Fiscal Policy in the Euro Area Crisis and its impact on growth

Jan in 't Veld
DG ECFIN, European Commission *

October 2012

1. Introduction

The fiscal stance has tightened significantly in most member states of the European Union and this is projected to continue in the following years. The need to bring down high public debt ratios to prudent levels in most Member States, together with persistent tensions in sovereign debt markets, in particular in highly-indebted EU countries, imply that fiscal consolidation remains the only viable strategy to support long run economic stability. However, the ongoing consolidation measures are being implemented in an especially difficult macroeconomic context, with deteriorating growth prospects, a sizeable share of credit-constrained households and interest rates close to the zero lower bound. In these conditions the costs of fiscal consolidations are higher now than they would be in 'normal' times. This is why it is important to thoroughly evaluate the likely adverse effects of a fiscal tightening on growth. It also means it is essential to design measures in such a way that negative growth effects are minimised. In the end, the sustainability of public finance ultimately rests on both prudent fiscal policy and good prospects for growth.

This paper gives an overview of model-based analyses of fiscal policy in the current crisis undertaken with different versions of the European Commission's QUEST model. The QUEST model is a structural New Keynesian macroeconomic model with a detailed fiscal block, which makes it particularly suitable for the analysis of fiscal policy shocks. The paper starts with a brief overview of fiscal developments since the beginning of the crisis. This is followed by a discussion of fiscal multipliers for different policy instruments in the model. The following section describes empirical evidence from estimated models and assesses how much fiscal policy shocks contributed to GDP growth. The question is what the appropriate counterfactual is to which one should compare the costs of consolidations, and section 5 assesses the costs of rising sovereign risk premia. The final section discusses how fiscal consolidations can be designed in a more growth-friendly way, by combining fiscal retrenchment with tax reforms which shift the burden from taxes on labour towards other sources like consumption.

- - - -

2. Fiscal developments in the Euro area

Since the onset of the financial crisis, there has been a dramatic deterioration in public finances in the EU (see Fig. 2.1-4). Part of this was cyclical and the consequence of the 'normal' operation of so-called automatic stabilisers. [1] This should reverse when the economy recovers, although the crisis has had ongoing negative effects on potential growth and this could put further pressure on public finances. The deterioration in underlying fiscal positions dates back to well before the crisis. In many countries, credit and asset price booms had led to improvements in fiscal positions in the years preceding the crisis, and this partly obscured the deterioration in underlying positions. The failure to fully account for the direct and indirect effects of strong asset prices on fiscal positions led to a distorted and overly optimistic assessment of the true fiscal stance in these 'good' years. When the bubble burst and the crisis unfolded, tax revenues fell sharply and the dramatic increase in budget deficits became apparent. Crisis-related stimulus measures also contributed to the deterioration in fiscal positions. Conventional stimulus measures under the common framework of the European Economic Recovery Plan (EERP) accounted for a relatively small share, around 1% in 2009 and 2010 each. These discretionary measures were called for as automatic stabilisers were considered insufficient to stem the collapse in demand. [2] Government support to banks, in the form of asset purchases and recapitalisations, accounted for a larger share, around 5% in total for the EU over the period 2009-10, and with a considerable dispersion across Member States.

The resulting rise in government debt has led to concerns about the long-run sustainability of, in particular, peripheral European countries' public debt. Sovereign bond spreads in the most vulnerable countries have risen sharply (Fig.2.5). [3] With a weakened banking sector and cross contagion of bank and sovereign debt, the risk premium has not been confined to sovereign debt, but also affected borrowing costs in the private sector. Interest rates on loans have risen in the most vulnerable countries, despite further cuts in the ECB policy rate, and interest rates that banks charge to non-financial corporations in Greece and Portugal are now 3-4 % higher than those in Germany (Fig.2.6). As the sovereign crisis spread, rates on loans in Spain, and Italy, have also diverged from German rates. This has underlined the urgency to deal with the sovereign debt crisis, and bring public finances back to a sustainable path.

---

[1] While the actual deficit in the euro area deteriorated from 0.7% in 2007 to 6.2 % in 2010, the cyclically adjusted deficit increased from 1.9 to 5% over those years.

[2] In 't Veld, Larch and Vandeweyer (2012) estimate the output smoothing provided by automatic stabilisers to be around 0.13-0.27 depending on the benchmark used.

[3] As spreads on sovereign interest rates increased, large financial assistance packages from the European Union and the IMF were negotiated for the most severely affected euro area countries. In parallel, a permanent mechanism, the European Stability Mechanism (ESM), has been created to provide assistance to euro area Member States in the future.

Figure 2.1 Net borrowing general government (% of GDP))
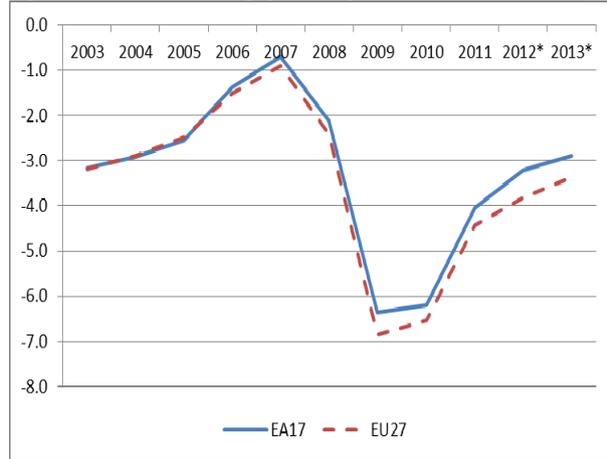
Figure 2.2 Gross debt general government (% of GDP)
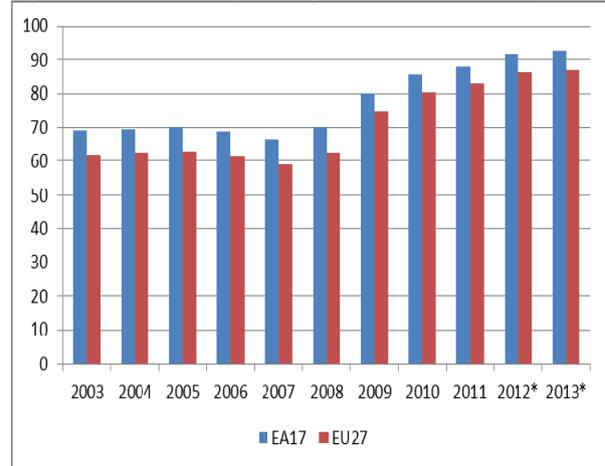
Figure 2.3 Net borrowing selected MS (% of GDP))
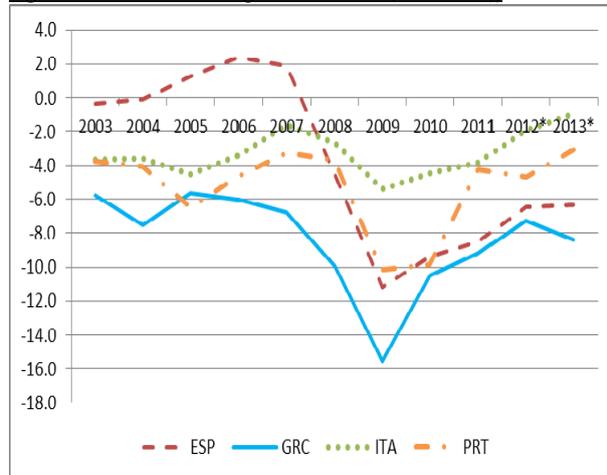
Figure 2.4 Gross debt general government (% of GDP)
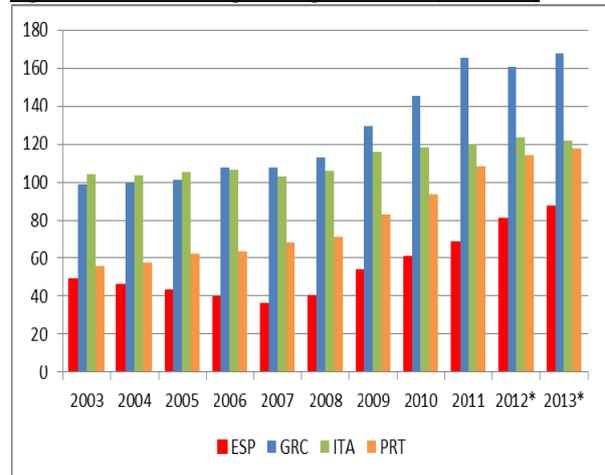
Source: Ameco

Figure 2.5: Sovereign bond spreads- selected MS (10y yield spreads to the German Bund)
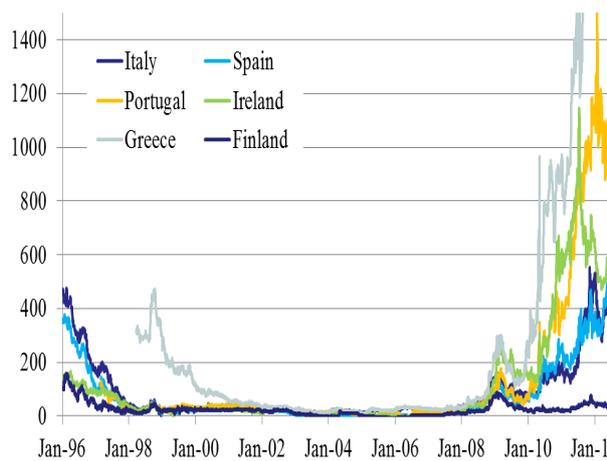
Figure 2.6 MFI interest rates on loans to NFC (all maturities)
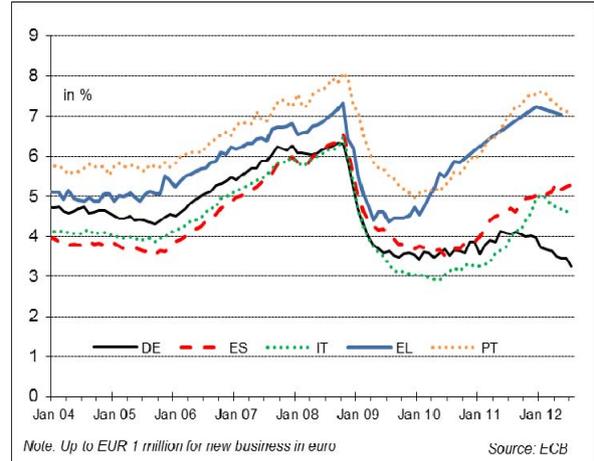
Note. Up to EUR 1 million for new business in euro

Source: ECB

3. Fiscal policy in the QUEST model

3.1 Fiscal multipliers

The GDP effect of fiscal policy depends on the instrument used and on many other factors. Fiscal multipliers are likely to be larger in times of crisis than in 'normal' times. Two factors that increase the effects of fiscal policy are, first, the rise in the number of financially constrained households in the economy and, second, the fact that interest rates are constrained by the zero lower bound (see e.g. Christiano *et al*., 2011, Woodford, 2010, Davig and Leeper. 2011 and Coenen *et al*., 2012). That multipliers are larger for spending shocks and targeted transfers, and higher in the presence of credit-constrained households and at the zero interest rate floor, is a robust finding in macroeconomic models, as results from a model comparison exercise of various structural models used by policymaking institutions showed (Coenen *et al*., 2012). There is considerable agreement across models on both the absolute and relative sizes of different types of fiscal multipliers.

Generally, the fiscal multiplier is found to be larger 1) for direct government spending and targeted transfers (as opposed to tax cuts and general transfers) ; 2) if the share of liquidity-constrained (or 'rule of thumb') and/or credit-constrained consumers is larger; 3) if nominal interest rates are invariant, either because they are constrained at their zero lower bound or because the country is a small member in a monetary union (this effect is reinforced by the presence of credit-constrained households and also stronger in case of a more persistent shock as long as nominal interest rates remain constant); 4) if economies are less open (unless the fiscal shocks are synchronised across trading partners); 5) if the fiscal shock is temporary rather than permanent.

Table 2.1 gives a general overview of fiscal multipliers for *temporary* one year stimulus measures in the EU in the European Commission's QUEST model (for details on the model, see annex). The multipliers reported in this table are for the EU as an aggregate region, temporary fiscal stimulus, one year shocks of 1% of baseline GDP. It shows in the first column fiscal instruments in a model with only 30% liquidity constrained households, what could be described as 'normal times'. The second column gives the GDP effect in a model in which an additional 30% of households are credit-constrained, and in the third column it adds the zero interest rate floor (current crisis conditions).

As mentioned above, GDP effects are larger for public spending shocks (government purchases and investment) than for tax reductions and transfers to households. The presence of credit-constrained agents raises fiscal multipliers significantly. The multiplier increases especially for those fiscal measures which increase current income of households directly, such as labour taxes and transfers. Credit constrained households not only have a higher marginal propensity to consume out of current income but their spending is also highly sensitive to changes in real interest rates. When fiscal stimulus is accommodated by monetary policy, as is the case at the zero lower bound, multipliers increase by even more. This is because the collateral constraint requires that spending must be adjusted to changes in interest payments. In other words, the interest rate exerts an income effect on spending of credit constrained households. There are also sizeable positive *spill-over effects* from fiscal stimuli. The effects of a global fiscal stimulus (as in the final three columns in the table) are larger than when the EU acts alone.

Table 3.1   Fiscal multipliers for transitory shocks:

	EU alone			Global stimulus		
	Without credit constraints	With credit constraints	With credit constraints and zero interest rate floor	Without credit constraints	With credit constraints	With credit constraints and zero interest rate floor
Investment subsidies	1.5	1.6	2.0	2.0	2.1	2.6
Government investment	0.9	0.9	1.1	1.0	1.1	1.2
Government purchases	0.8	0.8	1.0	0.9	1.0	1.2
Government wages	1.1	1.3	1.4	1.2	1.3	1.5
General transfers	0.2	0.4	0.5	0.2	0.5	0.6
Transfers targeted to credit-constrained hh.	-	0.7	0.9	-	0.8	1.0
Transfers targeted to liquidity-constrained hh.	0.7	0.7	0.9	0.8	0.9	1.1
Labour tax	0.2	0.4	0.6	0.3	0.5	0.6
Consumption tax	0.4	0.5	0.7	0.5	0.6	0.8
Property tax	0.0	0.1	0.2	0.0	0.2	0.2
Corporate income tax	0.0	0.0	0.0	0.0	0.0	0.1

Note: First year impact on EU GDP (% diff. from baseline) for a temporary one year fiscal stimulus of 1% of baseline GDP.

Source: Roeger and in 't Veld (2010)

Another key aspect of fiscal policy in the crisis was massive government support for the banking system, e.g., in the form of purchases of bank assets and of bank recapitalisations by governments. In several countries, these "unconventional" fiscal interventions were larger than the changes in standard fiscal instruments during the crisis. In the EU, asset purchases and recapitalisations combined amounted to 5% of GDP in the crisis (Roeger and in 't Veld, 2012).

Government support to banks was an efficient means of stabilising the real economy. Multipliers are lower than for government consumption, but generally larger than for transfers to households (Roeger and in 't Veld (2012), Kollmann et al. (2012a,b)). State support to the banking sector has helped to stabilise in particular corporate investment, which was a component of aggregate demand most severely affected by the financial crisis. Section 4.1 below compares impulse responses for government consumption and government support to banks.

3.2 Permanent fiscal policy shocks

There is a key difference between temporary and permanent fiscal shocks. A permanent fiscal shock involves much higher tax changes in the medium and longer run. The associated negative wealth effects are much larger and have an impact on private agents spending plans. To illustrate the differences between permanent and temporary shocks, Figures 3.1 compares two scenarios of increases in spending. The first is the temporary one year increase in government purchases as described in the previous section, with monetary accommodation. The second scenario is a permanent increase in purchases, also of 1% of baseline GDP, accompanied by a permanent increase in government's deficit to GDP ratio by 1% point, with labour taxes adjusting to target this deficit increase. A permanent increase in the deficit to

GDP ratio of 1 percentage point implies in the long run an increase in the debt to GDP ratio of more than 20 percentage points, given model assumptions on nominal growth rates in the steady state. In case agents believe the fiscal expansion is permanent, they will anticipate future increases in taxes to service this increase in debt. This increase in the present discounted value of taxes will lead to a desire to increase savings and agents will respond by reducing their consumption. Private consumption and corporate investment decline and GDP falls in the medium term below baseline and is more than 0.4 percent below baseline in the long run. This comparison highlights the importance of credibility of the temporary nature of the fiscal stimulus. If agents were to perceive the measures as permanent, the GDP multiplier would be smaller and become negative in the medium to long term.

Figure 3.1: Temporary vs. permanent increase government purchases

GDP: Consumption: aggregate
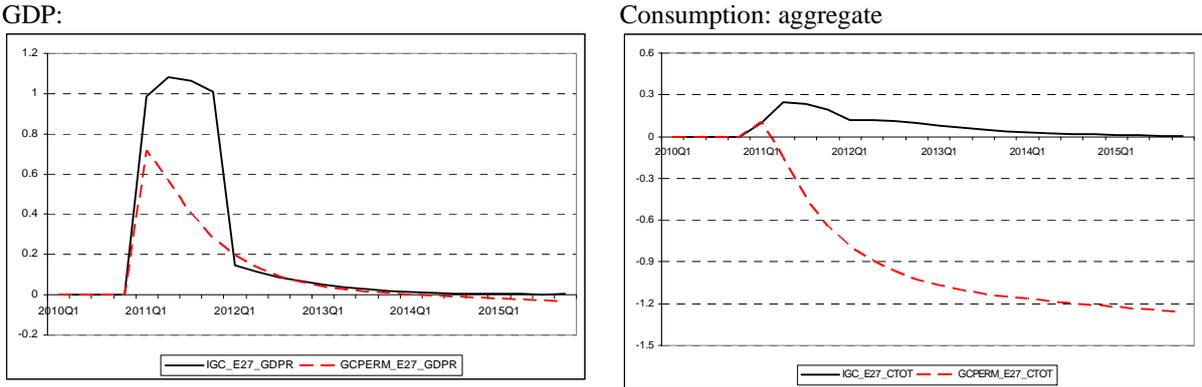
Note: Solid line: temporary 1 year increase in government purchases 1% of baseline GDP. Dashed line: permanent increase of 1% of baseline GDP (accompanied by permanent increase in government's deficit to GDP ratio by 1%p, labour taxes adjusting to target deficit increase).

This asymmetry in multipliers between temporary fiscal stimulus and those of a permanent fiscal consolidation indicates the GDP impact of credible permanent fiscal consolidations may be smaller than results reported from temporary shocks would suggest. Secondly, GDP effects become positive in the medium run as fiscal positions improve and the reduction in interest burden frees up budgetary space that can be used to reduce distortionary taxes.

This section explores the macroeconomic effects of permanent consolidations in the QUEST model. First, permanent changes in individual revenue and expenditure instruments are considered separately to highlight their different impacts on the economy. Then for general 'across-the-board' fiscal consolidation, with measures equally distributed over expenditure and revenue side, the effects are compared under different circumstances. First a fully credible scenario is compared to an alternative where credibility is lacking and agents do initially not believe consolidation measures are permanent. Under such 'learning' conditions, the effects of consolidations are significantly larger. Second, the effect of the zero interest rate floor is considered and third, the effects in case of a synchronised global consolidation. The multiplier for these balanced-composition consolidations depends crucially on the circumstances under which it is undertaken.[4]

---

[4] This section draws on the Chapter on fiscal consolidations in European Commission (2010).

3.2.1 By expenditure and revenue instrument

The impact of fiscal consolidations depends crucially on its composition. Graph 3.2 shows the effects for individual revenue and expenditure instruments. Scenarios are presented as standardised reductions in the ex-ante government deficit-to-GDP ratio by 1 pp. In each scenario this is achieved by an adjustment in the respective instrument that equals ex-ante 1% of (baseline) GDP. [5] With the gradual de-cumulation of government debt lower interest payments create space for reductions in labour taxes, and this raises employment and boosts GDP in the medium and long run. Note that these first scenarios assume full credibility and monetary policy supportive by reducing interest rates. The effects of consolidations under the zero interest rate floor are discussed in the following section

Expenditure measures

On the expenditure side, the main difference is between productive and unproductive spending. Government *investment* has a productivity-raising effect and a permanent reduction leads to the largest GDP losses, both in the short and long run. *Transfers* are unproductive in the model and only serve distributional purposes. Reducing such transfers - and lowering distortionary labour taxes in the medium/long run - leads rapidly to positive output effects in the model. However, cuts in transfers hit proportionally more those constrained 'rule of thumb' households who are more dependent on such transfers and have limited access to financial markets. Consumption of those households declines sharply. Government *purchase*s have no productivity-raising effect in the model and a reduction in this instrument has only a short-term negative GDP effect when it is compensated by cuts in labour taxes in the medium/long run. Lowering *government wages* however has a direct impact on aggregate GDP as defined in the national accounts.[6] Public sector wage cuts put downward pressure on wages in the private sector (spillover) and the reduction in incomes leads to a fall in consumption. This again particularly hits constrained households who depend on current disposable income for their consumption expenditure and their consumption falls. Lower wages in the private sector help to boost competitiveness though and this, as well as expectations of lower future taxes, raises employment. These effects gradually increase value added in the private sector and more than offset the reduction in the public sector in aggregate GDP.

Revenue measures

Raising taxes has generally negative short and long term output effects, but in these scenarios tax increases are compensated in the long run by reductions in labour taxes as the debt burden declines. Thus the scenarios show the dynamic adjustment to partial tax shifts away from labour taxes, to the extent that this is made possible by lower debt in the steady state.

---

[5] At first consolidations in the EU only are considered. The model assumes a continuing relevance of credit constraints in the economy. The labour tax rule that stabilises debt in the model is turned off in the first 15 years and then targets a 25 pps. lower debt-to-GDP ratio, consistent with a 1% of GDP permanent reduction in the government deficit and the assumptions on nominal growth rates in the model. The sovereign risk premium declines by 75 bps. in the long run.

[6] As output of general government is valued at costs, a government wage cut implies a decrease of value-added and GDP, not only in nominal terms, but, in the absence of other productivity measures for government services, also in volume terms. This is a pure accounting effect on the definition of GDP and does not in itself reflect any reduction in government services. Using alternative productivity measures can partly overcome this problem, but these have not yet been widely implemented.

Fig 3.2 Permanent fiscal consolidations (reduction deficit to GDP ratio 1%p)

Reduction government purchases:	Reduction government investment:
Reduction government wages:	Reduction government transfers:
Increase consumption taxes:	Increase labour taxes:
Increase property taxes:	Increase corporate profit taxes:
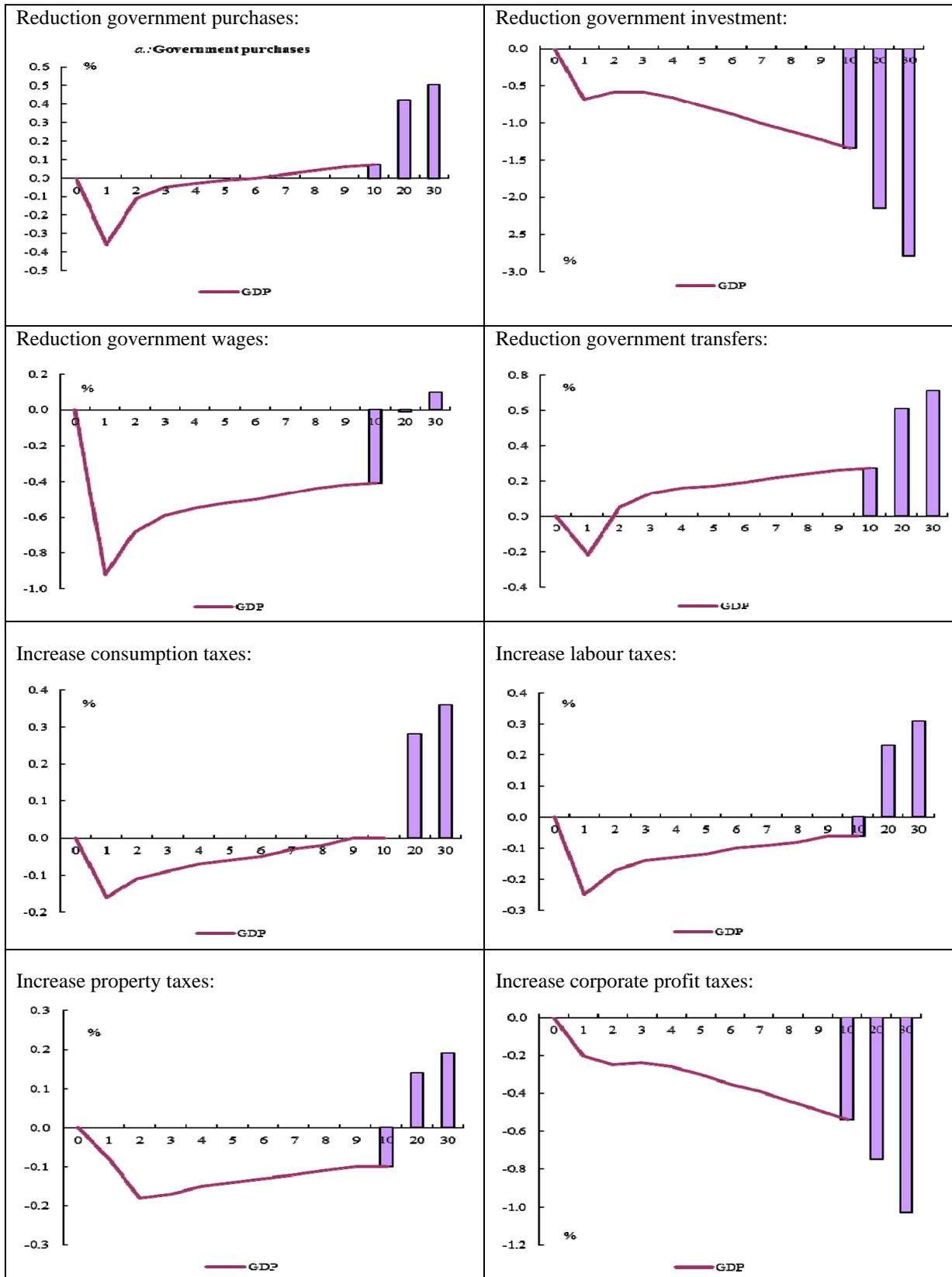
Short term effects of tax increases depend partly on adjustment costs in capital and labour. An increase in *corporate profit tax* may, with relatively high adjustment costs on capital, only have a relatively small short term impact but GDP losses build up over following years as investment is depressed and the capital stock declines. It generates the largest long run GDP loss of all tax-based consolidations. A consolidation through *labour taxes* also yields an initial GDP loss. In the long run, however, labour taxes can be reduced due to the fiscal space that becomes available as a result of the reduction in government debt, and GDP eventually turns positive. Taxes on *consumption* and *housing property* are less distortionary in the model. Increasing these taxes, compensated by future reductions in labour taxes, yields smaller short term negative impacts, with GDP falling by around 0.2% below base. Output gradually recovers and in the long run there are positive output gains. Property taxes have a more negative impact on GDP as defined in the model due to the decline in the housing stock, and hence housing services.

Tax increases also have different distributional consequences. Increases in labour taxes hit proportionally more consumption of constrained 'rule of thumb' households. Increases in consumption taxes affect all households, but constrained households are not able to smooth their consumption in anticipation of lower future taxes and are more affected. Property taxes reduce residential investment of credit-constrained and unconstrained households and lead to a permanently lower housing stock. GDP as defined in national accounts falls, as output of services of owner-occupied dwellings declines. In the medium to long run this is offset by an increase in production due to the reduction in labour taxes.

3.2.2 Balanced-composition consolidation scenario

The previous section looked at individual instruments, this section describes the macroeconomic effects and the dynamic adjustment to an across-the-board consolidation, through an adjustment in spending and taxes, roughly proportionally to their respective shares in the government budget. [7] The combined reduction in spending and increase in taxes lowers output on impact, by approximately 0.3% in the first year (Fig. 3.3). It leads to a gradual decline in the stock of debt, and the costs of servicing this debt also fall. The additional fiscal space that this creates is used to gradually reduce labour income taxes, offsetting the initial increase in taxes that was part of the consolidation package. In the long run, labour taxes are lower than in the no-consolidation baseline, and this boost employment and output.

Consumption declines in the short run as incomes are lower because of cuts in public sector wages (which also puts downward pressure on private sector wages), public sector employment and transfers. Higher taxes on labour income (in the short run) and taxes on consumption further depress consumption spending. But while employment initially declines, lower wages gradually stimulate employment growth in the private sector as competitiveness improves, and consumption also gradually recovers. The current account improves as imports decline due to lower domestic demand and exports increase.

---

[7] On the expenditure side cuts in transfers of 0.15% of (baseline) GDP, government wages of 0.1%, government employment of 0.1%, government purchases of 0.1% and in government investment of 0.05 %, and on the revenue side increases of 0.2% of GDP in labour taxes and VAT each, and 0.05% in corporate profit taxes and house property taxes. After 15 years a tax rule on labour taxes is gradually switched on which stabilises the debt-to-GDP ratio at a level 25 pps lower in the long run, similar as described above. The sovereign risk premium declines by 75 bps. in the long run. .

Consolidations when lacking credibility

The scenarios shown here assume the measures are part of a credible permanent consolidation plan, which is believed by agents to permanently reduce government debt and leads to anticipations of a lower tax burden in the future. Consolidation measures that lack this credibility have more detrimental effects. The impact multipliers of permanent government spending shocks shown in the previous section lie between 0.2 and 0.8, while for temporary fiscal contractions the range is between 0.8 and 1.2 and even larger when monetary policy is constrained by the zero interest rate floor. The second scenario, shown in Figure 3.3, assumes that the consolidation measures lack credibility in the first two years and are instead perceived as temporary. Only after the second year do the measures gain credibility and agents start to believe the consolidation is permanent. This initial credibility gap, with agents only gradually learning, leads to GDP losses in the first two years that are more than twice as large, while the long term positive effects are delayed till later. [8] This indicates the importance of designing fully credible consolidation measures. Consolidations that are not perceived as permanent but expected to be reversed at a later stage may have significantly larger output and employment costs. As a consequence, enacting legislation or changes in legislation that will take effect even several years down the road could be very useful to maximise the benefits from often painful reforms.

Figure 3.3: Across-the-board expenditure- and revenue-based consolidation of 1% of GDP

---
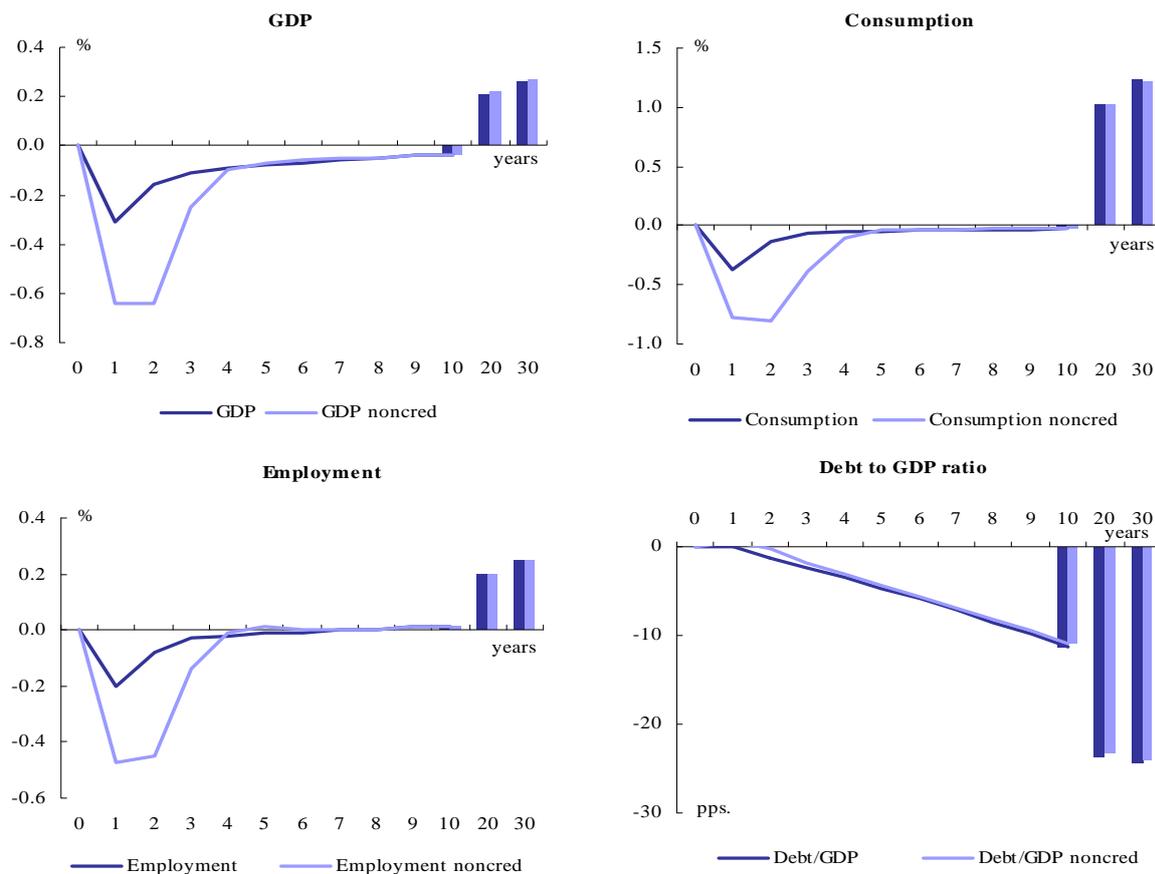
[8] A multiplier of 0.7 is roughly the average of fiscal multipliers of temporary shocks in spending and tax components.

Consolidation when interest rates are near zero interest rate floor

The above scenario assumes monetary policy can operate in normal fashion, and central banks cut interest rates in response to negative output and inflation gaps. However, at present policy rates in the euro area and in many other economies are near the zero interest rate floor. If monetary policy is constrained by this zero lower bound for nominal interest rates the impact on GDP can be larger. The left hand panel of Graph 3.4 illustrates this for the same across-the-board consolidation package as described above, when policy rates are near the zero lower bound. [9] The GDP impact in the first year rises from 0.3 to 0.5. This indicates fiscal consolidations could be more painful in the short term when policy rates are near the zero interest rate floor.

Figure 3.4: Impact fiscal consolidations : zero interest rate floor and global synchronisation
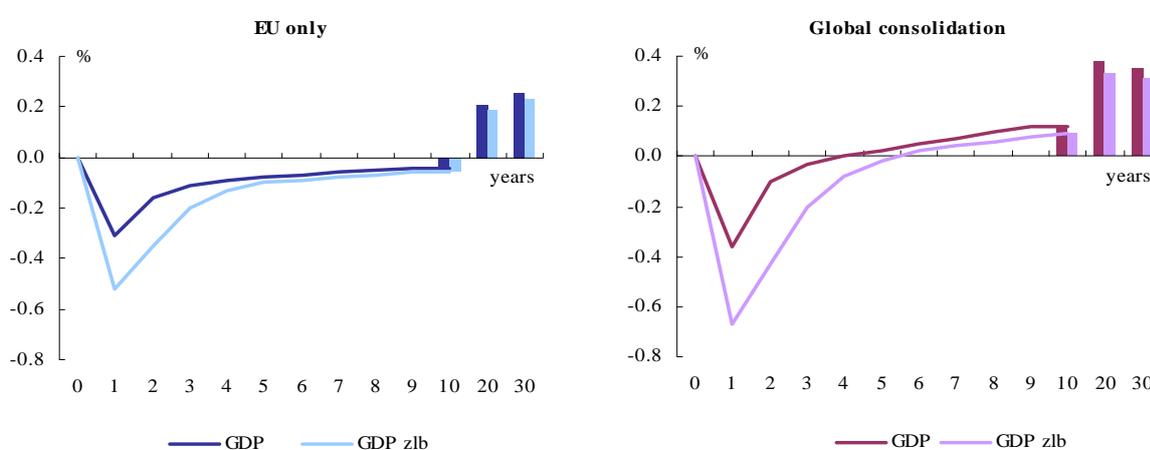
Consolidations when globally synchronised

The scenarios described above relate to consolidations in the European Union alone. However, at present many countries around the world face the need to consolidate and are embarking on a simultaneous fiscal retrenchment. The negative spillover effects of this could further raise the costs of fiscal retrenchments. The right hand panel in Graph 3.4 illustrates this. The GDP impact of the same 1% of GDP consolidation rises in the first year from 0.3 to 0.4 in case not only the EU embarks on consolidation, but if this is done across the world (global consolidation). The effects become even larger when central banks are constrained by the zero interest rate floor. In this case the GDP impact rises from 0.5 to 0.7. The larger impact effect is due to two factors. First, the fiscal consolidation abroad reduces demand for EU exports and this has a negative impact on EU GDP. Second, in case of only the EU consolidating, the depreciation vis-à-vis the (non-consolidating) rest of the world can play a cushioning role in the short term. In case of a synchronised global consolidation, the absence of such a cushioning effect implies a larger short term GDP impact.

All these alternative scenarios show is impact of consolidations on GDP can be considerably larger in the current environment, when interest rates are constrained by the zero lower bound and consolidations are globally synchronised.

---

[9] In this scenario, the Taylor type interest rate reaction function is switched off for one year and gradually reactivated in following periods.

4. Empirical estimates of the impact of consolidations

Another way to assess the impact of fiscal policy on the real economy is to look at results from model estimates. This section summarises some results of estimated model variants of the QUEST model for the Euro area as aggregate zone, and for Spain and Portugal separately. It first discusses estimated impulse responses to shocks to government consumption and government support to banks, and then shows historical shock decompositions to analyse the contributions of individual shocks estimated by the model, including fiscal shocks, to GDP growth in the recent crisis.

4.1 Estimated impulse responses
Figure 4.1 shows estimated impulse responses from a model estimated on quarterly EA data over 1995Q1-2011Q4 (Kollmann et al, 2012). This model variant includes an entrepreneur who owns a bank and firms, and two type of workers (non-constrained and credit constrained) who have different rates of time preference. The bank acts as an intermediary between the patient worker and the impatient worker and faces a capital constraint (see annex). In this model, real government consumption, investment and transfers to workers track the total technology trend and respond to deviations of the public debt and deficit from long run targets for these variables. The top panel shows the estimated impulse response to an innovation to the government consumption rule, with 90% confidence bands. The estimated law of motion of government consumption is highly persistent--an innovation to the law of motion of government consumption worth 1% of steady state quarterly GDP raises government consumption by 1.3-1.4% of GDP in the first two years. The cumulative increase in government consumption amounts to 6.6% of annual GDP. GDP rises by 0.80% (0.64%) of GDP in year 1 (year 2), and employment too increase persistently. Consumption and investment fall by 0.04% and 1.60%, respectively in year 1. Private consumption remains depressed thereafter, while investment returns to its pre-shock value in year 2, and then rises above the unshocked paths in years 2-5 (due to the rise in employment which increases the marginal product of capital).[10] The GDP multiplier is 0.6 in year 1, a value in the lower range of multipliers for temporary spending shocks only lasting one or two years, but slightly larger than for fully credible permanent shocks.[11] It should be noted that these impulse responses are calculated under normal monetary policy responses, which leads to lower multipliers than when monetary policy is constrained by the zero lower bound.

The second panel shows the effects of government support for the bank. This is a one-off shock for one quarter only, but the effect of the bank rescue measure on the real economy is persistent: during the first (second) year, GDP rises by 0.1% (0.03%), while non-residential investment increases by 0.58% (0.27%) over the same horizon. [12] The cumulative GDP multiplier (ratio of cumulated GDP changes to cumulated fiscal spending changes) of the bank rescue measure is 0.41 during the first year (but is greater at longer horizons).

---

[10] Private consumption rises slightly in the first two quarters, because the consumption of credit constrained households responds positively to the increase in their labor income. Consumption falls thereafter, as the rise in public debt triggers a reduction in government transfers to households.

[11] The previous section showed impact multipliers are smaller for more persistent spending shock (as in this case), as anticipated higher future (net) tax payments lead to a stronger and more rapid fall in private consumption and, thus a weaker expansion of GDP.

[12] In comparing responses in Panels (a) and (b), one should bear in mind that bank support is i.i.d.; thus Panel (b) shows responses to a one-time bank support; by contrast, government spending shocks are serially correlated and thus a given innovation triggers a much greater spending increase.

Fig 4.1 Estimated impulse responses for the Euro area
a. innovation to government consumption rule (1% of quarterly GDP)
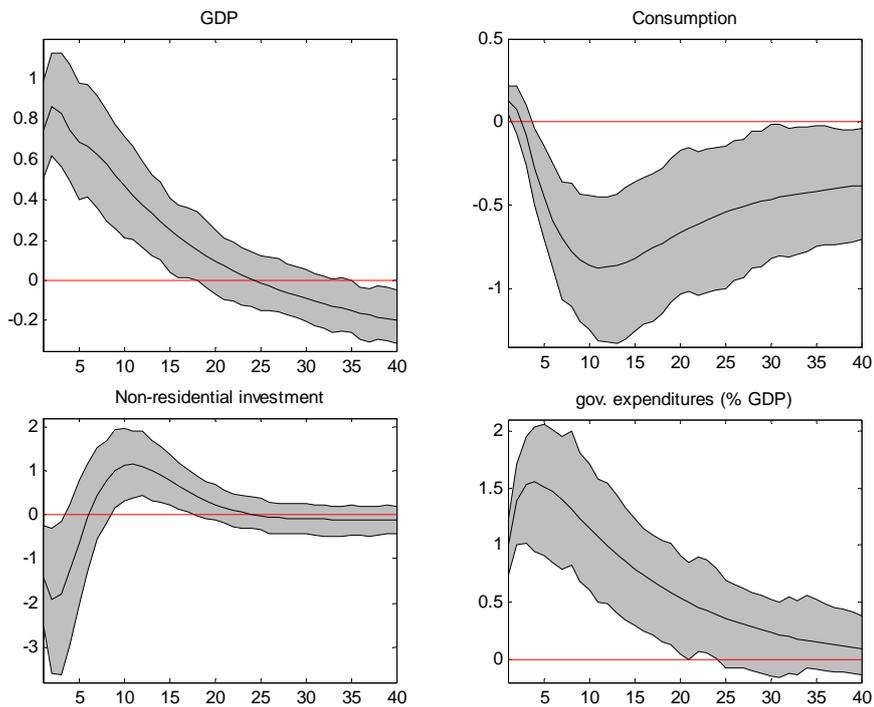
b. Innovation to government bank support rule (1% of quarterly GDP)
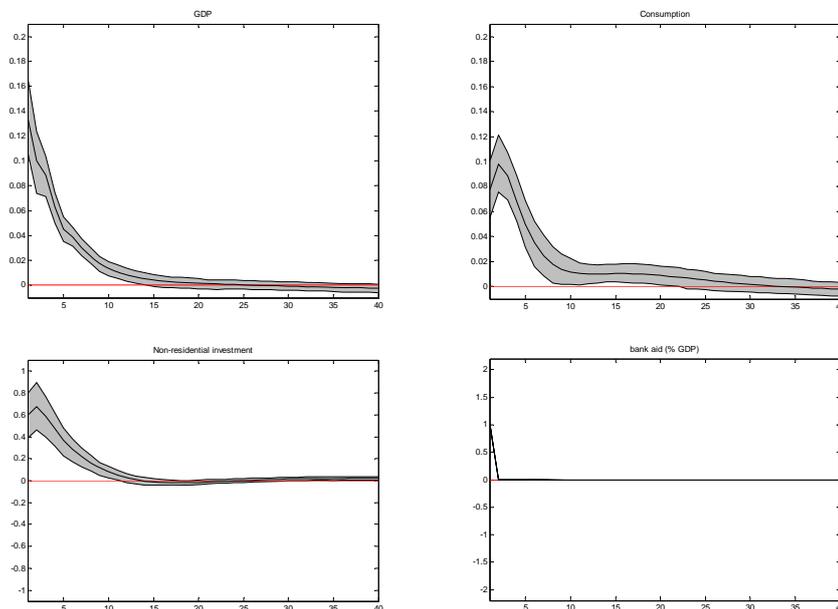
Note: Dynamic responses to exogenous shocks representing 1% of GDP: (a) innovation to policy rule for government purchases, (b) one-time bank aid. Responses of GDP, consumption (all private agents) and non-residential investment, are expressed as % deviation from the deterministic steady state.
Source: Kollmann et al. (2012)

A comparison with Panel (a) shows that government consumption has a larger impact multiplier than government support for banking, but that government consumption crowds out consumption and investment (in the short term), while bank support raises consumption and investment. Bank rescue measures thus stabilise investment, a component of aggregate demand that was especially adversely affected by the crisis.

4.2 Shock decompositions

4.2.1 Euro area

How much have fiscal policy shocks contributed to growth in the recent crisis ? On the basis of modelestimations we can analyse what the impact has been of changes in fiscal variables on GDP since the beginning of the crisis. In what follows we summarises some results of estimated model variants of the QUEST model for the Euro area as aggregate zone, and for Spain and Portugal separately. By decomposing GDP growth in the crisis years into separate contributions of individual shocks as estimated by the model we can see how much changes in public expenditure have contributed to GDP growth and compare this to the contribution of other factors behind the decline in growth.

Fig. 4.2 shows a historical shock decomposition for EA growth (Kollmann et al, 2012). The figure decomposes growth in deviations from steady state, which is set equal to the sample average over the estimation period of 1.6. In this model, real government consumption, investment and transfers to workers track the total technology trend and respond to deviations of the public debt and deficit from long run targets for these variables. The figure shows the contributions of innovations to these rules, as well as contributions from government support to banks (asset purchases and recapitalisations). It also shows the contributions of bank loan losses and groups all other shocks in the model together under 'others'. According to these estimates, government stimulus measures were able to support growth by up to 1 pp. during the 2008-09 crisis,. Government support to banks, larger than conventional stimulus measures, contributed even more to growth. As these measures were temporary, in terms of growth, they had a negative contribution in subsequent years. In 2011, the withdrawal of stimulus measures and stronger consolidations reduced growth. They contributed around ½ pp to the growth deterioration in 2011.

The public debt/GDP ratio increased by about 20 percentage points in 2008-2011 (Fig 4.2, panel b). Bank support accounts for about 18% of that rise in the debt/GDP ratio, while fiscal shocks explain 33% of the increase.[13] Together, the fiscal and bank-related shocks account for about half of the rise in the debt/GDP ratio.

---

[13] Note that these estimates of fiscal stimulus, based on estimated non-systematic innovations, include the workings of automatic stabilisers, and are larger than the discretionary fiscal measures announced by EA governments in early 2009 (European Economic Recovery Plan).

Figure 4.2 Historical decompositions of YoY GDP growth (demeaned)
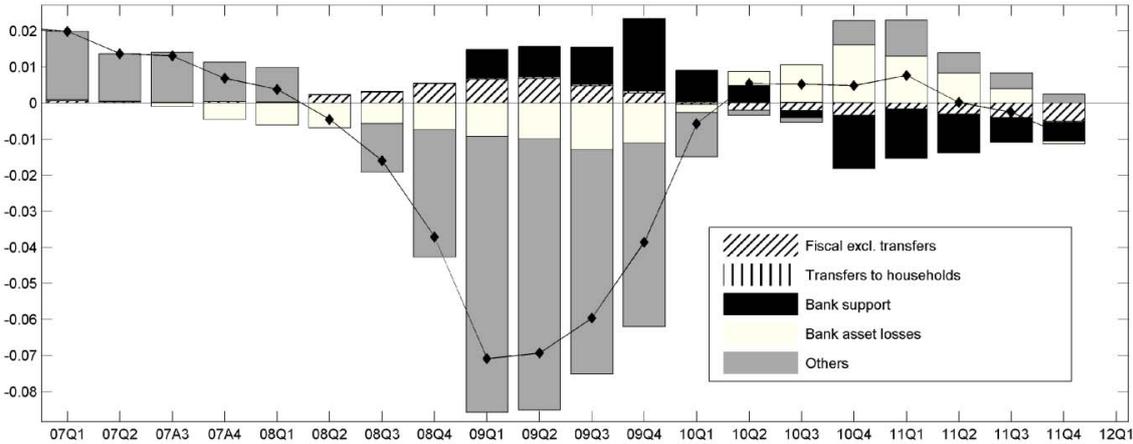
Fig. 4.2.b Historical decomposition Debt to GDP ratio (demeaned)
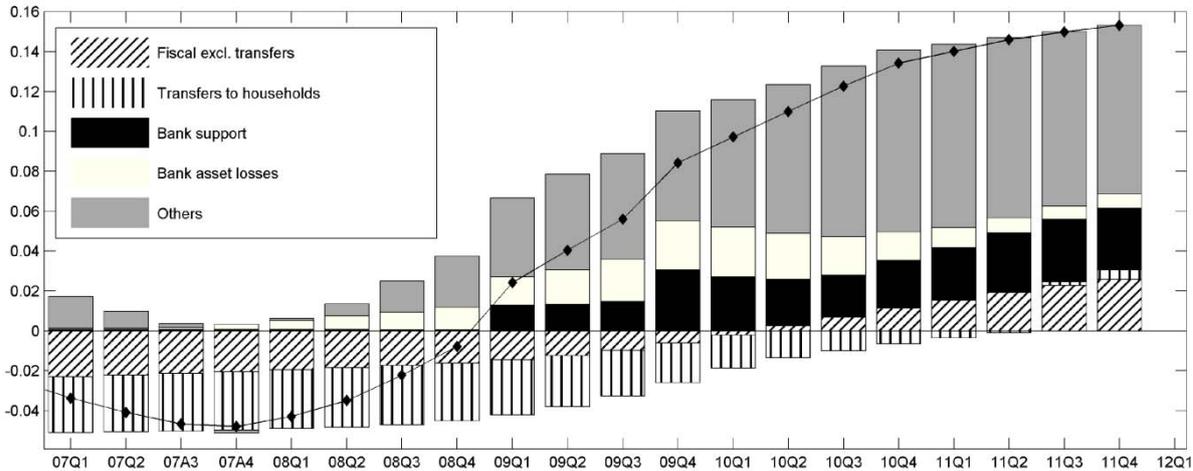
Note: Solid lines with dots show year-on-year (YoY) growth rates of EA GDP (Panel (a)) and the public debt ratio (Panel (b)), in 2007q1-2011q4. Mean YoY growth rates during the model estimation sample (1995-2011) are subtracted from plotted growth rates; the 1995-2011 mean debt/GDP ratio is subtracted from the plotted debt/GDP series. The bars show the contributions of different types of shocks to the historical series.
Source: Kollmann et al. (2012)

4.2.1 Spain and Portugal

Similar but more detailed analyses based on estimated models for Spain and Portugal (In 't Veld et al, 2012a, 2012b) are shown in Fig. 4.3-4. The figures decompose growth in deviations from steady state, which is set equal to the sample average over the period the models were estimated 1995Q1-2011Q4. [14] The shock labelled "fiscal" is the combined effect of government consumption, investment, and transfers to households.
Results indicate roughly half of the fall in growth in 2011 in these countries can be attributed to expenditure cuts. Other contributing factors are stock market and housing market risk

---

[14] For Spain this trend annual growth rate is 2.2%, for Portugal only 1%. This is higher than what is now considered the potential growth rate in these countries.

premium shocks, collateral shocks (tighter lending conditions), wage shocks (wage rigidities), world trade shocks and consumer confidence shocks. The main conclusions from the shock decompositions can be summarized as follows. First, the growth decompositions show the fall in growth in 2009 can be attributed to stock market and housing market risk premium shocks (bursting bubbles), collateral shocks (tightening lending conditions), wage shocks (ES: insufficient wage flexibility in the recession), productivity shock (PT), world trade shocks and consumer confidence shocks. Second, the fiscal shocks supported growth in 2009 by around 0.8%, both in Spain and in Portugal. Third, the decline in growth in 2011, relative to steady state growth, can be attributed for roughly half to cuts in government spending (see Tables 4.1-2 for details). Fourth, other factors that played a role for Spain in 2011 were housing risk premium shock and wages (wage rigidities). Productivity growth had a positive counterbalancing contribution (decline of construction sector, a low tech sector, raised average productivity). Fifth, other factors that played a role for Portugal in 2011 were the housing risk premium shock, the stock market risk premium shock, collateral tightening, and the external shock (world trade). Sixth, the main difference between Spain and Portugal is the positive contribution from productivity in the case of Spain and the negative contribution of shock to wages (insufficient flexibility in wages considering the deterioration in economic conditions).

Furthermore, there has been no direct impact of fiscal shocks on consumption growth and investment growth (except for a small effect of transfers on consumption growth). This suggests there is neither an additional multiplier effect of an increase in government expenditure on private expenditure, nor is there significant crowding-out of private demand. Note that consolidation in 2011 is mainly through reductions in government investment and government consumption, not so much in transfers. Consumption growth is mainly driven by collateral shock (tighter lending conditions) and shock to wages (negative employment effect due to wage rigidities), while investment growth is mainly driven by stock market risk premium shock.

Table 4.1 GDP growth contributions Spain

ES	GDP growth	GDP growth relative to trend	of which :		
			Gov. consumption and investment	Gov. transfers	Net contribution other shocks
2009	-3.7	-6.0	+0.8	0	-6.8
2010	-0.1	-2.3	0	0	-2.3
2011	0.7	-1.5	-0.7	0	-0.8

Table 4.2 GDP growth contributions Portugal

PT	GDP growth	GDP growth relative to trend	of which :		
			Gov. consumption and investment	Gov. transfers	Net contribution other shocks
2009	-2.9	-3.9	+0.8	-0.4	-4.3
2010	1.4	0.4	+0.2	-0.4	+0.6
2011	-1.6	-2.6	-1.0	-0.4	-1.2

Fig. 4.3 Spain : shock decomposition GDP growth-contribution

year on year E_GY

Legend:
- Technology
- Monetary policy shock
- Stock market risk premium shock
- Housing risk premium shock
- Collateral shock
- External shocks
- Fiscal shocks
- Confidence shock
- Shock to wages
- Others
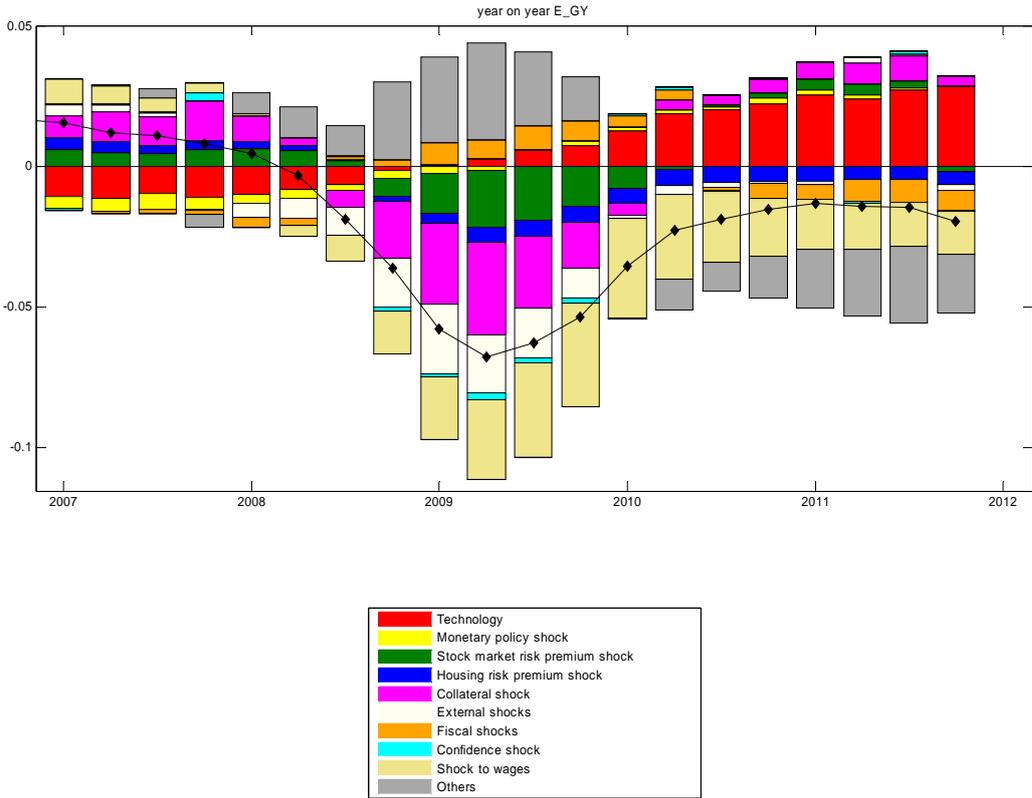
Fig. 4.4 Portugal : shock decomposition GDP growth

year on year E_GY

Legend:
- Technology
- Monetary policy shock
- Stock market risk premium shock
- Housing risk premium shock
- Collateral shock
- External shocks
- Fiscal shocks
- Confidence shock
- Shock to wages
- Others

17
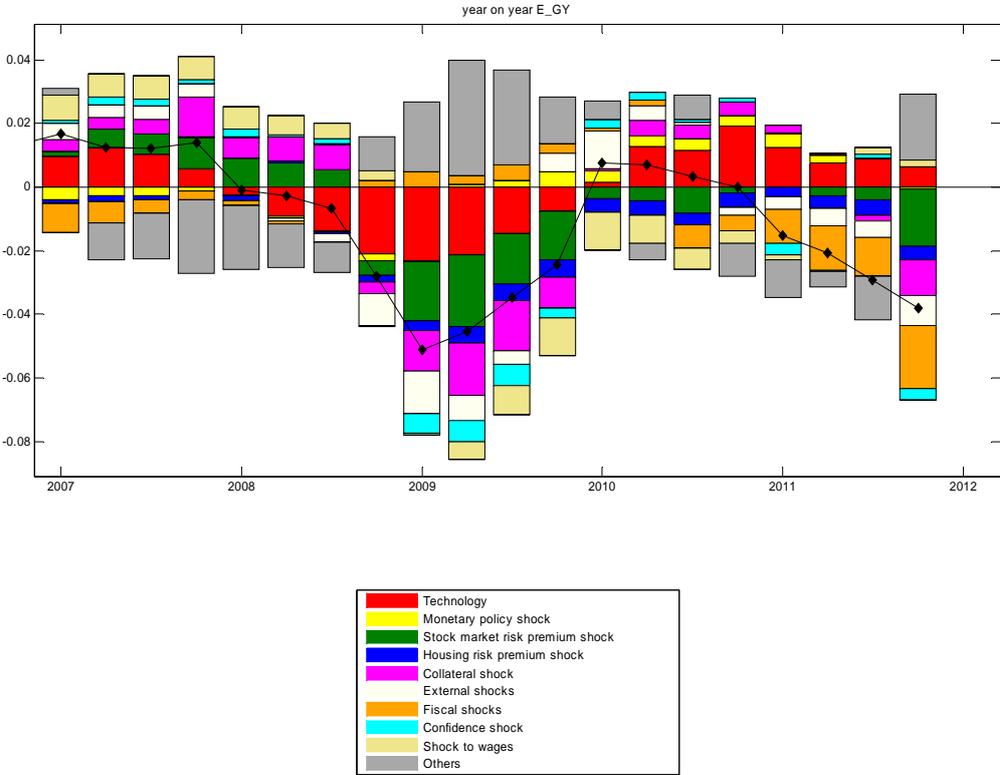
5. Costs of higher sovereign risk premia

The analysis discussed above compares the impact of consolidations relative to a no-change baseline. The question is what is this alternative counterfactual ? Many governments now face punitive sovereign bond spreads, and a no-policy-change scenario without consolidations could lead to even higher risk premia. In countries under severe market pressure delaying consolidation would probably result in higher risk premiums on government bonds and consequently worse economic prospects. These spreads, if persistent, can have serious implications for public finances and GDP and ultimately lead to explosive debt paths.

To illustrate this, figure 5.1 shows a stylised model simulation of a sovereign risk premium of 400 bps. over a period of ten years, without policy reaction. [15] This leads to a gradual increase in government interest payments, taking an ever larger share of government spending, a deterioration in the government deficit, an accumulation of debt, and, with part of the interest payments flowing abroad (wealth transfer), a deterioration in the current account.

Figure 5.1 Impact increase sovereign spreads
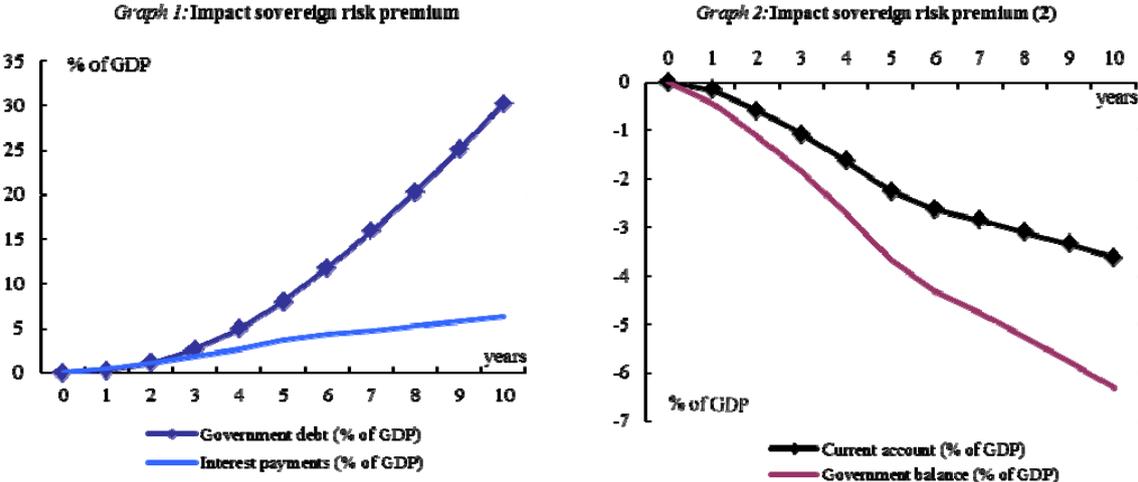
Note: increase in sovereign risk premium 400bp.

We cannot simulate scenarios of debt explosions, but we can show what the costs of higher risk premia are. Figure 5.2 shows results from a scenario analysis with an estimated model for Spain, and shows the effects of an increase in sovereign spreads that raise borrowing costs. The benchmark scenario is based on estimated fiscal stabilisation parameters in the model, and shows an only gradual reduction in the government deficit towards the steady state.[16] Sovereign spreads of Spanish bonds over German bunds have risen over the recent two years from less than 100 bps. to more than 400 bps. in the beginning of December 2011. In the

---

[15] The model behind Figure 5.1 is calibrated as a small euro area economy with government debt at 80% of GDP, with an average maturity of 5 years, and 70% of debt held abroad. The scenario simulated assumes a 400 bps. sovereign spread lasting for 10 years, after which period it is gradually phased out (with an autoregressive coefficient of 0.9).

[16] It should be noted that these scenarios are based on a direct extrapolation of the 2011 fiscal position and abstract from possible interventions to support financial institutions.

model the sovereign risk premium is determined by the debt-to-GDP ratio and an exogenous risk premium term. The estimation period is dominated by the pre-crisis period, and higher sovereign spreads are not (yet) reflected in the implicit government interest rate on debt. But if current spreads were to persist for longer, it would lead to a gradual increase in the average government interest rate, as debt matures and has to be renewed at these higher rates. The simulated scenario illustrates the effects of this for an increase of 400 bps. Crucially, it is assumed this risk premium is not confined to the government alone but also partly spills over into higher private sector borrowing costs. [17]

The sovereign risk premium shock is gradually feeding through into a higher government interest rate on its debt (assuming 5-years average maturity). A larger share of the budget has to be spent on higher government interest payments, around 2% of GDP more. It leads to a rapid increase in the deficit by about 2 pps. and an increase in the debt ratio of 15 pps.. In the model, the stabilising response in government consumption and transfers will eventually stabilise debt, but at the cost of a sharp reductions in these spending components. This, and the effects of higher borrowing costs across the economy, lead to declines in consumption and investment. These risk premia shocks result into generating a second dip recession in the model, with a fall in growth even larger than observed in 2009.

Figure 5.2 Impact of higher sovereign spreads
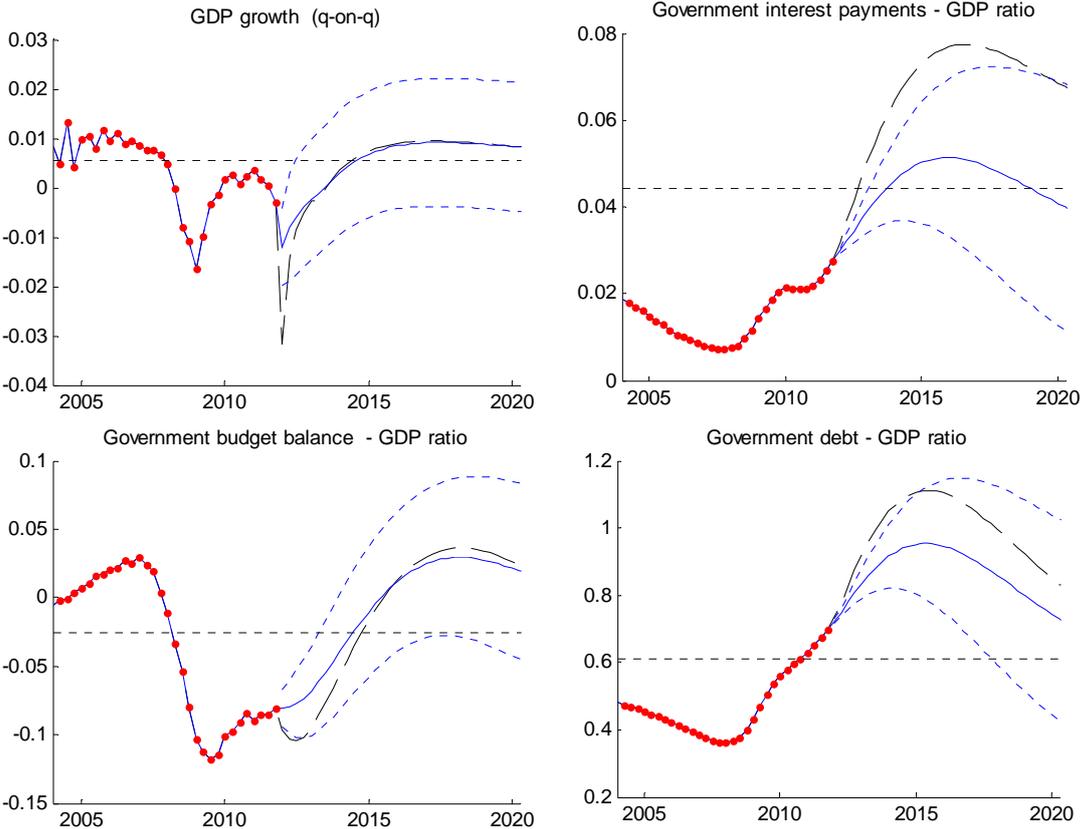
Note: blue line = baseline scenario (with 90% confidence interval bands); black dashed line = higher risk premium scenario . Source: In 't Veld *et al.* (2012b).

---

[17] The assumed 50% spillover to private financing costs is informed by empirical evidence shown in section 2 and Corsetti et al. (2012) and the empirical evidence cited therein.

6. Growth-friendly policies

The sustainability of public finance ultimately rests on both prudent fiscal policy and good prospects for growth. Given that in the current conditions the costs of fiscal consolidations can be high, it is essential to design measures in a growth-friendly, or least unfriendly, way possible such that negative growth effects are minimised.

As the analysis in section 3 showed, the micro-stance of fiscal consolidations matters greatly. The differences in short and long run effects of different fiscal instruments indicate consolidation packages can be designed to minimise the short term losses in GDP and maximise the long run gains. Such a package could consist of reductions in unproductive spending (purchases, transfers) and increases in the least distortionary taxes (consumption, housing), while at the same time reducing the most distortionary taxes (on labour and capital). This would combine the positive effects of structural reforms raising potential output with the necessary fiscal retrenchment.

Graph 6.1 shows an example of such a package which combines selective tax increases and expenditure cuts with reductions in distortionary taxes, and compares this to the balanced-composition, 'across-the-board' consolidation scenario described in the previous section. [18] Reducing tax distortions boosts employment and helps to minimise the short term output costs of the consolidation. The decline in private consumption is more persistent as consumption taxes are raised by more to finance the labour tax cut, but the positive employment effects boost incomes and mitigate the impact on consumption. The fall in GDP is short-lived and output rises above baseline in following years. Corporate investment increases as corporate profit taxes are reduced, raising capital accumulation and boosting potential output. This scenario illustrates that composition matters: well-designed measures that combine expenditure cuts with tax cuts can reduce the negative effects of fiscal consolidations on GDP and raise output by more in the long run.

---

[18] On the expenditure side cuts in transfers of 0.3% of (baseline) GDP, government wages, employment and purchases of 0.1% each, and on the revenue side increases of 0.5% of GDP in consumption and property taxes and reductions of 0.3% each in labour and corporate profit taxes.

Figure 6.1: Fiscal consolidation combined with tax reform
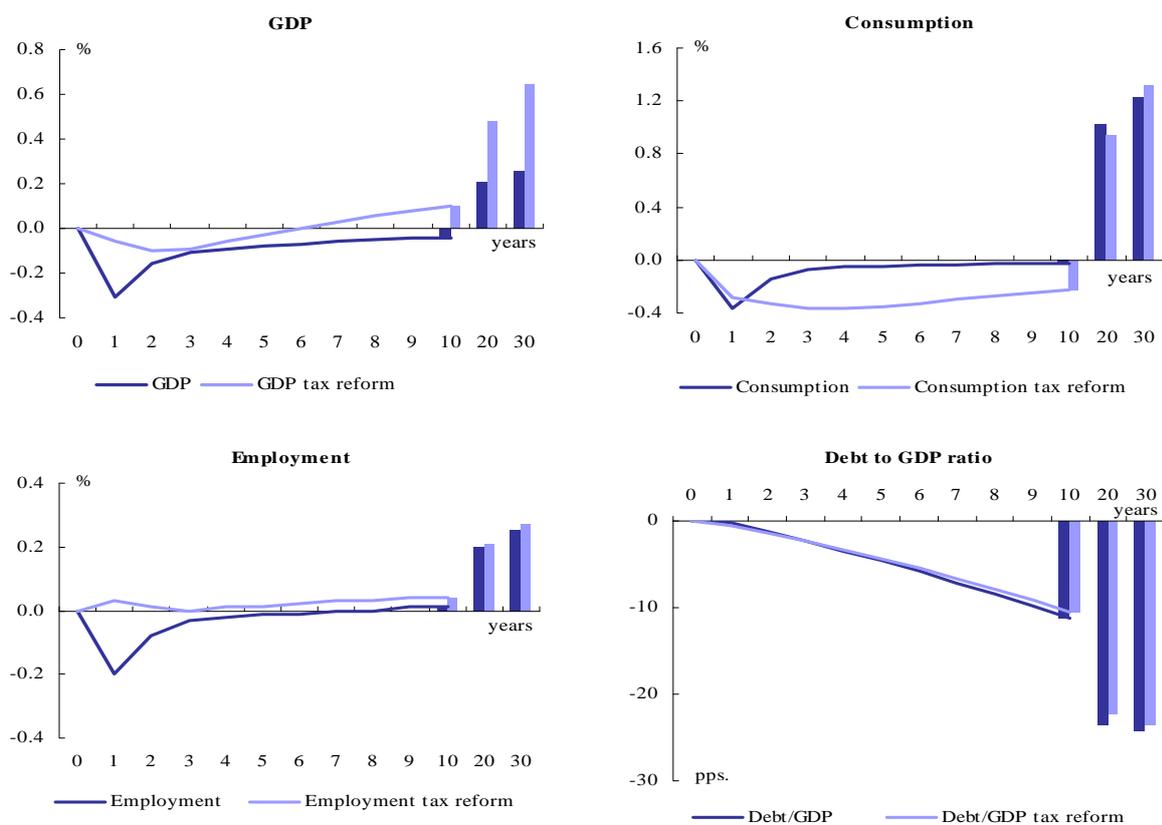
Besides a better growth-orientated design of consolidations, it is also imperative that consolidation efforts should be accompanied by growth-enhancing structural reforms. This could also help to underpin their credibility. Structural reforms supporting productivity, competitiveness and the growth potential can, if properly designed and swiftly implemented, partly offset adverse growth effects of fiscal tightening in the medium term. They include, for instance, lowering entry barriers for firms in sheltered sectors and simplifying red tape for the setup of new enterprises.

Roeger *et al*. (2012) identify reform needs in areas where structural indicators for the southern European vulnerable countries show room for improvement relative to the EA average. The identified reform needs are mostly in the following areas: competition in the final goods sector (mostly services and network sectors), intermediate firms' entry barriers (mostly innovative start ups), unemployment benefit generosity, the structure of direct and indirect taxes, government support to private R&D, and the skill composition of the labour force.

The analysis shows that the GDP per capita gap between the selected Mediterranean countries and the euro area average can be closed in the long run (>25 years) by Spain, Greece and Italy respectively and by more than 60% in Portugal. Reforming the product market yields the highest GDP gains in Greece. Portugal and to some extent Spain would benefit in the long run from skill upgrading of the labour force. Short term gains can mostly be expected from tax shifts towards higher VAT (and lower labour taxes). In terms of employment gains, tax

reforms and skill-upgrading in the form of increasing the share of medium and high-skilled labour supply can help the most to increase the employment rate in the long-run. Table 6.1 shows the effects for selected structural reforms Spain.

These results indicate that structural reforms are crucial: they promise large potential economic gains in the medium and long run, although the short run gains are unlikely to be large. Concerning the reform areas, the simulation results stress, in line with IMF (2012) and Bouis and Duval (OECD, 2011), the importance of product market reforms and labour market related tax reforms as the most promising areas of structural policy interventions. Pro-growth programs, such as expenditure on education and R&D should be preserved under expenditure cuts, while tax increases should rely on least growth-distorting instruments. More emphasis should be placed on education policy which is key in upgrading the labour force, especially in the Southern European countries where the share of low skilled labour is among the highest in the euro area. Increasing the share of medium and high-skilled human capital promises significant long-run economic gains in these countries.

Table 6.1 Selected structural reforms Spain

Stylised policy impulse	size	GDP effect (% deviation from baseline)					Employment effect (% deviation from baseline)				
		1	2	5	10	long run	1	2	5	10	long run
Product market											
Reducing final goods market mark-up	0.8 p.p.	0.0	0.1	0.3	0.5	1.2	0.0	0.1	0.2	0.2	0.2
Reducing intermediate firms' entry barriers	61%	0.0	-0.1	0.0	0.3	1.0	0.0	0.0	-0.1	-0.1	-0.2
Labour market											
Tax-shift from labour to consumption	4.2 % GDP	0.7	1.1	1.5	1.6	2.8	0.9	1.6	1.9	1.9	2.2
Knowledge and innovation											
Increasing the share of medium skilled workers	18 p.p.	0.2	0.2	0.6	1.5	3.4	0.6	1.5	3.5	3.6	3.6

Note: QUEST3(RD) simulations, % deviations from baseline. GDP per capita in Spain was 95% of the euro area average in 2009. These measures would fully close the income gap to the EA average.
Source: Roeger et al. (2012).

7. Concluding remarks

This paper has reviewed model-based analyses of the impact of fiscal consolidations on growth. New Keynesian theory suggests consolidation measures can in the current environment have larger multipliers than in normal circumstances. A higher share of credit-constrained households and interest rates constrained by the zero lower bound amplify the negative growth effects of consolidations. However, it is also clear that ensuring sustainability of public finances is crucial for underpinning economic stability. Financial market pressure leaves little room for the most vulnerable countries than to continue on their path of consolidation.

The size of the fiscal challenge differs among Member States and calls for a case-by-case approach to consolidation, exploiting room for manoeuvre where it exists. The speed of fiscal adjustment should be differentiated according to country-specific fiscal and macro-financial risks. This is in line with the flexibility embedded in the Stability and Growth Pact, which allows modulating the fiscal effort in case of economic shocks[19]. While it may be warranted to ask an additional fiscal effort of a country facing the risk of a debt interest spiral, longer correction deadlines certainly make sense for countries where sovereign risk is subdued. A differentiated application of flexibility, trading the risk to stabilisation against those to financial stability, is the right approach.

Against the background of high levels of public, debt deteriorating growth prospects, a sizeable share of credit-constrained households and interest rates close to the zero bound, the main challenge is to pursue the inevitable fiscal consolidation in as growth-friendly a manner as possible. This is a key condition for the credibility of consolidation, particularly in the face of the generalised risk aversion on sovereign debt markets and a surge in financing costs for some Member States. Credible medium-term growth-friendly consolidation programmes are of utmost importance to mitigate potential negative growth effects.

---

[19] Concerning the response to shocks, beyond the possibility to let the automatic stabilizers play around the adjustment path, an extension of the deadline for the correction of the excessive deficit is also possible on condition that the prescribed structural effort has been delivered.

ANNEX

The QUEST III model

The analysis in this paper uses different variants of the QUEST III model, the global macroeconomic model that is used for macroeconomic policy analysis and research in DG ECFIN of the European Commission. The QUEST models belong to the class of New Keynesian structural macroeconomic models based on microeconomic foundations derived from utility and profit optimisation and including frictions in goods, labour and financial markets.[20] Different versions of the model exist, estimated and calibrated, with differing degrees of disaggregation in terms of sectors, agents and countries, but all variants have at least some degree of heterogeneity and distinguish between constrained and unconstrained households. The models have a detailed disaggregation of fiscal policy, distinguishing on the expenditure side between government consumption, government investment and transfers to households, and on the revenue side between taxes on labour, consumption and corporate profits.

The section discussing fiscal multipliers uses in a 4 region model variant consisting of the Euro Area, the rest of the EU, the US and the rest of the world (Roeger and in 't Veld, 2010). This model has three sectors (tradable goods, nontradable goods, construction). Tradable goods, non-tradable goods and housing services are imperfect substitutes in the consumption and investment/intermediate bundles of households and firms. In addition, tradable goods produced in one region are imperfect substitutes for tradable goods produced in other regions. The regions are populated by households and firms. More precisely, each region is home to three different types of households: 1. Non-constrained households, infinitely-lived and forward-looking, who have full access to financial markets to make optimal intertemporal choices. They consume, invest in productive capital, residential property, land and financial assets (government bonds, debt of domestic and foreign households). They own the firms in the tradable, non-tradable and construction sectors and receive income from labour, from renting capital to firms, from selling land, from financial assets and profit income from firm ownership. 2. Credit-constrained households, also forward-looking, but with a higher degree of impatience. They make optimal intertemporal choices, but are subject to collateral constraints on their borrowing. Credit-constrained households consume and invest in residential property. Their ability to borrow depends on the current value of their housing collateral. The collateral constraints tighten when the value of residential property falls and relax when its value increases. 3. Liquidity-constrained households: These households cannot borrow against future income, and they do not save present income via financial and real investment. In every period they consume their current disposable wage and transfer income.

The section discussing shock decompositions of GDP growth are based on estimated models for Spain and Portugal (in 't Veld *et al.* , 2012a,b). These models are estimated over the period 1995Q1-2011Q4 and are models with housing sector and credit-constrained households. The results for the euro area are based on an extended version of the model estimated on quarterly EA data over the same period 1995-2011 (Kollmann *et al*, 2012). This model variant includes an entrepreneur who owns a bank and firms, and two type of workers (non-constrained and credit constrained) who have different rates of time preference. In equilibrium, the more patient worker holds financial assets (bank deposits and government debt). The other (impatient) worker borrows from the bank, using her housing capital as collateral. The bank thus acts as an intermediary between the patient worker and the impatient worker. The bank also holds bonds issued by the domestic government and by the rest of the word. The bank faces a capital constraint—a fraction of her assets has to be financed using bank capital. In this model, real government consumption, investment and transfers to workers track the total technology trend and respond to deviations of the public debt and deficit from long run targets for these variables.

---

[20] For a complete list of references to the QUEST model see:
http://ec.europa.eu/economy_finance/research/macroeconomic_models_en.htm

References:

Bouis, R. and R. Duval (2011), "Raising Potential Growth After the Crisis: A Quantitative Assessment of the Potential Gains from Various Structural Reforms in the OECD Area and Beyond", OECD Economics Department Working Papers, No. 835, OECD Publishing. http://dx.doi.org/10.1787/5kgk9qj18s8n-en

Christiano, L., M. Eichenbaum, and S.Rebelo. 2011. "When Is the Government Spending Multiplier Large?" *Journal of Political Economy*, Vol. 119, No. 1: 78–121.

Coenen, G., C. Erceg, C. Freedman, D. Furceri, M. Kumhof, R. Lalonde, D. Laxton, J. Linde, A. Mourougane, D. Muir, S. Mursula, C. de Resende, J. Roberts, W. Roeger, S. Snudden. M. Trabandt, J. in 't Veld (2012). Effects of Fiscal Stimulus in Structural Models. *American Economic Journal: Macroeconomics*, 4 (1): 22-68, available at: http://pubs.aeaweb.org/doi/pdfplus/10.1257/mac.4.1.22

Corsetti, G., K. Kuester, A. Meier and G. Mueller (2012) . Sovereign risk, fiscal policy, and macroeconomic stability, *IMF Working Paper* 12/33, January 2012

European Commission (2010), "Chapter 2: The Impact of foscal consolidations on Europe's economci outlook", in : European Economic Forecast – Autumn 2010, European Economy No 7/2010, Brussels: European Commission. Available at:
http://ec.europa.eu/economy_finance/publications/european_economy/2010/ee7_en.htm

IMF (2012, forthcoming). Staff Note on Fostering Growth in Europe Now

In 't Veld, J., M. Larch and M.Vandeweyer (2012). "Automatic Fiscal Stabilisers: what they are and what they do". *Open Economies Review* (forthcoming) . Also available as *European Economy Economic Papers no. 452*.
http://ec.europa.eu/economy_finance/publications/economic_paper/2012/ecp452_en.htm

In 't Veld, J. and W. Roeger (2012), "Evaluating the Macroeconomic Effects of Government Support Measures to Financial Institutions in the EU", *European Economy Economic Papers no. 453*.
http://ec.europa.eu/economy_finance/publications/economic_paper/2012/ecp453_en.htm

In 't Veld, J. , A. Pagano, R. Raciborski, M. Ratto and W. Roeger (2012a), "Imbalances and rebalancing scenarios in an estimated structural model for Spain", *European Economy Economic Papers no. 458*.
http://ec.europa.eu/economy_finance/publications/economic_paper/2012/ecp458_en.htm

In 't Veld, J. , A. Pagano, M. Ratto, W. Roeger and I. Szekely (2012b), "Sovereign debt sustainability scenarios based on an estimated model for Spain", mimeo

Kollmann, R., W. Roeger and J. in 't Veld (2012), "Fiscal policy in a financial crisis: standard policy vs. bank rescue measures, *American Economic Review, Papers & Proceedings 2012,* 102(3): 77–81.

Kollmann, R., M. Ratto, W. Roeger and J. in 't Veld (2012), "Fiscal policy, banks and the financial crisis", *Journal of Economics Dynamics and Control,* (forthcoming).

Leeper, Eric, Nora Traum and Todd Walker, 2011. The Fiscal Multiplier Morass: a Bayesian Perspective. NBER Working Paper 17444.

Roeger W., in 't Veld J. (2010), "Fiscal stimulus and exit strategies in the EU: a model-based analysis", *European Economy Economic Papers no. 426*.
http://ec.europa.eu/economy_finance/publications/economic_paper/2010/pdf/ecp426_en.pdf

Roeger, W., Varga J. and J. in 't Veld (2012) , "Growth Effects of Structural Reforms: The case of Greece, Italy, Spain and Portugal", mimeo.

Woodford, M., 2011. Simple analytics of the government expenditure multiplier, *American Economic Journal: Macroeconomics,* 3(1): 1-35.