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The design of fiscal consolidation measures in the European Union: distributional effects and implications for macroeconomic recovery[1]

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Abstract
The financial and economic crisis which started in the late 2000s and the fiscal consolidation measures to counter the subsequent government budget deficits have an impact on household income distribution and macroeconomic recovery. We consider the austerity measures in relation to their distributional impact and the potential channels through which fiscal consolidation can affect economic growth. We find notable variation in the size, composition and effects of fiscal consolidation. Richer households tend to bear a greater burden in most countries but spending cuts are more likely to affect liquidity constrained households casting doubts over previous findings in the macro-economic literature about the effectiveness of such measures. This suggests the need to consider more disaggregated evidence to reach robust policy conclusions.

JEL classification: D31, H24, H55, I3

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1. Introduction

Following the financial and economic crisis which started in the late 2000s, governments introduced extensive fiscal consolidation measures to address budget deficits. The way in which fiscal consolidation is achieved and the cost of the crisis is distributed has implications for the prospects for macroeconomic recovery and financial stability, as well as for the political acceptability of pathways in this direction.

Several studies have suggested that fiscal adjustments based on spending cuts, including both cuts in government services and public transfers to households, are more effective in reducing public debt and less harmful to economic growth compared with fiscal adjustments based on tax increases, e.g. Alesina and Perotti (1995, 1997), Alesina and Ardagna (1998, 2010, 2013), Alesina, Favero and Giavazzi (2012), Guajardo et al. (2014), IMF (2010), McDermott and Wescott (1996), von Hagen and Strauch (2001). Such studies, however, tend to focus on a macro-economic perspective and overlook how measures affect the distribution of household incomes, which could be a critical element for determining the potential impact on aggregate demand. It is increasingly recognized in the economic literature that it is important to consider heterogeneity of agents to avoid aggregation bias (e.g. Blundell and Stoker, 2005). For example, one might expect that cuts in non-contributory public transfers place a greater burden on the lower part of household income distribution, while tax increases require relatively bigger contributions from richer households who have a lower marginal propensity to consume, resulting in a smaller effect on aggregate demand. It is important to stress that the distributional effects depend on the overall design of the tax-benefit systems and also vary notably among specific benefit and tax instruments pointing to the need to consider even more disaggregated categories.

The growing fiscal consolidation literature is mainly macro-oriented and often overlooks the distributional effects, not least because of data availability and difficulties in linking various budget items with specific households. The distributional consequences of fiscal consolidation have been recognised to be as of primary importance, nevertheless: *"The crucial question, however, remains the impact of fiscal consolidations on the distribution of disposable income. On this, there is very little information, because very rarely does the timing of income-distribution surveys allow an analysis of its evolution before and after a fiscal consolidation…"* (Perotti, 1996). Perotti's claim is still valid after almost twenty years and notwithstanding the

generally wider availability of microdata than in the 1990s. More recently the concern for the distributional consequences of the economic crisis, fiscal stimulus packages and fiscal consolidation measures has increased remarkably but an assessment of the changes in income distribution is still lacking due to the difficulties in building a proper counterfactual scenario (Joumard et al., 2012).

The aim of this paper is to help to fill the gap in the fiscal consolidation literature regarding distributional effects, taking a cross-country perspective to give a stronger base for generalising the results. First, considering the actual design of the fiscal consolidation measures, we provide evidence on the distributional impact of the austerity measures implemented in EU countries since the start of the Great Recession and up to (mid) 2012. Second, we explore to what extent the design of the measures is associated with the potential impact on the consumption reactions of individuals and families facing the additional burden of the austerity measures. Our findings provide further insights for the macroeconomic performance of fiscal adjustments, complementing the macro-economic literature which tends to show that successful fiscal consolidations, in terms of limiting public deficit, stabilising public debt or output, have on average relied more on spending cuts.[2]

We make use of microsimulation techniques, which allow us to simulate tax-benefit policy changes in detail and estimate their effect on disposable income for each household with the help of relevant counterfactual scenarios. Aggregating the impact across all households yields a total measure of fiscal consolidation, as such providing an alternative, 'bottom-up' measurement strategy to the usual approaches in the macroeconomic literature. Specifically, we employ EUROMOD, the EU tax-benefit model, and concentrate our analysis on the PIGS countries (Portugal, Italy, Greece and Spain), the Baltic countries (Estonia, Latvia and Lithuania) and Romania which experienced the largest budget deficits and/or fall in economic output during the crisis. These countries are also among those in the OECD which have implemented or announced the largest fiscal consolidation, ranging between 6% and 18% of GDP (OECD, 2012; Sutherland et al., 2012).

Our paper has common elements with the strand of fiscal consolidation literature that uses a narrative approach to identify discretionary changes in fiscal policy (e.g. Romer and Romer,

[2] It should be noted that there are some differences between early studies in terms of whether some items have been considered as part of spending or tax adjustments. For example, Alesina and Perotti (1995) include cash transfers in spending, while Blanchard and Perotti (2002) deduct these from taxes.

2010; IMF, 2010) rather than statistical methods (e.g. Alesina and Perotti, 1995; Alesina and Ardagna, 1998; Blanchard and Perotti, Blanchard O. and D. Leigh (2013). Growth forecast errors and fiscal multipliers, IMF Working Paper 13/1. Washington: International Monetary Fund.

). However, unlike other studies relying on a narrative approach, we exploit the microsimulation model to derive our own estimates of fiscal consolidation measures, and their incidence along the income distribution, in a common framework rather than relying on official assessments by governments. An additional advantage of the microsimulation method in this context is that it allows for a focus on the design of the consolidation measures and an assessment of policy changes in greater detail as we can consider each individual policy instrument separately.

The degree of deficit reduction that these eight governments set out to achieve naturally varied, and so did the policy mix chosen to achieve it. Our analysis addresses the question of how changes to direct and indirect (personal) taxes, cash benefits and public sector pay – which have a direct impact on household (cash) resources – affect different income groups. We focus on these instruments as they provide governments with better control on distributional outcomes and offer more explicit choices, while macro-economic and labour market policies – and even cuts in public services – are blunt instruments in terms of their distributional effects.

The extent to which a decrease in disposable income due to fiscal consolidation measures reduces household spending on goods and services provides a link between our micro-based approach and the macro literature on fiscal consolidation. We exploit the variation in income among households and link such a change to the potential reduction in their consumption, depending on the liquidity constraints they face (Auerbach and Feenberg, 2000). Our approach shows the importance of the interactions between the design of fiscal consolidation measures and the income distribution; these matter on their own but also for the prospects for macroeconomic recovery, an aspect that is often ignored in the macro-oriented economic literature.

We find notable variation in the size, composition and first order effects of fiscal consolidation. Overall, richer households tend to bear a greater burden in most countries, though this differs a lot between types of tax-benefit instruments. Such heterogeneity tends to be less visible when measures are grouped as spending cuts and tax increases, which has been typically used in the fiscal adjustment literature. Moreover, our finding that spending cuts are more likely to affect liquidity constrained households casts doubts over previous findings in the macro-economic

literature about the effectiveness of such measures. This suggests that it is not the type of policy instrument per se which matters but how it affects different parts of income distributions, hence emphasising the need to consider more disaggregated evidence to reach policy conclusions.

The structure of this paper is as follows. Section 2 discusses methodology and summarises the fiscal consolidation measures taken in each country and the scope of our analysis. Section 3 presents an analysis of the composition and distributional effects of the measures in the eight countries and shows how the different policy mixes each have their own distributional implications as well as certain common features. Section 4, provides micro-based insights on the macro-economic effects of austerity policies, by combining the design aspects of the austerity measures and their potential impact on the aggregate demand, taking into account the liquidity constraints faced by household over the crisis. Final section concludes by summarising our policy relevant findings and by discussing a number of issues left for future developments of this paper.

2. Methodology

We make use of microsimulation techniques (Bourguignon and Spadaro, 2006; Figari et al., 2015) to simulate tax-benefit policy changes in detail and estimate their distributional pattern. We use EUROMOD, the EU tax-benefit microsimulation model (Sutherland and Figari, 2013) that allows us to assess and compare the effects across a number of countries in a comparable manner. EUROMOD simulates cash benefit entitlements and personal tax and social insurance contribution (SIC) liabilities on the basis of the tax-benefit rules in place. The version of EUROMOD used in this paper is based on information on personal and household characteristics (including market incomes) from the 2008 EU Statistics on Incomes and Living Conditions (EU-SILC) micro-data. We adjust the data to account for the most important labour market changes since the data collection year (which was before the financial and economic crisis) and the 2012, year of our policy simulations. As the economic crisis deepened, the countries considered here experienced reductions in labour market activity. We predict transitions from employment into short- or long-term unemployment and from being out of work into employment, based on the changes in employment as indicated by 2007 and 2011 Labour Force Survey (LFS) data. Transitions are applied within 18 strata of characteristics – according to age group (3), gender and educational level (3), selecting (randomly) for each stratum a required number of people for whom employment status is changed. This method builds on previous work by Figari et al. (2011) and is explained in detail in Navicke et al. (2014).

We also adjust the nominal level of market incomes by source, in line with actual changes since the income reference period. Finally, where relevant, some calibrations are adopted to take into account tax evasion (Greece, Italy) and non take-up of certain means-tested benefits (Estonia, Greece, Latvia, Romania), assuming behaviour in this respect to be the same before and after the policy changes.

We identify and simulate changes in national legislation regarding individual tax and benefit instruments up to 2012[3] at which point fiscal adjustments were at their maximum in most of the countries considered. We focus on the policy changes that were introduced explicitly in order to cut the public deficit, or stem its growth. The aim is to distinguish between changes that were part of a "business as usual" scenario and those introduced for austerity reasons. While mostly involving tax increases and cuts in social benefits and public sector pay, such policy changes also include increases in some benefits or reductions in taxes for certain groups to compensate or alleviate the impact of other measures. As such, we follow the spirit of other studies relying on historic sources, e.g. Romer and Romer (2010), IMF (2010), Devries et al. (2011).

To evaluate the effect of policy changes, it is necessary to define and construct the counterfactual scenario, i.e. what would have happened in the absence of the fiscal consolidation measures. We have chosen to interpret the "absence of the fiscal consolidation measures" as the continuation of pre-fiscal consolidation policies, indexed according to standard practice and official assumption, or law. Such indexation is not the same across countries under consideration. Apart from public pensions, most of the countries do not regularly index fiscal policies and instead change these occasionally on an ad hoc basis. The only countries not applying any indexation are Greece and Lithuania.

In this analysis we focus on the first order effects of measures which have a direct impact on household resources, i.e. changes in cash benefits, public pensions, direct personal taxes, social contributions and indirect taxes as well as public sector pay cuts, the latter measured net of any reduction in income tax and social contributions. We choose to exclude changes in employer SIC on the grounds that these are unlikely to affect disposable income in the short term. Moreover, we do not consider reductions in public services that have an impact on the welfare of households using them and reductions in public expenditure that cannot be allocated to

[3] EUROMOD base simulations refer to the mid-point of a given policy year (30th June). Tax-benefit policy changes for each country are summarised in EUROMOD Country Reports (along with modelling notes and validation results). See https://www.iser.essex.ac.uk/euromod/resources-for-euromod-users/country-reports

households (e.g. pure public goods like defence spending) and increases in taxes that are not straightforward to allocate to households.

Table 1 summarises the types of measures that have been used in each country within the scope of our analysis, since the 2008 economic downturn and up to 2012. The starting point from which measures were introduced is different across countries depending on many factors, including the timing of the national macro-economic and budgetary reactions to the financial crisis. Among the countries included in the analysis, the Baltic countries (Estonia, Latvia and Lithuania) and Portugal started introducing fiscal consolidation measures in 2009 and followed with further measures in 2010 to 2012. Other countries (Greece, Spain and Romania) started fiscal consolidation in 2010 and Italy introduced its first measures in 2011.

Table 1. Type of household income-related fiscal consolidation measures introduced

Type of measures	**EE**	**EL**	**ES**	**IT**	**LV**	**LT**	**PT**	**RO**
Benefit / pension cuts (or freezing)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Increased income taxes / reduced tax concessions	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No	**Yes**	No
Increased worker social insurance contributions	**Yes**	**Yes**	No	**Yes**	**Yes**	No	**Yes**	No
Public sector pay cuts (or freezing)	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Increased property taxes	No	**Yes**	(Yes)	**Yes**	(Yes)	(Yes)	(Yes)	(Yes)
Increased rate of VAT	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Start period of measures	2009	2010	2010	2011	2009	2009	2009	2010

Notes: Yes in bold indicates that measures are simulated in our analysis. (Yes) in parenthesis indicates that measures were introduced but are not possible to simulate. The fiscal consolidation measures included here are those that have a direct effect on household income and increases in the VAT rate(s) as of June 2012. In Estonia there was a substantial cut in average public sector pay in 2009 butby the end point of the period we consider, public pay had risen again (similar to the average wage in the private sector).

The table shows that all countries have cut cash benefits and/or pensions and, all of the countries except Lithuania and Romania increased income taxes or workers' social insurance contributions. Greece further introduced additional new taxes and/or contributions (some on an one-off basis). All countries also cut (or froze or somehow limited) public sector pay though given the period of analysis it is not possible to establish the extent and incidence of its effect in Estonia. While a number of countries also increased property taxes, it has not been possible to model these policy changes for all of them, due to lack of necessary information in the data.

Finally, all countries have also increased the rate(s) of VAT. Detailed information on the changes in each country can be found in Avram et al. (2013).

3. The redistributive effects of fiscal consolidation measures

The extent and composition of the "fiscal consolidation packages" analysed here is shown in Table 2. As noted above, our aggregate measure of fiscal consolidation is derived from micro-data and, hence, can provide a useful alternative to typical approaches in the fiscal adjustments macro literature.

Measured as a percentage of pre-austerity total disposable income (i.e. the counterfactual is given by the incomes in 2012 without the fiscal consolidation measures), the overall fiscal consolidation generated by the household income-related measures included in the analysis varies from 1.6% of disposable income in Italy to 9.2% in Latvia and 11.7% in Greece. Table 2 also shows the relative importance of the different types of measure and how countries differ in terms of the main source of consolidation: increases in income tax in Greece, Spain and Italy; increases in worker social insurance contributions in Estonia; cuts in non-means-tested benefits in Lithuania and Latvia; cuts in public pensions in Romania and Portugal. Pay cuts in the public sector played a major role in Greece, Latvia and Portugal. Means-tested benefits were cut in Portugal while in the other countries, spending on these benefits tended to increase, partly making up for reductions in other incomes. There are also interactions between pension and benefit cuts and income tax (and in some countries, social contributions) payable on these benefits. The figures for income tax increases are net of reductions due to the decreased tax base in these respects. The net effect is positive in Romania where there were no consolidation-related changes to income tax.

While changes to indirect taxes do not have an effect on household disposable income they do impact directly each household's consumption potential. The last column of Table 2 shows the increase in VAT payment due to the increase in the VAT rates (mainly the standard rate; reduced rates have been increased in Greece and Italy and we simulate these increases as well) as a proportion of disposable income. In doing so, we focus again on first order effects and have assumed that (i) there is no change in pre-tax expenditure or in pre-tax relative prices and (ii) the VAT increases are proportional to the pre-reform VAT payments. The effect of VAT increases ranges from less than 1% of disposable income in Italy to more than 3% in Greece and Romania and is clearly substantial compared to other components considered here.

Table 2. Aggregate effect of simulated consolidation measures in place in 2012 as a percentage of total household disposable income, by type of policy

Country	Public sector salaries	Public pensions	Means-tested benefits	Non means-tested benefits	Income taxes	Workers SIC	Total effect on disposable income	Effect of VAT changes on disposable income
EE	0.00	-1.64	0.15	-0.21	-0.32	-1.96	-3.98	-1.22
EL	-2.52	-1.92	-0.02	-0.17	-6.57	-0.53	-11.73	-3.33
ES	-1.27	-0.92	0.03	-0.11	-2.13	0.00	-4.41	-2.55
IT	-0.20	-0.36	0.00	0.00	-0.92	-0.15	-1.63	-0.49
LT	-0.40	0.00	0.42	-2.63	-0.04	-0.28	-2.93	-2.12
LV	-2.28	-1.05	0.04	-2.65	-1.26	-2.03	-9.23	-2.96
PT	-2.16	-2.69	-1.33	-0.32	-0.33	-0.05	-6.88	-1.42
RO	-1.15	-4.72	0.15	-0.55	0.56	0.00	-5.71	-3.30

Notes: The 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 the VAT rate(s). Source: own simulations with EUROMOD.The incidence of VAT is derived from, respectively, Võrk et al. (2008) for Estonia, Matsaganis and Leventi (2013) for Greece, Institute for Fiscal Studies (2011) for Spain, Taddei (2012) for Italy, and Ivaškaitė-Tamošiūnė (2013) for Lithuania. For the other countries we carried out our own calculations based on information from Household Budget Surveys (HBS) on the distribution of expenditure by COICOP categories (by income decile/quintile group).

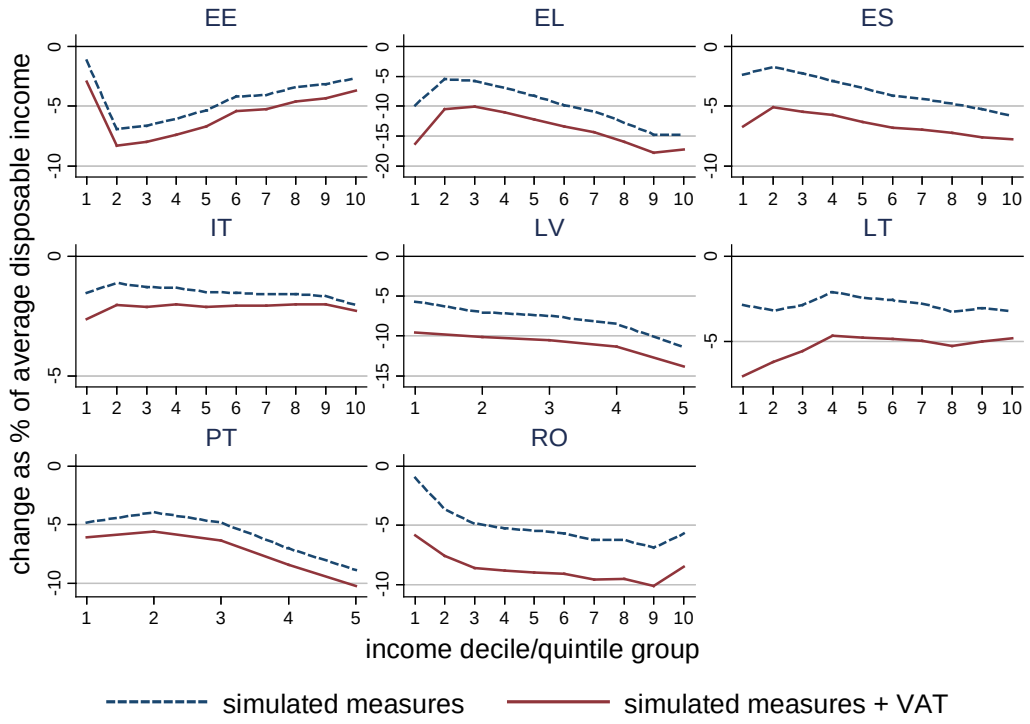
In interpreting these figures it is important to remember that they do not reflect the scale of the fiscal consolidation effort as a whole in each country but they indicate the scale of immediate and direct losses in monetary resources experienced by households. Nevertheless, as shown in Figure A.1 in the Annex, there is clear correlation between the simulated measures with an immediate impact on household resources (expressed in terms of total household disposable income) and the total fiscal consolidation (expressed in terms of GDP), which reinforces the cross-country comparability of our analysis.

The implications of the fiscal consolidation measures across the income distribution are illustrated in Figure 1. First, the figure shows (dashed line) the average proportional change in household disposable income by decile group caused by the fiscal consolidation measures with a direct effect on household disposable income (increases in income taxes and contributions, cuts in benefits and public sector pay). The largest group of countries (Greece, Spain, Italy, Latvia, Romania), show progressive decreases in income on the whole, i.e. richer income groups contributing more in relative terms. Portugal and, to a lesser extent, Lithuania show an inverted U-shape pattern where middle income groups contribute less compared to low and high income

groups. Estonia is the only country with a strong regressive distribution of income losses, although the effect is mitigated for the poorest decile group. Second, the solid line shows the distributive effects of the consolidation measures including increases in VAT rates. As expected, the effect of the VAT changes is regressive across the income distribution in each of the countries[4] and makes the combined effect flatter. The relative degree of regressivity across countries is due to (a) differences in the structure of VAT and how it relates to consumption patterns, i.e. the extent to which goods with lower tax rates are consumed by those on low incomes, and (b) the effective savings rate across the income distribution. Across all of the countries spending is much higher than income in the lower income decile groups, especially in Greece. The impact of VAT changes is naturally larger in countries with bigger increases in the standard VAT rate but what is important to note is that in several countries (Spain, Latvia, Lithuania, and Romania) the effects are of similar magnitude to those due to the measures affecting household incomes directly, highlighting their importance.

[4] It should be noted that assessing the effect of taxes paid on the basis of recorded spending patterns as a proportion of recorded household *income* can distort the view of the regressivity or otherwise of indirect taxes, and especially the effect at the bottom of the income distribution.

Figure 1. Percentage change in household disposable income due to simulated household income-based fiscal consolidation measures by household income decile group



Notes: The measures included here are: (a) those that have a direct effect on household disposable income (changes to direct taxes, cash benefits and public sector pay) and (b) increases in the standard rate of VAT. Other increases in indirect taxes are not included (with the exception of the VAT reduced rates in Greece and Italy and excises in Italy). Deciles are based on equivalised household disposable income in 2012 in the absence of fiscal consolidation measures and are constructed using the modified OECD equivalence scale to adjust incomes for differences in household size. The charts are drawn to different scales, but the interval between gridlines on each of them is the same. Source: own simulations with EUROMOD.

Looking at the design of the austerity measures (Table 3), in four countries (Estonia, Greece, Spain and Italy) tax increases represent roughly 50% or more of aggregate austerity measures even without the VAT changes (the first column). At the other extreme, in Romania the net effect of tax changes resulted in lower tax revenue due to a substantial erosion of the tax base due to cuts in public pensions. Including VAT shifts the overall balance between spending cuts and tax increases further towards the latter (the second column). Public wage and benefit cuts remain clearly a dominant source of consolidation in Portugal and Romania (70% or more), while tax increases account for 67-75% of consolidation in Italy, Greece, Spain and Estonia. Unlike other countries, Lithuania and Latvia have roughly an equal mix. Nevertheless, there is no clear association between the design of the austerity measures and the change in inequality.

Table 3. Austerity measure design and effect on inequality

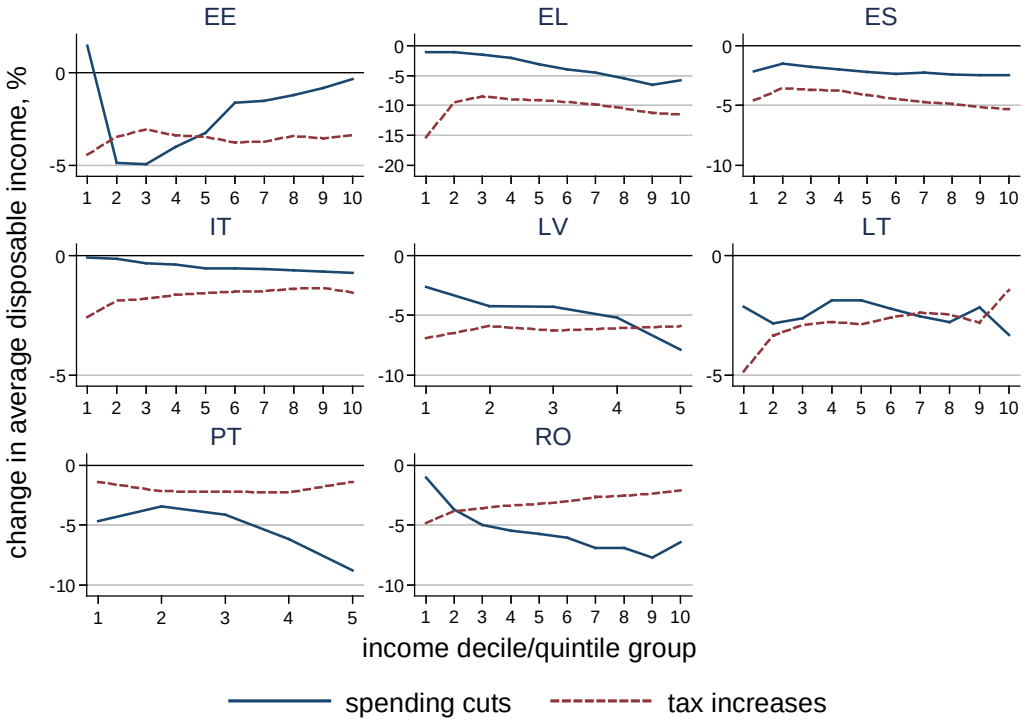
	Austerity measures design		Effect on Inequality
	% of Austerity Measures as taxes	% of Austerity Measures as taxes, including VAT	% change in P90/P10
Estonia	57.00	66.92	3.69
Greece	60.60	69.39	-11.64
Spain	48.41	67.39	-3.79
Italy	66.88	75.00	-0.43
Latvia	35.76	50.83	-4.31
Lithuania	11.03	48.81	0.40
Portugal	5.51	21.54	-4.55
Romania	-9.82	30.60	-4.85

Source: own calculations with EUROMOD.

To have a better understanding of the extent to which the design of the austerity measures is related to their distributional pattern, Figure 2 shows the variation in disposable income due to tax increases and spending cuts by income decile groups. It is important to note that the tax increases are net of any automatic tax reductions due to public sector pay cuts or other taxable benefits. The overall effect from *spending cuts* tends to be progressive in all countries but Estonia. The main drivers of such a distributional pattern are public wage cuts which show a strong progressive pattern while cuts in public pensions and other benefits show mixed results (see Figure A2 in the Annex). The large size of the public sector wage cuts drives the overall progressivity observed in Greece, Latvia, and Romania and determines the contributions of those in the top of income distribution in Portugal. The distributional incidence of cuts to public pensions depends on the design of the changes and the location of pensioners in the income distribution. In most of the countries where public pensions were reduced, this was implemented in the form of suspending pension indexation and freezing their nominal values (with higher losses for the pensioners in the lower-middle decile groups as in Spain and Latvia) or limiting the indexation for higher pensions (with losses larger in percentage terms in the middle and top of the distribution than at the bottom as in Greece, Italy and Portugal). In Estonia, the change in the indexation of public pensions resulted in the average pension being almost 10 percent lower in 2012 than it would have been otherwise, with a regressive effect because of the location of pensioners towards the bottom of the distribution. Cuts to non-pension benefits are notable only in a few countries though their incidence across the income distribution is very diverse (progressive in Latvia, regressive in Portugal, flat in Lithuania). There are important interactions

in all countries, in the form of means-tested benefits absorbing part of income losses due to other instruments. However, this is only evident for countries like Estonia (where social assistance was also made more generous), Spain and Romania; while in other countries the negative effect from cuts in non means-tested benefits (Greece, Lithuania) or even in means-tested benefits themselves (Portugal) dominates.

Figure 2. Percentage change in household disposable income due to spending cuts and tax increases by household income decile group



Notes: The 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 rate(s). Deciles are based on equivalised household disposable income in 2012 in the absence of fiscal consolidation measures and are constructed using the modified OECD equivalence scale to adjust incomes for household size. Source: own simulations with EUROMOD.

On the revenue side, the pattern of the distribution of *tax increases* is regressive in Lithuania and Romania but is generally quite flat in other countries with the exception of the larger burden faced by individuals in the first decile in several instances. In the case of the Baltic countries, small progressive increases from worker contributions are balanced with small regressive tax increases. Stronger progressive effects can be seen for Greece (with the exception of the first decile group) and Spain, where the tax increases are incident mainly on the top decile group.

4. Micro-based insights on the macro-economic effects of austerity policies

It is widely recognised that the way fiscal consolidation is achieved has implications for the prospects for macroeconomic recovery and financial stability. In this context, the controversy regarding the impact of fiscal consolidation on economic output (i.e. fiscal multipliers) has dominated the academic and policy debate since the outset of the Great Recession. Nowadays it is broadly agreed that the short term effects of fiscal consolidation measures are more severe than originally thought, with fiscal multipliers ranging between 0.9 and 1.7 (i.e. output loss associated with a percentage point of fiscal consolidation) rather than the assumed 0.5 at the beginning of the crisis (IMF, 2012; Blanchard and Leigh, 2013).

The debate on the fiscal multipliers is about the consequences of the fiscal consolidation measures on the intensity of the economic crisis which are two aspects clearly linked at least in the short term. On the one hand, austerity measures can determine a fall in aggregate demand with wider consequences on the economy in terms of firms' output, salaries and jobs availability. On the other hand, a depressed level of economic activity can undermine the effects of the austerity measures in terms of deficit reduction. Nevertheless, Blanchard and Leigh (2013), stress that "*the short term effects of fiscal policy on economic activity are only one of the many factors that need to be considered in determining the appropriate pace of fiscal consolidation for any single country*".

Distinguishing between the distributional and efficiency effects of the austerity measures from the wider effects of the economic crisis is somehow artificial. However, a proper counterfactual scenario, as the one used in the previous section to disentangle the distributional effects of the austerity measures, can allow one to gauge the extent to which austerity measures impact on the aggregate level of demand or, in other words, how the decrease in real income due to such measures is transmitted through to expenditures for good and services. It seem reasonable to assume that the channel through which the distributional impact of fiscal adjustments is likely to matter the most for macroeconomic performance is the effect on aggregate demand. Consumption patterns usually differ between income groups with low-income households being more responsive and showing a much larger marginal propensity to consume than affluent households (Parker, 2011; Jappelli and Pistaferri, 2010, 2014).

Following Auerbach and Feenberg (2000) one can assume that if the income shock is perceived as transitory and households can borrow their demand does not change. However, households

who face liquidity constraints fully adjust consumption expenditure after changes in disposable income.[5] In our analysis, we consider liquidity constrained households to be those who declare themselves as not having the capacity to face unexpected financial expenses (Dolls et al., 2012). We rely on the information included in the EU-SILC 2011 to predict the probability of being liquidity constrained in 2012, taking into account the simulated effects of austerity measures and labour market adjustments. The percentage of liquidity constrained individuals ranges from around 35% in Greece, Spain, Italy, and Portugal to 76% in Latvia (see Table 4) showing an increasing trend since the beginning of the economic crisis.[6]

Table 4. Percentage of liquidity constrained individuals and incidence of austerity measures

	% of liquidity constrained individuals	% of Austerity Measures on liquidity constrained individuals	% of Austerity Measures, including VAT, on liquidity constrained individuals
Estonia	42.18	35.75	35.38
Greece	34.48	15.90	17.80
Spain	33.01	19.55	22.27
Italy	35.57	20.63	23.11
Latvia	75.93	60.00	61.23
Lithuania	61.66	50.34	51.39
Portugal	30.16	16.52	17.21
Romania	53.82	45.44	44.90

Notes: liquidity constrained individuals based on the out-of-sample prediction of the probability of being liquidity constrained taking into account the simulated effects of austerity measures and labour market adjustments. Source: own calculations with EUROMOD.

In aggregate terms, liquidity constrained individuals face a relatively small share of total austerity measures (taking into account VAT increases as well), ranging from less than 20% in Greece and Portugal to 35% in Estonia and 45% in Romania, while in Lithuania and above all in Latvia, most of the austerity measures fall on their shoulders.

Assuming that households who face liquidity constraints fully adjust consumption expenditure after changes in disposable income, we can derive a lower bound for the effect on aggregate household demand calculating the effect of fiscal consolidation measures faced by the liquidity constrained (Table 5). The potential impact on aggregate demand, considering the effects of

[5] Among others, Galí et al. (2007) and Coenen et al. (2012) distinguish in their models between credit-constrained households, i.e. who consume all their income, and those who can smooth consumption intertemporally.

[6] Based on the SILC 2008, the share of liquidity constrained individuals ranges from around 20% in Estonia to 57% in Latvia.

increases in indirect taxes as well, is highly diverse and ranges from less than 1% (of total household disposable income) in Italy to more than 7% in Latvia.

Table 5. Potential effects of austerity measures on the aggregate demand

	Austerity measures faced by liquidity constrained households as % of total household disposable income	
	Excluding VAT	Including VAT
Estonia	1.43	1.84
Greece	1.86	2.68
Spain	0.86	1.55
Italy	0.33	0.49
Latvia	5.52	7.36
Lithuania	1.46	2.59
Portugal	1.14	1.43
Romania	2.59	4.05

Source: own calculations with EUROMOD.

In order to explore the potential channels through which fiscal consolidation can affect economic growth, and assuming that variation in income translates into a reduction in household consumption through the liquidity constraints they face, we look at the associations between the size and the design effects and the probability of being liquidity constrained. Table 6 shows the results of OLS regressions where the probability of being liquidity constrained is regressed over a measure of the size and the design of austerity measures. From the results it emerges that the *size* of the austerity measures (expressed as a percentage of household disposable income) is negatively correlated with the probability of being liquidity constrained in all countries except Estonia and Romania. This is expected given the distributive pattern of the austerity measures, being progressive in all countries but Estonia and Romania (showing a somewhat U-shaped pattern). The *design effect*, in turn, shows that a greater reliance on taxes is also associated with a lower probability of being liquidity constrained, in other words households more likely to be liquidity constrained tend to be more affected by spending cuts rather than tax increases. It is important to bear in mind that spending cuts include both reductions in public sector pays and in benefits, the latter being often an important source of income for liquidity constrained households. Assuming that liquidity constrained households are more responsive in terms of consumption to income shocks, then spending cuts can be seen as having more detrimental effects on aggregate demand. The same pattern is observed even controlling for income decile

groups, with the exception of Estonia and Romania, which is consistent with the distributive pattern observed in those countries. Including changes in VAT as well, as expected given the regressivity of VAT, in some countries we observe that higher reliance on taxes is associated with higher probability of being liquidity constrained but the association is still negative and significant in four countries.

Overall, our finding that spending cuts are more likely than tax increases to affect liquidity constrained households casts doubts over previous findings in the macro-economic literature about the effectiveness of such measures (Alesina and Perotti, 1995, 1997; Alesina and Ardagna, 1998, 2010, 2013). This suggests that it is important to distinguish between reductions in general government spending and cuts in benefits targeted to households and it is not the type of policy instrument per se which matters but how it affects different parts of income distributions. This could be another source of variation adding to relevant aspects of country heterogeneity in the context of fiscal consolidation as discussed elsewhere (e.g. Favero et al., 2011). Disaggregated data and micro-based analysis seem necessary to reach robust policy conclusions.

Table 6. Size and design effects of austerity measures on probability of being liquidity constrained

	Estonia	Greece	Spain	Italy	Latvia	Lithuania	Portugal	Romania
Size	-0.12	-1.44***	-1.92***	-7.19***	-1.22***	-0.36***	-1.18***	0.61***
	(0.106)	(0.048)	(0.066)	(0.164)	(0.063)	(0.088)	(0.059)	(0.055)
Design	-0.11***	-0.11***	-0.19***	-0.01*	-0.14***	-0.06***	-0.25***	-0.10***
	(0.009)	(0.011)	(0.006)	(0.006)	(0.007)	(0.013)	(0.012)	(0.035)
Constant	49.21***	57.67***	49.65***	46.71***	94.12***	65.41***	43.77***	52.13***
	(0.888)	(1.028)	(.452)	(0.597)	(0.646)	(0.468)	(0.626)	(0.526)
R^2	0.03	0.12	0.12	0.09	0.10	0.01	0.13	0.02
Controlling for income decile groups								
Size	-0.307***	-0.09**	-0.302***	-5.577***	-0.284***	-0.309***	0.06	1.12***
	(0.095)	(0.044)	(0.067)	(0.141)	(0.052)	(0.070)	(0.059)	(0.047)
Design	0.06***	-0.08***	-0.045***	-0.066***	-0.093***	-0.082***	-0.049***	-0.025
	(0.008)	(0.009)	(0.006)	(0.005)	(0.006)	(0.011)	(0.011)	(0.028)
Constant	15.3***	8.86***	11.91***	31.18***	66.21***	53.04***	25.2***	61.601***
	(1.335)	(1.426)	(0.996)	(0.704)	(0.993)	(1.122)	(1.23)	(0.932)
Controls for decile groups	*yes*	*yes*	*yes*	*Yes*	*yes*	*yes*	*yes*	*yes*
R^2	0.41	0.46	0.27	0.34	0.47	0.39	0.39	0.37
Including changes in the VAT in the Austerity measures								
Size	-0.32***	-0.11**	-0.16*	-5.37***	-0.47***	-0.12	0.19**	0.70***
	(0.094)	(0.046)	(0.081)	(0.145)	(0.055)	(0.076)	(0.074)	(0.134)
Design	0.07***	-0.09***	-0.01	-0.05***	-0.14***	0.09***	0.00	-0.07***
	(0.009)	(0.013)	(0.009)	(0.007)	(0.009)	(0.012)	(0.014)	(0.021)
Constant	14.75***	10.53***	8.80***	32.06***	72.71***	45.67***	22.50***	16.97***
	(1.415)	(1.793)	(1.430)	(0.838)	(1.240)	(1.529)	(1.599)	(2.284)
Controls for decile groups	*yes*	*yes*	*yes*	*Yes*	*yes*	*yes*	*yes*	*yes*
R^2	0.41	0.45	0.27	0.33	0.47	0.39	0.38	0.37
N. Obs.	4,744	6,504	13,014	20,928	5,196	4,823	4,454	7,805

*Notes: OLS regressions at household level. Dependent variable: Probability of being liquidity constraint. Size: Austerity measures as % of household disposable income. Design: % of Austerity Measures as taxes. Standard errors in brackets; *** significant at 1%; ** at 5%; * at 10%. Source: own calculations with EUROMOD.*

5. Conclusions

The design and distributional effects of fiscal consolidation measures are of great relevance, not only because inequality, and any driver of growth in it, matters in its own right, but also because they have implications for the effectiveness of policy for macroeconomic recovery.

We contribute to the literature on fiscal consolidation by estimating the distributional effects of recent policy reforms in eight EU countries which were intended to reduce budget deficits. Using the microsimulation approach, we identify and quantify fiscal consolidation measures introduced through cuts in cash benefits, increases in direct and indirect taxes and workers' social contributions and cuts in public sector pay. Our "bottom-up" measure shows that there is wide cross-country variation in the scale of the resulting aggregate reduction in household monetary resources (from 2% to 16%), and in the combinations of policy instruments that were adopted, resulting in variation in the distributional profiles of income losses. Most are progressive on the whole, although it should be emphasised that even if the poor pay a lower proportion of their income than the rich, in some countries the scale of the reductions in their income is still large (e.g. in Greece). Considering the effect of the increases in VAT, which have been introduced in all the countries, reduces any progressive effect. The latter are also substantial in absolute terms, in several countries being of similar magnitude to that resulting from the measures affecting household incomes directly.

The distributional pattern of the austerity measures is not only relevant in its own right but can also have important implications for the macroeconomic prospects. Based on previous episodes of fiscal consolidation over the period 1971-2009 Kaplanoglou et al. (2013) conclude that "*ameliorating the effect of adjustment, by supporting the weaker parts of society, is crucial for the success of fiscal consolidations and […] may provide the double dividend of enhancing the probability of success of the adjustment and of promoting social cohesion*".

The distributional impact of fiscal adjustments can matter for macroeconomic dynamics, for example, through the effect on aggregate demand as consumption patterns usually differ between income groups, and more disaggregated data and micro level modelling are needed in order to provide indications for the macroeconomic performance of the fiscal adjustments. Our finding that spending cuts are more likely to affect liquidity constrained households casts doubts over previous findings in the macro-economic literature about the effectiveness of such measures. This suggests that it is not the type of policy instrument per se which matters but how it affects

different parts of income distributions, hence emphasising the need to consider more disaggregated data to reach firm policy conclusions.

In interpreting our analysis there are some caveats to be borne in mind. Most importantly, our analysis does not include the impact of cuts in in-kind benefits and services on households. These would require additional information on the way in which cuts in public spending translate into a reduction of services available for households. Such data are not available in a comparable ways across countries. An extension to our analysis should also attempt to estimate behavioural responses, especially as these might vary between income groups.[7]

[7] Giavazzi and McMahon (2013) provide some evidence on this in the context of military spending.

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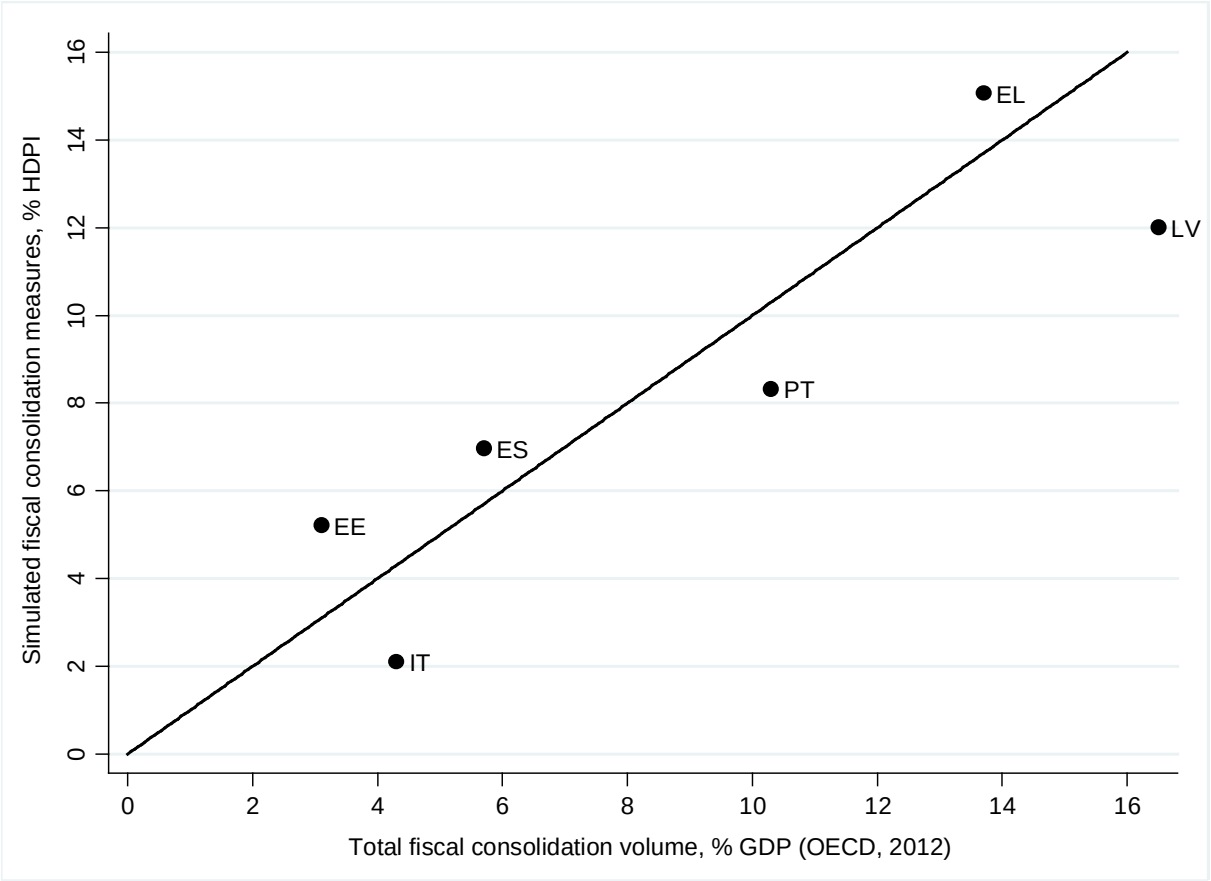
Annex

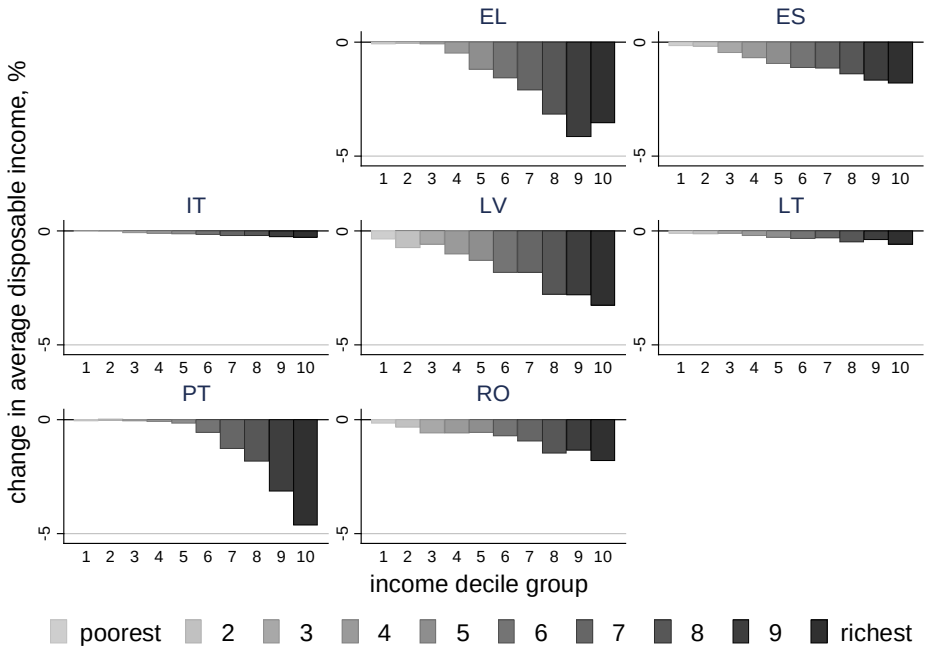
Figure A1: Aggregate amount of simulated fiscal consolidation measures in place in 2012 and total fiscal consolidation as % of GDP



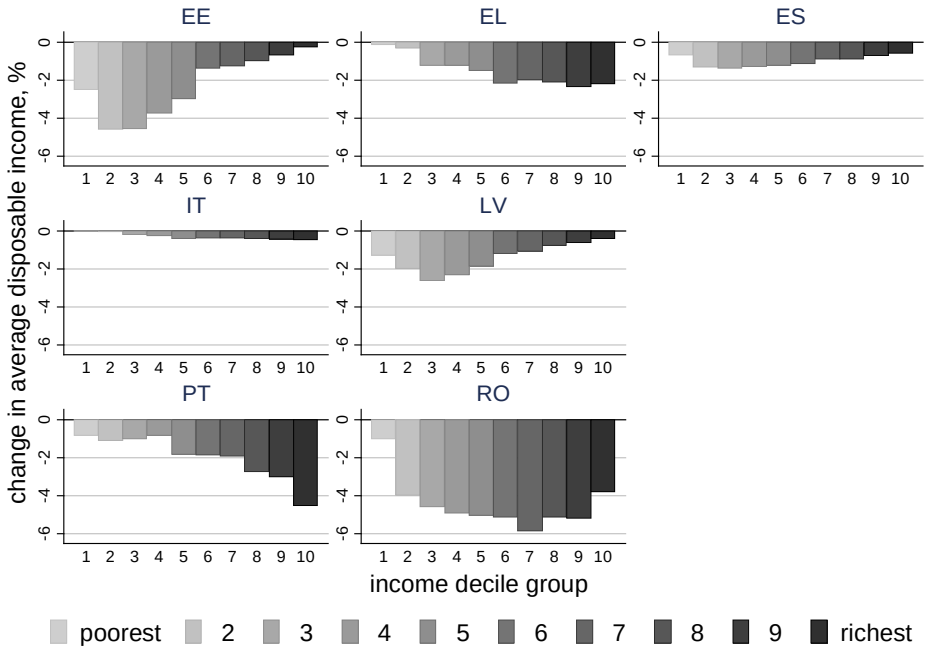
Notes: On vertical axis, amount of simulated measures (changes to direct taxes, indirect taxes, cash benefits and public sector pay) with a direct effect on household resources expressed as percentage of household disposable income (HDI). Estimates of total fiscal consolidation volume (horizontal axis) not available in a comparable way for Lithuania and Romania. Source: own simulations with EUROMOD (vertical axis) and OECD (2012) .

Figure A2: Percentage change in household disposable income due to simulated household income-based fiscal consolidation measures by type of measure and household income decile group

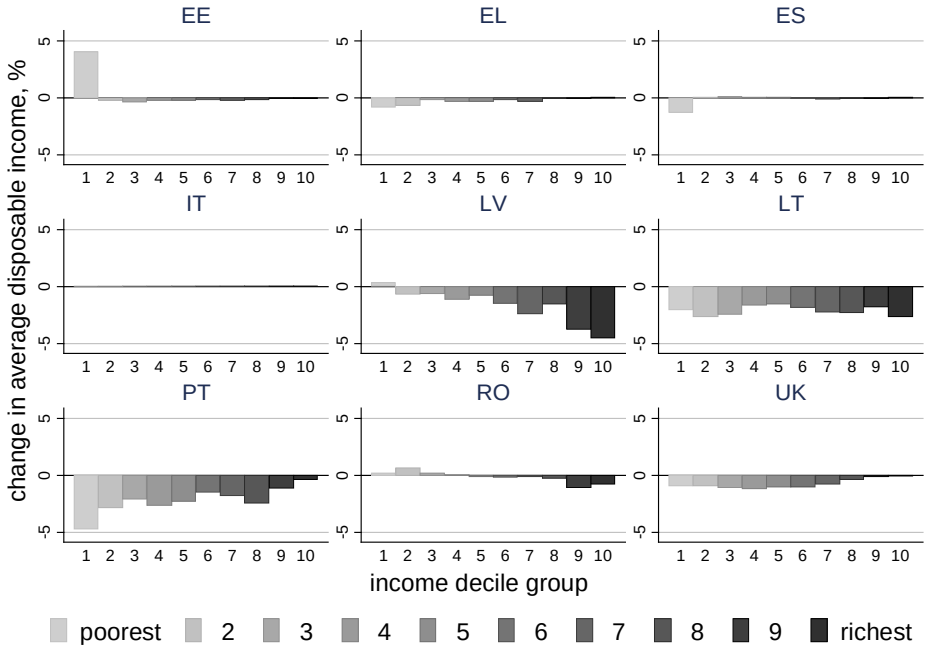
(a) public sector wages (net of taxes and SICs)



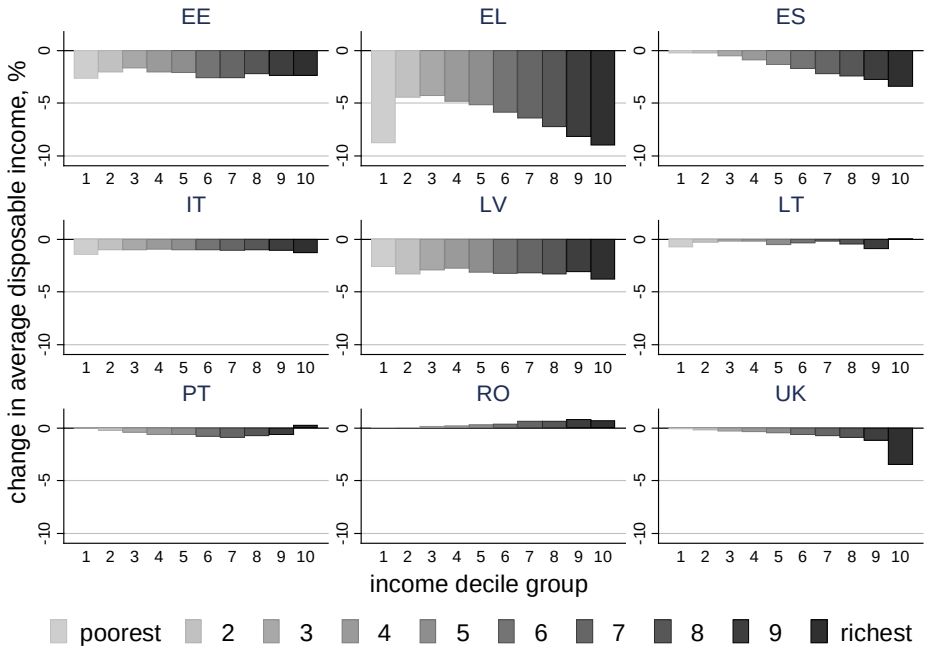
(b) public pensions



(c) non-pension benefits

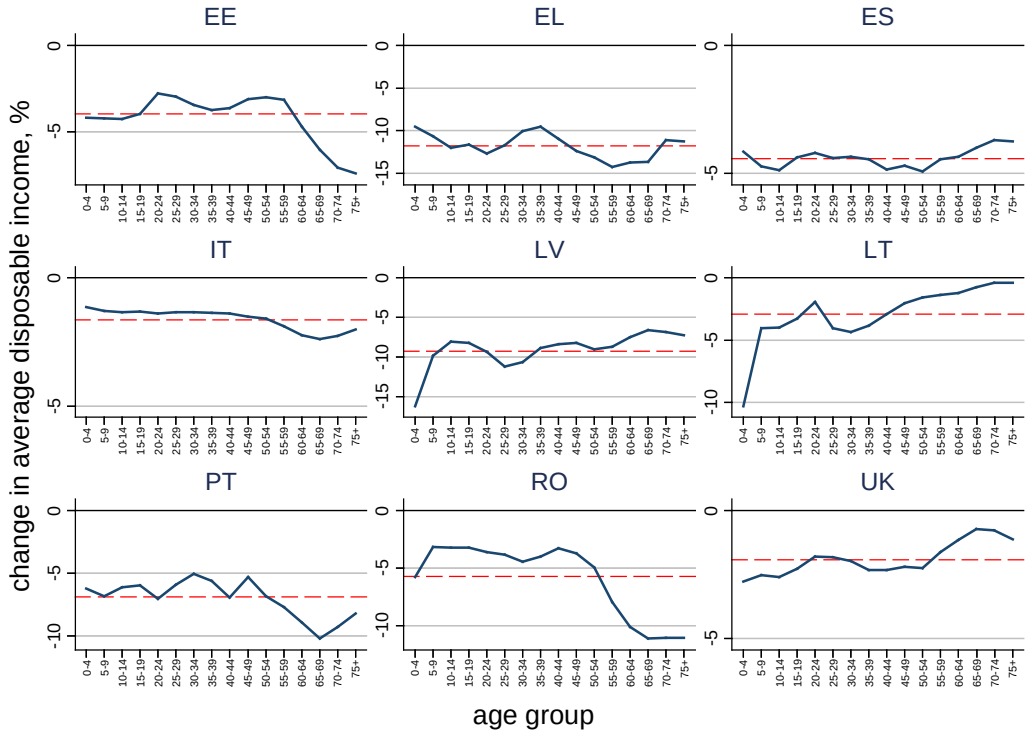


(d) Income tax and worker SICs



Notes: The measures included here are those that have a direct effect on household disposable income (changes to direct taxes, cash benefits and public sector pay). Deciles are based on equivalised household disposable income in 2012 in the absence of fiscal consolidation measures and are constructed using the modified OECD equivalence scale to adjust incomes for household size. The absence of a country from a chart indicates that there were no changes of the relevant type. Source: own simulations with EUROMOD.

Figure A3: Percentage change in household disposable income due to simulated household income-based fiscal consolidation measures: by person age



Notes: The dashed line denotes the average effect. The measures included here are those that have a direct effect on household disposable income (changes to direct taxes, cash benefits and public sector pay). Deciles are based on equivalised household disposable income in 2012 in the absence of fiscal consolidation measures and are constructed using the modified OECD equivalence scale to adjust incomes for household size. Source: own simulations with EUROMOD version F6.0.

Figure A4: Percentage change in household disposable income due to simulated household income-based fiscal consolidation measures: by type of household and household income decile group