INTERNATIONAL MONETARY FUND

REPUBLIC OF ARMENIA

Joint IMF/World Bank Debt Sustainability Analysis

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

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The IMF-World Bank staffs' debt sustainability analysis (DSA) suggests that Armenia is at a low risk of debt distress, with all external debt indicators well below the relevant country-specific debt-burden thresholds. An alternative scenario explores the impact of a new nuclear power plant. The analysis highlights the importance of continued sound macroeconomic policies and structural reforms for safeguarding the favorable debt outlook.

1. The DSA was prepared by Fund and World Bank staffs, using the joint Bank-Fund Low-Income Country Debt Sustainability Framework.[1] The macroeconomic assumptions underlying the baseline scenario are consistent with the framework presented in the staff report for the 2008 Article IV consultation and request for a low-access PRGF. The external debt data used for this exercise are broadly consistent with the authorities' medium term borrowing plans.

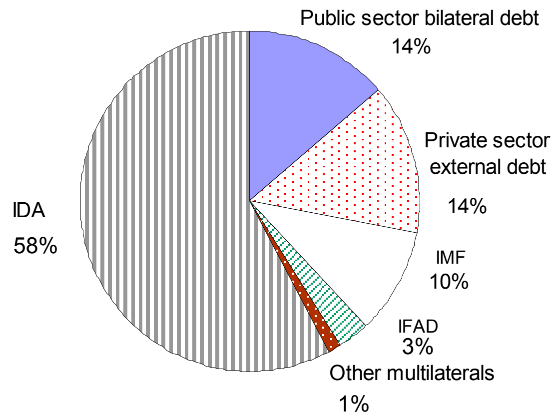
I. Structure of Debt

2. Armenia's external debt stock as of end-2007 is estimated at $1,846 million (20 percent of GDP), mostly representing public and publicly-guaranteed (PPG) debt owed to multilateral international organizations (Figure 1).[2] The outstanding debts of the government to the World Bank and to the Fund account for 58 percent and 10 percent of total external debt stock, respectively. Armenia's private sector external debt outstanding accounts for about 14 percent of total external debt.

[1] The most recent assessment of Armenia's debt sustainability was conducted in November 2007 in the context of the Fifth Review of the PRGF (Country Report No. 07/377).

[2] The DSA covers the central government only, since other public sector debt is believed to be negligible.

Figure 1. Armenia: External Debt Stock, end-2007



3. The total debt outlook continued to improve in 2007. Prudent debt management, combined with favorable exchange rate dynamics and robust economic growth, contributed to a decline in the external debt ratio from 25 percent of GDP in 2005 to 20 percent of GDP in 2007.

4. The share of domestic debt in the stock of public and publicly guaranteed debt is rather small, reflecting the limited development of the domestic debt markets. In 2007, the PPG debt owed to domestic creditors accounted for only 2.1 percent of GDP, virtually unchanged from the previous year.

II. THE BASELINE SCENARIO

5. The baseline scenario shows a sustainable fiscal position (Tables 1 and 2). The net present value of public sector debt would gradually increase over the projection period from about 10 percent of GDP in 2008 up to 20 percent of GDP in 2028, reflecting the increasing issuance of domestic debt securities on the one hand, but a declining share of public external debt on the other hand. The net present value of debt-to-revenue ratio would increase from 47 percent in 2008 to 67 percent in 2028, while the debt service–to-revenue ratio would edge up somewhat but not exceed 6 percent in any given year over the projection period. Throughout the projection period, these indicators for public debt would remain at comfortable levels and below the indicative thresholds for external debt.[3]

6. The external debt outlook remains benign, notwithstanding a notable moderation in external concessional financing (Table 3a, Figure 2). The net present value of external debt is expected to fall from 7 percent of GDP in 2007 to 5 percent of GDP in 2028, reflecting a

[3] External debt indicator thresholds for Armenia are as follows: present value of debt to export ratio (200 percent), present value of debt to GDP ratio (50 percent), present value of debt to revenue ratio (300 percent), debt service to export ratio (25 percent) and debt service to revenue ratio (35 percent).

Box 1. Macroeconomic Assumptions for the DSA Baseline Scenario, 2008–28

Annual real GDP growth is projected to average around 7 percent over the medium term, gradually declining to its long-run rate of 4 percent. The near-term growth is supported by the robust activity in construction and services, on the back of continued private transfers and FDI inflows.

Consistent with the CBA's target, the average inflation rate is assumed to be around 4 percent in the long-run. The near-term inflation is projected to be somewhat higher, largely on account of higher food and energy prices.

The external current account deficit is projected to average around 7 percent of GDP over the DSA projection period. Somewhat higher deficits are envisaged in the near-term, against the background of strong import growth. Exports are projected to grow robustly over the medium term, as new investments in base metal, minerals, and food processing sectors become operational. Private transfers will grow strongly in the near-term, financing a significant share of the trade deficit, but will gradually moderate thereafter.

In 2008–12, net FDI is expected to average about 7.0 percent of GDP, gradually moderating from the high levels explained by the privatization in base metal and mineral sectors. In the near term, FDI is expected to be concentrated mostly in these two traditional sectors, but also in food processing, telecommunication, banking and energy sectors. Improvements in business climate, however, should yield a more diversified FDI structure, with new investment going into new industries (e.g., tourism and IT sector). The long-run net FDI is projected to average around 5 percent of GDP.

Central government revenues (excluding grants) are projected to gradually increase from 19.6 percent of GDP in 2008 to 22.3 percent of GDP in 2013, and will continue to improve over the long-run, in line with government revenue targets.

The overall fiscal deficit is projected to decrease from 1.4 percent of GDP in 2008 to 1.0 percent of GDP in 2009, in line with understandings reached under the new PRGF program, and in the long term, remain at around 1 percent of GDP. Consistent with the staff recommendations, the gas subsidy expired on May 1st 2008 and the baseline assumes that no new subsidy will be introduced. It is also assumed that the import prices for gas will increase in 2009 from their current level of $110 to $154 per 1,000$m^3$.

The level of concessionality of new external borrowing is envisaged to decline in the future, as Armenia's income increases. The projected disbursements from the World Bank—Armenia's largest creditor, accounting for about 60 percent of country's total external debt stock as of end-2007—assume that starting from 2009 Armenia will begin receiving IBRD loans in addition to IDA credits, gradually shifting to exclusively IBRD borrowing by 2017. Starting 2009, IDA repayment terms are hardened, with the maturity period of 20 years. This reflects the fact that Armenia's per capita income exceeded the IDA eligibility threshold for two consequent years. Unidentified residual lending for 2009 and beyond is assumed to be on IBRD terms.

Consistent with the authorities' intention, deficit financing is assumed to be increasingly financed by domestic, rather than external, borrowing such that the stock of domestic debt would increase from 2.1 percent of GDP in 2007 to 10.1 percent of GDP in 2021, and to 14.9 percent by 2028. Residual borrowing from domestic sources reduces risks associated with currency mismatch of debt portfolio and contributes to deepening of domestic financial markets.

The private sector external debt stock in 2007 is estimated as the difference between Armenia's long-term total external debt and government's external debt. The new external borrowing by the private sector is assumed to match the balance of payments' conservative assumption on commercial banks' inflows of about 1 percent of GDP per annum. As the terms of Armenia's private sector borrowing are unknown, they are assumed to be similar to those in other comparable countries. Specifically, the maturity period is assumed to be 6 years (with a 1 year grace period) and the interest rate is set at 8 percent—a compromise between the interest rate on U.S. dollar-denominated sovereign bonds of similar maturity in Russia and Ukraine (about 6.5 percent), and the ongoing lending rate in U.S. dollars charged by Armenian banks on long-term loans (about 15–17 percent). To the extent that most of this lending is likely to be from foreign banks to their Armenian subsidiaries, this relatively low interest rate assumption is justified.

gradual increase in the share of the fiscal deficit financed by domestic sources and increasingly greater importance of external borrowing by the private sector. While Armenia's reliance on external financing gradually diminishes, the borrowing terms are projected to harden, leaving the external debt service in percent of exports broadly stable at about 3 percent over the long-term. The net present value of public external debt in percent of exports should fall from 46 percent in 2008 to 22 percent in 2028.

III. Stress Testing and Alternative Scenario

7. The standard menu of alternative scenarios and bound tests indicate that Armenia's public debt outlook would be most adversely affected by a lasting shock to economic growth (Figure 2).[4] Under the extreme adverse growth scenario the stress tests indicate that public debt ratios would follow a persistent upward trend through the projection horizon. Under permanently lower real GDP growth, the net present value of public debt-to-GDP would exceed 50 percent from 2025 onward, even though other debt indicators would remain at comfortable levels. Debt indicators are less prone to unfavorable debt dynamics under other stress tests. This result reinforces the importance of maintaining prudent financial policies and preserving macroeconomic stability in order to safeguard the debt outlook.

8. Armenia's external debt outlook is robust to a variety of shocks (Table 3b). Under all standard alternative scenarios and bound tests, the external debt ratios remain well below the relevant thresholds.

9. In addition to the standard stress test, an alternative baseline scenario, which included higher external debt financing for the planned construction of a power plant was also considered. The power plant is estimated to cost about $6 billion to be constructed during the period 2011–2017. This excludes the decommissioning of the existing nuclear power plant at an estimated cost of $1 billion. While the financing arrangements of this project are yet to be finalized, it is assumed as a worse case scenario that about $6 billion of the total cost will be financed by the government through the acquisition of non-concessional loans on commercial terms.[5] The funds are assumed to be evenly disbursed over six years.

10. The assumed increases in external borrowing associated with the power plant would result in a sharp but temporary worsening of debt indicators. The main debt indicators would more than double from 2011–2018, but revert to pre-power plant borrowing trend by the end of the projection period.

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[4] The framework for low-income country DSA incorporates alternative scenarios and bound tests aimed at identifying the sensitivities of the baseline projection to a range of potential shocks.

[5] Assumed terms for power plant financing are as follows: interest rate of 8 percent, one year grace period, and six years to maturity.

11. The external debt service to export ratio would breach the policy dependent threshold (25 percent) by 2013, but would quickly return to more sustainable levels and decline to less than 5 percent by 2028. The present value of debt to export ratio would jump from 39 percent in 2010 to 127 percent by 2014 but decline to 20 percent by the end of the projection period. The present value of the public sector debt to GDP ratio would increase from 9 percent of GDP and peak at 45 percent in 2016, while the debt to revenue ratio would move from 42 percent to a peak of 188 percent in 2016.

12. The results from this DSA suggest that Armenia's debt outlook is relatively stable. However, the debt outlook would deteriorate if a significant proportion of nonconcessional resources are required to finance projects such as the power plant. Given increasing external vulnerabilities and the sensitivity of the debt outlook to long-term growth assumptions, it is important that the authorities continue to follow a prudent borrowing strategy over the medium term.

Table 1. Armenia: 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	2018	2028	2014-28 Average
Public sector debt 1/	24.7	21.1	19.3			16.0	14.9	14.8	15.4	15.6	15.7		18.0	21.7	
Of which: foreign-currency denominated	22.4	18.9	17.2			13.7	12.2	11.7	11.6	11.2	10.6		9.8	6.9	
Change in public sector debt	-10.9	-3.6	-1.8			-3.3	-1.1	-0.1	0.6	0.2	0.2		0.8	0.3	
Identified debt-creating flows	-4.9	-3.6	-3.1			-1.5	-0.1	0.4	0.8	0.9	0.5		0.1	-0.4	
Primary deficit	1.5	1.7	2.0	2.1	1.8	1.1	0.6	0.9	1.1	0.7	0.6	0.8	0.4	0.4	0.4
Revenue and grants	17.8	18.0	20.1			20.2	21.1	21.4	21.9	22.3	22.8		25.2	30.2	
Of which: grants	0.4	0.5	0.7			0.6	0.9	0.7	0.6	0.5	0.4		0.4	0.3	
Primary (noninterest) expenditure	19.4	19.6	22.2			21.3	21.7	22.3	23.0	23.0	23.4		25.6	30.6	
Automatic debt dynamics	-5.9	-3.9	-4.6			-3.3	-0.6	-0.5	-0.3	0.3	-0.1		-0.3	-0.8	
Contribution from interest rate/growth differential	-1.2	-1.7	-1.3			-0.9	0.1	0.0	0.2	0.7	0.3		-0.3	-0.8	
Of which: contribution from average real interest rate	3.3	1.2	1.3			0.8	1.3	1.0	1.1	1.5	1.1		0.4	0.0	
Of which: contribution from real GDP growth	-4.5	-2.9	-2.6			-1.8	-1.2	-1.0	-0.8	-0.9	-0.9		-0.7	-0.8	
Contribution from real exchange rate depreciation	-4.6	-2.2	-3.4			-2.4	-0.7	-0.5	-0.5	-0.4	-0.4		...	...	
Other identified debt-creating flows	-0.6	-1.4	-0.5			0.8	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Privatization receipts (negative)	-0.6	-1.9	-1.4			-0.4	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	0.5	0.9			1.2	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes	-6.0	0.0	1.3			-1.8	-1.0	-0.5	-0.3	-0.8	-0.3		0.7	0.7	
Other Sustainability Indicators															
PV of public sector debt	2.2	2.2	11.2			9.6	9.3	9.4	9.9	10.3	11.1		15.0	20.3	
Of which: foreign-currency denominated	0.0	0.0	9.1			7.3	6.6	6.3	6.1	6.0	6.0		6.8	5.5	
Of which: external	...	...	9.1			7.3	6.6	6.3	6.1	6.0	6.0		6.8	5.5	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	4.6	4.3	3.8			3.9	1.9	1.4	1.7	2.0	1.8		1.6	2.2	
PV of public sector debt-to-revenue and grants ratio (in percent)	12.6	12.2	55.5			47.4	44.2	43.8	45.3	46.4	49.0		59.7	67.4	
PV of public sector debt-to-revenue ratio (in percent)	12.9	12.6	57.7			48.7	46.1	45.2	46.5	47.4	50.0		60.6	68.2	
Of which: external 3/	…	…	46.9			37.1	32.5	30.2	28.6	27.4	26.8		27.4	18.3	
Debt service-to-revenue and grants ratio (in percent) 4/	15.7	12.0	9.6			3.8	3.9	3.8	4.0	4.9	4.6		4.8	6.1	
Debt service-to-revenue ratio (in percent) 4/	3.0	2.0	1.7			1.6	1.9	1.9	2.0	2.8	2.6		2.4	2.0	
Primary deficit that stabilizes the debt-to-GDP ratio	12.4	5.3	3.8			4.4	1.6	1.0	0.5	0.5	0.4		-0.4	0.1	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	14.5	13.3	13.8	10.5	3.9	10.0	8.0	7.0	6.0	6.0	6.0	7.2	4.0	4.0	4.2
Average nominal interest rate on forex debt (in percent) 5/	1.0	0.9	0.9	1.6	0.8	0.8	0.8	0.9	0.9	1.0	1.1	0.9	1.7	2.9	2.1
Average real interest rate on domestic debt (in percent)	-5.3	-4.0	-12.2	13.9	23.8	-6.6	6.1	5.3	5.2	9.1	6.3	4.3	3.9	1.5	2.8
Real exchange rate depreciation (in percent, + indicates depreciation)	-26.6	-18.4	-33.6	-10.1	15.8	-24.0	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	20.5	15.0	26.7	8.1	10.7	19.2	7.6	6.4	6.4	5.4	5.4	8.4	2.3	1.5	2.5
Growth of real primary spending (deflated by GDP deflator, in percent)	0.3	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Grant element of new external borrowing (in percent)	...	...	...	…	…	53.9	44.7	56.1	58.8	48.7	15.8	46.3	15.8	15.8	...

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

1/ Gross 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 2. Armenia: 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	10	9	9	10	10	11	15	20
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	10	9	10	10	10	12	19	26
A2. Primary balance is unchanged from 2008	10	9	8	8	8	8	16	29
A3. Permanently lower GDP growth 1/	10	8	8	8	9	10	23	67
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	10	9	8	8	8	9	15	27
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	10	11	13	13	12	12	17	23
B3. Combination of B1-B2 using one half standard deviation shocks	10	10	12	11	10	10	13	16
B4. One-time 30 percent real depreciation in 2009	10	11	10	9	8	8	14	22
B5. 10 percent of GDP increase in other debt-creating flows in 2009	10	18	17	16	15	15	19	25
PV of Debt-to-Revenue Ratio 2/								
Baseline	47	44	44	45	46	49	60	67
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	47	45	45	46	47	51	76	85
A2. Primary balance is unchanged from 2008	47	41	38	36	35	37	66	98
A3. Permanently lower GDP growth 1/	47	40	37	38	38	42	91	222
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	47	40	38	38	36	38	61	88
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	47	54	63	59	54	53	66	77
B3. Combination of B1-B2 using one half standard deviation shocks	47	50	54	50	44	42	50	54
B4. One-time 30 percent real depreciation in 2009	47	51	45	41	36	37	54	72
B5. 10 percent of GDP increase in other debt-creating flows in 2009	47	84	77	72	67	65	75	83
Debt Service-to-Revenue Ratio 2/								
Baseline	4	4	4	4	5	5	5	6
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	4	4	4	8	8	9	12	14
A2. Primary balance is unchanged from 2008	4	4	4	5	6	6	8	12
A3. Permanently lower GDP growth 1/	4	4	4	5	6	7	13	35
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	4	4	4	5	6	6	7	10
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	4	4	5	13	14	10	7	9
B3. Combination of B1-B2 using one half standard deviation shocks	4	4	4	11	11	8	5	5
B4. One-time 30 percent real depreciation in 2009	4	4	5	5	6	6	6	9
B5. 10 percent of GDP increase in other debt-creating flows in 2009	4	4	7	29	9	19	8	10

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

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

2/ Revenues are defined inclusive of grants.

Table 3a. Armenia: External Debt Sustainability Framework, Baseline Scenario, 2005-2028 1/
(In percent of GDP, unless otherwise indicated)

	Actual			Historical 0 Average 0	Standard Deviation	Projections									
	2005	2006	2007			2008	2009	2010	2011	2012	2013	2008-2013 Average	2018	2028	2014-2028 Average
External debt (nominal) 1/	**27.3**	**22.7**	**20.1**			**17.5**	**16.5**	**15.7**	**14.8**	**13.8**	**12.7**		**11.3**	**8.3**	
Of which : public and publicly guaranteed (PPG)	22.4	18.9	17.2			13.7	12.2	11.7	11.6	11.2	10.6		9.8	6.9	
Change in external debt	-6.0	-4.6	-2.6			-2.6	-1.0	-0.8	-0.9	-1.0	-1.1		0.1	-0.4	
Identified net debt-creating flows	-12.9	-11.6	-7.8			1.4	2.8	2.7	1.6	0.7	1.4		1.7	-1.9	
Non-interest current account deficit	**0.3**	**1.3**	**6.0**	**6.6**	**5.2**	**9.3**	**10.3**	**10.2**	**9.2**	**8.0**	**8.3**		**7.4**	**2.6**	5.9
Deficit in balance of goods and services	14.4	16.1	19.7			23.0	24.8	23.9	22.0	20.5	19.8		17.8	11.0	
Exports	28.9	23.7	19.3			15.7	15.5	15.9	16.3	16.5	16.6		19.5	25.2	
Imports	43.3	39.7	39.0			38.7	40.2	39.8	38.3	37.0	36.5		37.4	36.3	
Net current transfers (negative = inflow)	-10.7	-10.9	-10.3	-9.3	1.2	-10.0	-10.4	-9.9	-9.4	-9.2	-8.4		-7.8	-6.2	-7.2
Of which : official	-1.3	-1.3	-1.0			-0.5	-0.4	-0.2	-0.1	-0.5	0.0		-0.3	-0.2	
Other current account flows (negative = net inflow)	-3.5	-4.0	-3.5			-3.8	-4.0	-3.8	-3.5	-3.3	-3.1		-2.7	-2.3	
Net FDI (negative = inflow)	**-4.7**	**-7.0**	**-7.2**	**-6.1**	**2.3**	**-6.8**	**-6.9**	**-6.9**	**-7.1**	**-6.8**	**-6.5**		**-5.6**	**-4.5**	-5.2
Endogenous debt dynamics 2/	**-8.4**	**-5.8**	**-6.5**			**-1.1**	**-0.7**	**-0.6**	**-0.4**	**-0.5**	**-0.4**		**-0.1**	**0.0**	
Contribution from nominal interest rate	0.8	0.6	0.4			0.5	0.5	0.4	0.4	0.3	0.3		0.3	0.3	
Contribution from real GDP growth	-3.5	-2.8	-2.2			-1.5	-1.2	-1.0	-0.8	-0.8	-0.7		-0.4	-0.3	
Contribution from price and exchange rate changes	-5.7	-3.6	-4.8			...	...	...	...	...	...		...	...	
Residual (3-4) 3/	**6.9**	**6.9**	**5.1**			**-4.0**	**-3.8**	**-3.6**	**-2.5**	**-1.7**	**-2.6**		**-1.6**	**1.5**	
Of which: exceptional financing	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
PV of external debt 4/	...	...	12.0			11.1	10.9	10.3	9.4	8.6	8.1		8.3	6.9	
In percent of exports	...	...	62.0			70.5	70.5	64.8	57.5	52.1	48.6		42.5	27.2	
PV of PPG external debt	**...**	**...**	**9.1**			**7.3**	**6.6**	**6.3**	**6.1**	**6.0**	**6.0**		**6.8**	**5.5**	
In percent of exports	**...**	**...**	**47.1**			**46.3**	**42.6**	**39.6**	**37.6**	**36.2**	**36.0**		**34.8**	**21.6**	
In percent of government revenues	**...**	**...**	**46.9**			**37.1**	**32.5**	**30.2**	**28.6**	**27.4**	**26.8**		**27.4**	**18.3**	
Debt service-to-exports ratio (in percent)	**2.7**	**2.5**	**2.2**			**8.3**	**8.1**	**8.7**	**8.6**	**8.0**	**7.2**		**4.1**	**4.5**	
PPG debt service-to-exports ratio (in percent)	**-2.1**	**-2.9**	**-2.6**			**2.9**	**2.6**	**2.3**	**2.2**	**2.1**	**1.9**		**1.8**	**2.7**	
PPG debt service-to-revenue ratio (in percent)	**-3.5**	**-3.9**	**-2.6**			**2.3**	**2.0**	**1.8**	**1.7**	**1.6**	**1.4**		**1.4**	**2.3**	
Total gross financing need (Billions of U.S. dollars)	-0.2	-0.3	-0.1			0.5	0.7	0.7	0.6	0.5	0.7		0.9	-0.5	
Non-interest current account deficit that stabilizes debt ratio	6.3	5.9	8.6			11.8	11.3	11.1	10.0	9.0	9.5		7.3	3.0	
Key macroeconomic assumptions															
Real GDP growth (in percent)	14.5	13.3	13.8	10.5	3.9	10.0	8.0	7.0	6.0	6.0	6.0	7.2	4.0	4.0	4.2
GDP deflator in U.S. dollar terms (change in percent)	20.5	15.0	26.7	8.1	10.7	19.2	7.6	6.4	6.4	5.4	5.4	8.4	2.3	1.5	2.5
Effective interest rate (percent) 5/	3.2	2.8	2.7	2.9	0.6	3.0	3.2	3.1	2.8	2.6	2.5	2.8	2.8	3.9	3.1
Growth of exports of G&S (U.S. dollar terms, in percent) 6/	43.8	6.7	17.6	19.0	12.8	6.7	14.4	16.8	15.8	13.3	12.5	13.2	10.7	8.0	9.8
Growth of imports of G&S (U.S. dollar terms, in percent) 7/	40.3	19.4	41.5	15.2	16.6	30.1	20.8	12.6	8.6	8.0	10.0	15.0	7.5	5.3	6.8
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	53.9	44.7	56.1	58.8	48.7	15.8	46.3	15.8	15.8	15.8
Government revenues (excluding grants, in percent of GDP)	17.4	17.5	19.4			19.6	20.2	20.8	21.4	21.8	22.3		24.8	29.8	26.3
Aid flows (in Billions of U.S. dollars) 7/	0.3	0.2	0.3			0.2	0.3	0.5	0.8	1.0	1.2		2.2	3.7	
Of which : Grants	0.0	0.0	0.1			0.1	0.1	0.1	0.1	0.1	0.1		0.1	0.2	
Of which: Concessional loans	0.3	0.2	0.2			0.1	0.2	0.4	0.7	0.9	1.1		2.1	3.5	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			1.1	1.2	1.4	1.4	1.0	0.6		0.5	0.4	0.5
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			71.3	74.8	70.9	70.1	64.6	46.6		39.9	51.0	45.5
Memorandum items:															
Nominal GDP (Billions of U.S. dollars)	4.9	6.4	9.2			12.1	14.0	16.0	18.0	20.1	22.5		32.8	60.3	
Nominal dollar in GDP growth	38.0	30.3	44.2			31.1	16.2	13.9	12.8	11.7	11.7	**16.2**	6.4	5.6	6.8
PV of PPG external debt (in Billions of U.S. dollars)			0.8			0.9	0.9	1.0	1.1	1.2	1.3		2.2	3.3	
(PVt-PVt-1)/GDPt-1 (in percent)						0.4	0.4	0.6	0.6	0.6	0.7	0.5	0.8	0.0	0.4

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 3b. Armenia: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2008-2028
(In percent)

	Projections										
	2008	2009	2010	2011	2012	2013	**2018**	2019	2020	2027	2028
PV of debt-to GDP ratio											
Baseline	7	7	6	6	6	6	**7**	7	7	6	5
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	7	5	4	3	4	3	**3**	3	3	9	10
A2. New public sector loans on less favorable terms in 2008-2028 2/	7	7	7	7	6	6	**7**	7	8	7	6
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	7	7	6	6	6	6	**7**	7	7	6	6
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	7	7	9	9	8	8	**8**	8	8	6	6
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009-2010	7	7	8	7	7	7	**8**	8	9	7	7
B4. Net nondebt creating flows at historical average minus one standard deviation in 2009-2010 4/	7	11	14	13	13	12	**11**	11	11	7	6
B5. Combination of B1-B4 using one-half standard deviation shocks	7	10	14	13	13	12	**11**	11	11	7	6
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	7	9	9	8	8	8	**9**	10	10	8	8
PV of debt-to-exports ratio											
Baseline	46	43	40	38	36	36	**35**	35	34	23	22
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	46	33	22	20	21	20	**16**	15	15	34	40
A2. New public sector loans on less favorable terms in 2008-2028 2/	46	43	41	40	38	37	**37**	37	37	27	25
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	46	43	40	38	36	36	**35**	35	34	23	22
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	46	52	67	63	60	58	**50**	49	48	29	27
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009-2010	46	43	40	38	36	36	**35**	35	34	23	22
B4. Net nondebt creating flows at historical average minus one standard deviation in 2009-2010 4/	46	70	88	81	76	73	**57**	54	51	27	24
B5. Combination of B1-B4 using one-half standard deviation shocks	46	66	87	81	76	73	**57**	55	52	28	25
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	46	43	40	38	36	36	**35**	35	34	23	22
PV of debt-to-revenue ratio											
Baseline	37	33	30	29	27	27	**27**	28	28	20	18
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	37	25	17	15	16	15	**13**	12	12	29	34
A2. New public sector loans on less favorable terms in 2008-2028 2/	37	33	31	31	29	27	**29**	29	29	22	21
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	37	33	31	29	28	27	**28**	28	28	20	19
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	37	37	43	40	38	37	**34**	33	32	21	19
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009-2010	37	36	37	35	33	32	**33**	33	33	24	22
B4. Net nondebt creating flows at historical average minus one standard deviation in 2009-2010 4/	37	53	67	62	58	54	**45**	43	41	23	21
B5. Combination of B1-B4 using one-half standard deviation shocks	37	52	67	62	58	55	**46**	44	42	24	22
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	37	45	42	40	38	37	**38**	38	38	27	25

Table 3b. Armenia: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2008-2028 (continued)
(In percent)

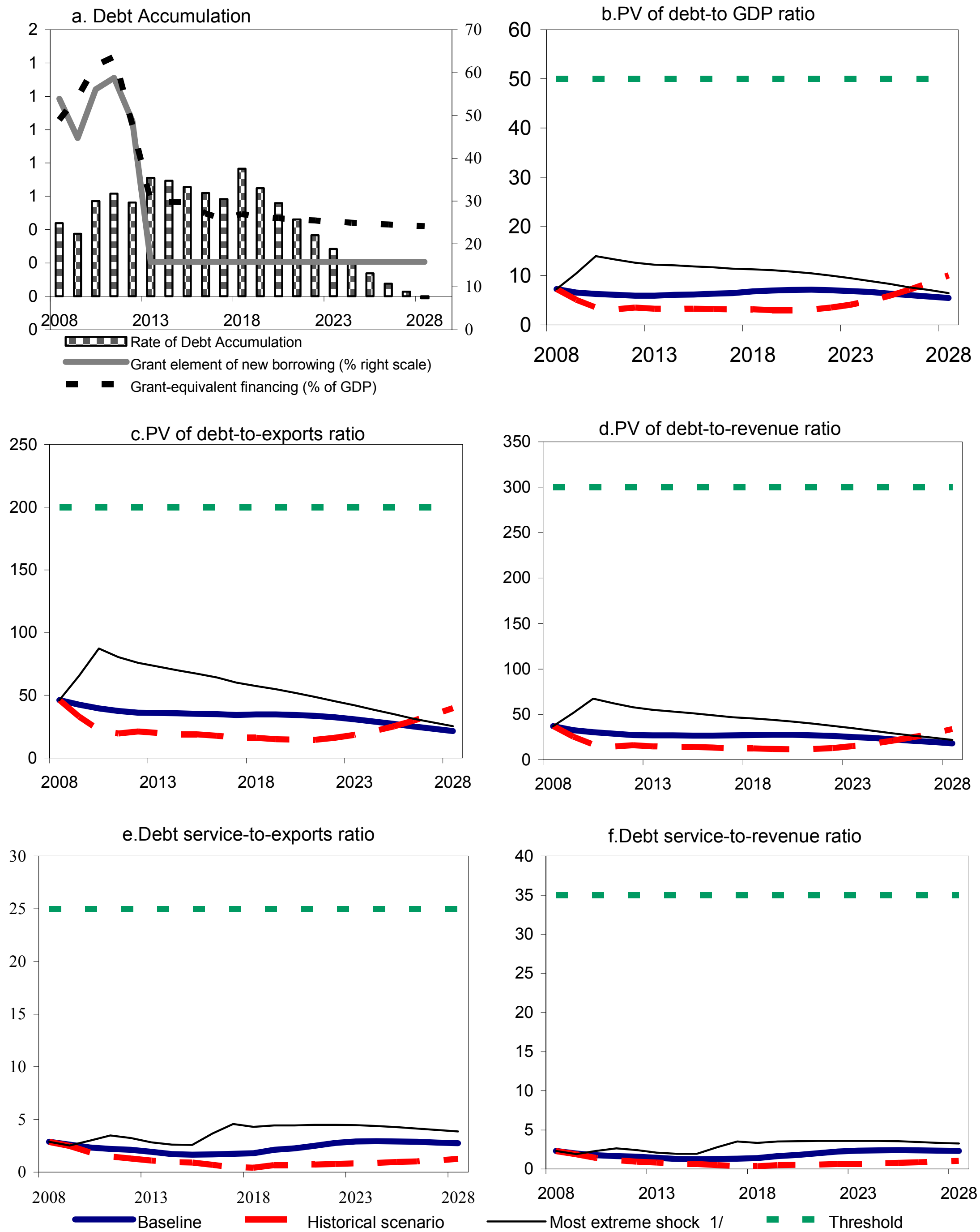
Debt service-to-exports ratio

Baseline	3	3	2	2	2	2	**2**	2	2	3	3
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	3	2	2	1	1	1	**0**	1	1	1	1
A2. New public sector loans on less favorable terms in 2008-2028 2/	3	3	2	2	2	2	**2**	2	2	2	2
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	3	3	2	2	2	2	**2**	2	2	3	3
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	3	3	3	3	3	3	**3**	3	4	4	4
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009-2010	3	3	2	2	2	2	**2**	2	2	3	3
B4. Net nondebt creating flows at historical average minus one standard deviation in 2009-2010 4/	3	3	3	3	3	3	**4**	4	4	4	4
B5. Combination of B1-B4 using one-half standard deviation shocks	3	3	3	4	3	3	**4**	4	4	4	4
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	3	3	2	2	2	2	**2**	2	2	3	3
Debt service-to-revenue ratio											
Baseline	2	2	2	2	2	1	**1**	2	2	2	2
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	2	2	1	1	1	1	**0**	1	1	1	1
A2. New public sector loans on less favorable terms in 2008-2028 2/	2	2	2	2	2	2	**2**	2	2	1	1
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	2	2	2	2	2	1	**1**	2	2	2	2
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	2	2	2	2	2	2	**2**	2	2	3	3
B3. U.S. dollar GDP deflator at historical average minus one standard deviation in 2009-2010	2	2	2	2	2	2	**2**	2	2	3	3
B4. Net nondebt creating flows at historical average minus one standard deviation in 2009-2010 4/	2	2	2	3	2	2	**3**	4	4	3	3
B5. Combination of B1-B4 using one-half standard deviation shocks	2	2	2	3	3	2	**3**	4	4	3	3
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	2	3	2	2	2	2	**2**	2	2	3	3
Memorandum item:											
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	23	23	23	23	23	23	**23**	23	23	23	23

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 nondebt 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.

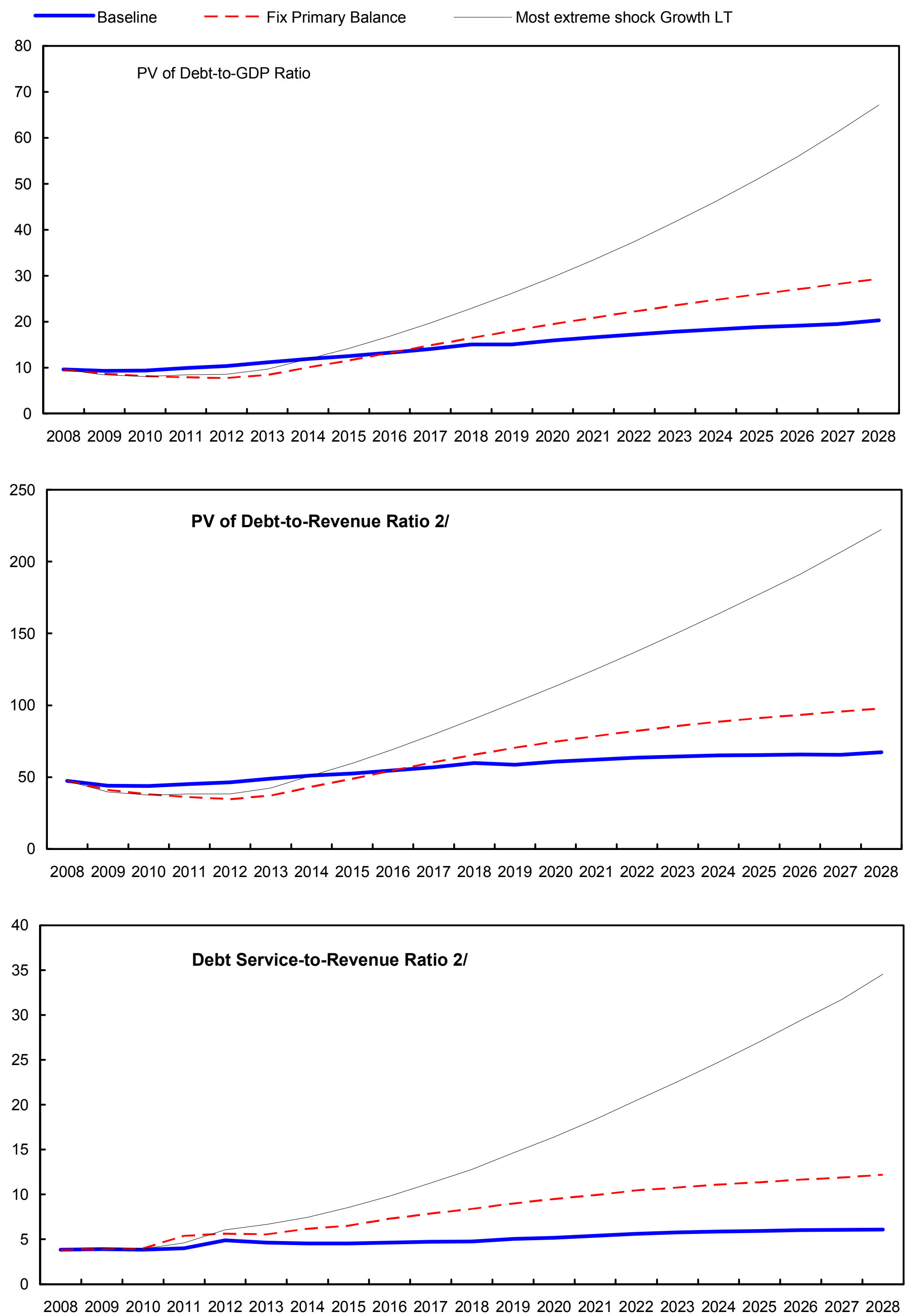
Figure 2. Armenia: Indicators of Public and Publicly Guranteed External Debt Under Alternative Scenarios, 2008-2028



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 Combination shock; in c. to a Combination shock; in d. to a Combination shock; in e. to a Non-debt flows shock and in picture f. to a Non-debt flows shock

Figure 3. Armenia: Indicators of Public Debt Under Alternative Scenarios, 2008-2028



Sources: Armenian 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.