-0.9	-1.5	-0.7	-0.8	-0.9	-0.9		-0.9	-0.8	
Contribution from price and exchange rate changes	-3.0	-2.6	-4.5			…	…	…	…	…	…		…	…	
Residual (3-4) 3/	**8.3**	**-0.2**	**-2.2**			**-3.9**	**-7.1**	**-4.9**	**-3.0**	**-2.8**	**-2.5**		**-0.9**	**-1.2**	
o/w exceptional financing	-0.1	0.0	-0.1			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
PV of external debt 4/	…	…	17.2			18.5	15.8	15.7	16.1	16.2	16.3		16.8	14.6	
In percent of exports	…	…	47.6			76.8	58.7	64.3	69.5	73.9	78.3		89.0	132.8	
PV of PPG external debt	**…**	**…**	**17.2**			**18.5**	**15.8**	**15.7**	**16.1**	**16.2**	**16.3**		**16.8**	**14.6**	
In percent of exports	**…**	**…**	**47.6**			**76.8**	**58.7**	**64.3**	**69.5**	**73.9**	**78.3**		**89.0**	**132.8**	
In percent of government revenues	**…**	**…**	**47.2**			**70.5**	**61.2**	**64.6**	**69.0**	**70.6**	**72.5**		**71.4**	**73.9**	
Debt service-to-exports ratio (in percent)	**2.9**	**3.5**	**2.9**			**4.3**	**3.3**	**3.5**	**3.4**	**3.7**	**4.0**		**3.7**	**8.2**	
PPG debt service-to-exports ratio (in percent)	**2.9**	**3.5**	**2.9**			**4.3**	**3.3**	**3.5**	**3.4**	**3.7**	**4.0**		**3.7**	**8.2**	
PPG debt service-to-revenue ratio (in percent)	**3.1**	**3.8**	**2.8**			**3.9**	**3.5**	**3.6**	**3.4**	**3.5**	**3.7**		**3.0**	**4.6**	
Total gross financing need (Billions of U.S. dollars)	-1.2	0.6	0.9			1.8	1.8	2.1	1.9	1.8	1.8		1.1	1.9	
Non-interest current account deficit that stabilizes debt rati	1.1	8.6	8.9			4.5	6.4	3.8	2.8	2.5	2.4		1.9	2.9	
Key macroeconomic assumptions															
Real GDP growth (in percent)	3.2	3.3	3.6	4.1	1.0	3.8	7.8	3.8	4.2	4.5	4.6	4.8	4.5	4.5	4.4
GDP deflator in US dollar terms (change in percent)	10.4	9.9	19.9	11.6	7.3	-7.0	14.2	4.9	3.3	1.5	1.7	3.1	0.9	3.2	1.4
Effective interest rate (percent) 5/	1.3	1.2	1.2	1.2	0.3	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.1	1.0	1.0
Growth of exports of G&S (US dollar terms, in percent)	14.9	-1.2	25.0	21.0	22.0	-35.7	37.7	-1.4	2.0	0.9	0.8	0.7	2.5	6.6	2.0
Growth of imports of G&S (US dollar terms, in percent)	29.6	20.3	17.8	14.3	9.7	-24.9	11.9	6.3	5.5	5.1	4.8	1.5	3.3	4.0	4.2
Grant element of new public sector borrowing (in percent)	…	…	…	…	…	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8	35.8
Government revenues (excluding grants, in percent of GDP	38.2	32.8	36.5			26.2	25.8	24.3	23.3	23.0	22.5		23.6	19.7	20.9
Aid flows (in Billions of US dollars) 7/	0.4	0.4	0.3			0.6	0.6	0.9	1.2	1.1	1.1		1.0	1.7	
o/w Grants	0.1	0.1	0.1			0.4	0.1	0.2	0.3	0.3	0.3		0.3	0.4	
o/w Concessional loans	0.3	0.4	0.3			0.2	0.5	0.7	0.9	0.8	0.9		0.7	1.3	
Grant-equivalent financing (in percent of GDP) 8/	…	…	…			1.8	1.0	1.3	1.7	1.5	1.4		0.9	0.9	1.0
Grant-equivalent financing (in percent of external financing)	…	…	…			77.0	51.3	49.2	50.9	52.4	51.7		52.8	52.6	50.3
Memorandum items:															
Nominal GDP (Billions of US dollars)	19.1	21.7	26.9			26.0	32.0	34.8	37.5	39.7	42.2		56.1	98.5	
Nominal dollar GDP growth	13.9	13.6	24.3			-3.5	23.1	8.9	7.6	6.1	6.3	8.1	5.4	7.8	5.8
PV of PPG external debt (in Billions of US dollars)			4.6			4.7	4.9	5.3	5.9	6.3	6.7		9.2	14.2	
(PVt-PVt-1)/GDPt-1 (in percent)						0.2	0.9	1.2	1.6	1.1	1.1	1.0	0.7	0.5	0.8

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 4.Yemen: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2009-2029
(In percent)

	Projections							
	2009	2010	2011	2012	2013	2014	**2019**	2029
PV of debt-to GDP ratio								
Baseline	18	16	16	16	16	16	**17**	15
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	18	10	4	…	…	…	**…**	…
A2. New public sector loans on less favorable terms in 2009-2029 2	18	16	16	17	18	18	**20**	21
A3. Nonadjustment scenario	19	16	16	16	16	19	**34**	78
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	18	16	16	16	17	17	**17**	15
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	18	20	24	24	24	24	**23**	17
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	18	17	17	17	17	18	**18**	16
B4. Net non-debt creating flow s at historical average minus one standard deviation in 2010-2011 4/	18	14	13	14	14	14	**15**	14
B5. Combination of B1-B4 using one-half standard deviation shocks	18	18	16	16	16	17	**17**	15
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	18	21	21	21	21	22	**22**	20
B7. Oil price $20 below baseline projection in 2010–14	18	17	17	17	17	17	**20**	19
PV of debt-to-exports ratio								
Baseline	77	59	64	70	74	78	**89**	133
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	77	39	15	…	…	…	**…**	…
A2. New public sector loans on less favorable terms in 2009-2029 2	77	59	66	74	81	88	**108**	188
A3. Nonadjustment scenario	78	60	65	71	77	97	**222**	987
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	77	57	63	68	72	76	**86**	131
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	77	105	138	146	153	161	**172**	210
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	77	57	63	68	72	76	**86**	131
B4. Net non-debt creating flow s at historical average minus one standard deviation in 2010-2011 4/	77	52	54	59	63	67	**77**	126
B5. Combination of B1-B4 using one-half standard deviation shocks	77	74	68	74	79	83	**94**	146
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	77	57	63	68	72	76	**86**	131
B7. Oil price $20 below baseline projection in 2010–14	72	70	74	83	87	88	**114**	96
PV of debt-to-revenue ratio								
Baseline	71	61	65	69	71	73	**71**	74
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	71	40	15	…	…	…	**…**	…
A2. New public sector loans on less favorable terms in 2009-2029 2	71	61	67	73	77	81	**87**	104
A3. Nonadjustment scenario	72	64	65	66	70	83	**156**	401
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	71	62	66	71	72	74	**73**	77
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	71	79	100	104	106	107	**99**	84
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	71	65	69	74	76	78	**76**	80
B4. Net non-debt creating flow s at historical average minus one standard deviation in 2010-2011 4/	71	55	54	58	60	62	**62**	70
B5. Combination of B1-B4 using one-half standard deviation shocks	71	68	65	70	72	74	**72**	77
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	71	81	86	91	93	96	**94**	99
B7. Oil price $20 below baseline projection in 2010–14	67	74	76	79	82	81	**95**	89
Debt service-to-exports ratio								
Baseline	4	3	4	3	4	4	**4**	8
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	4	4	3	2	2	2	**…**	…
A2. New public sector loans on less favorable terms in 2009-2029 2	4	3	4	4	4	5	**6**	13
A3. Nonadjustment scenario	4	3	4	4	4	4	**5**	32
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	4	3	4	3	4	4	**4**	8
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	4	5	5	6	6	6	**8**	16
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	4	3	4	3	4	4	**4**	8
B4. Net non-debt creating flow s at historical average minus one standard deviation in 2010-2011 4/	4	3	3	3	4	4	**3**	7
B5. Combination of B1-B4 using one-half standard deviation shocks	4	4	4	4	4	4	**4**	9
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	4	3	4	3	4	4	**4**	8
B7. Oil price $20 below baseline projection in 2010–14	4	4	4	4	4	4	**4**	6
Debt service-to-revenue ratio								
Baseline	4	3	4	3	4	4	**3**	5
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2009-2029 1/	4	4	3	2	2	2	**…**	…
A2. New public sector loans on less favorable terms in 2009-2029 2	4	3	4	4	4	4	**4**	7
A3. Nonadjustment scenario	4	4	4	3	3	4	**4**	13
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2010-2011	4	4	4	4	4	4	**3**	5
B2. Export value growth at historical average minus one standard deviation in 2010-2011 3/	4	3	4	4	4	4	**4**	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2010-2011	4	4	4	4	4	4	**3**	5
B4. Net non-debt creating flow s at historical average minus one standard deviation in 2010-2011 4/	4	3	3	3	3	4	**3**	4
B5. Combination of B1-B4 using one-half standard deviation shocks	4	4	4	4	4	4	**3**	5
B6. One-time 30 percent nominal depreciation relative to the baseline in 2010 5/	4	5	5	5	5	5	**4**	6
B7. Oil price $20 below baseline projection in 2010–14	4	4	4	4	4	4	**4**	5
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	36	36	36	36	36	36	**36**	36

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.

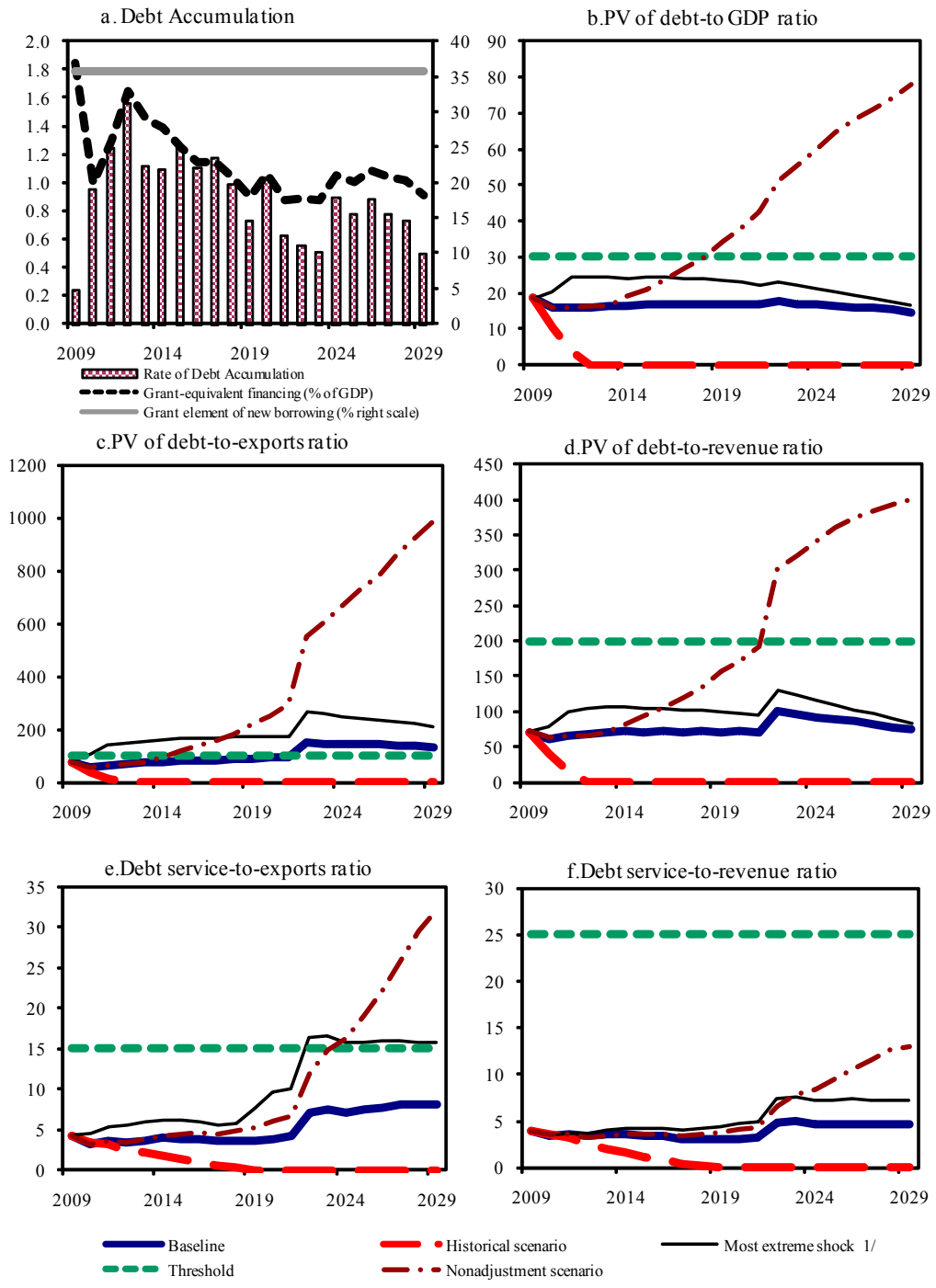
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).

4/ Includes official and private transfers and FDI.

5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.

6/ Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.

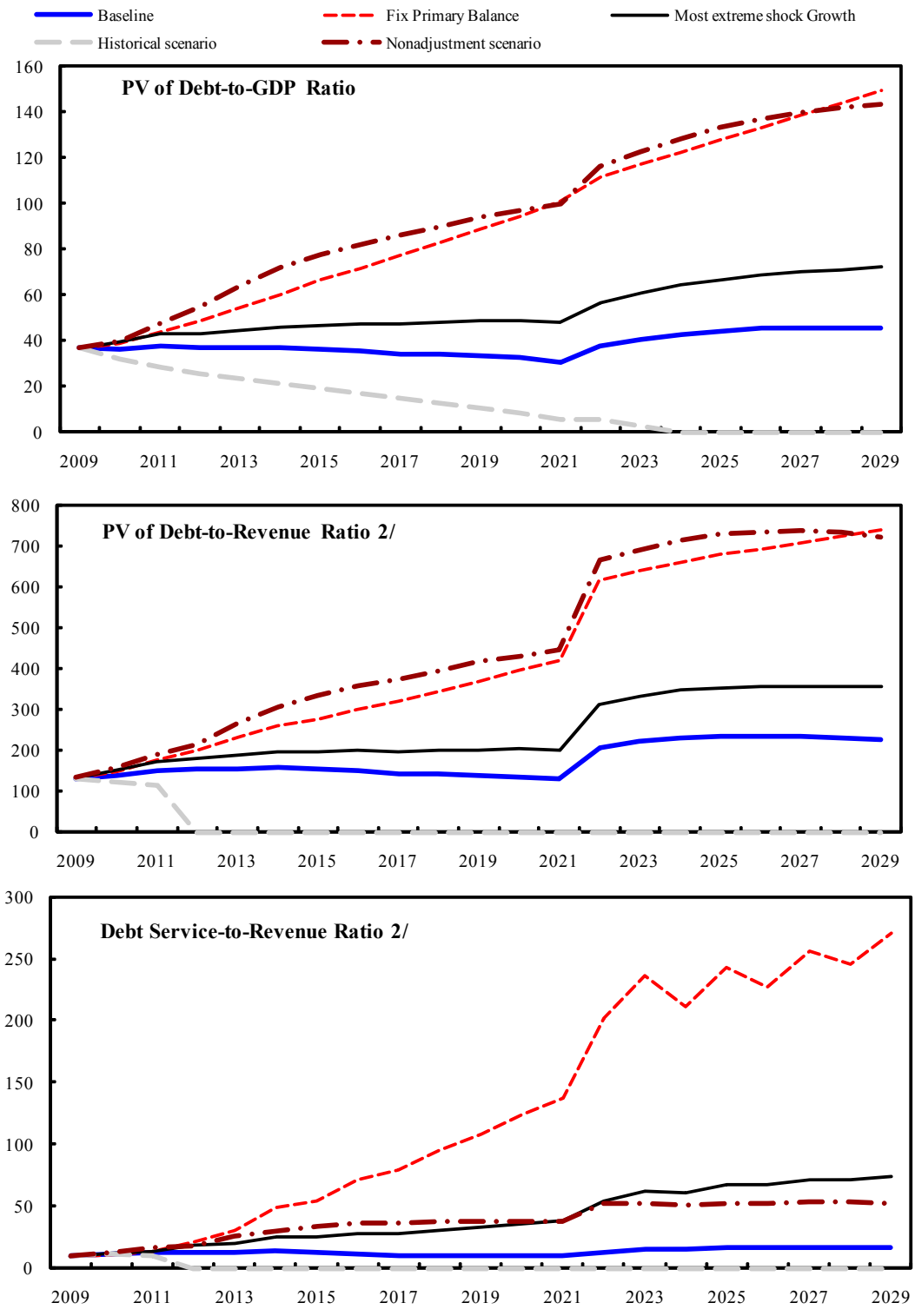
Figure 1. Yemen: Indicators of Public and Publicly Guaranteed External Debt under Alternatives Scenarios, 2009-2029 1/



Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2019. In figure b. it corresponds to a Most extreme shock Exports shock; in c. to a Most extreme shock Exports shock; in d. to a Most extreme shock Exports shock; in e. to a Most extreme shock Exports shock and in figure f. to a Most extreme shock Terms shock

Figure 2.Yemen: Indicators of Public Debt Under Alternative Scenarios, 2009-2029 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.

2/ Revenues are defined inclusive of grants.