# BRUEGEL POLICY CONTRIBUTION

OPTIONS FOR A EURO-AREA FISCAL CAPACITY

JEAN PISANI-FERRY, ERKKI VIHRIÄLÄ AND GUNTRAM WOLFF

Highlights

- Europe has responded to the crisis with strengthened budgetary and macroeconomic surveillance, the creation of the European Stability Mechanism, liquidity provisioning by resilient economies and the European Central Bank and a process towards a banking union. However, a monetary union requires some form of budget for fiscal stabilisation in case of shocks, and as a backstop to the banking union.

- This paper compares four quantitatively different schemes of fiscal stabilisation and proposes a new scheme based on GDP-indexed bonds. The options considered are: (i) A federal budget with unemployment and corporate taxes shifted to euro-area level; (ii) a support scheme based on deviations from potential output; (iii) an insurance scheme via which governments would issue bonds indexed to GDP, and (iv) a scheme in which access to jointly guaranteed borrowing is combined with gradual withdrawal of fiscal sovereignty.

- Our comparison is based on strong assumptions. We carry out a preliminary, limited simulation of how the debt-to-GDP ratio would have developed between 2008-14 under the four schemes for Greece, Ireland, Portugal, Spain and an 'average' country. The schemes have varying implications in each case for debt sustainability.

Jean Pisani-Ferry (jean.pisani-ferry@bruegel.org) is Director of Bruegel. **Erkki Vihriälä** (erkki.vihriala@bruegel.org) is a research assistant at Bruegel. **Guntram Wolff** (guntram.wolff@bruegel.org) is Deputy Director of Bruegel. This Policy Contribution is based on a briefing paper for the European Parliament Economic and Monetary Affairs Committee's Monetary Dialogue. The views expressed are those of the author(s) alone. Copyright remains with the European Parliament at all times.
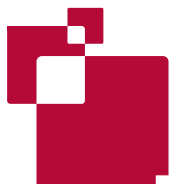
OPTIONS FOR A EURO-AREA FISCAL CAPACITY

JEAN PISANI-FERRY, ERKKI VIHRIÄLÄ AND GUNTRAM WOLFF, DECEMBER 2012

IN THE 1970s, the consensus among European policymakers was that if monetary union was to be pursued, a federal budget would also be established. In the late 1970s, a report to the European Commission by a group chaired by Sir Donald Mac-Dougall concluded that a federal budget of the order of 5-7 percent of GDP would be appropriate to support a monetary union[1]. Twelve years later, however, the Delors Report that provided the blueprint for Economic and Monetary Union would take for granted that the common budget would remain very small, with stabilisation assigned to national budgets[2]. In the event, the euro came into being in 1999 without having been preceded by any increase in the size of the EU budget.

In the Maastricht Treaty, all responsibility for stabilisation was therefore assigned to national budgets. In the words of the Stability and Growth Pact, in normal times governments were asked to keep their budgets *'close to balance or in surplus'* so that in times of recession they could let tax receipts decrease and deficits balloon, providing thereby some degree of automatic stabilisation. It was even envisaged (though reluctantly) that states could embark on discretionary stimulus[3].

Maastricht was not fully respected. Most states did not follow the Commission's recommendation to use good times to eliminate the deficit and create a buffer for stabilisation in bad times. On the contrary many used higher tax revenues during the booms to lower taxes and spend more, and found themselves forced to tighten in recession episodes, such as the one that followed the bursting of the dot-com bubble. Some did follow the script however: The governments in Spain and Ireland fulfilled their Treaty obligations and moved into surplus (Spain) or balance (Ireland). In 2007, their debt ratios were well below the Maastricht threshold of 60 percent of GDP. They were supposed to be ready for bad times.

When bad times – really bad times – came, however, the buffer proved much too small. In the course of two years, from 2007 to 2009, Spain moved from a 2 percent of GDP surplus to an 11 percent deficit; Ireland went from balance to a 14 percent deficit. Worries about state solvency soon manifested themselves through higher borrowing costs and rising default premia. Under pressure from markets and European commitments, by 2010 governments started a consolidation process to bring deficits back to sustainable levels.

The 2009 recession was admittedly of centennial magnitude globally and its impact was magnified by the bursting of a real estate bubble in both Spain and Ireland. So it may be unfair to use this episode to assess the capability for stabilisation provided by Maastricht. Markets and governments, however, will for a long time live in the shadow of the experience of the first decade of the 2000s. When the next recession comes, the markets will be more concerned about solvency, and governments more eager to avoid entering the danger zone than they were in 2009.

States are furthermore much more vulnerable than they were a few years ago, when the public debt ratio was 40 percent in Spain and 25 percent in Ireland. According to the European Commission's latest forecast, of the 17 members of the euro area, six (Belgium, Ireland, Greece, Italy, Cyprus and Portugal) are expected to record public debt in excess of 100 percent of GDP in 2014 and two others (Spain and France) are expected to be above 90 percent. Until debt has been reduced to much lower levels, there will be limits to the degree of stabilisation that can be achieved through national budgets.

There is therefore a need to avoid the impairment of the stabilisation role of the national budget, or to substitute it if it cannot be repaired.

1. Study Group on the Role of Public Finance in European Integration (1977).

2. Committee for the Study of Economic and Monetary Union (1989).

3. See Emerson *et al* (1992), Buti and Sapir (1998).

How can this be done? In this paper we examine four options:

i   A federal euro-area budget (expected to be in the order of magnitude of 2 percent of GDP);
ii A support scheme based on deviations from potential output;
iii A scheme whereby governments would issue bonds indexed to GDP (debt as equity).
iv Quotas for the issuance of mutually guaranteed debt.

THE RATIONALE FOR AN INTEGRATED BUDGETARY FRAMEWORK

All federations have sizeable federal budgets[4]. Empirically, such budgets therefore appear to be a natural complement to areas with integrated monetary policies. The founders of Europe's monetary union discussed this question and eventually decided that in Europe, stabilisation policy could be exercised at the national level. Assuming that automatic stabilisers imply that a 1 percent GDP decline translates into a 0.5 percent of GDP budgetary shortfall, starting from balance, automatic stabilisers could fully react to a 6 percent decline in output before the 3 percent Maastricht deficit level was reached. It was judged that a 6 percent decline in GDP was very unlikely.

The violence of this crisis has shown the limits to this approach. When the crisis started in countries such as Spain and Greece, corporate and house-hold deleveraging took on huge proportions. Those two sectors increased their savings rates by 12 percentage points and more, leading to a collapse of GDP, income and government revenues. The fiscal accommodation had to be, and actually was, substantial, leading to clearly unsustainable deficits of well above 10 percent of GDP. Containing the deficit within the 3 percent limit would have led to a massive contraction.

The combination of high private debt and fast-rising public debt, major price adjustment needs and continued private deleveraging led to dramatic market reactions. The limits to purely national stabilisation policy became very visible as entire economies were priced out of the market. An old insight from the theory of fiscal federalism turned out to be true: regional stabilisation can become quite ineffective (Oates 1968).

The euro area has put in place a significant response to counteract and limit the damage from this massive deleveraging process and the heightened market pressure.

- First, a European Stability Mechanism (ESM) safety net was created. The main aim of the ESM is to provide access to finance in cases of acute market-financing difficulty. It is an important addition to the European policy architecture but does not provide support to countries still benefitting from market access. On the contrary, it may lead them to implement procyclical fiscal policies in order to avoid the stigma of conditional assistance.
- The second response was a very sizeable provisioning of liquidity by the European Central Bank. This helped to finance banks in the south of Europe, many of which were and still are shut out of the market. Abundant ECB liquidity has thereby helped prevent a major banking crisis and has reduced funding tensions. But ECB liquidity has in fact substituted private credit markets at a time when they were playing a major destabilising role. It has not tackled the absence of fiscal stabilisation.
- The third response was an agreement to form a banking union in order to break the vicious circle connecting banks and sovereigns. A functioning banking union would allow credit markets to act as stabilisers. However, it is not certain that the credit channel by itself can provide enough stabilisation[5].

Put differently, would a 'Maastricht+' construction consisting of an ESM, a fully fledged banking union, and tighter surveillance mechanisms to prevent macroeconomic imbalances provide a

4. For a more detailed description, see Wolff (2012).

5. Asdrubali *et al* (1996) find that credit market smoothing by US states decreases when the shock is more persistent.

'All federations have sizeable federal budgets. The founders of Europe's monetary union discussed this question and decided that in Europe, stabilisation policy could be exercised at the national level. The violence of this crisis has shown the limits to this approach.'

sufficient basis for a common monetary union? We believe it would suffer from a number of major shortcomings:

- While good surveillance mechanisms are very much desirable, the accumulation of large debts in the private sector cannot be excluded. Episodes of major private-sector deleveraging require temporary but significant fiscal responses. A banking union cannot fully compensate for such problems because private sector deleveraging can be distinct from banking-sector problems. Given recent history, governments are likely to be much more reluctant to embark on stabilising initiatives in the event of adverse shocks for fear of testing the limits of market forbearance.
- Maastricht+ would not solve a fundamental coordination problem. In case of a severe recession in the euro area as a whole, the fiscal policy reaction is likely to be insufficient because countries will attempt to free-ride on one another. The European response in 2009 was still relatively well coordinated, with Germany and Spain providing the largest discretionary fiscal stimuli. Yet the current downturn shows little coordination in terms of fiscal response. The easiest way of achieving an adequate fiscal response in the area as a whole would be to have an area-wide macroeconomic stabilisation instrument.
- A common resolution authority needs to be viable and credible. The example of the US authority responsible for resolving banks, the Federal Deposit Insurance Corporation (FDIC), shows that taxpayer support may not be necessary. Yet, the credibility and effectiveness of FDIC action crucially depends on the ultimate backing of the US treasury. The US treasury in turn is credible because it has access to tax resources and can borrow.
- The participating countries' debt and deficit levels are far higher than those that would be required for Maastricht+ to work. The increased contamination of the banking system with sovereign debt renders debt resolution options via restructuring even more difficult than five years ago.

For these reasons we believe that more significant steps towards euro-area fiscal integration need to be taken. Ultimately, a monetary union that is supposed to be stable requires risk-sharing mechanisms. Such mechanisms would allow large adverse business-cycle effects to be mitigated. As with normal insurance, such mechanisms are not needed for small incidents but rather for large and unexpected events. We are aware that such steps cannot be taken lightly. They create major incentives for bad policies at a national level and moral hazard issues run very deep. As with any form of insurance, strong measures need to be taken to prevent free-riding behaviour. In the case of Europe, this will ultimately require Treaty changes.

COMPARING THE FINANCIAL IMPLICATIONS OF DIFFERENT OPTIONS

A number of different approaches to fiscal stabilisation in the euro area have been proposed (Wolff, 2012). This section introduces selected options and compares them qualitatively. The most important points of comparison are economic effects, practical feasibility and political realism. A particularly important question is if the possible approaches actually solve the main identified problem, which is to provide insurance against major risks. In particular, four proposals are reviewed.

The **first approach** consists of a fully federal model in which both actual spending and revenues are shifted to the euro-area level. The basic idea is to shift those items that have a high elasticity to income to the federal level. In the Annex, we consider a system in which unemployment expenditure is transferred to the federal level. This expenditure is financed by introducing a federal corporate tax. Thereby, relatively strong stabilisers would be created.

The advantage of this scheme would be that stabilisation would result from the normal operation of a federal budget. There are two drawbacks. First, it is not easy to identify public goods that would be (a) common as opposed to national and (b) euro-area specific rather than common to all EU countries. Second, to be effective, a small budget would need to rely on highly elastic revenues, which at aggregate level would make it prone to significant shifts between

surplus and deficit. Finally, those goods that typically exhibit stabilisation functions, such as unemployment insurance, often reflect societal preferences and therefore do not qualify easily as euro-area public goods (Wolff, 2012).

The **second scheme** would consist of a relatively simple rule building on the current fiscal framework. Deviations of output from potential would trigger support payments. Ideally, those payments would only start in case of large output gaps. In our scheme, the transfers are based on absolute (not relative) deviations of output from potential. Since business cycles are correlated in the euro area, the capacity would need to borrow during recessions and would balance out only over the business cycle[6]. A scheme based on deviations from the euro-area output gap, which could achieve real-time budget balance, would be economically and politically more difficult as countries in recessions would borrow to provide support to countries in worse recessions.

The advantages of the scheme are that existing government spending and revenue structures could remain unaltered (no transfer of competence to a new federal institution would be required) and that its stabilisation power could be maximised for any given level of contributions. Moreover, payments would by definition be temporary, thereby avoiding undesirable continued dependence on funds. The drawbacks are that it would rely on technical assumptions about potential output and limited flexibility to adjust to specific types of crisis[7].

The **third scheme** has been proposed in the abstract (Borensztein and Mauro, 2004) but we have not encountered any application to the euro area. The idea would be to let sovereigns issue GDP-indexed bonds, the value of which would depend on the state of the economy. In the event of a recession, the value of these securities would decline, forcing holders to take a hit and provide the insurance function.

The elegance of this approach is that it starts from the recognition that sovereign liabilities are a more risky asset in a monetary union; hence, the requirement that some of them be issued in the form of equity. This would ultimately mean that fewer risk-free assets would be available for institutional investors. This would force substitution away from government debt in Europe towards other forms of investment including debt abroad and corporate bonds. The drawback is that financing of government debt will become more expensive. Also, stabilisation at country level would in fact come from the holding of debt by non-residents only (as wealth effects between government and private residents would not improve domestic stabilisation).

Instead of creating new stabilisation instruments, the logic of the **fourth option** is to rescue the Maastricht assignment by permitting states to borrow even in situations of stress. This would require the euro-area partners providing the lenders with a repayment guarantee. This approach is similar to the ESM financial assistance scheme, which starts from the recognition that market access can dry up, and which enables countries to borrow via the ESM at lower rates. The difference compared to the ESM would be that cheaper access could be given earlier without the stigma of a programme – akin to the IMF's flexible credit line. The proposed scheme could work in the following way: in normal times, sovereigns would issue, say, 20 percent of their GDP in the form of Eurobonds, so that there would be a liquid market for them. A second tranche of, say, 20 percent of GDP would be available with only light conditions and would be intended to serve as a buffer for states willing to borrow in times of stress before they have to apply to a fully-fledged ESM programme[8]. Access to the scheme would be guaranteed to states meeting a number of *ex-ante* criteria. The advantage of the scheme would be to build on the existing logic of the Maastricht Treaty and of that of conditional assistance. The drawback is the reliance on controversial Eurobonds.

Table 1 on the next page summarises the options.

SIMULATIONS

To assess quantitatively the economic impact of the different instruments and the ability of those instruments to provide insurance against major shocks, Table 2 on the next page presents the results of counterfactual thought experiments. It describes what would have been the result in

6. A natural way to pay the debt incurred in recessions would be to extract payments from countries with output above potential in good times.

7. A variant of this scheme is proposed and discussed in Wolff (2012).

8. A variant of such a scheme has been been proposed by Enderlein *et al* (2012).

Table 1: Features and properties of four stabilisation options				
	Euro-area budget	Automatic transfer scheme	Debt as equity	Guaranteed bonds quota
Principle	Automatic stabilisation role of federal budget	Transfers based on output gap	Part of debt issued in the form of GDP-indexed bonds	Right to issue jointly guaranteed bonds (several tranches with increased withdrawal of sovereignty)
Origin of stabilisation	Income transfer from partners	Income transfer from partners	Wealth transfer from (non-resident) bondholders	Borrowing capacity, mutualisation of default risk
Advantages	True budget	Maximises stabilisation power for any given symetric level of contributions	Recognises risky character of government debt	Builds on Maastricht logic that stabilisation is done nationally
Drawbacks	Difficulty to agree on euro-area public goods. Budget balance prone to volatility. Large variation in societal preferences over proposed federal budget items. Incentive effects.	Relies on technical potential output assumptions. Real-time estimate uncertainty.	Untested instrument, higher cost of borrowing for sovereigns, stabilisation comes from non-resident holdings only	Requires controversial Eurobonds

Source: Bruegel.

terms of debt-to-GDP ratios in Greece, Ireland Portugal and Spain if the respective schemes had been in place at the end of 2007. Obviously, such a counterfactual is fraught with major difficulties, such as GDP developments and political dynamics, which may have been dissimilar under different schemes. The simulations are deliberately simplified and take a mechanical approach by focusing in each of the four cases exclusively on the analysis of the proposed stabilisation tool. We do not try to create a comprehensive counterfactual macroeconomic scenario by incorporating fiscal response functions, changes in market confidence or other elements. We only estimate the support payments/government savings from each of the four schemes and subtract them from the actual debt-to-GDP ratio to yield our naïve counterfactual estimate. The assumptions of each scenario are explained in more detail in the Annex.

Table 2 documents the effect of the schemes on the debt-to-GDP ratio in the four economies. Clearly, the mechanisms would have implied very different debt dynamics. The *'southern country'* included in the table is a generic crisis country that has the average characteristics of the four countries studied. It can be used to compare different schemes on an aggregate level.

Before comparing the schemes, it must be strictly

noted that they are not calibrated to be commensurate. Some provide much more stabilisation than others because they involve higher transfers. At this stage we do not provide an evaluation of the relative effectiveness of the schemes for a similar amount of resources. Also, it must be noted that we do not provide a macroeconomic assessment. For example, we do not study the economic and financial effects of substituting GDP-indexed bonds to standard bonds in private portfolios. In part, such bonds will result in the transfer of volatility from the public sector to the private sector. Here, we only look at the public sector.

The different schemes have very different effects depending on the country in question. According

Table 2: Reduction in 2014 debt-to-GDP ratio (percentage points) based on different scenarios				
Country	Euro-area budget	Automatic transfer scheme	Debt as equity	Guaranteed bonds quota
Greece	-1.2	14.4	12	4.4
Ireland	11.1	2.6	5.3	3.1
Portugal	-0.5	4.4	4.3	3.2
Spain	10.6	6.2	5.3	2.4
Southern country	5.7	6.7	7.8	3.4

Source: Bruegel. Note: Simulations are based on simplified assumptions and only serve illustrative purposes. More research is required to make a detailed assessment. Positive numbers mean debt reduction, negative numbers a debt increase.

to the effects on the generic 'southern country', the federal budget, transfers based on the output gap and GDP indexing of bonds would have reduced debt levels in a comparable fashion. The federal borrowing quota would have had a smaller effect because of its limited scale. Here, the quota is not assumed to induce additional borrowing; it replaces some of the national borrowing at high rates by lower yielding federally guaranteed bonds.

However, on a country-level there is significant variation in the effects of each scheme. For Spain and Ireland, the federal budget has the biggest impact because their significant spending on unemployment would have been subtracted from the budget deficits because it would have become a federal responsibility. This measure can be misleading though. Because Spain has a more generous unemployment system than the euro-area average, the centralisation of the system would have led to lower transfers to Spanish residents suffering from unemployment. This would have reduced domestic demand and therefore offset part of the reduction in the debt-to-GDP ratio. On the other hand, countries such as Portugal and Greece that have less generous systems, and hence derive less budget benefits from moving this spending to the federal level, would have received a demand boost from federal transfers. Accounting for this demand effect tends to narrow the actual beneficial effects from the federal budget across countries.

We find that Greece would have benefitted significantly from transfers based on the output gap and GDP-linked bonds, because its output gap is assumed to be very sizeable (an average of -7.7 percent during 2008-14 according to AMECO), and its nominal GDP growth has fallen the most relative to expectations in 2008. Conversely, because Portugal's output gap is estimated to be smaller (average of -2.8 percent) and its growth has disappointed by less, it benefits less from the two schemes.

The different stabilisation mechanisms are not necessarily substitutes and they can indeed be considered as complements. A combination of them could have very significant stabilising effects.

CONCLUSIONS

This Policy Contribution has argued that an integrated European fiscal capacity would make the euro area more stable if it is constructed so that it can cover major risks. We have evaluated a number of recent proposals and have also proposed a new mechanism based on GDP-indexed bonds. Our conclusion is that euro-area fiscal schemes would have potentially significant stabilisation properties but also possibly significant distributional effects, as their impact on southern euro-area countries would be different.

This shows the difficulty of conceiving and supplementing a euro-area stabilisation mechanism. It would be advisable to pursue the evaluation of the issue further, so that workable options can be presented to European leaders.

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ANNEX

Simulations

A federal euro-area budget insuring countries against negative income shocks

In this section we assume the existence from the beginning of 2008 of a federal budget that would have provided unemployment benefits. Its revenues would have come from a federal corporate income tax.

Such a system would lead to inter-country transfers if labour market institutions were not harmonised. Figure 1 represents the differences in the generosity of the unemployment benefit systems in the euro area. The correlation between the unemployment rate and unemployment expenditure is far from perfect. For instance, Belgium has the highest expenditure on unemployment although its unemployment rate is below the euro-area average, reflecting a relatively generous system[9].

Figure 1: Unemployment rate and government expenditure on unemployment in 2010
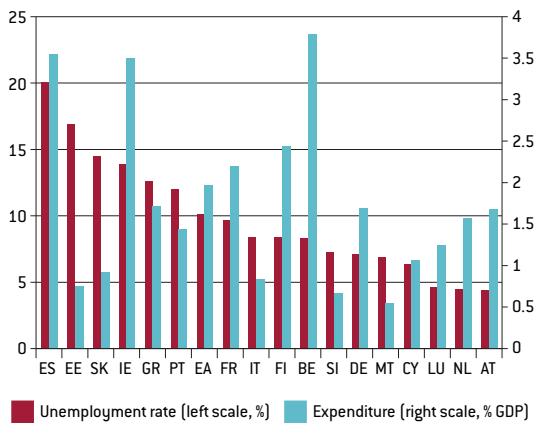
Source: Bruegel based on Eurostat.

To judge the magnitude of a federal budget, we studied the amount of total government expenditure on unemployment (Eurostat). The euro area spent 1.8 percent on unemployment mitigation on average from 2002-10. During the same period, corporate taxes averaged 2.7 percent of GDP. In order to balance revenue with expenditure on average we concluded that a federal budget would need a corporate tax that would provide revenues

equivalent to 1.8 percent of euro-area GDP over the business cycle.

By using AMECO data on corporate earnings[10], we find that the average corporate tax rate that would have generated 1.8 percent of GDP in income during 2002-10 is 12.6 percent. Hence, by multiplying the gross earnings of corporations by 12.6 percent, we yield the amount of federally collected corporate tax revenue[11].

To calculate the evolution of the debt-to-GDP ratio with a federal budget, we first subtract from the deficits of the four countries the lost revenue caused by moving part of the corporate tax revenue to the federal level. To compensate for this, the federal budget takes care of all the costs of unemployment benefits. Therefore the total effect on the budget is the sum of the lost revenue and the reduced spending. For example, the tax rate of 12.6 percent would have generated 1.9 percent of Irish GDP in revenues in 2010. In the same year, expenditure on unemployment in Ireland equalled 3.5%/GDP. Therefore, Ireland would have benefited from the scheme by $3.5 − 1.9 = 1.6\%/GDP$ in 2010[12].

We need to project government expenditure on unemployment because the series extends only until 2010. We estimate country-specific elasticities by estimating the following regression for each country separately.

$$\frac{unemployment\ expenditure}{GDP}_t =$$

$$\alpha + \beta \times unemployment\ rate_t + \epsilon_t, \quad t = 2002, ..., 2010$$

The elasticity (coefficient β) ranges from 0.08 for Portugal to 0.234 for Ireland. Ireland therefore has the most elastic system in which the GDP share of unemployment expenditure increases by 0.23 percent for every percentage point increase in the unemployment rate; Portugal has the least elastic system.

Figure 2 summarises the effects of a federal budget on the debt-to-GDP ratios of the four countries in 2014. We have added (as in the other schemes) a generic 'southern country' to facilitate the comparison of alternative schemes on an aggregate level. In all exercises, we assume that

9. For a more detailed analysis of the differences between labour market institutions and outcomes, see Wolff (2012).

10. We use the series 'Gross balance of primary income (UBGC)' to measure earnings subject to a corporate tax.

11. We therefore ignore the lags and elasticity frictions of the corporate income tax.

12. In this version, the federal corporate tax is fully offset by reducing national corporate taxes.

'southern country' had a debt-to-GDP ratio of 60 percent at the end of 2007. In this exercise, its corporate tax revenues are the average of the revenues of the four countries, as is its unemployment expenditure and elasticity. In addition to the cumulative effect in 2014, we provide time-series of the debt-to-GDP ratio at the end of the Annex.

Figure 2: Decline in debt-to-GDP ratio (percent-points) in 2014 as a result of the federal budget
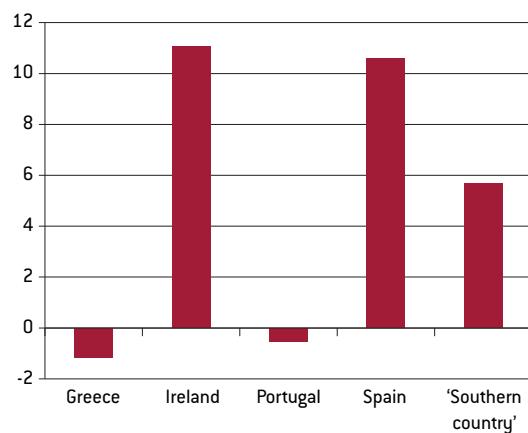
Source: Bruegel calculations.

Under the scheme, Spain would have lowered its debt-to-GDP ratio in 2014 by 10.6 percentage points but Portugal (and Greece) would have experienced virtually no change. The reason is that unemployment benefit expenditure in Portugal is at a low level (an average of 1.2 percent of GDP during 2002-10), which means that the reduced expenditure from eliminating this from the national budget is limited. Spain on the other hand has high unemployment expenditures both because of the relatively high generosity and high unemployment.

Figure 2 can, however, be misleading. It does not take into account the relative magnitude of the unemployment benefit transfers with and without the federal budget, which the residents in the four countries receive but which do not affect the debt-to-GDP ratio of the countries directly. Nevertheless they affect domestic demand. If a country would have spent more on unemployment alone than via the transfers it receives from the federal budget, domestic demand would have been reduced and this would have indirectly affected the debt-to-GDP ratio.

In order to analyse these indirect effects we study unemployment rates and unemployment expenditure in 2008, which is assumed to be the introduction year of the federal budget. Unemployment in the euro area was 7.6 percent and expenditure at 1.5 percent of GDP. To calculate the flow of transfers from the federal government, we assume that spending responds to deviations of the unemployment rate from the euro-area average by a common elasticity. We calculate the average elasticity of unemployment expenditure to the unemployment rate in the euro area during 2002-10. This is done in a panel regression setting including all 17 euro-area countries for 2002-10.

The regression is of the form:

$$\frac{unemployment\ expenditure}{GDP}_{i,t} = \alpha_i + \beta \times unemployment\ rate_{i,t} + \epsilon_{i,t},$$
$$i = 17\ euro\ area\ countries, t = 2002, \dots, 2010$$

The estimate for the β coefficient is 0.12, meaning that a one percentage point increase in the unemployment rate increases expenditure on unemployment by 0.12 percent of GDP. The coefficients α_i account for the country-specific fixed effects. The R^2 of the regression is 0.59. With the calculated elasticity and unemployment rate projections (AMECO) we are able to forecast the evolution of unemployment expenditure from the common scheme.

For instance, in Portugal unemployment in 2008 was 8.5 percent. Therefore it would have received federal transfers amounting to 1.5 + (8.5 − 7.6) * 0.12 = 1.6% of GDP in 2008. Because the actual spending on unemployment benefits in Portugal in 2010 was only 1 percent, the difference would have constituted a stimulus of 0.6 percent of GDP relative to what actually happened. On the other hand, under a common unemployment benefit scheme, Ireland would have received transfers of only 2.3 percent of GDP in 2010, whereas it actually spent 3.5 percent of its GDP on unemployment. Consequently the move to a common unemployment benefit system would have tightened the fiscal position in Ireland by 1.2 percent if some of the improvement in public finances (Figure 2) had not been used to counteract this.

An automatic transfer scheme based on deviations from potential output

Wolff (2012) has evaluated the need for a common euro-area budget and proposed different forms that this could take. One of these is the idea that the euro-area budget would provide insurance to countries based on deviations from potential output. If the output gap of a country would become more negative than a given threshold (x percent of GDP), the country would receive transfers worth y percent of that output gap. Because Wolff (2012) argues that the common budget would be used only for sizeable shocks that could not be taken care of nationally, we have here used x = -2%. So the insurance kicks in only if the (negative) output gap is more than 2 percent. Also, to limit moral hazard, the degree of insurance is set at less than unity, namely y = 25%. Consequently, if a country has an output gap of 3 percent, it will receive 3% * 25% = 0.75% of GDP as a transfer from the federation[13]. The above choices of x and y are only for the sake of simplification. In reality, any scheme would have to be phased to avoid a huge incentive to distort the numbers[14].

Given those assumptions, we calculate how the debt-to-GDP ratio of the four countries would have developed since the end of 2007. For debt and output we use data from the October 2012 World Economic Outlook, whereas for the output gap we use estimates from the European Commission, which would presumably be in charge of the calculations underlying the transfer payments.

In addition to the individual four countries, we also calculate the effect on a generic country called 'southern country', to be able to compare the different schemes (i)-(iv) on an aggregate level. The output gap and nominal GDP growth of 'southern country' is the average of the four countries.

According to Figure 3, most of the four countries have had an output gap greater than -2 percent since 2009. It is noteworthy that Ireland is assumed to reach potential output between 2013 and 2014.

By summing up the transfer payments in different years we can calculate by how much the scheme

would have reduced debt-to-GDP ratios in the four countries by 2014 (Figure 4).

Figure 3: Output gap estimates (percent of GDP)
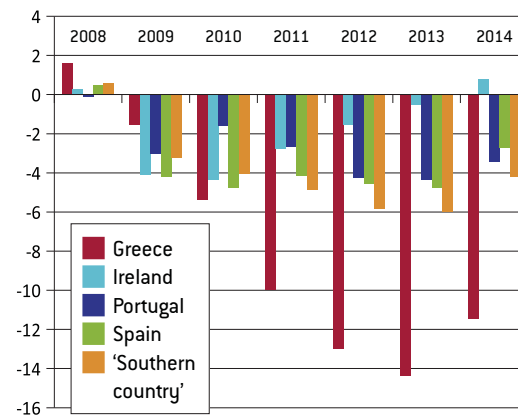
Source: Bruegel based on AMECO.

Figure 4: Decline in debt-to-GDP ratio (percentage points) in 2014 as a result of output gap based transfers
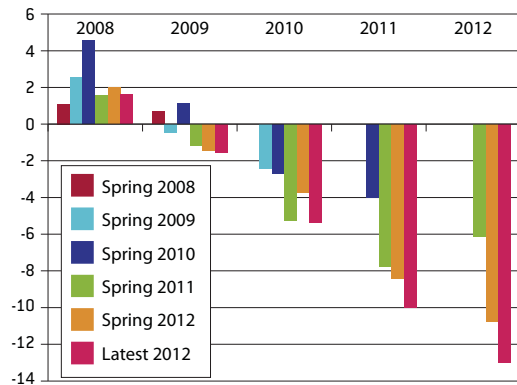

Source: Bruegel.

Greece and Spain would have benefited from the insurance scheme most, cutting their debt-to-GDP ratios by 14.4 and 6.2 percentage points respectively by 2014. Ireland and Portugal would have benefited less (2.6 and 4.4 percentage points respectively), simply because their output gap estimates are not as negative. The generic 'southern country' would have reduced its debt-to-GDP ratio 6.7 percentage points (close to the four country average of 6.9 percentage points). In the calculations it is implicitly assumed that all the transfers from the federal level are used to reduce debt and not to run a looser fiscal policy.

13. The scheme could be structured also so that only shortfalls sufficiently above the euro-area output gap would be compensated for (Italianer & Pisani-Ferry 1992). The two schemes have different implications for the overall budget position of the euro area, with our choice being more countercyclical.

14. This is because under the above scheme a country with an output gap of 1.9 percent would receive no support, whereas a country with an output gap of 2 percent would receive 0.5 percent of its annual output as a transfer.

A severe problem with this type of a transfer scheme is the volatility of estimates of potential GDP. This can be observed by looking at previous European Commission estimates of the Greek output gap (Figure 5).

Figure 5: Evolution of European Commission estimates for Greek output gap (% of GDP)

Source: Bruegel based on AMECO.

The estimates for the Greek output gap have been revised downwards many times. Therefore, the actual transfers would have been considerably smaller if they had been based on initial output-gap estimates. Consequently, any transfer scheme based on output gaps should have clear rules concerning the revision of estimates and whether this should result in ex-post corrections to transfer payments.

GDP-linked bonds

The idea of indexing bonds to GDP as an insurance against disappointing growth has been proposed for instance by Borensztein and Mauro (2004).

Our counterfactual scenario is the following: prior to 2008, countries issued long-term bonds (maturity 10 years) up to 30 percent of GDP. It is assumed that countries can only issue indexed debt up to a limit, because investors fear that high debt levels make countries prone to crises. Because Ireland and Spain had issued less than 30 percent of GDP of long-term bonds at the end of 2007, all their long-term bonds are assumed to be indexed. The generic southern country is assumed to have issued bonds up to the 30 percent limit. However, the additional borrowing from

2008 onwards is assumed to be non-indexed. This is due to investors being averse to buying indexed bonds at the beginning of a downturn.

The face value of the bonds evolves according to deviations of nominal output from its baseline path, which can be thought to have been agreed between the issuing country and investors. The base year is 2007. From then on the baseline growth is equal to the projected nominal output growth in the April 2008 World Economic Outlook. The formula for the face value of the indexed bonds is:

$$D_t = D \times \frac{Y_t}{Y_t^b} \, ,$$

where D_t is the amount of outstanding debt; D is the amount originally lent and also the face value to be repaid if growth is equal to baseline; Y_t is the level of nominal GDP at time t; and Y_t^b is the level of baseline nominal GDP at that time. Figure 6 represents the dramatic shortfall in Greek nominal GDP relative to the baseline.

Figure 6: Greece baseline (April 2008 WEO) and actual nominal GDP (October 2012 WEO), €bns
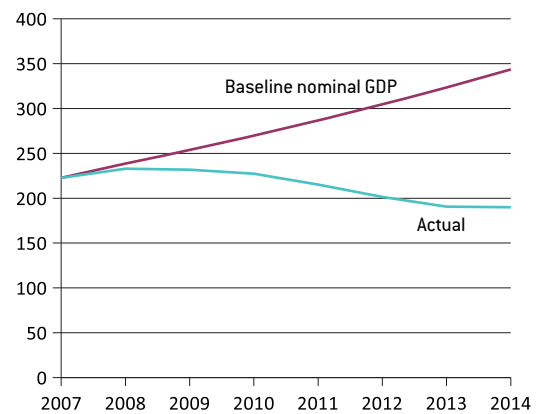
Source: Bruegel based on WEO April 2008 (baseline) and WEO October 2012 (actual).

Additionally it is assumed that the indexed bonds pay a risk premium of 1.5 percent on top of the interest rate on normal bonds to compensate for increased variance of returns. The figure is admittedly arbitrary. However, as Borensztein and Mauro argue, risk premia on GDP-linked bonds should not be excessive because there is sufficient variation in GDP-growth rates across countries. According to the Capital Asset Pricing Model (CAPM), the premium should reflect only

undiversifiable risk.

The counterfactual debt-to-GDP ratio is calculated by taking the difference between the face value of the indexed bonds and those of regular bonds accounting for the higher interest rate paid on the indexed bonds. This amount is then added to the actual debt-to-GDP ratio giving the counterfactual ratio. Output data is from IMF WEO[15] and the baseline interest rate (equal to the interest rate on standard bonds) is the European Commission estimate of the average interest rate of government debt in 2008. Finally, the outstanding amount of long-term bonds at the end of 2007 is from Eurostat.

Figure 7 represents the decline in debt-to-GDP ratios in 2014 if the four countries had issued indexed debt.

Figure 7: Decline in debt-to-GDP ratio (percentage points) in 2014 as a result of the issuance of indexed bonds
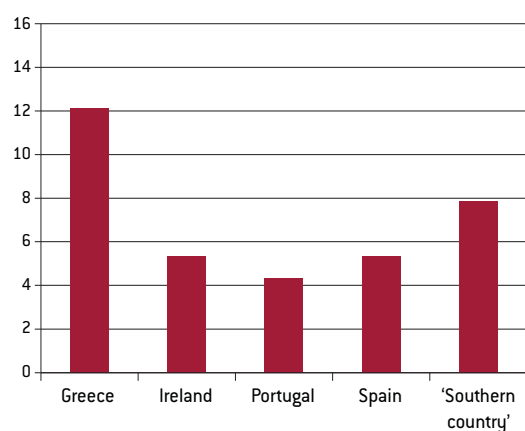
Source: Bruegel.

From Figure 7 it can be seen that Greece (12.1 percentage points of GDP reduction) would have benefited much more from such of a scheme than the other three countries (average: 5.0 percentage points of GDP). This has two explanations: first, Greece started the crisis with high debt levels (and consequently with high indexed debt), whereas the build-up of debt in other countries occurred only after the crisis. Second, the GDP shortfall from baseline was the most dramatic in Greece. The 'southern country' would have benefited by 7.8 percentage points. As with alternative schemes, the calculations do not try to incorporate any

output effects caused by the reduced debt levels.

To provide some sensitivity analysis, Table 3 provides estimates of debt reduction based on different risk premia. Even a risk premium of 3.5 percent would have generated positive debt reduction in all four countries.

Table 3: Sensitivity of decline in debt-to-GDP ratio (percentage points) in 2014 to risk premium

Country/risk premium	1%	1.5%	2.5%	3.5%
Greece	13.3	12.0	9.6	7.1
Ireland	6.0	5.3	4.0	2.7
Portugal	5.4	4.3	2.2	0.1
Spain	6.2	5.3	3.5	1.7
Southern country	8.9	7.8	5.6	3.4

Source: Bruegel.

A European Debt Agency (EDA) in line with the Padoa-Schioppa group proposal (Enderlein et al, 2012)

The fourth scenario does not allow for an easy counterfactual simulation. Presumably all countries would have entered the crisis with 20 percent of GDP in common federal debt, which would have decreased slightly the interest payments and consequently the debt levels of crisis countries.

The average interest rate of general government debt in 2008 was 4.3 percent in Germany, 4.9 percent in Greece, 5.1 percent in Ireland, 4.6 percent in Spain, and 4.5 percent in Portugal (AMECO). If we imagine that the four countries would have borrowed up to 20 percent of GDP before 2008 with the German interest rate (through federal borrowing), the yearly gain in lower interest rate payments would have been (5.1% - 4.3%) * 20% = 0.16% of 2008 GDP for Ireland, and somewhat lower for the others. To calculate the cumulated amount of savings up to 2014 we assume that the legacy debt has a residual maturity of over six years, so that it is not redeemed before then.

Countries facing a surge in their borrowing costs after the financial crisis would have issued another 20 percent of GDP in federal debt subject to soft conditionality. In our simulation we assume that the countries would have started issuing common debt after their spread on 10 year bonds

relative to German y breached 2 percent. This would have happened to Greece in December 2008, to Ireland in January 2009, to Portugal in May 2010 and to Spain in June 2010.

Figure 8: Spreads of 10 year bonds over Bunds
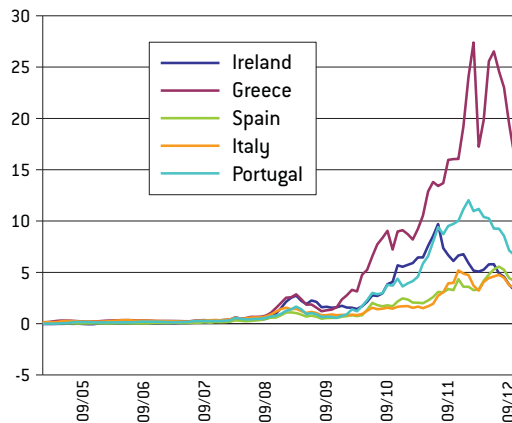
Source: Bruegel based on Eurostat.

To determine the amount of interest savings, we study how long it would have taken to issue (in gross terms) 20 percent of GDP in bonds by each country after their cut-off point (ECB data)[16]. We calculate the average spread over that period relative to German Bunds, which we assume to represent the interest saving achieved through federal borrowing. For the 'southern country' the yearly savings from the second 20 percent of GDP of federal borrowing are assumed to be 20 percent multiplied by the average spread of the four countries.

Figure 9: Decline in debt-to-GDP ratio (percentage points) in 2014 as a result of federal borrowing quotas
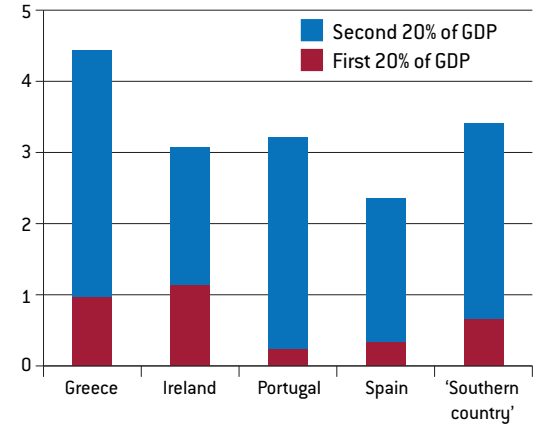
Source: Bruegel.

According to Figure 9, the savings range from 4.4 percentage points of GDP for Greece to 2.4 percentage points for Spain. Most of the benefits come from being able to borrow at lower rates during crisis times (the second 20 percent) to avoid paying an elevated spread. In net present value terms the savings are even bigger because Figure 9 does not take into account the savings on interest payments after 2014.

Figure 10: Time series of the evolution of debt-to-GDP ratios according to different schemes
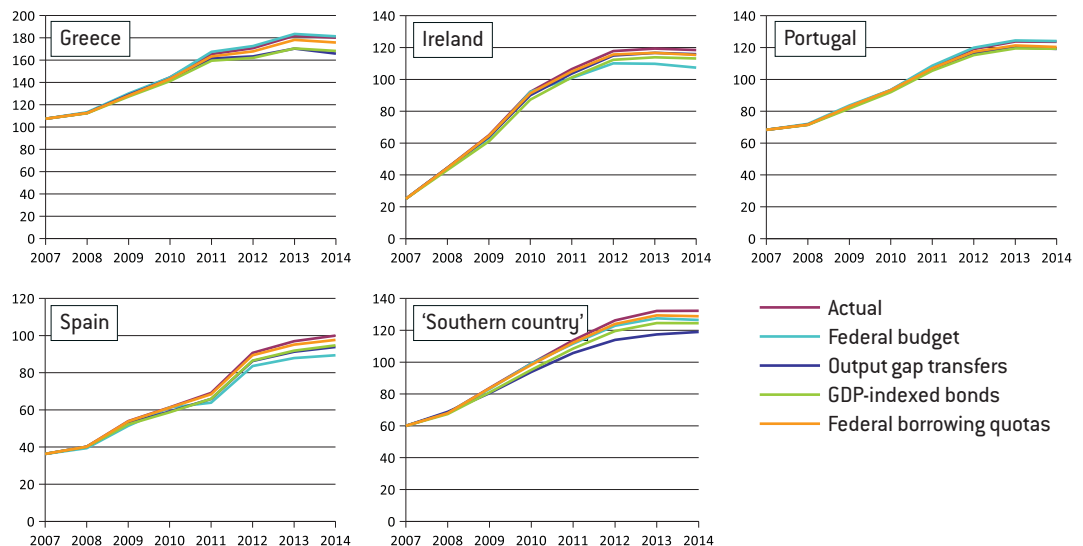
16. Portugal did not have the time to issue up to 20 percent of GDP in bonds between their cut-off date and their rescue package. Nevertheless, we calculate the amount of savings as if they would have, because the rescue date is presumably endogenous.

Source: Bruegel.