

Fiscal Policy and Financial Distress: A Balance Sheet Perspective*

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This draft: 27th October 2015

Abstract

Governments actively manage the public balance sheet during episodes of financial distress. Under these circumstances, the stock of gross public debt is not a sufficient statistic for fiscal sustainability. In this paper, we examine the roles of financial asset acquisition, liquidity management, debt management and the central bank balance sheet in determining the fiscal health of a government. We argue that a strategy of “under-promising and over-delivering” is essential in restoring market access.

* This paper was presented at the conference "Rethinking Fiscal Policy After the Crisis", Bratislava, September 2015 and it benefitted from comments from the participants as well as Íde Kearney and Rossa White. Email: jofitzge@tcd.ie, plane@tcd.ie. We thank Rogelio Mercado and Jonathan Rice for research assistance. Lane thanks the Irish Research Council for grant support.

I Introduction

In fiscal analysis, the traditional focus has been on the gross stock of government debt and the general government fiscal balance. However, this can be an excessively narrow focus, especially in periods in which governments turn to more elaborate types of financial engineering. In general, it is desirable to analyse a more complete version of the public balance sheet, in order to assess properly the financial health of the government.

On the liability side, the face value of the aggregate gross stock of government debt is not a sufficient statistic. The composition of debt liabilities is crucial in relation to the present value of debt and funding risk, with maturity structure, the schedule of coupon payments and the identity of creditors (for instance, on-market debt versus official debt) all playing an important role. In addition, the government has implicit liabilities (for instance, unfunded pension commitments), contingent liabilities (for instance, explicit or implicit guarantees to the financial system) and deferred liabilities (for instance, future payment streams to the operators of PPP/PFI projects).

On the asset side, governments hold an array of financial assets and considerable non-financial assets (the public capital stock). In addition, through commercialisation, the claims on some non-financial assets can be transformed into financial assets (for instance, converting the water infrastructure network into a dedicated utility). Financial assets include cash

balances, the assets of sovereign wealth funds and equity and debt claims on state-owned enterprises.

Taking a balance sheet perspective is helpful in analysing financial engineering initiatives such as privatisations and PPP projects. It is also especially important during periods of financial distress when the public balance sheet may be deployed to make interventions in the private sector (for instance, through bailouts of distressed corporates or financial institutions). Along another dimension, the exposure of a sovereign to a funding crisis also depends on its treasury management, with pre-funding through the accumulation of cash balances providing a buffer during periods of erratic market access.

The full public sector balance sheet also incorporates the balance sheet of the central bank.¹ The scale of central bank balance sheets has expanded enormously in recent years. This provides scope for extra financial income (on the expanded set of financial assets held by the central bank) but also poses credit risks (if a central bank incurs losses on the collateralised assets it holds). The monetary-fiscal interactions through the public balance sheet represent another key analytical challenge. For instance, capitalising the present value of future monetary income has recently been discussed in the context of reducing the outstanding stock of gross government debt (Wyplosz and Paris 2014, Corsetti et al 2015).

¹ For a monetary union, the balance sheet of the common central bank links the fiscal balance sheets of the member countries.

The analysis of the public balance sheet should be viewed in the context of a more general “balance sheet approach” (BSA) in analysing sustainability issues (IMF 2015). In one direction, the risks associated with a high level of sovereign debt differ across countries with positive or negative net international investment positions. In the other direction, a low current stock of public debt may not be fiscally sustainable if other sectors are at risk of financial distress as a result of excessive leverage.

For instance, an external funding crisis or a domestic financial crisis may result in the transformation of the public balance sheet, via rescue operations that act to transfer assets and liabilities from the private sector to the government or to increase the contingent liabilities of the government through the provision of guarantees and insurance to private entities.² This may be the result of a publicly-financed restructuring of the balance sheets of the banking system, the corporate sector and/or the household sector. In some cases, the costs of such bailouts may feed directly into the fiscal balance; in others, the main costs may remain off balance sheet. In some cases, the government may also acquire foreign assets. Examples include the nationalisation of a bank with international operations or the establishment of an asset management agency that acquires non-performing (domestic and foreign) loans from the domestic banking system. The long-term horizon of the government means that it may be better able to withstand short-term declines in the market value of assets, although at the cost of increased direct risk to the taxpayer if the ultimate return on these assets fail to meet expectations.

² This material is adapted from Lane (2010). See also Tirole (2015).

In what follows, we explore some dimensions of taking a balance sheet approach to fiscal analysis. Our particular focus is on understanding the true fiscal dynamics of financially-distressed sovereigns. We do not address other interesting balance sheet issues such as the role of unfunded liabilities such as pay-as-you-go pension commitments or healthcare commitments.

In Section 2, we quantitatively examine the importance of financial operations for the dynamics of gross public debt. In Section 3, we turn to a case study of Ireland, which has experienced two major sovereign debt crises (1980s and 2010-2013). Section 4 concludes by offering some directions for future research.

II The Dynamics of Gross Public Debt

In this section, we investigate the contribution of financial asset acquisition to the dynamics of gross public debt. Rather than minimising gross debt (for a given path for the fiscal balance), governments may choose to acquire financial assets for a variety of reasons (as outlined above).

Equation (1) gives a decomposition of the change in the debt-output ratio between any two periods $N-t$ and N (Escolano 2010):

$$d_N - d_{N-t} = \sum_{s=N-t}^{N-1} \frac{i_{s+1}}{1 + \gamma_{s+1}} d_s - \sum_{s=N-t}^{N-1} \frac{\gamma_{s+1}}{1 + \gamma_{s+1}} d_s + \sum_{s=N-t+1}^N P_s + \sum_{s=N-t+1}^N SFA_s \quad (1)$$

where d is the debt-GDP ratio, i is the average nominal interest rate paid on the debt, y is the growth rate of nominal GDP, P is the ratio of the primary (non-interest) deficit to GDP and SFA is the stock-flow adjustment term.

The first two terms show the dependence of debt dynamics on the outstanding stock of debt. All else equal, a higher interest rate is associated with more rapid debt accumulation, while a faster rate of nominal GDP growth is associated with an improvement in the debt to GDP ratio by increasing the denominator in this ratio. In a given period, the net impact of these two terms depends on the sign of $(i_{s+1} - y_{s+1})$: if the interest rate is higher than the growth rate, there is upward pressure on the debt ratio; conversely, if the interest rate is below the growth rate, there is downward pressure on the debt ratio.

The third term captures the contribution of the primary balance, while the final term is driven by factors that do not affect the fiscal balance but do operate on the stock of gross debt. In particular, the stock-flow adjustment term is affected by the acquisition of financial assets by the government. One basic type of financial asset is represented by a government's cash balances. For instance, a government may choose to "over-fund" in a given period by issuing more debt than is required to fund the fiscal balance and repay maturing debt obligations, which adds to cash balances. Conversely, a government may avoid tapping market funding if it has sufficient cash balances to meet its financing requirements in a given interval. A second type of financial acquisition relates to corporate or bank rescue operations by

which a government may issue debt (or run down cash balances) in order to acquire a debt or equity claim in a distressed entity.

Figure 1 illustrates the dynamics of cash balances for a selection of countries. The surge in cash holdings for the European periphery countries during the crisis is quite striking and is consistent with an increased value of a cash buffer during periods of market turbulence, despite the high opportunity cost if sovereign bond yields are at elevated levels.

Table 1 shows the impact on the public balance sheet of government financial interventions during the financial crisis. Governments intervened through a number of mechanisms, including: capital transfers to banks; public recapitalisation of banks; insurance schemes; and liability guarantee schemes. In column (1), the fiscal net revenue/cost is shown: governments can earn revenues by charging fees for financial support and incur costs by making capital transfers and/or incurring losses on financial investments. Column (2) shows the peak value (scaled by GDP) over 2008-2014 of financial assets acquired through intervention during the crisis, while column (3) shows the peak value of financial liabilities acquired.

Over 2008-2014, column (1) of Table 1 shows that the cumulative net cost has been quite significant for a number of countries (Ireland, Greece, Slovenia and Cyprus in particular) but was relatively minor for other countries. For a wider set of countries, financial interventions generated significant expansions in the public balance sheet, even if the cumulative net fiscal cost

was relatively low in a number of countries. Accordingly, the lesson from Table 1 is that governments may engage in significant financial engineering (acquisition of financial assets and financial liabilities) during a financial crisis, even if the net impact on the fiscal accounts (as captured by net revenues/costs) can be quite low.³

Table 2 shows the contributions of each term in explaining country-level fiscal dynamics over 1998-2007; 2007-2009; 2009-2012; and 2012-2014. In Table 3, we report regressions of each term on the initial stock of public debt (for the corresponding period) in order to gain a sense of the relative importance of each term in the cross-country variation in debt dynamics.

During the 1998-2007 pre-crisis period, the cross-country evolution of gross debt ratios was positively linked to the scale of interest payments but not to the other underlying factors. A plausible interpretation is that debt stabilisation concerns were weak during this period, so that primary balances were not responsive to outstanding debt stocks.⁴ There was no relation between initial debt levels and the growth term or the stock-flow adjustment term. The orthogonality of initial debt and the growth term is not consistent with models in which countries with faster expected growth trajectories rationally choose to run up debt levels.

³ This point applies a fortiori if off balance sheet interventions (such as guarantees) are included.

⁴ The response of the primary balance to the stock of public debt may also be nonlinear, with significant adjustment only in scenarios in which high debt levels trigger sustainability concerns. See also Eichengreen and Panizza (2015).

Debt dynamics during the global financial crisis are captured in Panel B of Table 3. During this period, the cross-country pattern in the stock-flow adjustment term was destabilising in the sense that those countries with high initial debt levels also experienced larger stock-flow adjustments. The growth term was stabilising (in relation to the cross-country distribution) in that more indebted economies benefited from a larger growth impact on the debt-output ratio.

The results for the European debt crisis period (2009-2012) are shown in Panel C of Table 3. During this period, the cross-country variation between initial debt levels and the growth term remained a stabilising force, while the other terms did not show a significant co-movement pattern with the initial debt level.

Finally, Panel D of Table 3 shows the results for the 2012-2014 period. During this period, there was some disposal of financial assets by highly-indebted countries, so that the stock-flow adjustment term negatively covaried with the initial stock of public debt. A second striking feature is the positive covariation between the growth term and the initial debt stock: the most indebted countries suffered relatively poorer growth performance (plausibly driven by the Greek experience).

The basic message from the analysis in this section is that the gross stock of public debt is not a sufficient statistic for the state of the public balance sheet. In one direction, bailout operations and/or the accumulation of a cash buffer

can induce growth in the stock of public debt in excess of the level required to fund the fiscal balance. In the other direction, gross debt can decline if the government disposes of financial assets or runs down cash buffers. More broadly, gross debt can also decline if a government creates new financial assets by capitalising various future revenue streams and/or through a privatisation programme. Accordingly, the expansion and contraction of the public balance sheet requires careful analysis in terms of assessing the implications for fiscal sustainability and/or identifying optimal fiscal policy.

Finally, the composition of the gross stock of public debt also matters for sustainability in terms of maturity structure and the identity of the investor base (domestic or foreign; bank or non-bank; private or official). All else equal, longer maturities and a “sticky” investor base (buy-to-hold investors; committed investors) can be helpful in minimising rollover risk.

In the next section, we examine this set of issues in the specific context of the Irish experience in managing its fiscal crises (1980s and 2008-2013).

III. Lessons from Ireland

Over the last forty years, Ireland has undergone two major financial crises: the first in the 1980s and the second over the period 2008-2012. In both cases, the ratio of national debt to GNP peaked at well over 100% (Figure 2). The first crisis was primarily due to extremely unwise fiscal policies pursued in the late 1970s and early 1980s and the financial sector remained largely

unaffected. However, in the recent crisis, the problems in the public finances were massively increased by the collapse of the banking sector. The financial crisis magnified the costs to the government of achieving a resolution. Moreover, it contributed to a climate of fiscal uncertainty: at the time, it was very difficult to assess what would be the likely final cost to the government of fixing the broken banking system.

The Economic Crisis of the 1980s

Following the adoption of a very expansionary fiscal policy in the late 1970s when real interest rates were low, there was a major downturn in the economy in the early 1980s. This coincided with a big increase in real interest rates. The result was a crisis in the public finances, mirrored in a very large external deficit (Honohan 1999). Government borrowing peaked at 16% of GNP in 1981 and 1982 and the current account deficit in 1981 was around 14% of GNP. There were serious concerns in those years about the sustainability of the rapidly rising debt. However, very deflationary budgets in 1983 and 1984 were implemented in an attempt to bring the situation under control (Kearney *et al.*, 2000). This tough fiscal action convinced the markets that the situation was manageable.

In this crisis there was not a major problem with the banking system.⁵ There was no housing bubble and the strict controls on the relatively closed domestic financial system meant that the banks did not suffer major problems of default in the recession. The counterpart to the government borrowing was the borrowing abroad to fund the current account deficit. The banks were not unduly exposed externally.

Reflecting the current account deficit, a growing share of the rising debt was funded abroad. The small size of the Irish economy and the small market for Irish pound assets meant that much of the foreign borrowing was denominated in foreign currencies. However, there was also an extensive domestic market for Irish pound denominated debt. The banks were required to hold approximately 20% of their assets in government bonds. However, the bulk of the bonds held domestically were absorbed by the other domestic financial institutions – pension funds and insurance companies. With liabilities of the pension funds and the insurance companies denominated in Irish pounds they sought to match their liabilities with Irish pound assets

While the market operations by the Irish government were fully disclosed there was one aspect of the treasury management operations of the government which was only disclosed with a lag.⁶ In 1985 and 1986, the government borrowed heavily abroad. The amount borrowed significantly

⁵ Nonetheless, there was a problem with one major bank which got into difficulties as a result of an unwise acquisition abroad. This required the state to guarantee its solvency but, in the end, there was not net cost to the government (Honohan, 1999). Also the problem was contained within a single financial institution.

⁶ In the 1980s, the debt was handled directly by the Department of Finance, However, in the late 1980s a special state agency, the National Treasury Management Agency (NTMA) was established which has managed the national debt ever since.

exceeded the funding needs for the year. However, instead of lodging it with the Central Bank, where it would have appeared as a government deposit, which was the normal practise, it was, instead, held on deposit abroad. The amount held abroad on deposit at the end of 1986 amounted to 2.8% of GNP. Because it did not show up at the time in the government accounts the situation looked slightly worse than they actually were.

When a new government came into office early in 1987, it cut expenditure very substantially, clearly bringing the fiscal crisis under control. At this point the government also disclosed this “hidden” liquid asset. In turn this significantly changed market sentiment: bond yields fell from 12.8% in January 1987 to 10.5% in December 1987. This relative lack of transparency contrasts with the recent crisis where all significant information on the management of the national debt was disclosed in real time. In the context where there was huge uncertainty about the cost of the banking bail-out it was important to reassure financial markets through full disclosure of all available information. The experience gained in dealing with foreign financial institutions in the 1980s crisis was important – it provided a basis of expertise that was still available in the recent crisis. The National Treasury Management Agency (NTMA) was set up in 1990 to manage the debt, taking over the experienced staff from the Department of Finance.

The rapid decline in the debt ratio from the late 1980s onwards stemmed primarily from the rapid growth in GNP, especially in the period after 1993. The economic crisis of the 1980s had delayed a convergence to EU levels of

output and income per head, a convergence which occurred instead in the 1990s.

As a result of the fiscal tightening implemented by successive governments, the level of government borrowing fell below 3% of GNP in 1989 and the deficit was effectively eliminated by 1996. However, while some surpluses occurred in later years, especially from sales of state assets, these played a very limited role in reducing the debt burden as growth was so rapid over the 1990s.

While inflation had played a major role in reducing the debt burden in countries such as the US and the UK in the immediate post war years, inflation was relatively moderate over the 1990s, playing only a subsidiary role in reducing the burden of the debt.

Summary of Impact of Great Recession on the Public Finances

At beginning of the current crisis, Ireland began from a strong position. As shown in Figure 3, the level of debt was very low and there were considerable liquid assets – cash, deposits and a portfolio of global equities and bonds. However, the bursting of the property bubble simultaneously caused a massive deterioration in the public finances and also the collapse of the domestic banking system. A consequence of the problems in the domestic banks was that the government was dragged into the provision of massive support for the illiquid and insolvent banks.

Table 5 shows government borrowing both before and after the massive transfers to the banks. While the need to support the banking system was a very big factor in the rise in the debt, the biggest factor raising indebtedness over the period 2008-2014 was the cumulative government deficit, excluding support to the banks. This amounted to 66% of GNP over the 7 years. The transfers to the banks amounted to a cumulative 33% of GNP. In addition, part of the recapitalisation of the banks, amounting to 15% of GNP, was undertaken by the sovereign wealth fund the National Pension reserve Fund (NPRF) and it did not appear in government borrowing – it was treated as a change in the asset composition of the NPRF. Thus the cumulative cost of supporting the banks over the 7 years amounted to 48% of GNP.

Figure 3 shows the origin of the debt as a share of GNP, with the bulk of it being due to the cumulative deficits. It also shows the significant borrowing needed to build up the liquid assets of the government sector.

The management of the huge programme of borrowing that needed to be undertaken over a very short period was a complicated operation. Because of the uncertainty about the magnitude of the problem, especially of the funding needs of the banking system, it resulted in great uncertainty in financial markets. The fact that Ireland was only one of quite a number of countries that were suffering similar crises meant that there was a serious danger of contagion.

Ireland began from a position of considerable experience of managing a very large debt. The State agency charged with managing the debt grew out of the experience of the 1980s and many of those working in the areas had had first-hand experience of the searing experience of the 1980s.

One of the key concerns of financial markets is possible asymmetries of information – does the government know more about the size of the problem than they are disclosing? In the case of the 1980s, as discussed earlier, the government used a lack of transparency in government accounting to surprise markets positively. However, this time around, the use of standard Eurostat accounting rules made for much greater transparency.

Developing Credibility

The crisis had blown up very rapidly and it proved to be much more serious than anyone predicted. Forecasts for the public finances and the funding needs of the banking system in 2008-2010 proved to be far too optimistic. Even more serious was the continuing upward revision in the estimated funding needs of the banking system. It was only with the publication of new stress tests of the banking system in March 2011 that a realistic ceiling on the cost of the banking crisis was established. All of this led to a major loss of credibility, a loss that took some considerable time to restore. The loss of credibility had a major cost in terms of higher risk premia on lending to Ireland.

The continuing upward revision in estimates of the potential costs of the banking system over the course of 2010 saw Ireland's access to funding drying up and the result was the recourse to the support of the Troika in late November 2010. However, before assistance was sought from the Troika, the government had put in place an adjustment programme designed to bring government borrowing below 3 per cent by 2015. The adjustment programme previously agreed with the EU Commission in 2009 had planned to reach this borrowing target by 2014 but, because of the additional burden of funding the banking sector losses, the time scale for meeting the borrowing target was extended to 2015.

The adjustment programme set out by the government in early November 2010 was accepted by the Troika in December 2010 without significant change. Thus it was the Irish government's plan, rather than a plan imposed from outside, that formed the basis for the ongoing fiscal adjustment. Up to that point, the forecasts for the public finances in the government's programme had proved to be overly optimistic. However, in drawing up the programme in late 2010, the then government aimed to under-promise.

Table 6 summarises the ex-ante fiscal policy measures taken over the course of the crisis, including the measures pencilled in for 2015.⁷ Together, the cumulative ex ante adjustment amounted to just under 20 per cent of GDP. The composition of the large adjustments made over the period 2008-2015 is shown in Table 6. Roughly two thirds of the measures involved cuts in

⁷ This is the effect of the measures taken, assuming no feedback from these measures to government revenue and expenditure.

expenditure and one third involved increased taxation. This contrasts with the adjustment in the 1980s, when the initial measures were heavily weighted towards increased taxation and cuts in capital expenditure (Honohan, 1999). Among the measures introduced this time round were cuts in public sector pay and cuts in welfare benefits.

Having consistently failed to meet fiscal targets over the previous three years, the government programme published in November 2010 was deliberately very conservative. The aim was to put in place a programme of adjustment that was readily achievable resulting in future outperformance. This policy has been pursued ever since in preparing fiscal forecasts.

This policy of under-promising and over-delivering in Ireland contrasted with that of Spain. The adjustment in the Spanish public finances planned in Spring 2010 was more ambitious than that of Ireland (Table 7). While beginning with a deficit at a slightly lower level in 2010, the plan was to reduce the deficit to 3 per cent of GDP by 2013. The outgoing government, in the Spring of 2011, raised the bar for the incoming government, committing to reduce the deficit even more rapidly in 2011 and 2012. However, the incoming Spanish government in Spring 2012 found that this time path of adjustment was not realistic and it had to dramatically alter the plan.

In the case of Ireland, sure but steady progress since 2010 was rewarded with a steady fall in bond yields. In the case of Spain it took longer to achieve such

an outcome because of the initial under-performance relative to forecasts. While difficult to achieve politically, the lesson from these two examples of adjustment programmes seems to be that it is better to under-promise and over-deliver.

Keeping Liquid

The Irish authorities managing the national debt began off the recent crisis with two major advantages: (i) the initial level of debt was very low at under 25% of GNP at the end of 2007, as shown in Figure 3; and (ii) there was also a significant sovereign wealth fund, the National Pension Reserve Fund (NPRF).⁸ The value of the NPRF plus the cash held by the government at the end of 2007 amounted to over 15% of GNP so that the debt, net of liquid financial assets, was around 10% of GNP.

The lesson learned at the end of the 1980s crisis was that holding significant cash reserves greatly helped in managing the debt market. This preference for liquidity mirrors the decision in economies with independent currencies to hold substantial foreign reserves against possible capital market volatility (Jeanne and Rancière, 2011). As the crisis manifested itself in 2008, the

⁸ The bulk of the assets were held in equities which could, potentially, be liquidated relatively quickly. However, the high weighting on global equities also meant that the value of the NPRF was hard hit during the global financial crisis: it was not set up as a rainy day fund but as a long-term inter-generational savings vehicle.

NTMA built up its cash reserves very rapidly by undertaking extensive borrowing (Table 8) In addition, not shown here, there was the NPRF. While the full magnitude of the problems facing the government was not apparent in the first half of 2008, nonetheless the NTMA had already built up significant holdings of cash and deposits by mid-year. Over the course of Autumn 2008, further major borrowing was undertaken. Between the end of 2007 and the end of 2008, as well as funding the very large borrowing needs of the government, the NTMA increased holdings of cash and deposits by 11% of GNP. This policy continued over the course of 2009 so that by the end of the year holdings of cash amounted to 15.5% of GNP.

As shown in Table 8, initially quite a lot of the funding was short-term in nature. However, over the course of 2009 and the first quarter of 2010 this short-term funding was converted into borrowing at much longer maturities. The objective of this policy was to try and render the government secure from any wider crisis which might have impacted on the government's ability to borrow.

By early 2010, the NTMA had liquid assets equal to the then expected government borrowing needs for at least 18 months, possibly to the end of 2011. However, while the NTMA had sought to protect against downside risks by borrowing well ahead of need, the size of the funding required to recapitalise the banks was even greater than the NTMA had provided for. This became apparent over the course of the Summer of 2010 and the result was

that it became impossible to borrow in the Autumn of 2010 at any realistic interest rate.

While the government still held cash amounting to around 12% of GNP, because there was no realistic chance of undertaking further borrowing over the course of 2011 to fund the banks, the government accepted the assistance of the EU and of the IMF in late November 2010. A further factor forcing the government to accept outside assistance was the discomfort expressed by the ECB at the amount of liquidity support it had to provide for the troubled banking system.

While, prior to the bail-out of December 2010, the NTMA had a clear strategy aimed at remaining exceptionally liquid, questions were raised as to whether the same strategy was appropriate once the EU and IMF long-term funding had been agreed. However, as shown in Figure 4, throughout the years that the EU/IMF programme was in place (2010-2013), cash holdings remained very high. If the support from the EU/IMF had been unconditional in nature, once the programme had been agreed in December 2010, then the funding would have been rather like an overdraft, available to draw down at will.

Under those circumstances the cash could have been used in 2011 instead of drawing down the EU/IMF funding.

However, because of the quarterly performance reviews, the government were nervous that, in the event of a dispute arising with the Troika, this source of funding would suddenly dry up. As a result, they continued to hold large

reserves of liquid assets. In the event there were no disputes and the agreed funding was disbursed as expected. The cost of holding these precautionary balances amounted to around 0.5% of GNP in 2011 and 2012.⁹

As shown in Table 9, three of the countries that participated in EU/IMF programmes (Ireland, Portugal and Greece) gradually adopted rather similar policies on liquidity. As discussed, in the case of Ireland the huge increase in holdings of cash and deposits occurred at the very beginning of the crisis, to some extent anticipating the funding difficulties to come. In the case of Portugal the increase in liquidity occurred in 2011 and in the case of Greece in 2012, after the EU/IMF Programmes were already in place. Portugal, like Ireland, still holds a large amount of cash which is available to smooth any temporary funding problems that might arise in the immediate post-programme years. In the case of Greece the holdings of liquid assets were not sufficient to ride out the disputes with the EU and the IMF in the first half of 2015 and the cash reserves are probably largely exhausted.

The one other country shown in Table 9 as holding large amounts of cash and deposits is Germany. This is surprising as the German economy is in a very strong position with sound and stable public finances. However, with low bond rates, the cost of remaining liquid is significantly lower than for Portugal, Ireland and Greece.

⁹ The difference between the average cost of EU/IMF funding and the deposit rate at the ECB.

With the improvement in the public finances and the strong growth in the Irish economy, the question arises today as to whether the large holding of cash is still required. Over the last year these holdings proved very useful, as they allowed the government to refinance the IMF borrowing at much lower cost when the opportunity arose. However, the holdings of cash today should be more than enough to fund the government's needs (borrowing and rolling-over maturing debt) for 2016 and into 2017. The Minister for Finance has indicated that the government will, as a result, gradually reduce this liquidity buffer.

Maturity Structure

As shown in Figure 5, in the 1980s crisis, as well as funding the very large government borrowing requirement, there was also a need to roll over a large amount of borrowing that matured each year. This posed major challenges for the authorities.

The experience of the last 8 years was rather different as the NTMA ensured that the debt maturity profile was longer and more regularly spaced: there was not a severe bunching of repayments. Having borrowed short-term in 2008 the NTMA managed to convert this borrowing into medium to long term borrowing by early 2010, albeit at the cost of a high interest rate.

The borrowing from the EU and the IMF as part of the agreed programme was initially at a mixture of maturities. However, these provisions were

subsequently revised for the borrowing from the EU, providing for longer term maturities.¹⁰ The fact that repayments were delayed till well after the ending of the programme meant that the funding needs for the period immediately after the end of the programme were manageable. This facilitated re-entry to the markets.

The first time the NTMA re-entered the markets was in the summer of 2012. On that occasion the NTMA swapped longer dated bonds for bonds due to mature relatively early. This had the advantage that it showed an ability to begin funding on the open market again, as well as improving the maturity profile of the debt.

The practise in the past has been that the NTMA tries to avoid bunching of debt repayments by swapping short-term debt for long-term debt. It is likely that they will return to this practise to smooth the rolling-over of existing debt in future years.

Figure 6 shows the maturity structure of government debt for a number of countries in 2014. Ireland and Portugal both have quite a high proportion of long-term debt. This has meant that their funding needs have been limited in the years immediately following the ending of their programmes. Spain, by contrast, has a somewhat shorter maturity profile along with countries such as Sweden and Slovakia.

¹⁰ This extension of maturities followed on the provision of a similar revision to the terms of the lending to Greece.

Holders of debt

Until the end of the 1980s, Irish banks were required to hold around 20% of their assets in the form of government debt. Because of the exchange risk, all of this debt was Irish government debt. However, with deregulation at the end of the 1980s the banks were free to choose how much to hold. As shown in Figure 7, their holdings were rapidly reduced at the time of the start of the EMU. With the ending of exchange risk from lending abroad, other investment opportunities opened up outside Ireland. In addition, the banking system rapidly increased its exposure to the Irish property market. As a result, by the beginning of the crisis, Irish banks held very little Irish government debt.

The domestic private sector, mainly pension funds and insurance companies, also held substantial amounts of Irish government debt up to the beginning of EMU. However, over the period 1999-2007, they greatly reduced their holdings of government debt, diversifying their portfolio of assets to include substantial holdings of foreign assets. This reflected the fact that prior to EMU they had been constrained to hold largely Irish pound assets to match their assets to their Irish pound denominated liabilities.

Since 2008 there has been some increase in banks' holdings of Irish government debt. However, it still remains below the levels seen in the 1990s.

The domestic private sector (pension funds and insurance companies) have continued to maintain very small holdings of Irish government debt. The increase in holdings by the Central Bank of Ireland reflects the take-over by the Irish government of the liabilities to the ECB of the insolvent banks. In 2013, these liabilities were converted into long-dated government bonds, which are gradually being sold off.

During the programme years 2010-2013, the IMF had suggested that the government should have raised funding by issuing treasury bills to be taken up by the domestic banks. This strategy was adopted by a number of other countries facing funding difficulties. However, given the problems with the banking system, the Irish authorities believed that it would have been unwise to do so as it would be seen to increase the interdependence of the state and the banking system.

While it is difficult to get good data on holdings of national debt on a similar basis to those for Ireland in Figure 7, it would appear that Ireland is unusual in the extent to which the debt is held outside the country. This feature meant that, while the State proved to be seriously affected by the problems in the banks after 2008, the balance sheets of the banks were not directly affected by the problems in the public finances.

Nature of the financial assistance

The financial assistance provided as part of the EU/IMF programme agreed at the beginning of December 2010 was of very considerable importance. At a time when the uncertainty about the government's liabilities through the banking system meant that it could not borrow at any sustainable rate it provided the necessary funding. The agreement on the programme of adjustment already put in place by the government also lent credibility to that programme, both abroad and domestically. The nature of the oversight was also helpful. The incoming government were free to alter the programme provided that the key parameters were left unchanged. The questioning by the Troika at their periodic visits helped sustain the commitment to sensible policies.

Unlike the other programmes agreed, in the case of the Irish programme exceptional support was provided by the non-euro area governments – the UK, Sweden and Denmark. This support was provided at low cost to the Irish government.

The initial terms agreed as part of the programme involved quite high interest rates charged by the EU. The formula used added a risk premium to the market interest rate at which the EU funds were raised. However, at a later date, as part of the second Greek programme, the interest rates were reduced for the programme countries to eliminate the substantial risk premium and the maturities of the loans were increased.

The loans provided by the IMF came at a significantly higher interest rate and the maturities of the loans were generally shorter than those eventually

agreed for the EU funding. However, the IMF loans had the major advantage that the Irish government had the option of repaying the debt early if it so wished. With the dramatic fall in the interest rate facing the Irish government, since the end of 2013, nearly all of the IMF loans have been repaid and refunded on the open market. This has resulted in a major saving in interest payments. A similar policy is now being pursued by the Portuguese government, replacing IMF loans with normal borrowing.

A final complication with the Irish programme was the fall-out from the guarantee provided to the banks, in particular to the bank that proved to be insolvent. While that bank continued in operation it relied very heavily on liquidity assistance from the ECB, backed by a government guarantee of repayment. However, in 2013 the bank was wound up and the government guarantee was converted into government bonds. This left the Central Bank of Ireland holding the bonds which will be sold off as monetary conditions permit. The terms of the new bonds provided for very long maturities with a variable interest rate based on Euribor, plus a large premium, reflecting the premium then payable on Irish debt relative to German debt. Because the bonds were held at risk of the Central Bank of Ireland, rather than the ECB, the difference between the interest paid by the government and the interest paid by the Central Bank to the ECB means that, until the bonds are sold by the Central Bank, there is a substantial profit for the Central Bank of Ireland. This profit is duly paid to the bank's owner, the government.

So far the bonds are being sold by the Central Bank more rapidly than had been provided for in the minimum schedule agreed with the ECB. In turn the

Irish government has been able to refinance the bonds at the current very low interest rate. While the profit of the Central Bank is, as a result, reduced, because the bonds were due to be sold off long before their maturity date the effect of the transaction is to substantially reduce the long-term cost of the borrowing. Thus the nature of the instrument agreed with the ECB and the EU in 2013, as part of the liquidation of the insolvent bank, has provided additional flexibility for the Irish government, allowing it to manage down the long-term cost of the crisis.

Managing the Government's Financial Assets

The guarantee provided by the government to the domestically owned banks in September 2008 effectively resulted in their nationalisation. Two insolvent banks were merged and then closed in 2013 and the remaining three institutions (after amalgamations) ended up in government ownership.

Already some of the shares in two of these banks have been sold. The redemption of preference shares and the sale of ordinary shares resulted in the repayment of over €4 billion to the taxpayer. However, the largest of the banks still remains in government hands with a majority stake in a second bank and a minority stake in the third bank.

The banking system still has major problems with a high volume of non-performing loans. While provision has been made for the possible losses on these loans, they nonetheless continue to impact on the banks' performance. However, with output in the economy moving back towards potential there has been a period of rapid growth. This has helped to move the banks back to profitability.

With a return of the economy to reasonable growth and appropriate management of the banks, over the rest of the decade they may return towards more normal operating conditions. If this were to happen the eventual sale of the remaining government stake in the banks could result in a significant further once-off reduction in the debt. The objective of government policy should be to try and maximise the eventual return from the sale of these state assets. However, even with favourable circumstances the eventual direct fiscal cost of the support for the banking system, illustrated in Figure 3, is still likely to be very substantial.

The Cost of Funding

When the NTMA began borrowing heavily and building up a buffer of liquid assets the Irish long bond yield was not very much higher than it was at the time in Germany (although it was much higher than it is today in Ireland) (Figure 8). However, as the public finances deteriorated and, in particular, as the problems with the domestic banking system loomed ever larger, the risk premium for Irish government borrowing continued to rise. In 2009 and into

the beginning of 2010 the risk premium was manageable and the Government continued to borrow as necessary on international markets.

However, over the course of 2010, as the problems with the banking system became clearer, the risk premium rose dramatically so that in the autumn the government found that it could no longer borrow at a realistic rate.

However, with the EU /IMF programme in place and with the publication of the stress tests on the banks in March 2011, it gradually became apparent to the financial markets that there was no more bad news hidden from view. The risk premium began to fall. However, because of the availability of funding from the EU / IMF programme at an attractive interest rate, especially after the rates were revised down, the government had no need to access the financial markets in 2011 and 2012.

The decline in the risk premium occurred against the background of an unprecedented fall in German bond yields. With a decline in the risk premium in Ireland, and a similar but somewhat later decline in Portugal and Spain, nominal interest rates fell in Ireland, Spain and Portugal to levels significantly below those experienced in the pre-crisis years. This fall in interest rates, and the ability of Ireland and Portugal to access them, has played an important role in making high debt levels sustainable.

Previous episodes where countries have found themselves heavily indebted have often been accompanied by relatively elevated interest rates. This had

made debt levels over 100% of GDP difficult to sustain. However, in the current situation the very low nominal interest rates are of significant benefit to indebted countries. As long as the low nominal interest rates persist, Ireland (and Portugal and Spain) will continue to replace maturing high interest rate debt with new debt carrying a lower yield, further reducing the effective burden of the debt on the economy.

The effect of this process is that already the share of debt interest in GNP in Ireland is falling, having peaked in 2012-13 (Figure 9). Interest payments were 4.7% of the national debt (the effective interest rate) in 2007 whereas they had fallen to 3.8% by 2014. This reflects the relatively low interest rates available on the bulk of the debt issued since the crisis began.

Since EMU began the burden of interest payments as a share of GDP has fallen pretty continuously in the case Germany (Figure 10). Not surprisingly the advent of the crisis saw a big increase in the share of GDP going on interest payments in the period 2008-2012 in a range of other countries. However, the very low level of interest rates, combined with favourable rates under the EU/IMF programmes (especially for Greece), have seen the burden of debt interest fall back in Greece Spain and Ireland.¹¹ By 2014 the burden of the debt (measured by the burden of interest payments) in Ireland, Spain and Greece was very similar to that experienced in Belgium and the US. It is well

¹¹ As Portugal repays its debt to the IMF early there will also be some reduction in the interest bill.

below the levels previously experienced by Ireland in the 1980s and the early 1990s.¹²

IV Conclusions

We conclude by highlighting some important topics for future research in relation to the analysis and management of the public balance sheet.

First, the European sovereign debt crisis has underlined the value in mitigating rollover risk of sufficient long maturities in the composition of debt issuance and adequate cash buffers. There is a substantial premium to being liquid when a crisis hits. It gives governments much more freedom to manoeuvre. In parallel to the debate on the optimal scale of official reserves for emerging economies, more work on the optimal scale of liquid public assets is warranted. In terms of political economy, the importance of demonstrating credibility in charting a course to fiscal sustainability is vital. To this end, a strategy of under-promising and over-delivering is more successful than excessively-optimistic projections.

Second, in terms of the composition of the investor base for sovereign debt, a challenge for a monetary union is to work out the appropriate role for the area-wide banking system as holders of sovereign debt. It is manifestly clear that excessive holdings of domestic sovereign debt by the domestic banking

¹² However, the rate of inflation is also much lower.

system sows the seeds of instability (see, amongst many others, Brunnermeier et al 2011). At the same time, sovereign debt is an important category of liquid assets for banking systems. For a monetary union, designing financial regulations that encourage banks to hold an area-wide diversified portfolio of sovereign debt is an important priority.¹³

Third, in the context of sovereign crises, an important element in the composition of the investor base is the different characteristics of private-sector creditors versus official-sector creditors. Obtaining access to official funding can bring significant benefits in terms of funding stability and lower funding costs. It also holds the promise of “soft” types of debt adjustments through renegotiation of the duration and coupon payments on official debt. However, the Greek experience suggests that more radical levels of debt restructuring are less likely vis-à-vis official creditors than vis-à-vis private creditors, for a variety of political economy reasons. Accordingly, troubled sovereigns (and, on the other side, potential official creditors) require a sophisticated understanding of the pros and cons of bailout funding.

Fourth, the expansion of central bank balance sheets and, in particular, increased holdings by central banks of sovereign debt call for closer scrutiny of the interactions between the central bank balance sheet and the balance sheet of the wider public sector. Again, this is a more complex challenge for a monetary union, especially a monetary system that includes both a common central bank and a constellation of national central banks.

¹³ See also Corsetti et al (2015) and European Systemic Risk Board (2015).

Fifth, it is plausible that there should be an expanded role for state-contingent debt securities. The literature on different varieties of GDP-indexed bonds is extensive.¹⁴ However, in the context of providing support to the financial system during crisis episodes, working out the relative roles of nonlinear “loss insurance” schemes versus plain-vanilla liability guarantees or the different forms of publicly-funded recapitalisation is a high priority.

Finally, with respect to interest rate risk, this time round the effective burden of a large debt is lower than in the past because of low interest rates.

References

Borensztein, Eduardo and Paolo Mauro (2004), “The Case for GDP-Indexed Bonds,” *Economic Policy* 19(38), 165-216.

¹⁴ See, amongst many others, Borensztein and Mauro (2004).

Brunnermeier, Marcus K., Luis Garicano, Philip R. Lane, Marco Pagano, Ricardo Reis, Tano Santos, Stijn Van Nieuwerburgh and Dimitri Vayanos (2011), "European Safe Bonds: ESBies", *Euro-nomics.com*.

Corsetti, Giancarlo, Lars P. Feld, Philip R. Lane, Lucrezia Reichlin, Hélène Rey, Dimitri Vayanos and Beatrice Weder di Mauro (2015), *A New Start for the Eurozone: Dealing with Debt*, Monitoring the Eurozone 1, Centre for Economic Policy Research.

Eichengreen, Barry and Ugo Panizza (2015), "A Surplus of Ambition: Can Europe Rely on Large Primary Surpluses to Solve Its Debt Problem?," *Economic Policy*, forthcoming.

Escolano, Julio (2010), "A Practical Guide to Public Debt Dynamics, Fiscal Sustainability, and Cyclical Adjustment of Budgetary Aggregates," *IMF Technical Notes and Manuals 10/02*.

European Systemic Risk Board (2015), *The Regulatory Treatment of Sovereign Exposures*.

Honohan, Patrick (1999), "Fiscal Adjustment and Disinflation in Ireland: Setting the Macro Basis of Economic Recovery and Expansion", in F. Barry (ed.), *Understanding Ireland's Economic Growth*, MacMillan Press.

IMF (2015), "Balance Sheet Analysis in Fund Surveillance," *Policy Paper*.

Jeanne, O. and R. Rancière, 2011, "The Optimal Level of International reserves for Emerging Market Economies; A New Formula and Some Applications", *Economic Journal*, 121 (September), 905–930.

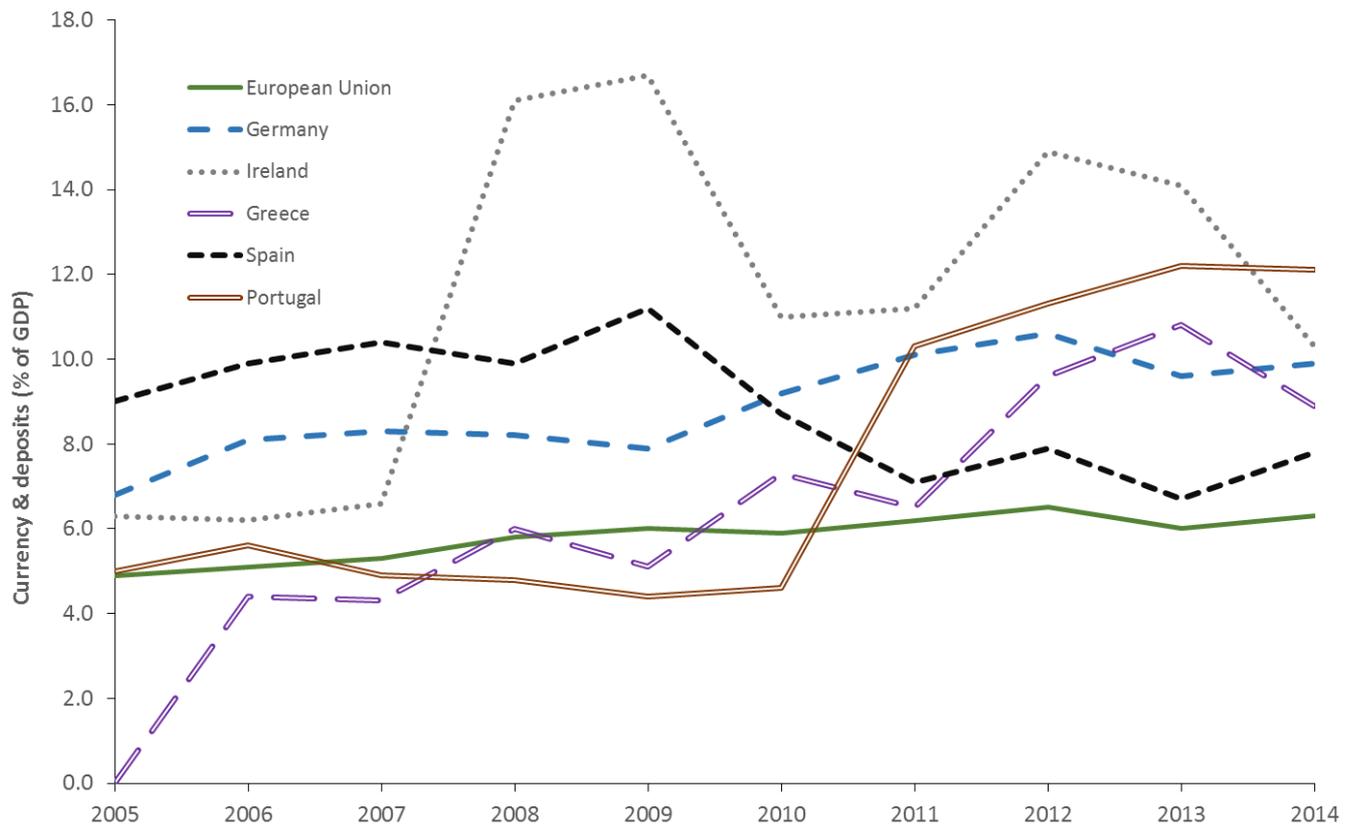
Kearney, Ide, McCoy, D., Duffy, D., McMahon, M., Smyth, D. (2000), "Assessing the Stance of Irish Fiscal Policy", ESRI Series: Budget Perspectives 2001/1

Lane, Philip R. (2010), "External Imbalances and Fiscal Policy," in *External Imbalances and Public Finances in the EU* (edited by Salvador Barrios, Servaas Deroose, Sven Langedijk, Lucio Pench), European Economy Occasional Paper No. 66.

Paris, Pierre and Charles Wyplosz (2014), *PADRE: Politically Acceptable Debt Restructuring in the Eurozone*, Geneva Special Report on the World Economy 3, ICMB and CEPR.

Tirole, Jean (2015), "Country Solidarity in Sovereign Crises," *American Economic Review* 105(8), 2333-2363.

Figure 1: General government currency & deposit holdings



Source: Eurostat Sectoral Financial Accounts

Table 1: Impact on Public Balance Sheet of Government Interventions During the Financial Crisis (2008-2014).

	(1)	(2)	(3)
	Net Revenue /Cost	Assets	Liabilities
Belgium	-0.4	6.1	6.5
Denmark	0.6	4.4	4.4
Germany	-1.3	10.2	11.8
Ireland	-25.6	11.3	38.9
Greece	-12.5	15.9	23.1
Spain	-4.4	2.4	4.9
France	0.1	0.5	0.4
Italy	0.1	0.3	0.3
Cyprus	-8.5	9.3	9.7
Latvia	-3.3	7.4	9.5
Lithuania	-3.0	0.1	2.8
Luxembourg	0.2	5.8	5.5
Hungary	0.1	2.1	3.2
Netherlands	-0.7	12.7	12.7
Austria	-3.1	7.6	8.4
Portugal	-2.9	8.1	11.1
Slovenia	-12.1	6.1	18.2
Sweden	0.2	0.6	0.2
United Kingdom	-0.4	9.7	9.7

Note: Percent of GDP. Column (1) refers to net revenue/cost (cumulative over 2008-2014); columns (2) and (3) refer to peak levels of asset and liability acquisition over 2008-2014.

Source: Eurostat – Supplementary Table for the Financial Crisis.

Table 2: Breakdown of Debt Dynamics

<i>1998 – 2007</i>	<i>debt_1998</i>	<i>primary</i>	<i>interest</i>	<i>growth</i>	<i>sfa</i>	<i>debt_2007</i>
European Union	.	.	.	.	.	57.8
Euro area	71.6	.	0.0	-25.9	.	65.0
Belgium	119.6	-42.2	46.9	-40.3	2.9	86.9
Bulgaria	69.8	-26.9	22.0	-37.9	-10.4	16.6
Czech Republic	14.3	24.7	9.0	-19.5	0.5	29.0
Denmark	60.1	-45.9	25.1	-18.1	6.2	27.3
Germany	59.7	-6.3	26.0	-14.0	-2.0	63.5
Estonia	6.1	.	.	-5.7	.	3.7
Ireland	51.6	-26.7	12.5	-31.0	17.6	23.9
Greece	89.5	.	.	-55.5	.	103.1
Spain	62.8	-23.0	21.4	-33.3	7.7	35.5
France	61.2	-1.8	24.7	-22.3	2.4	64.2
Croatia	.	.	.	.	.	34.5
Italy	111.2	-21.5	47.3	-36.1	-1.2	99.7
Cyprus	54.6	-5.1	27.3	-37.0	14.0	53.8
Latvia	9.0	8.9	5.9	-13.8	-1.6	8.4
Lithuania	15.8	.	.	-20.7	.	16.7
Luxembourg	7.3	-25.2	2.4	-4.3	27.0	7.1
Hungary	57.3	15.9	41.1	-46.4	-2.7	65.2
Malta	50.4	11.1	33.7	-29.4	-3.4	62.4
Netherlands	63.2	-18.6	23.6	-23.4	-2.0	42.7
Austria	64.1	-10.4	29.8	-24.1	5.4	64.8
Poland	36.8	.	.	-29.6	.	46.5
Portugal	52.1	13.3	25.3	-25.6	3.4	68.4
Romania	13.0	2.8	20.7	-20.0	-4.7	11.8
Slovenia	22.4	3.8	16.8	-14.2	-6.2	22.6
Slovakia	31.0	23.5	23.8	-39.5	-8.8	30.0
Finland	47.1	-52.1	18.2	-18.2	39.0	34.0
Sweden	62.7	-31.8	21.5	-21.1	6.2	37.5
United Kingdom	42.4	-3.6	19.6	-18.3	0.6	40.6
Iceland	45.8	-34.7	24.5	-25.9	16.2	25.9
Turkey	.	.	.	.	.	41.1
Switzerland	.	-3.7	.	.	.	.
United States	60.0	-4.9	32.2	-15.5	-12.2	59.6
Japan	134.1	29.4	20.8	26.5	-31.9	178.9
Canada	85.7	-59.7	49.4	-49.4	40.0	66.0

<i>2007 – 2009</i>	<i>debt_2007</i>	<i>primary</i>	<i>interest</i>	<i>growth</i>	<i>sfa</i>	<i>debt_2009</i>
European Union	57.8	.	0.0	3.3	.	72.9
Euro area	65.0	.	0.0	0.9	.	78.4
Belgium	86.9	-0.9	7.4	-1.0	6.9	99.3
Bulgaria	16.6	1.0	1.6	-1.9	-3.1	14.2
Czech Republic	29.0	5.4	2.2	-1.9	-0.7	34.0
Denmark	27.3	-3.7	3.4	0.7	12.7	40.4
Germany	63.5	-2.3	5.3	1.5	4.4	72.4
Estonia	3.7	.	.	0.7	.	7.0
Ireland	23.9	17.6	3.3	6.0	11.3	62.2
Greece	103.1	15.2	9.9	-1.8	0.3	126.8
Spain	35.5	12.1	3.2	0.2	1.6	52.7
France	64.2	5.1	5.2	0.4	3.8	78.8
Croatia	34.5	4.8	3.8	-0.6	2.2	44.7
Italy	99.7	-1.4	9.3	2.5	2.3	112.5
Cyprus	53.8	-0.2	4.9	-3.1	-1.4	54.1
Latvia	8.4	10.9	2.1	4.9	10.0	36.2
Lithuania	16.7	10.7	1.9	1.4	-1.7	29.0
Luxembourg	7.1	-3.5	0.7	0.3	10.8	15.5
Hungary	65.2	-0.4	8.6	6.4	1.2	81.1
Malta	62.4	0.9	6.6	-3.9	1.8	67.8
Netherlands	42.7	1.2	4.1	-0.2	8.7	56.5
Austria	64.8	0.7	6.1	-0.8	8.9	79.7
Poland	46.5	.	.	-0.3	.	52.5
Portugal	68.4	7.5	6.1	0.1	1.5	83.6
Romania	11.8	12.2	2.2	0.8	-3.8	23.2
Slovenia	22.6	5.6	2.4	-0.6	4.5	34.5
Slovakia	30.0	7.6	2.7	-3.5	-0.8	36.0
Finland	34.0	-4.4	2.7	1.0	8.3	41.7
Sweden	37.5	-4.0	2.7	4.9	0.6	41.8
United Kingdom	40.6	11.7	4.1	11.8	-2.2	66.1
Iceland	25.9	13.6	9.2	17.6	13.6	79.8
Norway	49.7	-31.6	2.8	1.8	21.4	44.2
Switzerland	.	-4.8	.	.	.	.
United States	59.6	12.6	7.1	0.9	3.2	83.3
Japan	178.9	6.7	4.0	-26.8	42.9	205.8
Canada	66.0	-2.3	7.5	5.0	9.0	85.2

<i>2009-2012</i>	<i>debt_2009</i>	<i>primary</i>	<i>interest</i>	<i>growth</i>	<i>sfa</i>	<i>debt_2012</i>
European Union	72.9	6.7	8.4	-7.0	3.9	84.9
Euro area	78.4	5.1	8.7	-4.8	3.5	91.0
Belgium	99.3	1.8	10.2	-10.3	3.0	104.0
Bulgaria	14.2	3.5	2.3	-1.9	0.0	18.0
Czech Republic	34.0	7.1	4.1	-2.8	3.0	45.5
Denmark	40.4	2.7	5.7	-3.6	0.2	45.5
Germany	72.4	-2.4	7.2	-8.4	10.3	79.0
Estonia	7.0	-1.4	0.4	-1.4	5.0	9.7
Ireland	62.2	42.5	10.6	-3.0	9.5	121.7
Greece	126.8	11.7	18.1	31.2	-30.9	156.9
Spain	52.7	21.9	7.3	1.5	1.1	84.4
France	78.8	9.2	7.5	-6.0	-0.2	89.2
Croatia	44.7	10.8	8.5	1.5	-1.4	64.1
Italy	112.5	-3.4	14.1	-3.8	2.8	122.2
Cyprus	54.1	9.2	7.2	-2.8	11.9	79.5
Latvia	36.2	7.2	5.3	-7.4	-0.5	40.9
Lithuania	29.0	13.4	5.7	-7.2	-0.9	39.9
Luxembourg	15.5	-1.0	1.3	-3.3	8.9	21.4
Hungary	81.1	-0.6	12.9	-4.5	-11.2	77.7
Malta	67.8	0.4	9.2	-10.7	0.9	67.5
Netherlands	56.5	8.2	5.2	-2.1	-1.2	66.5
Austria	79.7	1.0	8.4	-8.2	0.9	81.7
Poland	52.5	8.6	7.7	-10.2	-2.7	55.8
Portugal	83.6	11.9	12.2	4.2	13.0	124.8
Romania	23.2	10.2	4.9	-2.7	1.9	37.5
Slovenia	34.5	10.1	5.5	0.4	2.9	53.4
Slovakia	36.0	11.2	4.6	-4.8	5.1	52.1
Finland	41.7	1.6	4.2	-4.2	9.8	53.0
Sweden	41.8	-2.0	3.0	-11.8	5.9	36.9
United Kingdom	66.1	16.5	9.0	-14.9	8.6	85.3
Iceland	79.8	4.4	14.5	-15.6	5.3	88.5
Norway	44.2	-41.2	3.2	-13.0	36.1	29.3
Switzerland	.	-3.7	.	.	.	.
United States	83.3	20.1	11.4	-18.0	3.3	100.2
Japan	205.8	19.6	6.2	-53.2	35.1	213.5
Canada	85.2	.	.	.	.	.

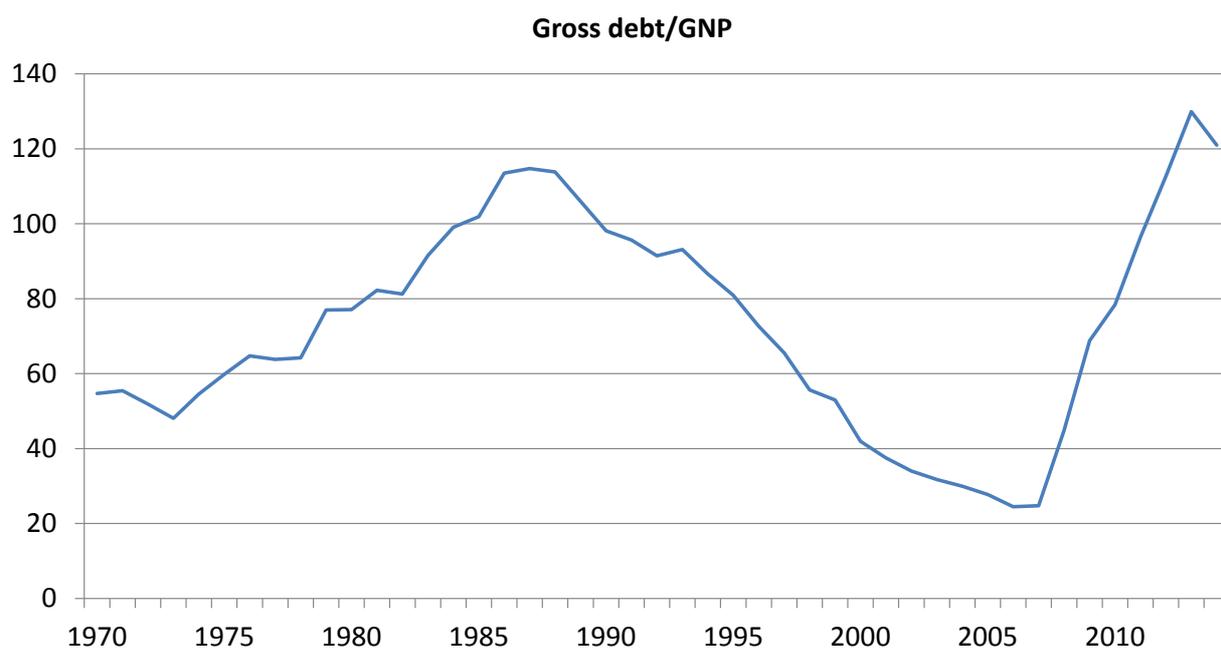
<i>2012-2014</i>	<i>debt_2012</i>	<i>primary</i>	<i>interest</i>	<i>growth</i>	<i>sfa</i>	<i>debt_2014</i>
European Union	84.9	0.9	5.3	-3.1	0.3	88.4
Euro area	91.0	0.0	5.5	-2.3	0.3	94.5
Belgium	104.0	-0.1	6.2	-3.6	0.0	106.4
Bulgaria	18.0	3.0	1.6	-0.4	4.8	27.0
Czech Republic	45.5	0.0	2.7	1.6	-6.0	43.8
Denmark	45.5	-4.0	3.2	-1.1	1.4	45.0
Germany	79.0	-4.4	3.8	-4.2	-0.1	74.2
Estonia	9.7	0.6	0.3	-1.0	0.3	9.8
Ireland	121.7	1.2	8.4	-7.4	-13.1	110.8
Greece	156.9	6.5	8.2	12.3	-7.6	176.3
Spain	84.4	5.9	6.6	-0.2	1.6	98.3
France	89.2	3.9	4.4	-2.0	-0.3	95.3
Croatia	64.1	2.9	7.2	1.6	5.3	81.2
Italy	122.2	-3.6	9.5	0.7	3.1	131.9
Cyprus	79.5	1.7	6.2	10.4	9.7	107.5
Latvia	40.9	-0.5	2.9	-3.2	0.4	40.4
Lithuania	39.9	0.2	3.6	-3.5	1.0	41.1
Luxembourg	21.4	-2.0	0.8	-1.7	4.1	22.7
Hungary	77.7	-3.7	8.7	-2.6	-4.1	76.0
Malta	67.5	-0.8	5.7	-6.2	2.3	68.6
Netherlands	66.5	2.1	3.0	-1.1	-1.1	69.5
Austria	81.7	-0.8	5.1	-3.1	3.8	86.8
Poland	55.8	3.1	4.5	-4.0	-11.8	47.6
Portugal	124.8	-0.5	10.0	-3.7	-1.7	128.9
Romania	37.5	0.6	3.4	-4.5	1.4	38.4
Slovenia	53.4	14.1	5.8	-2.3	11.2	82.2
Slovakia	52.1	1.9	3.7	-2.3	-1.9	53.6
Finland	53.0	2.6	2.5	-1.2	2.0	58.9
Sweden	36.9	2.0	1.6	-0.5	0.1	40.1
United Kingdom	85.3	5.6	5.7	-7.4	2.6	91.8
Iceland	88.5	.	9.4	-10.6	.	82.5
Norway	29.3	-22.6	1.7	1.0	.	.
Switzerland	.	-1.9	.	.	.	.
United States	100.2	3.2	7.3	-4.2	8.3	114.7
Japan	213.5	12.1	4.1	67.2	-58.9	238.0
Canada	.	.	.	.	.	.

Table 3: Cross-Country Variation in Fiscal Dynamics

A: 1998-2007				
	(1) Prim	(2) Int	(3) SFA	(4) Grow
α	-12.81 (-0.24)	10.38*** (3.11)	24.82* (1.95)	-20.45*** (-3.87)
Debt ₉₈	-0.48 (-1.01)	0.26*** (4.83)	-0.28 (-1.38)	-0.08 (-0.92)
R ²	0.01	0.47	0.07	0.03
Observations	28	28	28	32
B: 2007-2009				
	(1) Prim	(2) Int	(3) SFA	(4) Grow
α	4.31 (1.48)	2.57*** (3.84)	-0.58 (-0.23)	5.88*** (3.61)
Debt ₀₇	-0.02 (-0.34)	0.04*** (3.72)	0.13** (3.08)	-0.11*** (-3.92)
R ²	0.01	0.32	0.25	0.33
Observations	31	31	31	33
C: 2009-2012				
	(1) Prim	(2) Int	(3) SFA	(4) Grow
α	2.84 (0.67)	3.44*** (3.18)	1.89 (0.49)	-1.39 (0.37)
Debt ₀₉	0.06 (1.06)	0.07*** (4.34)	0.04 (0.72)	-0.12** (-2.37)
R ²	0.04	0.39	0.02	0.16
Observations	32	32	32	32
D: 2012-2014				
	(1) Prim	(2) Int	(3) SFA	(4) Grow
α	-2.67 (-1.32)	1.94** (2.63)	11.74** (3.36)	-12.81*** (-3.4)
Debt ₁₂	0.05** (2.08)	0.04*** (4.68)	-0.18*** (-4.35)	0.18*** (4.04)
R ²	0.13	0.42	0.4	0.35
Observations	31	32	30	32

Note: Regressions on initial debt-GDP ratio: (1) Primary Deficit; (2) Interest Payments; (3) Stock Flow Adjustment; (4) GDP growth term.

Figure 2: Ireland, Gross Debt to GNP ratio, %



Note: CSO: *National Income and Expenditure, Government Financial Statistics*; ESRI: Databank.

Table 4: Holdings of Irish Government Debt, Share of the Total, %

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Domestic:											
Banks	13.3	11.6	12.2	11.7	11.8	12.3	11.0	20.4	10.9	9.9	10.1
Private Sector	45.1	40.0	37.2	35.3	36.4	36.4	39.9	31.8	38.3	36.6	38.2
Central Bank	4.6	3.5	2.8	2.2	2.9	2.0	1.6	1.5	1.4	1.5	1.4
Foreign	37.0	44.9	47.8	50.8	48.9	49.2	47.6	46.3	49.4	52.0	50.3

Note: This includes bonds denominated in Irish pounds as well as borrowing abroad in foreign currencies.

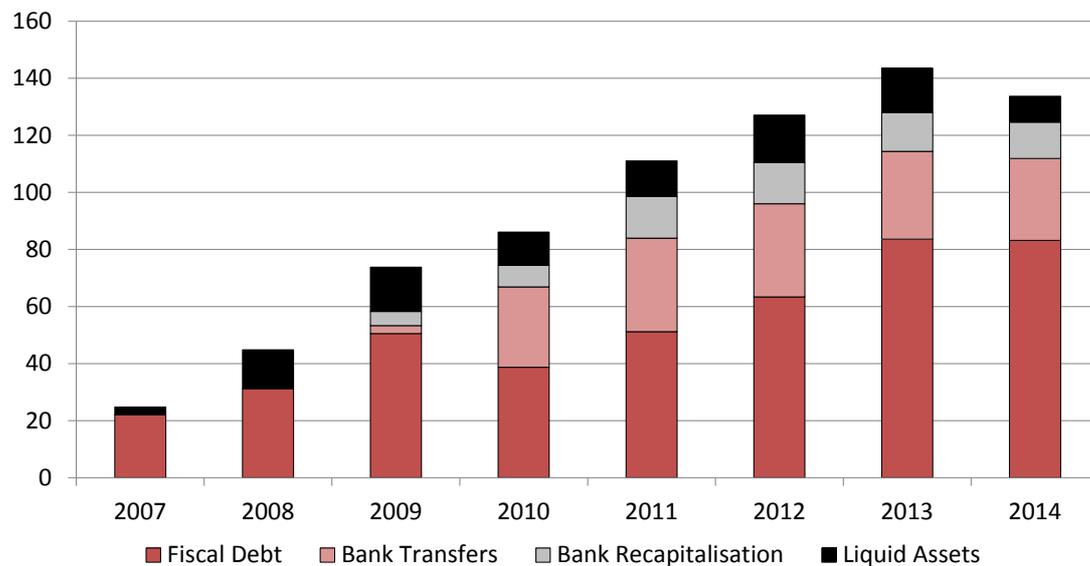
Source: *Central Bank of Ireland and ESRI databank.*

Table 5: Irish Government Borrowing, % of GNP

	2007	2008	2009	2010	2011	2012	2013	2014
Including Banks	-0.3	8.1	16.6	38.4	15.4	9.8	6.8	4.6
Excluding Banks	-0.3	8.1	13.8	13.1	10.4	9.6	6.8	4.6

Source: CSO: *Government Financial Statistics*

Figure 3: Composition of Irish Gross Debt, % of GNP



Note: CSO: National Income and Expenditure, Government Finance Statistics; NTMA Annual Reports.

Table 6: Summary of Actual and Planned Austerity Measures in Ireland over Period 2008-2015, €bn.

	2008-2010	2011	2012	2013	2014	2015	2008-2015
Revenue	5.6	1.4	1.6	1.3	0.9	0.7	11.5
Expenditure	9.2	3.9	2.2	2.3	1.6	1.3	20.5
<i>of which Capital</i>	1.6	1.9	0.8	0.6	0.1	0.0	5.0
Total	14.7	5.3	3.8	3.5	2.5	2.0	31.8
Per cent of GDP	9.2%	3.3%	2.3%	2.1%	1.5%	1.1%	19.5%

Source: Department of Finance Budgets. GDP figures revised based on CSO: National Income and Expenditure, 2011 and Duffy, et al., 2012.

Table 7: Stability Programme Updates – Ireland and Spain

Official Plans	2010	2011	2012	2013
Plan of: Spain				
Spring 2010	9.8	7.5	5.3	3.0
Spring 2011	9.2	6	4.4	3.0
Spring 2012	9.2	8.5	5.3	3.0
Latest	9.6	9.6	10.6	7.2
Plan of: Ireland				
Winter 2009	11.6	10	7.2	4.9
Winter 2010		10.6	8.6	7.5
Latest	10.6	8.9	8.1	7.1

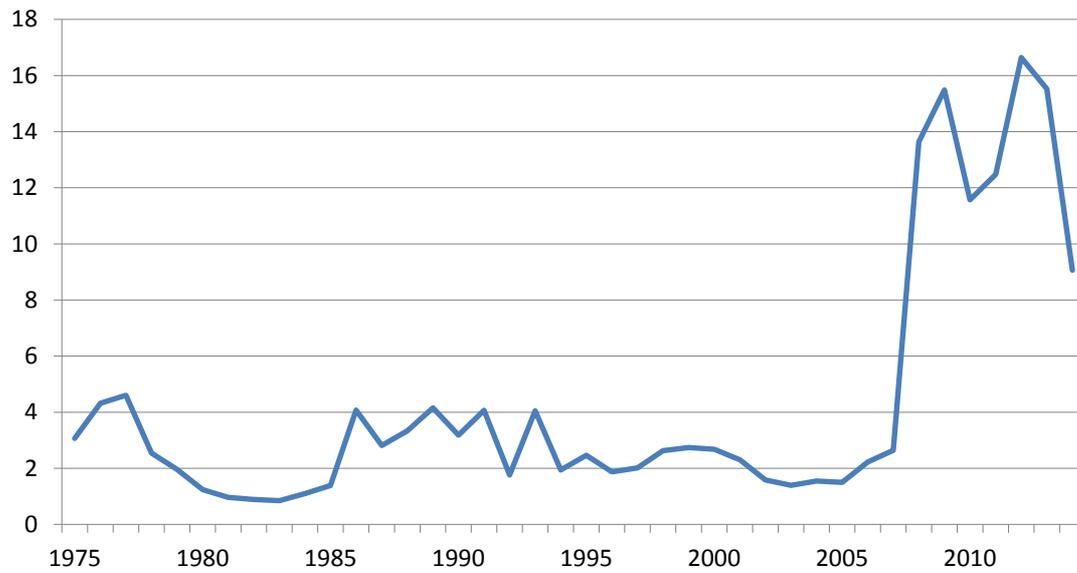
Source: Stability Programme Updates for Spain and Ireland. Latest data for Spain from EU AMECO database; for Ireland Duffy, et al., 2013.

Table 8: Irish Government Borrowing: Change in National Debt and Liquid Assets, € million

Change in Debt and Assets	2008				2009				2010			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Total nat. debt	4451	8417	11260	8330	9932	11731	1832	1568	19639	-591	15524	4988
Long term debt	-300	6947	-69	4720	11482	4273	3965	8706	20826	6392	13095	9046
Short term debt	4750	1470	11329	3610	-1550	7458	-2133	-7138	-1186	-6983	2428	-4058
Liquid assets	2683	3888	7003	5741	5199	3607	-4787	-2313	3091	-6782	1804	-12018
Gov. borrowing	1768	4529	4257	2589	4733	8124	6619	3881	16548	6191	13720	17006

Note: CSO: *Quarterly Government Debt (Maastricht Debt) for General Government.*

Figure 4: Irish Government holding of Cash and Deposits, % of GNP



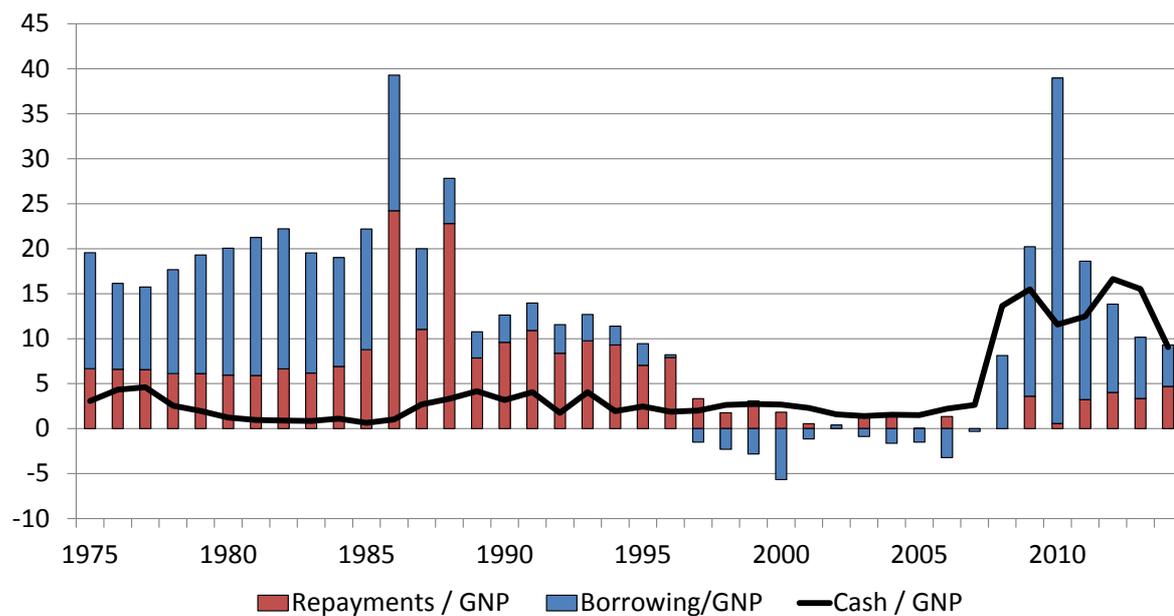
Note: CSO: *National Income and Expenditure, Government Finance Statistics*; ESRI: *Databank*; Department of Finance: *Finance Accounts*

Table 9: Irish Government Cash and Deposits as a % of GDP

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Euro area-19	5.1	5.1	5.1	5.7	6.3	6.2	6.2	6.6	6.1	6.3
Belgium	2.7	2.5	2.8	4.6	4.4	4.7	4.7	4.5	4.3	4.5
Germany	6.7	7.8	7.9	7.8	8.0	9.0	9.6	10.0	9.2	9.5
Estonia	4.9	4.5	3.6	3.6	7.3	5.7	5.6	6.0	6.5	6.3
Ireland	5.7	5.5	5.9	15.9	18.3	11.9	11.3	14.6	13.7	9.8
Greece		4.0	3.9	5.5	5.0	7.5	7.1	10.7	12.0	9.5
Spain	8.1	8.8	9.4	9.1	11.1	8.8	7.2	8.0	6.8	7.8
France	3.2	1.4	1.4	2.2	3.1	2.1	2.9	2.6	2.1	2.0
Italy	3.9	4.5	3.6	4.1	5.2	5.8	4.5	4.7	4.8	5.4
Netherlands	3.8	2.5	3.0	3.0	2.9	2.3	2.2	2.3	1.7	1.7
Portugal	4.7	5.3	4.6	4.5	4.3	4.6	10.4	11.8	12.5	12.1
Sweden	1.8	2.5	2.2	3.1	2.5	2.0	2.8	2.7	2.4	4.3
United Kingdom	2.2	2.7	3.0	3.5	4.4	4.1	4.9	4.7	4.7	4.8

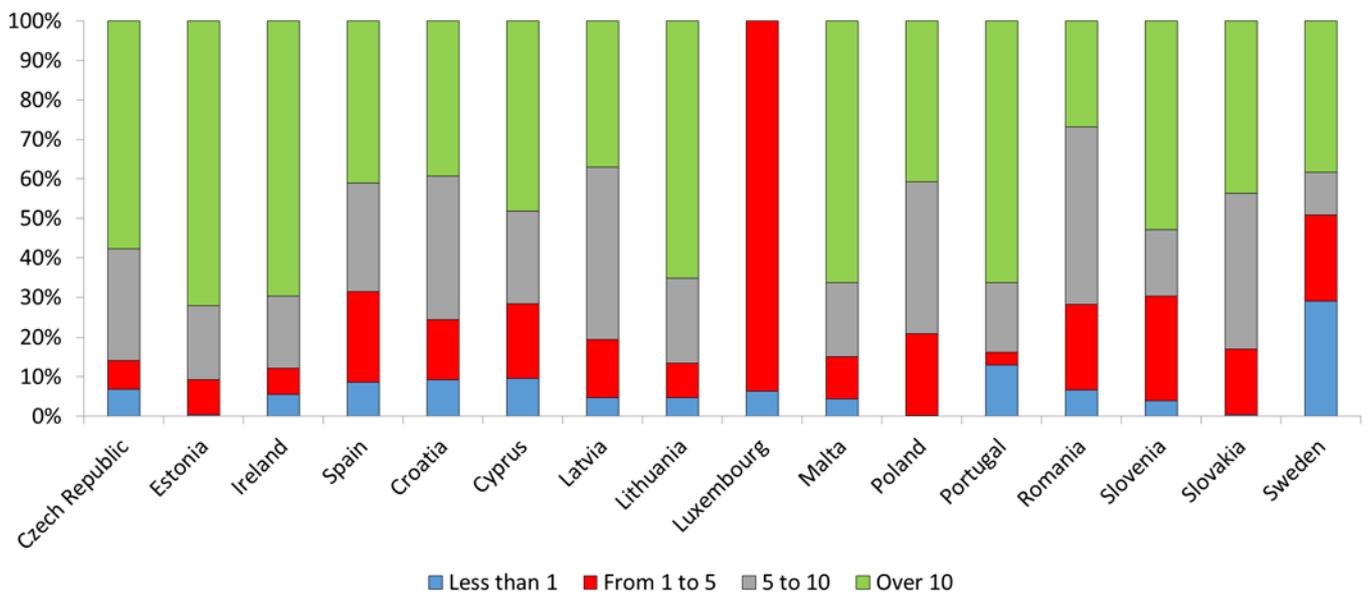
Source: Eurostat

Figure 5: Funding Needs (including repayments) and Holdings of Cash, % of GNP



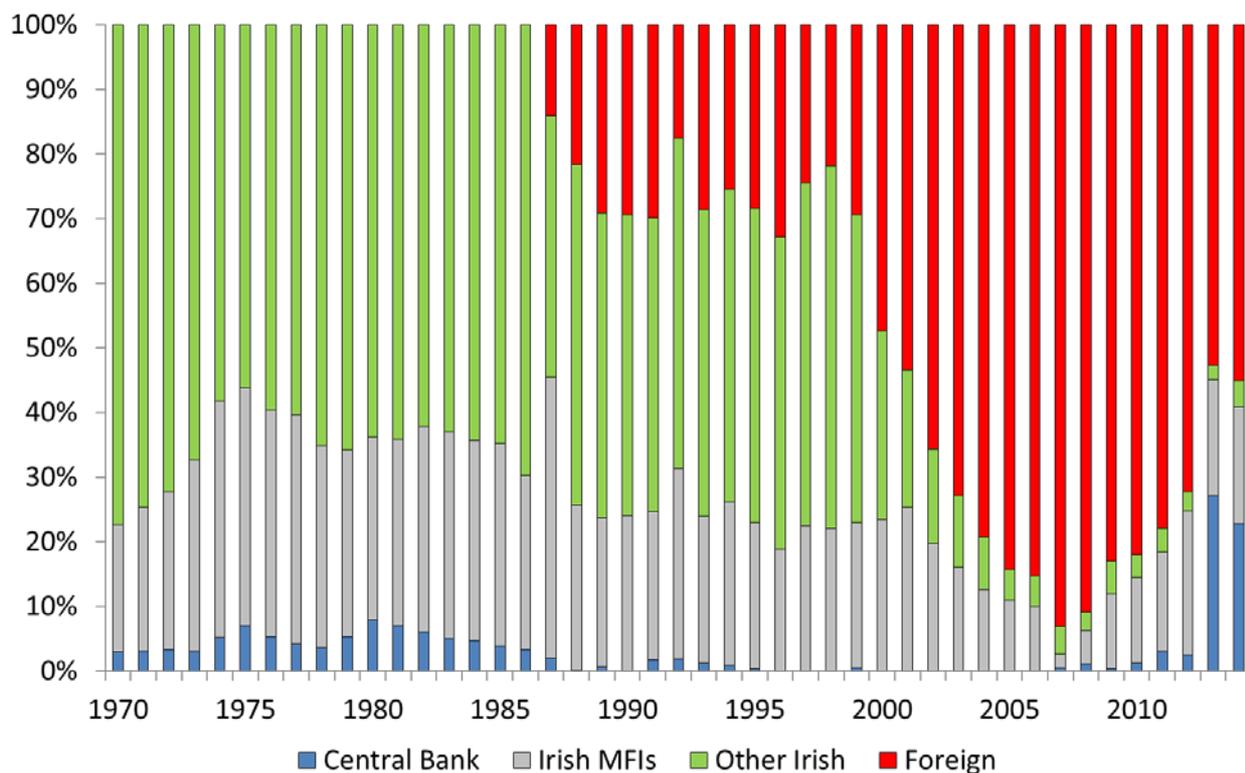
Note: CSO: *National Income and Expenditure, Government Finance Statistics*; ESRI: *Databank*; Department of Finance: *Finance Accounts*

Figure 6: Maturity Structure of Government Debt, 2014, % of Total



Note: Eurostat

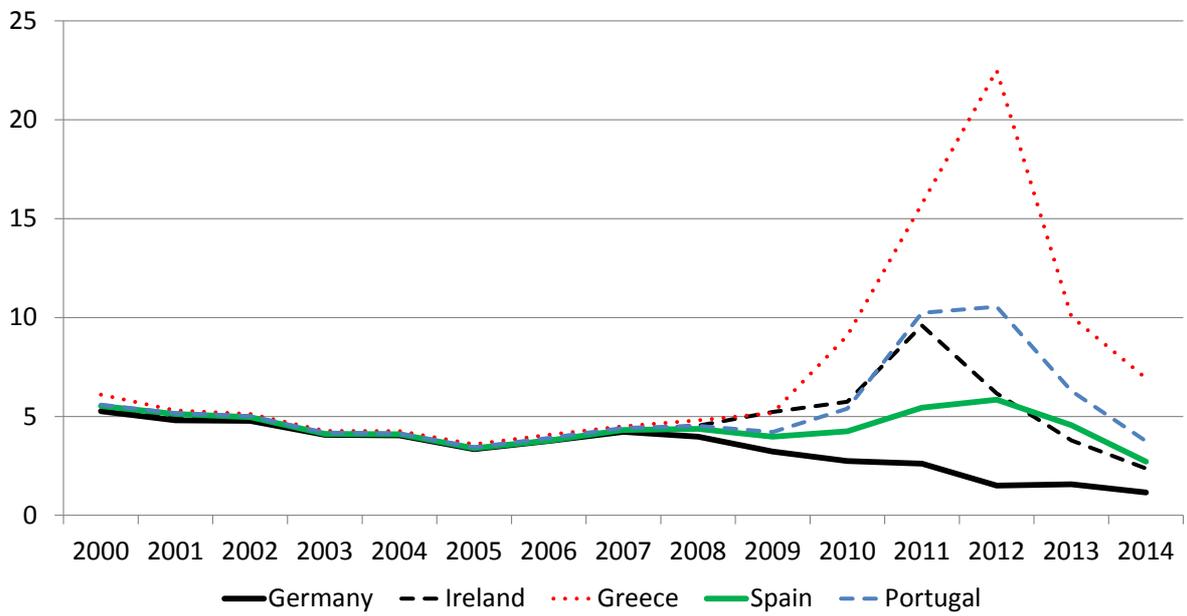
Figure 7: Irish Government Debt Holdings, % of Total



Source: Central Bank of Ireland.¹⁵

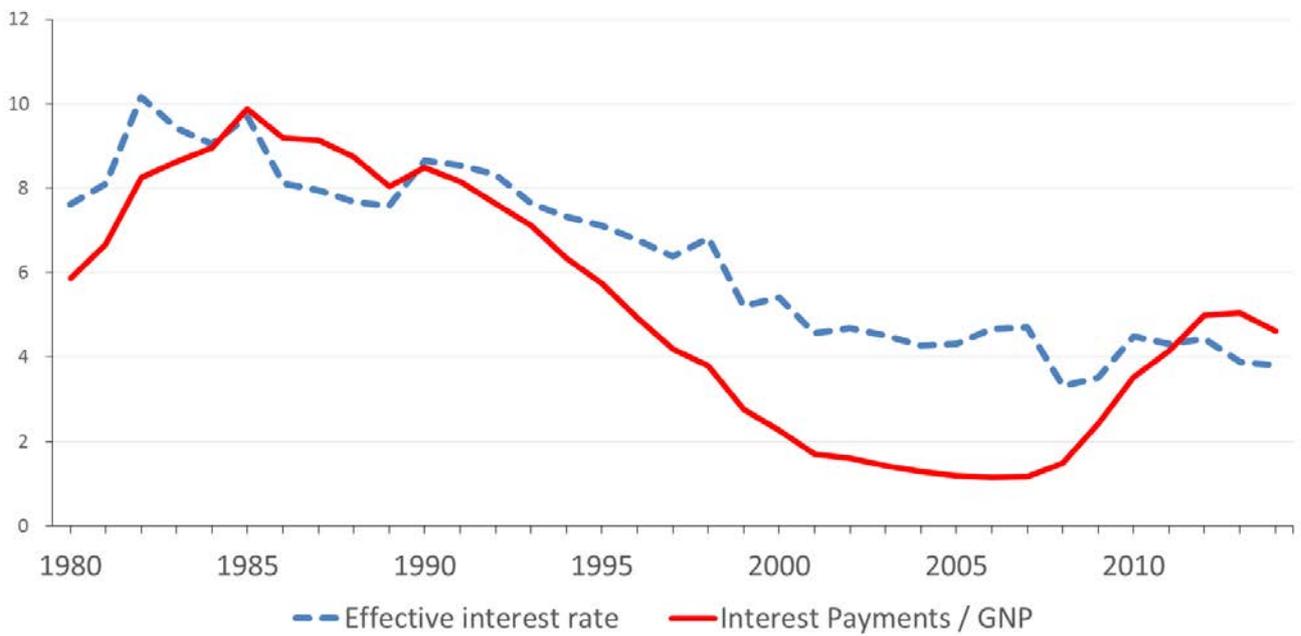
¹⁵ The absence of foreign holdings of Irish government debt up to the mid-1980s may reflect data problems.

Figure 8: Long Bond Yields



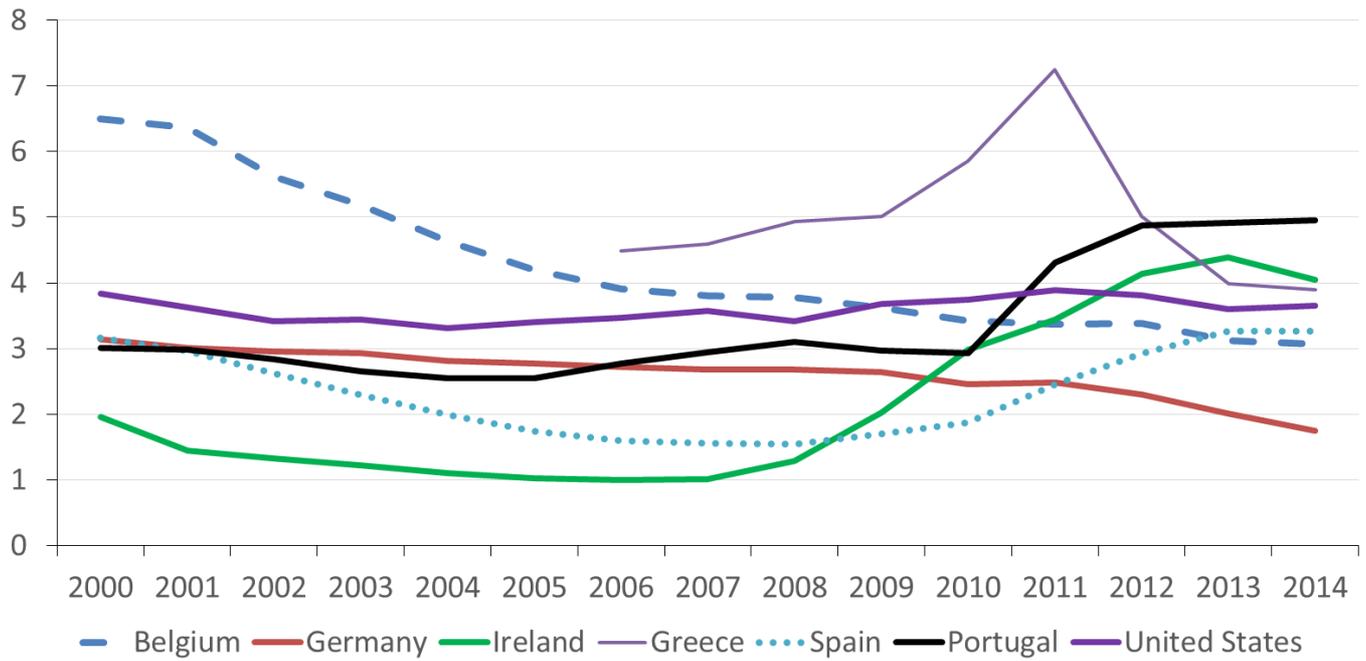
Source: EU Commission, AMECO Database

Figure 9: Ireland, National Debt Interest payments as % of GNP and of Debt outstanding



Source: CSO, National Income and Expenditure and ESRI Databank

Figure 10: National Debt Interest as % of GDP



Source: AMECO Database