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ADJUSTMENT DIFFICULTIES AND DEBT OVERHANG IN THE EURO-ZONE PERIPHERY

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Adjustment Difficulties and Debt Overhangs in the Eurozone Periphery

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Abstract

This paper describes four key drivers behind the adjustment difficulties in the periphery of the eurozone:

- The adjustment will be particularly difficult for Greece and Portugal, as two relatively closed economies with low savings rates. Both of these countries combine high external debt levels with low growth rates, which suggest they are facing a solvency problem. In both countries fiscal adjustment is a necessary condition for overall sustainability, but it not sufficient by itself. A sharp cut in domestic consumption (or an unrealistically large jump in exports) is required to quickly establish external sustainability. An internal devaluation (a cut in nominal wages in the private sector) is unavoidable in the longer run. Without such this adjustment in the private sector, even continuing large-scale provision of official funding will not stave off default.
 - Ireland's problems are different. They stem from the exceptionally large losses in the Irish banks, which were taken on by the national government, leading to an explosion of government debt. However, the Irish sovereign should be solvent because the country has little net foreign debt.
 - Spain faces a similar problem as Ireland, although its foreign debt is somewhat higher but its construction bubble has been less extreme. The government should thus also be solvent, although further losses in the banking system seem unavoidable.
 - Italy seems to have a better starting position on almost on all accounts. But its domestic savings rate has deteriorated substantially over the last decade.
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Contents

1.	Introduction	3
2.	On the fiscal adjustment and its feasibility	4
3.	Have markets been irrational? How capital flows create their own fundamentals	6
4.	Reliance on foreign capital and the impact of higher risk premia.....	9
5.	External debt sustainability: As boom turns to bust.....	11
	1) What is the external debt of eurozone periphery?.....	12
	2) The external adjustment	15
6.	Concluding remarks	18
	Selected References	20
	Annex A. Keynesian multipliers and the effect of fiscal consolidation	21
	Annex B. Fiscal sustainability.....	22
	Annex C. The sustainability of the external debt	23

1. Introduction

During the first decade after the start of EMU, the euro area and more broadly the global economy were characterised by an unprecedented credit boom. The expansion of credit was particularly strong in four peripheral countries: Greece, Ireland, Portugal and Spain (hereafter GIPS). The difficulties these countries are now experiencing derive simply from the ‘sudden stop’ of the large private capital inflows they had received until recently.

Market financing, which had been excessively abundant until 2009 for both governments and the private sector, suddenly dried up during 2010: at a certain point the government of Greece, and then of Ireland and Portugal were no longer able to fund themselves at any price. In order to prevent a disorderly default, ‘Europe’ (or rather the financially stronger EU member states) had to provide them with substantial financial support, first on a bilateral basis (Greece), and then via a hastily created new institution, the European Financial Stability Facility (EFSF).

The underlying assumption of the European-led rescue effort has been that the countries in question only face a temporary liquidity crisis and that a relatively short and sharp adjustment effort should be sufficient for them to resolve their fundamental problems (mostly fiscal and external deficits); thus making it possible to again have access to international capital markets.

This paper aims to provide background material on the key parameters and mechanisms that will determine the success of the adjustment efforts.

Before going into detail, it will be useful to emphasize one peculiarity of EMU: within the euro area, the usual assumption that public debt is risk-free does not hold. The reason is that no individual euro area country has access to the printing press. The latter is what makes government debt risk-free in nominal terms in countries with their own currency. In this sense, in the peripheral euro area countries, public debt has more of the characteristics of private or perhaps ‘sub-sovereign’ debt than of a risk-free security.

It is only in countries with solid public finances (essentially Germany and some of its neighbours) that public debt remains public debt in the sense in which the term is usually used.

What is thus happening in the euro area is the age-old process whereby creditors put pressure upon governments to support the weaker debtors (banks and/or euro peripheral governments). If history serves as any guide, this pressure will prevail because the alternative is perceived to be a potentially disruptive breakdown in markets, which will further delay recovery.

In this sense, Europe seems destined to repeat the classic bust scenario in which private debt becomes public debt but with the difference that governments of core European countries take on the debt of peripheral countries, both private and public. However, the willingness and ability of the core countries to accept this burden are limited. Hence one needs to prepare for the second stage of crisis, namely an increased risk of sovereign default. This danger is likely to persist for some time.

In this paper we shall focus on the analysis of the position of peripheral eurozone countries, the GIPS mentioned above, but we will also scrutinize data for Italy, which is sometimes thought to be in a similar situation. We thus look at the ‘GIPSY’ (for Greece, Ireland, Portugal, Spain and Italy).

The following analysis shall show that these five economies in reality are quite different. Portugal and Greece share two key features, namely high external debt and an extremely low rate of national savings. The latter implies that these two countries have to rely continuously on large inflows of capital to finance consumption.²

By contrast, Spain has a much lower debt to start with and higher savings rate, but it is very exposed to financial markets because its construction boom went hand in hand with a huge expansion of financial activity. Since house prices have not yet fully adjusted, the magnitude of the potential losses in the banking sector is still unknown.

² See Gros (2010b).

In Ireland house prices have fallen more than in Spain and the losses in the banking sector have been so large that the government could not absorb them without outside support. These two adversities lie at the heart of Ireland fiscal troubles. In a strict sense, in Greece and Portugal the problem of the sovereigns is potentially insolvency, while in Ireland and Spain it should be illiquidity. Of course, the difference is never so clear-cut *ex ante* and insolvency of banks could lead to sovereign insolvency

Italy seems different from both of these subgroups in that its savings rate is as high as in Ireland and Spain and its foreign imbalances are much smaller. With a rather conservative financial sector, it should be able to weather the storm quite well, but given the high level of public debt, avoiding deterioration of its saving position is crucial.

The remainder of this note analyzes the three main aspects that determine the (fiscal and external) adjustment process in Greece and the other peripheral euro area member countries. The first objective of this investigation is to examine the fiscal adjustment, its impact on demand and, hence, on output and tax revenues, which could potentially create a vicious circle. Section 3 sheds light on the role of capital flows in affecting debt sustainability analysis. Section 4 investigates the reliance of each of the countries on foreign capital and borrowing. Section 5 identifies different aggregates to measure external debt for each of the GIPSY countries, evaluates their adjustment needs and compares them with the experience of the Baltic states after 2008. It concludes that given the current combinations of high-risk premia, low growth and very high external debt levels, doubts about the sustainability of the external position of Greece and Portugal are justified. The last section concludes and provides some policy recommendations.

2. On the fiscal adjustment and its feasibility

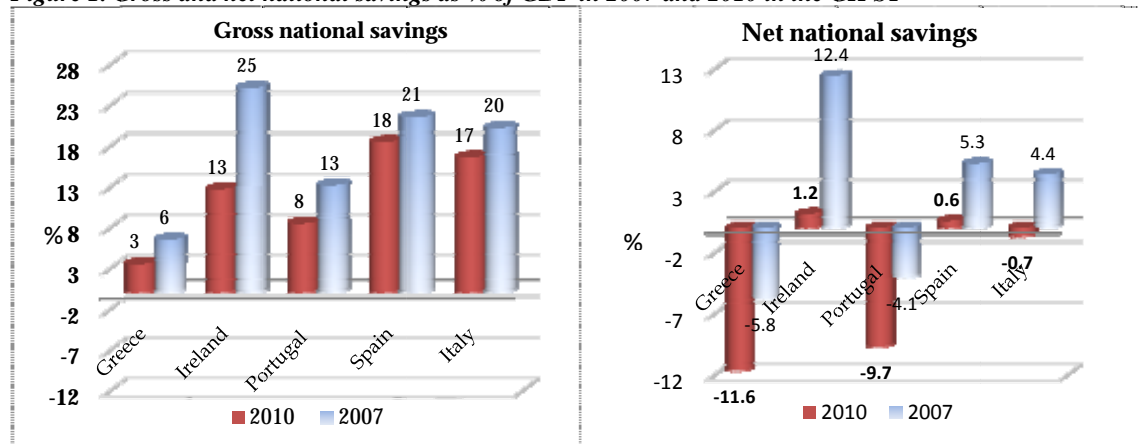
The ‘euro crisis’ started when the true scale of the disarray in Greek public finances was revealed in late 2009. After that, Greece was required to put in place tough austerity programmes to improve its fiscal position. We thus start with the analysis of the possible consequences of large fiscal adjustment programmes.

Any fiscal consolidation has a negative impact on demand via the so-called ‘Keynesian multiplier’: when public spending goes down, GDP and therefore income fall and so does consumption, which in turn induces another drop in GDP.

Standard textbooks show that the size of the Keynesian multiplier, and hence the final effect of fiscal consolidation on GDP, is influenced by two factors: the propensity to save and the degree of trade openness. In particular the multiplier is large when the savings rate is low and/or when the degree of trade openness is low. Moreover, a low degree of trade openness also means that exports cannot provide a strong offset to low domestic demand – adding to the political difficulties of maintaining a tight fiscal stance.

The Greek economy seems to possess all the characteristics indicate of a difficult adjustment: large debt and deficits, low gross savings and negative net savings (see Figure 1), relatively closed economy (see Table 1) and a high dependence on the external financial market.

The problem facing Greece could then be described as the need for a very large fiscal adjustment without a safety valve. Portugal has in most respects similar characteristics, but in a somewhat attenuated form, given its lower debt and the higher degree of openness.

Figure 1. Gross and net national savings as % of GDP in 2007 and 2010 in the GIPSY

Source: European Commission Services (AMECO database).

Figure 1 and Table 1 suggest that the Irish economy, despite difficulties in the financial sector, with its high level of savings and openness, has in principle the potential for achieving fiscal consolidation at the lower cost in terms of GDP contraction. Italy and Spain are the countries with the lowest level of government deficit and debt, respectively, and the countries with the highest level of national savings in the GIPSY group, despite a significant fall in the post-crisis period.

Table 1. Degree of openness in the GIPSY in 2009

Country	Exports % GDP	Imports % GDP	Openness indicator
Greece	19.0	29.8	0.49
Ireland	90.7	75.4	1.66
Portugal	27.9	35.5	0.63
Spain	23.4	25.5	0.49
Italy	24.0	24.4	0.48

Note: Openness indicator is defined as the sum of import and exports relative to GDP.

Source: European Commission Services (AMECO database).

As mentioned earlier, the first benchmark for the cost of the fiscal adjustment in terms of output fall can be obtained using the Keynesian multiplier. To keep things simple, we consider the simplest macro model: an open economy, where consumption depends on income, exports are determined by foreign demand (and hence exogenous in the short run) and imports vary proportionally with domestic income (see Annex A for the derivation).

Table 2 shows the impact of the fiscal adjustment on output in the five peripheral eurozone countries required to meet the Maastricht criterion of 3% deficit relative to GDP.

Table 2. Simple Keynesian multipliers

Country	Keynesian multiplier: $1/(1-c+m)=1/(s+m)$	Excess deficit (actual 2009 – 3%)	Impact of fiscal adjustment on output relative to baseline, in %
Greece	2.5	12.4	-31.0
Ireland	1.3	11.4	-14.8
Portugal	1.7	6.4	-10.7
Spain	2.0	8.1	-16.2
Italy	1.5	2.2	-3.3

Note: The marginal savings rate, s , is computed as the ratio of the increment in private savings relative to the increment in GDP over the period 2002-07; similarly the marginal propensity to import, m , is computed as the ratio of the increment in imports relative to the increment in GDP over the same period.

Sources: European Commission Services (AMECO database) and authors' calculations.

The data suggest that, with the exception of Italy, the adjustment would be so large as to be politically unfeasible. This judgment would not change even if one takes into account that the adjustment would be stretched over a number of years and if the numbers in the last column would be corrected for the cumulative effect of the trend growth over this period. For Greece, even assuming a trend growth rate of 3% per annum, and 3-year adjustment period, the overall predicted fall in GDP would still be more than 20%.

In the standard approach of assessing the effect of fiscal stimuli, large multipliers are seen as ‘magnifiers’ of fiscal policy measures and are therefore welcome. However, large multipliers also imply that the contractionary effect of fiscal consolidation is going to be larger. Greece exhibits the largest multiplier as it is the country with the lowest (gross) savings rate (12% on average, compared to 24% in Germany for instance), while Ireland is the country with the smallest. Given the combination of the largest multiplier and largest adjustment need, Greece stands out as the country with the largest impact of the fiscal adjustment on GDP. In 2009 Ireland had a similar fiscal adjustment need³, but the estimated impact on output was smaller given that it is a much more open economy.

The reference to 2009 might overestimate the adjustment in Greece, as 2009 represents an outlier with respect to both the preceding and the following year. The correction of about 5-6 percentage points achieved in 2010 coincided with a drop in GDP of 4.5%, (about 6% lower than baseline GDP growth, assumed to be +1.5%), which would suggest a somewhat lower multiplier, but the outlook for 2011 foresees a further fall and a fiscal balance that remains still largely negative. What past experiences so far suggest is that, under these conditions, further fiscal correction will become more and more politically difficult.

Overall, while the simplistic multipliers used here may exaggerate the severity of the recession that would follow the fiscal adjustment required by a strict adherence to the Maastricht criteria, they clearly illustrate that the assumption that GDP growth can remain positive over large fiscal adjustment periods is unrealistic and that the large negative impact on output driven by the fiscal adjustment might well be politically impossible in some of the countries.⁴ These might be the reasons why financial markets continue to harbour doubts about the sustainability of public finances of these countries.⁵

3. Have markets been irrational? How capital flows create their own fundamentals

It is often remarked that until recently financial markets have seemed to provide Greece with ample financing, although its current account deficits and the (approximate) size of its public debt were well known. However, this was during a period when Greek GDP, as well as the Irish and the Spanish GDP, were growing in nominal terms by over 7% and nominal (long-term) interest rates were around 4%. With the nominal growth rate 3 percentage points higher than the interest rate, public debt sustainability was not an issue. However, the situation changed radically in 2009. As shown in Table 3 with the crisis breaking in, nominal (actual and expected) growth rates have become much smaller or even negative and market interest rates asked on governments debt, as well as the private sector, have started to rise.

³ The adjustment need, and its attendant impact on the GDP, has increased dramatically and sharply in 2010, following the Anglo-Irish Bank’s funding.

⁴ See Alcidi & Gros (2010) on the European experience with large fiscal adjustments.

⁵ As will be shown later, Greece suffers from twin deficits: a large fiscal deficit and an equally large current account deficit. Sustainability requires dealing with both, but this would require a change in the behaviour of the private sector, which cannot be controlled by the government. Therefore under the assumption that import behaviour stays unchanged and no improvement in competition materialises, the fall in GDP induced by fiscal austerity will reduce imports, but it may be not sufficient to eliminate the present deficit.

Table 3. Key factors for sustainability: Growth rates of nominal GDP and nominal interest rates

	GDP (nominal growth rate)		Difference	Long-term nominal interest rate		Difference
	2003-07	2009-12	Change: Boom to bust	2003-07	After 2010*	Change: Boom to bust
Greece	7.3	-0.6	-7.9	4.1	11	6.9
Ireland	7.5	-2.5	-10	3.9	9	5.1
Portugal	3.7	0.4	-3.3	4.0	7	3
Spain	7.4	0.4	-7.0	3.9	4.8	0.9
Italy	3.5	1.2	-2.4	4.1	4.5	0.4

* Long-term interest rates are very difficult to forecast and, given the high level of uncertainty, subject to significant changes even in the short run. Moreover, since 2010, Greece and Ireland are under special refinancing programmes so that market rates matter only relatively. The data in the table are supposed to reflect market conditions and are derived assuming a risk-free rate at 3% (roughly the return on 10-year German bund) and risk premia of 8, 6, 4, 1.8 and 1.5% in Greece, Ireland, Portugal, Spain and Italy, respectively. The risk premia are the actual ones of early 2011.

Sources: European Commission Services (AMECO) and authors' calculations.

Here again Greece seems in an extreme situation compared to the other countries. The fall in the growth rate of nominal GDP is the largest, close to 8 percentage points, and the increase in the interest rate is also the largest.

One way of defining sustainability of public finances is to ensure that the primary balance deficit is large enough to offset the so-called 'snowball effect'.⁶ If this condition is satisfied, the debt-to-GDP ratio does not increase. During the boom phase, i.e. until 2007, when the growth rate of nominal GDP was much larger than the cost of refinancing its debt, governments could thus run a primary deficit and still keep the debt-to-GDP ratio constant.⁷

However, the crisis brought much lower growth prospects and a much higher risk premium. If Greece were to pay an interest rate of 11%, as market rates suggest in early 2011, and given that its growth rate for 2011 is expected to be negative (-2.4 according to the IMF review in March 2011)⁸ and its debt-to-GDP ratio at around 1.4, the primary balance surplus required to prevent the debt ratio from increasing would be about 20% of GDP. Of course, such a high interest rate and low growth are not representative of the long run and debt sustainability is a long-run issue. However they show a tendency and influence financial markets in the short run.

The figures in Table 4 show the adjustment needed to ensure that the debt ratio does not increase and is rather close to the adjustment that is needed to satisfy the Stability Pact.⁹

⁶ This is obtained by multiplying the level of debt by the difference between the interest rate and the growth rate.

⁷ The exact level of this ratio is difficult to pin down for Greece given the repeated massaging of the figures; in any case it was far larger than 3% and does not matter in this context.

⁸ See <http://www.imf.org/external/pubs/ft/scr/2011/cr1168.pdf>.

⁹ See Economic Forecast Autumn 2009 for a description of the unsustainable path of Government debt, in the euro area members, under the hypothesis of no fiscal adjustment.

Table 4. The actual fiscal adjustment required to prevent debt-to-GDP ratio from increasing

	Actual (2010) primary balance % of GDP	Primary surplus (% of GDP) required for sustainability	Adjustment required for sustainability
Greece	-3.2	18	21.2
Greece*	-3.2	4.2	7.4
Ireland**	-10.0	4.9	14.9
Ireland***	-10	2.9	12.9
Portugal	-4.4	2.5	7.5
Spain	-7.3	1.3	10.7
Italy	-0.4	3.1	3.6

Note: Primary surplus required for sustainability is derived from the equation (B1) in Appendix B. In the calculations we have assumed that the long-term interest rates are the ones shown in Table 3 (column “After 2010”), while for the growth rate we have assumed 1.5% for each of the countries. For Greece and Ireland we presented both the requirements under market conditions as of early 2011 and the conditions created by their rescue packages.

* This adjustments are based on the IMF review, which assumes that the future average interest rate is about 6% and the nominal growth rate 3%.

** The actual primary deficit of Ireland in 2010 is much larger, it amounts to 29.3 percentage points of GDP as consequence of the funding of the Anglo Irish Bank, the value shown in the table is an average of the 2009 and (expected) 2011 deficits.

*** The adjustment is based on interest rates of 6%, as applied by the EFSF.

Source: Own calculations based on AMECO data and IMF.

One question is how growth perspectives could change so drastically to reverse the debt sustainability over a very short time span. The answer to this question lies in the drivers of growth during the boom period. After the creation of the euro, large capital flows started to fly from core eurozone countries into the periphery. The peripheral eurozone economies (mainly Greece, Ireland and Spain) in their catching-up phase appeared to core European member states with large savings and little domestic investment prospects as a great investment opportunity. Large capital inflows quickly generate their own fundamentals: high growth rates driven by strong demand for consumption and/or construction investment, supported by easy credit fed from abroad. In all this the financial system, banks in particular, played a crucial role. They intermediated the flows and magnified the availability of credit through leverage by generating a tight network of intra-sector exposures. In this sense capital flows (and leverage) were the ‘financial manifestation’ of the macroeconomic imbalances. When the financial crisis broke in late 2007, the risk perception changed dramatically and resulted in a sudden stop of private capital flows. In principle macro imbalances within a monetary union do not matter in the classical sense by definition. If anything, imbalances were part of the euro plan: one of the purposes of having a single currency was exactly to stimulate capital flows and movements of resources from countries with excess savings towards countries with scarce financial resources to promote faster growth. This is in fact what happened on a very large scale. Yet, the crisis brought about a new perspective and it was realized that there are two main reasons why intra-euro area imbalances may matter. The first one is that large and persisting inflows fundamentally mean the accumulation of external borrowing and, hence, debt in the receiving country; the second is that capital inflows do not necessarily finance productive investment able to ensure future growth and thus the creation of new resources to repay the debt. In some cases, inflows fund consumption and contribute to inflated bubbles, which produce temporary nominal growth but not a sustainable one.

This is what happened in Greece and Portugal, where inflows mainly financed consumption, as suggested by very low national savings rates. Indeed, as shown earlier in Figure 1, the net national savings rate of Greece and Portugal were substantially in negative territory and the gross savings rates in single digits. The external deficits of Portugal and Greece were thus not due to particularly high investment, but to the fact that the increase in consumption over the last decade could not be financed out of current production. In the cases of Spain and Ireland, both of which have much higher national savings rates than Greece, the foreign debt financed mainly an excess of housing investment and a huge bubble in the construction sector.¹⁰

¹⁰ See Gros (2010b).

In this perspective, moving back to sustainability fundamentally requires an expenditure adjustment for governments and/or the private sector, depending on where the problem of excessive borrowing lays. Overall, the adjustment should take place by reducing or eliminating further external borrowing, i.e. achieving a balanced or positive current account, and possibly attacking the stocks, i.e. deleveraging.

4. Reliance on foreign capital and the impact of higher risk premia

The impact of increasing sovereign risk premia,¹¹ described in the first part of the previous section, is not likely to remain limited to the cost of refinancing public debt, but it will affect the cost of use of capital for the private sector as well. An elevated risk premium on public debt is being transmitted to the entire domestic economy, thus providing an additional shock equivalent to a large interest rate increase for the private sector.

There are several dimensions to take into account to understand why this is occurring, but the key element is the resource constraint for the entire economy. If the government tries to achieve a deficit reduction by cutting transfer spending or increasing taxes, households and enterprises have either to cut back consumption and/or investment, as predicted by the Keynesian effect discussed above, or they can try to borrow more. One could argue that fiscal consolidation could increase demand through a positive non-Keynesian effect on expectations (see among others Giavazzi et al., 2000). However, this is unlikely to be the case for Greece, Portugal and potentially also other peripheral countries, because the channel through which the non-Keynesian effect works is the domestic interest rate: reductions in the fiscal deficits are expected to reduce the domestic interest rate and therefore stimulate demand. This channel is broken in the case of Greece, Ireland and Portugal, which now depend on official financing.

These considerations imply that the estimates of the cost of fiscal adjustment suggested by the simple Keynesian multiplier are not so far off the mark as would be suggested by more complex models.

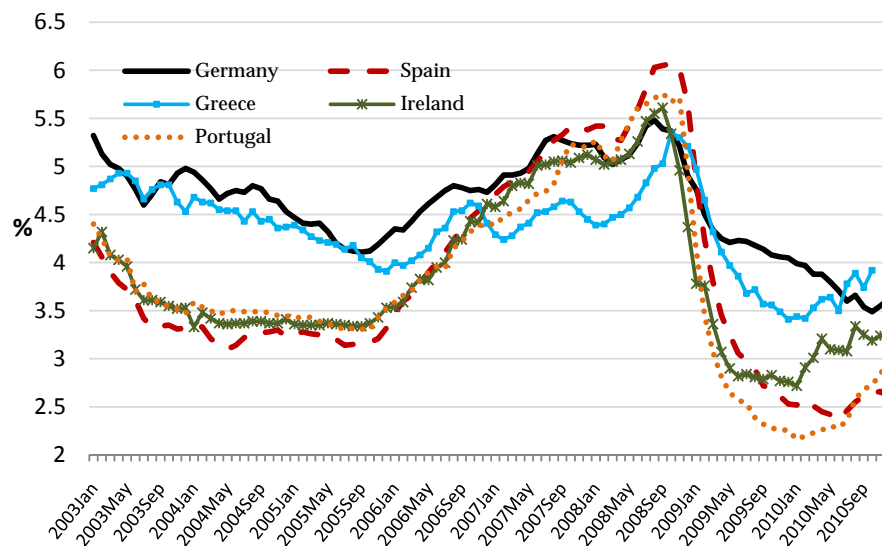
In addition, under ordinary circumstances, higher funding costs for governments are reflected in higher funding costs for the private sector because in most financial systems government debt constitutes the benchmark for riskless assets. A similar principle applies to the international capital market in which private borrowers, especially banks, usually pay a higher interest rate than their own sovereign. For example, the rates charged for default insurance in CDS (credit default swaps) contracts for banks are almost always higher than the CDS rate for the sovereign in which the bank is headquartered. This implies that for the banks in the GIPS, the marginal cost for funding on the international market must have increased considerably. However, banks in the euro area have another source of funding: the ECB. With the full (unlimited) allotment policy of the ECB, any euro area bank can obtain as much funding as it desires as long as it has sufficient collateral. This last condition has not been difficult to satisfy since banks have been able to securitize part of their loan books, which they then use as collateral. Moreover, when difficulties arose the ECB has waived ratings requirements first regarding Greek government debt (April 2010) and then for all types of Irish securities (March 2011). This is the reason why the pass-through of higher risk premia on government debt to domestic borrowers has been rather limited so far.¹² Instead of increasing, interest rates on (domestic) loans granted by banks of peripheral eurozone countries have actually fallen in the aftermath of the Lehman failure, as a consequence of the exceptional monetary policy measures undertaken by the ECB. Figure

¹¹To assess the effect of an increase in interest rates on government bonds, textbooks usually distinguish between Ricardian and non-Ricardian economies. If the Ricardian equivalence does not hold, an increase in the return on government bonds, which are wealth for households, results in higher consumption, regardless of the reasons of the increase. By contrast, in a Ricardian economy, because the expectation of higher future taxes is discounted immediately, no effect on consumption should be observed. Crucially in both cases it is assumed that government debt is held by residents. However, reality differs from the textbook assumptions and the entire discussion about Ricardian equivalence is beside the point for countries such as Greece and Portugal, where the government deficit was financed by capital inflows.

¹²Moreover domestic funding costs have not increased as much as deposit rates have remained low.

2 shows the average interest rates on loans for house purchase in the GIPS and in Germany. All the series have a common trend driven by the changes in monetary policy, but interestingly and despite what one would expect, the rate in Germany is higher than in the other countries also after the crisis started. There has been some increase in peripheral mortgage rates since early 2010, but this has been rather limited compared to the very large increases in the risk premia on the government debt of these countries.

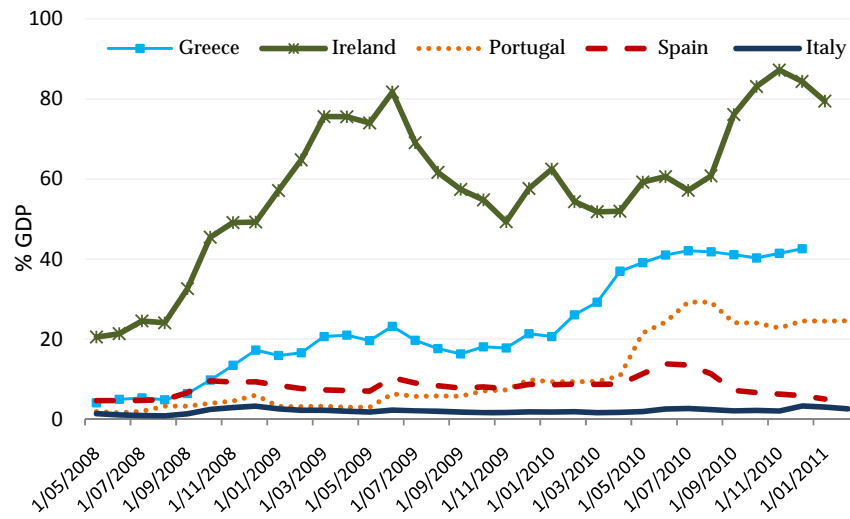
Figure 2. Interest rates on loans for house purchase



Note: Interest rates on loans for house purchase excluding revolving loans and overdrafts, convenience and extended credit card debt [A21-A2Z], Total, New business, to Households and non-profit institutions.

Sources: ECB, Statistical warehouse.

Figure 3 below provides evidence of the large borrowing by monetary and financial institutions from national central banks as a percentage of GDP and explains why domestic interest rates did not reflect usual the transmission mechanisms. The banking systems of Greece and Ireland have received a total of more than €200 billion in external funding via the ordinary monetary policy operations of the ECB. Without these huge transfers, which amounted to about 50% of GDP for Greece and 80% for Ireland, the economies of these two countries would have been subject to the same type of ‘sudden stop’ of capital inflows that happened in the Baltic nations, whose banking systems do not have access to the refinancing windows of the ECB (section 5 develops further this comparison).

Figure 3. MFIs' borrowing from central banks (% of GDP)

Sources: National central banks and authors' calculations.

Such large numbers suggest that while banks in both countries have been cut off from the interbank market, the ECB has played a crucial role of lender as last resort (but not really at a penalty rate, since the cost was only 1% until April 2011). Yet what was supposed to be an emergency, temporary measure risks becoming a source of addiction to cheap financing. If access to the ECB's windows were to become more difficult, residents of Greece or Ireland would no longer be able to finance their current level of spending, and these economies would weaken further.

Assuming that the risk premium for Greek banks would be equal to that of the Greek government outside the EU/IMF umbrella, i.e. around 700-800 basis points, the lending of the ECB to the Greek banking system amounts to an implicit subsidy worth around €8 billion or about 3% of GDP. This is more than the country receives in structural funds from the EU. For Ireland, the implicit subsidy is even larger and worth more than 4% of GDP, if one applies a risk premium of 600 basis points on the financing supplied by the ECB.

The recourse to the ECB remains by far the cheapest source of funds for banks in the euro periphery, but as a result the risk on the balance sheet of the ECB will be increasing. This is why the ECB has recently tighten its eligibility criteria for the collateral it accepts (and is expected to do so again), as banks in the periphery (and some weak banks in core euro states) have exhibited a clear tendency to transform ever-more risky parts of their assets into securities that they could use as collateral for the ECB's windows.

5. External debt sustainability: As boom turns to bust

The analysis above has focused on the sustainability of government debt and the possible effects of fiscal consolidation on the real economy; however a comprehensive sustainability analysis of the position of a country should also include external debt. Given the dependency on foreign capital of many eurozone peripheral countries, external debt is of crucial importance. In what follow we shall argue that fiscal adjustment alone is not sufficient if it is not accompanied by external adjustment. Foreign capital has become scarcer for some countries because financial markets have recognised that it is not only the internal fiscal position of the government that has become untenable as the boom has turned into a bust, but also the position of the country as a whole with respect to the rest of the world. The question then becomes how to assess the sustainability of the external debt position of a euro area member country.

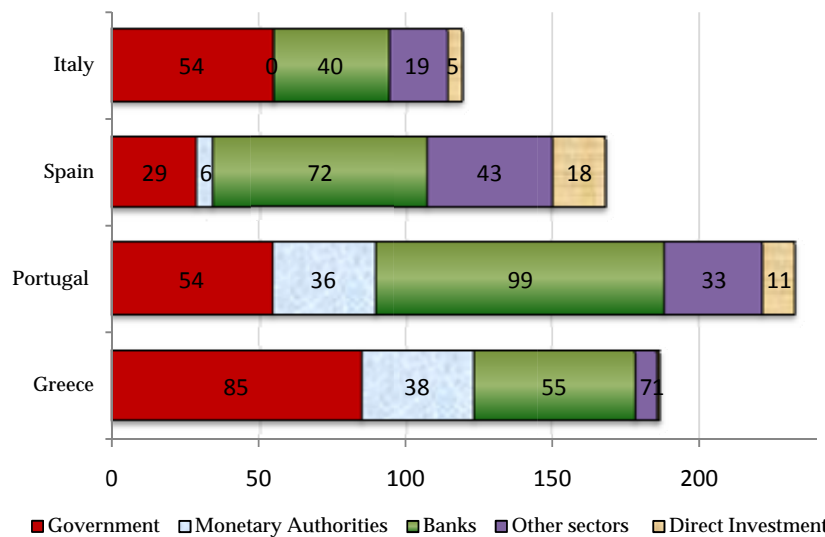
1) What is the external debt of eurozone periphery?

Despite the massive debate about external financing difficulties, it remains difficult to calculate and even more so to assess the level of a country's external debt.

First of all, there is no consensus on the concept of external debt to be used for the assessment. Gross debt is the more relevant concept in a crisis situation when government and private agents have to service (and roll over) their gross debt obligations. Even if some agents in the economy hold large foreign assets, these may be inaccessible immediately to fund the debt service or the repayment obligations that arise when existing debt is not rolled over. In what follows we shall take a close look at the gross external debt of Greece, Ireland, Portugal, Spain and Italy.

We start by considering the data on gross external debt as provided by national central banks based on the concept developed by the IMF.¹³ Figure 4 shows the data on gross external debt, as a percentage of GDP, and its breakdown by sectors.

Figure 4. Gross external debt (as % of GDP in 2010q3) and its breakdown by sector



Note: Data on gross external debt for Ireland (which is more than 1000% relative to GDP) are not displayed because it is unlikely to accurately represent its effective external position. The investment position of Ireland is distorted by the financing activities of the multinational companies, attracted with its low corporate income tax, which lead to extraordinarily high gross assets and liabilities. Erroneously, its gross external debt would comprise the debt of local subsidiaries owned 100% by foreign financial, and other, corporations.

Sources: Bank of Greece, Banco de Portugal, Banco de España, Banca d'Italia, European Commission services (AMECO) and authors' calculations.

As of 2010, the total external debt of Greece amounts to more than €400 billion, i.e. almost 190% of GDP (see Figure 4). Of it, about half has been issued by the government. In terms of GDP, this is equivalent to about 85%. Given that total government debt is about €340 billion (or 140% of GDP), this implies that about 60% of the government debt is held by foreigners (see Figure 5).¹⁴ Interestingly between 2009q3 and 2010q3, the total external debt of Greece has increased by about €25 billion, while the share issued by the government has fallen and the one issued by the monetary authorities has

¹³ For the IMF definition, see <http://www.imf.org/external/pubs/ft/eds/Eng/Guide/index.htm>. In theory the gross external debt of a country could be also calculated from its International Investment Position (IIP) as the difference between its total liabilities and the incoming FDI, but unfortunately Eurostat does not provide complete data for these calculations. The IFS (IMF) does provide IIP data but only in dollars. For that reason, we eschew making a comparison because if a discrepancy emerges, it would be difficult to impute it to the exchange rate effect or measurement issues.

¹⁴ Note that in 2009, almost 75% of the government debt was held by non-residents.

increase by more than €50 billion. Roughly speaking the debt of the monetary authority should be considered as public debt, hence two-third of the total external position of Greece has a public source. However, holders of the monetary authorities' debt do not belong to the private sector but, most likely, to the ESCB (European System of Central Banks). This makes that part of the debt relatively less vulnerable.

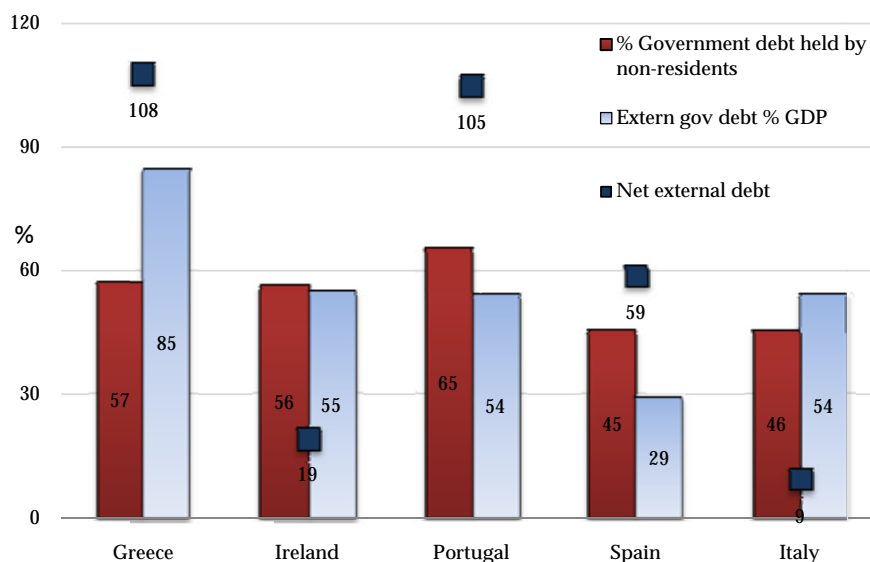
In the case of Portugal, the total external position of the country relative to GDP is even larger than in Greece (more than 200%, see Figure 4), but the distribution across sectors is different. The total external debt of Portugal amounts to about €400 billion and one-fourth of it is issued by the government. Since the gross government debt amounts to about €140 billion, this implies that about 65% of the government debt is held by non-residents (see Figure 5). Unlike Greece, in Portugal the private sector is largely exposed to external financing. Banks are exposed as much as 100% of GDP and the percentage increases to 132% if banks and the rest of the private sector are lumped together. This is far higher than in any other peripheral country (with the exception of Ireland).

Spanish gross external debt is about 170% of GDP, little below the Greek debt but while in Greece the largest borrower is the government, in the case of Spain, the private sector and in particular banks are the most indebted to the rest of the world, i.e. about 115 percentage points of the GDP, altogether. In contrast, the government has the smallest, relative, external debt among within the GIPSY group.

Lastly, Italy has the smallest total external debt as a percentage of GDP (about 120%) and it is almost equally shared between private (bank and other sectors) and public issuers. Given that Italian public debt is about 120% of GDP, this implies, as shown in Figure 5, that 46% of the Italian government debt is held by foreigners. Italian banks have the lowest relative exposure to the rest of the world.

Overall the countries exhibit quite high heterogeneity and this feature persists also when looking at the net external debt. Indeed, in principle in the long run, when the return on the assets owned by all residents is supposed to be available to finance all debt service obligations, the proper concept to monitor is the net debt. Yet precise data on net debt are difficult to obtain. In theory, the net foreign indebtedness of a country should be equal to the gross debt minus foreign assets held by residents, but this is far too difficult to measure. An alternative evaluation is based on the cumulated current account balances over a quite long period of time. Figure 5 displays the net external debt as a % of GDP computed according to that method over the period 1990-2010. Greece and Portugal emerge as the countries with the largest net external debt relative to GDP, and Italy with the lowest one.

Figure 5. External debts

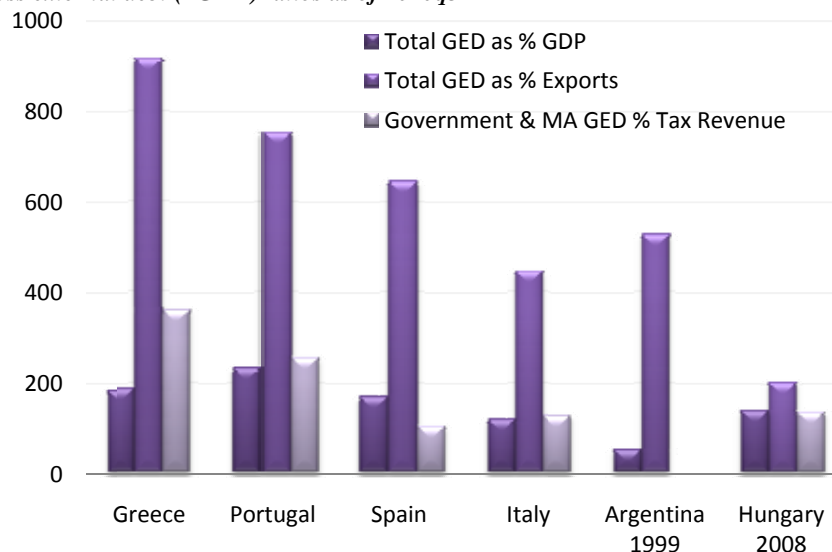


Note: Net external debt is computed by the sum of the current account balances over the period 1990-2010 (1995-2010 for Greece as earlier data are not available).

Sources: European Commission services (AMECO, March 2011) and authors' calculations.

That said, it should be noted that ratios of gross external debt to GDP provide only partial information on sustainability because ultimately the total (private and public) external debt has to be serviced via a transfer to the rest of the world, i.e. by exports, and public debt (domestic and external) requires adequate taxation. Figure 6 shows three indicators of the sustainability of the gross external debt for the usual set of countries (as of 2010) as well as Argentina (1999) and Hungary.¹⁵ According to chart below, Greece and Portugal appear to be in a much worse situation than Argentina in 1999, two years before it defaulted¹⁶ or Hungary at the time the IMF loan agreement, both in terms of the standard ratio of debt to GDP and debt to exports.

Figure 6. Gross external debt (=GED) ratios as of 2010q3



* The sector breakdown of the external debt is not available for Argentina; the ratio of total external debt to tax revenue in 1999 was 660%.

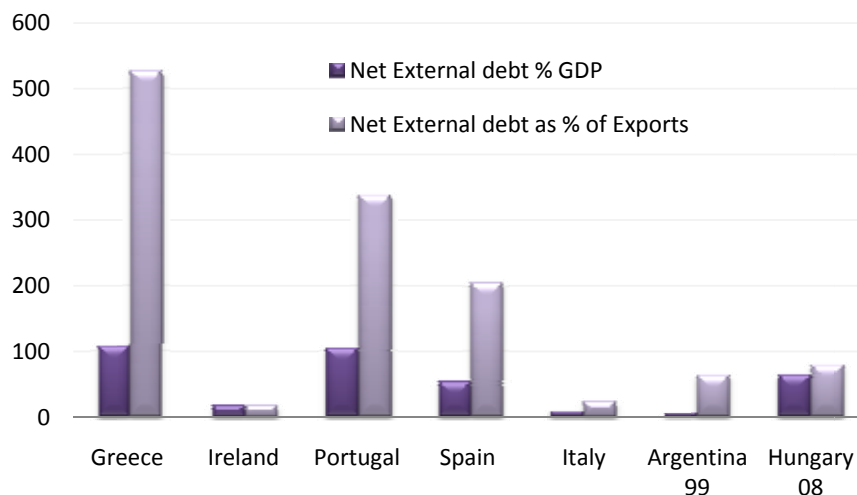
Sources: National central banks, European Commission Services (AMECO), IFS (for Argentina), JHED (for Hungary external debt) and authors' calculations.

As argued earlier, net debt might be a more important concept in the longer run and therefore the variable to consider in the sustainability assessment. On this account, as shown in Figure 7, the indebtedness of most countries appears to be much smaller (and this is especially the case for Ireland).¹⁷

¹⁵ See Appendix C on the definition of external debt and detailed data for each sector of the economy.

¹⁶ See Calvo et al. (2003) on the lessons from the Argentina default.

¹⁷ Note that the IMF external debt sustainability assessment for Greece only considers the net external debt.

Figure 7. Net External Debt ratios as of end 2010

Note: Net external debt is computed as sum of the current account balances over the period 1990-2010, 1995-2010 for Greece as earlier data are not available. For Hungary there is a large discrepancy between balance of payments figures included in the IFS and the national account figures provided by the European Commission. According to IFS data, net external debt as a % of GDP was 49% and 66% as a % of exports.

Sources: National central banks, European Commission Services (AMECO), IFS (for Argentina), JHED (for Hungary external debt) and authors' calculations.

However, this was the case also for Argentina (and to some extent that of Hungary). It is not surprising given that Argentina had not run large current account deficits in the past: deficits of the size observed within the euro area would anyway not have been financed by international capital markets. Nonetheless, its government had borrowed heavily from international capital markets, whereas its citizens had preferred to send their money abroad rather than pay taxes at home. Argentina defaulted because the government was not able to tax the wealth its citizens had squirreled abroad. The Greek government (and not only) might find itself soon in a very similar position. This is why the gross debt figures are the more relevant ones in a time of crisis.

2) *The external adjustment*

Analogous to the standard analysis for fiscal sustainability, the key factor for external sustainability is the difference between the interest paid on foreign debt (rather than government debt) and the growth rate of exports (rather than the GDP growth, see Annex C for details). Similar to the result of the fiscal sustainability assessment, the situation about external sustainability appeared quite comfortable during the boom, when exports were growing at a rate even higher than GDP (and interest rates were low). However, the constellation has reversed since 2009 and export growth is likely to remain anaemic since the major export market of the countries under consideration is the eurozone itself, and its growth prospects are not encouraging.

Table 5 shows the size of the trade balance surplus required to maintain external debt constant (and thus at the very high level as shown above) and the adjustment in the trade balance necessary to move from the current position to a sustainable path. According to the table, Italy is the country closest to external sustainability.

Table 5. External adjustment needs for sustainability

	Actual trade balance (% of GDP)	Risk premium	Trade surplus (% of GDP) required for sustainability	Adjustment required for sustainability
Greece	-7.3	8	17	24
Ireland	-19.3	6	64	45
Portugal	-8.0	4	11	19
Spain	-2.1	1.8	4	6
Italy	-0.8	1.5	2	3

Note: The trade balance that would be compatible with sustainable debt is derived from eq. (C3) in Appendix C. It is calculated based on the assumption that the export growth rate is the same for all countries and equal to 1.5% (market growth as predicted by the European Commission services) and using data on gross external debt as documented in Figure 5. Measures for risk premia, as previously explained, do not pretend to be exact and are only indicative; they are the same as in Table 3.

Sources: Own calculations based on AMECO and IFS data.

Putting aside Ireland, which represents a special case,¹⁸ the largest adjustment is required in Greece and Portugal. The data suggest that in order to avoid accumulation of further external debt, both countries will either have to face a reduction in their consumption of foreign goods equivalent to about 20% of GDP or experience a considerable export boom assisted by a substantial internal devaluation (i.e. a cut in nominal wages throughout the economy). Since the latter is rather unlikely in the short run, it seems that a substantial compression in domestic demand is unavoidable before external equilibrium can be reached. As a sustainable external position is a pre-condition for lower risk premia on international financial markets, it is thus likely that these risk premia will not fall substantially as long as the external deficits continue at their present unsustainable scale.

Section 4 has highlighted the need for large adjustment in demand, and in particular consumption, in countries with large external debt and deficits. It is clear, from the general equilibrium perspective, that deficit countries can adjust only if surplus countries accept the corresponding counterpart: a reduction in their surpluses. Given that Germany has the largest surplus in Europe, many commentators have argued that the adjustment in the euro area periphery would be possible only if Germany stimulates its domestic demand.¹⁹ However European Commission data for 2010 show that the combined surplus of the three smaller creditor nations – Sweden, Switzerland and the Netherlands – is about €90 billion, not much smaller than that of Germany (€120 billion). In addition the external adjustment of the three countries most in need – Greece, Portugal and Spain – amounts to more than €80 billion, just below 1% of the euro area's GDP. A stronger expansion of domestic demand in Germany can be desirable to facilitate this adjustment, but, given the orders of magnitude and the distribution of surpluses, it seems far-fetched to expect Germany to fundamentally change its approach to economic policy in order to allow peripheral countries to return to a sustainable external position.

In addition, exports are unlikely to be able to adjust over a short period and re-establish external sustainability. This implies, as anticipated earlier in section 4, that a downward adjustment in spending will be inevitable.

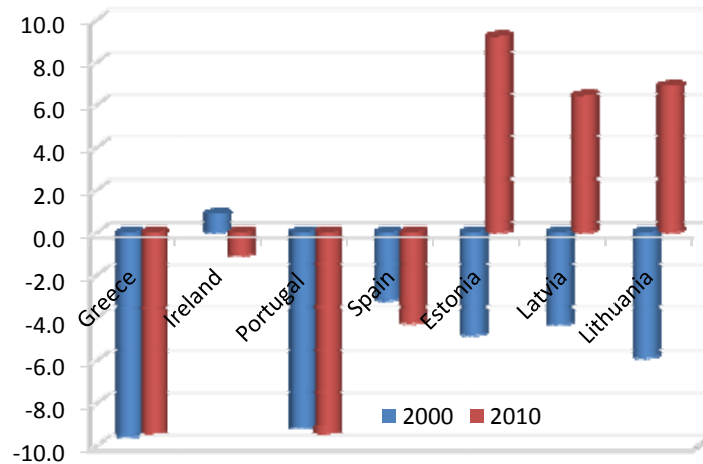
In this perspective, the experience of the Baltic countries is very insightful. Trends in capital flows similar to the ones towards the eurozone periphery had emerged also in the north periphery of the EU. Between 2003 and 2007, large amounts of private capital flew from surplus countries, especially Nordic countries (e.g. Sweden), towards the Baltic states to fund consumption and construction bubbles. When the financial crisis broke in late 2007, the risk perception changed dramatically and resulted in a sudden stop of capital flows. Since the Baltic economies decided to keep their parity with the euro unchanged, the only way forward for them was an internal devaluation: a fall in prices and

¹⁸ As noted earlier, since external debt data comprise the debt of local subsidiaries owned by foreign corporations, the computation of the trade surplus required for sustainability is unduly affected by this phenomenon (which does not really represent foreign debt).

¹⁹ See remarks by French Finance Minister Christine Lagarde in the *Financial Times*, 15 March 2010.

wages. This materialized in an impressive contraction in spending, which has turned the current account balance into positive figures quite rapidly. Internal devaluation followed in order to lay the base for export-led growth (in the case of Latvia nominal unit labour costs fell by 17% within two years). To get a sense of the overall correction, Figure 8 displays the dramatic change in the current account balance between 2007 and 2010 in the ELL (=Estonia, Lithuania and Latvia) and compares it with comparable data in the GIPS (=Greece, Ireland, Portugal and Spain).

Figure 8. Current account balance in the GIPS and Baltic states (% of GDP)

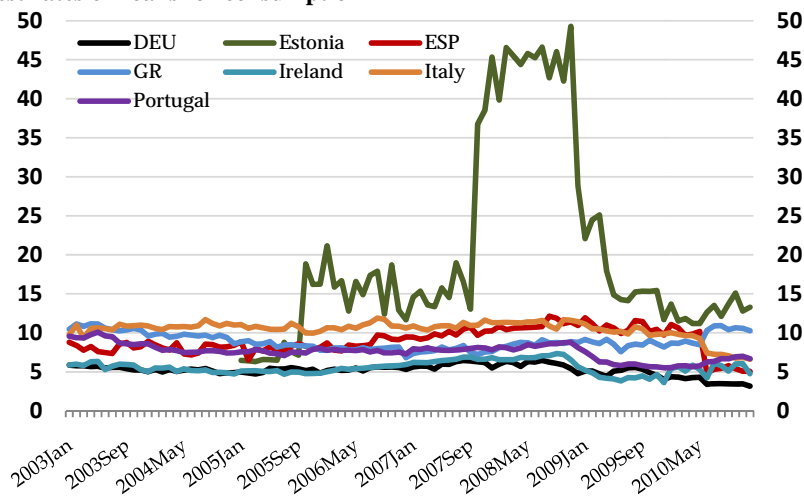


Source: European Commission services (AMECO).

This correction has not happened in the periphery of the eurozone, where the current account is negative and is expected to stay so also next year, except in Ireland.

The crucial element to explain the difference between the periphery of the eurozone and the EU is the ECB. Resorting to the ECB has permitted banks to lower, or keep unchanged, their interest rates against increasing levels that working market mechanisms would have implied. This explains why private demand and in particular consumption has not adjusted significantly in these countries despite the size of the crisis. Figure 7 shows the effect of a ‘sudden stop’ in the eurozone and outside the eurozone (Estonia was not member of the euro area in 2008) on the interest rates on consumption credit.

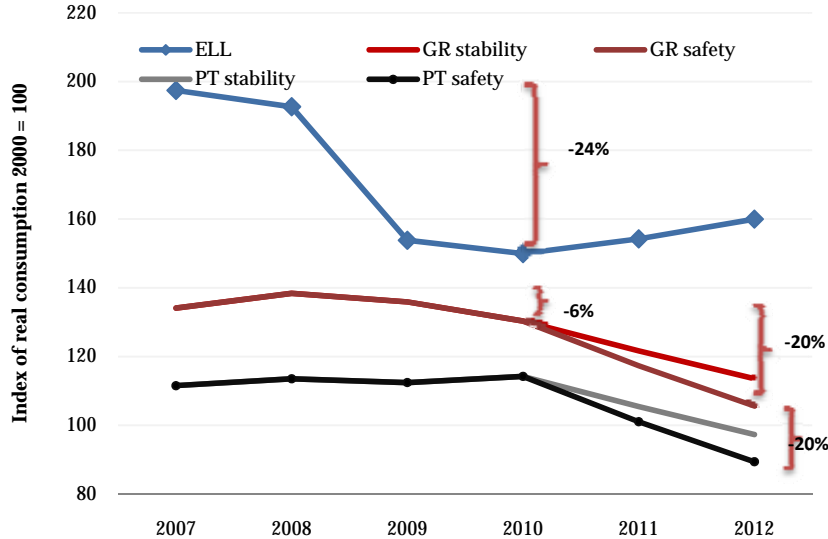
Figure 9. Interest rates on loans for consumption



Source: ECB statistical warehouse, [A21-A2Z], Loans excluding revolving loans and overdrafts, convenience and extended credit card debt (up to 1 year) to Households and non-profit institutions (New business).

Similar adjustment has taken place also in Latvia and Lithuania. Figure 10 shows the average correction in consumption in the Baltic states and compares it with the path of consumption in Greece and Portugal and the adjustment after 2010 that would ensure ‘stability’ and ‘safety’. Stability is defined as consumption associated with a balanced current account and safety as consumption associated with a current account surplus.

Figure 10. Consumption adjustment



Note: Greece’s need for stability is calculated as the real consumption associated with a balanced current account, while Greece’s need for safety and the level of real consumption associated with a current account surplus of 2.5%.
Source: European Commission Services (Ameco) and authors’ calculations.

The raw data thus suggest that Greece (and Portugal) would have to accept a cut in consumption equal to about 20%, similar to that experienced by the Baltic countries. This simple accounting exercise suggests the order of magnitude of the correction that would be required in Greece and Portugal if these countries were financed themselves. Until the current account does not turn to an approximate balance, the external debt burden of these countries will keep on increasing, thus reinforcing the doubts in the market about their sustainability.

6. Concluding remarks

We have highlighted the importance of foreign debt and external adjustment. The corollary of our analysis is that this should be taken into account in the adjustment programmes that the GIP countries have to accept.

For Greece the issue is mainly fiscal in the sense that with a full fiscal adjustment the external deficit would be much reduced. Unfortunately, however, the level of public debt is already so high and the ability of the political system to agree and implement measures that would structurally increase revenues so low that it is unlikely that Greece will be able to fund itself in the market at reasonable rates any time soon. A reduction in public debt (a restructuring) thus seems unavoidable. However, the external adjustment also needs to happen. An economy-wide cut in wages would foster external adjustment on two accounts: on the one hand, it would reduce income and thus consumption, and on the other, it would increase competitiveness and thus exports. The latter will be crucial to get the economy growing again, but it will take time (several years) to have its full effect. If this is done in conjunction with a substantial reduction in the debt burden, the country should become viable again.

Ireland is the opposite case: the country has little foreign debt and should run a current account surplus already in 2011. The main focus of the adjustment programme for Ireland should thus be to mobilize the considerable foreign assets of the private sector in the service of the large public debt (owned

mainly to foreigners). This could be done, for example, by 'inducing' Irish pension funds to repatriate their foreign assets and invest them in Irish government bonds. This might actually be enough to substitute most of the EFSF programme, given that Irish pension funds own over €75 billion euro in assets, of which a large proportion is invested abroad. Such an approach would of course require a change in Irish regulations (and probably some exemptions from EU directives), but it could lead to a rapid compression of spreads.

Portugal is again different since in this case the government is not over-indebted (its debt/GDP ratio is about the same as France). The EFSF package for Portugal was sold by the government as a victory because the country gained a couple of years more to delay the fiscal adjustment. However, in the case of Portugal the real underlying problem is one of foreign debt, not so much public debt.

The key issue for Portugal is thus how to avoid a further accumulation of foreign debt, in other words, how to turn the current account into surplus. As for Greece (and the Baltics, whose experience we summarise), this will require a substantial cut (+/-20%) in consumption. As for Greece a cut in wages would foster adjustment in both the short and long run.

If the adjustment is left to fiscal policy alone, the risk is that households might have to pay higher taxes, but might continue consuming since they can get credit at lower rates than their government. This is the key difference between countries in the eurozone: as their banks can refinance themselves cheaply through the ECB and they can continue to consume, thus delaying the adjustment.

What is needed in Portugal is not thus only, and not even mainly, a fiscal adjustment, but a reduction in private consumption, especially any consumption financed by credit. The country would thus need to tax consumption credit. A temporary surcharge in VAT would also help, as it would induce households to delay consumption.

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Annex A. Keynesian multipliers and the effect of fiscal consolidation

Assuming a simple open economy in which consumption depends on income, exports are determined by foreign demand (and hence exogenous in the short run) and imports vary proportionally with domestic income, the impact of an exogenous change in government spending on GDP can then be computed as follows:

$$(A1) \Delta Y = \frac{1}{1-c+m} \Delta \bar{G}$$

Where G is government spending, c is marginal propensity of consumption and m the marginal propensity to import. The pure Keynesian multiplier is thus given by $1/(1-c+m)$, or $1/(s+m)$, where s is the marginal propensity to save (of the private sector). In percentage terms equation (1) can be written as a relationship between the change in government expenditure as a proportion of GDP and the growth rate of GDP:

$$(A2) \frac{\Delta Y}{Y} = \frac{1}{1-c+m} \left(\frac{\Delta \bar{G}}{Y} \right)$$

In this simplest of Keynesian approaches, the change in government expenditure is exogenous and the same multiplier would apply to any other exogenous change in expenditure, for example exports or investment. However, under the present circumstances it is difficult to find any major expenditure category that could be 'crowded in' indirectly as a consequence of a cut in government expenditure. Given that banks throughout the euro area seem still reluctant to extend credit, investment is likely to remain weak everywhere. Similarly, intra-area exports are unlikely to revive given that major changes in cost competitiveness can occur only via major cuts in nominal wages, which are not in the cards for the time being.

The large drop in output indicated by the simplistic multipliers suggests that fiscal consolidation might be much more difficult than assumed by the official convergence programs since the drop in output will also lead to lower tax revenues. If tax revenues vary with demand, the multiplier has to be adjusted at each stage of spending to take into account the leakage which includes not only savings and imports but also taxes. Assuming that additional revenues face a marginal tax rate of t , the multiplier becomes as follows:²⁰

$$(A3) \frac{\Delta Y}{Y} = \frac{1}{s+t+m} \left(\frac{\Delta \bar{G}}{Y} \right)$$

²⁰ Here we make the assumption that $T = \bar{T} + tY$ and $G = \bar{G} + gY$ (both Government spending and tax revenue have an exogenous component and a component proportional to the income) and that $t=g$.

Table A1. Keynesian multipliers including tax

Country	Keynesian multiplier including tax: $1/(s+m+t)$	Impact of government spending on deficit: $(s+m)/(s+m+t)$
Greece	1.4	0.5
Italy	0.8	0.5
Spain	1.0	0.5
Portugal	0.9	0.6
Germany	0.5	0.8
Ireland	0.9	0.7

Note: t , the marginal tax rate, is computed as ratio of the increment in tax burden of the total economy relative to the increment in GDP over the period 2002-07.

Source: AMECO.

This multiplier is considerably lower than the one calculated above. However, in this case the change in the deficit that can be achieved by a cut in government spending is also smaller and reads as follows:

$$A(4) \frac{\Delta Def}{Y} = \left[1 - \frac{t}{s+t+m} \right] \left(\frac{\Delta G}{Y} \right) = \left[\frac{s+m}{s+t+m} \right] \left(\frac{\Delta G}{Y} \right)$$

Equation (4) suggests that the final impact on the deficit will be only a fraction of the cut in government expenditure. This in turn means that the ‘effort’ in terms of cutting expenditure might be much higher than assumed so far.

Taking into account taxation thus suggests that the multiplier is lower, but the required cut in expenditure higher. These two effects just cancel out as one can see by substituting equation (4) back into equation (3) which confirms the original multiplier in terms of the required deficit reduction:

$$A(5) \frac{\Delta Y}{Y} = \frac{1}{s+t+m} \left(\frac{\Delta G}{Y} \right) = \frac{1}{s+t+m} \left(\left[\frac{s+t+m}{s+m} \right] \left(\frac{\Delta Def}{Y} \right) \right) = \frac{1}{s+m} \left(\frac{\Delta Def}{Y} \right)$$

This implies that of Greece were to achieve a reduction in the deficit of 4 percentage points of GDP, government expenditure should be cut by about 8 percentage points which is expected to reduce output by about 11%.

Annex B. Fiscal sustainability

The traditional debt sustainability analysis concentrates on a simple question: Is the debt-to-GDP ratio compatible with the government’s intertemporal budget constraint? The answer to this question is affirmative if the present constellation of expected primary deficits, growth rates and interest rates can go on forever, without leading to exploding debt levels.

Typically, standard exercises focus on the fiscal adjustment that will keep the time sequence of public debt-to-GDP ratios constant. The rationale is that if the debt-to-GDP ratio is, at least, stable, the intertemporal budget constraint is satisfied. A constant debt-to-GDP ratio requires that:

$$(B1) \frac{\overline{PD}_t}{Y_t} = \frac{D_{t-1}}{Y_t} \left(\frac{i_t - y_t}{1 + y_t} \right) + SF_t$$

where \overline{PD} is the primary deficit compatible with a sustainable debt, Y is the GDP at current prices, D the general government debt, i is the ‘implicit’ interest rate (actual interests paid divided by the stock

of debt), y is the nominal GDP growth rate, SF^{21} is the stock-flow adjustment and subscript t stands for time. The element $(D_{t-1}/Y_t) \times [(i_t - y_t)/(1 + y_t)]$ represents the so-called *snowball effect* and crucially depends of the difference between (long run, steady state) interest rate and growth rate. The stock-flow adjustment captures the various factors that influence changes in the valuation of the stock of debt (or debt assumption outside the budget). The latter element has become much more important in many countries as government support for banks resulted in large increases in public debt that is not accounted for under the normal (national accounts based) deficit figures.

Traditional debt sustainability analysis is based on mathematical approach that provides the condition for a process, namely the debt-to-GDP ratio, to be non explosive. While this provides useful indications about the determinants of debt dynamics which are then used to derive policy recommendations, this approach embeds shortcomings that become particularly acute when applied to foreign debt or/and in times of stress and thus high risk premia.

Annex C. The sustainability of the external debt

As shown in the tables above, Greece, Portugal and Spain exhibit very high external debt. One important implication of it is that ultimately it has to be serviced by a ‘transfer’ of resources to the rest of the world through exports (of goods and services). Accordingly the external debt-to-exports ratio is more relevant than the standard debt-to-GDP ratio to assess the external sustainability.

Applying the traditional approach of debt sustainability to the foreign debt implies that the condition under which the foreign debt-to-export ratio is stable is:

$$(C1) \quad \frac{\overline{TB}_t}{E_t} = \frac{ND_{t-1}}{E_t} \left(\frac{i_t - e_t}{1 + e_t} \right)$$

Where \overline{TB}_t is the sustainable trade balance, ND is net external debt and e is the exports growth rate. Similarly to the case of government debt, the stability condition is given by the relative size of the interest rate with respect to the growth rate. Yet when considering net external debt, another source of complexity emerges. A country net external debt is defined as the difference between assets and liabilities (this is the gross debt) net of foreign investment. In time of crisis the interest paid by a country on its liabilities is larger than the one it receives on its holdings, with the difference being the risk premium. Accounting for this implies that the condition above is modified as follows:

$$(C2) \quad \frac{\overline{TB}_t}{E_t} = \frac{ND_{t-1}}{E_t} \left(\frac{i^{rf}_t - e_t}{1 + e_t} \right) + \frac{\pi_t}{1 + e_t} \frac{GD_t}{E_t}$$

Where i^{rf} is the risk free rate, π is the risk premium and GD the gross external debt. The existence of the risk premium makes external adjustment more difficult.

$$(C3) \quad \frac{\overline{TB}_t}{Y_t} = \left\{ \frac{E_t}{Y_t} \right\} \left\{ \frac{ND_{t-1}}{E_t} \left(\frac{i^{rf}_t - e_t}{1 + e_t} \right) + \frac{\pi_t}{1 + e_t} \frac{GD_t}{E_t} \right\}$$

This equation shows that the (change in the) trade balance as a proportion of GDP required to maintain sustainability after the emergence of a risk premium is roughly proportional to the gross debt to export ratio times the ratio of exports to GDP. Formally the difference between the trade balances (as a proportion of GDP) which main external debt constant in a boom and bust would be given by:

$$(C4) \quad \frac{TB_t}{Y_t \text{ boom}} - \frac{TB_t}{Y_t \text{ bust}} = \left\{ \frac{E_t}{Y_t} \right\} \left\{ \frac{ND_{t-1}}{E_t} (e_{bust} - e_{boom}) + \pi_t \frac{GD_t}{E_t} \right\}$$

where it is assumed, as usual that $(1+e)$ is approximately equal to one.

²¹ For the sake of simplicity, this term is dropped in the equations that follow.