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The role of tax policy in times of fiscal consolidation

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The role of tax policy in times of fiscal consolidation

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by the Directorate General for Economic and Financial Affairs
held in Brussels on 18 October 2012

Edited by Savina Princen and Gilles Mourre

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1. Introduction

1.1 Purpose of the workshop

The global financial and economic crisis revealed vulnerabilities of the European tax systems and the necessity to reform them in many cases. It also put governments in front of major tax policy challenges and dilemmas when searching for the recovery path. Most Member States needed to boost their revenue – in order to support the overall consolidation efforts – while at the same time needed to undertake actions to support recovery and restore sustained growth over the medium and long term. The situation became even more complicated when considering the necessity to safeguard social equity. In this context, more than ever, new visionary and growth-friendly tax policy approaches are needed, as well as methods to assess their impact on the economy and on people.

Following a wide range of tax stimulus measures in the immediate aftermath of the crisis, the focus of tax policy has clearly shifted towards a much needed consolidation of public finances. Overall, this led in many Member States to an increase in personal income taxes and social security contributions. In the domain of indirect taxation, the clear trend towards increasing the tax burden, seen before the crisis and interrupted with the stimulus package of 2009, resumed as of 2010. It took the form of higher tax rates, particularly excise duties and broader tax bases.

Despite reforms, structural features of European tax systems remain entrenched. The 2012 analysis of tax reforms in the EU found that several Member States could use revenue measures in addition to expenditure measures to consolidate their public finances and make them more sustainable. Shifting from direct to indirect taxes appears to be an option for some Member States to make their tax system more growth-friendly. At the same time, the failure to improve tax governance continues to burden the tax systems, as a number of Member States face a large shadow economy, high levels of VAT fraud and evasion as well as low efficiency of their tax administration.

The contributions collected in this volume were presented at the workshop 'The role of tax policy in times of fiscal consolidation' organised by the Directorate General for Economic and Financial Affairs of the European Commission on 18 October 2012. The present conference proceedings gather together the views of academics, national policy-makers and international institutions on those issues, which are of great policy-relevance at the current juncture. The part dedicated to the first session of the workshop touched upon consolidation on the revenue side and its macroeconomic impact. The theoretical contributions focused on how tax policy may be used in the design of a fiscal consolidation strategy in order to avoid economic backsliding and how these efforts could be measured. It was argued that tax increases depress economic activity and that expenditure cuts combined with tax cuts could make more sense in the long run. However in the short term and in some countries, tax increases may be needed to consolidate the public finances, while the tax expenditures – sometimes difficult to implement politically – are gradually kicking in. Country-specific contributions provided insights into fiscal consolidation experience of Ireland and Italy, highlighting recent reform strategies.

The session on 'Redistributive effects of consolidation on the revenue side' discussed the best tax bases to be used to safeguard social equity and consider tax policy options to make the richest contribute to fiscal adjustment needs. It highlighted that all available tax bases, including wealth, consumption and environmentally related tax bases, could be used to protect social equity, given their complementary features. Thus, it was suggested by several speakers to create a combination of tax increases and compensations – which would offset the negative impact on low income earners. It was also argued by one speaker that taxation of top income earners could be exploited by introducing a European wealth tax to help Member States raise tax revenue which they cannot raise on their own. Finally, the country-specific presentations looked into various experiences in distributing income through the tax system.

1.2 A few lessons from the 2012 Commission report 'Tax reforms in EU Member States'

*Gilles Mourre**

1.2.1 The policy context

In the face of unsustainable public finances, tighter cooperation and better communication is essential for achieving better outcomes for Europe's economy. The European Semester was set up in 2011 to help meet such objectives. Launched every year with the publication of the Annual Growth Survey, it represents the annual cycle of integrated economic coordination across EU Member States. It allows for an annual assessment of each Member State's broad policy strategy. The European Semester regularly underlines the importance of the design and structure of the tax system to make it more effective, efficient and fairer. At its fourth edition, the 2012 'Tax reforms in EU Member States' Report (TRR) contributed to this discussion and served as an analytical input to regular economic surveillance, including noticeably the 2013 European Semester.

The 2012 TRR contributed to nourishing a dialogue with Member States on tax matters. It benefited considerably from discussions with the Member States at the Economic Policy Committee attached to the ECOFIN Council. Further dialogue with Member States appears mutually beneficial to dig deeper into country dimensions and to go beyond the identification challenges merely derived from quantitative indicators available for most EU countries.

The 2012 TRR reviews recent tax reforms in Member States and indicates the scope for future reforms. Based on various information sources, it attempts to identify common trends of reforms across countries, while reporting reforms country-by-country. The report also analyses the tax policy challenges in EU Member States, in particularly those having a potential impact on growth, employment and fiscal sustainability. It is also worth pointing out that housing taxation and tax governance – issues discussed during last year's workshop – were also covered in the 2012 TRR, showing the relevance of the annual tax workshop.

1.2.2 Tax reforms adopted in 2011 – 2012, when consolidation gains momentum

The financial and economic crisis has resulted in a serious deterioration of public finances and major turbulence in sovereign debt markets. Thus, the fiscal policies in 2011 and 2012 were driven by the need to restore the sustainability of public finances. For most Member States, the need for more revenue to support consolidation effort was associated with other difficulties stemming from the requirement to support the economic recovery and restore sustained growth in the medium and long term.

After drifting downward and reaching in 2009 the lowest levels since the beginning of the decade, tax revenue stabilised as a percentage of GDP in 2010 and reversed its trend in 2011. This upward movement of the tax-to-GDP ratio is expected to continue at least until 2013

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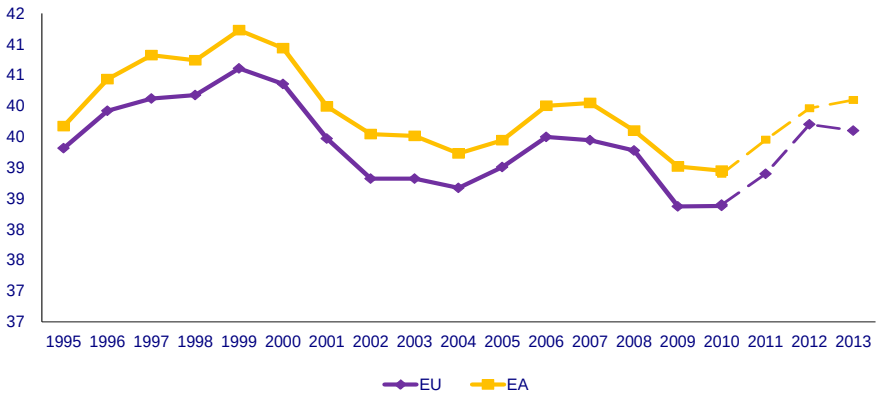
when it is expected to reach almost 40% of GDP, despite adverse cyclical conditions causing some loss in tax revenue (see Figure 1). This evolution has to be attributed to a large extent to the tax policy measures undertaken in 2011 and 2012. It shall also be noted that in international terms the European Union as a whole is still regarded as an area with high taxes, despite the considerable fluctuations in revenue since the onset of the financial and economic crisis.

Figure 1: Development of the overall tax burden



Source: Commission services.

In the period 2011-12, many Members States have increased taxes in order to speed up fiscal consolidation (see Table 1). Most of them have increased personal income taxes, mainly through hikes in statutory rates, or social security contributions, while aiming at increasing work incentives for specific groups. The changes in the corporate tax bases have been slightly more frequent than changes in corporate tax bases. About half of the Member States saw hikes in the VAT rates, both in the standard rate and the reduced ones. Excise duties increased in most Member States for environment and energy products and for alcohol and tobacco. Tax on immovable property was also increased in a few countries.

Table 1: Overview of tax reforms in 2011 and 2012

		Statutory rates	Base or special regimes
Personal Income Tax	Increase	BE, DK,CY, FI, EL, ES, IE, IT, LU*, NL, PT	AT, BE, CZ*, DK, ES**, FI, FR, EL, HU, IE, PL, PT, SK, UK
	Decrease	FI, HU, LV, NL	CZ, DK, EE, FI, DE, ES, HU, IE, LV, MT, NL, SE, UK
Corporate Income Tax	Increase	FR, PT	CZ, AT, BE, DK, ES**, HU
	Decrease	UK, FI, EL, SI, NL,	ES, HU, IT, LT, LU, UK
Social Security Contributions	Increase	AT, BG, CY, FR, EL, HU, LV, PL, PT, UK	IE, SK
	Decrease	DE, IE	CZ
Value Added Tax	Increase	PT, UK, CY, ES**, IE, HU, LV, PL, SK, IT, FR, BG, EL, CZ	AT, BE, BG, CY, DK, EL, ES** FI, LV, NL, PL, PT,
	Decrease		CY, EL, ES, IE, LT, PL
Excise Duties	Increase	AT, BE, BG, CY, CZ, DE, EL, ES, FI, FR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SK, SI, UK	DK, EE, LV, PL
	Decrease	SI	
Taxation of Property	Increase	CY, EL, ES, IE, PT, UK	CY, IT, LT, LV
	Decrease	NL	

Note: The reforms are not consolidated, therefore a country could be recorded as having adopted both a tax increasing measure and a tax decreasing measure in the same area.
Source: Commission services.

1.2.3 Main challenges relevant for tax policy in consolidation times

The 2012 TRR also provides a first identification of the main tax policy challenges in EU Member States, using an indicator-based screening. The latter offers a cross-country consistent method, which provides useful preliminary indications but deserves further country-specific investigation to avoid the one-size-fits-all fallacy. Moreover, the results of the report, old now by around one year, will be updated in the 2013 issue of the report, to be published in autumn 2013. The 2012 TRR looks into the need and scope for fiscal consolidation on the revenue side, but also into other dimensions particularly relevant in consolidation times, such as the broad rationalisation of the tax system and the redistributional aspects of taxation.

Need and potential scope for consolidation on the revenue side

As for the relevance of consolidation on the revenue side, the report proposes to screen Member States, according to the existence of a fiscal sustainability issue ('the need') and the availability of some 'tax space' ('the scope'). A high value in one of the two commonly accepted indicators of fiscal sustainability (i.e. 'debt compliance risk in the medium run', called also 'S1', and 'ageing-induced fiscal risks' in the long run, called also 'S2') signals the need for a strong adjustment in the fiscal deficit. The latter will allow either for bringing the public debt level down to the Treaty threshold of 60% of GDP by 2020 or for stabilising the debt level in the long term. This adjustment, if very large, may require using tax increases as a complement to expenditure controls.

Table 2: Consolidation on the revenue side: screening results

Country	Potential need for higher tax revenues to help consolidation	Overall 'tax space' available (low tax-to-GDP ratio)	No significant increase in tax-to-GDP ratio in recent years	Scope for (further) increasing least distortionary taxes	Need and scope for tax-based consolidation
BE	X		X	X	
DE			X	X	
EE		X	X	(X)	
ES	X	X	X	X	X
FR			X	X	
IT				X	
CY		X	X	(X)	
LU	X		X	X	
MT	X	X	X	X	X
NL	X		X		
AT			X	X	
SI	X	X	X	(X)	X
SK	X	X	X	X	X
FI			X		
BG		X	X	(X)	
CZ		X		X	
DK			X		
LV		X	X	X	
LT		X	X	X	
HU			X	(X)	
PL		X	X		
RO		X	X	X	
SE			X		
UK	X		X	(X)	

Source: Commission services.

There could be a potential scope for using tax increases if the tax-to-GDP ratio is relatively low, and if, at the same time, there is either some room for increasing the least distortionary taxes (consumption, recurrent housing and environmental taxes) or the absence of a 'tax fatigue' (signalled by a large increase in the tax burden in the recent past). The main screening approach is explained in more detail and with some further improvement and proper updates in Wöhlbier et al. (2013). While some Member States had either a need or a

potential scope for using tax to consolidate their public finance, only a few combined both conditions in 2012 (see Table 2). However, the result of Table 2, based on a fairly restrictive screening, is purely indicative and may have been made outdated by reforms undertaken after the production of the indicators used.

The consolidation effort needed in some Member States could be achieved through the following measures: (i) further tax hikes in the short term; (ii) cutting expenditures in the medium run – to reduce gradually the weight of taxes in some countries; (iii) broadening the tax bases (closing loopholes in direct and indirect taxation) rather than increasing tax rates.

Rationalising the tax systems by efficiency-friendly reforms

Fiscal consolidation need is also an occasion to rationalise the tax systems by revenue-neutral reforms to enhance its efficiency and remove distortions harmful to growth. This would imply shifting taxation toward growth enhancing tax bases (away from labour toward consumption, property and environment), broadening tax bases and improving tax governance and the quality of tax administration.

Table 3 provides an overview of Member States that may need to consider tax policy measures according to an indicator-based analysis. Thus, around a third of EU Member States appear to have both room and need for shifting taxation away from labour toward consumption taxes, recurrent property taxes or environmental taxes. Moreover, many Member States could broaden their tax bases. Some need to review/reduce tax expenditure in direct taxation. Many Member States still face a low VAT collection induced by the numerous reduced rates and exemptions. Other relevant challenges relate to the specific design of individual taxes, such as the debt bias in corporate and housing taxation and the revision in housing and environmental taxation.

Table 3: Overview of tax-related challenges in EU Member States

(based on quantitative indicators)

Country	Contribution of tax increases to consolidation	Need and room for tax shift	Broadening tax bases				Tax governance challenges		Special topics			
			Need to review tax expenditure in PIT	Need to review tax expenditure in CIT	Debt bias in corporate taxation	Increasing VAT efficiency	Tax compliance	Tax administration	Housing taxation		Environmental taxation	
									Structural shift	Debt bias	GHG target	Design
BE		X	(X)	X		(X)	X		X	X	X	X
DE		(X)			(X)							X
EE										X		
IE	-			X		(X)					X	
EL	-		X		X	X	X	X	X	X	X	X
ES	X		X	X	(X)	X	X		X	X		
FR		X	X	X	X	(X)			X			X
IT		X	X			X	X		X	X	(X)	X
CY							(X)		X		(X)	
LU				X	X				X	X	X	X
MT	X			X	X		X				X	
NL				X						X		
AT		(X)	X								(X)	
PT	-		X	X	X	(X)	X	X	X	X		X
SI	X			X			X				(X)	
SK	X					(X)	X	X			X	X
FI										X	(X)	
BG							X	X				
CZ		X		X		(X)	X	X		X		
DK										X	(X)	
LV		X		X		X						
LT				X		(X)	X				X	X
HU		(X)				(X)	X					
PL			(X)			(X)	X	X				
RO		X		X		X	X	X				
SE					(X)					X		
UK			X	X		X						

Source: Commission services.

Lastly, a number of Member States face the challenge of improving tax governance, by either reducing a large shadow economy and fighting against high levels of VAT fraud and evasion.

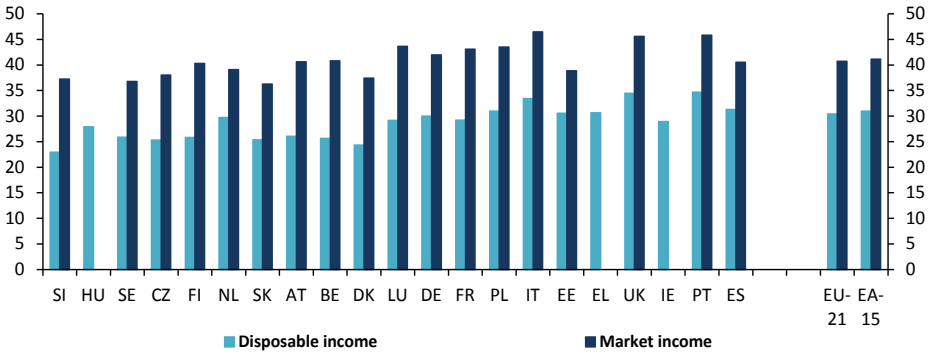
Some have a particular potential to increase the efficiency of the tax administration, by cutting high administrative costs per net revenue collected or reducing the high administrative burden of tax systems for mid-sized companies.

Paying attention to redistributive considerations

Last but not least, the need to distribute the burden of tax increases (required by fiscal consolidation) fairly across the society is another issue to be borne in mind when designing tax policy. The tax system has indeed a strong impact on the income distribution, as suggested by Figure 2. Redistribution can take place through several channels, namely: (i) progressive tax scale for labour income (but also through income replacing transfers, benefits and public consumption expenditures); (ii) tax expenditures (which run the risk of making the system regressive); (iii) labour disincentives to work, embedded in the tax system (hitting the low skilled particularly).

Figure 2: Impact of the tax system on income concentration

Concentration of market income and disposable income measured by the Gini-coefficient



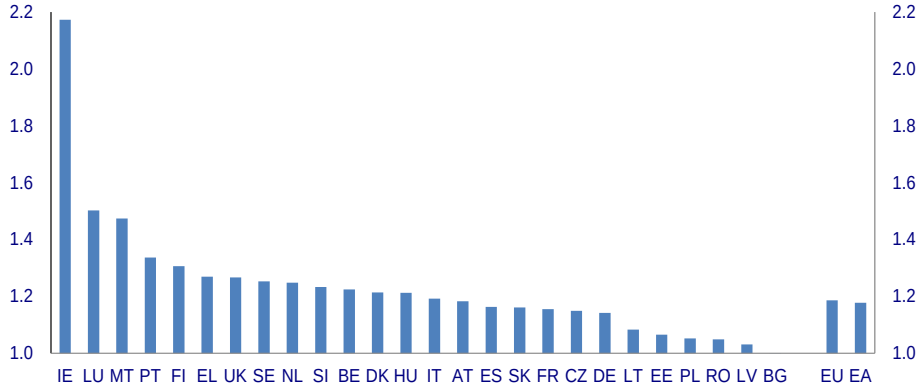
Note: EU-21 refers to those 21 OECD member countries that are also EU Member States. EA-15 refers to those 15 OECD member countries that are also part of the euro area. The OECD data refer to the working-age population (18-65 years old). The data refer to a year between 2006 and 2009. Income data are adjusted for household size (equivalation). Averages are arithmetic and refer to the Member States for which the respective data is available.
Source: OECD.

Redistribution through the tax-benefit system is the prerogative of Member States, which have different perceptions of social equity and different collective preferences for balancing efficiency versus equality. The redistributive features of tax systems, such as the progressivity of labour taxation, vary strongly across countries (see Figure 3). Therefore, it is difficult and unwise to come up with prescriptive policy recommendations in this complex and sensitive area. The identification of clear policy challenges in this field rests at national level.

However, any Member State facing substantial efficiency challenges in the tax-benefit system (e.g. large share of tax expenditures) and at the same time achieving a poor outcome in terms of mitigating income inequalities may have scope for improving efficiency without compromising redistribution policies or increasing redistribution without harming efficiency.

Figure 3: Indication of the progressivity of labour taxation

Ratio of tax wedge 167% / 67% of the average worker (single, no children), 2010



Source: Eurostat and OECD.

Moreover, the need to take the sustainability of public finances into account in the design of tax policy corresponds to what intergenerational equity generally demands, in particular avoiding passing a considerable (and unsustainable) debt burden on to the next generation. Such a burden may imply more taxes, less growth-friendly public expenditure and less social protection, with a possibly adverse impact on growth and welfare for the next generation.

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2. Summary of the workshop

Savina Princen[*] *and Eugeniu Colesnic*[**]

Against the background of severe consolidation needs in many EU Member States, the workshop addressed the macroeconomic impact of consolidation measures on the revenue side and the redistributive effects thereof. These two topics rank high on the current taxation policy agenda. In this context, the workshop discussed the possibility of tax-based consolidation policies to minimise economic distortions and analysed which tax bases could help to safeguard social equity. It brought together speakers from the IMF, the European Commission, academia, national administrations and policy makers to present their work and views in this area.

Marco Buti (Director-General of the Commission's DG ECFIN) gave an introductory statement, stressing the growing attention on national tax policies. He stressed that this increased focus on tax policy was reflected in several key policy strands. First, the 2012 European Semester – the annual cycle of policy coordination across EU Member States – covered tax policy at national level with quite some details. Proof of this was the number of country-specific recommendations related to tax issues, covering around 20 Member States. Second, tax policy appears indirectly in the Stability and Growth Pact (SGP),[1] as the expenditure benchmark introduced by the revision of the SGP, provides that the annual growth of public expenditure – netted out of *discretionary revenue measures* – should follow the trend of potential GDP growth. Finally, the adjustment programmes in euro area countries, namely Ireland, Greece and Portugal at the time of the workshop, were placing tax policy reforms at the core of the fiscal consolidation process and the growth-oriented structural policies.

Gilles Mourre (head of the tax policy unit at DG ECFIN) carried on with the delivery of a keynote address presenting the main relevant results of the Commission report "Tax reforms in EU Member States 2012"[2] published on 10th October 2012, a week before the workshop. He stressed that the 2012 Tax Reform Report contributed to the discussion around the main topics of the workshop. It tried to distinguish recent trends in tax reforms. Moreover, it made a first attempt at identifying Member States with a need and a potential room for consolidation on the revenue side. It also identified growth-friendly tax reforms, the urgency of which became greater in the context of the present crisis. Finally, it discussed some issues related to the redistributive aspects of tax policy, particularly relevant in times of consolidation. The report served more generally as an analytical input to the economic integrated surveillance, including the European Semester, i.e. the annual cycle of coordination of the economic policy of EU Member States. He pointed out that the 2012 report was part of a dialogue with Member States since it strongly benefited from discussions with the Member States at the Economic Policy Committee attached to the ECOFIN Council.

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**Eugeniu Colesnic was an intern at DG ECFIN during the preparation of the proceedings.
[1] Embedded in the 'six-pack' – six pieces of legislation enhancing EU governance adopted in December 2011.
[2] The report is written jointly by DG ECFIN and DG TAXUD.

It represented an important step towards clarifying the analytical underpinning of policy recommendations in the area of tax policy.

Mourre stressed that many Members States increased taxes in order to speed up fiscal consolidation in the period 2011-12. Most of them increased personal income taxes, mainly through hikes in statutory rates, or social security contributions, while aiming at increasing work incentives for specific groups. About half of the Member States saw hikes in the VAT rates, both in the standard rate and the reduced ones. Excise duties increased in most Member States for environment and energy products and for alcohol and tobacco.

He presented a first identification of tax policy challenges in EU Member States, using an indicator-based screening, which offers a cross-country consistent method but deserves further investigation to avoid the one-size-fits-all fallacy. On substance, he pointed out that, in times of fiscal consolidation, tax policy may consider the following dimensions, which are covered to various degree in the 2012 Tax Reform Report: (i) the need and scope for further tax hikes in the short term; (ii) cutting expenditures in the medium run so as to reduce the weight of taxes gradually in some countries; (iii) broadening the tax bases (closing loopholes in direct and indirect taxation) rather than increasing tax rates. At the same time, consolidation need is also an occasion to rationalize the tax systems by revenue-neutral reforms, which could, among other things, imply a tax shift toward growth-enhancing tax bases (away from labour toward consumption, property and environment) and improving governance and quality of tax administration. Last but not least, fairly distributing the burden of tax increase (and consolidation) across the society is another issue to be kept in mind when designing tax reforms.

2.1 Session on consolidation on the revenue side and its macroeconomic impact

The presentations and discussions in the session on the macroeconomic impact of consolidation on the revenue side touched upon the balance between current measures and their medium-term effects. It also provided insights from macroeconomic modelling to design tax consolidation policy and looked into ways to measure consolidation efforts on the tax side. Two country-specific contributions (Ireland and Italy) showed how tax measures were used for consolidation purposes. This session was chaired by Lucio Pench (European Commission, DG ECFIN).

Michael Keen (IMF) discussed promising tax policy avenues that could minimise economic distortions in a context of constrained fiscal policy. In his view, the main challenge on the revenue-side was to find tax instruments that would play their part in restoring fiscal sustainability, be as supportive as possible of long-term output/welfare, do least to depress current activity and respect equity concerns. He argued that it is extremely important to get the right balance between current actions and credible medium-term commitments. A topical issue in his view was the size of multipliers which are, according to some analyses, larger in recessions. Simultaneously, he stressed that there were almost no studies on size by type of taxes and that, generally, it was broadly suggested that the multipliers are larger for taxes that reduce aggregate demand and are more regressive.

Matthias Burgert presented a joint study with Volker Wieland, written specifically for the workshop. The paper studied how tax policy may be used in designing a fiscal consolidation strategy so as to mitigate or avoid a decline in economic activity. They employed New-Keynesian dynamic stochastic general equilibrium (DSGE) models to assess quantitatively short- and long-run impacts of tax and expenditure changes. Their paper systematically explored the impact of changes in tax rates and expenditure adjustment on economic activity and the government debt-to-GDP ratio. Burgert and Wieland focused specifically on two types of scenarios. In the first scenario, a permanent change in tax revenue was fully accommodated by a permanent change in transfer expenditure, stabilizing the debt to GDP ratio at the initial steady-state level. In the second scenario, the change in tax revenue was ultimately offset by a change in interest paid on debt at a new steady-state debt-to-GDP ratio. Apart from changes in labour income taxes, the authors also focus on changes in consumption and capital taxes.

The authors find that consolidation strategies based on tax increases depress economic activity in the long-run. This result confirms earlier research within structural macroeconomic models on the distortive effect of taxes. If the fiscal room obtained from lowering government debt is used to lower taxes, real GDP, household consumption and hours worked will increase in the long-run. Overall, the stimulating effect from income tax reductions is greater that from consumption or capital tax reductions. Moreover, Burgert and Wieland's transfer-based consolidation in which the budgetary room from a reduction in transfers is used to – at the same time – reduce taxes and to lower debt, allows for a stimulation of economic activity not only in the long-run, but also in the short-run. Their result therefore complements earlier research (e.g. by Coenen, Mohr and Straub, 2008) that indicated a trade-off between long-run benefits and short-run adjustments where a single fiscal instrument is used. In their analysis, Burgert and Wieland consider 25 per cent of euro zone households to be credit-constrained, that is, without access to financial intermediation. Their model simulations, however, do not take into account that a lowering of government debt may reduce sovereign risk premia. If this effect were to be included, the expansionary effect of fiscal consolidation would be increased.

In the afferent discussion, Werner Röger (European Commission, DG ECFIN) stressed that although the observations of Burgert and Wieland were consistent with the pre-crisis macro-economic thinking, these had also been questioned. He exemplified the latter by referring to a study of Perotti (2012) who expresses a general criticism about the feasibility of expansionary consolidations in the short run. Furthermore, he argued that additional objections can be raised in the current economic crisis. Röger also noted that the authors of the study did not explicitly model credit frictions and had either no or a very small share of credit constrained consumers. In Röger's view this was an important reason why the policy experiments of Burgert and Wieland yielded positive private consumption effects already in the short run, despite of a massive reduction of transfers which was only partly compensated by reduction of taxes. Röger also suggested that by changing some of the modelling assumptions, the negative fiscal multiplier associated with the recommended consolidation strategy did not hold. Nevertheless, he saw in the proposed strategy an interesting option for consolidation.

Salvador Barrios and Bert Saveyn (European Commission, DG Joint Research Centre), provided a joint discussion of the presentations by Burgert and Wieland and by Keen. They discussed relevant issues that were not considered in Burgert and Wieland's paper, namely that in many euro area countries the private credit channel is seriously impaired and high private indebtedness (of both households and enterprises) prevent consumption or investment increase in the short and, in many cases even, the medium term. Hence, they foresaw that the expected positive effect of public debt reduction on interest rate levels and private agents' consumption and investments was likely to be limited. Another aspect was that it was unrealistic to operate tax cuts while struggling to increase revenue. As an alternative, the discussants suggested tax shift reforms.

Barrios and Saveyn also argued when discussing Keen's presentation, that social acceptance of tax reforms was a key ingredient for their success. They considered equity concerns an integral part of an optimal tax policy and claimed that measures such as VAT tax harmonisation should be accompanied by complementary policies for low income households with the view to improving the political feasibility of reforms. As the distortionary effects of such reforms are not properly reflected in DSGE models, they suggested complementing these with additional analysis (e.g. computable general equilibrium or quasi-static models, microsimulation models).

Savina Princen (European Commission, DG ECFIN) gave a presentation on how consolidation efforts on the tax side can be measured using discretionary tax measures (DTM). Princen argued that this bottom-up approach – which added up all the individually defined discretionary measures – can be more appropriate in times of large shocks than the traditional top-down one, correcting directly total revenues from their estimated cyclical components. She compared the sum of DTM with the change in the cyclically adjusted revenue and obtained a similar trend for the pre-crisis period and the start of the crisis with both measurements.

Princen also analysed the size, composition and cyclicality of DTM in the EU in the period 2001-12. Regarding the size and composition of DTM, the share of DTM was almost nil on average (less than 0.1% of GDP) in the EU, largely because DTM cancelled out over the period 2001-12 and differed widely across countries. On the relationship between discretionary measures and the business cycle, the use of DTM seems to be mainly related to shifts in policy regimes – caused by changes in the economic context – rather than reflecting a regular cyclical pattern.

Gary Tobin (Ministry of Finance, Ireland) highlighted the key elements to a successful economic recovery from the Irish economic and fiscal crisis and focussed on public finance issues. He noted that Ireland had narrowed and hollowed out its tax base in the past. Since the crisis, the strategy was to broaden the base at both ends of the income spectrum, in order to keep the nominal tax rates low while increasing the effective rate in a fair way. He also pointed out that revenue-raising measures across all areas had been implemented or planned – income, capital, indirect, expenditures, reliefs and incentives.

Simultaneously, Tobin highlighted that the process of fiscal consolidation in Ireland had been underway long before the country entered in the Economic Adjustment Programme. An

adjustment of around EUR 10 billion (equivalent to about 6% of GDP) had been already implemented on the revenue side. He stressed that a significant element of the revenue adjustment was front-loaded. Tobin also presented two case studies of tax reform measures, which were considered to be a success. The first case corresponded to the introduction of the Universal Social Charge, which had the scope to broaden tax base, simplify taxation structure, remove poverty traps and create a sustainable and efficient charge. The second case referred to the temporary reduction of the VAT (at 9% from 13.5%) – targeted mainly at labour intensive goods and services relating to tourism – in order to boost employment.

Vieri Ceriani (Undersecretary of State at the date of the workshop, Italy) presented the recent package of tax reforms adopted in Italy. He placed the reforms in the Italian macroeconomic context, characterised by no major imbalances – except for the high level of public debt – and no strong deterioration in the fiscal deficit during the years 2009-11. Against the background of a relatively high tax-to-GDP ratio, the revenue-side measures taken at the end of 2011 (so called 'Salva Italia' decree) aimed at reducing the tax burden on labour and capital, while increasing taxes on property, financial assets and specific luxury assets. In parallel, measures to increase compliance were introduced. The strategic framework for tax reform was set out in the 'Delega fiscale', which envisaged further strengthening of the recent reforms, particularly in the area of company (ACE for new equity) and property taxation (updating of cadastral values) from a growth enhancing perspective.

2.2 Session on the redistributive effects of consolidation on the revenue side

The second part of the workshop, on the redistributive effects of consolidation on the revenue side, was chaired by Georg Fischer (European Commission, DG EMPL). He recalled that the purpose of the session was to present the current knowledge and to exchange experiences on how consolidation measures may impact income redistribution.

John Hills (London School of Economics) opened the second session exploring some of the equity issues that were crucial to guide decisions relating to the composition of fiscal consolidation measures. He highlighted eight different meanings of 'social equity' and noted that only in two of them a set of regressive measures would be consistent with the concept of social equity. Several of the other interpretations of social equity would suggest that recovery measures should be progressive and at least that they should not be regressive. Hills also set out the options that could be used by governments to improve the fiscal balance and then compared the impacts of public spending cuts and of tax hikes. When looking at some specific measures, he pointed that, in order to avoid visible increases in tax rates, higher revenue could also be collected by widening the base of particular taxes. Using the UK example, he showed that, unless compensated, broadening of the VAT base would be regressive because exemptions and reduced rates often correspond to a larger share in the consumption basket of the poorer than richer households. Furthermore, much of the revenue from VAT base broadening would be lost on compensations, if the latter were to be set up.

Hills also referred to higher carbon taxes that not only would generate more revenue, but also would correct an externality. This tax again is expected to be regressive and would result in

social equity problems in the absence of carefully designed offsetting measures. Hills then discussed the issue of taxing wealth and argued that greater taxation of wealth would offer revenue-raising, economic efficiency, and social equity advantages. Nevertheless, this option might face political and administrative impediments. As regards the adverse distributional effects of general cuts in public spending, he argued that these could be moderated by making benefits and services more targeted or selective. However, targeted spending cuts can create or exacerbate efficiency problems that may be far worse than those of the increase in general tax rates that governments are trying to avoid. Answering the central question of the presentation, Hills concluded that the use of all available tax bases – and tax rates – was necessary to protect social equity, rather than choosing between them. This encompassing approach was likely to be more equitable than most forms of spending cut.

Marcel Gerard (Catholic University of Louvain) stressed that, regardless of whether fiscal tightening was the best solution for restoring trust and fostering recovery and growth, those who suffered the most as a result of austerity programs were the poorest and not those who could be blamed for the current crisis, like the bankers and other among the richest. Furthermore, he pointed to the opinion of the IMF, which considered that fiscal consolidation measures tended to worsen inequality, and emphasized the current challenge to put the greatest burden on those who had the largest shoulders. Gerard highlighted new options which were related to the current circumstances, namely that the ability-to-pay could be measured by the taxpayers' largest gains prior to the crisis. Or it could be linked to the responsibility for the crisis.

Gerard then proposed tax packages aiming at distributional neutrality, while trying also to suggest tax novelties. A first package combined a VAT increase and an income tax increase. A second tax package for distributional neutrality involves a combination of a CO2 tax and the distribution of energy vouchers to poor people. As regards tax novelties, he depicted the idea of taxing those who benefited from rents in the past, especially if their rent-seeking activities were in a way partly responsible for the current crisis, like financial activities. He also suggested introducing a two-sided tax on mobile telephone calls or on e-mails, which might generate large revenue with small distributive effects. He then focused on the issue of tax rates and bases mobility. Gerard concluded that policy makers needed to make sure that tax increases were distributionally neutral, or at least neutral for lower deciles. He advised combining tax increases with compensations and urged leaders to be imaginative.

Thomas Piketty (Paris School of Economics) discussed the perennial question of whether the rich should pay for fiscal adjustment by presenting the historical developments in the top incomes and in wealth. He then made a proposal for a European wealth tax and discussed alternative policy options. Using the World Top Income Database, which included annual series covering most of the 20th century for over 25 countries around the world, Piketty analysed the dynamics of wealth and income distribution. The latter revealed that in continental Europe, the rise of top income shares started later than in the United States and was quantitatively much smaller. Hence, the income concentration remained much lower in continental Europe than in the US.

He then presented another study which analysed how and why aggregate private wealth national-income ratios evolved in the long-run. The study provided evidence of much higher wealth-income ratios in Europe compared with the US. Thus, Piketty saw more scope for the taxation of wealth in Europe rather than of income. He estimated at 125% of EU GDP the wealth tax base for the very rich (i.e. those holding 1% of the wealth). Piketty admitted that other options (especially the increase of corporate tax) were also possible, but these would raise less revenue. He suggested introducing a wealth tax at the EU level to help Member States raise tax revenue in the context of fairly high mobility of capital.

Francesco Figari (University of Insubria and ISER – University of Essex), acting as a discussant of Piketty, considered the European wealth tax suggested by Piketty as a promising option in order to raise extra revenue, but also to reduce wealth inequality. He argued that such a tax could enhance the intergenerational social mobility and promote equal opportunities across individuals. He then highlighted that the suggested wealth tax and the fiscal union are based on some common pillars – i.e. fiscal rules and policy coordination, fiscal equalisation, and an EU-wide tax.

Figari also underlined three important aspects to be considered when designing such a tax: namely (i) it should ensure the equality of taxation for all forms of personal capital income; (ii) it should address the issue of the increased mobility of the tax base and the potential easy access of wealthy households to tax havens; (iii) it should be accompanied by a relatively high tax-free allowance in order to avoid an additional burden on lower income people with relative high value assets (e.g. housing assets). Finally, he remarked that the same type of policies can have different distributional impacts across countries and that taxation of wealth has not kept the pace with the increasing importance of financial and housing wealth.

In the last part of the session, Thomas Larsen (Ministry of Taxation, Denmark) and Madis Aben (Ministry of Finance, Estonia) looked into country-specific experiences in distributing income through the tax system. Based on the Danish experience, Larsen pointed out that governments shall seek fully financed tax reforms, bearing in mind that the degree of self-financing of spending cuts (or tax increases) are lower than the degree of self-financing of spending increases (or tax decreases). He also stressed the need to focus either on temporary measures with limited impact on long-term growth and sustainability or on any other measures that affect the real economy only in a limited way.

Madis Aben noted that distributional consequences were not considered at all while making radical fiscal changes in Estonia, since the priority of tax policy in this catching-up economy remained the collection of revenue in a way promoting the economic efficiency and individual responsibility. However, the share of population in absolute poverty almost doubled during the crisis (approximately 12% of population). According to an OECD report (2012), the low level of short-term income support places Estonia among the EU countries with the highest poverty among those without work. Issues as fairness, general welfare and distribution of income are not popular subjects in Estonia, rather these issues are raised by neutral observers from abroad (OECD, etc.).

2.3 Concluding policy panel

The concluding policy panel discussion highlighted a number of issues, some of which were only mentioned in passing in the previous two sessions. The importance of international cooperation in terms of exchange of information was emphasised. It was also considered important to reduce the legal uncertainty affecting the tax system and to simplify it in order to increase its efficiency, all other things being equal. Reform designers needed to avoid fast changes, unclear tax codes and complex tax systems. The reforms themselves should be more persuasive, with stronger social elements. Realities were complex: one needed to pay attention also to unintended consequences of action, since it was too easy to assume that distributional consequences could simply and easily be corrected away. Although compensations were often seen as a solution, side effects of compensation mechanisms should not be ignored in practice. Furthermore, people did not often believe in them.

Panellists stressed that, obviously, tax policy cannot be regarded as a universal solution for solving budgetary problems. Policy makers shall pay attention to the interactions of tax policy with non-tax policy. They should also look for innovative non-tax instruments (e.g. in the environmental area). The interaction of taxes with other policies might prove critical. As regards longer-term tax reforms, it was stressed that financial sector taxation could play an important role, although market regulation may be as efficient as tax policies in a number of cases.

It was also argued by some panellists that the initiatives for significant tax reforms at the EU level met resistance at Member States level. Thus, decision-making with qualified majority would ease the adoption process. However, whether there is a willingness from the side of Member States to accept such a change remains an open question.

Last but not least, the importance of identifying the right tax bases was a major issue, since broad tax bases may comply with textbook recommendations but may not be exempt from economic distortions. Therefore, general recommendations on the adequate tax structure should be completed by proper consideration of the detailed design of specific tax bases.

Lucio Pench (European Commission, DG ECFIN) closed the workshop stressing once again the great policy-relevance at the current juncture of the two topics discussed. This workshop confirmed the fruitfulness of the dialogue between policymakers and academics and the pertinence of exchanging country-specific experience.

3. SESSION I: Consolidation on the revenue side and its macroeconomic impact

3.1 Tax policy for Consolidation and Growth

*Michael Keen**

Making tax policy is rarely easy, but right now it is exceptionally hard. Revenue instruments need to play their part in restoring fiscal sustainability, minimize adverse impacts on activity levels, be as supportive as possible of long-term growth and, at the same time, respect equity objectives. The challenges are profound.

This brief note considers just a few aspects of these challenges – a fuller account, with policy advice that was more or less standard at the start of the crisis, is in IMF (2010a). The focus is on those that are most novel. For in many cases decisions are having to be made on the basis of knowledge that is increasingly realized to be imperfect, and to address problems that had hardly recognized before the crisis.

3.1.1 The near-term

Multipliers

For the near-term, the size of fiscal multipliers has again emerged as a topic of considerable interest and controversy. Recent evidence suggests they are larger in recessions (Auerbach and Gorodnichenko, 2012) and perhaps larger than previously thought (Blanchard and Leigh, 2013). But the crisis has also brought the realization that we know almost nothing about how multipliers vary across tax instruments. Some signs have emerged that the ranking of instruments by short-run multipliers may be quite different from that in terms of long run growth. While the evidence suggests, for instance, that relatively heavy reliance on the VAT is conducive to growth (as discussed below), there are now signs that the contractionary effects of a VAT increase can be particularly pronounced (Riera-Crichton and others, 2012). This potentially faces policy-makers with a new set of tradeoffs – between impacts on short and longer-term growth – in deciding how best to consolidate.

Fiscal devaluation

One potential reform that attracted particular attention in the early stages of the crisis was that of shifting from the employers' social contribution (ESC) to consumption taxes (notably the VAT) as a way of addressing competitiveness problems in troubled Eurozone countries. The idea was that with fixed nominal (pre-employee level charges), the cut in social contributions would reduce labour costs and hence the foreign prices of exports; while the increase in the VAT, applying to imports and domestic production alike, would preserve the implied increase in the relative domestic consumer price of imports. The effect would only be temporary, of course, as wages would be expected to adjust to the now-higher domestic consumer price level; but it would be welcome nonetheless.

The empirical evidence suggests that such a strategy could indeed increase net exports: for a panel of OECD economies, de Mooij and Keen (2013) find, in some specifications, a short run increase in net exports from a shift of one per cent of GDP ranging between 1 and 4 per cent of GDP. Few countries, however, have adopted large reforms of this kind. This seems to

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have reflected both the inherent danger to revenue of embarking on reforms large enough to have a marked effect and resistance to the distributional implications of the higher VAT rate (compensation for which would have eat into the impact of the reform). Some noted too that the effectiveness of such a reform in any one country would be reduced if others did the same – as with downward competition in rates of corporate taxation. There is a difference however. Competition in corporate tax rates can plausibly lead to a situation in which all countries are worse off than they were initially: they end up making less use of a relatively non-distorting instrument. The downside of a fiscal devaluation would be limited, however, since the end-point would in any case likely be a less distorting tax system than the initial one.

3.1.2 The medium- and longer-terms

Hierarchies of taxes?

For the medium and longer-term challenges, empirical work at the OECD[3] has pointed to a useful 'hierarchy of taxes' in terms of their (relative) growth friendliness: property taxes (especially recurrent taxes on personal residences) come at the top, followed by consumption taxes, the personal income tax and last the corporate tax. Results of Arnold and others (2011), for instance – which actually refer to effect not on growth rates directly but on long-run income levels – imply that shifting one per cent of tax revenue from income to consumption taxes – which might mean increasing the standard VAT rate by something in the order of one percentage point – increases long run per capita GDP by 0.25-1 per cent.

This hierarchy is enormously convenient for broadly policy advice, and has doubtless proved especially appealing because it likely matches the profession's priors. But there are several reasons for caution.

Empirically, the results may not be entirely robust: Xing (2012) finds, for instance, that allowing heterogeneous responses across countries removes the difference between the personal and corporate income taxes. And Acosta and others (2012), on a wider data set, do not find such adverse effects from the corporate tax.

Conceptually, it is not always clear as it may seem precisely how to interpret the results. It is well-known, for instance, that with perfect capital markets a uniform rate VAT is equivalent to a flat tax on wage income. So if the VAT is 'better' for growth than the personal income tax, presumably the difference is to do with the taxation of savings, or perhaps progressivity considerations. But if so, the policy recommendations may be quite different: to reduce the progressivity of the PIT, for instance, rather than shift to the VAT.

Moreover, the advice that emerges from the hierarchy is highly generic. The empirics presume, for instance, that all VATs, and all corporate income taxes, are the same – which they are manifestly not, and in ways likely to matter for growth. A CIT that bears only on rents, for instance, is likely to have less effect on investment than one with a high marginal effective tax rate. And there is now evidence, for instance, that it may matter a good deal for growth whether a shift towards the 'growth friendly' VAT is accomplished by raising the standard rate or by broadening the base (Acosta and others, 2013).

[3] Building on the important work of Kneller and others (1999).

Suggestive though the hierarchy results are, tax policy making thus requires a close look at instrument design – and at a wider set of instruments. And for this it is natural to look first to the instruments likely to do least damage: those that correct pre-existing distortions, and those that bear on rents.

New instruments to reduce distortions and raise revenue

The most obvious distortions in want of correction are environmental ones. And the most obvious of these are in relation to carbon emissions. Here there is scope in the EU, for example, for more rapid transitions to full auctioning of emission rights, and a need to widen the scope of the Emissions Trading Scheme (to include international aviation for instance and maritime transport). The potential contribution to revenue needs is substantial: proposals in the US, for instance, could have raised around 0.5 per cent of GDP (with full auctioning). More generally, in many advanced economies the interaction of complex energy tax system, regulatory interventions and trading schemes have produced structures lacking the coherence needed to properly address revenue and environmental concerns – a point made powerfully for the U.K., for instance, in the *Mirrlees Review*.[4]

A further set of externalities brought to the fore in the crisis are those from the distress and failure of systemically important financial institutions. Addressing these is primarily a role for regulatory policy, but there has been increasing interest in the possibility of a complementary role for tax measures – if only to go some way to offset the impact on financial institutions of the general 'debt bias' taken up below (Keen, 2011). Indeed a dozen or so EU countries have adopted forms of bank levy since the crisis (generally bearing on something approaching wholesale borrowing). The emerging evidence is that these have indeed had a marked impact on bank borrowing (Devereux and others, 2013). The issue now is whether these should be strengthened and better coordinated across countries, in terms of both design and double tax arrangements.

The financial crisis also brought to the fore the anomalous VAT treatment of financial services: largely because no-one understood how to bring them fully into the system when the EU VAT was designed in the 1970s, these are predominantly exempt. Now it is understood better how this can be done (see for example Poddar and English (1997)), though practical concerns continue to linger. In any event, full inclusion in the VAT seems a remote prospect, so that simpler (if imperfect) fixes warrant attention. One such is the 'Financial Activities Tax' (FAT) proposed in IMF (2010b), which (in its simplest form) would be a charge on the sum of the wages paid by and profits of financial institutions. The issues here are complex, in terms of assessing the welfare and revenue implications of both current arrangements and those under the FAT. And the political momentum has clearly been instead with the financial transactions tax. But the revenue and efficiency issues at stake are so large that inaction in this area remains a significant concern.

Reducing distortions by reforming existing instruments

Taxing rents

There may be scope too for increasing taxes on rents – that is, on returns in excess of those required by investors – their appeal being that these are in principle non-distorting (at least,

[4] Mirrlees and others (2011).

and this is a big qualification, if these rents cannot be moved abroad by either real or avoidance activities). Explicit taxes of this form are most often observed in the natural resource sector, and here several G20 countries remain surprisingly reliant on distorting royalties rather than the various forms of rent tax available (described, for instance, in Daniel and others, 2010). Achieving this may not be easy, as Australia's experience in attempting to move in this direction showed. But the need now faced in several countries, advanced and other, to decide the tax treatment of unconventional energy sources provides an opportunity to shift towards more effective resource tax regimes.

The crisis has prompted awareness of potentially large rents in other areas too, notably in the financial sector, one potential source being an implicit subsidy (through reduced borrowing costs) to institutions regarded as too big to fail. The bank levies mentioned earlier can be seen as partly addressed to these, and a few countries have made some attempt to reach them by (generally temporary) bonus taxes. The most coherent approach to taxing such rents, however, would be to reform the existing corporate tax system into (or add to it) one on rents. The 'Allowance for Corporate Equity' (ACE) form of corporate tax is attracting particular attention in this context. Such a system would allow a deduction not only for interest payments, but also for a notional return on equity: the base, in present value, would thus be returns in excess of normal.[5] Such a system, or variants, have now operated with some success in a number of countries, including Belgium, Brazil, Croatia and Austria; Italy has also recently moved to an ACE.

The downside of the ACE is that it is base-narrowing, and so revenue-losing. But the loss can be limited by giving the allowance only for equity issued after introduction: and current low interest rates mean the immediate loss could be quite limited.

Addressing Debt Bias

An important upside is that one aspect of the neutrality of the ACE is that it largely eliminates 'debt bias': the corporate-level tax preference for debt that arises when interest, but not the return to equity, is deductible. The crisis has taught us that the welfare cost of excess leverage – especially in the financial sector – may be much higher than previously thought. And recent work has confirmed that this tax bias has indeed led banks to be significantly more leveraged than would otherwise be the case (de Mooij and Keen, 2012), with the implication that reducing this bias would generate substantial welfare gains (de Mooij and others, 2013).

3.1.3 Concluding

All this of course vastly understates the challenges that tax policy makers face. Perhaps most important, little attention is paid above to equity concerns, which are addressed elsewhere in this volume. And additional new issues have emerged even in the last months, most notably in relation to tax avoidance by multinationals – new not as an issue itself, but in policy makers' commitment to address it. Tax policy continues to be under almost unprecedented pressure, and several countries have made important achievements in terms of the primary objective of mobilizing revenue. It remains to be seen whether tax systems will emerge from these hard times more or less sound than when they went into it.

[5] For more on the ACE, see Devereux and Freeman (1991) and, on experience in practice, Klemm (2006).

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3.2 The role of tax policy in fiscal consolidation: Insights from macroeconomic modelling

*Matthias Burgert and Volker Wieland **

Abstract

The purpose of this study is to evaluate how tax policy may be used in the design of a fiscal consolidation strategy so as to mitigate or avoid a decline in economic activity. To this end, we make use of structural models of the euro area to provide a quantitative assessment of the short- and long-run impacts of tax and expenditure changes and debt reduction. These models account for short-run nominal rigidities and other economic frictions as well as the distorting effects of taxes on the incentives for work and production. We find that tax increases depress economic activity. By contrast, consolidation achieved by expenditure cuts while avoiding tax increases or even lowering taxes is expansionary in the short-, medium- and long-run.

3.2.1 Introduction

Government deficits and indebtedness have risen around the world following the global financial crisis and recession. A number of European economies and members of the euro area continue to experience severe fiscal crises. The sustainability of their government finances is in doubt. Even the euro area as a whole is faced with a drastic increase in the overall government deficit and debt.

Figure 1 shows how total government expenditures and revenues in the euro area diverged after 2006. The left-hand-side panel measures expenditures (grey line) and revenues (black line) as a percentage of pre-crisis euro area GDP in 2006. Government spending increased between 2006 and 2010 by almost 8 per cent of 2006 GDP and flattened out in 2011. Revenues fell in 2009 due to the recession but recovered in 2010. By 2011, they exceeded the 2008 peak by about 2 per cent. According to the European Commission's estimates (dotted lines) expenditures and revenues both rise in 2012 though revenues a bit more swiftly than expenditures. Relative to current GDP (right-hand-side panel), revenues have stayed fairly flat throughout the crisis years while expenditures have risen substantially. Importantly, the ratio of expenditures to current GDP in 2012 is projected to remain almost 4 percentage points above the pre-crisis ratio.

As spending has exceeded revenues, government debt has risen rapidly as indicated in Figure 2. In 2006, euro area government debt amounted to a bit less than 70 per cent of euro area GDP. In 2012 it is estimated to exceed 90 per cent of GDP. Sustainability of government finances requires stabilizing debt at a level relative to GDP that can be anticipated to be maintained in the future. The sustainable ratio may differ across euro area member economies, because it depends on economic and political institutions and market perceptions of their functioning. Even so, the fact that the euro area average has risen far beyond the

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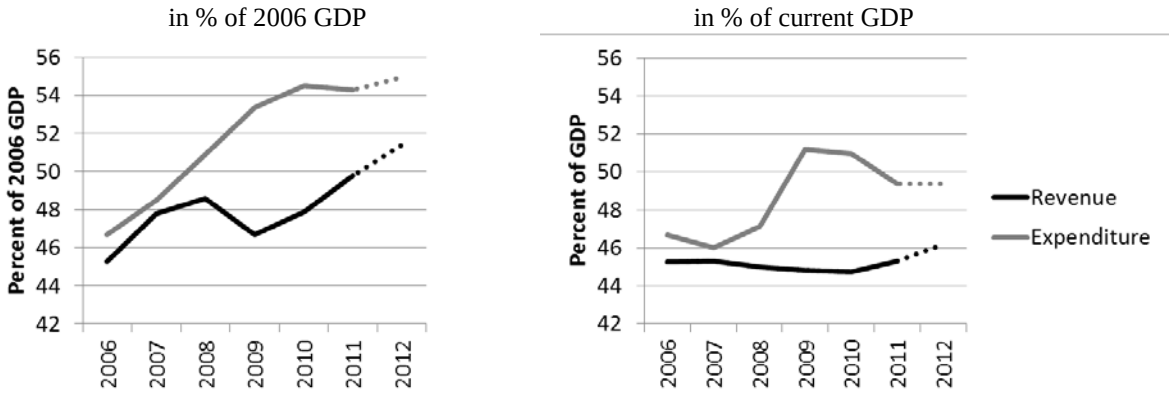
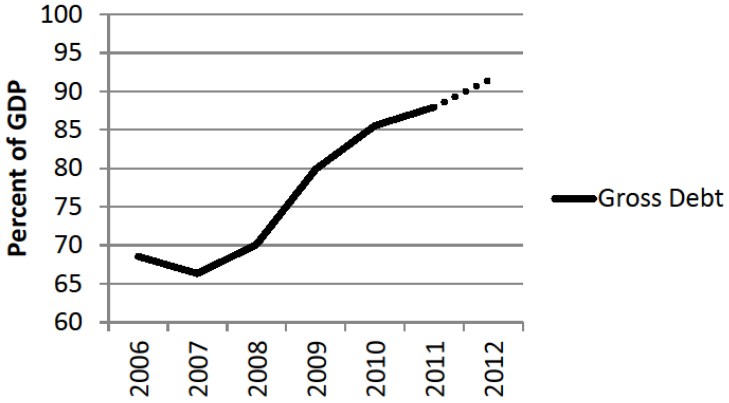
original safety margin of 60 per cent envisioned in the Stability and Growth Pact underscores the need for consolidation, not only in debt crisis countries, but also across the area as a whole.

Figure 1: Total government expenditure and revenues in the euro area



Notes: Data are taken from the European Commission's AMECO database. Dotted lines refer to 2012 estimates of the European Commission.

Figure 2: Gross government debt in the euro area



Notes: Data are taken from the European Commission's AMECO database. The chart shows gross debt relative to current euro area GDP. The dotted line indicates the 2012 estimate of the European Commission.

Consolidation of euro area government finances requires bringing expenditures in line with revenues and reducing the outstanding debt. Debt need not necessarily be reduced in absolute terms, but certainly relative to euro area GDP. Ideally, such a reduction in the debt to GDP ratio is achieved by growing GDP faster than government debt. To this end, tax policy plays a central role. Changes in certain tax rates will not only have a direct effect on the magnitude of government revenues, but they will also impact on the incentives to work, consume, save, invest and produce, and thereby have a lasting effect on growth.

The objective of this study is to evaluate how tax policy may be used in the design of a fiscal consolidation strategy so as to mitigate or avoid a decline in economic activity. To answer this question, it is necessary to employ a structural macroeconomic model that accounts for the endogenous interaction of government expenditures and taxes with household and firm decision making in determining overall economic activity. We utilize New-Keynesian dynamic stochastic general equilibrium models to assess short- and long-run impacts of tax and expenditure changes quantitatively. These models account for short-run nominal

rigidities and other economic frictions as well as the distorting effects of taxes on the incentives for work and production.

Earlier research using such models (cf. Coenen, McAdam and Straub (2008) and Coenen, Mohr and Straub (2008)) has confirmed that lowering taxes ultimately induces greater economic activity and employment. While this result had previously been established within a neoclassical or real-business-cycle framework, their research took into account imperfect competition and price and wage rigidities as well as other real economic frictions and adjustment costs and international spillover effects. With regard to fiscal consolidation, however, Coenen, Mohr and Straub (2008) concluded that the long-run benefit that results from using the improvement in the budgetary position to reduce tax rates can only be achieved by accepting noticeable short-run adjustment costs. They considered consolidation strategies that used a single fiscal instrument, for example, either reductions of government consumption followed by increases later on, or increases in labour income taxes followed by lower tax rates once government debt has been reduced.

The finding of Coenen, Moor and Straub (2008) stands in contrast to empirical studies that identified expansionary fiscal consolidations (cf. Giavazzi and Pagano (1990), Alesina and Perotti (1995), Alesina, Favero and Giavazzi (2012) and Alesina and Ardagna (2012)). Typically, such expansionary consolidations were associated with expenditure cuts rather than tax increases. Recently, Cogan, Taylor, Wieland and Wolters (2012) showed how to reconcile these findings with a version of the model used in the Coenen et al. studies. They evaluate a practical consolidation strategy modeled on the 2013 Budget resolution passed in March 2012 by the U.S. House of Representatives.[6] In their model simulations GDP rises in the short run upon announcement and implementation of this strategy and remains higher than in the baseline in the long run. The strategy imposes reductions in government purchases and transfers that are weighed more heavily to the latter expenditure component. Government savings are partly used to lower the labour income tax rate (or to avoid an impending increase that would be required for sustaining increased spending) and partly to lower government debt.

This paper systematically explores the impact of changes in tax rates and expenditure adjustments on economic activity and the government debt-to-GDP ratio. Specifically, we focus on two types of scenarios. In the first type of scenario, a permanent change in tax revenue is fully accommodated by a permanent change in transfer expenditure, stabilizing the debt to GDP ratio at the initial steady-state. In the second scenario, the change in tax revenue is ultimately offset by a change in interest paid on debt at a new steady-state debt-to-GDP ratio. We study primarily increases and reductions in labour income taxes but also analyse changes in consumption and capital taxes.

Our benchmark model is the modified version of the Coenen, McAdam and Straub (2008) (CMS) model employed by Cogan et al. (2012). While Cogan et al. explore the impact of U.S. tax and expenditure changes on the U.S. part of the model, which they have re-parameterized with empirical estimates from Cogan, Cwik, Taylor and Wieland (2010), we evaluate the impact of euro area tax and expenditures changes in the euro area part of the

[6] House Concurrent Resolution, 112th Congress, 2nd Session, House Report No. 112, March 2012.

model, which is parameterized as in Coenen et al. with estimates from Smets and Wouters (2003). The Coenen et al. (2008) model is sometimes called the New-Area-Wide Model (NAWM), because an estimated version of this model has replaced the so-called Area-Wide-Model (AWM) in European Central Bank policy analysis.[7]

Because of modelling uncertainty, it is important that policy evaluations be robust to alternative assumptions. For this reason, we employ a second model of the euro area built at the European Commission, namely the open-economy model of Ratto, Röger and in't Veld (2009). This model was estimated with quarterly euro area data from 1981Q1 to 2006Q1 thereby including a large part of EMU history. The authors named their model 'QUEST III' and we refer to it as the 'EU-Quest' model.

We find that tax increases depress economic activity. By contrast, consolidation achieved by reducing transfers and accompanied by lower taxes is expansionary in the short-, medium- and long-run. To be clear, the tax cuts are relative to a baseline, which, if it corresponds to the actual current outlook for the euro area economy, may well include tax increases. Thus, in terms of practical implementation, the consolidations we study could simply deviate from such a baseline outlook by avoiding tax increases.

The remainder of the paper is organized as follows. First, we review the findings of the earlier studies highlighted above in more detail. Then, we describe the properties of the macroeconomic models that we use to evaluate the role of tax policy in fiscal consolidation: the New Keynesian model of the United States and euro area economies of Coenen, McAdam and Straub (2008) and more briefly the euro area model of Ratto, Röger and in't Veld (2009). We focus specifically on the government sector and fiscal aspects of household decision making. The fourth section analyses the impact of permanent changes in income taxes that are accommodated in the long-run either by changes in transfers or debt service. The fifth section summarises the impact of taxes on consumption and capital. The short-run effect of a constraint on monetary policy accommodation arising from the zero bound on nominal interest rates is analysed in section 3.2.6. Section 3.2.7 uses the EU-Quest model of Ratto et al. for a model comparison exercise. Section 3.2.8 concludes. The appendix contains a complete description of the modified version of the CMS model from Cogan et al. (2012).

3.2.2 A brief review of some recent findings

In the following we shortly review the main findings of the studies mentioned in the introduction. We start with the analysis of tax reductions and fiscal consolidation in the Coenen et al. (2008) studies. Then, we summarize results obtained by recent contributions to the empirical literature on expansionary fiscal consolidation such as Alesina and Ardagna (2012) and Alesina, Favero and Giavazzi (2012). Finally, we review the fiscal consolidation strategy that Cogan, Taylor, Wieland and Wolters (2012) found to be expansionary in simulations of their version of the Coenen at al model.

[7] We have made our implementations of the AWM, NAWM and other models available online in a new macroeconomic model archive (see http://macromodelbase.com.). The model comparison approach is presented in Taylor and Wieland (2012) and Wieland et al. (2012).

Coenen, McAdam and Straub (2008) and Coenen, Mohr and Straub (2008)

Nobel laureate Edward Prescott proposed higher taxation in Europe as the main factor explaining lower employment relative to the United States (see Prescott (2004)). Coenen, McAdam and Straub (2008) put this explanation to the test by using their two-country large-scale New-Keynesian DSGE model for evaluating the long-run impact of a reduction of tax rates on economic activity. Their model simulations indicate that lowering tax distortions in the euro area to levels prevailing in the United States would induce substantial increases in hours worked and output. Specifically, they consider a reduction of euro area consumption and income taxes as well as social security contributions to U.S. levels. In the long-run, such a tax reform raises hours worked by 13.7 per cent and output by 11.9 per cent in the euro area part of their model. Interestingly, there is also a positive spillover effect to U.S. output of about 0.5 per cent in the long run. In this simulation, the debt-to-GDP ratio is stabilized at the initial steady-state.

Coenen, Mohr and Straub (2008) used essentially the same model to analyse the consequences of a fiscal consolidation, that is, a targeted reduction in government indebtedness. They evaluated the consequences of policies implemented to reduce the government debt-to-output ratio from 70 per cent to 60 per cent. The settings of fiscal instruments were determined by a simple fiscal rule.

To give an example, Coenen, Mohr and Straub (2008) used the following rule for varying the income tax rate, τ^n relative to a target level $\tau^{n,*}$ so as to enforce a particular debt-to-GDP target B_t^*:

$$(\tau_t^n - \tau_t^{n,*}) S_{WN,t} = \varphi_B \left(\frac{B_t}{P_{Y,t} Y_t} - B_t^* \right) \tag{1}$$

where B_t refers to government debt, $P_{Y,t}$ to the price index and Y_t to real GDP. $S_{WN,t}$ denotes (pre-tax) real wage income, that is the relevant tax base for the labour income tax. The debt-to-GDP target B^* is reduced from 70 to 60 per cent. The target $\tau^{n,*}$ is the debt-neutral tax rate that is consistent with the long-run steady-state debt to GDP ratio. Effectively, this rule implies that the labour tax rate increases at first to generate additional tax revenue that is used to reduce government debt. In the longer-run, the tax rate converges to the new, lower debt-neutral rate. At this tax rate, the long-run reduction in tax revenue is made up by lower interest payments on the reduced level of government debt.

Coenen, Mohr and Straub (2008) also evaluate similar single-instrument rules for the consumption tax rate, transfers, and government purchases. They find that only the tax rate rules deliver long-run improvements in output and household consumption together.[8] The long-run effects are driven by shifts in the above-mentioned debt-neutral levels. The benefit to economic activity is greatest in the case of an income tax reduction. The transfers-based rule leads to long-run reductions in output and household consumption. The government

[8] We refer to the baseline version of their model, in which the equilibrium real interest rate and net foreign asset position do not vary with the target level of government debt.

purchases rule boots GDP in the long-run but at the expense of a reduction in household consumption.

Coenen et al. also compute the short-run effect of consolidation with single-instrument rules. They find that the expenditure reductions or tax increases that are necessary in the short-run to move the debt-to-GDP ratio on a downward path always involve substantial short-run adjustment costs in terms of lower output and consumption. Thus, they conclude that fiscal consolidation can have positive long-run effects on economic activity (particularly in the case of long-run tax reductions) but implies a reduction in economic activity in the short run. Their conclusions based on simulations of a structural macroeconomic model stand in stark contrast to the conclusions of the empirical literature on expansionary fiscal consolidation.

Alesina and Ardagna (2012) and Alesina, Favero and Giavazzi (2012)

Recent contributions to the empirical literature on case studies of fiscal consolidation include Alesina and Ardagna (2012) and Alesina, Favero and Giavazzi (2012). Alesina, Favero and Giavazzi (2012), for example, use the so-called narrative approach for analysing the impact of multi-period consolidation plans on economic growth. They identify consolidations that were associated with minimal or no negative impact on economic activity. Using data from 17 OECD countries collected by Devries, Guarjardo and Pescatori (2011) they conclude that spending based adjustments have been associated with mild, short-lived recessions, or no recession at all, while tax-based adjustments have been associated with deep and prolonged recessions. Their study contradicts the conclusion of Devries et al. (2011) that monetary policy is the explanation for systematic differences between tax-based and expenditure-based adjustments.

Alesina and Ardagna (2012) also confirm earlier studies (cf. Giavazzi and Pagano (1990), Alesina and Perotti (1995)) that found that fiscal adjustments based mostly on the spending side have been less likely to be reversed and have led to more lasting reductions of debt to GDP ratios. Furthermore, they conclude from their analysis that expenditure-based fiscal consolidations are correlated with smaller recessions than tax-based ones. They also identify cases with increased GDP growth during and immediately after spending based consolidations. Furthermore, they point out that episodes of expansionary fiscal consolidation are more likely to occur when consolidation is accompanied by reforms that lead to more efficient adjustments in labour and goods markets.

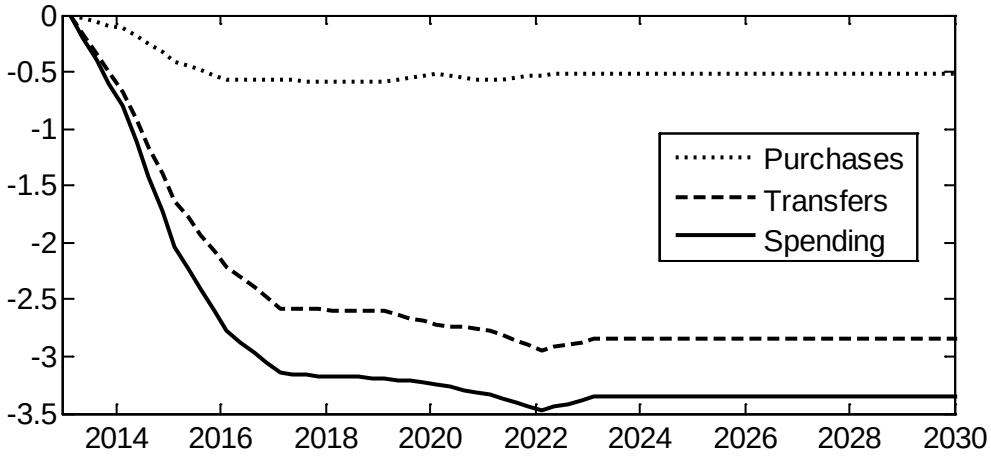
In light of the more pessimistic conclusions drawn by Coenen et al. (2008) from an evaluation of single-fiscal instrument rules for debt reduction in a structural macroeconomic model with a detailed fiscal sector, it is important to explore whether other fiscal consolidation strategies might be able to deliver outcomes that are closer to the cases identified by the above literature. A first example of an expansionary consolidation strategy is provided by Cogan, Taylor, Wieland and Wolters (2012) using a version of the model of Coenen, McAdam and Straub (2008).

Cogan, Taylor, Wieland and Wolters (2012)

Cogan et al. (2012) evaluate a plan modelled on the 2013 Budget Resolution passed in March 2012 by the U.S. House of Representatives. This plan contains reductions in both government purchases and transfer payments from their current trajectory. It could realistically be used to

reduce federal spending, and thereby, bring the U.S. federal budget deficit down from its current level of 9 per cent of GDP. Because the U.S. federal budget was close to balance before the crisis, (the federal deficit was only 1.3 per cent of GDP in 2007) this strategy would mitigate the size of any tax rate increase. Hence Cogan et al. argue that, relative to the 2012 policy baseline, long-run tax rates would be lower under this alternative strategy.

Figure 3: Cogan et al. (2012) fiscal consolidation strategy: percentage deviation of purchases, transfers and total spending from baseline as a share of GDP



Cogan et al. proceed to evaluate the impact of exogenous changes in government purchases and government transfers in line with the plans from the Budget Resolution (shown in Figure 3). The plan reduces transfers relative to the budget baseline by 2.5 percentage points, and government purchases by 0.6 percentage points. Most of these reductions occur relatively early in the ten year period; by 2015. The funds that become available by reduced federal spending are used to lower the labour income tax rate by about 5 percentage points relative to baseline with the remaining funds used to lower the debt to GDP ratio as implied by the budget constraint and the model of the economy. As a result of the announcement and implementation of these policy changes U.S. output and hours worked rise on impact, in the medium and in the long run relative to the baseline path. Thus, Cogan et al. (2012) provide an example of an expansionary consolidation in a version of the Coenen et al. structural model. They show that it is possible to explain the factors behind the expansionary consolidations identified by the empirical literature with structural model simulations. In the following, we explore the role of tax policy in inducing such consolidations more systematically. In doing so, we employ macroeconomic models of the euro area.

3.2.3 Macroeconomic models for evaluating the role of tax policy in fiscal consolidation

A quantitative assessment of the consequences of changes in taxes for the government budget, government debt and overall economic activity, consumption and investment requires a structural macroeconomic model that can account for the endogenous interaction of fiscal policy decisions and household and firm decision making. The two models we consider, the model of Coenen, McAdam and Straub (2008) and the model of Ratto, Röger and in't Veld (2009) are fairly large-scale New Keynesian dynamic stochastic general equilibrium models. These models allow us to disentangle the effects of certain changes in government policies on market participants' behaviour and expectations formation. Market participants are generally

modelled as thoughtful and aware of their interests, that is, rational and forward-looking individuals. However, they may be constrained in their decisions and options. And some of them may even behave in a more ad-hoc manner, following simple rules of thumb. In the short- and medium-run, the nominal and the real side of these model economies are interdependent. The models take into account nominal rigidities and the resulting interaction of fiscal with monetary policy making.

Tax policy in the model of Coenen, McAdam and Straub (CMS 2008)

The CMS model covers two large open economies, the United States and the euro area. Coenen et al. (2008) calibrate both economies symmetrically using parameter estimates obtained by Smets and Wouters (2003) with euro area data. Cogan, Taylor, Wieland and Wolters (2012) have modified the parameterization of the US part of the model using parameter values from Cogan, Cwik, Taylor and Wieland (2010) that were estimated using U.S. data.

Each economy contains households, firms, a fiscal and a monetary authority. In the following we describe the fiscal authority and some aspects of household decision making that are particularly relevant to fiscal policy. Parameter values for the U.S. and euro area parts of the model are reported together with a more complete set of model equations in the Appendix.

Taxes and household behaviour

There are two types of households indexed by *I* and *J*. The members of household *J* can smooth consumption only via holding money. Members of household *I* exhibit greater financial sophistication. They also consider buying domestic and foreign bonds and accumulating physical capital. Households maximize utility by choosing consumption, $C_{i,t}$, investment, $I_{i,t}$, next period's capital stock, $K_{i,t+1}$, the intensity with which existing capital is utilised, $u_{i,t}$, next period's holdings of domestic and internationally traded bonds, $B_{i,t+1}$ and $B^F_{i,t+1}$, and current period's money holdings $M_{i,t}$.

Household members take their decisions in a forward looking manner. Consequently, not only changes in fiscal policy today, but also anticipated future changes can have an immediate effect on households' decisions today. The budget constraint faced by members of household *I* is given by:

$$\begin{aligned}
&\left(1+\tau_t^C+\Gamma_\nu\left(\nu_{i,t}\right)\right)P_{C,t}C_{i,t}+P_{I,t}I_{i,t}+R_t^{-1}B_{i,t+1}+\left(\left(1-\Gamma_{B^F}\left(B_t^F\right)\right)R_{F,t}\right)^{-1}S_tB^F_{i,t+1}+M_{i,t}+\varphi_{i,t}\\
&=\left(1-\tau_t^N-\tau_t^{W_h}\right)W_{i,t}N_{i,t}+\left(1-\tau_t^K\right)\left(R_{K,t}u_{i,t}-\Gamma_u\left(u_{i,t}\right)P_{I,t}\right)K_{i,t} \qquad (2)\\
&+\tau_t^K\delta P_{I,t}K_{i,t}+\left(1-\tau_t^D\right)D_{i,t}+TR_{i,t}+B_{i,t}+S_tB^F_{i,t}+M_{i,t-1}.
\end{aligned}$$

$P_{C,t}$ and $P_{I,t}$ denote the prices of one unit of the consumption and the investment good, respectively. R_t and $R_{F,t}$ are the risk-less returns on domestic and internationally traded bonds, respectively. Internationally traded bonds are denominated in foreign currency. To obtain the domestic value they are multiplied with the nominal exchange rate S_t. $W_{i,t}$ denotes the wage,

$N_{i,t}$ denotes labour services, $R_{K,t}$ refers to the rental rate for capital services rent to firms, $u_{i,t}K_{i,t}$, and $D_{i,t}$ denotes dividend payments. δ is the depreciation rate of capital, while $\varphi_{i,t}$ constitutes state contingent securities that are traded by members of household *I* in order to insure against individual wage-income risk.

The budget constraint indicates some frictions that the household has to take into account. For example, consumption purchases are subject to a transaction cost Γ_v. Γ_{B^F} is a financial intermediation premium that the households must pay when buying internationally traded bonds. Varying the intensity of capital utilisation relative to its steady-state level is subject to a cost $\Gamma_u(u_{i,t})$.

The budget constraint also includes a number of different tax rates. Changes in these rates have direct effects on the consumption-savings choice, the labour supply decision, investment decisions and other choices made by household members in maximizing expected life-time utility. Households are faced with a tax rate, τ^C on consumption purchases and rates of τ^N and τ^K on wage and capital income, respectively. Furthermore, they pay social security contributions, τ^{W_h} from their wage income. Dividends are taxed at the rate of τ_t^D. Finally, households also receive lump-sum transfers TR_t from the government. We deviate from Coenen et al. (2008) by assuming that transfers are equally distributed between households of type *I* and *J*.

Taxes and the government budget

The government budget constraint is given by:

$$\begin{aligned} &P_{G,t}G_t + TR_t + B_t + M_{t-1} = \\ &\tau_t^C P_{C,t}C_t + \tau_t^N (W_{I,t}N_t^I + W_{J,t}N_t^J) + \tau_t^{W_h}(W_{I,t}N_t^I + W_{J,t}N_t^J) + \tau_t^{W_f} W_t N_t + \\ &\tau_t^K (R_{K,t}u_t - (\Gamma_u(u_t) + \delta)P_{I,t})K_t) + \tau_t^D D_{i,t} + R_t^{-1}B_{t+1} + M_t \end{aligned} \tag{3}$$

The left hand side denotes expenditures while the right hand side denotes revenues. In terms of expenditures G_t refers to direct purchases of the government in real terms, separate from transfers to households, TR_t, that are reported in nominal terms. $P_{G,t}$ is the government purchases deflator. B_t denotes governments that mature in the current period and have to be paid back. The value of newly-issued government debt that will mature in period *t+1* appears on the revenue side in period t, suitably discounted with the gross interest rate R_t. Though money does not formally mature, it is a form of government debt that pays zero interest. Thus, last period's money supply, M_{t-1}, is shown on the expenditure side, while period t money supply appears on the government revenue side. The difference is the additional seigniorage obtained in period *t*.

Government revenues raised by taxing consumption, dividends, wage and capital income and by charging social security contributions to employees and employers are all taken into

account on the right-hand side of equation (3). Tax rates and direct purchases are set by the government and treated as exogenous in our model simulations. Demands for government bonds and money are determined by household utility maximization and set according to the relevant first-order conditions.

Lump sum transfers TR_t are determined by the following reaction function:

$$\frac{TR_t}{P_{Y,t}Y_t} - TR_t^* = \varphi_{B_Y}\left(\frac{B_t}{P_{Y,t}Y_t} - B^*\right), \tag{4}$$

Transfers as a fraction of steady state nominal output are adjusted accordingly to the gap between target and actual debt as a share of nominal output. $P_{Y,t}Y_t$ is nominal GDP. TR_t^* is the debt-neutral level of transfers which is consistent with the target level of debt B^* in the long run. The long run stock of debt relative to GDP is determined jointly by the target B^* and the endogenous demand for government bond holdings of domestic and foreign households.

Tax policy in the EU-Quest model of Ratto, Röger and in't Veld (2009)

As a robustness check we will also evaluate the impact of tax changes in the context of fiscal consolidation in the open-economy model of the euro area developed by Ratto et al. (2009). This model was estimated with quarterly euro area data from 1981Q1 to 2006Q1 thereby including a large part of EMU history. The authors named their model 'QUEST III' and we refer to it as the 'EU-Quest' model. This model was built specifically for the joint analysis of fiscal and monetary policy and provides a thorough treatment of the government sector. It includes policy rules for government consumption, government investment and government transfers and uses data on these variables in estimation. It also accounts for distortionary taxes on consumption, capital and labour income. Another important departure from the assumptions made in standard DSGE models concerns the treatment of households. The model allows for the possibility that many households follow "rules of thumb" like the original Keynesian consumption function with a constant marginal propensity to consume, or that they are constrained to consume all their current income (see, for example, Gali, López-Salido, and Vallés (2007)). Ratto et al. (2009) estimate that 35 per cent of euro area households are constrained in this manner. This share is somewhat greater than the value estimated for the United States by Cogan et al. (2010) of 26.5 per cent.

3.2.4 The impact of permanent changes in income taxes under different assumptions concerning government spending and debt

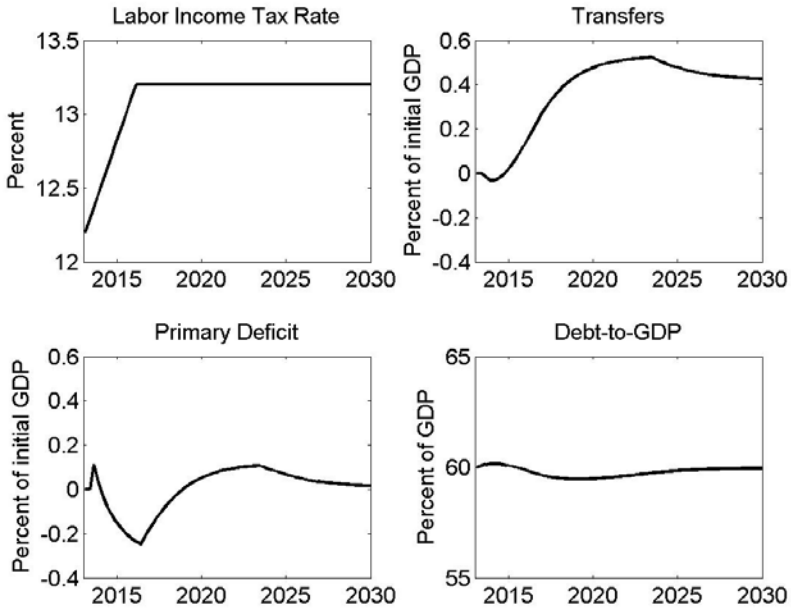
In this section, we consider permanent changes in income tax rates together with different adjustments in government spending. We use the CMS model to estimate the impact of these changes on economic activity and the government debt-to-GDP ratio. We distinguish two extreme scenarios for a given change in the tax rate. In the first scenario, the resulting adjustment of tax revenue is fully accommodated by a permanent change in government transfers to households, thereby stabilizing the debt to GDP ratio at the initial steady-state. In the second scenario, the change in tax revenue is ultimately offset by the change in interest paid on debt at a new steady-state debt-to-GDP ratio.

A permanent increase in the labour income tax rate

First, we simulate a permanent increase in the labour income tax rate of 1 percentage point that is phased in over three years. Figure 4 shows the impacts of the policy changes on the government sector in the CMS model. The path of the tax rate is shown in the top-left panel. The long-run target for transfers, TR* in equation (4), is set such that the increase in tax revenue is used up in paying for higher transfer expenditures.[9] The top right panel indicates an increase in transfers of about 0.5% of initial GDP.

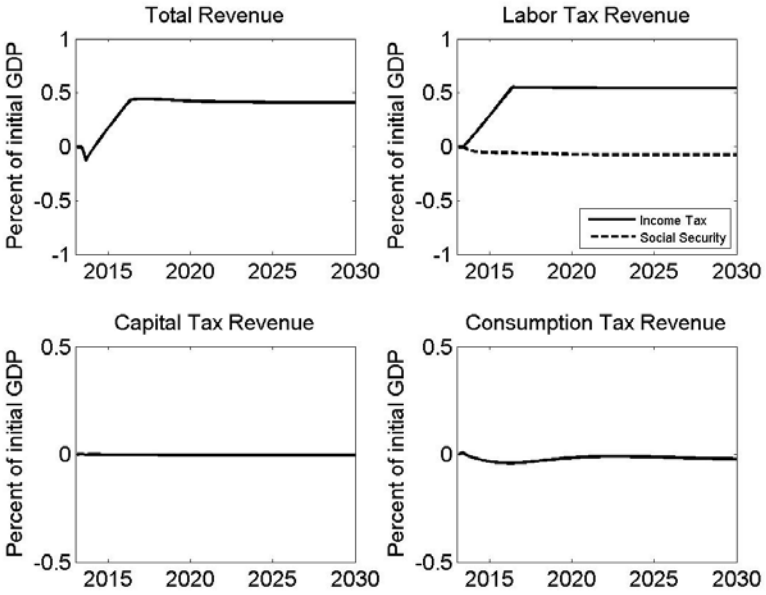
The debt-to-GDP ratio will change temporarily (second row, right panel) but eventually settle down again at the initial level of 60 per cent of GDP, because transfers adjust to use up the higher tax revenue. In fact, there is fairly little temporary variation in the debt to GDP ratio, because transfers rise almost in parallel to income tax revenue, except for some short-run variations in the primary deficit.

Figure 4: Permanent increase of labour income tax by 1 percentage point
Impacts on the government sector in the CMS model



[9] To be precise, in cases where the long-run level of output is changed, debt may increase or decline slightly, because equation (3) defines the debt-to-GDP target in terms of current GDP.

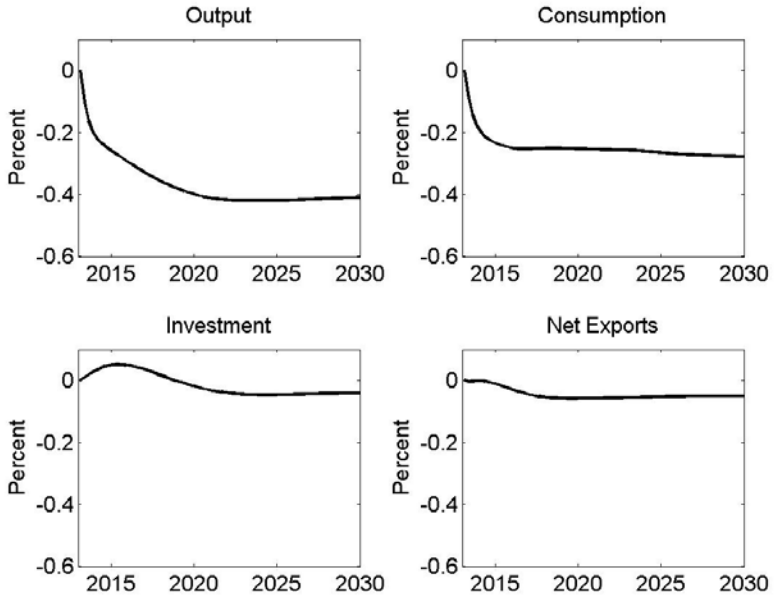
Figure 4 continued



Notes: The tax rate is given in percentage points. Transfers, tax revenues and primary deficit are all expressed in per cent of initial GDP. The debt-to-GDP ratio is given in per cent of current GDP.

The impact of tax and government spending changes on GDP and its components is shown in Figure 5. Interestingly, economic activity declines on announcement and implementation of the policy changes and continues to decline till it reaches a lower steady state. The new level is about 0.40 per cent below the initial starting value. Similarly, consumption declines by about 0.30 per cent of GDP, while investment and net exports fall by smaller amounts.

Figure 5: Permanent increase of labour income tax by 1 percentage point
Impacts on GDP and its components



Notes: GDP and its components are reported in per cent of initial GDP.

In sum, the increase in lump-sum transfers financed by an increase in the wage income tax has a contractionary effect throughout the simulation. This contraction occurs in spite of the short-run Keynesian effects that are present in the model due to the existence of overlapping price and wage contracts. The income tax distorts incentives to work and produce. A higher income tax rate implies greater distortions and thus a lower level of production. In our simulation, there is little difference in the timing of taxes and transfers. The increased income from transfers is largely offset by tax increases.

Next, we allow the government to finance the increase in transfers for some time by incurring additional debt. In this simulation, the long-run target level for transfer expenditures remains at the initial steady-state. This assumption is consistent with an increase in government debt that is eventually stabilized at a level where the increase in interest paid on government debt matches with the increase in tax revenue resulting from the permanent 1 percentage point increase in the income tax. The impacts of this policy change on the government sector and economic activity are shown in Figures 6, 7 and 8.

Figure 6: Effect of income tax increase and higher government debt on fiscal sector

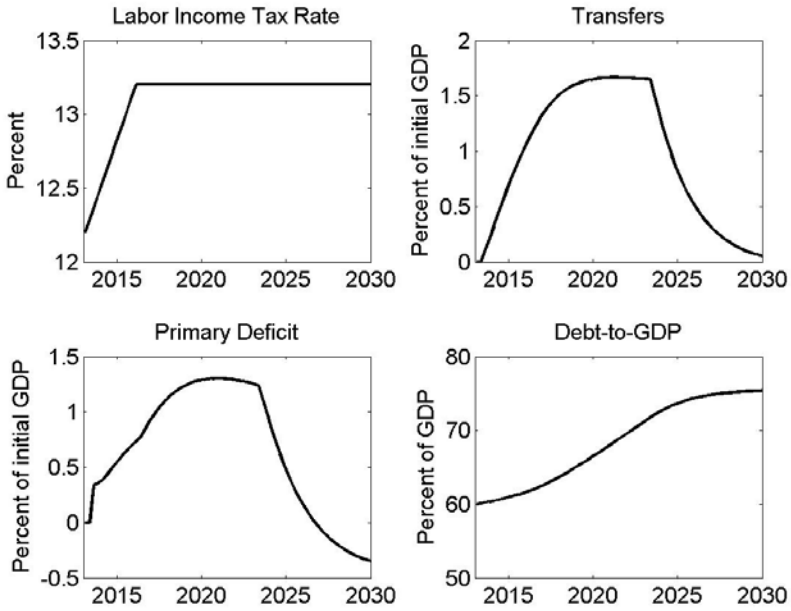
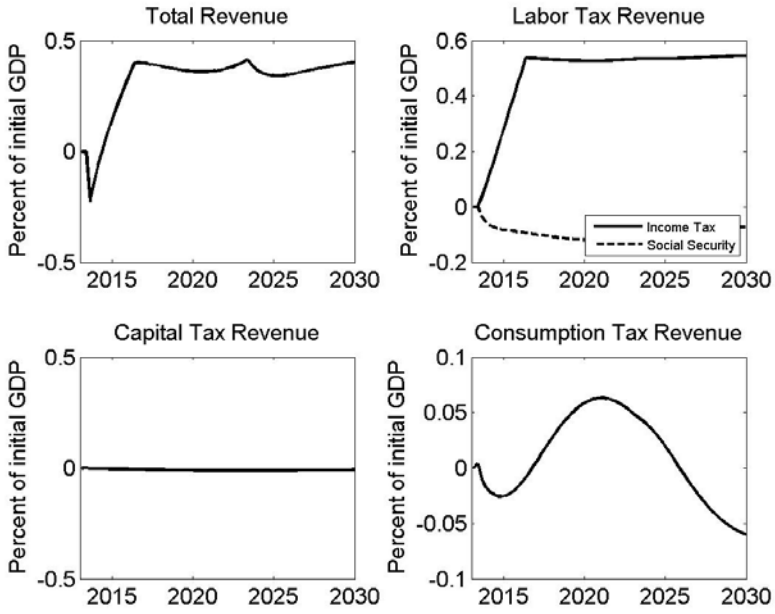


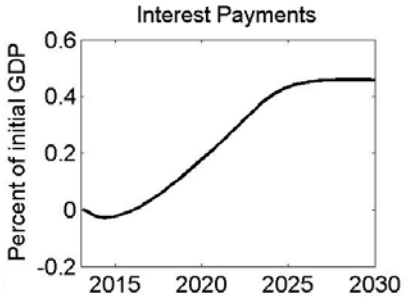
Figure 6 continued



Notes: The tax rate is given in percentage points. Transfers, tax revenues and primary deficit are all expressed in per cent of initial GDP. The debt-to-GDP ratio is given in per cent of current GDP.

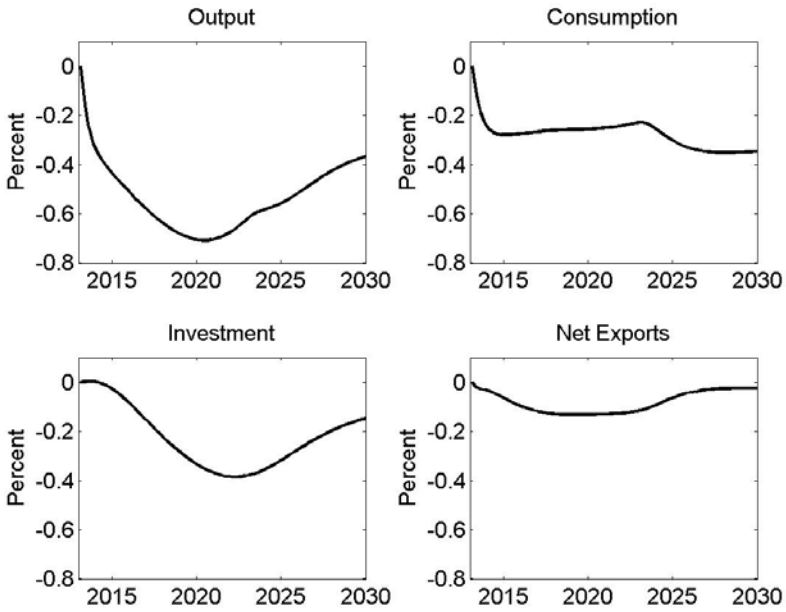
This time, transfers rise by 1.5 per cent of GDP for over 10 years and then return to the initial level relative to baseline. Thus, they far exceed the additional revenue generated by the permanent increase in the income tax rate for many years. As a result, the government budget goes into deficit and government debt increases. Eventually, debt levels out at about 75 per cent of current GDP. At this level, interest paid on government debt reaches a bit more than 0.4 per cent of initial GDP (Figure 7) and absorbs the additional tax revenue.

Figure 7: Resulting increase in interest paid on government debt



Notes: Values reported in per cent of initial GDP.

Figure 8: Effect of income tax increase and higher government debt on GDP and its components



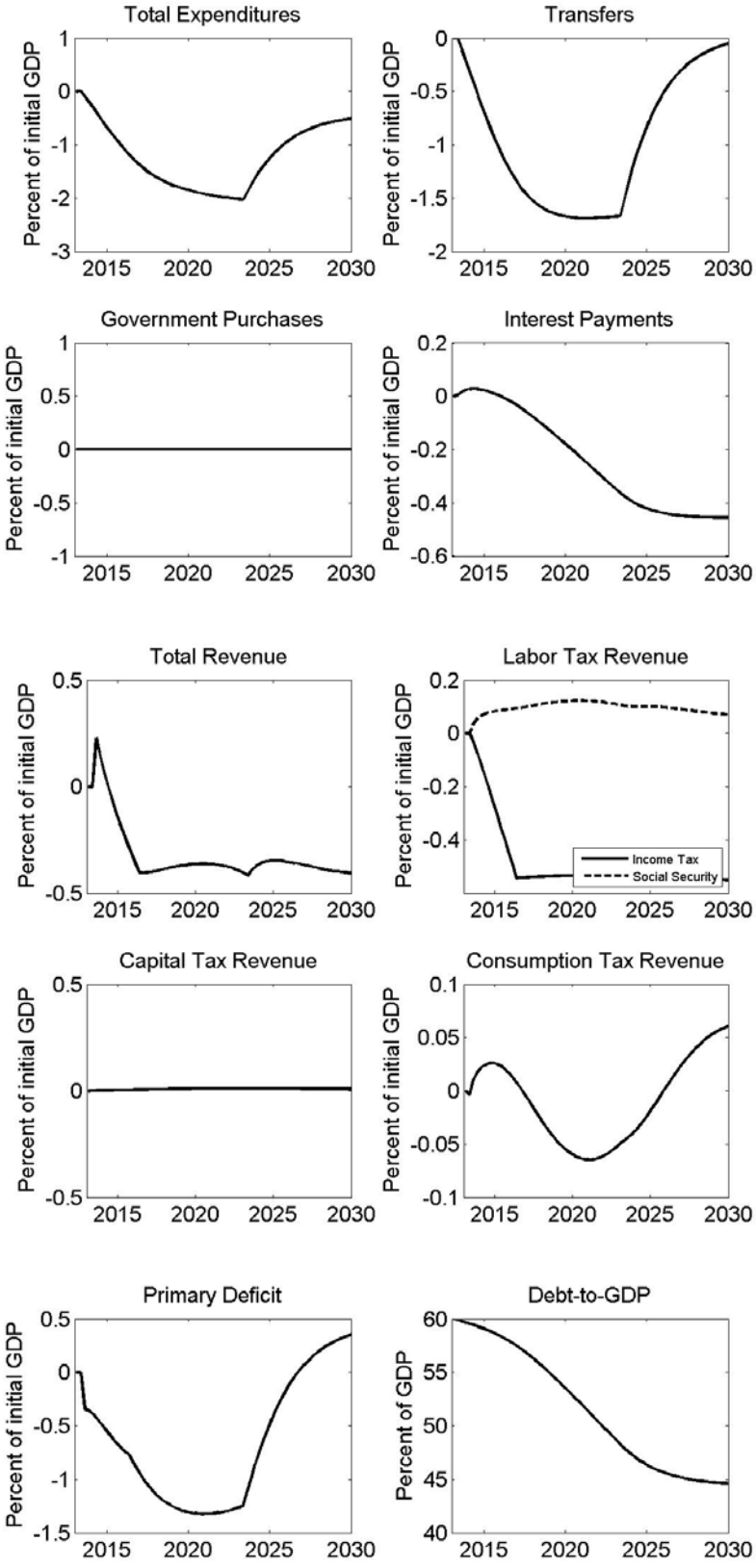
Notes: GDP and its components are reported in per cent of initial GDP.

The impact on overall GDP and its components shown in Figure 8 remains negative throughout the simulation. In fact, GDP falls more than in the preceding scenario in the short- to medium-run. With income temporarily increased by government transfers, households choose to enjoy more leisure. Hours worked decline more in the short- run than in the long-run. Initially, capital utilization is adjusted downwards. Over time, the reduction in investment leads to a decline of the capital stock.

A permanent reduction of the labour income tax rate

The preceding simulations of tax increases suggest that a policy change that is symmetric to the second scenario considered would achieve fiscal consolidation along with an expansionary path of economic activity. Thus, we simulate a permanent reduction in the labour income tax of 1 percentage point phased-in over three years. In the long-run, the reduction in tax revenue is going to be fully accommodated by a reduction in interest paid on government debt following fiscal consolidation. To achieve this goal, transfer spending is reduced temporarily. The impacts of these changes in tax and expenditure policies on the government sector and economic activity are shown in Figures 9, 10 and 11.

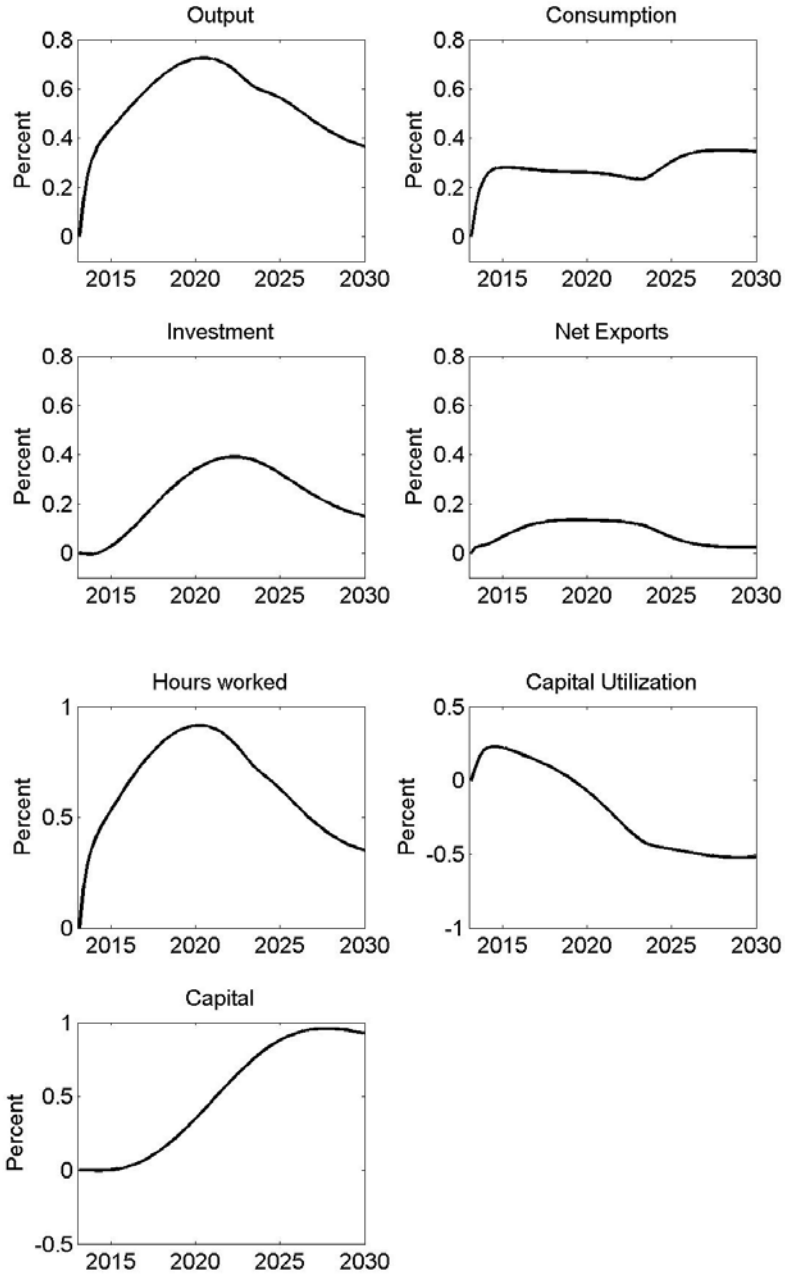
Figure 9: Effect of income tax and government debt reduction on the government sector



Notes: Government expenditures and tax revenues are all expressed in per cent of initial GDP.

Figure 9 reports the development of government expenditures and revenues, the budget deficit and debt-to-GDP ratio. The expenditure reduction is largely used to consolidate government debt. Eventually, the debt-to-GDP ratio levels out at about 15 percentage points below the initial ratio. At this level interest paid on debt is sufficiently lower to make up for the reduction in tax revenue. Lower distortions due to the reduction in the labour income tax induce greater incentives for work and production.

Figure 10: Effect of income tax and debt reduction on GDP, its components, hours worked and the stock and utilization of capital



Notes: GDP and its components are reported in per cent of initial GDP.

As shown in Figure 10 fiscal consolidation based on expenditure cuts accompanied by income tax reduction is strongly expansionary. Output increases even more in the short- to

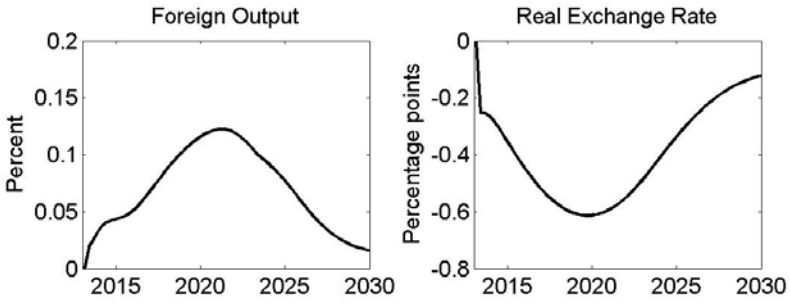
medium-run than in the long-run. Hours worked peak in the medium run. The capital stock increases over time.

The simulation of this fiscal consolidation strategy is conducted relative to a baseline. If the baseline is replaced with the actual current outlook for the euro area economy it may well include increases in tax rates. Thus, in terms of practical implementation the consolidation strategy may not require actual tax cuts but rather imply avoiding tax increases that are implicit in the current outlook.

In our simulations, government expenditure changes only concern lump-sum transfers to households. Instead, some of the reduction could be applied to direct government purchases as in Cogan, Taylor, Wieland and Wolters (2012). However, reducing purchases has a stronger negative impact on aggregate demand than reducing transfers.

Interestingly, the international spillovers of expansionary fiscal consolidation in the euro area are positive. Output in the U.S. economy also increases. Thus, austerity need not have drawbacks for international trading partners.

Figure 11: International spillover effects of income tax and debt reduction in the euro area



Finally, the long-run impacts of the simulated tax, expenditure and debt reductions on key variables are summarized in Table 1. Total governments revenues decline by 0.45 per cent of GDP in the long run. The negative revenue effect of lowering the wage income tax rate is partly compensated by increased economic activity and by slightly greater revenue from consumption taxes and social security contributions. In the long run, the loss in government revenue is matched by a reduction in the interest paid on government debt of the same magnitude. Consequently, government expenditure, specifically transfers to households return to their initial share of initial GDP.

Finally, it is important to point out that the steady-state real interest rate is not affected by the reduction of the debt-to-GDP ratio in this simulation. Thus, our calculations do not take into account an important potential benefit of lower debt, namely lower risk premia on government debt. In this regard, our evaluation still understates the long-run benefits of fiscal consolidation and may be viewed as a conservative estimate.

Table 1: Long-run impacts on key variables

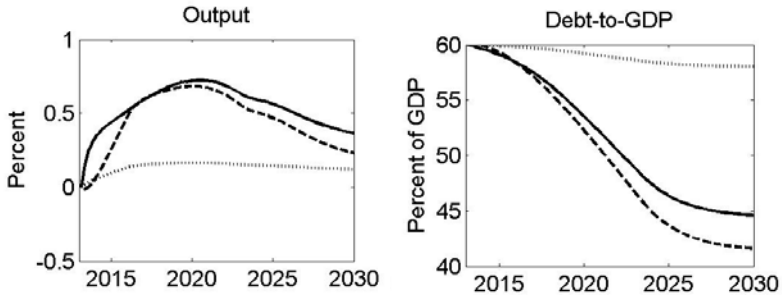
Labour income tax rate	-1
Primary deficit	0.45
Debt-to-GDP	-15.49
Total expenditures	-0.45
Transfers	0.00
Government Purchases	0
Interest paid on gov. debt	-0.45
Total revenue	-0.45
Income tax revenue	-0.52
Social security contribution	0.06
Capital tax revenue	0.00
Consumption tax revenue	0.04
Real interest rate	0.00
Real exchange rate	-0.16
Output	0.30
Consumption	0.22
Investment	0.04
Net exports	0.03
Hours worked	0.35
Capital utilization	0.00
Capital	0.20
Real wage	-0.06
Foreign output	0.02

Note: Table reports percentage changes or percentage point changes relative to initial steady states. Variables are defined as in Figures 1 through 11.

3.2.5 Fiscal consolidation with lower consumption and capital taxes

We have also explored the consequences of permanent changes in consumption and capital tax rates in conjunction with transfer adjustments. Here, we simply compare the consequences of 1 percentage point reductions in income, consumption and capital tax rates respectively. Expenditures are assumed to respond as in the third simulation in section 3.2.4. Government transfers to households are temporarily reduced to achieve a reduction in government debt that is sufficiently large so that interest paid on debt declines as much as tax revenue. Transfers return to the initial steady state level once the necessary reduction in interest expenditure is achieved. The outcomes concerning output and the debt to GDP ratio are shown in Figure 12.

Figure 12: Output and debt-to-GDP ratio following a permanent reduction in tax rates with expenditure based consolidation



Notes: Solid lines: Reduction of income tax by 1 pp. Dashed lines: reduction of consumption tax by 1 pp. Dotted lines: Reduction of capital tax by 1pp.

In all three cases the reduction in the tax rate induces an increase in GDP. The increase in GDP is largest for the 1 percentage point reduction of the income tax rate (solid line) and smallest for the 1 percentage point reduction of the capital tax rate (dotted line). The decline in the debt-to-GDP ratio is most pronounced with the consumption tax rate. The reason is that the consumption tax cut induces the greatest reduction in tax revenue. Thus, debt needs to decline further to achieve the necessary reduction in interest paid on debt to make up for lost tax revenue. In this case, the temporary reduction in transfer expenditures is also the largest. Long-run effects are summarized in Table 2.

Table 2: New steady-states with lower tax rates and lower debt- to-GDP ratio (in per cent)

Variables	income tax reduction 1pp	consumption tax reduction 1pp	capital tax reduction 1pp
Debt-to-GDP	-15.49	-18.49	-1.99
Total expenditures	-0.45	-0.54	-0.06
Total revenue	-0.45	-0.54	-0.06
Output	0.30	0.15	0.12
Consumption	0.22	0.11	0.01
Investment	0.04	0.02	0.07
Net exports	0.03	0.02	0.03
Hours worked	0.35	0.17	0.03
Capital	0.20	0.10	0.33

Note: Numbers shown are percentage changes or percentage point changes relative to initial steady states. Variables are defined as in Figures 1 through 11.

3.2.6 Monetary and fiscal policy interaction at the zero-lower-bound on nominal interest rates

In the near term, the impact of fiscal policy changes on the economy is also shaped by the particular response of monetary policy. In the CMS model, the monetary authority sets the interest rate according to the following Taylor-type rule with interest rate smoothing:

$$R_t^4 = \phi_R R_{t-1}^4 + (1-\phi_R)\left[R^4 + \phi_\Pi \left(\frac{P_{C,t}}{P_{C,t-4}} - \Pi \right) + \phi_{g_Y} \left(\frac{Y_t}{Y_{t-1}} - g_Y \right) \right]. \qquad (5)$$

Accordingly, the annualized interest rate, R^4, depends on its own lagged value and on deviations of CPI-inflation from the central bank's target rate for inflation, Π, and deviations of output growth from potential or steady-state growth.

The role of monetary policy in the simulations of tax and expenditure changes in sections 3.2.4 and 3.2.5 is easily deduced from equation (5). Whenever the fiscal policy change induces a reduction in GDP growth below potential and the inflation rate below target, the monetary authorities react to boost GDP growth and inflation by lowering the nominal interest rate. Expansionary consolidations as studied in the third simulation in section 3.2.4 and the simulations in section 3.2.5 are accompanied by a temporary tightening of monetary policy that acts to dampen the expansion.

In the current policy environment of near zero central bank interest rates it is of particular interest to explore the consequences of the zero-interest-rate floor for the interaction of monetary and fiscal policy. Due to the existence of cash, a zero-interest asset, savers need not accept negative interest rates. As a result, central banks cannot lower the nominal interest rate below zero in response to a recession. In the following we explore the consequences of this lower bound for the simulations of tax policy changes considered in section 3.2.4.

Specifically, we start by considering the case of a permanent increase in the labour income tax of one percentage point and a debt-financed temporary increase in transfer spending. In this simulation, debt rises until it is large enough so that interest paid on this debt is just covered by the additional tax revenue. As shown earlier, the increase in distortionary taxation results in a reduction of GDP in the short-, medium- and long-run. Inflation increases a bit throughout the simulation. Even so, the decline in GDP growth is large enough so that the monetary policy rule in equation (5) prescribes a temporary easing of monetary policy. The short-run impacts on nominal and real interest rates, output and inflation are shown in Figure 13. As indicated by the solid line in the top left panel, the interest rate rule implies a temporary decline in the nominal interest rate in the first two and a half years of the simulation. Afterwards, the interest rate increases slightly.

Figure 13: Permanent increase in labour income tax and temporary debt-financed Increase in transfers with constant interest rates

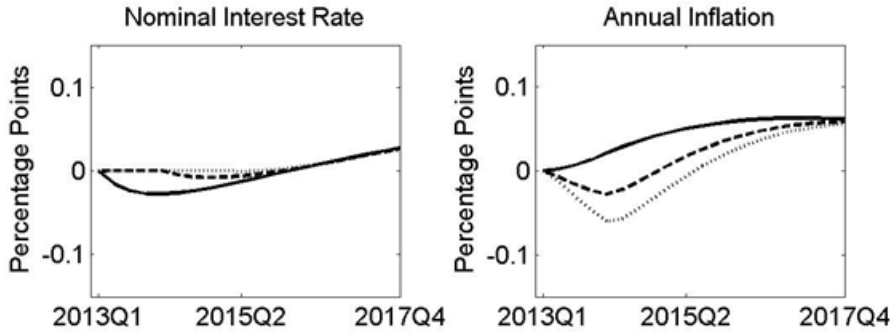
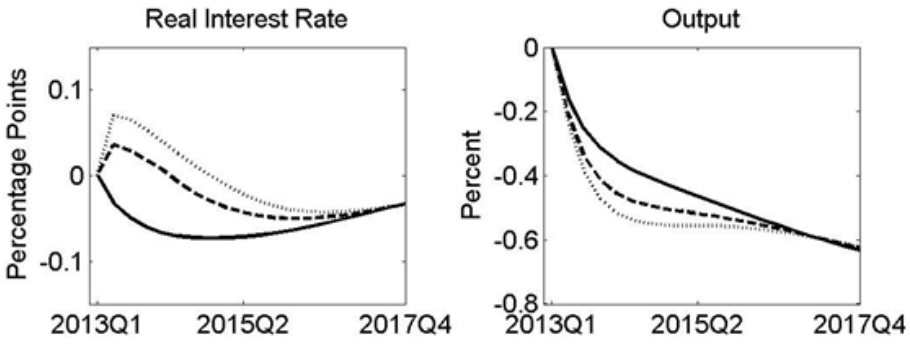


Figure 13 continued

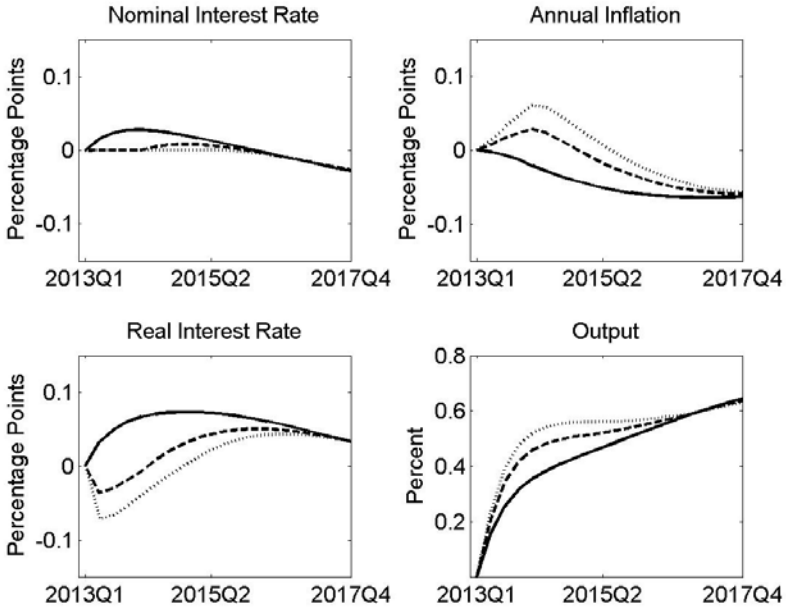


Notes: Solid lines: nominal interest rate set according to equation (5). Dashed lines: interest rate kept constant for one year. Dotted lines: interest rate kept constant for two years.

Next, we consider a scenario in which the central bank holds the nominal interest rate constant for one year. It captures the temporary impact of the zero lower bound when the notional interest rate target implied by the rule is negative for one year. During this year, the central bank is then prevented from lowering the interest rate as much as prescribed by the rule. As indicated by the dashed lines inflation then declines on impact (top left panel), the real interest rate rises (bottom left panel) and output declines more quickly in the first two years of the simulation (bottom right panel). Thus, the constraint on monetary policy acts to worsen the impact of the fiscal policy change on economic activity. The negative effect is even bigger when the central bank interest rate is kept constant for two years (dotted lines).

What about the interaction of the monetary and fiscal policy in the case of an expansionary consolidation? The simulation of a permanent reduction of the labour income tax along with transfer and debt reduction studied previously causes output to increase in the short, medium and long run, while inflation declines as indicated by the solid lines in Figure 14. Since the speed of the increase in GDP is greater than the rate of decline of inflation, the central bank responds by tightening monetary policy a bit during the first two years (solid line in the top left panel). Thus, the zero lower bound would not constitute a constraint for monetary policy in the near term. If nonetheless the central bank holds the nominal interest rate constant for one (dashed line) or two years (dotted line), GDP rises even more quickly and inflation increases temporarily.

Figure 14: Permanent increase in labour income tax and fiscal consolidation with constant interest rates



Notes: Solid lines: nominal interest rate set according to equation (5). Dashed lines: interest rate kept constant for one year. Dotted lines: interest rate kept constant for two years.

These simulations indicate that the absence of a monetary policy response to fiscal consolidation may have important near term effects on economic activity and inflation. They also emphasize the beneficial effects of designing a fiscal consolidation strategy that has a sufficiently expansionary effect on GDP such that the monetary authority would respond under normal circumstances by tightening monetary policy.

3.2.7 Model comparison

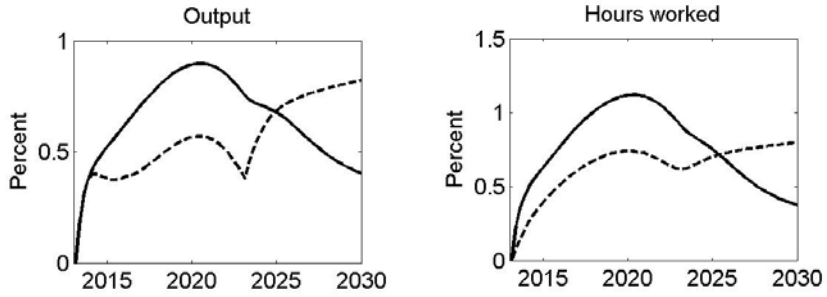
Because of modelling uncertainty, it is important that policy evaluations be robust to different modelling assumptions. For this reason, we employ a second model of the euro area built at the European Commission, namely the open-economy model of Ratto, Röger and in't Veld (2009) (EU-Quest) to check whether the fiscal policy mix studied in the CMS/NAWM model would also generate an expansionary consolidation in the EU-Quest model. We consider what has become our benchmark scenario, namely a permanent reduction of the labour income tax rate of 1 percentage point together with a reduction in the debt-to-GDP ratio that is achieved by temporary transfer cuts. In the long-run transfers return to the initial share of GDP[10] and the reduced tax revenue is made up with reduced interest paid on government debt.

Due to a particular feature of the EU-Quest model our benchmark simulation experiment has to be slightly modified. The EU-Quest model does not explicitly include the level of GDP. It

[10] In the simulations of the CMS model in section 3.2.4 transfers are set to return to the initial share of initial steady-state-GDP, and thus effectively a lower share of the increased final steady-state GDP. Unfortunately, the EU-Quest model does include the level of steady-state GDP, but only shares of GDP. Thus, for the purpose of model comparison in this section we define transfers in the CMS model in terms of current GDP as in the EU-Quest model.

only models the growth rate of GDP. Components of GDP exhibit the same trend growth and are expressed as shares of current GDP. Thus, we modify the experiment such that transfers return to the initial share of current GDP rather than the initial share of the initial level of GDP. Furthermore, we drop the reaction functions for government consumption and investment growth that are part of the EU-Quest model and replace the function for transfers with rule defined by equation (4).

Figure 15: Real GDP and hours-worked following an income tax cut and transfer-based debt-reduction: CMS (solid) versus EU Quest (dotted) models

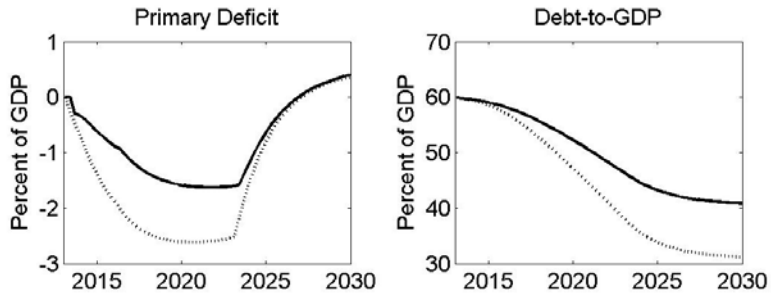


Notes: Dashed lines: EU-Quest model. Solid lines: Coenen et al. model.

The simulation of the above fiscal policy changes in the EU-Quest model also results in an expansionary consolidation. As confirmed in Figure 15 output and hours worked increase on impact and stay above the initial value in the medium and long-run in the EU-Quest model (dashed line). The medium-run increase is somewhat lower than in the CMS model (solid line), while the long-run effect is even greater in the EU-Quest model than in the CMS model.

Figure 16 shows that the initial deficit reduction is quite a bit larger in the EU-Quest model than in the CMS model. The debt-to-GDP ratio needs to decline further in this model in order to compensate for lower tax revenue by lowering interest paid on outstanding debt.

Figure 16: Primary deficit and debt-to-GDP ratio following an income tax cut and transfer-based debt-reduction: CMS (solid) versus EU Quest (dotted) models



Notes: Dotted lines: EU-Quest model. Solid lines: Coenen et al. model.

Finally, Table 3 compares the long-run impacts on key variables in the CMS and EU-Quest models. Generally, the long-run benefits from removing distortions due to income taxes are greater in the EU-Quest model than in the CMS model. From this perspective, our estimates

of the expansionary effect of tax- and transfer-based consolidation in the CMS model remain conservative.

Table 3: New steady-states with lower tax rates and lower debt- to-GDP ratio (in per cent)

Variables	CMS model	EU Quest model
Debt-to-GDP	-19.5	-29.0
Total expenditures	-0.57	-0.47
Total revenue	-0.57	-0.47
Output	0.31	0.84
Consumption	0.18	0.56
Investment	0.05	0.15
Net exports	0.03	0.02
Hours worked	0.35	0.91
Capital	0.21	1.13

3.2.8 Conclusions

Our investigation of the role of tax policy in fiscal consolidation finds that the distortive effect of taxes depresses economic activity in the long run and thereby confirms earlier research with structural macroeconomic models. Thus, if the fiscal room obtained by lowering government debt, and thereby lowering interest paid on government debt, is used to lower taxes, then real GDP, hours worked and household consumption will increase in the long-run. In our model simulations, the long-run boost to economic activity from income tax reductions is greater than what can be achieved with consumption or capital tax reduction.
Contrary to earlier work on fiscal consolidation we find that the long-run benefits that can be obtained by fiscal consolidation do not necessarily come with a recession in the short-run. Specifically, earlier analysis by Coenen, Mohr and Straub (2008) that indicated a trade-off between long-run benefits and short-run adjustments was restricted to fiscal consolidation rules that use a single fiscal instrument. For example, if the income tax was used as fiscal instrument, consolidation implied raising the income tax in the short-run in order to pay down the debt and then be able to reduce income taxes again later on.

Instead, we consider a transfer-based consolidation where one part of the funds released is used for income tax reduction and the other part is used for lowering the debt-to-GDP ratio. In the long-run, this strategy implies that transfers return to their initial magnitude while lower interest payments on government debt compensate for the reduced tax revenue. Such fiscal adjustments imply an increase in GDP, hours worked and consumption on impact, in the medium run and in the long run. Thus, they provide a model-based explanation for the type of expansionary fiscal consolidations identified by empirical studies using episode analysis and narrative methods.

What policy conclusions should be drawn from this analysis? First, our findings suggest that it should be no surprise if fiscal consolidations that are achieved by income tax hikes tend to have a recessionary effect. More interestingly, we show that fiscal consolidation can be expansionary. Expansionary consolidations are based on government spending reductions with part of the savings used for tax cuts, or at least avoiding tax hikes. In terms of the mix of

spending cuts the lions' share is assigned to government transfers to households rather than direct purchases. Direct purchases have a larger multiplier effect than transfers, because they reduce aggregate demand directly.

Given the current state of the euro area economy with near zero central bank interest rates, it is of interest to understand the impact of fiscal consolidation when monetary policy may be constrained by the zero-lower-bound on nominal interest rates. Our analysis suggests that in this situation it is even more important to design a fiscal consolidation strategy that helps increase economic activity from the start, because monetary policy may not be able to counteract a recessionary effect as it would under more normal circumstances.

A number of factors even suggest that our estimates of the expansionary effect of certain types of fiscal consolidation strategies may be biased downwards. For example, in our simulations the equilibrium real interest rate and the net foreign asset position are independent of the debt to GDP ratio. In practice, fiscal consolidation is likely to induce a lower equilibrium real interest rate thereby further reducing the interest expenditure on outstanding government debt. Lower interest rates will provide an additional boost to private sector investment and capital accumulation. In the current European context with very high sovereign risk premia in certain crisis countries, the effect of a reduction in the debt to GDP ratio on government bond rates is likely to be much more pronounced than in normal times. Furthermore, an increase in the net foreign investment position due to lower domestic government debt would enable domestic households to earn more foreign interest income and finance a lasting trade deficit (see Coenen, Mohr and Straub 2008).

Of course, the magnitude of the expansionary effect of fiscal consolidation depends on parameter estimates and modelling assumptions. We have conducted a first robustness check by comparing the effect of tax and expenditure changes in the CMS model to the EU-Quest model of Ratto et al. (2009). Our findings indicate that the expansionary effect of transfer based consolidation with part of the savings used for tax and part for debt reduction are even larger in the EU-Quest model.

One model feature that may be of particular concern is the extent to which lower labour taxes are transmitted to lower real wages. We have investigated the consequences of a higher degree of nominal wage rigidity and found that the qualitative results remain unchanged. Of course, there may also be sources of real wage stickiness. To the extent that real wage stickiness and barriers to labour mobility render the economy less flexible, they are best addressed by labour market reform rather than foregoing fiscal consolidation. Not surprisingly, event studies suggest that episodes of expansionary fiscal consolidation are more likely to occur when consolidation is accompanied by reforms that lead to more efficient adjustments in labour and goods markets.

Of course, achieving more economic growth is not the only objective of government policy. Fiscal policy measures are often undertaken to achieve a certain degree of re-distribution. Both, direct government purchases and government transfers to households may be motivated by distributional concerns, for example, direct expenditure on public schools and universities or transfers to welfare recipients. Our simulations focus on transfer-based consolidations because of the smaller multiplier effect. There are two types of households in our model and

we assume that transfers cuts are distributed equally. In practice, the level and distribution of transfers in the euro area economy leave substantial room for targeting transfer cuts at the middle to higher-income rather than very-low-income recipients. A well-designed reduction of transfer expenditures would mostly affect those households that would also benefit from lower than baseline income taxes. Finally, given that euro area government expenditures have risen substantially in absolute terms since the years prior to the financial crisis (see Figure 1), there is room for reducing government expenditures without going below the pre-crisis level.

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Appendix

Detailed description of the Coenen-McAdam-Straub (2008) model as modified by Cogan, Taylor, Wieland and Wolters (2012)

The CMS model covers two large open economies, the United States and the euro area. Coenen et al. (2008) calibrate both economies symmetrically using parameter estimates for the euro area from Smets and Wouters (2003). Instead, we calibrate the US part of the model using parameter values from Cogan et al. (2010) who used US data to estimate a version of the model by Smets and Wouters (2007) extended to include rule-of-thumb consumers. Under our calibration, the model may be used to analyse fiscal consolidation in the United States and its spillovers to the euro area.

Each economy contains households, firms, a fiscal and a monetary authority. We start with a description of the fiscal authority and then introduce the optimization problems of the households and firms to show how the different fiscal variables enter these decision problems.

Fiscal authority

To better understand the structure of the fiscal sector in the CMS model, it is useful to review the government budget constraint:

$$\begin{aligned} & P_{G,t}G_t + TR_t + B_t + M_{t-1} = \\ & \tau_t^C P_{C,t}C_t + \tau_t^N (W_{I,t}N_t^I + W_{J,t}N_t^J) + \tau_t^{W_h}(W_{I,t}N_t^I + W_{J,t}N_t^J) + \tau_t^{W_f} W_t N_t + \\ & \tau_t^K (R_{K,t}u_t - (\Gamma_u(u_t) + \delta)P_{I,t})K_t) + R_t^{-1}B_{t+1} + M_t \end{aligned} \qquad \text{(A1)}$$

The left hand side denotes expenditures while the right hand side denotes revenues. G_t, TR_t, τ_t^C, τ_t^N, $\tau_t^{W_h}$, $\tau_t^{W_f}$ and τ_t^K refer to government consumption, transfers, the consumption tax rate, the labour tax rate, employee and employers' social security contributions and the capital tax rate, respectively. These are all set exogenously. B_t and M_t are government bonds and money supply. Demands for these assets are determined by the household's utility maximization as characterized by first order conditions. Lump sum transfers TR_t are determined by the following equation in which transfers as a fraction of steady state nominal output are adjusted accordingly to the gap between target and actual debt as a share of nominal output:

$$\frac{TR_t}{P_{Y,t}Y_t} - TR_t^* = \varphi_{B_Y}\left(\frac{B_t}{P_{Y,t}Y_t} - B^*\right), \qquad \text{(A2)}$$

where $P_{Y,t}Y_t$ denotes nominal GDP and B^* denotes the debt-to-GDP target. This equation is used to determine what share of the budget deficit is paid for by changes in lump-sum transfers and what share is covered by accumulating new debt. The long run stock of debt relative to GDP is determined together by the target B^* and the endogenous demand for government bond holdings of domestic and foreign households.

Households

There are two types of households that are indexed by *I* and *J*. The members of household *J* can smooth consumption only via holding money, while members of household *I* can additionally buy domestic and foreign bonds and accumulate physical capital. The members of household *I* are indexed by $i \in [0,1-\omega]$ and the members of household *J* are indexed by $j \in [1-\omega,1]$. Each member i of household *I maximizes* the following utility function:

$$E_t\left[\sum_{k=0}^{\infty}\beta^k\left(\frac{1}{1-\sigma}\left(C_{i,t+k}-\kappa C_{I,t+k-1}\right)^{1-\sigma}-\frac{1}{1+\theta}\left(N_{i,t+k}\right)^{1+\theta}\right)\right], \tag{A3}$$

where $C_{i,t}$ denotes consumption of member i of household *I*, $C_{I,t}$ denotes average consumption of all members of household *I* and $N_{i,t}$ denotes hours worked. β is the discount factor, σ denotes the inverse of the intertemporal elasticity of substitution , θ is the inverse of the Frisch labour supply elasticity and κ determines the degree of habit formation. The household maximizes utility by choosing consumption, $C_{i,t}$, investment, $I_{i,t}$, next period's capital stock, $K_{i,t+1}$, the intensity with which existing capital is utilised, $u_{i,t}$, next period's holdings of domestic and internationally traded bonds, $B_{i,t+1}$ and $B^F_{i,t+1}$, and current period's money holdings $M_{i,t}$. Household members take into account their budget constraint:

$$\begin{aligned}&\left(1+\tau_t^C+\Gamma_\nu\left(\nu_{i,t}\right)\right)P_{C,t}C_{i,t}+P_{I,t}I_{i,t}+R_t^{-1}B_{i,t+1}+\left(\left(1-\Gamma_{B^F}\left(B_t^F\right)\right)R_{F,t}\right)^{-1}S_tB^F_{i,t+1}+M_{i,t}+\varphi_{i,t}\\&=\left(1-\tau_t^N-\tau_t^{W_h}\right)W_{i,t}N_{i,t}+\left(1-\tau_t^K\right)\left(R_{K,t}u_{i,t}-\Gamma_u\left(u_{i,t}\right)P_{I,t}\right)K_{i,t}\\&+\tau_t^K\delta P_{I,t}K_{i,t}+\left(1-\tau_t^D\right)D_{i,t}+TR_{i,t}+B_{i,t}+S_tB^F_{i,t}+M_{i,t-1}.\end{aligned} \tag{A4}$$

$P_{C,t}$ and $P_{I,t}$ denote the prices of one unit of the consumption and the investment good, respectively. R_t and $R_{F,t}$ are the risk-less returns on domestic and internationally traded bonds, respectively. Internationally traded bonds are denominated in foreign currency. To obtain the domestic value they are multiplied with the nominal exchange rate S_t. $W_{i,t}$ denotes the wage, $R_{K,t}$ denotes the rental rate for capital services rent to firms, $u_{i,t}K_{i,t}$, and $D_{i,t}$ denotes dividend payments.

The budget constraint indicates some frictions that the household has to take into account. The purchase of the consumption good is subject to a transaction cost Γ_ν that depends on the consumption-based velocity, $\nu_{i,t}$. Γ_{B^F} is a financial intermediation premium that the households must pay when buying internationally traded bonds. Varying the intensity of capital utilisation relative to its steady-state level is subject to a cost $\Gamma_u(u_{i,t})$. The budget constraint includes a number of different tax rates so that changes in fiscal policy have a direct effect on the consumption-savings choice, the labour supply, investment decisions and the other variables the household members use to maximize their expected life-time utility. Households pay taxes on consumption purchases, on wage income and on capital income.

Furthermore, they pay social security contributions and receive transfers. The household members take their decisions in a forward looking manner so that not only changes in fiscal policy today, but also anticipated future changes can have an immediate effect on households' decisions today.

The capital stock owned by household member *i* evolves according to the usual capital accumulation equation:

$$K_{i,t+1} = (1-\delta)K_{i,t} + \left(1-\Gamma_I\left(I_{i,t}/I_{i,t-1}\right)\right)I_{i,,t} \quad , \qquad \text{(A5)}$$

where $\Gamma_I\left(I_{i,t}/I_{i,t-1}\right)$ denotes investment adjustment costs. The members of household *I* have monopolistic power in the labour market and therefore some wage-setting power. To achieve sticky wages the staggered nominal wage setting scheme by Calvo (1983) is used. In each period household members can optimally reset their wage with probability $1-\xi_I$. All members that reset their wage optimally set the same wage rate $W_{I,t} = \tilde{W}_{i,t}$ Those members that cannot reset their wage in a specific period adjust their wage by indexing it to a geometric average of last period's change in the price of the private consumption good and the steady-state consumer-price inflation rate:

$$W_{i,t} = \left(\frac{P_{C,t-1}}{P_{C,t-2}}\right)^{\chi_I} \pi_C{}^{1-\chi_I} W_{i,t-1}, \qquad \text{(A6)}$$

where χ_I denotes the indexation parameter. Households that are allowed to optimally reset their wage are assumed to maximize lifetime utility taking into account the indexation scheme and the demand for their labour services.

Members of household *J* also maximize the utility function in equation (3), but do not have access to the bond market and cannot accumulate physical capital. Therefore, they choose consumption $C_{j,t}$ and money holdings $M_{j,t}$ to maximize their lifetime utility function subject to the following budget constraint:

$$\left(1+\tau_t^C+\Gamma_\nu\left(\nu_{j,t}\right)\right)P_{C,t}C_{j,t} + M_{j,t} = \left(1-\tau_t^N-\tau_t^{W_h}\right)W_{j,t}N_{j,t} + TR_{j,t} + M_{j,t-1} + \varphi_{j,t} \quad \text{(A7)}$$

The members of household *J* also act as wage-setters in a manner analogous to the members of household *I*. We deviate from Coenen et al. (2008) by assuming that lump-sum transfers are equally distributed between households of type *I* and *J*. Coenen et al. (2008) instead consider an unequal distribution, which implies that changes in transfer payments induce redistribution of transfers and lump-sum taxes, a feature not intended to be part of the fiscal consolidation strategy that we evaluate.

Firms

There are two types of firms. Intermediate goods firms indexed by $f \in [0,1]$ produce a tradable differentiated intermediate good, $Y_{f,t}$. Perfectly competitive final goods firms

combine domestically produced goods and imported intermediate goods into a consumption good, Q_t^C, an investment good, Q_t^I ,and a public consumption good, Q_t^G.

Intermediate goods firms produce a single, tradable differentiated good using an increasing-returns-to-scale Cobb-Douglas technology with capital services and labour as inputs:

$$Y_{f,t} = \max\left[z_t K_{f,t}^{\alpha} N_{f,t}^{1-\alpha} - \psi, 0\right], \tag{A8}$$

where $K_{f,t}$ denotes capital services rented from household I and $N_{f,t}$ an index of differentiated labour services provided by members of households I and J. z_t denotes total-factor productivity and ψ represents fixed cost of production that ensure zero profits in steady state. The firm takes the rental cost of capital, $R_{K,t}$, and the aggregate wage index, W_t, as given and minimises total input costs $R_{K,t}K_{f,t} + (1+\tau_t^{W_f})W_t N_{f,t}$ which yields an equation for marginal cost. Marginal costs are identical across all firms as they face the same input prices:

$$MC_t = \frac{\left(R_{K,t}\right)^{\alpha}\left(\left(1+\tau_t^{W_f}\right)W_t\right)^{1-\alpha}}{z_t \alpha^{\alpha}(1-\alpha)^{(1-\alpha)}}. \tag{A9}$$

Intermediate goods firms have monopolistic pricing power. In addition, price changes are subject to staggered price contracts of the Calvo (1983) variety. The firms sell their goods in both the domestic and foreign market and charge different prices at home and abroad, i.e. they engage in local currency pricing.[11] Each firm can reset domestic prices in period *t* with probability $1-\xi_H$ and prices charged abroad with probability $1-\xi_X$.

Firms that can optimally reset their domestic and/or foreign price in period *t* maximize the sum of discounted expected future profits taking as given domestic and foreign demand $H_{f,t}$ and $X_{f,t}$:

$$E_t\left[\sum_{k=0}^{\infty}\Lambda_{I,t,t+k}\left(\xi_H^k\left(P_{H,f,t}H_{f,t} - MC_t H_{f,t}\right) + \xi_X^k\left(S_t P_{X,f,t}X_{f,t} - MC_t X_{f,t}\right)\right)\right]. \tag{A10}$$

Firms that cannot reset their price optimally in period *t* index it to a geometric average of last period's change in the price indexes $P_{H,t}$ and $P_{X,t}$ and the steady state inflation rates π_H and π_X:

$$P_{H,f,t} = \left(\frac{P_{H,t-1}}{P_{H,t-2}}\right)^{\chi_H}\pi_H^{1-\chi_H}P_{H,f,t-1}, \qquad P_{X,f,t} = \left(\frac{P_{X,t-1}}{P_{X,t-2}}\right)^{\chi_X}\pi_X^{1-\chi_X}P_{X,f,t-1}. \tag{A11}$$

[11] See Cwik, Müller and Wolters (2011) for a detailed analysis of differences in producer currency pricing and local currency pricing and estimated shares for each pricing scheme.

The final goods firms produce the non-tradable final private consumption and investment goods by combining purchases of domestically produced intermediate goods with purchases of imported foreign intermediate goods using a constant-returns-to-scale CES technology:

$$Q_t^X = \left(\nu_X^{1/\mu_X}\left(H_t^X\right)^{1-1/\mu_X} + \left(1-\nu_X\right)^{1/\mu_X}\left(\left(1-\Gamma_{IM,X}\left(IM_t^X / Q_t^X\right)\right)IM_t^X\right)^{1-1/\mu_X}\right)^{\mu_X/(\mu_X-1)}, X \in \{C, I\}, \quad \text{(A12)}$$

where $\mu_X > 1$ denotes the intratemporal elasticity of substitution between domestic and foreign intermediate goods and ν_X denotes the home bias. There is also a cost $\Gamma_{IM,X}$ that the firm has to pay when varying the use of the bundle of imported intermediate goods to make the import share relatively unresponsive in the short run to changes in the relative price of import goods.

The public consumption good is produced by combining domestic intermediate goods without any use of imported intermediate goods: $Q_t^G = H_t^G$.

Central bank

The monetary authority sets the interest rate according to the following Taylor-type rule with interest rate smoothing, where the nominal interest rate responds to deviations of CPI-inflation from the inflation target and output growth from steady state output growth:

$$R_t^4 = \phi_R R_{t-1}^4 + (1-\phi_R)\left[R^4 + \phi_\Pi\left(\frac{P_{C,t}}{P_{C,t-4}} - \Pi\right) + \phi_{g_Y}\left(\frac{Y_t}{Y_{t-1}} - g_Y\right)\right]. \quad \text{(A13)}$$

Parameterization

The countries differ with respect to their population size. Otherwise, Coenen et al. (2008) have parameterized the two economies symmetrically using values estimated by Smets and Wouters (2003) with euro area data. By contrast we set most of the parameter values of the U.S. part of the model along the lines of Cogan et al.'s (2010) medium-scale DSGE model estimated with U.S. data.

Table A-1 reports chosen parameter values. The labour supply elasticity equals $1/\theta = 0.5$ in both countries and is consistent with microeconomic estimates (see Chetty et al., 2011). Since it is a key parameter determining the effects of fiscal policy, we will examine the sensitivity of the simulation results to variations in this parameter in section 3.2.7.

Table A-1: CMS Model Parameter Choices as in Cogan et al. (2012)

Parameter	Symbol	U.S.	euro are
Labour supply elasticity	$1/\theta$	0.5	0.5
Intertemporal elasticity of substitution	$1/\sigma$	1	1
Share of constrained households J	$1-\omega$	0.27	0.25
Calvo price stickiness, domestic market	ξ_H	0.65	0.90

Calvo price stickiness, exports	ξ_X	0.30	0.30
Price indexation parameter	χ_H	0.22	0.50
Calvo wage stickiness	ξ_I	0.73	0.75
Wage indexation parameter	χ_I	0.62	0.75
Home/foreign good substitution elasticities	μ_X	1.50	1.50
Adjustment cost conc.imports in investment	$\Gamma_{IM,X}$	2.50	2.50
Consumption habits parameter	κ	0.67	0.71
Tax Rates (in%):			
Consumption tax rate	τ^C	7.70	18.3
Labour tax rate	τ^N	15.4	12.2
Social security contributions (employee)	τ^{W_h}	7.10	11.8
Social security contributions (employer)	τ^{W_f}	7.10	21.9
Capital tax rate	τ^K	18.41	18.41

We deviate from Coenen et al. (2008) with respect to the calibration of the intertemporal elasticity of substitution. Instead of a value of $1/\sigma = 2$ we use $1/\sigma = 1$ for both economies. This value implies log utility and is consistent with a balanced-growth path. Though the model is simulated without trend growth, it is advisable to use growth-consistent preferences in order to render findings from model simulations meaningful to baseline scenarios with balanced growth.

The other parameters may be found in the earlier equations and are taken from Cogan et al. (2010) or Coenen et al. (2008). The tax rates are key policy parameters and all taken from the comparative study of U.S. and euro area taxes by Coenen et al. Their values for consumption, income and social security taxes are based on data for the U.S. and the euro area. The capital tax rate is calibrated to match the observed investment-to-output expenditure ratio. The government consumption-to-GDP ratio is calibrated to $G_t / Y_t = 16\%$ for the US and $G_t^* / Y_t^* = 18\%$ for the euro area.

The target for the debt-to-GDP ratio is set to $B^* = 60\%$ of annual GDP in both countries. In Coenen et al. (2008) transfers in per capita terms are unevenly distributed between households *J* and households *I* in the proportion 3 to 1. We deviate from this setting and distribute transfers equally between household *J* and *I*.

3.3 Discussion

Werner Röger[*]

The paper of Burgert and Wieland uses the ECBs New Area Wide model to analyse the impact of tax policy in the context of a fiscal consolidation strategy for the whole euro area. The paper provides a contribution to the re-invigorated debate on the effects of fiscal consolidations on real economic activity, supporting a non-Keynesian view as put forward by Giavazzo and Pagano (1990) and Alesina and Perotti (1995) in the early 90s.

These authors challenged the conventional wisdom about a positive fiscal multiplier and argued that especially in the case of credible permanent fiscal consolidations, a reduction in the government deficit could be accompanied by positive GDP effects even in the short run. Their empirical work suggested that permanent expenditure cuts are more successful in reaping short term benefits compared to tax increases. These observations are in principle consistent with (pre-crisis) macroeconomic thinking emphasising the absence of credit frictions for private households, allowing them to respond quickly to expectations of higher net income associated with lower tax burden by increased borrowing.

However, these "non-Keynesian" effects have also been questioned. In particular it was argued that non-Keynesian effects are only possible if fiscal contractions are accommodated by expansionary monetary policy. For example: Roberto Perotti, (2012) argues that "…in all consolidations interest rate fell fast, and wage moderation played a key role in generating a gain in competitiveness and a decline in interest rates. These results cast doubt on at least some versions of the “expansionary fiscal consolidations” hypothesis."

While Perotti expresses a general criticism about the feasibility of expansionary consolidations in the short run, additional objections can be raised in the current economic environment. First, it is unlikely that monetary policy which is stuck close to the zero lower bound can in fact significantly support fiscal tightening. Second, an important factor for a negative fiscal multiplier are well functioning financial markets which allow the private sector to offset higher government saving by increased private sector borrowing against higher future net income. This is an important pre-condition and is unlikely to hold in the current juncture. Countries with the highest consolidation needs suffer both from high government debt but also strong private sector indebtedness and undercapitalised banks. Some countries in the euro area not only have accumulated high levels of sovereign debt but also high levels of household debt. For example, household debt in Spain (as a share of disposable income) has increased from 70% in the year 2000 to more than 120% in 2011. A doubling or nearly doubling of household debt burdens can also be observed in Ireland and Portugal for example. Because both governments and the private sector are forced into a deleveraging process simultaneously, the standard mechanism generating non-Keynesian effects from fiscal consolidations is unlikely to work. A recent overview of the effects of fiscal policy in macro models used in policy institutions is provided by Coenen et al. (2012).

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Against this background, it is interesting to note that Burgert and Wieland either implicitly or explicitly take into account these criticisms by devising a rather unorthodox consolidation strategy, which is based on two main elements, namely first a permanent reduction of distortionary taxes (labour, capital, consumption) and second, a temporary reduction of transfers to households. Temporary transfer reductions are necessary because the reduction of distortionary taxes is not self-financing. The transfer reduction is therefore required to reduce the sovereign debt level and thereby interest payments sufficiently in order to make sure that lower tax revenue are not leading to an increase in government debt.

The authors show that this strategy does indeed yield short run benefits in terms of higher GDP and employment. They also respond in the paper to the criticism that monetary accommodation would be necessary for achieving this result. In particular they show that monetary policy, which is modelled by a standard Taylor rule does not accommodate the fiscal consolidation but in fact slightly increases the nominal interest rate because the GDP growth effect exceeds the (negative) inflation effect in the short run. Consequently a policy where the ECB would keep nominal rates constant in the first year would even yield higher GDP effects. The fact that the monetary accommodation argument against the negative multiplier does not work in this case is obviously due to the design of the fiscal consolidation. Not only is inflation dampened by a reduction in transfers, which reduces spending and increases supply by shifting the labour supply curve to the right. In addition inflation is falling by cost reducing effects from lower taxes.

Also Burgert and Wieland at least implicitly take into account that their consolidation strategy is not based on the assumption that the private sector can borrow against future tax reductions, because their plan foresees tax and expenditure cuts already in the current period. Since their strategy frontloads the tax reduction it does not have to rely on future expected tax reductions. However, they do not explicitly model credit frictions and have either no or very small shares of credit constrained consumers.

In my view this is an important reason why their policy experiment yields positive private consumption effects already in the short run, despite the fact that there is a massive reduction of transfers (above 1.5% of GDP) which is only partly compensated by reduction of taxes (about 0.5% of GDP). Financially unconstrained consumers can smooth the temporary reduction of transfers and frontload consumption in anticipation of permanent tax reduction to an extent which is not possible with a substantial share (above 40%) of credit constrained households. The same experiment conducted with a version of the QUEST model with 40% credit constrained households would indeed give a temporary negative consumption effect, however the effect would be relatively small (about -0.3% over about 10 years). This would also result in a small negative GDP effect over a period of 2 years.

The results presented in the paper also depend on strong wealth effects, which can be seen in the impulse response of hours worked in Figure 10 of the paper, which shows an increase of 1% and then a decline to 0.4% as the transfer reduction is phased out. This suggests that about 60% of the employment increase is explained by a wealth effect in the labour supply equation. While this is certainly conceivable within the logic of standard labour supply specifications used in DSGE models, nevertheless this result strongly depends on the choice

of elasticities. For example, in the QUEST model with a larger share of credit constrained households there is still a positive income effect generated by transfer reduction but the peak increase of hours worked would only be 0.2%.

The strong immediate employment and GDP effect also hinges strongly on the degree in which real wages would decline in the short run i.e. it depends on the degree of real wage rigidity. In the models used by Burgert and Wieland, the degree of real wage rigidity is set to zero which allows wages to be reduced quickly to a decline in labour taxes and a reduction in transfers. For higher degrees of real wage rigidity, the short run expansionary effects would be smaller. For example, allowing a high degree of real wage rigidity in the QUEST model used above, would imply a reduction of consumption of about -.6% and a decline of GDP of about 0.2% in the medium term.

This suggests that by changing some of the modelling assumptions, the negative fiscal multiplier associated with the proposed consolidation strategy does not survive. Nevertheless it is important to notice that the multiplier associated with this fiscal strategy remains relatively small. Since the net consolidation amounts to about 1% of GDP, the multiplier would be at around 0.2, even taken into account a zero lower bound constraint, a high share of credit constrained households and real wage rigidity. This makes this strategy an interesting option for consolidation. However, at least two caveats must be mentioned. First, this policy leads to a reduction of transfer payments, i.e. pensions and social assistance by about 10%. I guess this would raise strong concerns about the social fairness of such a fiscal consolidation. However, given the reforms undertaken in some Member States this is not impossible. Also, this simulation assumes that households regard this consolidation as fully credible, in particular they will believe that tax cuts will be permanent.

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3.4 Discussion

Salvador Barrios and Bert Saveyn[*]

The paper by Burgert and Wieland draws lessons from the recent empirical evidence on optimal fiscal consolidations based on structural macroeconomic DGSE models such as the Coenen/McAdam/Straub (2008) and Cogan Taylor/Wieland/Wolters (2012) models as well as the Ratto/Röger/in't Veld (2009) QUEST III model. These models can be used to analyse the impact of fiscal consolidations accounting for the endogenous response of economic activity. Burgert and Wieland provide simulation results of these models using two scenarios: (i) a permanent change in tax revenues accommodated by a permanent change in transfer expenditure and (ii) a permanent change in tax revenue ultimately offset by a change in interest paid. They show that a permanent reduction in labour income tax combined with a reduction in public spending leads to an expansionary fiscal consolidation promoting both growth and debt reduction. Their main conclusion is that an optimal fiscal consolidation should combine expenditure cuts with tax cuts. Such a strategy would be particularly advisable for the euro area given potential cross-country spillovers. The fiscal room of manoeuvre resulting from a lower debt and cut in public expenditure should be used to lower labour and capital taxes in order to mitigate the negative effects of fiscal retrenchment on GDP and household consumption. Burgert and Wieland also show that the long-run impact on economic activity tends to be larger with expenditure cuts/labour tax cuts rather than when public consumption or capital taxes are reduced instead.

Burgert and Wieland's analysis provides valuable insights on the determinants of successful fiscal consolidations. Their analysis is especially welcome given its focus on the euro area. Accordingly, optimal fiscal consolidation strategies should aim at minimising the distortionary effects of tax-based fiscal consolidations. Tax hikes should be avoided since these exert disincentives effect on economic agents´ decisions to consume and invest. An optimal strategy should thus consist in lowering both debt (through expenditure cuts) and taxes (especially on labour income) in order to favour growth. Two issues specific to the euro are not considered in their analysis, however. Firstly, Burgert and Wieland do not consider the specific root of the euro area fiscal crisis which is the global financial crisis. In many countries the private credit channel is seriously impaired and high private indebtedness (on both the household and enterprises sides) prevent consumption or investment increase in the short and in many cases, even the medium term. The expected positive effect of public debt reduction on interest rate levels and private agents´ consumption and investment is thus likely to be limited. Secondly, some euro area countries are currently struggling to raise tax revenues. In many instances tax cuts are therefore simply not conceivable. The analysis should thus consider the possibility to implement tax shift reforms whereby some taxes could be marginally lowered or left untouched while others (less distortive) tax categories could be increased in greater proportion. Such tax shift strategies could be designed to change relative prices, e.g. labour vs. leisure or domestic vs. foreign prices, in order to improve supply-side conditions. This would also be warranted given that the demand side is constrained by high indebtedness and low (or expensive) access to credit.

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The presentation of Keen emphasizes that fiscal consolidation strategies should strike a right balance between their short vs. long-term impact. On the revenue side tax policy measures need to ensure fiscal sustainability and to support long-term growth without compromising equity. Social equity is needed in order to guarantee social acceptance of tax reforms. In the short term specific attention needs to be paid on each tax category specific multiplier. While recent work suggests that multipliers are larger during recessions, still little is known about the multipliers associated to detailed specific tax categories. It is therefore arguably difficult to establish a hierarchy of taxes according to their distortive effect in a precise manner. In principle multipliers are larger for taxes that reduce aggregate demand and that have a strong regressive component. Tax measures may act through quantities if price adjustment is impaired (as in the case of labour markets with a rigid wage setting). Tax measures might also have different impact when being (or being perceived as) temporary rather than permanent. For instance commitment to future VAT rate increase may favour consumption in the short-run and positively impact on tax revenues in the medium term. Over the long term public revenues will need to increase in most developed economies and policy makers should favour tax instruments with the smallest marginal cost of public funds (MCF). For large revenue increases tax instruments with the slowest increase in MCF should be preferred although in practice this means that the change (and not only the level) of tax elasticities is known with sufficient accuracy. The existing econometric literature provides some insight on a possible hierarchy of taxes, see in particular Arnold et al., (2012). Property taxes, especially recurrent taxes on personal housing wealth and consumption taxes, are deemed to have the least growth-damaging effect. On the contrary taxes affecting factors´ supply such as personal income taxes or corporate income taxes are usually deemed to be more distortive. Recent research suggests that accounting for cross-country heterogeneity and endogeneity issues in econometric estimations can lead to radically different conclusions regarding the ranking of taxes according to their impact of GDP growth, see Ling (2012). The analysis of growth-effect of different tax categories should be more nuanced given that two tax measures affecting the same tax category could have different effects on growth depending on the nature of distortion it is intended to correct. For instance corporate income tax reforms can have a very different design depending on whether they are intended to tackle rent rather than investment-generated revenues. Tax reforms should pay special attention to equity issues, in particular in the case of VAT and PIT reforms. The VAT offers good potential for tax reforms in countries where it is low and/or inexistent (e.g. Japan, U.S.) while in countries where it is already established, rates are usually already high. The scope for reform of the EU VAT tax systems are more towards uniform bases and rates. However, distributional concern call for possible compensation of least favoured strands of the population. This in turn would reduce the overall revenue gains expected from VAT tax increases. Regarding personal income tax, the optimal level of personal income tax progressivity is difficult to gauge given its potential interactions with corporate taxation. Experience with flat tax reforms have shown that tax revenues can indeed increase due to improved compliance.

Keen´s call for more detailed tax analysis accounting in particular for equity concerns is especially welcome since social acceptance of tax reforms are a key ingredient for their success, especially regarding VAT and PIT reforms. DGSE models provide only rough ranking of taxes according to their distortionary effects on economic activity. A careful scrutiny at each tax-specific effect can tell a very different story as in the case of corporate

taxation for instance. These effects are likely to be missed in existing DGSE models. Furthermore equity concerns are an integral part of the optimal tax policy making and some measures such as VAT tax rate harmonisation should be accompanied by complementary policies, such as revenue support to low-income household, in order to improve the political feasibility of tax reforms. The distortionary effects of these reforms also depend on country-specific issues and recent econometric evidence based on pooled data such as Arnold et al. 2012 does not properly account for the effect of cross-country heterogeneity. In addition the economies of the EU Member States are economically integrated such that the potential effects of tax reforms are also closely connected. This is typically the case where cross-border shopping takes place across small Member States such as the Benelux. Policy recommendations could be based on the calculation of the MCF by tax category at the EU rather than at the country-level in order to capture these spillover effects. Generally speaking, the complexity of issues at stake calls for a modelling toolbox whereby DGSE analysis would be complemented by CGE/quasi-static models (such as GTAP or GEM-E3) allowing for more detailed analysis by tax category at the cost of more simplified assumptions regarding agents´ behaviour. Equity concerns require the use of microsimulation models (such as EUROMOD in the EU case) in order to design optimal tax strategies that would eventually need to be complemented with other (non-tax) policy measures.

3.5 Measuring consolidation efforts on the tax side

Savina Princen[*]

Measuring consolidation efforts on the tax side can be done according to two approaches. The traditional approach is a top-down one, correcting the revenue from the cyclical component, i.e. the component that depends on the cycle and which is independent of government actions. As in times of large shocks, this approach does not always give an accurate reflection of the discretionary fiscal efforts on the revenue side, consolidation efforts are also measured by adding up all the individually defined discretionary measures. This approach acts bottom-up and regroups the discretionary measures in taxation and social security contributions under the name 'discretionary tax measures' (DTM). The collection of those measures allows having an additional method to measure consolidation efforts on the revenue side.

3.5.1 Definition of discretionary tax measures

DTM can be defined as *any legislative or administrative change in policy that has an impact on tax revenues*. Strictly speaking, they are not an ESA 95 National Account item. As DTM result from a policy or an administrative decision, they should be distinguished from i) the impact of automatic indexation or ii) the revenue increases mandated by law, which occur automatically to offset corresponding increases in specified expenditures, such as automatic rise in social security contributions in reaction to a surge in social security spending.

DTM correspond to three categories of measures: i) measures already adopted, ii) measures planned with some certainty, meaning measures credibly announced in the sense of a likelihood of political enactment and implementation and known with sufficient details (i.e. they can be attributed to a specific ESA 95 category) and iii) measures foreseen for the future with a high degree of uncertainty regarding their actual implementation.

All categories are reported in the Stability and Convergence Programmes (as specified in the latest Code of conduct). The DTM data collected in the context of the Output Gap Working Group of the Economic Policy Committee, only include the two first categories. The European Commission collected those data in order to more precisely assess tax revenue elasticities with respect to GDP. As discretionary tax policy is widely used by governments, discretionary measures are expected to represent a relevant part of GDP, which could – at least in part – affect the short-term pattern of tax elasticities. It is this data collection that is used in the subsequent analysis.

3.5.2 Size and composition of discretionary tax measures

In order to evaluate the size and importance of DTM, we express them as a share of GDP and compute an average across years and countries. Although values can be quite large for individual years or countries, the average share of DTM is almost nil (less than 0.1% of GDP) in the EU as a whole over the period 2001-12. This – at first sight surprising – result can be explained by three observations.

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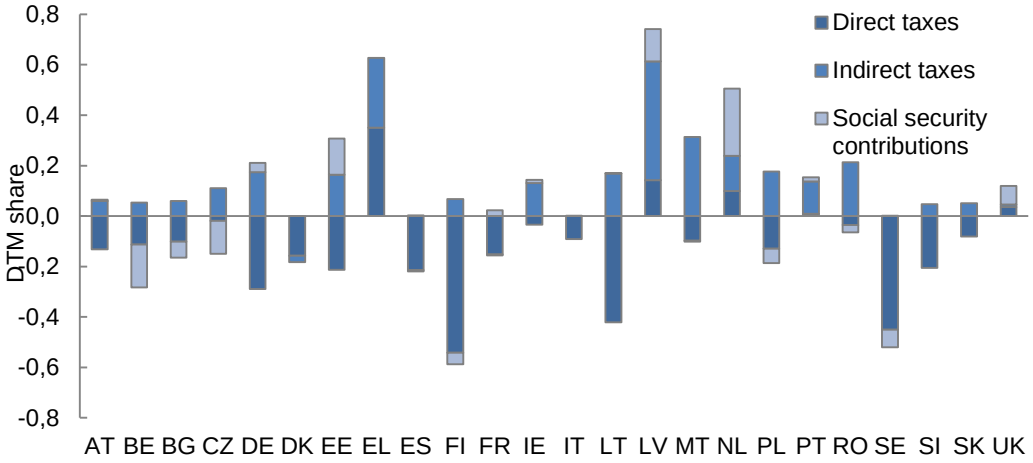
- First, as country business cycles are not fully synchronised and political cycles differ, discretionary tax hikes in one country tend to be offset by discretionary tax cuts in another country, in any given year.
- A second element explaining the small average share of DTM is that positive and negative DTM tend to cancel out over the business cycle. Evidence is reported in Figure 1, which provides a country-wise analysis of DTM. At the same time, the average size of discretionary measures over the whole period differs considerably among countries, as they range from -0.5% of GDP (tax cuts) in Finland to 0.7% of GDP (tax increases) in Latvia.
- A third reason for the small average share of DTM is the composition of DTM: within each country compensating shifts among tax categories seem to be a common pattern. Based on Figure 1, it can be observed that discretionary tax cuts are mainly accounted for by direct taxes and that those tax cuts are (partially) compensated by discretionary increases of indirect taxes, presumably as part of a growth-friendly tax shift.

Figure 1: Composition of discretionary tax measures (% of GDP)



3.5.3 Cyclicality of discretionary tax measures

The relationship between discretionary policy and the business cycle is far from obvious. In order to investigate the impact of the business cycle on DTM (as a share of GDP), a panel regression with fixed effects is used. The regression takes the following specification:

$$DTM_{i,t} = \beta_0 + \beta_1 OG_{i,t-1} + \beta_2 X_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where β_0 is a constant term, β_1 is the coefficient of the output gap, β_2 the coefficient of the explanatory variables (i.e. the budget balance (as percentage of GDP), the debt-to-GDP ratio and the tax-to-GDP ratio). This equation is estimated for 23 EU countries for the period 2001-2012 and for all tax categories. Table 1 reports the regression results for different tax categories.

Table 1. Determinants of discretionary tax measures

	(1) Direct	(2) Indirect	(3) Total Tax	(4) SSC	(5) Total
L.Output Gap	0.00425	0.0148*	0.0191	-0.0114*	0.00768
	(0.45)	(1.72)	(1.60)	(-1.82)	(0.55)
L.Budget Balance	-0.0256**	-0.0289**	-0.0546***	-0.00625	-0.0608***
	(-2.10)	(-2.58)	(-3.52)	(-0.77)	(-3.36)
L.Debt to GDP	0.334	-0.115	0.219	-0.0795	0.139
	(0.99)	(-0.37)	(0.51)	(-0.35)	(0.28)
L2.Tax to GDP	0.0104	-0.0251	-0.0148	-0.0109	-0.0257
	(0.55)	(-1.45)	(-0.62)	(-0.87)	(-0.92)
Crisis	0.0587	-0.00929	0.0494	0.000673	0.0500
	(1.08)	(-0.19)	(0.71)	(0.02)	(0.62)
Constant	-0.841	1.184	0.343	0.509	0.852
	(-1.05)	(1.61)	(0.34)	(0.95)	(0.72)
Observations	230	230	230	230	230
R-squared	0.092	0.060	0.127	0.044	0.132

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

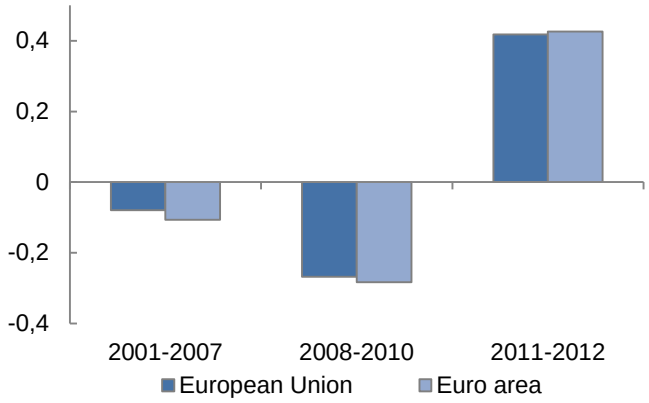
In Table 1, the coefficient of the variable Output Gap is not significant for total DTM. It is weakly significant for indirect taxes and social security contributions and the impact of the cycle is very limited: a 1% increase of the output gap only generates a 0.01 p.p. increase (decrease) of DTM for indirect taxes (social security contributions). Overall, the business cycle is only a weak determinant of DTM, which seems to confirm the finding that the use of DTM is mainly related to shifts in policy regimes, caused by changes in the economic context. The regressions also show that the variable Budget Balance is a statistically significant determinant of DTM for indirect taxes, total taxes and total levies. The estimated coefficients of Budget Balance are negative, indicating that the higher the budget deficits, the stronger the discretionary tax increases. Therefore, the situation of public finance has some impact of the direction and size of DTM. However, this impact is fairly modest, as the coefficient only amounts to approximately 0.06 p.p. of GDP (total levies).

To analyse whether the change in economic context rather than the business cycle determines the use of DTM, we focus on three distinct policy regimes. Our dataset allows analysing discretionary policy from the revenue side over the period 2001-12 and hence covers the financial crisis period 2008-10, as well as the period following the crisis. For each of the periods, Figure 2 shows the average size of the total DTM, expressed as percentage of GDP. The weighted averages of the EU and the euro area are reported for the three policy regimes:

- A *pre-crisis regime* (2001-07), characterised by a slightly positive output gap in both the EU (1.4%) and the euro area (0.9%) on average.[12] During this period, DTM mainly consisted of tax cuts (i.e. entailing lower revenues), providing evidence of mildly pro-cyclical tax policy. This 'benign neglect' was common in good fiscal times, when countries felt they could afford tax cuts, partly because of tax windfalls from booming asset prices.

[12] The output gaps used here correspond to their ex-post value, as calculated in the Commission 2012 autumn forecast, which may differ from real-time output gaps.

Figure 2: Discretionary tax measures over time (total levies)

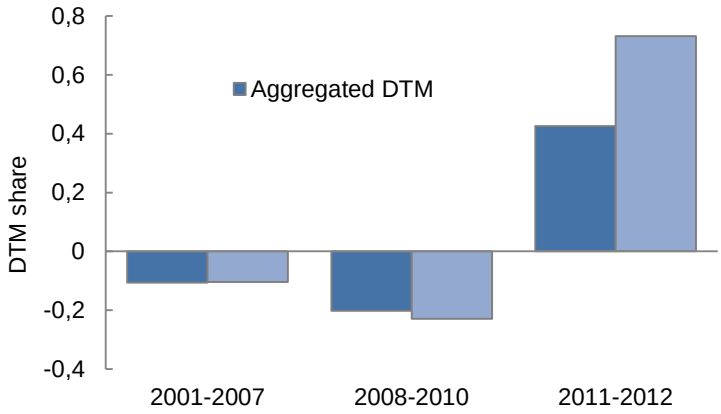


- A *crisis regime* (2008-10), characterised by a negative output gap in both the EU (-1.3%) and the euro area (-1.6%) on average. The crisis regime consisted of large stimulus measures, including tax cuts and was therefore largely counter-cyclical.

- A *consolidation regime* (2011-12), characterised by a negative output gap in both the EU (-2.4%) and the euro area (-2.8%) on average. During the consolidation period, characterised by the debt crisis and the lack of fiscal space, EU Member States engaged in pro-cyclical tax hikes, as a way to consolidate their public finances, despite poor cyclical conditions.

The three distinct policy regimes thus all have a distinct fiscal nature. Comparing the sum of DTM with the change in the cyclically adjusted revenue (Figure 3), shows that both approaches indicate the same trend and that both measures are very close for the pre-crisis and the start of the crisis. In the consolidation period, the cyclically adjusted revenue suggests a stronger tax increase than the aggregated DTM data.

Figure 3: Aggregated discretionary tax measures versus the change in the cyclically adjusted revenue



Those differences could be explained by the different benchmark used by the two approaches: the benchmark underlying the cyclically adjusted revenue corresponds to the nominal revenue increasing at the same pace as potential output, while the benchmark for aggregating DTM is the development of the nominal revenue in absence of new policy actions.

3.5.4 Conclusions

This contribution focuses on how consolidation efforts on the tax side can be measured using discretionary tax measures (DTM). It compares the results obtained using this bottom-up approach with the ones using the traditional top-down approach, correcting the revenue from the cyclical component. This contribution also analyses the size, composition and cyclicality of DTM in the EU over the period 2001-12.

Comparing the sum of DTM with the change in the cyclically adjusted revenue shows that both approaches indicate the same trend and that both measures are very close for the pre-crisis and the start of the crisis. In the consolidation period, the cyclically adjusted revenue suggests a stronger tax increase than the aggregated DTM data.

Regarding the size and composition of DTM, the share of DTM is almost nil (less than 0.1% of GDP) on average in the EU, largely because DTM cancel out over the period 2001-12 and differ widely across countries. On the relationship between discretionary measures and the business cycle, the use of DTM seems to be mainly related to shifts in policy regimes, caused by changes in the economic context, rather than to the business cycle. While small pro-cyclical tax cuts were observed during the pre-crisis period (2001-07), larger counter-cyclical tax breaks were adopted during the crisis period (2008-10), as part of the stimulus package. During the consolidation period (2011-12), characterised by the debt crisis and the lack of fiscal space, EU Member States have engaged in pro-cyclical tax hikes, as a way to consolidate their public finances.

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3.6 Consolidation on the Revenue Side: Ireland

Gary Tobin[*]

3.6.1 Introduction

There were three component elements[13] which resulted in the economic and fiscal crisis which hit the Irish economy in the latter part of the last decade:

- a steady loss of competitiveness during a prolonged boom;
- the bursting of a property bubble; and
- an international banking crisis which triggered a worldwide recession.

In a similar way, there will be arguably three elements to a successful Irish economic recovery:

- restoring order to the public finances
- restructuring the banking system; and
- regaining competitiveness and returning the economy to sustainable growth

There are positive signs that the Irish economy is on the path to recovery. Real GDP grew by 1.4% in 2011 (the first year of growth since 2007) and the economy continues to grow. And while the domestic economy remains subdued, exports are leading the recovery, with growth of 5.1% in 2011 with very strong growth in services exports evident in particular, up 9.6% in 2011. Continued wage moderation coupled with productivity growth has seen unit labour costs come down significantly in recent years and inflation remains low. 2011 also saw the second consecutive year of a balance of payments surplus and this is expected to strengthen over the medium term.

Unemployment, usually a lagging indicator, however remains stubbornly high at over 14.5%. The EU-ECB-IMF Programme of External Support also remains very much on track. In fact the EU-ECB-IMF targets have been consistently bettered. The Government remains committed to returning fully to the capital markets as soon as possible. In this regard, the National Treasury Management Agency has already had considerable success in raising new funds.

Given the particular focus of this DG ECFIN Workshop, this paper only focuses on the first element of Ireland's recovery strategy: namely restoring order to the public finances.

* Head of Unit – Business Tax Team, Department of Finance, Ireland. The author would like to thank colleagues in the Irish Ministry of Finance for their useful comments in the preparation of this Paper. In particular: Derek Moran; Alan Mahon; Keith Hennessy; and Brendan O'Connor. The views expressed in this paper are entirely those of the author and should not be attributed to the Irish Ministry of Finance.

[13] http://budget.gov.ie/budgets/2010/FinancialStatement.aspx

3.6.2 Path to Recovery in Ireland

Successive Irish Governments, since the onset of the crisis, have recognised that radical broadening of the tax base was needed in Ireland to restore the public finances to a sound footing by making the tax system more sustainable and moving away from reliance on transactional taxes which by their very nature are reliant on the economic cycle[14]. The collapse in transactional tax revenues, post crisis, stamp duty and capital gains tax in particular, also presented the Government with an opportunity to reform the taxation of property.

In particular it was recognized that throughout the Celtic Tiger years, the tax base was narrowed and 'hollowed out' and that post crisis more than anything else we simply needed to increase the numbers paying tax. Arguably, Ireland, pre crisis, had a model tax system with low taxes on labour with a significant emphasis on consumption taxes. But an income tax system where more than 45% of tax units paid no income tax was simply not sustainable. Partly as a result of successive social partnership agreements between the Government, trade unions and employers, during the period after 2000 the entry point to income tax increased from €7,238 to €18,300 at its peak and since the introduction of individualisation, bands widened by 105% for the single person and married two earners while credits increased by 92% since their introduction in 2001. The proportion of tax units exempt from income tax had thus increased from 34% in 2004 to an estimated 45% in 2010. At the same time the proportion paying at the higher rate had fallen from 23% to just 13%.

It was also recognized by the Government that tax expenditures and reliefs must be abolished or restricted: in particular higher income earners should not be able to shelter themselves from paying their fair share of tax. By broadening the base at both ends of the income spectrum, the strategy is to keep nominal rates of tax lower while the effective rate can be raised in a way that is fair. The aim is to be fair but also confront the pervasive structural problems of the income tax system and recognise that excessively high marginal tax rates damage economic activity.

It was also agreed that revenue raising measures across all areas would be implemented – income, capital, indirect, expenditures, reliefs and incentives. For example, capital tax rates have been increased by 50% from 20% to 30% and exemption limits were reduced by 60%.

The Government strategy however has remained steadfastly committed to the maintenance of the 12½% corporate tax regime as a cornerstone of industrial policy. Research by the OECD [15] points to the importance of low corporate tax rates to encourage growth. In ranking taxes by their impact on economic growth, corporate tax was found to be most harmful. In other words, governments seeking additional tax revenues would be advised to consider increasing all other types of tax (property, consumption and income) before increasing corporate taxes.

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[14] See: http://www.budget.gov.ie/The%20National%20Recovery%20Plan%202011-2014.pdf. http://www.taoiseach.gov.ie/eng/Publications/Publications_Archive/Publications_2011/Programme_for_Government_2011.pdf

[15] 'Tax and Economic Growth', OECD Economics Department Working Paper No 620 July 2008

3.6.3 Front Loaded Fiscal Consolidation

The process of fiscal consolidation has been underway since mid-2008, long before Ireland entered an EU-ECB-IMF Programme. To date adjustments designed to save/yield approximately €25 billion (around 16% of 2011 GDP) have already been implemented with around €10 billion of adjustments on the revenue / tax side (equivalent to about 6% of GDP). A significant element of the revenue / tax adjustment was front loaded, particularly so in the *Supplementary Budget* which was announced in April 2009.

In a relatively short presentation it is not possible to discuss all of the various revenue / tax reform measures that have been put in place over the past five years but two case studies are presented below.

3.6.4 Case Study: Universal Social Charge

This section of the presentation draws heavily from a Review of the Universal Social Charge carried out and published by the Irish Ministry of Finance in 2011[16].

The Universal Social Charge (USC) was introduced in Budget 2011 and replaced the Income and Health Levies. By 2010 almost half of income earners were not liable to income tax. The structures of the Income and Health Levies and PRSI were over-complex and relied on a narrow base which differed for each charge. In addition, the interaction of the levies and, to a lesser extent, PRSI with Income Tax, created a number of anomalies which discouraged employment and did not fully reflect the differences in gross incomes.

Therefore, the main reasons for introducing the USC were as follows:

- To broaden the Tax Base
- To simplify the Taxation Structure
- To remove Poverty Traps and
- To create a sustainable and efficient charge

The Universal Social Charge applied from 1 January 2011 at the following rates:

- 2% on the first €10,036 (€193 per week)
- 4% on the next €5,980 (€193.01 to €308.00 per week) and
- 7% on the balance.

It is estimated that in 2011 approximately 514,000 more income earners paid the USC than had previously paid the Income Levy. The breakdown is as follows:

- The estimated number of income earners paying the Health Levy in 2010 was 989,000

[16] http://taxpolicy.gov.ie/wp-content/uploads/2012/01/Universal-Social-Charge-Review.pdf

- The estimated number of income earners paying the Income Levy in 2010 was 1,469,000
- The estimated number of income earners paying the USC in 2011 is 1,984,000

The USC operates on a much wider income base than income tax. It applies to all taxpayers and the scope, for example, for the wealthy to avoid the charge through large contributions to pension funds is not available. Also, for example, there are no exemptions for income from forestry, mining or artistic pursuits. Passive investors cannot reduce their liability to it through capital allowances.

Given the width of the base and its simple structure, the USC is an efficient charge. It is estimated that a one percentage point increase in the three standard rates of USC (i.e. 2%, 4% and 7% to be increased to 3%, 5% and 8%) would yield €745 million in a full year. To raise the same through the income tax system would require a two percentage point increase on the standard rate or a four percentage point increase on the higher rate or a combination of both.

One of the distortionary effects of the Health Levy was caused by its very high entry point. Income earners did not pay the Health Levy until their income exceeded €26,000 per annum (€500 per week) and then they paid Health Levy on their entire income. This is known as a "step effect". The doubling of the Health Levy in 2009 exacerbated the impact of this "step effect". The "step effect" resulted in an anomalous situation where an individual earning €25,500 per annum could receive a pay rise of €1,000 per annum but receive a lower net pay. This sudden liability to a charge can lead to "poverty traps" which can discourage people from working, taking on extra work or progressing in their place of work. The USC is designed to apply across income levels in a smoother progression while also addressing the irregularities caused by the 'step effects' in the levies and PRSI.

The Universal Social Charge, like any tax increase, was not welcomed by the public. Taxpayers experienced a drop in net income in Budget 2011. Many people thought the USC was the reason for the reduction in their net income. This was not the case for many taxpayers. The reason many income earners saw reductions in their net income was due to the reduction in income tax credits and bands that also occurred in Budget 2011. Most taxpayers earning over €26,000 per annum would have benefited from the introduction of the USC all other things being equal; particularly those earning between €26,000 and €35,000 who had been suffering disproportionately from the sudden impact of the 4% Health Levy.

While many income earners would be better off under the USC than the Income Levy and Health Levy combined, there are a significant number who will pay more tax as a result of the introduction of the USC. This is due to the fact that there were many exemptions from the Income Levy and Health Levy. The entry points to paying these charges were relatively high and the numbers of exempt individuals were also high. For example, only 989,000 income earners paid the Health Levy – this is less than half the total number of income earners on the tax record and was due to the high exemption threshold to the levy as well as the different types of income and income earners that were exempted from the levy.

3.6.5 Case Study: Jobs Initiative – Targeted Temporary Reduction in VAT

This section of the presentation draws heavily from research carried out by Brendan O'Connor, Senior Fiscal Economist in the Irish Ministry of Finance in a 2012 paper entitled '*Measuring the Impact of the Jobs Initiative: Was the VAT Reduction Passed On and Were Jobs Created?*'.[17]

In May 2011 the Government announced a *Jobs Initiative* which involved a series of measures to boost employment. A key aspect of the *Jobs Initiative* involved the introduction of a new, temporary, second reduced rate of VAT at 9% which was targeted mainly at labour intensive goods and services relating to tourism. It was introduced with effect from 1 July 2011 and applies until end-December 2013.

The 9% rate applies to the following categories which had previously been subject to VAT at 13.5%:

- The supply of food and drink (excluding alcohol and soft drinks) in the course of catering or by means of a vending machine;
- Hot take-away food and hot drinks;
- Hotel lettings, including guesthouses, caravan parks, camping sites etc;
- Admissions to cinemas, theatres, certain musical performances, museums, art gallery exhibitions;
- Amusement services of the kind normally supplied in fairgrounds or amusement park services;
- The provision of facilities for taking part in sporting activities by a person other than a non-profit making organisation;
- Printed matter e.g. newspapers, brochures, leaflets, programmes, maps, catalogues,
- Printed music (excluding books); and, Hairdressing services.

The Minister for Finance announced in his Jobs Initiative speech that to ensure that the tourism sector is delivering added employment from the 9% rate of VAT, the effects of the changes would be assessed and the measures reviewed before the end of 2012 in the context of preparing Budget 2013.

One of the means of testing the effectiveness of the stimulus is an examination of the rate of pass through of the VAT reduction to lower consumer prices.

Whilst overall prices covered by the VAT reduction fell compared with economy wide headline and underlying inflation, different rates of inflation occurred in the various categories covered by the reduced VAT rate.

For example, clear evidence of pass through occurred in the following series:

- Meals out;

[17] http://taxpolicy.gov.ie/wp-content/uploads/2012/11/Measuring-the-Impact-of-the-Jobs-Initiative-Was-the-VAT-Reduction-Passed-On-and-Were-Jobs-Created.pdf

- Hairdressing;
- Admissions to cinemas, theatres, musicals, museums and art galleries; and,
- Newspapers.

Significant price volatility occurred in the 'hotels and other accommodation' series which fell by 13% from July 2011 to January 2012, and recovered to within 1% of the June 2011 price level by June 2012. This is driven by the cyclical nature of hotel prices which peak in midyear and decline thereafter. Another series impacted by seasonality is hairdressing services with a clear 'December effect' causing a temporary spike in prices around the Christmas period.

The Central Statistics Office releases employment data quarterly through the Quarterly National Household Survey (QNHS). The most recent QNHS release was in respect of Q2 2012. The 9% reduced VAT rate came into existence at the start of Q3 2011. Thus there are four quarters of out-turn data on the employment impact available, including the quarter in which the rate change occurred. Based on the data that are publicly available from the CSO the most relevant economic sector that is mainly accounted for by 9% VAT rate items is – 'accommodation and food services'. All other 9% VAT rate items form small parts of broader economic sectors and an analysis of these sectors would not be informative in terms of the specific impact of the 9% reduced VAT rate.

Whilst it is therefore not possible to look at the impact of the Jobs Initiative across every 9% VAT rate category, the food and accommodation services covers 70% of the Jobs Initiative basket according to expenditure data provided by the CSO as part of its price series. It is therefore reasonable to analyse the food and accommodation services economic sector as a proxy for the overall impact. According to the QNHS there were 114,500 people employed on a seasonally adjusted basis in the accommodation and food services economic sector in Q2 2012, compared with 108,300 in Q2 2011, the quarter that immediately preceded the introduction of the 9% rate. This represented a net increase in the sector of 6,200 jobs (+6%).

3.6.6 Concluding Remarks

While a lot has been achieved in terms of fiscal consolidation in Ireland since the crisis commenced, at a not insignificant cost to Irish society in terms of jobs and living standards, certain challenges remain, not least the introduction of a new property tax system. This is a priority item for Budget 2013.

As a final comment, it should be remembered that no matter how innovative the tax policy responses to the need for fiscal consolidation, a well-functioning revenue collection system is essential if these changes are to be successfully implemented. In this regard, Ireland is fortunate in having arguably one of the best performing Revenue authorities in the world.

4. SESSION II: Redistributive effects of consolidation on the revenue side

4.1 Safeguarding social equity during fiscal consolidation: which tax bases to use?

John Hills[*]

This paper explores some of the equity issues that are – or at least should be – central to decisions about the composition of fiscal consolidation measures. It starts by discussing the varied possible criteria for assessing 'social equity' in the context of the crisis. It then sets out the possible options for fiscal consolidation and then compares the impacts of the overall choice between general reductions in public spending and increases in taxation. It then looks at four specific options in a little more detail, before concluding.

While most of the issues are general to any Member State, some of the illustrations are made using UK data, and discussed from a perspective of a country which starts with one of the highest levels of income inequality in the EU, and where over the medium term more than four-fifths of fiscal consolidation is planned to come from reductions in public spending, rather than increases in taxation. The paper does not discuss the appropriate scale or rate of consolidation from a macroeconomic perspective or the efficiency differences between different approaches.[18]

4.1.1 Meanings of 'social equity'

An immediate issue in approaching this topic is that 'safeguarding social equity' could mean several different things, depending on one's perspective. There could be at least eight interpretations, running roughly from the least to the most distributionally progressive:

- In coping with the unexpected national shock, all households should make an *equal contribution* – for instance through effectively lump sum tax increases, or through losses in services or cash benefits that have an equal value to each household.
- Governments should *withdraw gains* that people had previously made as a result of its activities that were in the long run unsustainable – for instance, by reversing public spending increases (or tax cuts) that were made at a time when there was what turned out to be an over-optimistic view of the public finances. That is, we were living beyond our means, and now need to adjust back to what was always the underlying reality.
- Contributions through higher taxes or losses of services should have an *equal proportionate impact* on each household depending on its resources, such as disposable income – that is, the effects should be neutral across the income distribution as measured at the start of the consolidation.

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[18] See the papers by Michael Keen and Matthias Burgert and Volker Wieland in this collection, and European Commission (2012), chapter 5.

- A related requirement could be that impacts should be neutral between *generations*, either in absolute terms, or in proportion to their relative resources.
- Contributions should be *progressive*, with 'the broadest shoulders carrying the largest burden'.
- Fiscal consolidation should be carried out in a way that *offsets* the distributional effects of other aspects of the crisis, such as rising unemployment or changes in real wages, that is, restores levels of inequality to pre-crisis levels.
- Contributions should come from those who had the largest gains *before the crisis*, on the grounds that it was the whole operation of the economy, and the growth in inequality in many countries, that was unsustainable, not just taxes and public spending.
- The burden should be borne by those judged to have *caused* the crisis, such as those in the financial sector.

Each of these interpretations would suggest a different evaluation of a particular package of measures. It might be noted, though, that in the current European context only in the first two cases would a regressive set of changes be consistent with the concept of social equity (with the possible addition of the fifth, if in a particular case the effect of the crisis had borne proportionately more heavily on the better-off than on the worse off). Several of the other concepts of equity would suggest that the impact of adjustment should in some way be progressive, and most that it should not be regressive.

4.1.2 Fiscal consolidation options

Governments have at their disposal a wide range of ways in which they could improve the fiscal balance. Each will have its own distributional and equity implications, and these will vary from country to country. These categories include the following (with those discussed in more detail below highlighted in bold):

- **General spending reductions**, across all public services and transfers.
- **Spending reductions targeted** by income or other criteria.
- Cuts in public sector wages.
- Specific indirect tax increases – such as on alcohol, tobacco, or motoring.
- Increases in VAT rates or **broadening of the VAT base**.
- Environmental taxes, such as an increase in the **Carbon price**.
- Income tax rates, reductions in income tax allowances or allowable deductions.
- Social insurance contribution rates or base-broadening (e.g. to the retired population, or through increasing ceilings for contributions).
- Stronger taxation of investment income or capital gains.
- **Reduction of tax privileges –** for instance for owner-occupied housing, pension contributions or other forms of saving.
- **Property or wealth taxes**.[19]
- **Taxes on wealth transfers** such as inheritance (on donor or donee basis) or gifts.

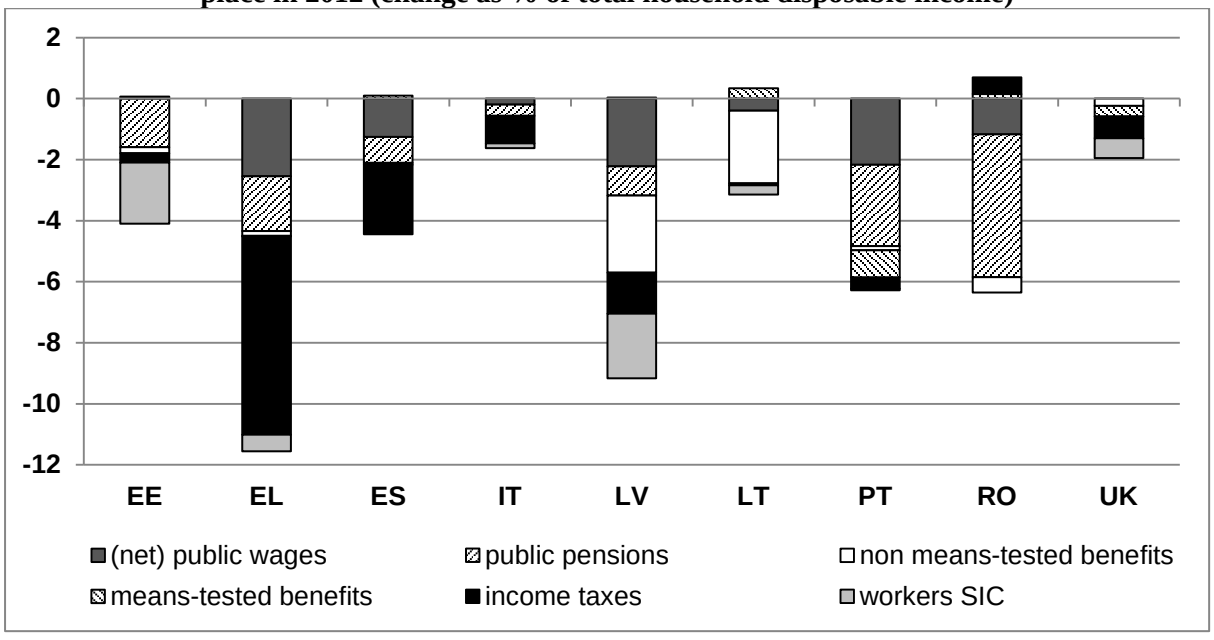
[19] See Thomas Piketty's contribution to this collection.

- Financial transactions taxes (such as 'Tobin taxes' or more traditional stamp duties).
- Measures to counter tax evasion or to reduce avoidance through closing down loopholes or tax havens.

4.1.3 General spending cuts and tax increases

While the impact of specific spending cuts or tax increases can vary greatly from that of general cuts or tax increases, the scale of the consolidation now being implemented by most governments makes it hard for them to be very selective. As a prelude to looking at implications of specific measures, it is important therefore to look at the difference between general – across the board – spending cuts and increases in all taxes. As shown in Michael Keen's contribution to this symposium the IMF's assessment of fiscal adjustments between 2010 and 2012 suggests that in the advanced countries under most fiscal pressure, tax increases represented just over 1.0 per cent of GDP, but spending reductions about 4.4 per cent. In other advanced countries, the average adjustment was much smaller, but spending cuts also accounted for at least 80 per cent of the total.

Figure 1: Aggregate effect of simulated household income-based fiscal consolidation measures in place in 2012 (change as % of total household disposable income)



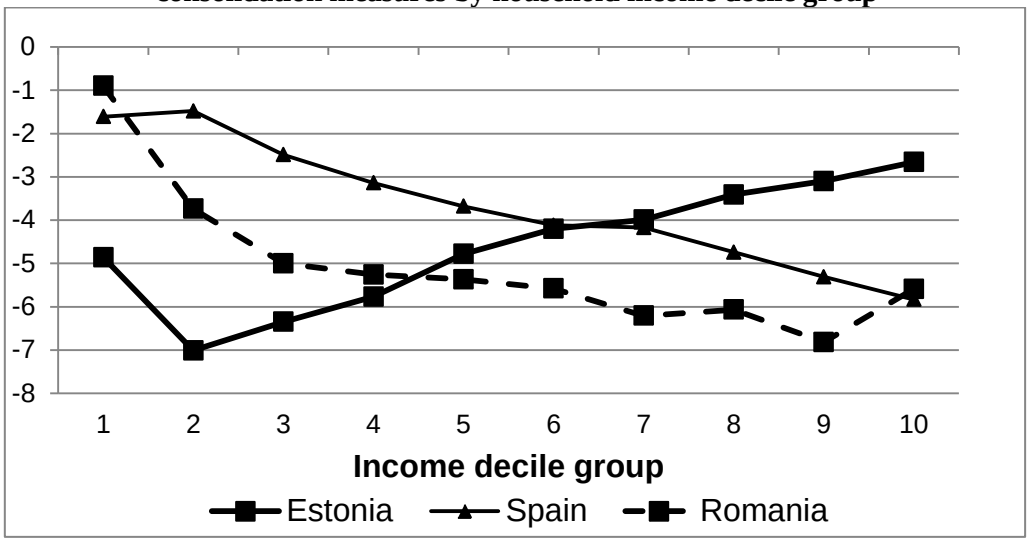
Source: Avram, *et al.* (2012), figure 1, based on results from EUROMOD.

This balance varies greatly between countries, however, and with it, distributional effects. Figure 1 shows the measures whose distributional effects have recently been examined for nine EU Member States by Avram, *et al.* (2012) using the simulation model, EUROMOD. The measures covered are only some of those which have contributed to each country's total, importantly excluding indirect taxes increases and cuts in services. They include, however, increases in direct taxes, cuts in benefits of different kinds, and reductions in public sector wages. The analysis relates only to measures in place by June 2012. In some cases, such as the UK, the balance of early measures has been much more weighted to tax increases – which are easier to implement quickly – than is planned for the medium-term. While in Greece (EL) and Spain (ES), income tax accounted for half or more of these early measures, in countries

such as Portugal (PT) and Romania (RO) nearly all of the adjustment came on the spending side. In Estonia (EE), half of the adjustment came from employee social insurance contributions.

This mix affects the overall distributional impact. Figure 2 contrasts the modelled effects of these changes in Estonia, Spain and Romania. In all three countries the total effect of the modelled measures is between 4 and 6 per cent of GDP. In Estonia, the overall impact is regressive, with a smaller proportionate impact the higher one goes up the income distribution. This reflects the regressive effects of cuts to public pensions alongside a general proportional effect of increased social insurance contributions. By contrast, in Spain the increases in direct taxes are progressive and larger in scale than the (somewhat regressive) cuts to public pensions. The overall impact on households in the top half of the distribution is largest in Romania – from a combination of cuts in public sector wages (progressive) and a large contribution from reduced public pensions (with a roughly proportional effect, but little impact on the poorest tenth).[20] If VAT rate increases are allowed for (5 percentage points in Spain and Romania, 2 percentage points in Estonia), the regressive effects in Estonia are increased, while the progressivity of the changes in Spain and Romania is reduced.[21]

Figure 2: Percentage change in household disposable income due to simulated fiscal consolidation measures by household income decile group



Source: Avram *et al.* (2012), figure 2, based on results from EUROMOD.

A substantial part of public spending is not covered in analyses of this kind, however – that on services or in kind benefits (to the extent it is not covered by changes in public sector wage levels). In kind benefits are usually equivalent to a much larger proportion of the disposable incomes of those with lower than of those with higher incomes. Verbist, Forster and Vaalavuo (2012, table 7) find that they averaged the equivalent of 76 per cent of the disposable income of the poorest fifth across 27 OECD countries, but only 14 per cent of

[20] Details for each country presented in figure 3 of Avram, *et al.* (2012).

[21] Avram, *et al.* (2012), figure 5. The pattern is similar in the other countries covered, with, for instance, the early UK measures emerging as mildly regressive across the distribution from second to ninth decile groups if VAT is included, but as mildly progressive before it is included. As the data sources underlying EUROMOD do not include data on expenditure alongside those for income, the estimates of the impact of VAT changes are imported from other sources.

those in the top fifth. By implication, adding in the effects of cuts in public services where these have been made would – unless they were strongly targeted by income (see below) – show a more regressive picture than the kinds of analysis shown above.

To compare across-the-board changes in public spending or taxation as a whole requires data on who is affected by both, as well as what can be uncertain assumptions about their incidence. For instance, higher employer social insurance contributions could potentially be reflected either in lower gross wages or in reduced net revenues for employers. Equally, spending cuts affecting particular areas could depress local house prices and so be capitalised in lower asset values.

In the UK the Office for National Statistics makes annual estimates of the effects of the bulk of social spending and for taxes that can be attributed to households.[22] Using these one can contrast the distributional effects of on the one hand equal percentage cuts in all social benefits and services (in cash and kind) and on the other equi-proportional increases in taxes. Using data for 2008-09, every £1,000 raised per household would be equivalent to 3.5 per cent of disposable household income. If this were raised through an increase in all taxes, this would represent 3.4 per cent of the income of the poorest fifth of households, and 3.7 per cent of the income of the richest fifth. The impact, on ONS's incidence assumptions, would therefore be roughly proportional.[23] But if the same amount was raised through balanced cuts in public social spending, the loss would be equivalent to 11.9 per cent of disposable income for the poorest fifth, and only 0.9 per cent of income for the richest fifth.[24]

4.1.4 Specific options for fiscal consolidation

This section looks in a little more detail at four specific elements of fiscal consolidation, using evidence from the UK case to argue that careful attention needs to be given to distributional and related issues, if a requirement of social equity is taken seriously.

(a) Broadening of the VAT base

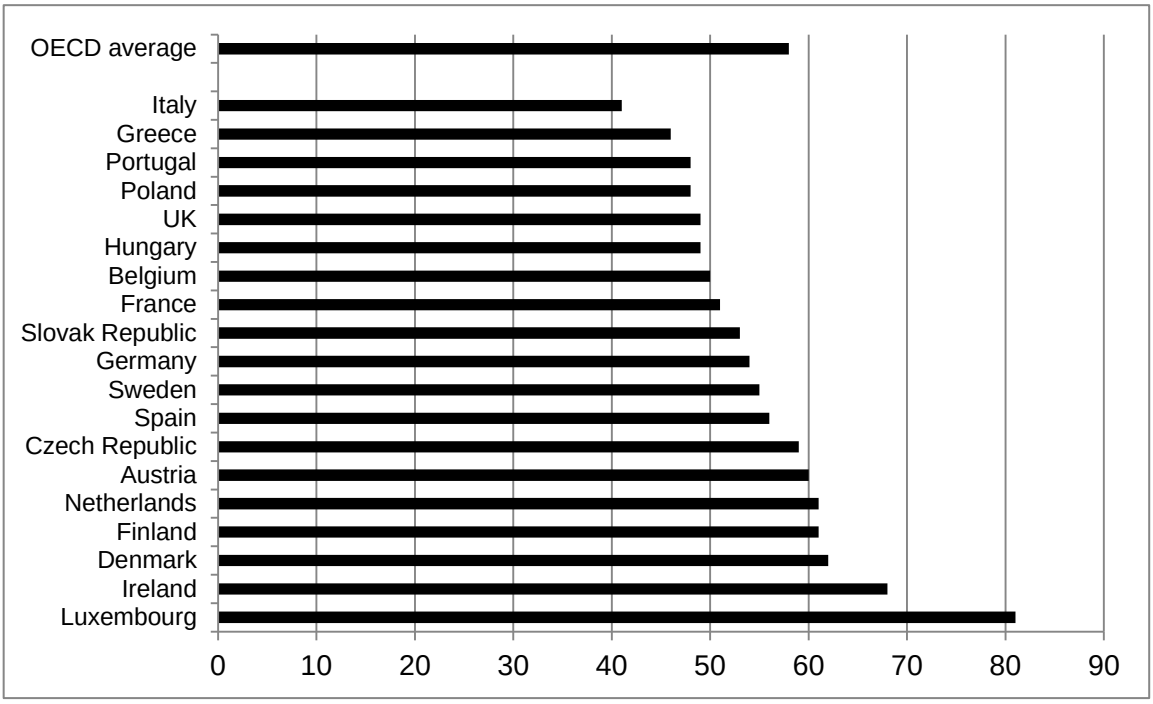
While policy-makers in general try to avoid visible increases in tax rates, increased revenue can also be gathered through widening the base of particular taxes. This is clearly the case in many countries as far as VAT is concerned, as Figure 3 shows. This presents analysis carried out for the Mirrlees Review of the actual yield of VAT in various OECD countries by comparison with what could be raised if the VAT base covered all consumption at the country's standard rate. In all of them this yield falls short as a result of explicit exemption or zero-rating, reduced rates for particular forms of consumption, or the non-inclusion of some less visible forms of consumption from the base. In six of the countries, including the UK, the actual yield of VAT was less than half of the theoretical uniform potential yield.

[22] See, for example, Barnard (2010), which sets out the particular assumptions made about the incidence of cash benefits, direct and indirect taxes and public services. The latter include education, health care, and certain housing subsidies.

[23] Note, though that this is only the case because of the assumption that all taxes, direct as well as indirect, are raised in proportion. Within the UK system it is only income tax and social insurance systems that emerge as progressive. Other elements are regressive, if not balanced by these.

[24] Author's calculations based on Barnard (2010).

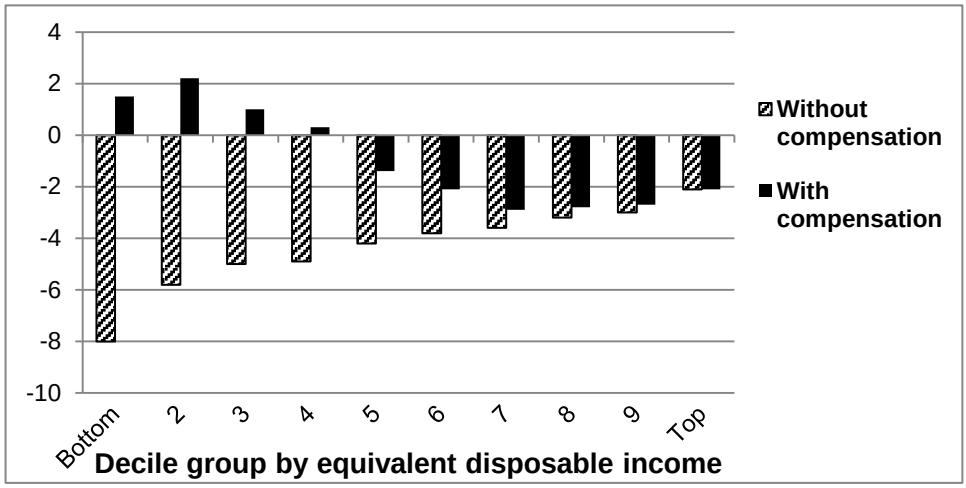
Figure 3: VAT revenue as percentage of potential yield from all consumption at standard rate, 2005



Source: Crawford, Keen and Smith (2010), table 4.2. Figure shows C-efficiency – VAT revenue divided by standard VAT rate times final consumption expenditure (minus VAT).

For a government wanting to avoid tax rate increases, base broadening could therefore be attractive. However, unless compensated for in some way, this would – in the UK, at least – be regressive, as exemptions and reduced rates (for items such as food or domestic fuel) may be a larger share of the consumption of the basket for poorer than richer households. As Figure 4 shows, if there were no compensation, VAT broadening would cost the poorest tenth of households the equivalent of 8 per cent of their disposable incomes, falling to 2 per cent for the richest households. However, the revenue from this could be used to compensate poorer households. The second set of bars shows what he distributional pattern would be if much of the revenue was used to increase means-tested social assistance benefits and tax credits by 15 per cent. On *average* the bottom three tenths of the income distribution would be net gainers from a package of this kind. However, within even the bottom groups there will still be some losers – reflecting lack of take up of means-tested benefits and tax credits (see Figure 6 below for a related example).

Figure 4: VAT broadening in the UK with and without compensation



Source: Crawford, Keen and Smith (2010), figures 4.1 and 4.2. Figures based on unifying VAT at 17.5% in 2005-06. Compensation is 15% rise in means-tested social assistance and tax credits.

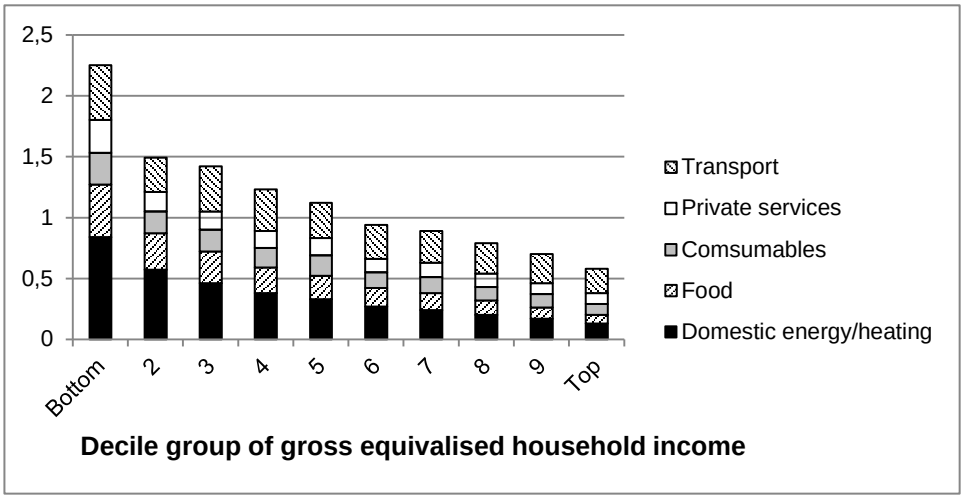
Base broadening could in theory therefore be carried out while not affecting the overall progressivity of the tax and transfer system. But there are three issues when considering this as part of fiscal consolidation:

- First, the compensation needed from offsetting changes to protect low-income households can be considerable. Indeed in the final recommendations of the Mirrlees Review (2012) itself, *all* of the increased revenue is spent on a package of increases to tax allowances and thresholds, tax credits, a cut on the main income tax rate, other means-tested benefits, state pensions, and child allowances. But in the context of fiscal consolidation, the aim is revenue-raising, so by definition what would be available for compensation would be much more limited, leaving a larger proportion of low-income households exposed to losses.
- Second, while the aim of base-broadening is increased efficiency through achieving a more neutral tax system, some forms of targeted compensation will themselves have an efficiency cost. This is particularly the case where means-tested benefits are made more generous. In countries such as the UK where means-testing is already extensive, this could mean exposing more households to the very high effective marginal tax rates that can emerge from the combination of overlapping means tests and direct taxes (the 'poverty trap').
- Third, there must be some doubts as to whether such compensation measures would, in fact, be continued in the long-run. Their rationale would be an increase in the cost of living measured specifically for low-income households as a result of higher indirect taxes. But in the long-run it is likely that the overall generosity of such benefits would be judged politically in real terms using a general price index or in relation to average incomes. In these terms, the one-off increase might eventually be eroded as anomalous. Of course, this would boost the long-run revenue raising from base-broadening, but by the same token the regressivity implicit in it would re-emerge.

(b) Carbon taxes

A second area where there are efficiency reasons of a different kind for increases in taxation (or equivalent charges) is environmental taxation, specifically increasing the cost of Carbon emissions. Here higher taxes could both raise revenue and correct an externality – indeed the greatest ever economic externality, in the assessment of the 2006 Stern Review. The downside is again distribution and hence equity. Figure 5 shows the underlying problem. This presents greenhouse gas emissions of all kinds (as kg of CO_2-equivalent) resulting from the consumption of UK households, taking account of the emissions embodied in imported goods, shown per pound of income of each income group. Total emissions of richer households are, of course, greater than those of poorer households, because they consume more. But the carbon-intensity of consumption of poorer households, weighted to items such as domestic fuel, is much greater – more than 2 kg of CO_2e per £ of income for the poorest tenth, compared to only just over 0.5kg for the richest tenth.

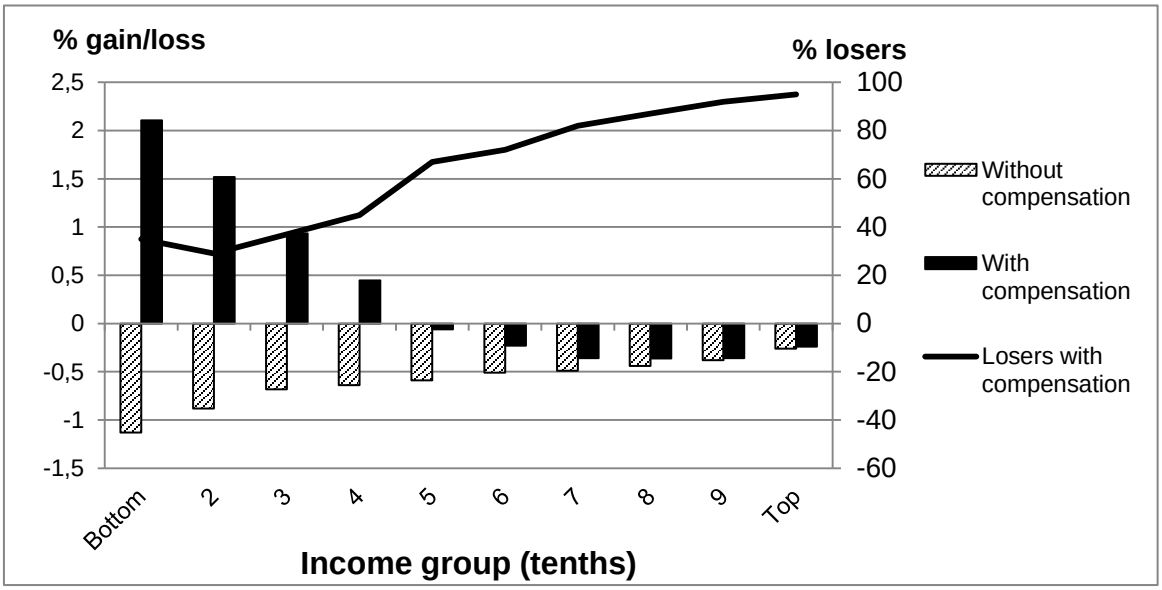
Figure 5: Greenhouse gas emissions (kg CO_2e) per £ of household income (UK, 2006)



Source: Gough et al. (2011), figure 8. Includes indirect emissions (e.g. from imported goods).

By implication, a Carbon tax, even if broadly based, and so catching all kinds of consumption, not just the easier targets such as domestic fuel or transport, will be regressive. Again, of course, from a measure that raises revenue, some of that revenue can be used to try to compensate losers and to offset the regressivity. Figure 6 shows an example of this kind of package, and how its overall regressive effect could be compensated. In this case, a Carbon tax of £30 (€ 35) per tonne of CO_2 is imposed on domestic fuel. The effects of this are shown both without compensation and in the case where *all* of the revenue gained is used to finance a package of increases in means-tested benefits and tax credits.

Figure 6: Impact of Carbon price (£30/tonne of CO_2) on domestic fuel (UK, 2008-09)



Source: Hills (2009), table 15.6, based on Dresner and Ekins (2006). Compensation uses all revenue raised to increase means-tested benefits and tax credits.

This sort of analysis again suggests some equity problems with this kind of measure, unless there are carefully designed offsetting measures.[25] In this example, a clearly progressive overall effect can be achieved. However, note that even where *all* of the revenue is used for this kind of compensation through transfers, there are still significant numbers of low-income losers, as shown by the solid line in the figure (against the right hand scale). More than a quarter of those in the bottom three income groups would still be losers. If the increase in the cost of carbon was intended to raise net revenue – as it would be if implemented as part of fiscal consolidation, the proportion of low-income households that would be losers would inevitably be higher. In UK terminology, the problem of 'fuel poverty' would be exacerbated.

This problem – that a package can be made progressive overall, but still have low-income losers – reflects not just problems with take-up of means-tested benefits, but also variations in fuel consumption *within* income groups, much of this stemming from the poor energy efficiency of many UK homes, including those occupied by low-income households. To avoid making the problems of some of the most vulnerable households worse, a corollary of measures that increase the cost of Carbon is not just some form of compensation through short-term income improvement, but also direct action to improve energy efficiency of the housing stock. This is likely to be good value for money in cost-benefit terms, [26] but it again implies that significant amounts of revenue raised from increasing the cost of Carbon would need to be spent in this way, but this further limits how much it can contribute to fiscal adjustment, if social equity is to be protected.

[25] See European Commission (2012), box 5.5, for discussion of this issue across a wider range of countries.
[26] See Hills (2012) for a detailed discussion.

(c) Capital and related taxes

A third area where there is a strong case for broadening the tax base as a whole is the structure for taxing wealth and income from it.[27] Direct taxes are often focussed on income, and within that on earned income in particular. But wealth offers an additional component of personal economic resources, which on horizontal as well as vertical equity grounds should be captured within the overall tax base. In recent decades personal wealth has become far more important in relation to personal incomes in some countries such as France and the UK. At the same time, wealth is more unequally distributed than income, making wealth taxes attractive in distributional terms. As far as economic efficiency is concerned, wealth taxes of various kinds offer opportunities to 'tax the fixed factor' and so minimise economic distortions, such as through taxing unimproved land values or inheritances. Greater taxation of wealth therefore offers revenue-raising, economic efficiency, and social equity advantages.

In fact, however, the relative contribution of wealth taxes has been diminishing. In the UK case, for instance, capital related taxes (inheritance, capital gains and stamp duties on transfers) fell from 2.0 per cent of GDP in 1948 to 1.1 per cent of GDP in 2010.[28] This presents a paradox, with the explanations suggesting political and other barriers to moving in what appears to be the logical direction:

- Crucially, both the stock of wealth and many of the ways in which it gives its owners a return – such as capital gains or the imputed rent of owner-occupiers – do not generate a cash flow which can easily be intercepted by the authorities before people receive them. At the same time, the invisibility of some of these flows creates a public acceptability barrier.
- Some of the ways of avoiding taxing implicit flows – such as delaying capital gains tax until realisation or property taxes until death – can create inefficient 'lock-in' effects, as well as reducing cash flow (and usually net present value) to the state.
- A particular barrier is presented by 'asset rich/income poor' households if capital taxes are run separately from other direct taxes, rather than there being some kind of integrated assessment of taxable capacity which takes account of both.
- For taxes on the stock of wealth or property, revaluation issues arise. If revaluation is only periodic, relative changes can be large, creating significant losers as well as gainers; at the same time, using out of date valuations is inequitable. But frequent revaluations are both expensive and can be intrusive. This creates a political vicious circle, where revaluations are avoided because of the scale of change they would create for some, but the tax base becomes less and less related to reality.
- Many forms of saving benefit from favourable tax treatment, but there can be technical problems in assessing exactly what someone's gain in economic resources is – for instance, when the present value of future defined pension rights increases as a result of improvements in life expectancy, or because of a fall in expected long-run returns elsewhere in the market.

[27] See Thomas Piketty's contribution to this collection.
[28] See Hills, *et al.* (2013), chapters 8 and 9, for more detailed discussion.

- Public views may not match those implicit in economic assessments of what are equivalent sets of resources – for instance, the pejorative branding of inheritance taxes as 'death taxes'[29] or as double taxation on income that (may have been) already taxed.

Such problems suggest that what may seem logical ways of extending the tax base in ways that are both economically efficient and socially equitable may in fact be problematic in political and administrative terms. The very inequality of wealth holdings in itself creates a powerful lobby with an interest in accentuating such difficulties.

(d) Progressive spending cuts?

Faced with the regressive impacts of cuts to many forms of public spending discussed in Section 3, one solution is to try to concentrate cuts in transfers or in public services only on those with higher incomes. This might allow fiscal adjustment without violating some of the equity criteria laid out above, and without increases in marginal tax rates that governments want to avoid.

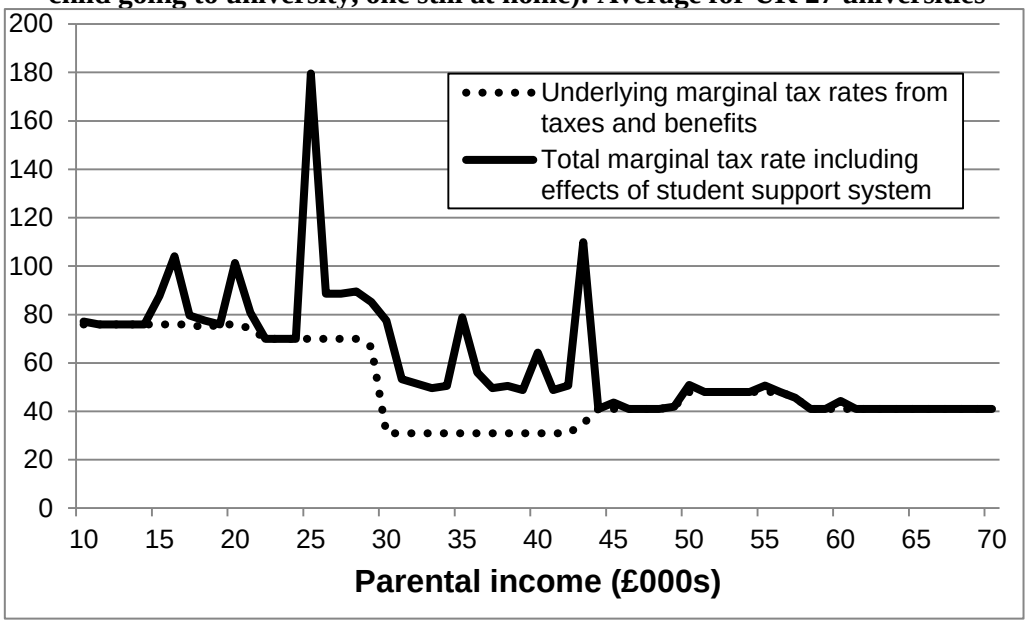
But doing so is likely also to affect economic incentives: introducing or strengthening means-tests will increase the effective marginal tax rate on those affected by them. If designed poorly this may affect the rates that are already highest and most likely to create problems. As a case study example of this general problem, a recent UK example has been the unintended side-effects of a reform to university financing in England. This has involved a trebling in fees for most universities (from £3,000 to £9,000 or €10,000 per year). The logic of this reform is that most students will have above average earnings later in life. The fees are not collected up front, but only as a percentage (9 per cent) of earnings above a threshold. This in itself creates a later marginal tax rate (for many students, the 'debt' will in fact, never be repaid if their lifetime earnings are not particularly high).

But social mobility considerations have also led to concern that prospective students from low-income backgrounds – with less information about potential benefits from higher education – may be put off applying for it by the prospect of a large 'debt' on leaving university. The government already runs a system of living cost grants for students with lower-income parents and has now encouraged universities to design their own systems of means-tested bursaries and fee reductions which depend on recent parental income. The result of this can be chaotic, and has created some very large (retrospective) effective marginal tax rates, if the situation of parents and children is considered together.[30] Figure 7 shows the scale of this on average across 27 of the larger or more prestigious universities. The dashed line shows the effective marginal tax rates that a two-child one earner family would already have faced (in the year that is used for assessing parental income) from the direct tax and tax credit system. The solid line then adds in the effects of higher parental income on the means-tested bursaries and fee reductions that a student would be entitled to. The marginal rates shown are based on relatively large – £1,000 – income changes (to avoid even more extreme 'cliff edge' effects at particular thresholds). Even so, there are income ranges where the combined – retrospective – rates exceed 100 per cent, and a very wide range where they

[29] Graetz and Shapiro (2005).
[30] See Hills and Richards (2012) for detailed discussion. This analysis treats fee reductions and bursaries as equivalent, although for some students their long run value may differ for technical reasons.

exceed 50 per cent. In the most extreme case – where the bursaries are most generous – the combined effect is a 99 per cent marginal rate if the family's earnings had changed from 70 per cent to 250 per cent of national median earnings.

Figure 7: Combined effective marginal tax rate (%) per £1,000 (single earner couples with one child going to university, one still at home): Average for UK 27 universities



Source: Hills and Richards (2012), figure 8. Parental income is essentially gross earnings in an earlier year, with some minor adjustments. Figure relates to students entering university in Autumn 2012.

This is a parochial example, both geographically and in terms of sector affected. But it illustrates a more general point: introducing further means-tests within an already heavily means-tested system – as in the UK – runs the danger of pushing effective marginal tax rates for particular sub-groups of the population to levels where they are more likely to affect behaviour. If poorly designed – as is more likely, if responsibility for them is decentralised – they may create anomalies in treatment that are seen as horizontally inequitable between people with fairly similar circumstances.

4.1.5 Conclusions

'Social equity' will have varied meanings for different observers, so the benchmark applied should be specified before assessing the impact of particular measures. However, most conceptions will be incompatible with packages of fiscal adjustment that are regressive, and some will imply that they should be progressive. In general, across-the-board cuts in public spending will be regressive, although cuts in particular areas may not be, depending on the circumstances of a particular country – with, for instance, the distributional effects of reductions in the real value of public pensions varying between Member States. By contrast, general tax increases are more likely to be distributionally neutral, although this will depend on the progressivity of direct taxes offsetting the regressivity of most indirect taxes.

Member States have a range of instruments at their disposal for improving their fiscal balance. Some of these have efficiency, as well as revenue-raising advantages. However, the examples looked at in more detail in this paper suggest the need for careful assessment of

their equity effects. Most Member States have scope for broadening the VAT base, for instance, but doing so is likely to be regressive, unless much of the revenue is used for compensation measures – and even then avoiding some low-income losses may be difficult. This is also true of environmental taxes, such as measures that increase the cost of Carbon, which are regressive unless compensated for in other ways (which may include direct action on energy efficiency, not just income transfers). There is a strong equity and efficiency case for more use of taxes on wealth and income from it, but a series of practical and political barriers to imposing them. The adverse distributional effects of general cuts in public spending can be moderated through making benefits and services more targeted or selective, but doing so can create or exacerbate efficiency problems that may be far worse than those of the increase in general tax rates that governments are trying to avoid.

Surveying the issues and the evidence, it is hard to avoid the conclusion that safeguarding social equity during fiscal consolidation is likely to require the use of *all* available tax bases and rates of tax, rather than there being a choice between them, and that doing so is likely to be more equitable than most forms of spending cut. But even the most attractive options for extending the tax base bring with them a series of issues that can be challenging, to say the least.

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4.2 Discussion

Marcel Gérard[*]

Many people, especially in the European Union (EU), argue that the current economic crisis needs fiscal consolidation and austerity measures in order to offset public deficits. Such measures, they say, are the most able to restore trust in EU Member States capabilities, a pre-condition for economic recovery and growth, some claim. However other scholars, including at the International Monetary Fund (IMF, 2012a) consider that "continued focus on nominal deficit targets runs the risk of compelling excessive fiscal tightening if growth weakens". In any case, those who most suffer of austerity programs are the most dependent people, the poorest, not those who bear « responsibility » in the raise of the crisis, like the bankers and other among the richest people. "Regarding the composition of austerity measures, insists the IMF (2012b, p. 56), cuts in social benefits tend to worsen inequality more than other spending reductions (as in Germany, 1992–99, and Norway, 1993–97); tax-based consolidations that rely more on indirect taxes or are mixed with expenditure cuts tend to worsen inequality (e.g., that in Iceland, 2004–06)."

Therefore a challenge for EU and world leaders might be to find out the tax measures which on the one hand effectively contribute to fiscal consolidation; but on the other hand reduce as least as possible the welfare of the poorest. Clearly there is room for a debate on social equity and fiscal consolidation. And the question is:

- How to manage austerity in such a way that it is socially equitable; or in other terms: how to put the greatest burden of austerity on those who have the largest shoulders?

We know that two polar ways exist, which can be combined for reducing deficits: cuts in spending on the one hand – the solution currently preferred by most governments; and tax increases on the other hand. That latter in turn potentially combines tax base broadening, tax rates increase, tax liabilities increase and novelties or innovations on the revenue side.
Let us now propose a short and personal summary of the presentation by John Hills before turning to a discussion of that interesting contribution.

The presentation
The personal summary of the presentation proposed below is organized around two questions and a tentative conclusion. Those two questions respectively are "What does social equity really mean?" and "What does a social equity target imply for the design of the policy?"

The right question: what does social equity really mean?
In his contribution John Hills starts asking the right question: What does social equity really mean? And in an attempt to answer that question, he rightly distinguishes various concepts of (or cases relevant for) social equity. A first option is to suggest that social equity means equal contribution by every citizen or household, thus a lump sum tax or a lump sum loss in benefit. That option however is in fact a regressive device.

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A second candidate is a proportional contribution. But then a question immediately arises: proportional to what? With a possible answer: to the taxpayers' ability-to-pay measured by her or his income. But then how to measure income? From the literature we know that ability-to-pay might be valued by the level of global income, a concept which gathers together income from labour as well as from property and income from domestic source as well as from abroad – see Haig (1921) and Simons (1938). But we also know that reasons exist for making a distinction between labour and property income, based on efficiency grounds – see Ramsey (1927) - and justifying e.g. dual income tax – see Sorensen (1994, 2005). Moreover ability-to-pay can also be approximated by a multi-dimensional welfare indicator including e.g. consumption, leisure and wealth.

But next to that rather traditional debate, new options now arise which are related to the current crisis and its flow of suffering. Ability-to-pay could be measured by the taxpayers' largest gains prior to the crisis. Or it could be linked to responsibility in the crisis. Then Hills addresses his central issue: what does a social equity target imply for the design of the policy?

What does a social equity target imply for the design of the policy?
As author says, social equity implies that fiscal consolidation will be at least distributionally neutral, if not progressive. However, across-the-board cuts in public spending – apparently the preferred option of governments – are very likely to be regressive. By contrast, general tax increases are roughly proportional to income (in UK case). Within taxes, progressivity of direct taxes could offset regressivity of indirect taxes.

Conclusion of the author
We share the author conclusion that "it is hard to avoid the conclusion that safeguarding social equity during fiscal consolidation is likely to require the use of *all* available tax bases and rates of tax, rather than there being a choice between them, and that doing so is likely to be more equitable than most forms of spending cut. But even the most attractive options for extending the tax base bring with them a series of issues that can be challenging, to say the least."

Discussion
I would like to devote my discussion to go beyond the presentation, trying to propose tax packages deemed to imply distributional neutrality; trying also to be imaginative and to suggest tax novelties; and finally, being aware of the risk related to mobility, to focus on tax bases mobility and on the optimal decision making level.

Tax packages
A first tax package candidate for distributional neutrality is a combination of (a) a VAT increase, typically an indirect regressive tax, and (b) an income tax liabilities increase, typically a direct progressive element, e.g. a proportional increase of the progressive rate and simultaneously a removal of « tax niches » in favor of high income taxpayers. Those two measures are convergent: revenue goes up.

A second tax package candidate for distributional neutrality is a combination of (a) a CO2 Tax, typically a regressive tax – see Kosonen (2012) for a discussion –, and (b) the

distribution of energy coupons or vouchers to poor people, which is a new government spending. Obviously the latter two measures are not convergent. The second package especially raises an interesting policy issue: where to put the poverty threshold? Results for France suggest, among others, distinguishing between rural and urban municipalities – see Bureau (2010).

Tax novelties

Two novelties are depicted below. First, assume that taxing those who benefited of rents in the past is considered as socially equitable, especially if their rent seeking activities bear some responsibilities in the crisis. That involves, for example, taxing financial activities – see European Commission (2010).

Two arguments at least help supporting such a tax. One can be called "Too big to fail" and refers to the Pigouvian view of restoring efficiency through the tax correction of market failures: here a tax on the size of the banks, through taxing their liabilities towards their customers or their assets, looks like forcing them to pay the premium of an insurance against an adverse externality. A second is based on the observation that there is no VAT paid on financial activities; then a tax on labour compensation in the financial sector might be seen as offsetting that lack of VAT, labour compensation being part of the value added.

Second, and more generally, we might be in search of relatively immobile and inelastic tax bases on which a very small tax might generate large revenue, with small distributive effect. Potential candidates include a two-sided tax on mobile telephone calls and short messages (sms) or on e-mails and other electronic forms of communication.

The issue of mobility

Taxing more heavily capital income? Trying to answer that question might generate a conflict between the efficiency rule suggesting tax being conversely proportional to mobility – see again Ramsey (1927) –, and Haig-Simons equity viewpoint proposing to tax all forms of income similarly, more precisely to tax a global income consisting of all incomes, disregarding their type (labour or property) and their source (at home or abroad).

Moreover additional concerns appear in case of mobility. First, there is the issue of the rates and the bases, especially of the coordination of the rates and the bases, and of the geographical area to be considered as the efficient level of tax system governance. Second and third concerns focus on the bases.

How to « immobilize » the base, making uninteresting tax shifting strategies, like the manipulation of transfer prices or the use for tax purposes of an intra-group set of claims and debt? Exchange of information at EU level, evolution to a collaborative FATCA – joint statement by the US Treasury and some EU Member States in February 2012, see White and Case (2012) – and call to the G20 are instruments able to "immobilize" the tax bases.

The coordination of tax rules at EU level is also a hot topic. Just to take an example, refer to the issue of the inclusion of capital gains (accrued? or realized?) in the tax base of all EU Member States.

Taxing wealth is another controversial issue – see e.g. the contributions of Thomas Piketty. If such a tax is decided, then related questions arise: will the tax be levied on an annual basis? Or will it be a tax at inheritance, bequest or realization? Again conditions are fulfilled for conflict between efficiency rule (tax conversely proportional to mobility) and Haig-Simons equity.

Other issues are then raised: expanding the scope of the savings directive – see European Commission (2012a,b) –, adopting Dutch Box 3 – see Brys (2006), Cnossen and Bovenberg (2001), Gérard (2004, 2005)? At the level of rates, what is the degree of advancement of EU coordination? Finally: deciding exchange of information at least at EU level – see Gérard (2004, 2005), Huizinga and Nielsen (2003), Keen and Ligthart (2006) – or further entering into collaborative FATCA.

Conclusion

Assuming that fiscal consolidation is desirable and revenue increase is at stake, reading and discussion of John Hills' contribution lead us to suggest undertaking policies which imply tax increases which are distributionally neutral, or at least neutral for lower deciles. We also suggest creating combinations of tax increases and compensations deemed to be neutral for lower deciles. And we call leaders to be imaginative but aware of mobility issues and of the existence of optimal geographical level for tax design decision making which may be larger for tax setting than for cuts in spending.

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4.3 Should we make the richest pay to meet fiscal adjustment needs?

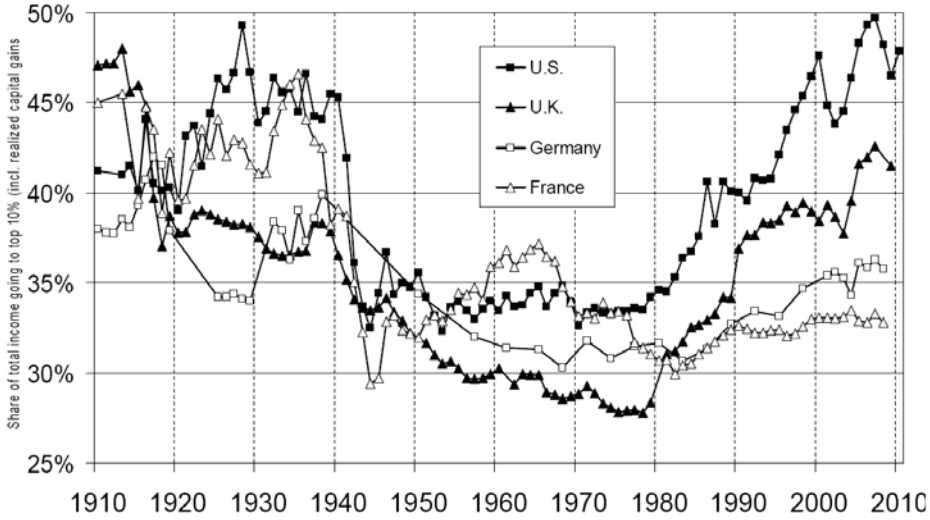
Thomas Piketty[*]

4.3.1 The rise of European wealth-income ratios

In order to answer the question whether the wealthy should bear a larger portion of the EU fiscal adjustment burden, one should start by analysing the dynamics of income and wealth distribution. The World Top Incomes Database (WTID) is in this respect an excellent source of information, as it includes annual series covering most of the 20th century for over 25 countries from the five continents and is the largest historical data set on income inequality.

When looking at the income shares of the top decile from 1910 to 2010 (Figure 1), a different pattern can be observed for the United States and continental Europe. In the US, the top decile share rose dramatically from 35 to 50 % of national income (top percentile share from 10 to 20 %) over the period 1980-2010, absorbing 70 % of macroeconomic growth and reaching the levels registered at the beginning of the 20th century. In continental Europe, the rise in top income shares started only during the mid-1990s and was quantitatively much smaller. As a result, income concentration is much lower in continental Europe than in the United States.

Figure 1. Top Decile Income Shares 1910-2010



Source: World Top Incomes Database, 2012. Missing values interpolated using top 5% and top 1% series.

A recent study (Piketty and Zucman, 2013) analyses how and why aggregate private wealth-national income ratios evolve in the long-run. Until recently, it was impossible to answer properly this basic question because national accounts were mostly about flows – on income, output, savings – and very little about stocks and liabilities. In order to address the aforementioned question a new data set of national balance sheets for the top 8 rich countries

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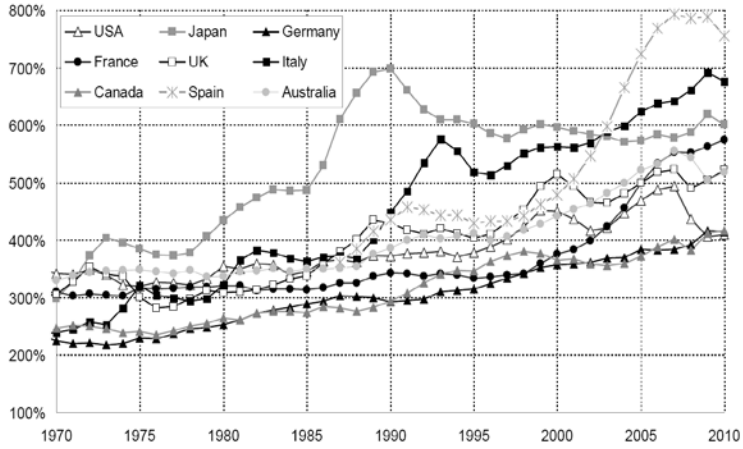
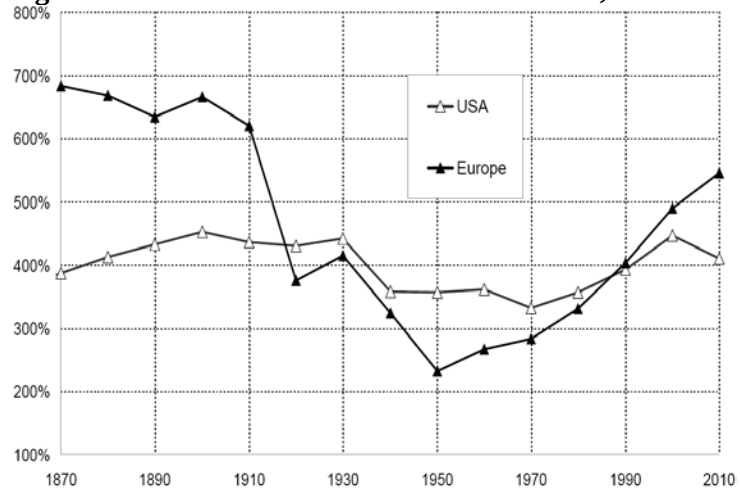
was compiled to estimate wealth accumulation equations over the timeframe 1970-2010.[31] For the United States, Germany, France and the United Kingdom the analysis was expanded by looking at the official national accounts as well as at the historical estimates over the period 1870-2010.

Figure 2: Private wealth/national income ratios, 1970-2010



Source: Authors' computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors).

Figure 3: Private wealth/national income ratios, 1870-2010



Source: Authors' computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors). Europe: average Germany-France-UK-Italy.

The study provided evidence of a gradual rise of wealth-income ratios over the 1970-2010 period in every developed country considered, from about 200-300 % in 1970 to 400-600 % in 2010 (Figure 2). Another interesting result of the study is the fact that today's ratios seem to be returning to the high values registered in the 19th century in Europe (600-700 %) (Figure 3). This can be accounted for by a combination of factors. Politics is responsible for the long-run asset price recovery effect (itself driven by changes in capital policies since the World Wars, from anti- to pro-private wealth holders). Also economic factors as high saving rates and low growth rates (driven down by near zero population growth and the slowdown of productivity) have contributed to the rise of wealth-income ratios in Europe (Piketty and

[31] The top 8 countries are: the United States, Japan, Germany, France, United Kingdom, Italy, Canada and Australia

Saez, 2012).[32] These factors explain the different long-run evolution of private wealth in Europe and the United States.

4.3.2 A proposal for a European wealth tax

Given the above mentioned results, the introduction of a comprehensive wealth tax at European level could be justified. A comprehensive wealth tax would be based on the market value of the net personal worth and calculated as the sum of the non-financial and financial assets minus the liabilities. It would therefore be very different from the 19th century style wealth tax, based on cadastral values. It is actually closer to the current French wealth tax (*Impôt sur la fortune*, ISF), based on annual wealth returns (assets are valued at market prices). The European wealth tax would however need to have a broader tax base than the ISF (no exemptions) and the returns should be prefilled by the tax administration on the basis of information transmitted by the third parties (banks). Although this process requires a lot of data exchange, it is technically doable. Political aspects play a key role here – automated cross-border information exchange on financial assets and financial flows should be linked to every EU free trade agreement, and appropriate sanctions should be enforced. Being able to publish credible tabulations on the number of European wealthy individuals by net wealth brackets would also be an appropriate test for the working of automated information exchange systems.

Introducing a marginal tax rate of 1 % for net wealth above EUR 1 million (about 2.5 % of the EU's population concerned) and a marginal tax rate of 2 % for net wealth above EUR 5 million (about 0.2 % of the EU's population concerned), would raise revenue of approximately 2 % of EU GDP. There are two reasons why such high revenue could be raised: (i) aggregate private wealth is very large in the EU (500 % of EU GDP), (ii) wealth is highly concentrated, as the top decile owns 60 % of the aggregate wealth, and the top 1 % holds 25 % of it. Hence, the wealth tax base for the very rich – holding 1 % of the wealth – is estimated at 125 % of EU GDP.

Alternative options are possible, but would raise less revenue. A financial transaction tax (FTT) would only raise less than 0.5 % of EU GDP; introducing a supplementary tax rate of 20 % on top 1 % income earners (above EUR 100 000) would increase revenue by 0.5 % of EU GDP; increasing the tax rate on corporate profits by 10 % would represent extra revenue of about 1 % of GDP. All these options are useful, especially the increase in corporate tax, given the tax competition and the large decline in rates. Nevertheless, in the long-run the wealth tax is the most promising option. It is also worth noting that this is the most natural option in order to reduce public debt. Europe is the continent with the highest private wealth-income ratio, so it is quite paradoxical that it is also the continent facing the largest difficulties to solve its public debt problem.

4.3.3 Conclusion

This presentation showed that top income shares are significantly higher in the United States than in Europe, while wealth-income ratios are superior in Europe. The taxation of wealth is therefore most useful in Europe, while in the United States top income taxation could be

[32] The Harrod-Domar-Solow steady-state formula $\beta=s/g$ (where β is the wealth-income ratio, s is the net saving rate and g is the total growth rate) allows to explain accurately the rise in wealth-income ratios.

exploited. The introduction of a European wealth tax can be beneficial if it helps the Member States to raise tax revenue, which is adapted to their economic fundamentals and which they cannot raise on their own. Although top income or corporate taxation meet the two criteria as much as the suggested wealth tax, the latter is even more appropriate in the long-run as it raises more revenue. The increase of VAT or general income or payroll taxation meet none of the criteria.

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4.4 Discussion

Francesco Figari[*]

Thomas Piketty's contribution provides a solid and quantitative base and a practical proposal in order to address the issue whether and how the rich should pay for a larger part of the fiscal adjustment needed to reduce the public debt in the European countries.

From a positive perspective, the justification for a comprehensive wealth tax at the European level arises from the observation that the wealth-income ratios in Europe rose over the last 40 years, showing a much clearer increasing pattern with respect to the US.

New dataset of national balance sheets: a great achievement

Such evidence is made possible thanks to a new dataset of national balance sheets for the top 8 rich countries over a long period of time (Piketty and Zucman, 2013).

This achievement represents an important step towards the need for more comprehensive and integrated data on individual well-being as recently highlighted in the Report by the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz, Sen and Fitoussi, 2009). In their aim to go *Beyond GDP*, in order to identify better measures of economic performance in a complex economy, Stiglitz, Sen and Fitoussi recommend to consider income, consumption and wealth and to give more prominence to their joint distribution.

> *"Income and consumption are crucial for assessing living standards, but in the end they can only be gauged in conjunction with information on wealth." - (Recommendation 3)*

> *"Average measures of income, consumption and wealth should be accompanied by indicators that reflect their distribution. Ideally, such information should not come in isolation but be linked." - (Recommendation 4)*

Piketty and Zucman (2013) new dataset represents a milestone in this ongoing process to better measure individual well-being and it is a great attainment for the future empirical research in this area. At the same time, more efforts need to consider a full range of individual level surveys and their inter-relations in order to allow for joint analysis of income, consumption and wealth and to ensure comparability across countries and over time (Atkinson et al. 2011). On the positive side, new household surveys as those developed as part of the Luxembourg Wealth Study (Jäntti et al. 2013) and the Eurosystem Household Finance and Consumption Network (ECB, 2013) can provide additional insights in order to have a better knowledge of the distribution of wealth which is essential in the design of a wealth tax.

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A pan-European perspective

In practical terms, the European wealth tax can be a promising option in order to raise a large extra revenue. From a theoretical point of view, the optimal taxation literature does not offer clear guidance for tax policy (Boadway et al. 2010). However, a wealth tax lowers the net return on financial investments relative to investments in human capital and if the revenue was redistributed to all individuals (directly or not), a wealth tax could enhance the intergenerational social mobility and promote equality of opportunities across individuals.

A European wealth tax is "technically doable", although difficult to be implemented due to political aspects, among else the fact that national wealth taxes (in different forms) have been abolished in many countries in the 1990s.

At the same time, this proposal opens exciting avenues for the future debate on fiscal policies in the European Union and on innovative fiscal designs.

On the one hand, some of the pillars characterising a fiscal union are clearly invoked in the proposal of a European wealth tax: fiscal rules and policy coordination, fiscal equalisation, and a EU-wide tax. Moreover, the chance to have an extended government budget at the EU level, combined with an EU tax, would be something achievable (Fuest and Peichl, 2012).

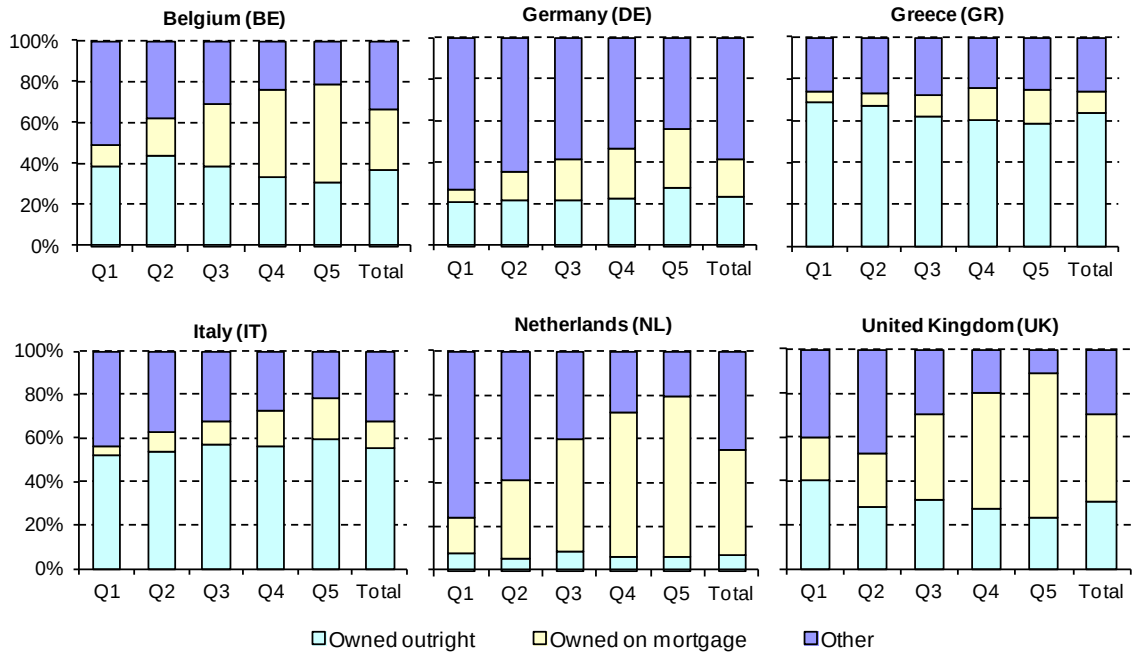
On the other hand, the definition of the fiscal design aspects of such a tax is not an easy task. First, the definition of a comprehensive wealth tax should ensure that all forms of personal capital income are taxed equally. This would be feasible by taxing, for example, the imputed income from capital (by applying a notional return differentiated by type of assets) rather than the wealth stock, as it is currently done in the Netherlands (Owens, 2006). Second, the increased mobility of the tax base and the relatively easy access of wealthy households to tax havens (Zucman, 2013) raise the issue whether the European Union is wide enough for a wealth tax and introduce a potential different treatment of more mobile wealth components, as financial assets, with respect to housing assets. Third, the introduction of relatively high tax-free allowance should avoid liquidity problems otherwise faced by low income people with relative high value assets (e.g. housing assets).

Clearly, a European wealth tax involves important redistributive effects. It is well known that wealth is distributed unevenly in all industrialized countries and wealth inequality is larger than income inequality. Taxing wealth is a way to reduce this inequality. However, it is important to assess the role of the different wealth components across countries, in order to set appropriate tax-free allowances and concentrate the tax burden on the wealthy part of the population.

Piketty and Zucman (2013) show the changing nature of national wealth and highlight the increasing role of housing assets, in particular in Europe. Non-financial assets (mainly housing assets) represent, on average, more than half of household's portfolio. They represent an increasing share of gross household assets ranging, in 2012, from below 40% in Denmark and the Netherlands, around 55% in Germany and the UK, to above 60% in France and Italy. Moreover, non-financial assets exceed financial assets in all the European transition countries (Shorrocks et al. 2012).

Given the relevance of housing assets, the distribution of home-ownership across income quintiles is something non negligible. From Figure 1 it emerges that in most countries the share of those living in property owned outright is relatively stable across quintiles, while the higher the quintile the higher the share of the population living in accommodation owned on a mortgage and the lower the share of those living in rented housing (Figari et al. 2012). As a consequence, a new comprehensive tax on wealth would represent an additional burden also for people living in the bottom half of the income distribution unless tax-free allowances (for example, of euro 1 million as in Piketty's proposal) and progressive tax schedule are properly implemented.

Figure 1: Distribution of the population according to housing tenure



Notes: Total: total population. Q1 – Q5: household equivalised disposable cash income quintile groups.
Source: Figari et al. (2012) based on EUROMOD.

Do governments want to have the rich paying for fiscal adjustment?

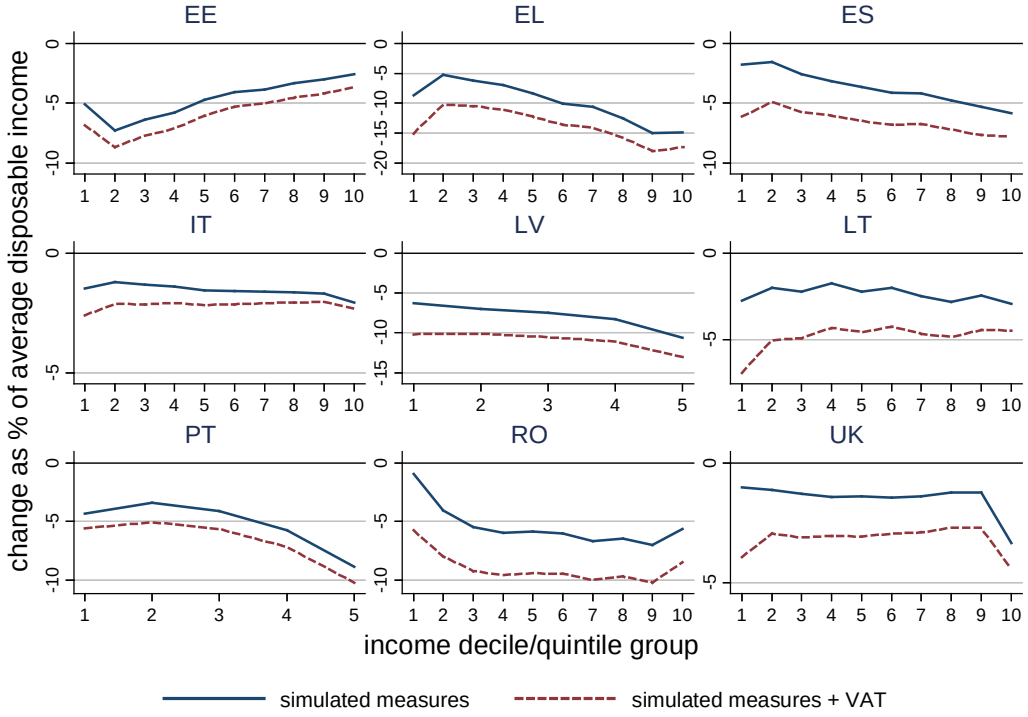
Nevertheless, after more than three years of fiscal consolidation in Europe, one is legitimate to ask whether the proposal of a comprehensive wealth tax is somehow in line with the current practice in the European countries, at least for what concern its redistributive effects.

The fiscal consolidation measures, as extraordinary and temporary measures aimed at collecting extra revenue to prevent the deterioration of the most important public finance indicators, could be seen as an avenue where politicians can express their view on the future path for tax reforms.

Figure 2 shows the redistributive effects of the fiscal consolidation packages implemented after the 2008 economic downturn and up to mid-2012 in nine European Member States. The measures simulated with EUROMOD, the EU-wide tax-benefit microsimulation model (Sutherland and Figari, 2013), are limited to those with a direct impact on household's resources and consumption potential (i.e. changes in cash benefits, public sector salaries, direct and indirect taxes).

In one third of the countries (Spain, Latvia and Romania), the better-off lose a higher proportion of their incomes than the poor as a result of the consolidation measures modelled. In Portugal and Greece, the burden of fiscal consolidation falls more heavily on the poor and the rich than it does on those on middle incomes, showing some inverted U-shape pattern. Even if the effect of consolidation measures can be labelled progressive, a proportional income drop may actually affect the living standards of those already in lower income brackets more severely. This is particularly clear in Greece where the 10% of households with the lowest incomes lose on average 8% of their incomes from the policy changes and the figure is over 5% in Latvia and Portugal. The UK and Italy show more mildly progressive and nearly proportional changes of incomes over the income distribution. At the other extreme, in Estonia and Lithuania, fiscal consolidation measures have had a clearly regressive impact (Avram et al. 2013).

Figure 2: Fiscal consolidation measures as a percentage of household disposable income



Notes: The fiscal consolidation measures included here are those that have a direct effect on household disposable income (changes to direct taxes, cash benefits and public sector pay) and increases in VAT. Deciles or quintiles are based on equivalised household disposable income in 2012 in the absence of fiscal consolidation measures.
Source: Avram et al. (2013) based on EUROMOD.

From these empirical estimates it is clear that the redistributive effects of the austerity measures implemented up to mid-2012 are differentiated across countries. Moreover, the same type of policies can have different distributional impacts across countries depending on their design and the underlying income distribution.

With respect to the political economy of the future tax reforms in Europe, it would be important to assess the extent to which the fiscal consolidation measures can be considered as an indication for the future path for tax reforms. On the one hand, if we consider the austerity measures as the outcome of deliberate choices of the governments, their redistributive impact

can reveal, at least partially, the current preferences over redistribution of national governments. On the other hand, it is important to remark that taxation of wealth has not kept pace with the increasing importance of financial and housing wealth and Piketty's contribution is a reminder that "the issue of wealth and wealth transfer taxation is very likely to play an important role in the public finance debates of the coming decades" (Piketty, 2010).

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Programme

ECFIN Workshop
'The role of tax policy in times of fiscal consolidation'

Brussels – Berlaymont Building, Walter Hallstein Room
Thursday 18 October 2012

8:30-9:00 *Registration and welcome coffee*

9:00-9:10 **Introduction** by **Marco Buti** (ECFIN)

9:10-9:30 **Keynote address** by **Gilles Mourre** (ECFIN): "Key challenges for tax policy in times of fiscal consolidation: Lessons from the 2012 report 'Tax reforms in EU Member States' "

9:30-12:45 **Session 1: Consolidation on the revenue side and its macroeconomic impact** (Chair: **Lucio Pench** (ECFIN))

9:30-10:00 **Michael Keen** (IMF): "Promising tax policy avenues to minimise economic distortions in a context of constrained fiscal policy"

10:00-10:30 **Volker Wieland** replaced by **Matthias Burgert** (Goethe University of Frankfurt): "Macroeconomic effects of consolidation on the revenue side: insights from different macroeconomic models"

10:30-10:45 *Discussant*: **Werner Röger** (ECFIN) and **Salvador Barrios/Bert Saveyn** (JRC)

10:45-11:15 *Coffee break*

11:15-11:35 **Savina Princen** (ECFIN) "Measuring consolidation efforts on the tax side"

11:35-12:15 **Gary Tobin** (Department of Finance, Ireland) and **Vieri Ceriani** (Ministry of Economy and Finance, Italy), "Consolidation on the revenue side – country experiences"

12:15-12:45 General discussion

12:45-14:00 **Lunch break**

14:00-16:45 **Session 2: Redistributive effects of consolidation on the revenue side** (Chair: **Georg Fischer** (EMPL))

14:00-14:30 **John Hills** (London School of Economics): "Consolidation measures on the revenue side: which tax bases to use to safeguard social equity?"

14:30-14:45 *Discussant*: **Marcel Gérard** (Université catholique de Louvain)

14:45-15:15 **Thomas Piketty** (Paris School of Economics): "Should we make the richest pay to meet fiscal adjustment needs? Income and capital tax options"

15:15-15:30 *Discussant*: **Francesco Figari (University of Insubria)**

15:30-16:00 *Coffee break*

16:00-16:40 **Thomas Larsen** (Denmark) and **Madis Aben** (Estonia): "Taxation and consolidation - distributional issues: a tale of two countries"

16:40-17:20 **General panel discussion: Fiscal consolidation needs – What is the role for tax policy?**
Presenters: Michael Keen, Thomas Piketty, John Hills, Gilles Mourre

17:20-17:30 **Closing remarks** by **Lucio Pench** (ECFIN)

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