Greece: Debt Sustainability Analysis
October 21, 2011

Since the fourth review, the situation in Greece has taken a turn for the worse, with the economy increasingly adjusting through recession and related wage-price channels, rather than through structural reform driven increases in productivity. The authorities have also struggled to meet their policy commitments against these headwinds. For the purpose of the debt sustainability assessment, a revised baseline has been specified, which takes into account the implications of these developments for future growth and for likely policy outcomes. It has been extended through 2030 to fully capture long term growth dynamics, and possible financing implications.

The assessment shows that debt will remain high for the entire forecast horizon. While it would decline at a slow rate given heavy official support at low interest rates (through the EFSF as agreed at the July 21 Summit), this trajectory is not robust to a range of shocks. Making debt sustainable will require an ambitious combination of official support and private sector involvement (PSI). Even with much stronger PSI, large official sector support would be needed for an extended period. In this sense, ultimately sustainability depends on the strength of the official sector commitment to Greece.

A. Revised baseline

1. **Recent developments call for a reassessment of the assumptions used for the debt sustainability analysis.** Since the fourth review, the situation in Greece has taken a turn for the worse, with the economy increasingly adjusting through recession and related wage-price channels, rather than through structural reform-driven increases in productivity. The authorities have also struggled to meet their policy commitments against these headwinds, and due to administrative capacity limitations in the Greek government. The growth and fiscal policy adjustments assumed under the program individually have precedent in other countries' experience, but experience to date under the program suggests that Greece will not be able to set a new precedent by realizing at the same time and from very weak initial conditions a large internal devaluation, fiscal adjustment, and privatization program.

2. **To give the debt sustainability analysis a firmer foundation, the following set of more likely policy and macroeconomic outcomes has been assumed** (the financing and other assumptions are discussed in more detail in Annex I):

- **A slower recovery**. In keeping with experience to date under the program, it is assumed that Greece takes longer to implement structural reforms, and that a longer timeframe is necessary for them to yield macroeconomic dividends (e.g. due to complementarities). A longer and more severe recession is thus assumed, with output contracting by 5½ percent in 2011, and by 3 percent in 2012. Growth then averages about 1¼ percent per year in 2013-14, 2⅔ percent in 2015-20 (as a cyclical rebound kicks in, and structural reforms start to pay off); and 1⅔ percent per year in 2021-30

(as the economy reverts to potential growth, which is constrained by demographic trends). All told, real output growth is projected to be cumulatively 7¼ percent lower through 2020, versus the projections made at the time of the 4th Review.

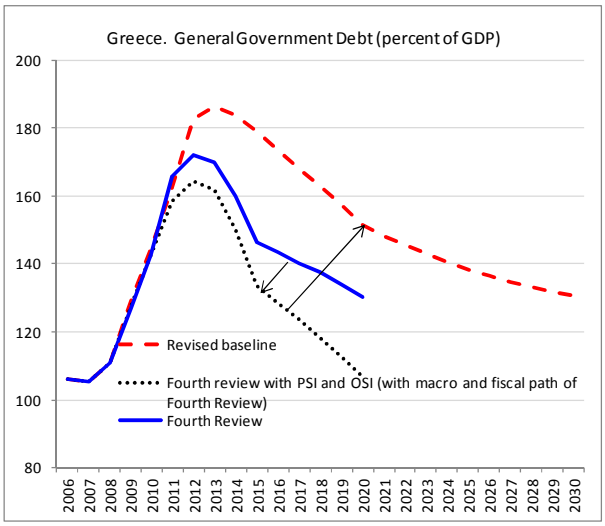
- **Lower privatization proceeds**. Given the adverse market conditions and technical constraints faced by Greece, a more conservative but still suitably ambitious path is assumed for privatization proceeds for the purpose of the debt sustainability analysis. Receipts rise from 1½ percent of GDP in 2012 to 2 percent of GDP for the period 2013-14, and peak at 2½ percent of GDP during 2015-17. They fall back at 2 percent of GDP per year for 2018-20. Through 2020, total privatization proceeds would amount to €46 billion, instead of the €66 billion assumed in the program (i.e. the original target of €50 billion plus an additional amount reflecting the fact that bank recapitalization will likely create additional assets to be disposed of).

- **Reduced fiscal adjustment needs**. The nominal fiscal targets are maintained through the program (mid-2013) and after that, the primary surplus is assumed to improve further until it reaches 4½ percent of GDP for the period 2014-16. The primary surplus steps down to 4¼ percent of GDP in 2017-20 and to 4 percent of GDP in 2021-25 (a level which in the past Greece has been able to sustain). Since few countries have been able to sustain a 4 percent primary surplus, it is assumed that from 2026 onwards, the primary surplus is maintained at 3½ percent of GDP. Under this path, which requires sustained and unwavering commitment to fiscal prudence by the Greek authorities, the overall fiscal balance would not drop below 3 percent of GDP until 2020.

- **Delayed access to market financing**. The PSI agreed at the July 21 Summit is assumed to be put into place. The issue of when market financing will be restored is inherently uncertain. For the purposes of this analysis, new market financing is assumed to become available only once Greece has achieved 3 years of growth, three years of primary surpluses above the debt stabilizing level, and once debt drops below 150 percent of GDP. This is admittedly an arbitrary rule, and is used for illustrative purposes to give an indication of the scale of official support that could be needed to fill any financing gap until market access is restored in 2021.

3. **Under these assumptions, Greece's debt peaks at very high levels and would decline at a very slow rate pointing to the need for further debt relief to ensure sustainability**. Debt (net of collateral required for PSI) would peak at 186 percent of GDP in 2013 and decline only to 152 percent of GDP by end-2020 and to 130 percent of GDP by end-2030. The financing package agreed on July 21(especially lower rates on EFSF loans) does help the debt trajectory, but its impact is more than offset by the revised macro and policy framework. Greece would not return to the market until 2021 under the market access assumptions used, and cumulatively official additional financing needs (beyond what

remains in the present program, and including the eventual rollover of existing official loans) could amount to some €252 billion from the present through to 2020.

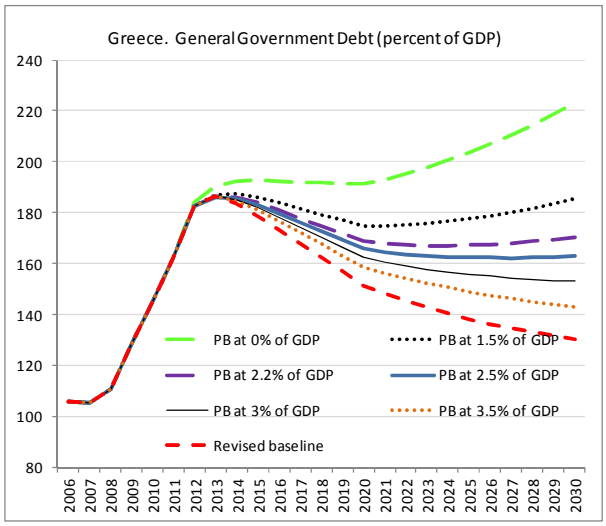


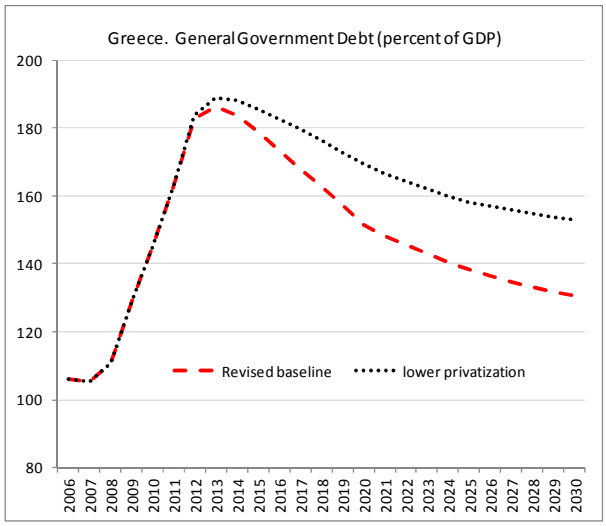
4. **Stress tests to this revised baseline illuminate further the problem with sustainability, revealing that the downward debt trajectory would not be robust to shocks:**

- **All else unchanged, significant shortfalls relative to the revised fiscal and privatization targets would deteriorate debt dynamics even further:**

  - **Lower primary balances**. If due to policy slippages, the primary balance gets stuck at any level below 2½ percent of GDP (a level which under the program would only be exceeded in 2013), debt would be on an increasing trajectory from already very high levels. (At the time of the fourth review, the debt stabilizing primary balance was calculated to be 3.8 percent of GDP; under the revised baseline, largely due to the reduction in the average interest rate on public debt, the debt stabilizing primary balance is 2¼ percent of GDP.)

  - **Shortfalls with privatization receipts.** Failures with privatization (only €10 of €46 billion realized), would have a significant impact on the level of debt and the debt trajectory (noticeably slowing the rate of decline). Debt would end at 169 percent of GDP by end-2020 and 153 percent of GDP by end-2030 (without additional fiscal adjustment to compensate for higher interest payments). With market access unlikely, financing gaps would arise (further testing the willingness of the official sector to provide additional financing).

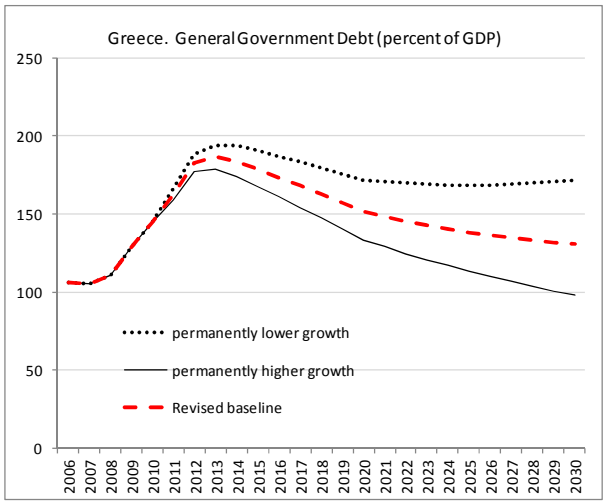


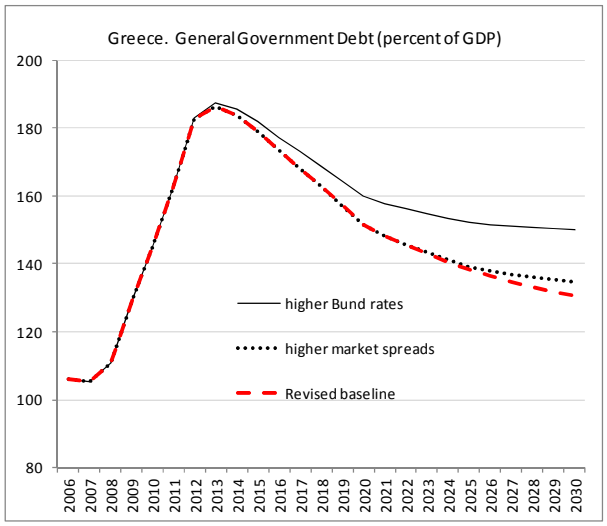


- **Permanent growth and interest rates shocks can lead to unsustainable debt dynamics**:

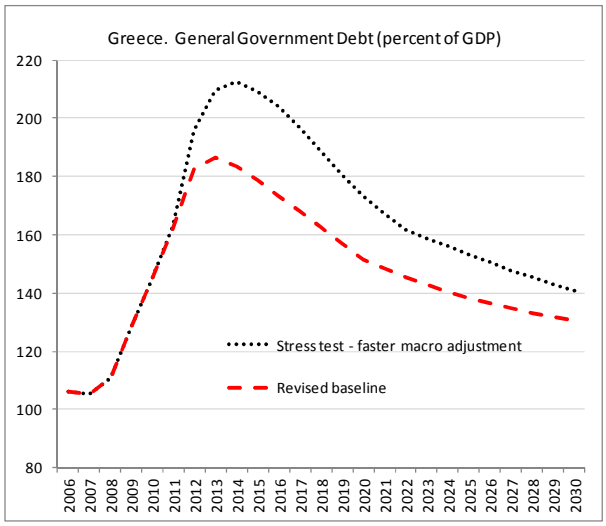
  - **Growth**. Results can be very sensitive to growth outcomes. Fixing the primary balance, permanently lower growth (-1 percentage point each year) would render debt clearly unsustainable, while higher growth (+1 percentage point each year) would lead debt to fall to just under 130 percent of GDP by 2020. Allowing fiscal feedbacks—with higher growth making it easier to sustain a higher fiscal adjustment and lower growth making it easier to fall permanently short of targeted adjustment levels—would reinforce these outcomes. There is also a second endogeneity at play, whereby strong growth will be very hard to achieve unless Greece's high debt overhang is decisively tackled. Overall, the scenario emphasizes the crucial importance of frontloading growth-enhancing structural reforms for debt sustainability.

  - **Spreads and Bund rates.** If new market access would take place at slightly different levels, this would not have a large impact on the debt level. For example, if return to markets is at 150 bps higher than the baseline but primary balances are unchanged, debt-to-GDP levels would be only slightly different by 2030. Essentially, Greece is not in the market in this scenario until late the second decade, limiting the need for new market financing, and thus the impact of interest rates. However, higher Bund rates, which would affect the rates for the heavy volume of official borrowing, would limit the debt decline in the second decade once potential growth starts to slow down and result in debt stabilizing at a very high level (about 150 percent of GDP).





- **A combined shock—to represent a scenario of strong internal devaluation enforced by a much deeper recession—would sharply raise debt in the near-term.** To model this it is assumed that through much deeper recession and deflation the competitiveness gap is unwound by 2017, instead of during the next decade. The headwinds from the deeper recession are assumed to delay the achievement of fiscal and privatization policy targets by three years. As the economy rapidly shrinks, debt would reach extremely high levels in the short run at 208 percent of GDP. If Greece could weather the shock to confidence this could create, the eventual more rapid recovery of the economy would help bring debt back down towards the revised baseline path, but it would remain at a very high level in 2020 (173 percent of GDP).. Market access would not likely be restored until 2027 (under the assumptions on access used, in particular the 150 percent of GDP debt threshold). Cumulative additional financing needs (including rollover of existing official debt) could approach €450 billion.



B. Financing scenarios as a route to debt sustainability

5. **Making Greek debt sustainable requires an appropriate combination of new official support on generous terms and additional debt relief from private creditors:**

- **Large, long-term, and sufficiently generous official support** will be necessary for Greece to remain current on its debt service payments and to facilitate a declining debt trajectory. The commitments given at the July 21 Summit—that euro area partners would continue to support countries under adjustment programs, like Greece, for as long as it takes to regain market access (provided the program is implemented)—represent an important breakthrough, and the credibility of this commitment is critical to a sustainable Greek debt position. The revised baseline does indeed rely on additional official support beyond the amounts tabled during the July 21 Summit, to give the Greek government time to adjust until market access is successfully restored. As noted, the precise timing of market re-access is inherently uncertain. Under the assumptions used, the time required to get back to market could be significant, generating a potential need for additional official financing ranging up to €440 billion (i.e. under the worst case of the scenarios studied here, the faster macro adjustment shock).

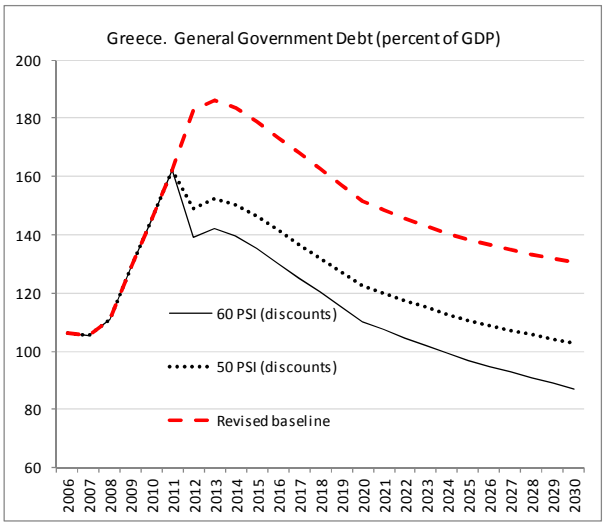
Greece. Table: Official Financing Under Different Scenarios (billion Euro unless otherwise indicated)

	Total official financing	Total official financing (in % of 2011 GDP)	Average per year 3/	Additional official financing 1/			
				Total	2010-14	2015-20	2021-30
(1) July 21st Brussels Summit (for reference)	216.0	99.2	28.2	109.0	109.0	0.0	0.0
(2) Revised baseline 2/	359.3	164.9	25.8	252.3	163.7	88.6	0.0
(3) Stress test on fast macro adjustment 2/	551.1	253.0	18.3	444.1	169.9	115.5	158.7
(4) 50 PSI 2/	220.5	101.2	31.8	113.5	98.6	14.9	0.0
(5) 60 PSI 2/	216.3	99.3	31.1	109.3	95.8	13.5	0.0

1/ Additional to the Euro 107 billion package of the SBA program.
2/ Market access restored under criteria described.
3/ Excluding PSI related financing requirements (additional FSF resources, collateral, buy-backs).

- **Deeper PSI**, which is now being contemplated, also has a vital role in establishing the sustainability of Greece's debt[1]. To assess the potential magnitude of improvements in the debt trajectory, and potential implications for official financing, illustrative scenarios can be considered using discount bonds with an assumed yield of 6 percent and no collateral. The results show that debt can be brought to just above120 percent of GDP by end-2020 if 50 percent discounts are applied. Given still-delayed market access, large scale additional official financing requirements would remain, estimated at some €114 billion (under the market access assumptions used). To get the debt down further would require a larger private sector contribution (for instance, to reduce debt below 110 percent of GDP by 2020 would require a face value reduction of at least 60 percent and/or more concessional official sector financing terms). Additional official financing requirements could be reduced to an estimated €109 billion in this instance. Of course, it must be noted that the estimated costs to the official sector exclude any contagion-related costs.

[1] The ECB does not agree with the inclusion of these illustrative scenarios concerning a deeper PSI in this report.


Greece. General Government Debt (percent of GDP)
200
180
160
140
120
100
80
60
60 PSI (discounts)
50 PSI (discounts)
Revised baseline
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
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2020
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2030

Table A1. Greece: Public Sector Debt Sustainability Framework Revised Baseline Scenario, 2008-2030
(In percent of GDP, unless otherwise indicated)

	Actual			Projections												
	2008	2009		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2030	Debt-stabilizing primary balance 10/
Baseline: Public sector debt 1/	111	129		**145**	**162**	**183**	**186**	**184**	**179**	**173**	**168**	**163**	**157**	**152**	**130**	**-1.3**
Change in public sector debt	5.3	18.2		15.6	17.8	20.3	3.7	-2.7	-4.7	-5.5	-5.4	-5.2	-5.6	-5.6	-1.3	
Identified debt-creating flows (4+7+12)	6.4	19.8		16.7	17.8	28.1	3.7	-2.7	-4.7	-5.5	-5.4	-5.2	-5.6	-5.6	-1.3	
Primary deficit	4.8	10.4		5.0	2.3	-1.4	-2.5	-4.5	-4.5	-4.5	-4.3	-4.3	-4.3	-4.3	-3.5	
Revenue and grants	39.8	37.9		39.5	40.2	39.9	40.9	41.0	40.9	39.1	38.6	38.1	37.7	37.4	37.4	
Primary (noninterest) expenditure	44.7	48.3		44.6	42.4	38.5	38.4	36.5	36.4	34.6	34.3	33.8	33.4	33.0	33.9	
Automatic debt dynamics 2/	0.6	7.8		8.0	13.1	12.9	6.3	3.6	2.2	1.3	1.3	1.1	0.7	0.8	2.2	
Contribution from interest rate/growth differential 3/	0.6	7.8		8.0	13.1	12.9	6.3	3.6	2.2	1.3	1.3	1.1	0.7	0.8	2.2	
Of which contribution from real interest rate	1.8	4.2		3.4	4.8	8.1	7.2	7.4	7.0	6.3	6.0	5.6	4.9	4.4	4.1	
Of which contribution from real GDP growth	-1.2	3.7		4.6	8.3	4.8	-0.9	-3.8	-4.8	-5.0	-4.7	-4.5	-4.2	-3.6	-1.9	
Contribution from exchange rate depreciation 4/	0.0	0.0		...	...	...	...	...	...	...	...	...	...	...	...	
Denominator = 1+g+p+gp	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Other identified debt-creating flows	1.0	1.6		3.7	2.4	16.5	-0.2	-1.8	-2.3	-2.3	-2.5	-2.0	-2.0	-2.0	0.0	
Privatization receipts (negative)	0.0	-0.4		0.0	-0.5	-1.5	-2.0	-2.0	-2.5	-2.5	-2.5	-2.0	-2.0	-2.0	0.0	
Recognition of implicit or contingent liabilities	1.0	0.3		1.0	4.6	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Other 4/	0.0	1.6		2.6	-1.7	5.1	1.8	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	
Residual, including asset changes (2-3) 5/	-1.1	-1.6		-1.1	0.0	-7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Public sector debt-to-revenue ratio 1/	277.9	340.5		365.5	404.1	457.8	455.4	447.6	437.0	443.0	435.6	427.0	416.4	405.4	348.8	
Gross financing need 6/	9.8	15.7		19.2	26.1	22.6	15.6	19.0	13.9	11.6	10.1	8.0	8.5	7.6	5.1	
Scenario with key variables at their historical averages 7/				**145**	**147**	**155**	**155**	**154**	**152**	**150**	**149**	**147**	**146**	**145**	**0**	**-3.4**
Scenario with no policy change (constant primary balance) in 2010-2020			Historical	**145**	**165**	**192**	**204**	**211**	**216**	**220**	**224**	**229**	**233**	**237**	**0**	**0.2**
Key Macroeconomic and Fiscal Assumptions Underlying Baseline			Average													
Real GDP growth (in percent)	1.2	-3.3	3.2	-3.5	-5.5	-2.9	0.5	2.1	2.7	2.9	2.8	2.8	2.7	2.4	1.5	
Average nominal interest rate on public debt (in percent) 8/	4.9	4.7	5.5	4.2	4.5	5.1	4.3	4.5	4.5	4.5	4.6	4.7	4.7	4.7	5.1	
Average interest rate on new market debt (incl. T bills)				0.0	3.3	7.3	5.0	5.0	5.0	5.0	5.0	5.0	4.9	5.0	5.7	
Average interest rate on all new debt (includes EU bilateral and IMF debts)				1.2	3.4	4.1	3.9	4.2	4.5	4.5	4.5	4.5	4.5	4.5	4.8	
Spreads above German bund (10-year) 9/				1175	1175	1000	800	495	475	400	345	300	250	250	250	
German bund rate				225	275	350	350	350	350	350	350	350	350	350	360	
Average real interest rate (nominal rate minus change in GDP deflator, in percent)	1.8	3.6	2.3	2.5	3.1	4.9	4.0	4.1	3.9	3.7	3.6	3.5	3.2	2.9	3.2	
Inflation rate (GDP deflator, in percent)	3.1	1.1	3.2	1.7	1.4	0.2	0.3	0.4	0.6	0.8	1.0	1.2	1.5	1.7	1.8	
Growth of real primary spending (deflated by GDP deflator, in percent)	7.9	4.5	6.2	-11.0	-10.0	-11.9	0.3	-3.0	2.4	-2.0	1.8	1.4	1.5	1.2	1.6	
Primary deficit	4.8	10.4	1.6	5.0	2.3	-1.4	-2.5	-4.5	-4.5	-4.5	-4.3	-4.3	-4.3	-4.3	-3.5	

1/ General government debt (net of debt for collateral requirements).

2/ Derived as $[(r - \pi(1+g) - g + \alpha\varepsilon(1+r)]/(1+g+\pi+g\pi))$ times previous period debt ratio, with r = interest rate; π = growth rate of GDP deflator; g = real GDP growth rate; α = share of foreign-currency denominated debt; and ε = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).

3/ The real interest rate contribution is derived from the denominator in footnote 2/ as $r - \pi (1+g)$ and the real growth contribution as -g.

4/ Includes build up of deposits, collateral requirements.

5/ For projections, this line includes exchange rate changes. For 2012, large residual can be explained by headline debt reduction following the discount bond exchange and debt buy backs.

6/ Defined as general government deficit, plus amortization of medium and long-term general government debt, plus short-term debt at end of previous period.

7/ The key variables include real GDP growth; real interest rate; and primary balance in percent of GDP.

8/ Derived as nominal interest expenditure divided by previous period debt stock.

9/ Market access assumed to start in mid-2013, therefore, no market borrowing takes place at spreads for 2010-2012.

10/ Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

Appendix I: Financing and other assumptions of the DSA Exercise

1. **The financing and other assumptions underpinning the revised baseline are as follows**:

- **Financing assumptions**. These have been updated, versus the fourth review, to reflect the agreements reached at the July 21 Summit. Thus, going forward, EFSF financing is assumed to be provided at 100 bps above the German 10-year Bund rate (rising from 4 percent in 2012 to 4.7 percent by 2016); PSI is completed on the July 21 parameters, but participation is assumed to fall short of 90 percent, and almost all of the debt is assumed to be exchanged for par bonds (involving about €35 billion in collateral financed by the EFSF). Some €33 billion of post-2020 bonds are assumed bought back (using €20 billion in financing provided by the EFSF). IMF exposure remains under SBA terms with €30 billion in total access. Greece is assumed to return to the market at spreads falling from 500 bps to 250 bps by 2020 (with the spread contained by much lower rollover requirements over the medium-term, and by the potential availability of additional EFSF financing, consistent with euro-zone leaders pledge to support Greece for as long as it takes for Greece to return to markets).

- **Other Policy assumptions**

  - **Bank recapitalization/HFSF funding**. Total additional banking sector support needs are preliminary calculated to amount to €20 billion, bringing total HFSF needs to some €30 billion. The additional financing is needed to provision for losses on banks' private loan portfolios and on their government bond holdings.

  - **Arrears clearance**. This is assumed to apply to end-2010 arrears for an amount of €4.5 billion (compared with €5.1 billion in end-March arrears used for the 4th Review). Arrears clearance has been frontloaded compared to the 4th Review assumptions: state budget arrears are assumed cleared by Q1 2012, while hospital, legal entity, social security fund and local government arrears are paid down in 2012.

  - **Deposit accumulation**. The size of the cash deposit buffer of the government remains at €11 billion, but this sum is now built up by end-2012 (versus mid-2014 in the 4th review). The deposit buffer represents one quarter worth of payments. It can also stand in for shortfalls in the ambitious program privatization targets.