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Gianluca Cafiso\*

# Debt Developments and Fiscal Adjustment in the EU

Since the financial crisis in 2008-09, concern over the sustainability of some EU countries' sovereign debt has continued to mount higher and higher. This paper explores the ways in which the financial crisis caused the deterioration of European debt-to-GDP ratios, examines which countries are on sustainable debt paths and quantifies the fiscal adjustment required per country for debt sustainability.

Over the last two years the international community has grown more and more concerned about the unprecedented difficulties experienced by some euro area (EA) countries in financing their public debt. As of May 2011, Greece, Ireland and Portugal had requested joint EU-IMF support to avoid (or postpone) a default on their debt. At the same time, almost all the EA countries started tight fiscal corrections under the strengthened EU Commission's surveillance<sup>1</sup> in order to secure their fiscal positions and avoid contagion. Nonetheless, the outlook became gloomier in autumn 2011: a debt restructuring was agreed for Greece in October, and Italy and Spain's sovereigns have been under increasing strain since August.

In this work we analyse the most recent evolution of the debt-to-GDP ratio (hereinafter DGR) in the EU15 countries. We particularly consider the most troubled EU countries and make a comparison with others. Our objective is to understand how the 2008-09 crisis has caused the current difficulties and how costly corrective measures will be. We start by studying current developments. We then assess the necessary fiscal adjustment to control the DGR.

Here we preview the main results of our analysis:

- A comparison over time shows that the large 2005-10 DGR increase is not unprecedented in terms of

magnitude nor in terms of simultaneity among countries.

- The DGR increase is mainly a primary balance problem, particularly for Greece, Portugal and Ireland. Interest payments have only had a minor effect on their DGR evolutions so far.
- Projections show the difference between Greece and Portugal's difficulties and those of Ireland. Greece and Portugal had unsustainable fiscal stances well before the 2008-09 financial crisis.
- As for Spain and Italy, projections show that uncertainty regarding the sustainability of their debt cannot depend on their past stances but on worries regarding their future economic developments.
- As a matter of fact, the fiscal adjustment required by the most-troubled countries is too large for DGR stabilisation to be quick.
- The new EU debt-reduction rule requires some countries to have a large budget surplus in 2012-2014; this is unlikely to be achieved already in 2012.

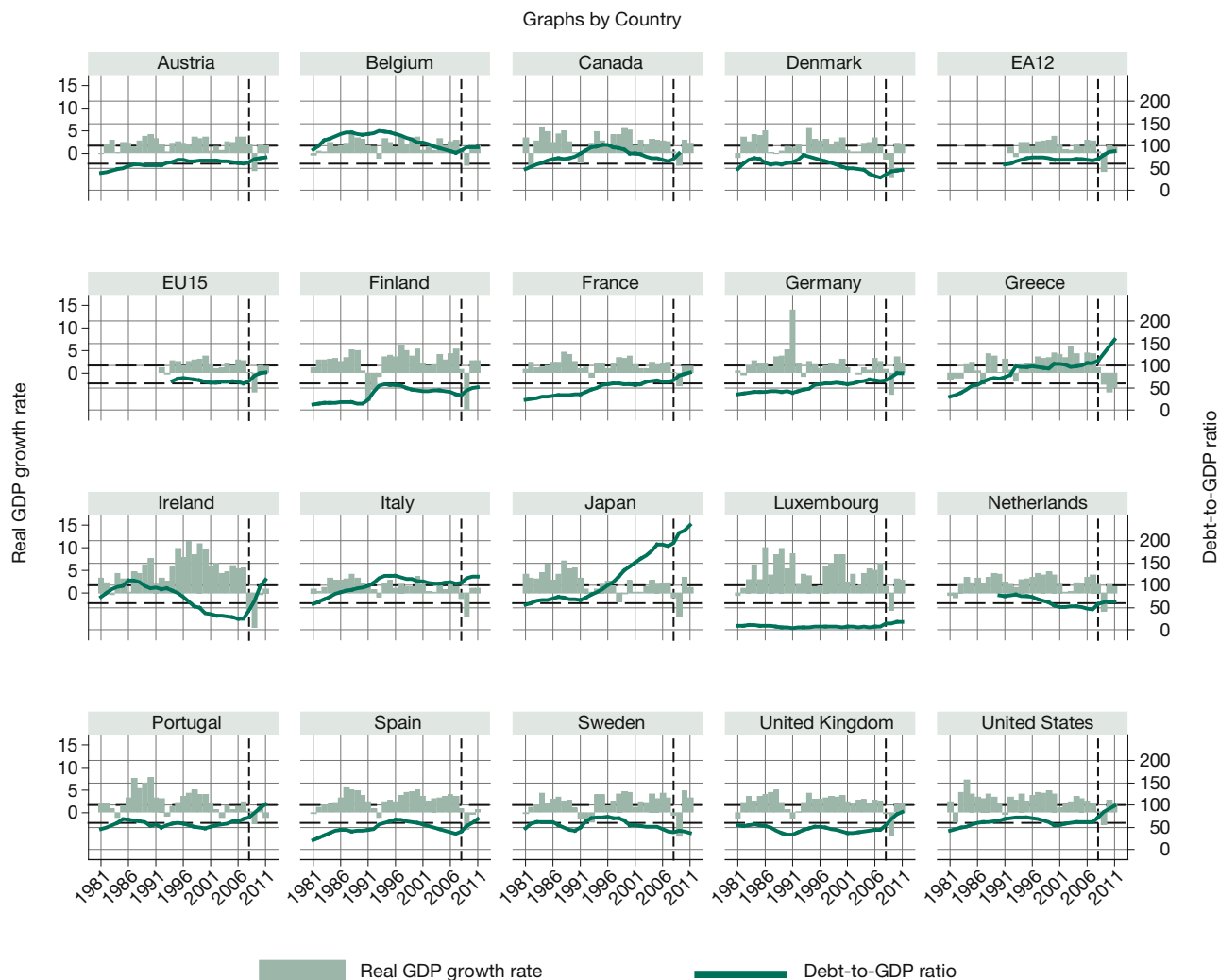
## Current Developments in Perspective

In December 2010 the average DGR of the EU15 group had increased by 18.6 percentage points with respect to its 2005 level. The highest variation for the EU15 group is, however, the period 1980-85 (19.9 percentage points). In absolute terms, the current DGR level of the EU15 group is higher than ever, but it remains

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The analytic relations used for the analysis in this paper are explained in details in the document G. Cafiso: A guide to Public Debt equations. Mimeo, available at <https://sites.google.com/site/giancafiso/research-works/notes-other>, 2012.

Figure 1  
Debt-to-GDP Ratio from 1981 to 2011



Notes: Black long-dash vertical lines mark year 2008, upper black long-dash lines mark 100% DGR level, lower black long-dash lines mark 60% DGR level; DGR estimated values for 2011.

Source: Data from ECFIN Ameco database.

comparable to past values. Given its countercyclical dynamics, the DGR has generally increased during slowdowns and diminished during periods of growth. In Figure 1, real GDP growth rates are plotted against the DGR evolution.

In 2005-10 Greece, Ireland, Portugal and the UK recorded a variation higher than the EU15 average (18.6 percentage points). At the end of 2010 only two EA countries, Luxembourg and Finland, were under the 60% Maastricht limit, although the Netherlands and

Spain were close with DGRs of 62.7% and 60.1% respectively.<sup>1</sup>

This comparison over time shows that the large 2005-10 DGR increase is unprecedented neither in magnitude nor in terms of simultaneity among countries. In many countries, current DGR levels are comparable to previous values (to wit: Italy, Spain, Belgium, Ireland).

<sup>1</sup> However, the 2011 projected DGR for Spain is 68.1% (ECFIN Ameco database).

**Table 1**  
**Decomposition of DGR Variation (2008-10)**  
 % of GDP

Country	$\Delta b = -pb + rib - rgc + sfa$				$rib = +nib - icf$		
	$\Delta b$	$sfa$	$pb$	$rgc$	$rib$	$nib$	$icf$
Austria	3.86	1.51	-0.55	0.03	1.84	2.71	0.87
Belgium	4.20	1.92	-0.14	0.07	2.21	3.69	1.48
Finland	4.40	4.06	0.93	-0.48	0.78	1.42	0.64
France	5.92	0.61	-3.33	-0.14	1.84	2.61	0.78
Germany	6.11	4.69	0.49	-0.02	1.89	2.56	0.67
Greece	12.45	0.79	-6.70	-2.27	2.68	5.23	2.54
Ireland	23.73	2.59	-15.77	-1.57	3.80	2.24	-1.56
Italy	5.13	1.05	0.55	-1.93	2.69	4.71	2.01
Luxembourg	3.91	4.37	0.48	0.01	0.03	0.36	0.34
Netherlands	5.81	2.87	-1.31	-0.17	1.46	2.10	0.64
Portugal	8.25	1.12	-4.62	-0.28	2.22	3.01	0.79
Spain	7.99	-0.08	-6.42	-0.45	1.21	1.76	0.55
EA12	7.65	2.12	-3.03	-0.60	1.89	2.70	0.81
Denmark	5.35	4.90	0.95	-0.42	0.98	1.77	0.79
Sweden	-0.15	0.92	1.59	-0.10	0.41	1.28	0.86
United Kingdom	11.84	3.65	-6.51	-0.55	1.13	2.38	1.24
EU15	7.25	2.33	-2.69	-0.55	1.68	2.52	0.84

Notes: All values are averages of 2008, 2009, 2010 figures.  $\Delta b$  is the debt variation,  $sfa$  is the stock-flow adjustment,  $pb$  is the primary balance,  $rgc$  is the real growth contribution,  $rib$  is the real interest bill,  $nib$  is the nominal interest bill,  $icf$  is the inflation correction factor.

## Understanding Current Developments

Figure 1 shows that the DGR has started to increase since 2008.<sup>2</sup> To focus the analysis, we therefore concentrate on the 2008-10 triennium.<sup>3</sup> We comment on developments only for the EU countries with a DGR increase higher than the EU15 average in 2005-10 (Greece, Ireland, Portugal, the UK). Although Italy and Spain are not compliant with this criterion, we also comment on these countries because of mounting con-

cern over the sustainability of their debt. We refer to this group of six countries as GIPUSI.

The analytical decomposition discussed in this section (briefly explained in Box 1 and in detail in Cafiso<sup>4</sup>) quantifies the contribution of each component driving the DGR variation. We explicitly consider the structural part of the DGR variation: primary balance, real growth and interest bill. We also mention the stock-flow adjustment component. The contribution of each component to the DGR variation is reported in Table 1 in per cent of GDP. Some components contribute positively, others negatively. To convey the relevance of each component with respect to the DGR variation, we report their percentage weight in Table 2 (these weights are marked with  $w\%$  in the text to distinguish them from non-weighted figures).

<sup>2</sup> It was 2008 when governments undertook measures to stop adverse economic developments, i.e. stimulus packages and rescues of large financial institutions. Just to mention some cases, the Franco-Belgian banking group Dexia SA received financial support from the French and Belgian authorities in September 2008. At the same time, Fortis, a Benelux banking group, was nationalised by the Belgian, Dutch and Luxembourgish authorities. Actions of this kind were also undertaken in other EU countries as well as in the USA (e.g. Fannie Mae, Freddie Mac, AIG).

<sup>3</sup> In this section we do not include forecasts for 2011; we prefer considering only DGR consolidate figures since we look at the past to understand the current stance.

<sup>4</sup> G. Cafiso: A guide to Public Debt equations, Mimeo, available at <https://sites.google.com/site/giancafiso/research-works/notes-other>, 2012.

## Box 1

## Debt Equations

A government's capacity to serve its debt depends upon its revenues, which are closely related to its GDP evolution. For this reason, debt analyses are developed considering debt with respect to GDP. Moreover, this makes a cross-country comparison straightforward.

The evolution of DGR is explained using the debt equation. The debt equation is a difference equation derived from budget accounting<sup>1</sup> which indicates the dependence of DGR upon the interest rate (implicit), the GDP growth rate and the primary balance. The simplest debt equation is:

$$b_t - b_{t-1} = -w_t + \underbrace{\left( \frac{1 + i_t}{1 + \alpha_t} - 1 \right)}_{\text{snowball effect}} b_{t-1} - sfa_t \quad (1)$$

where:  $b_t$  is DGR at time  $t$ ,  $w_t$  is the primary balance,  $i_t$  is the implicit/nominal interest rate,  $\alpha_t$  is the nominal GDP growth rate, and  $sfa_t$  is the stock-flow adjustment; small letters indicate ratios to GDP.

In textbooks, the stock-flow adjustment term is not reported, and instead seigniorage is included. However, seigniorage is not relevant in empirical applications for the EU countries while operations which either generate deficit and not debt, or vice versa, are of a relevant magnitude.

Equation (1) describes the evolution of debt in an intuitive way. The snowball effect accounts for the combined effect of the interest payment and GDP growth on the debt rollover. To make clearer the contribution of these two factors, Equation (1) is rewritten in a way to separate the two effects and to consider explicitly the inflation erosion effect<sup>2</sup>:

$$b_t - b_{t-1} = -w_t + \underbrace{\frac{1 + i_t}{(1 + \pi_t)(1 + \eta_t)}}_{\text{composite rate}} b_{t-1} - sfa_t$$

given

$$\frac{1 + i_t}{(1 + \pi_t)(1 + \eta_t)} \cong i_t - \pi_t - \eta_t \quad (2)$$

$$b_t - b_{t-1} = -w_t + \underbrace{\left( \frac{i_t}{1 + \alpha_t} - \frac{\pi_t}{1 + \alpha_t} \right)}_{\text{real interest bill}} b_{t-1} - \underbrace{\frac{\eta_t}{1 + \eta_t} b_{t-1}}_{\text{real growth contribution}} - sfa_t$$

where:  $\pi_t$  is the inflation rate and  $\eta_t$  is the real GDP growth rate.

The debt equation can be complicated further by considering the issuance of foreign currency denominated debt.<sup>3</sup>

1 C. Walsh: Monetary theory and policy, 2003, The MIT Press.

2 J. Escolano: A Practical Guide to Public Debt Dynamics, Fiscal Sustainability, and Cyclical Adjustment of Budgetary Aggregates, IMF Technical Notes and Manuals, International Monetary Fund, 2010.

3 C. Cottarelli, L. Forni, J. Gottschalk, P. Mauro: Default in Today's Advanced Economies: Unnecessary, Undesirable, and Unlikely, IMF Staff Position Note SPN/10/12, International Monetary Fund, 2010. Debt issuance in a foreign currency is almost null for the EU countries. To wit, the average share of local currency debt is about 99% for the advanced economies included in our sample (OECD: Central Government Debt: Statistical Yearbook 2010, Organization for Economic Cooperation and Development, 2010).

**Table 2**  
**Decomposition of DGR Variation (2008-10)**

Weight of components

Country	b 2010	$\Delta b$	ass( $\Delta b$ )	$\frac{+}{sfa}$	$\frac{-}{pb}$	$\frac{-}{rgc}$	$\frac{+}{rib}$
Austria	72.26	3.86	7.51	38.43%	-13.92%	0.88%	46.77%
Belgium	96.79	4.20	9.50	44.33%	-3.16%	1.51%	51.00%
Finland	48.37	4.40	8.30	65.00%	14.82%	-7.65%	12.53%
France	81.70	5.92	9.32	10.30%	-56.29%	-2.44%	30.97%
Germany	83.23	6.11	10.31	66.12%	6.93%	-0.26%	26.69%
Greece	142.76	12.45	20.21	6.35%	-53.84%	-18.25%	21.56%
Ireland	96.19	23.73	27.53	10.91%	-66.47%	-6.61%	16.02%
Italy	119.00	5.13	12.95	16.88%	8.83%	-31.05%	43.24%
Luxembourg	18.42	3.91	5.58	89.55%	9.76%	0.14%	0.55%
Netherlands	62.73	5.81	8.55	49.32%	-22.58%	-2.98%	25.12%
Portugal	93.00	8.25	12.05	13.55%	-56.08%	-3.42%	26.95%
Spain	60.11	7.99	10.47	-1.04%	-78.59%	-5.55%	14.83%
EA12	81.21	7.65	11.16	27.78%	-39.67%	-7.86%	24.69%
Denmark	43.58	5.35	9.80	67.60%	13.09%	-5.81%	13.50%
Sweden	39.76	-0.15	5.16	30.39%	52.55%	-3.44%	13.62%
United Kingdom	79.98	11.84	15.46	30.80%	-54.99%	-4.63%	9.58%
EU15	75.86	7.25	10.62	32.13%	-37.11%	-7.62%	23.14%

Notes: b2010 is the DGR level in 2010,  $\Delta b$  is the debt variation, sfa is the stock-flow adjustment, pb is the primary balance, rgc is the real growth contribution, rib is the real interest bill. Weights are calculated over the sum, ass( $\Delta b$ ), of the absolute value of sfa, pb, rgc, rib; by so doing, weights sum up to 1. The effect of each component on the final DGR variation is marked by the sign at the top of each column.

### *The contribution of the primary balance*

The primary balance may be in surplus or in deficit; a primary surplus lessens the increase of the DGR while a deficit increases the DGR because it needs to be financed. The average primary balance (PB) in the triennium 2008-10 is -2.69% of GDP for the EU15 countries (row "EU15" in Table 1). In the GIPUSI group, Greece, Portugal, the UK and Spain have a primary deficit ranging from -4.6% to -6.7% of GDP; Ireland's deficit is much higher though (-15.77% of GDP). On the other hand, Italy enjoys a primary surplus (+0.55%).

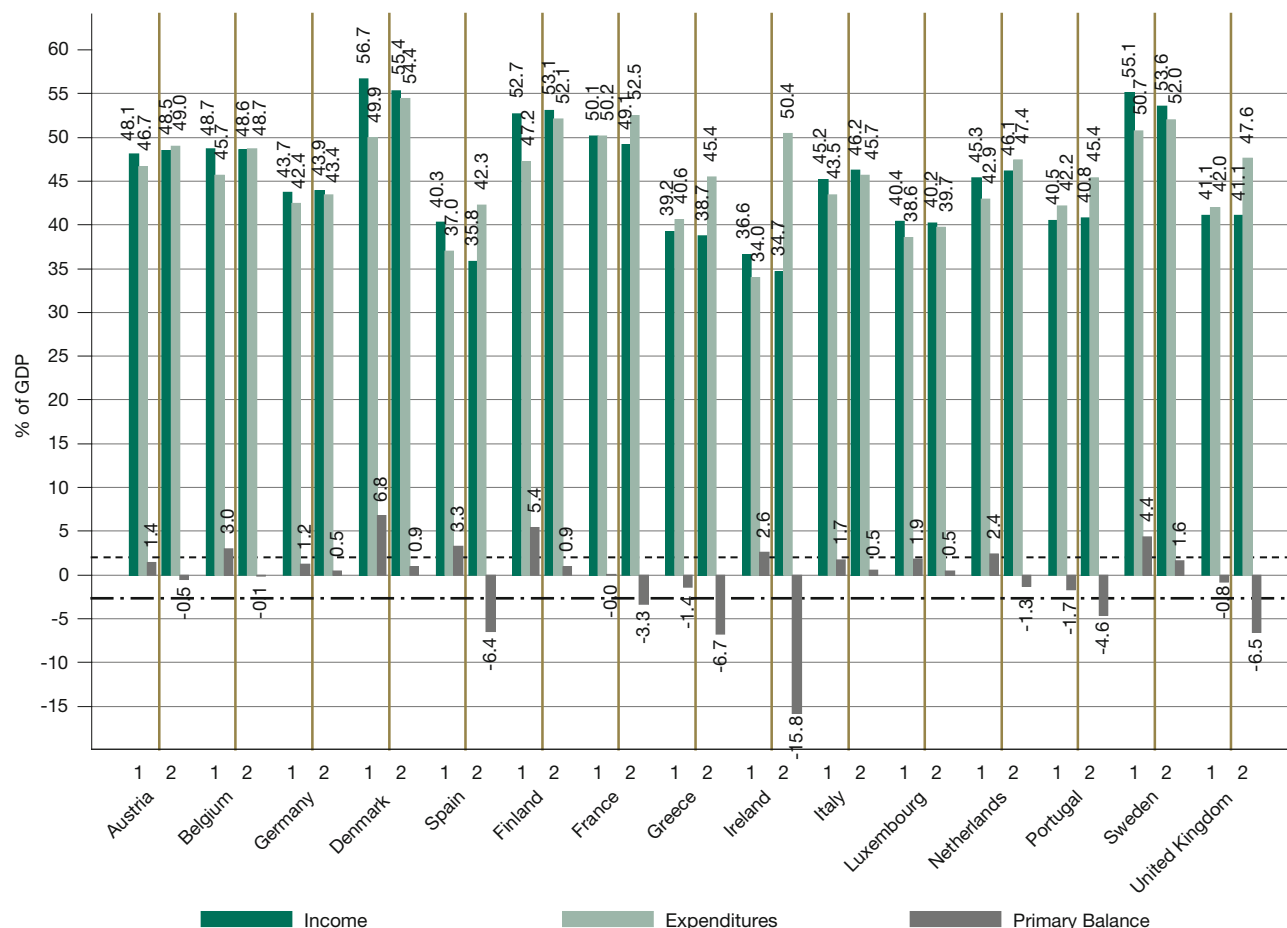
The share of PB in DGR variation is 37.1 w% for the EU15 group (row "EU15" in Table 2). In the GIPUSI group, it is higher than 50.0 w% and positive for all countries but Italy; it reaches 78.59 w% for Spain. For Italy, the PB contribution to the DGR is negative (because of Italy's surplus) and it amounts to 8.83 w%.

The DGR increase is PB-driven, particularly for the six countries under consideration. However, Italy differs since it shows a sound primary balance stance.

In line with the result on the PB's role in the DGR evolution, Figure 2 shows a net worsening of the PB in the period 2008-10 with respect to 2005-07: Greece's deficit worsens from -1.4% to -6.7%, Ireland's from +2.6% to -15.8%, Portugal's from -1.7% to -4.6%, Spain's from +3.3% to -6.4% and the UK's from -0.8% to -6.5%. Italy, however, maintains a primary surplus in both periods, though lower in the second (from +1.7% to +0.5%).<sup>5</sup>

<sup>5</sup> Higher deficits are the outcome of lower tax revenues during the 2008-10 recession while expenditures remain constant or increase (Figure 2). Indeed, government tax revenues are assumed to have a unit elasticity with respect to income while government expenditures are assumed to be non-elastic (N. Girouard, C. André: Measuring cyclically-adjusted budget balances for OECD countries. OECD Economic Department Working Papers No. 434, Organization for Economic Cooperation and Development, 2005). The increasing difference is eventually financed through debt which gets higher and higher compared to decreasing GDP. For an analysis of public expenditures and how they are expected to impact debt dynamics, see C. Cottarelli, A. Schaechter: Long-Term Trends in Public Finances in the G-7 Economies, IMF Staff Position Note SPN/10/13, International Monetary Fund, 2010.

Figure 2  
Tax Revenue, Government Expenditures and Primary Balances



Notes: 1 stands for the 2005-07 triennium, 2 stands for the 2008-10 triennium. The dotted/dashed line marks the average EU15 Primary Balance in period 2 (= -2.69%), and the dashed line marks the same for period 1 (= +2.02%).

### The contribution of the interest bill

The burden of outstanding debt is quantified by the interest bill.<sup>6</sup> It depends on the stock of outstanding debt and the interaction of the implicit interest rate and inflation on that stock. The average real interest bill (RIB) is 1.68% of GDP for the EU15 group (row "EU15" in Table 1). Among the GIPUSI countries, Ireland, Italy and Greece bear the highest RIB with respect to GDP (3.80%, 2.69% and 2.68% respectively). While for Greece and Italy this is due to their high debt stock, Ireland's high RIB stems mainly from deflation in the period considered.

The RIB has the largest share of the DGR variation for Italy (43.24 w%) and Portugal (27.0 w%) in the GIPUSI group. The bill is directly related to the outstanding amount of debt, which is why its weight is at the top for Italy and Belgium (51.00 w%).

Low RIB contributions in the GIPUSI group strengthen the role of the PB. Apart from countries with a large debt stock and a sound PB stance, interest payment has had a minor effect on the DGR evolution so far.<sup>7</sup>

6 The nominal interest bill (NIB) is corrected for the effect of inflation (ICF); this delivers the real interest bill (RIB) in Table 1.

7 If the ongoing turmoil in the sovereign markets persists, the interest bill will increase considerably in the future. As of November 2011, Italy and Spain's spreads have exceeded 450 basic points with respect to the 10-year German Bund. This will soon affect emissions in the primary market.

### *The contribution of growth*

As depicted in Figure 1, real GDP dropped in all EU15 countries in 2009. Consequently, the real growth contribution (RGC in Table 1) is negative for almost all EU15 countries (a negative RGC increases the DGR). The EU15 average RGC is -0.55% of GDP. The effect of negative growth has been particularly adverse in terms of GDP for Greece (-2.3%), (Italy -1.9%) and Ireland (-1.6%).

Looking at the decomposition of the DGR variation (Table 2), the RGC accounts for -7.62 w% for the EU15 group. For the GIPUSI group, the RGC is relevant only for Italy (-31.0 w%) and Greece (-18.25 w%).

Real GDP decreased considerably during the 2008-10 period, which exacerbated the DGR directly (GDP decreases while debt increases) and indirectly (PB declines because of a lower tax revenue).

### *SFA operations*

The yearly debt variation is largely driven by the financing needs of the government (net balance including interest, ESA95), but other governmental operations determine the evolution of debt by an amount known as the stock-flow adjustment (SFA). The SFA amount depends upon operations which either generate debt but not deficit, or vice versa, and which have a more financial, non-budget origin.<sup>8</sup>

The weight of SFA on DGR variation is not trivial (Table 2). For some countries, particularly those with a low DGR increase and a sound fiscal stance, this accounts for the majority of the DGR variation (to wit, Denmark, Finland and Germany). For the group of GIPUSI countries, it is definitely less relevant in terms of DGR variation, with the UK and Italy showing the highest values (30.8 w% and 16.9 w% respectively).

### Debt Projections

In this section we discuss DGR projections under two different scenarios. We use projections to assess EU

countries' fiscal stances before the crisis and to consider how their DGRs would evolve if the economy were to continue to perform (on average) as it had in the past.

In scenario 1, the parameters are set equal to their 2005-07 average. We name this the "positive scenario" where EU15 countries are supposed to enjoy pre-crisis growth rates. In scenario 2, the parameters are set equal to their 1999-2010 average. This is the period available since the introduction of the euro in 1999, and it includes the years of the economic crisis. Scenario 2 is less favourable both in terms of growth and interest rates on debt rollover. Projections are plotted in Figure 3.<sup>9</sup>

Projections show that the DGR has an increasing trend for Greece and Portugal regardless of the scenario considered. Ireland exhibits a decreasing trend in scenario 1 but an increasing one in scenario 2, with this difference depending on a lower growth rate and a primary deficit in scenario 2 (indeed, scenario 2 includes the crisis years 2008-09). The UK, too, exhibits an increasing trend in both scenarios, with scenario 2 having a steeper evolution because of lower growth and a larger primary deficit. For Spain the opposite holds true: the strong economic performance of Spain in both 2005-07 and the larger part of 1999-2010 drives its DGR downwards in both scenarios (the decreasing trend develops much faster in scenario 1). Italy's DGR evolution is limited under both scenarios; its DGR remains constant in scenario 1.

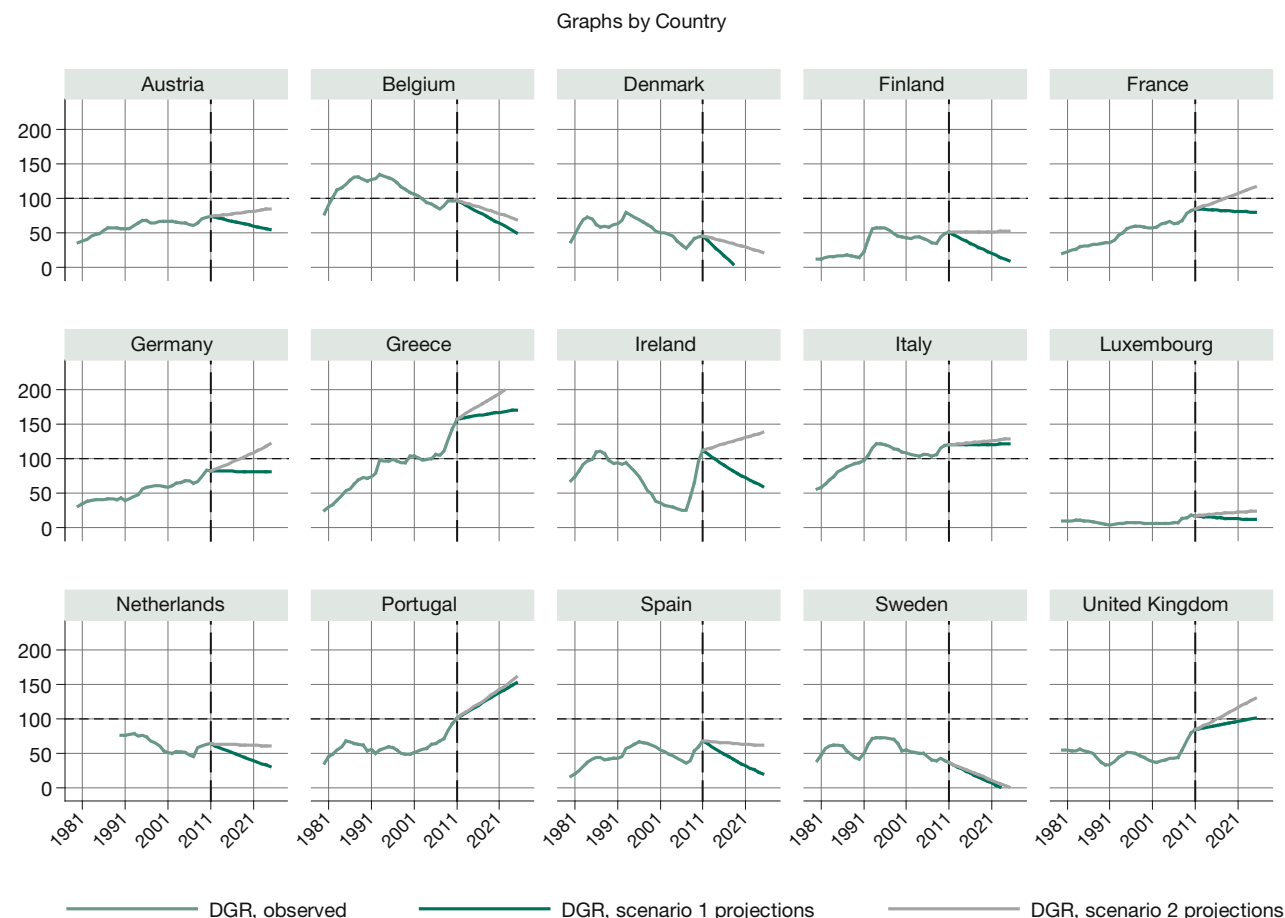
Greece and Portugal exhibit unsound DGR evolutions in both scenarios. Their previous fiscal stances are unsustainable in any case. Ireland's stance before the crisis, however, was sound (scenario 1) and would lead to a lower DGR. Concern regarding Spain and Italy's debt sustainability cannot depend on their past fiscal stances, which were sound (particularly for Spain), but on worries regarding their future economic conditions.

<sup>8</sup> To wit, much of the financial resources needed for the 2008 rescues and stimulus measures were collected through debt issuance. This has caused an increase of debt not mirrored in the primary balance but in an account known as "Net Financial Acquisitions", which is the main component of SFA. SFA is closely monitored by Eurostat; information can be found on the Eurostat website [epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home](http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home) (Themes: Economy and Finance>Government Finance Statistics>News).

<sup>9</sup> The parameters which characterise each scenario are the interest rate on debt rollover (IR), the nominal GDP growth rate (NGR), the PB and SFA; all are country-specific. Projections here do not have a forecasting value because they are based on past economic conditions. Indeed, the future DGR evolution will depend on discretionary government policies as well as market conditions which are unknown. Furthermore, the estimated evolution of ageing population-related expenditures (retirement and health costs) is to be considered in forecasts; see S. Cecchetti, M. Mohanty, F. Zampolli: The future of public debt: prospects and implications, BIS Working Papers No. 300, Bank for International Settlements, 2011, for more details.



Figure 3  
DGR Projections under Different Scenarios, 2012-2025



Notes: The projection period is 2012-2025 (14 years), and we use 2011 as our initial condition.

### Fiscal Adjustment

In the previous section we studied the DGR in order to understand what has driven its evolution. The primary balance emerged as the main driver. As mentioned above, the primary balance worsened in many EU countries in 2008-10 due to the economic policy response to the financial crisis (stimulus and rescues) and to the large GDP contraction in 2009. The joint effect of these factors resulted in a serious deterioration of public finances, a deterioration which EU countries have been trying to stop since mid-2010 by reducing their deficits and containing indebtedness.<sup>10</sup> In this section we turn

to consider the fiscal adjustment necessary to achieve the latter.

In their attempt to control the DGR evolution, fiscal authorities can commit to stabilising the DGR at its current level or to driving it to a specific target value.<sup>11</sup> We discuss fiscal adjustments (a variation of the primary balance stance) as a means to stabilise the DGR at its current level and to enforce the new EU discipline on debt reduction from 2012.

<sup>10</sup> Such commitment has been officialised by the new EU discipline which strengthens the Stability and Growth Pact (ECFIN: NEMO/11/364, op. cit.).

<sup>11</sup> Generally speaking, the DGR is influenced through ordinary fiscal policy. However, it should also be noted that inflation erodes the real burden of debt; M. Francese, A. Pace: Il debito pubblico italiano dall'unità ad oggi. Una ricostruzione della serie storica. Questioni di Economia e Finanza, Banca d'Italia, 2008, show how much inflation in the post-war period reduced public debt in Italy. Obviously, inflation is not a policy option for the euro area countries. The erosion effect of inflation is also the reason why some countries issue inflation-indexed bonds.

**Table 3**  
**Required Fiscal Adjustment, 2011-Based Calculations**

Country	b 2011e	pb	pbca	rir	rgr	pbs	rfa
Austria	73.85	-0.93	-0.73	1.69	1.72	-0.02	0.71
Belgium	96.98	-0.36	-0.21	1.31	1.80	-0.47	-0.26
Finland	50.57	0.23	0.44	-0.30	2.85	-1.60	-2.03
France	84.67	-3.12	-2.55	1.49	1.65	-0.13	2.42
Germany	82.36	0.40	0.28	1.66	2.25	-0.49	-0.76
Greece	157.73	-2.80	-0.26	4.80	-2.96	12.25	12.51
Ireland	112.02	-6.78	-3.43	3.59	0.93	2.98	6.41
Italy	120.27	0.80	1.53	2.64	1.14	1.81	0.28
Luxembourg	17.24	-0.51	-0.57	-1.19	2.75	-0.68	-0.11
Netherlands	63.91	-1.62	-1.05	1.19	1.50	-0.20	0.85
Portugal	101.72	-1.71	-0.67	4.56	-1.03	5.69	6.36
Spain	68.09	-4.14	-2.77	2.59	0.66	1.32	4.09
EA12	85.78	-1.71	-0.83	2.00	1.10	1.71	2.54
Denmark	45.30	-2.24	-1.87	3.34	1.88	0.66	2.53
Sweden	36.50	1.62	1.37	0.90	3.27	-0.87	-2.23
United Kingdom	84.18	-5.44	-4.82	2.55	2.18	0.32	5.14
EU15	79.69	-1.77	-1.02	2.05	1.37	1.37	2.39

Notes: All values are forecasts for 2011 by ECFIN. b2011e is the DGR level, pb is the primary-balance, pbca is the cyclically adjusted primary balance, rir is the real interest rate, rgr is the real growth rate, pbs is the debt-stabilising primary balance, rfa is the required fiscal adjustment.  $rfa = pbca - pbs$  where  $pbs = (rir - rgr) \cdot b2011$ .

### Stabilisation of the DGR

Debt sustainability is a concept which involves several dimensions and which differs if considered in the long or short term. Among the most relevant factors influencing sustainability are external indebtedness<sup>12</sup>, membership in a currency union<sup>13</sup>, long-term expenditure perspectives<sup>14</sup> and the structure of debt.

As for the time horizon, in a long-term perspective, sustainability requires considering the government's capacity to raise revenue in the future, because the intertemporal budget balance is to be maintained.<sup>15</sup>

From this perspective, sustainability recalls solvency. In the short term, sustainability refers more to the government's capacity to stabilise the DGR. Stabilisation is achieved when the primary balance equals the real interest/real growth rate difference times the outstanding debt level (debt-stabilising primary balance, PBS).

Cottarelli et al.<sup>16</sup> define the fiscal correction required in order to stabilise the DGR ( $DGR_{t+1} = DGR_t$ ) as the required fiscal adjustment (RFA). It amounts to the difference between the current cyclically adjusted primary balance (PBCA, structural stance) and the PBS target for next year. We adopt this definition and base its calculation on the ECFIN's forecast of the 2011 real interest and the real growth rates. The RFA that EU countries would need to undertake in 2011 to keep

12 D. Gros: External versus domestic debt in the euro crisis, VoxEU, 24 May 2011.

13 P. De Grauwe: Managing a fragile Eurozone, VoxEU, May 2011.

14 ECFIN: Public finance and ageing, European Economy News, EC – DG Economic and Financial Affairs, 2006.

15 Long-term sustainability requires that the present discounted value of all future expenditures plus the outstanding debt equals the present discounted value of all future revenues, when one excludes that the government can fool the markets by running a Ponzi game. Past events show that Ponzi games are not unlikely in some non-EU countries.

16 C. Cottarelli, L. Forni, J. Gottschalk, P. Mauro: Default in Today's Advanced Economies: Unnecessary, Undesirable, and Unlikely, IMF Staff Position Note SPN/10/12, International Monetary Fund, 2010.

Table 4  
Debt Reduction for 2012-2014, Based on 2011 DGR Levels

Country	b 2011	b 2011*	diff60%	1/20th	dif12	dif13	dif14	bE2014	DGRgap
Austria	73.84	73.84	13.84	0.69	13.15	12.46	11.76	71.76	2.08
Belgium	96.97	96.97	36.97	1.85	35.12	33.27	31.42	91.42	5.55
Finland	50.57	.	.	.	.	.	.	.	.
France	84.67	84.67	24.67	1.23	23.44	22.20	20.97	80.97	3.70
Germany	82.36	82.36	22.36	1.12	21.24	20.12	19.00	79.00	3.35
Greece	157.73	157.73	97.73	4.89	92.85	87.96	83.07	143.07	14.66
Ireland	112.02	112.02	52.02	2.60	49.42	46.82	44.22	104.22	7.80
Italy	120.27	120.27	60.27	3.01	57.26	54.24	51.23	111.23	9.04
Luxembourg	17.24	.	.	.	.	.	.	.	.
Netherlands	63.91	63.91	3.91	0.20	3.72	3.52	3.33	63.33	0.59
Portugal	101.72	101.72	41.72	2.09	39.63	37.55	35.46	95.46	6.26
Spain	68.09	68.09	8.09	0.40	7.68	7.28	6.87	66.87	1.21
EA12	85.78	96.16	36.16	1.81	34.35	32.54	30.73	90.73	5.42
Denmark	45.30	.	.	.	.	.	.	.	.
Sweden	36.50	.	.	.	.	.	.	.	.
United Kingdom	84.18	84.18	24.18	1.21	22.97	21.76	20.55	80.55	3.63
EU15	79.69	95.07	35.07	1.75	33.32	31.56	29.81	89.81	5.26

Notes: Calculations are only for the EU15 countries which exceed the 60% DGR Maastricht limit. b2011 is the forecasted DGR for 2011, diff60% is the DGR difference with respect to the 60% limit, 1/20th is the required yearly reduction rate, difYY is the DGR difference in year YY after correction, bE2014 is the required DGR at the end of the 3-year correction period, DGRgap = b2011 - bE2014.

their DGRs at their 2010 levels are presented in Table 3.<sup>17</sup>

The average RFA is 4.72% for the EU15 group. Except for Italy, all the GIPUSI countries exhibit an RFA much higher than the EU15 average. Greece's adjustment amounts to 15.77%.<sup>18</sup> As for Ireland, its 2011 adjustment amounts to an extraordinary 26.11%. This is due to the country's vertiginous 2010 deficit; indeed, Ireland's 2011 PBS is limited to just 2.56%. Portugal's RFA is also very high (11.47%) because of its bad fiscal stance in 2010, its high real interest rate (4.56% compared to the EU15 average of 2.05%) and its real output, which is expected to decrease in 2011 (-1.03%). The RFA is also quite high for the UK (6.78%) and Spain

(7.51%), with the main difference between the two being the UK's higher debt level and expected real growth in 2011. Italy needs a small correction to keep its DGR stable in 2011 (only 0.78%), since it has a sound 2010 fiscal stance (PBCA equal to 1.01%).

The fiscal adjustment required in the majority of the GIPUSI countries is too great for stabilisation to be quick. DGR levels are likely to increase in 2012 too. Medium-term correction paths are therefore more realistic.

#### Reduction of the DGR: The New EU Debt-Reduction Rule

In June 2011, the EU countries approved the rules for stronger EU economic governance. Debt levels and trajectories will now be a criterion in the assessment of public finances in the context of the excessive deficit procedure. In particular, "Member States with debt in excess of 60% of GDP must reduce the amount by which their debt exceeds the threshold by at least 1/20th per year over three years. If they do not, they will

17 The RFA considers the PBCA (A. Fedelino, A. Ivanova, M. Horton: Computing cyclically adjusted balances and automatic stabilizers, IMF Technical Notes and Manuals, International Monetary Fund, 2009). The PBCA indicates the value of the primary balance net of output cyclical fluctuations. The PBCA may be computed with respect to potential or trend GDP. For the scope of our analysis, we use trend GDP calculated through the Hodrick-Prescott filter (smoothing parameter equal to 100).

18 However, after the 26 October (2011) agreement all figures regarding Greece are unreliable because of the forthcoming restructuring of its debt.

Table 5

## Primary Balance in 2012-2014 to Achieve the 2014 DGR Target under Different Scenarios

	Scenario 1 (2005-2007)							Scenario 2 (1999-2010)			
Country	b. 2011	bTG. 2014	DGR gap	nir	ngr	ΔDFL	pbn	nir	ngr	ΔDFL	pbn
Austria	73.8	71.8	2.08	4.86%	5.33%	2.00	0.37	4.91%	3.39%	1.48	1.77
Belgium	97.0	91.4	5.55	4.66%	4.84%	2.34	1.69	5.08%	3.66%	1.88	3.15
Finland	.	.	.	3.96%	5.73%	1.44	.	4.72%	3.78%	1.41	.
France	84.7	81.0	3.70	4.26%	4.51%	2.30	1.03	4.60%	3.29%	1.65	2.29
Germany	82.4	79.0	3.35	4.30%	3.24%	0.96	1.95	4.56%	2.04%	0.86	3.12
Greece	157.7	143.1	14.66	4.89%	7.03%	3.23	1.84	5.71%	5.76%	3.02	4.82
Ireland	112.0	104.2	7.80	4.17%	8.24%	2.45	-1.51	4.44%	6.10%	1.92	0.89
Italy	120.3	111.2	9.04	4.68%	3.58%	2.16	4.26	5.03%	2.98%	2.32	5.34
Luxembourg	.	.	.	3.33%	10.94%	5.00	.	4.03%	7.63%	3.52	.
Netherlands	63.9	63.3	0.59	4.70%	5.20%	2.01	-0.11	5.14%	4.21%	2.30	0.76
Portugal	101.7	95.5	6.26	4.60%	4.40%	2.83	2.27	5.04%	3.85%	2.59	3.23
Spain	68.1	66.9	1.21	4.22%	7.80%	3.92	-1.84	4.73%	5.87%	3.21	-0.32
EA 12	96.16	90.7	5.43	4.39%	5.90%	2.55	1.00	4.83%	4.38%	2.18	2.51
Denmark	.	.	.	4.98%	4.96%	2.43	.	5.76%	3.48%	2.33	.
Sweden	.	.	.	3.87%	5.52%	1.86	.	4.34%	4.19%	1.70	.
United Kingdom	84.2	80.6	3.63	5.29%	5.31%	2.69	1.20	5.36%	4.31%	2.42	2.04
EU15	95.07	89.8	5.26	4.45%	5.78%	2.50	1.01	4.90%	4.30%	2.17	2.46

Notes: nir stands for implicit interest rate (nominal) on debt, ngr is the nominal GDP's growth rate, pbn is the primary balance to erase the DGRgap, DGRgap is the required DGR reduction by 2014, ΔDFL is the variation of the GDP deflator. Scenario 1: nir and ngr are set equal to their 2005-07 values. Scenario 2: nir and ngr are set equal to their 1999-2010 values (euro period).

be placed in EDP.<sup>19</sup> The application of the new debt-reduction rule for the period 2012-2014 will require the adjustments reported in Table 4 for the countries above the 60% Maastricht limit.

As discussed in the previous section, conventional reduction of the DGR is feasible through primary surpluses which erode the outstanding level of debt year after year. Therefore, it is relevant to consider the necessary primary balance (PBN) to achieve the 2014 DGR target level for the countries exceeding the 60% threshold. The PBN depends on the interest, inflation and growth scenario which the EU countries will face. We envisage two scenarios, the same ones used for our previous projections. In scenario 1, economic parameters are

set equal to their 2005-07 averages (pre-crisis period). In scenario 2, they are set equal to their 1999-2010 averages (euro period).

Given gloomy growth perspectives for 2012, as reported in the autumn 2011 ECFIN forecasts, we consider more likely the less favourable scenario 2. We therefore limit the discussion here to this scenario. Primary balances needed to achieve the 2014 DGR target (as calculated in Table 4) are given in Table 5. The 2011-forecasted PBCA (column "pbca" in Table 3) is also reported to quantify the necessary fiscal adjustment from 2011 to 2012 to meet the new rule.

For the EU15 countries exceeding the 60% Maastricht limit, the average DGR gap (difference between actual and target DGR) to be narrowed by 2014 is 5.26%; the yearly PBN to achieve this is 2.46% (scenario 2).<sup>20</sup>

19 ECFIN: NEMO/11/364, op. cit. Under the new rule, debt evolution is required to be:  $b_{t+1} = b_t - [(b_t - 60.0) \times 1/20]$ , where  $b_t$  indicates the DGR. In the agreement it is stated that "all relevant factors should be taken into account, as outlined in the Commission proposal, when assessing the satisfactory pace of debt reduction". Relevant factors are to be interpreted as attenuating with respect to the automatic trigger of the EDP (to wit, public versus private indebtedness).

20 Keep in mind that the rule will apply only to euro area countries; we also report calculations for the UK for coherence with the other sections.

Greece's PBN amounts to 4.82% of GDP; this is a very high surplus to achieve considering that Greece's 2011 PBCA is -0.26%.<sup>21</sup> Portugal's PBN amounts to 3.23% (2011 PBCA is -0.67%), while Ireland's PBN is only 0.89% (2011 PBCA is -3.43%), which is much less than Portugal's even though Ireland's DGR gap is larger. Spain is the only country which can afford a primary deficit because of its small DGR gap (PBN is -0.32%, 2011 PBCA is -2.77%). As for the UK, its PBN amounts to 2.04% (2011 PBCA is -4.82%). Italy differs from its EU partners in the magnitude of its PBN (5.34%) due to its large DGR gap and persistently low real growth. Nonetheless, Italy's correction might be feasible since it is expected to enjoy a structural primary surplus in 2011 (2011 PBCA is 1.53%).

Conditional on our assumptions about the future economic situation, the surplus to be attained (in 2012-2014) in order to fulfil the new EU debt reduction rule requires a large correction effort for 2012. It seems unlikely that all euro area countries will succeed in following the rule in 2012, particularly those with high DGR levels and low growth perspectives.<sup>22</sup>

## Conclusions

The results of our analysis show that the generalised debt-to-GDP ratio increase in 2008-10 is derived mainly from a deterioration of the primary balance; interest payments and negative growth have worsened the situation. The main causes of the 2008-10 primary deficits are the support and stimulus plans launched in 2008, the rescue of some financial institutions and the economic slowdown in 2009. Economic developments in 2011 allow us to assume a further increase of the DGR.

Projections, however, show that some euro area countries had an unsustainable fiscal stance well before the 2008-09 financial crisis (Greece and Portugal). Conversely, the debt of other countries has only recently come under strain, probably because of worries regarding their future economic developments (Italy and

Spain). Stabilisation requires a quick deficit reduction/surplus increase if economies continue to underperform. Unfortunately, the magnitude of the fiscal adjustment seems too large to be achieved quickly.

Based on this evidence, external help has been appropriate so far to avoid extreme adverse developments in some countries (Portugal and Ireland), developments which might be contagious to other countries.<sup>23</sup> However, such external help has not been enough to ensure the near future viability of the euro area for the financial markets. The establishment of the European Financial Stability Facility and the planned launch of the European Stability Mechanism in mid-2012 have been controversial. Some countries have shown reluctance to get involved in other countries' public finance problems, even indirectly.<sup>24</sup> Nonetheless, EU support is of mutual interest because it is the way to limit contagion among financial institutions and because it might be the only effective solution in case of financial markets' mistrust. Indeed, no fiscal consolidation is effective when markets bet on a country's chances of success or in case of large-scale speculation. It could be wise to provide temporary financing outside the financial market to avoid debt spirals.

If debt restructuring is unavoidable, governments will need to ensure the stability of their financial institutions that are more exposed to foreign restructured assets. This is likely to require resources which might be of the same amount, or even larger, than those necessary to avoid default.<sup>25</sup> This sequence of events might cause further budgetary problems whose second-round effects are difficult to foresee. As for the troubled countries, a default would not improve their primary deficit but only reduce the interest bill.

21 Evidence of this kind leads many to believe that Greece has no more capacity to control its debt evolution. However, as of October 2011, Greece is out of any debt reduction plan and has moved on to restructuring its debt.

22 It is worth noting that the new rule might be effective in reducing the DGR (of the EU15 countries exceeding the limit in 2011) from 95.07% to 89.81% by 2014. This is a DGR level close to the 90% threshold documented to be "dangerous" for economic growth by C. Reinhart, K. Rogoff: Growth in a time of debt, NBER Working Paper No. 15639, National Bureau of Economic Research, 2010. For a discussion about this, see G. Cafiso, R. Cellini: The consequences of the new EU debt-reduction rule, VoxEU, November 2011.

23 In this regard, the transmission channel relies on financial institutions' holdings of other troubled countries' bonds. German banks are very exposed to Greek bonds (Z. Darvas, J. Pisani-Ferry, A. Sapir: A comprehensive approach to the Euro-area debt crisis, Bruegel Policy Brief 2011/02, Bruegel 2011), French banks to Italian bonds (BIS: Consolidated Banking Statistics, Bank for International Settlements, 2010), Spanish banks to Portuguese bonds, etc.

24 The EFSF has shown that EU agencies can collect funds through bonds paying an interest rate similar to that of the most trustworthy euro area countries. At the beginning of its operations, the EFSF was assigned the best possible credit rating: AAA by Standard & Poor's and Fitch Ratings, Aaa by Moody's ([www.efsf.europa.eu](http://www.efsf.europa.eu)). EU countries have agreed to convert the temporary EFSF into the permanent European Stability Mechanism in mid-2012. The ESM is a fully defined framework which will be able to provide concessional loans to countries for which financing in the market is not feasible or convenient. For a discussion of the potential functioning of the EU framework for liquidity and solvency crises, see F. Gianviti, A.O. Krueger, J. Pisani-Ferry, A. Sapir, J.V. Hagen: A European mechanism for sovereign debt crisis resolution: a proposal, Bruegel 2010.

25 L. Papademos: The pitfalls of EZ sovereign debt restructuring, VoxEU, 26 October 2011.