INTERNATIONAL MONETARY FUND

REPUBLIC OF ARMENIA

IMF Debt Sustainability Analysis

Prepared by the Staff of the International Monetary Fund

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The updated IMF 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. Despite the inclusion of higher short term borrowing from the Fund, the debt outlook remains similar to that which was presented in Country Report No. 09/29. An alternative scenario examines the impact of additional new borrowing from Russia. The analysis highlights the importance of continued sound macroeconomic policies and reforms for safeguarding the favorable debt outlook.

1. The DSA was prepared by Fund staff, using the joint Bank-Fund Low-Income Country Debt Sustainability Framework.[1] The macroeconomic assumptions underlying the baseline scenario are consistent with the medium term framework presented in the staff report and include new Fund lending in the baseline. The external debt data used for this exercise is broadly consistent with the authorities' medium term borrowing plans.

Structure of debt

2. Armenia's external debt stock as of end-2008 is estimated at $2,174 million (18 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 55 percent and 6 percent of total external debt stock, respectively. Armenia's estimated private sector external debt outstanding accounts for about 15 percent of total external debt.

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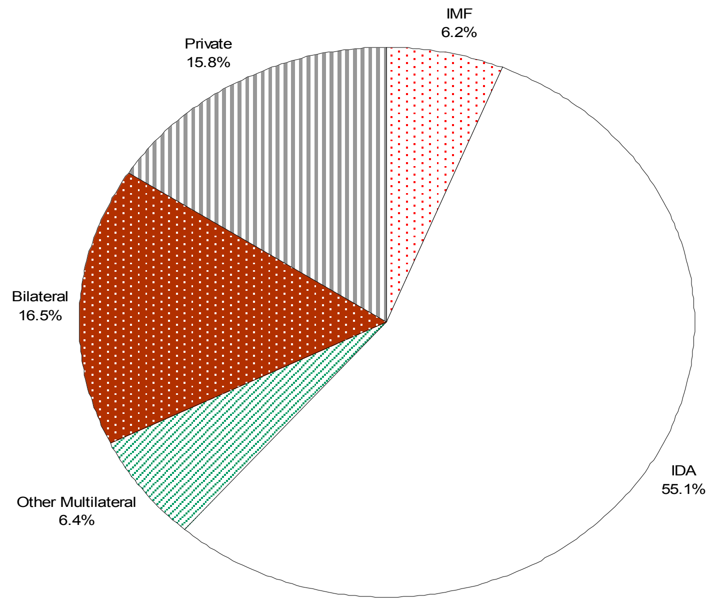
[1] The most recent assessment of Armenia's debt sustainability was conducted in November 2008 in the context of the new PRGF (Country Report No. 09/29).

[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 2008



3. The share of domestic debt in the stock of public and publicly guaranteed debt is small, reflecting the limited development of the domestic debt markets. In 2008, the PPG debt owed to domestic creditors accounted for only 2.3 percent of GDP, virtually unchanged from the previous year.

The baseline scenario

4. The baseline scenario shows a sustainable fiscal position (Table 1, Figure 3). The net present value of public sector debt would gradually increase over the projection period from 9.8 percent of GDP in 2008 up to 23.6 percent of GDP in 2028, reflecting the increasing issuance of domestic debt securities on the one hand, and a declining share of concessional public external debt on the other hand. The net present value of debt-to-revenue ratio would increase from 49 percent in 2008 and climbing steadily to 97 percent in 2012 and declining thereafter to 80 percent in 2028. The debt service–to-revenue ratio would also edge up to 12 percent in 2013 and declining to below 10 percent at the end of the projection period. Despite the temporary spike in 2009-2012, these indicators for public debt would remain at comfortable levels and below the indicative indicators for external debt.

Box 1. Macroeconomic Assumptions for the DSA Baseline Scenario, 2009–28

Annual real GDP growth is projected to average around about 6 percent between 2011-2016, thereafter declining to its long-run rate of 4 percent. Medium term growth is supported by a relatively strong recovery in private transfers and FDI inflows. The average inflation rate is assumed to be around 4 percent in the long-run.

The external current account deficit is projected to average around 7.5 percent of GDP over the DSA projection period. Somewhat higher deficits are envisaged in the near-term, against the background of weakening export demand and private transfers. Exports are projected to recover steadily over the medium term, owing to increased exchange rate competitiveness and as new investments in base metal, minerals, and food processing sectors become operational. Private transfers are projected to rebound over the medium term, financing a significant share of the trade deficit, but will gradually moderate thereafter.

In 2010-15, net FDI is expected to average about 6.0 percent of GDP, gradually moderating from the high levels experienced in the pre crisis period, which was driven by the privatization in base metal and mineral sectors. In the near term, the level of FDI will be constrained by developments in the global economy and in particular Russia. Improvements in business climate, however, should yield a more diversified FDI structure, with new investment going into new industries (e.g., tourism and the 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 20.0 percent of GDP in 2009 to 22.7 percent of GDP in 2014, and will continue to improve over the long-run, in line with government revenue targets. The overall fiscal deficit is projected to decrease from 2.8 percent of GDP in 2009 to 2.4 percent of GDP in 2011, and in the long term, remain at around 1.4 percent of GDP.

The level of concessionality of new external borrowing is envisaged to decline in the future, given recent increases in Armenia's relative income. The projected disbursements from the World Bank—Armenia's largest creditor, accounting for about 55 percent of the country's total external debt stock as of end-2008—assume that starting from 2009 Armenia will begin receiving IBRD loans in addition to IDA credits, gradually shifting to exclusively IBRD borrowing over the medium term. In addition, the degree of concessionality of borrowing is likely to be further reduced given significant level of borrowing from the Fund over the next three years. Unidentified residual lending for 2011 and beyond is assumed to be on non-concessional terms.

Consistent with the authorities' intention, over the medium term the deficit is assumed to be increasingly financed by domestic borrowing. The stock of domestic debt would thus increase from 2.6 percent of GDP in 2008 to 12.3 percent of GDP in 2022, and to 16.9 percent by 2028.

The private sector external debt stock in 2008 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 estimated as a proportion of commercial banks' projected inflows. The terms of private sector borrowing are unknown, and 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.

5. The external debt outlook remains benign, notwithstanding a notable increase in non-concessional financing over the medium term (Table 3a, Figure 2). The net present value of external debt is expected to increase from 7 percent of GDP in 2008 to 16 percent of GDP in 2013 and declining thereafter to about 7 percent in 2028. The increase reliance on non-concessional external borrowing over the medium term will result in a steep but temporary increase in the external debt service ratio. External debt service in percent of exports increases from 3 percent to 11 percent over the medium term, but declines relatively quickly to a long term average of about 3 percent. The net present value of public external debt in percent of exports rises rapidly from 50 percent in 2008 to 90 percent in 2012, on account of increased IMF lending and weaker export performance. However, with a projected gradual recovery in exports earnings, and moderated debt accumulation over the medium term, the NPV of debt to export ratio declines steadily to reach 20 percent in 2028.

Stress testing and alternative scenario

6. 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).[3] 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 30 percent from about 2020 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.

7. 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.

8. In addition to the standard stress test an alternative scenario, which included higher external debt financing for government investment spending was also considered. The investment is expected to be financed by a $500 million loan from Russia. The exact terms of the loan are unknown . The following is assumed: (i) an interest rate will be charged at a rate of LIBOR plus three percent, with a grace period of 5 years and maturity of 15 years; and (ii) the loan is assumed to be fully disbursed in 2009-2010.

9. The increase in external borrowing associated with the Russian loan is projected to have minimal impact on Armenia's long term debt sustainability. Over the near term this additional borrowing will result in a steep increase in all debt indicators. The NPV of debt to export ratio would jump to 120 percent and the debt service to revenue ratio would increase to 108 percent by 2010. These results suggest that the capacity to contract additional non-

[3] 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.

concessional borrowing over the near term is relatively restricted. However, thanks to the relatively favorable starting position, all indicators would remain well below the country specific debt-burden thresholds.

10. The results from this DSA suggest that Armenia's debt outlook is relatively stable. However given increasing external vulnerabilities and the sensitivity of the debt outlook to long-term growth assumptions, it is important that the authorities 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					Estimate	Projections												
	2005	2006	2007	Average	Standard Deviation	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2008-13 Average	2018	2028	2014-28 Average
Public sector debt 1/	24.3	18.7	17.5			17.9	26.7	28.3	29.3	28.7	26.3	25.3	24.6	25.0	25.2	27.8	25.7	26.1	
o/w foreign-currency denominated	22.1	16.5	15.4			15.4	23.4	24.6	24.8	23.5	20.3	18.6	17.3	17.0	16.5	23.3	16.3	9.2	
Change in public sector debt	-8.3	-5.6	-1.2			0.4	8.7	1.6	0.9	-0.6	-2.4	-1.0	-0.7	0.4	0.2		0.5	0.2	
Identified debt-creating flows	-5.5	-5.6	-2.3			0.0	5.7	2.7	1.3	2.7	-0.1	-0.4	-1.0	-0.3	-0.5		0.1	0.0	
Primary deficit	1.8	1.7	2.0	2.1	1.8	1.4	2.7	2.2	1.8	1.3	1.2	1.0	0.7	0.6	0.6	1.8	0.6	0.7	0.8
Revenue and grants	17.8	18.0	20.1			19.9	21.1	21.3	21.6	22.0	22.5	23.0	23.4	23.9	24.4		24.9	29.7	
of which: grants	0.4	0.5	0.7			0.3	0.9	0.9	0.2	0.2	0.3	0.2	0.6	0.6	0.6		0.5	0.2	
Primary (noninterest) expenditure	19.7	19.6	22.1			21.4	23.8	23.4	23.5	23.3	23.7	24.0	24.1	24.5	25.0		25.5	30.4	
Automatic debt dynamics	-6.7	-5.9	-3.8			-1.7	3.0	0.6	-0.5	1.3	-1.3	-1.4	-1.7	-0.9	-1.1		-0.6	-0.7	
Contribution from interest rate/growth differential	-4.8	-1.7	-1.1			-0.9	-0.4	0.4	0.2	1.2	-0.1	-1.2	-1.1	-1.1	-0.9		-0.7	-0.8	
of which: contribution from average real interest rate	-0.7	1.2	1.2			0.2	-0.6	1.2	1.8	2.8	1.5	0.1	0.1	0.1	0.1		0.3	0.2	
of which: contribution from real GDP growth	-4.1	-2.8	-2.3			-1.1	0.3	-0.8	-1.6	-1.7	-1.6	-1.3	-1.2	-1.2	-1.0		-1.0	-1.0	
Contribution from real exchange rate depreciation	-1.9	-4.2	-2.7			-0.9	3.4	0.2	-0.8	0.2	-1.2	-0.2	-0.5	0.1	-0.2		...	...	
Other identified debt-creating flows	-0.6	-1.4	-0.5			0.3	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)	-0.6	-1.9	-1.4			-0.9	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	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	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	0.0	0.0		0.0	0.0	
Residual, including asset changes	-2.8	0.0	1.1			0.4	3.1	-1.1	-0.3	-3.3	-2.3	-0.6	0.3	0.7	0.7		0.4	0.2	
Other Sustainability Indicators																			
PV of public sector debt	2.2	2.2	10.2			9.9	16.0	18.7	20.4	21.4	21.5	22.2	22.0	22.2	22.1		22.2	23.7	
o/w foreign-currency denominated	0.0	0.0	8.1			7.4	12.7	15.0	15.9	16.2	15.5	15.5	14.7	14.2	13.4		12.8	6.8	
o/w external	...	...	8.1			7.4	12.7	15.0	15.9	16.2	15.5	15.5	14.7	14.2	13.4		12.8	6.8	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...	...	...	...	...		...	...	
Gross financing need 2/	5.1	4.4	4.4			4.4	2.2	3.0	3.2	3.0	3.5	4.0	3.4	2.5	2.1		2.1	3.0	
PV of public sector debt-to-revenue and grants ratio (in percent)	12.6	12.2	50.6			49.8	75.9	88.2	94.2	97.1	95.6	96.8	93.9	92.8	90.5		89.3	79.7	
PV of public sector debt-to-revenue ratio (in percent)	12.9	12.6	52.6			50.6	79.4	91.8	94.9	97.8	96.7	97.8	96.2	95.2	92.7		91.2	80.4	
o/w external 3/	…	…	41.8			37.6	63.1	73.5	73.8	74.3	69.7	68.2	64.2	61.0	56.3		52.5	23.0	
Debt service-to-revenue and grants ratio (in percent) 4/	1.4	2.0	1.6			1.5	0.7	2.4	2.6	3.6	3.0	2.9	2.9	2.8	2.8		2.6	2.7	
Debt service-to-revenue ratio (in percent) 4/	1.4	2.0	1.7			1.5	0.7	2.5	2.6	3.7	3.0	2.9	2.9	2.9	2.9		2.6	2.7	
Primary deficit that stabilizes the debt-to-GDP ratio	10.1	7.3	3.2			1.0	-6.1	0.5	0.9	1.9	3.6	2.0	1.4	0.2	0.4		0.1	0.5	
Key macroeconomic and fiscal assumptions																			
Real GDP growth (in percent)	14.5	13.2	13.8	10.5	3.9	6.8	-1.5	3.0	6.0	6.0	6.0	5.0	5.0	5.0	4.0	4.4	4.0	4.0	4.2
Average nominal interest rate on forex debt (in percent)	1.0	0.9	0.9	1.6	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.2	1.3	1.4	1.5	0.8	1.6	2.1	1.8
Average real interest rate on domestic debt (in percent)	...	-4.0	-12.2	16.1	24.2	-9.0	...	19.0	8.9	11.2	5.4	2.9	3.0	3.4	3.8	7.1	3.0	2.4	1.8
Real exchange rate depreciation (in percent, + indicates depreciation)	-20.6	-27.6	-32.3	-11.0	16.8	-15.6	...	...	...	...	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	20.5	15.1	26.7	8.1	10.8	21.4	-7.9	-6.5	2.1	3.1	4.1	5.1	4.1	3.1	2.1	2.7	2.1	1.5	2.4
Growth of real primary spending (deflated by GDP deflator, in percent)	0.3	0.1	0.3	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1
Grant element of new external borrowing (in percent)	...	...	...	…	…	53.9	31.5	31.1	25.5	18.9	15.8	15.8	15.8	15.8	15.8	29.4	15.8	15.8	...

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

1/ Gross debt of the central government.

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	16	19	20	21	21	22	24
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	10	13	13	13	13	13	19	32
A2. Primary balance is unchanged from 2008	10	13	14	13	12	12	19	54
A3. Permanently lower GDP growth 1/	10	14	16	17	16	17	28	70
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	10	12	10	8	5	3	-5	-25
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	10	16	19	19	17	16	19	24
B3. Combination of B1-B2 using one half standard deviation shocks	10	14	15	12	8	5	-6	-32
B4. One-time 30 percent real depreciation in 2009	10	19	21	20	20	19	22	29
B5. 10 percent of GDP increase in other debt-creating flows in 2009	10	24	25	25	23	22	24	28
PV of Debt-to-Revenue Ratio 2/								
Baseline	49	75	88	94	97	95	89	80
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	49	60	63	62	59	58	76	108
A2. Primary balance is unchanged from 2008	49	62	65	62	57	53	75	184
A3. Permanently lower GDP growth 1/	49	68	77	78	75	74	113	236
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	49	55	49	38	23	11	-21	-84
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	49	74	88	86	79	73	78	81
B3. Combination of B1-B2 using one half standard deviation shocks	49	65	72	58	38	23	-25	-110
B4. One-time 30 percent real depreciation in 2009	49	90	99	94	89	86	90	97
B5. 10 percent of GDP increase in other debt-creating flows in 2009	49	112	118	114	106	98	98	96
Debt Service-to-Revenue Ratio 2/								
Baseline	4	5	5	6	10	12	7	8
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	4	4	4	5	9	11	11	18
A2. Primary balance is unchanged from 2008	4	5	5	3	8	9	8	29
A3. Permanently lower GDP growth 1/	4	5	5	6	12	15	15	37
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2009-2010	4	4	4	0	2	2	-10	-20
B2. Primary balance is at historical average minus one standard deviations in 2009-2010	4	5	6	10	15	15	8	10
B3. Combination of B1-B2 using one half standard deviation shocks	4	4	5	7	11	4	-12	-24
B4. One-time 30 percent real depreciation in 2009	4	6	7	8	15	19	12	16
B5. 10 percent of GDP increase in other debt-creating flows in 2009	4	5	9	32	15	27	10	13

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.: 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**	**20.2**			**18.2**	**19.0**	**22.4**	**25.4**	**25.4**	**24.0**		**21.2**	**14.0**	
o/w public and publicly guaranteed (PPG)	22.4	18.9	17.3			15.3	21.1	24.0	24.9	23.2	20.6		16.1	9.1	
Change in external debt	-6.0	-4.6	-2.5			-1.9	0.7	3.4	3.1	0.0	-1.4		-0.4	-0.7	
Identified net debt-creating flows	-12.9	-11.6	-8.2			4.9	7.1	3.3	1.3	0.3	0.5		0.6	2.3	
Non-interest current account deficit	**0.3**	**1.3**	**6.0**	**6.6**	**5.2**	**12.2**	**11.3**	**10.3**	**8.7**	**7.8**	**7.6**		**5.9**	**6.5**	6.2
Deficit in balance of goods and services	14.4	16.1	19.7			24.9	22.2	22.0	21.1	20.6	20.0		17.5	15.9	
Exports	28.9	23.7	19.3			14.7	12.8	15.8	16.8	17.7	18.2		23.1	34.1	
Imports	43.3	39.7	39.0			39.6	35.0	37.7	38.0	38.3	38.2		40.6	50.0	
Net current transfers (negative = inflow)	-10.7	-10.9	-10.3	-9.3	1.2	-9.0	-8.1	-8.6	-9.4	-9.7	-9.2		-8.6	-6.9	-8.1
o/w official	-1.3	-1.3	-1.0			-0.5	-0.5	-0.3	-0.2	-0.2	0.0		-0.5	-0.3	
Other current account flows (negative = net inflow)	-3.5	-4.0	-3.5			-3.6	-2.8	-3.0	-3.1	-3.2	-3.2		-3.0	-2.5	
Net FDI (negative = inflow)	**-4.7**	**-7.0**	**-7.6**	**-6.1**	**2.4**	**-6.6**	**-4.5**	**-6.4**	**-6.3**	**-6.4**	**-6.2**		**-5.3**	**-4.3**	-5.0
Endogenous debt dynamics 2/	**-8.4**	**-5.8**	**-6.5**			**-0.7**	**0.3**	**-0.5**	**-1.0**	**-1.0**	**-0.9**		**-0.1**	**0.1**	
Contribution from nominal interest rate	0.8	0.6	0.4			0.4	0.0	0.1	0.2	0.4	0.5		0.7	0.6	
Contribution from real GDP growth	-3.5	-2.8	-2.2			-1.1	0.3	-0.6	-1.2	-1.4	-1.4		-0.8	-0.6	
Contribution from price and exchange rate changes	-5.7	-3.6	-4.8			…	…	…	…	…	…		…	…	
Residual (3-4) 3/	**6.9**	**6.9**	**5.6**			**-6.9**	**-6.4**	**0.0**	**1.8**	**-0.3**	**-2.0**		**-0.9**	**-3.0**	
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/	...	...	12.0			10.2	9.4	13.0	16.5	18.2	19.2		17.8	11.6	
In percent of exports	...	...	62.0			69.4	73.2	82.3	97.9	102.7	105.1		77.0	34.1	
PV of PPG external debt	**...**	**...**	**9.1**			**7.4**	**11.5**	**14.6**	**15.9**	**16.0**	**15.7**		**12.6**	**6.7**	
In percent of exports	**...**	**...**	**47.1**			**49.9**	**89.8**	**92.7**	**94.6**	**90.4**	**86.3**		**54.6**	**19.6**	
In percent of government revenues	**...**	**...**	**46.9**			**37.5**	**56.9**	**71.8**	**74.2**	**73.3**	**70.7**		**51.8**	**22.8**	
Debt service-to-exports ratio (in percent)	**2.7**	**2.5**	**2.2**			**8.4**	**7.9**	**8.1**	**2.1**	**8.1**	**12.8**		**10.0**	**7.3**	
PPG debt service-to-exports ratio (in percent)	**-2.1**	**-2.9**	**-2.6**			**3.1**	**4.2**	**3.7**	**3.6**	**7.9**	**10.8**		**3.2**	**2.7**	
PPG debt service-to-revenue ratio (in percent)	**-3.5**	**-3.9**	**-2.6**			**2.3**	**2.6**	**2.9**	**2.8**	**6.4**	**8.9**		**3.0**	**3.2**	
Total gross financing need (Billions of U.S. dollars)	-0.2	-0.3	-0.1			0.8	0.8	0.5	0.3	0.3	0.5		0.6	1.7	
Non-interest current account deficit that stabilizes debt ratio	6.3	5.9	8.5			14.1	10.6	6.9	5.6	7.8	9.0		6.3	7.2	
Key macroeconomic assumptions															
Real GDP growth (in percent)	14.5	13.2	13.8	10.5	3.9	6.8	-1.5	3.0	6.0	6.0	6.0	4.4	4.0	4.0	4.2
GDP deflator in US dollar terms (change in percent)	20.5	15.1	26.7	8.1	10.8	21.4	-7.9	-6.5	2.1	3.1	4.1	2.7	2.1	1.5	2.4
Effective interest rate (percent) 5/	3.2	2.8	2.7	2.9	0.6	2.5	0.1	0.4	1.0	1.6	2.1	1.3	3.5	4.6	3.8
Growth of exports of G&S (US dollar terms, in percent)	43.8	6.7	17.6	19.0	12.8	-1.0	-21.3	18.8	15.4	15.0	13.5	6.7	13.2	8.9	11.3
Growth of imports of G&S (US dollar terms, in percent)	40.3	19.4	41.5	15.2	16.6	31.7	-19.9	3.9	8.8	10.4	10.0	7.5	9.0	8.3	8.7
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	53.9	31.5	31.1	25.5	18.9	15.8	29.4	15.8	15.8	15.8
Government revenues (excluding grants, in percent of GDP)	17.4	17.5	19.4			19.6	20.2	20.4	21.5	21.8	22.2		24.4	29.4	25.9
Aid flows (in Billions of US dollars) 7/	0.3	0.2	0.3			0.2	0.8	1.2	1.4	1.7	1.8		2.3	2.5	
o/w Grants	0.0	0.0	0.1			0.0	0.1	0.1	0.0	0.0	0.0		0.1	0.1	
o/w Concessional loans	0.3	0.2	0.2			0.1	0.7	1.1	1.4	1.6	1.8		2.2	2.4	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			0.8	2.5	2.1	1.0	0.5	0.5		0.7	0.3	0.5
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			66.3	42.1	43.4	29.0	26.5	29.9		43.9	40.7	41.7
Memorandum items:															
Nominal GDP (Billions of US dollars)	4.9	6.4	9.2			11.9	10.8	10.4	11.3	12.3	13.6		20.0	36.2	
Nominal dollar GDP growth	38.0	30.3	44.2			29.6	-9.3	-3.7	8.2	9.3	10.4	**7.4**	6.2	5.6	6.8
PV of PPG external debt (in Billions of US dollars)			0.8			0.9	1.2	1.5	1.8	2.0	2.1		2.5	2.4	
(PVt-PVt-1)/GDPt-1 (in percent)						0.4	3.1	2.6	2.6	1.6	1.3	1.9	0.0	-0.1	0.2

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	11	15	16	16	16	**13**	12	11	7	7
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	7	4	4	6	7	6	**7**	7	7	1	0
A2. New public sector loans on less favorable terms in 2008-2028 2	7	11	13	14	14	14	**12**	11	11	7	7
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	7	11	13	14	14	14	**11**	11	10	6	6
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	7	8	8	10	10	10	**9**	9	9	7	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	7	11	13	14	15	14	**11**	11	10	7	6
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	7	12	18	19	19	19	**14**	13	12	7	7
B5. Combination of B1-B4 using one-half standard deviation shocks	7	3	-1	0	1	1	**3**	3	3	4	4
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	7	17	22	24	24	23	**19**	17	17	11	10
PV of debt-to-exports ratio											
Baseline	50	90	93	95	90	86	**55**	49	45	22	20
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	50	34	27	35	37	36	**32**	29	26	3	0
A2. New public sector loans on less favorable terms in 2008-2028 2	50	84	84	84	80	77	**51**	46	42	22	20
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	50	90	93	95	90	86	**55**	49	45	22	20
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	50	46	43	47	47	46	**33**	31	29	17	15
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	50	90	93	95	90	86	**55**	49	45	22	20
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	50	94	113	113	107	102	**62**	55	50	22	20
B5. Combination of B1-B4 using one-half standard deviation shocks	50	20	-9	0	3	5	**13**	13	14	14	13
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	50	90	93	95	90	86	**55**	49	45	22	20
PV of debt-to-revenue ratio											
Baseline	37	57	72	74	73	71	**52**	47	44	25	23
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	37	22	21	27	30	29	**30**	28	26	4	0
A2. New public sector loans on less favorable terms in 2008-2028 2	37	54	65	66	65	63	**48**	44	42	25	23
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	37	53	64	66	65	63	**46**	42	39	22	20
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	37	39	40	45	46	45	**38**	36	34	23	22
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	37	54	65	67	67	64	**47**	43	40	23	21
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	37	60	87	89	87	83	**59**	53	49	26	23
B5. Combination of B1-B4 using one-half standard deviation shocks	37	15	-7	0	2	4	**12**	12	13	15	14
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	37	84	106	110	109	105	**77**	70	65	37	34

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	4	4	4	8	11	**3**	3	3	3	3
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	3	3	2	1	1	1	**2**	2	2	1	1
A2. New public sector loans on less favorable terms in 2008-2028 2	3	4	4	5	5	4	**3**	3	3	2	1
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	3	4	4	4	4	3	**6**	6	5	3	3
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	3	3	2	2	2	2	**3**	4	3	2	2
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	3	4	4	4	4	3	**6**	6	5	3	3
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	3	4	4	4	4	4	**7**	7	6	3	3
B5. Combination of B1-B4 using one-half standard deviation shocks	3	3	1	1	1	1	**1**	1	0	2	2
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	3	4	4	4	4	3	**6**	6	5	3	3

Debt service-to-revenue ratio

Baseline	2	3	3	3	6	9	**3**	3	3	3	3
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2008-2028 1/	2	2	1	1	1	1	**2**	2	2	1	1
A2. New public sector loans on less favorable terms in 2008-2028 2	2	3	3	4	4	4	**3**	3	3	2	2
B. Bound Tests											
B1. Real GDP growth at historical average minus one standard deviation in 2009-2010	2	2	3	3	3	2	**5**	5	4	3	3
B2. Export value growth at historical average minus one standard deviation in 2009-2010 3/	2	3	2	2	2	2	**4**	4	3	3	3
B3. US dollar GDP deflator at historical average minus one standard deviation in 2009-2010	2	2	3	3	3	2	**5**	6	4	3	3
B4. Net non-debt creating flows at historical average minus one standard deviation in 2009-2010 4/	2	3	3	3	3	3	**7**	7	6	4	3
B5. Combination of B1-B4 using one-half standard deviation shocks	2	2	1	0	1	0	**1**	1	0	2	2
B6. One-time 30 percent nominal depreciation relative to the baseline in 2009 5/	2	4	4	4	4	4	**9**	9	7	5	5
Memorandum item:											
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	19	19	19	19	19	19	**19**	19	19	19	19

Source: Staff projections and simulations.

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

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

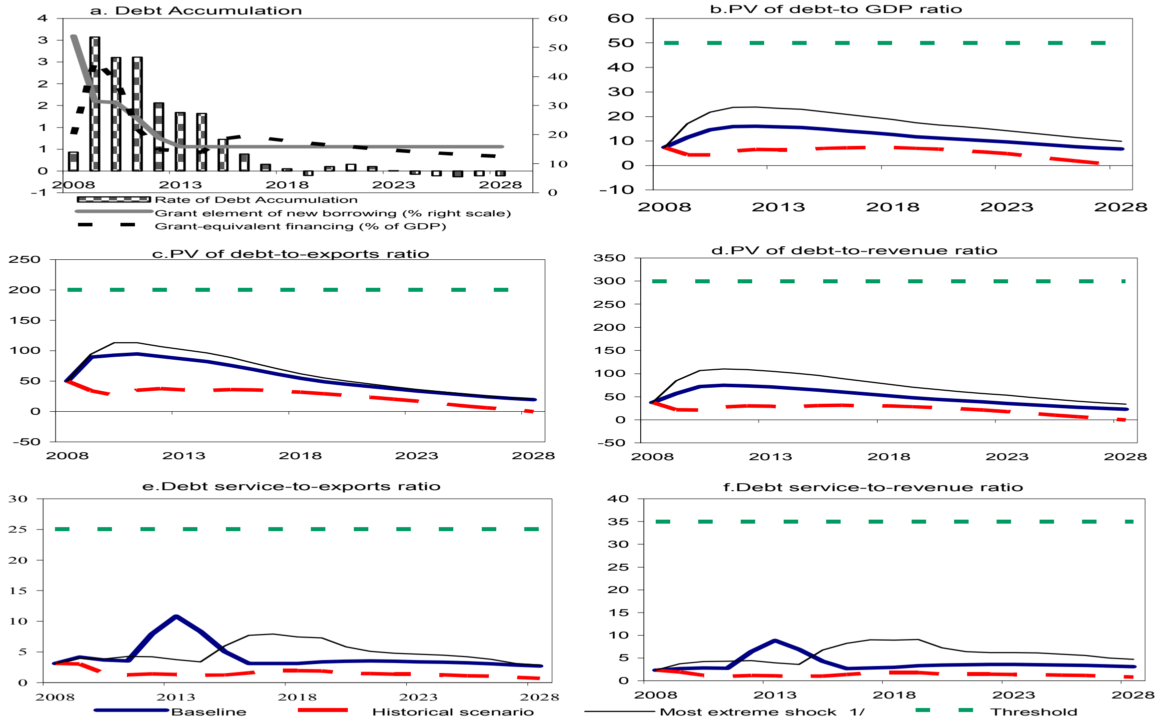


Figure 3. Armenia: Indicators of Public Debt Under Alternative Scenarios, 2008-2028