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# Redistribution in a joint income–wealth perspective: A cross-country comparison

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## Abstract

Redistribution is usually understood in terms of income, as a resource used to rank individuals as well as determine tax liabilities or benefit entitlements. Yet, it is increasingly argued that more prominence should be given to the joint distribution of income and wealth and interest into the taxation of wealth for redistributive purposes has largely increased. By including income and wealth data from the Eurosystem Household Finance and Consumption Survey into the tax–benefit microsimulation model EUROMOD, we add two novel aspects to the literature. First, we include the analysis of taxes on wealth and wealth transfers. Second, we evaluate redistributive effects of tax–benefit systems against the joint income–wealth distribution instead of income only. We show that expressing living standards in terms of both income and wealth results in considerable reranking of individuals, which in turn leads to a lower redistributive impact of tax–benefit systems than is traditionally considered.

**Key words:** wealth policies, distributional analysis, Europe, EUROMOD, HFCS

**JEL classification:** C53, D31, H24

## 1. Introduction

Over the last decades, we have witnessed a renewed interest, both from academic and political actors, in the level and evolutions of inequality, and more particularly the role government intervention plays in these processes. A major reason for this resurgence is the fact that inequality has been on the rise in many developed countries (Huber and Stephens, 2014), as shown for instance by the OECD (2015, 2011) and which has only partly been offset by government redistribution (Immervoll and Richardson, 2011; Avram *et al.*, 2014). Inequality and redistribution are usually understood in terms of income, as a resource used

to rank individuals as well as determine ability to pay or benefit entitlements. However, one of the most striking evolutions is related to wealth rather than income. Over the last 60 years, private wealth accumulation has continuously increased such that aggregate private wealth–national income ratios have nowadays returned to levels observed in the 19th century, ranging from 300% to 600%. Such levels are determined by different economic factors, such as the long-run asset price recovery effect, high saving rates and low economic growth rates, at least partially sustained by pro-capital policies. High wealth–income ratios are not necessarily bad but they raise challenging issues about capital taxation (Piketty, 2014) and the overall structure of inequality (Davies, 2009).

Despite these developments in private wealth accumulation, in the prevailing literature, living standards continue to be one-dimensionally defined and measured through income streams. However, savings and assets also significantly impact living standards of individuals and households through their various functions. First, wealth increases consumption possibilities through the generation of capital income, and this without having to sacrifice leisure. Savings and assets can also serve as a buffer to smooth consumption during low-income periods or to face unexpected costs. Furthermore, the mere ownership of wealth also increases utility because it creates independence and opens up a wider range of free choices (Sherraden, 1991). Finally, wealth is an important contributor in achieving or maintaining class status (Spilerman, 2000), as well as having economic and political power. Given the increasing importance of wealth over income, one can even argue that being a capital owner has become the most important determinant of living standards. Therefore, it is increasingly argued that more prominence should be given to the joint distribution of income, consumption and wealth (Stiglitz *et al.*, 2009; Brandolini *et al.*, 2010; Jäntti *et al.*, 2013; OECD, 2013).

As living standards and inequality are typically expressed in income terms, previous studies have also evaluated the redistributive effects of income taxes and transfers by comparing the distribution of market and disposable household income (see e.g. Mahler and Jesuit, 2006; Avram *et al.*, 2014; Huber and Stephens, 2014; Verbist and Figari, 2014). However, over the last years, strong arguments have been made for broadening the scope of indirect and wealth taxes as a way to raise government revenues and adopt forms of taxation less detrimental to growth (e.g. Arnold *et al.*, 2011; Bach *et al.*, 2014; Piketty, 2014). Yet, empirical evidence on the effects of both existing and hypothetical wealth taxes is largely missing as previous studies do not take into account wealth taxes and policies as part of the redistributive effort of welfare states.

Based on this literature, we expect that expressing inequality and redistribution in terms of income alone provides only a partial picture about the level of socio-economic inequality and government redistribution. In particular, we expect that a more comprehensive concept of resources and their use, including income, wealth and consumption, provides a different evaluation of the redistributive effects of European welfare states (Davies, 2009). Therefore, the relevant hypothesis to test is whether and to what extent tax–benefit systems are still redistributive when wealth is taken into account both as indicator of individual resources and as component of the ability to pay taxes of an individual. Hence, this article contributes to the literature by adding two novel aspects to the redistributive analyses of tax–benefit systems. First, in addition to the traditional income framework, we adopt and extend the framework developed in the asset-based poverty literature (Weisbrod and Hansen, 1968; Brandolini *et al.*, 2010) to test the hypothesis according to which the redistributive effects of

tax–benefit systems against the joint distribution of income and wealth differ from the redistributive effects considering the income distribution only (Brandolini *et al.*, 2010). This hypothesis is based on the different characteristics of income and wealth owners and on the relatively weak correlation between the two different distributions. Second, we test the hypothesis of regressivity of indirect taxes (due to the higher propensity to consume among low-income individuals; see Decoster *et al.*, 2010) and progressivity of taxes on wealth (due to the expected concentration of wealth in top of the distribution; see Cowell and Van Kerm, 2015) and their joint effect on overall redistributive effects. A special focus goes to wealth taxes where we include both recurrent (i.e. real property and yearly wealth taxes) and event-based wealth taxes (i.e. real-estate transfer taxes, inheritance and gift taxes). We analyse this in a cross-country framework by comparing results across six EU countries, namely Belgium, Finland, France, Germany, Italy and Spain. These countries are characterized by a broad range of tax–benefit systems, of different size and design, heterogeneous distributions of income and wealth as well as their correlation, and different housing markets (the largest component of most households' wealth).

In order to do this, we adapted the Eurosystem Household Finance and Consumption Survey as an underlying database for the EU-wide tax–benefit microsimulation model, EUROMOD. The new empirical evidence presented in this article provides important insights on the overall redistributive effects of current tax–benefit systems and highlights potential new avenues for the future debate on fiscal and social policies in the European Union and on innovative tax–benefit designs. It also offers new perspectives for the literature on the economic, demographic and political determinants of inequality and redistribution. First, the power resources theory argues that the distribution of power determines inequality and redistribution (Bradley *et al.*, 2003; Mahler and Jesuit, 2006). As wealth represents one of the main sources of economic and political power, only looking at income will not tell the whole story. Another influential theory argues that inequality and redistributive policy are shaped by economic and demographic variables (Mahler and Jesuit, 2006). Many studies, for instance, point toward globalization and skill-biased technological change to explain the increase in income inequality and lower redistribution due for instance to international tax competition (e.g. OECD, 2011; Kanbur, 2015). These processes have not only affected income, but at the same time also substantially increased the role played by wealth. Technological change has, e.g., created new types of assets such as robots, while globalization increases capital mobility. International tax competition has also affected wealth taxes much more than it did personal income taxes or the provision of social transfers. When it comes to demographic factors, population ageing is often mentioned as an important determinant because pensioners are often found at the bottom of the income distribution. However, in line with the life cycle model of wealth accumulation, the elderly are generally the wealthiest. When elderly live longer this means that their offspring receives inheritances later in life, a moment when they often already accumulated significant amounts of wealth themselves, which may exacerbate wealth inequality. Finally, also institutional arrangements and path dependency may explain why redistribution remains focussed on reducing income inequalities and not so much wealth inequalities.

The remainder of this article is organized as follows. The data and methods are described in Section 2. In Section 3, we present the joint income–wealth framework which is then used to evaluate the redistributive effects of tax–benefit systems in Section 4. We start from the total redistributive effects and then investigate the contribution of the different redistributive

instruments, which is further decomposed into their size and progressivity. A decomposition between the elderly and non-elderly is analysed in Section 5 to take into account the life cycle character of wealth accumulation and the relevant role played by public pensions in determining the income distribution of most European countries. The last section concludes.

## 2. A cross-European perspective: countries, tax–benefit systems and data

In order to consider the variety of European tax–benefit systems and to be able to provide a strong base for generalizing the results to a broad range of welfare states, this article adopts a cross-country perspective and covers six countries: Belgium, Finland, France, Germany, Italy and Spain. These countries are characterized by different levels and distributions of income and wealth. The average equivalized net wealth ranges from about €105 560 in Finland and €128 819 in Germany to more than €200 000 in Belgium, with an average of around €150 000 in France, Italy and Spain. Gini coefficient[1] of net wealth is equal to 0.576 for Spain, 0.598 for Belgium, 0.608 for Italy, 0.638 for Finland, 0.670 for France and 0.744 for Germany. Also the correlation between income and wealth varies largely as will be clear from Section 3. They also provide a good representation of a broad range of tax–benefit systems and existing wealth taxation which largely shape the observed levels and distributions of disposable incomes, characterized by average equivalized levels ranging from less than €15 000 in Italy and Spain, around €20 000 in Belgium, France and Germany to more than €22 500 in Finland; Gini coefficients of disposable income range from 0.249 in Finland to 0.350 in Spain (Kuypers *et al.*, 2018). Moreover, these countries are characterized by well-developed but heterogeneous housing markets. Focussing on the main residence market emerges a clear prevalence of homeowners in Spain (around 83%), and Belgium, Italy, Finland, where they represent around 70% of the population, while the presence of renters is important in France (around 45%) and even dominant in Germany (55%) (HFCN, 2013*b*). Given the importance of housing wealth in the individuals' portfolio, the interplay between house ownership and real estate taxes is an important determinant of the overall redistributive effect of wealth taxation.

### *2.1 Tax benefit systems*

The relative importance of taxes and benefits with respect to the overall resources of a given economy and the design of the tax–benefit instruments are the key determinants of the redistributive process that contributes to the observed distribution of disposable income (i.e. market incomes (MIs), pensions and social benefits minus social insurance contributions (SICs) and direct taxes) and consumable income (CI) (i.e. disposable income after deduction of indirect taxes). Personal and capital income taxes, wealth taxes, indirect taxes and SICs represent between 21% (Spain) and 31% (Finland) of national Gross Domestic Product (GDP) (Figure 1). Focussing on cash transfers (excluding public pensions), government intervention allocates resources between 6% and 10% of GDP, with more efforts clearly identified in Belgium and Spain. Public pensions absorb the largest share of public resources in Finland, France, Germany and Italy, ranging from 7.7% of GDP in Germany to 12% in France.

1 Gini coefficient ranges from 0 (perfect equality) to 1 (all resources owned by one individual).

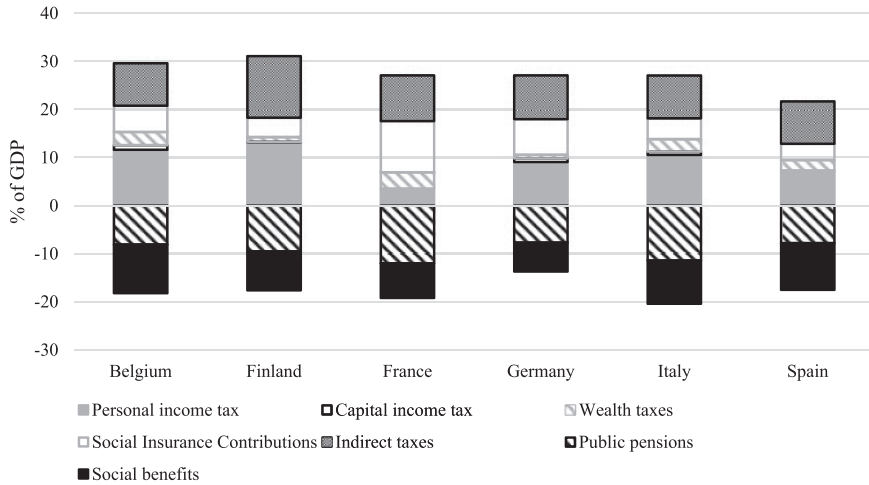


**Figure 1** Tax revenues and social benefit expenditure as percentage of GDP. *Notes*: Figures for taxes and SICs refer to 2015, for social benefits to 2013. In view of comparability with the analyses presented in the article, tax revenues reflect taxes paid by individuals only, SICs exclude employer contributions, indirect taxes include VAT and excise duties.
*Source*: OECD Tax Revenue Database and OECD Social Expenditure Database.

The relative importance of the different instruments varies greatly across countries and focusing on a single instrument could be misleading. Personal income taxes have a progressive structure and include the different levies on all sources of earned income, pensions and some social benefits (e.g. unemployment benefits). Taxes paid on income from capital are usually characterized by a separate and often more proportional tax structure. Personal and capital income taxes represent <10% of GDP in France and Spain and almost 15% in Finland and Belgium. In all countries, mandatory SICs are levied on labour income from employees and self-employed (on voluntary basis in Germany) and on some social benefits (with the exclusion of Italy) although with a contribution rate lower than on income from work. They represent about 5% of GDP, with a higher incidence in France (10%) and Germany (7.5%). Wealth taxes exist in different forms in all countries, with an overall revenue ranging from 1% of GDP in Finland and Germany to almost 3% in Belgium and 3.5% in France. Indirect taxes (VAT and excises) represent about 9% of GDP in all countries, except for Finland were it is almost 13%.

### *2.2 HFCS-data and EUROMOD*

It is only recently that high quality and comparable micro-level data on household wealth have become available. Mainly the Luxembourg Wealth Study and the Eurosystem Household Finance and Consumption Survey (HFCS) present milestones in this process.[2] The empirical evidence presented in this article makes use of the latter. The HFCS covers

2 As it is the case of Finland and Italy, LWS and HFCS are increasingly using, whenever possible, the same source of data, guaranteeing robustness in the cross-country analysis of income and wealth distributions.

**Table 1** Overview of reference periods and sample sizes

| Country | Reference period | | Sample size | |
|---|---|---|---|---|
| | Wealth | Income | Households | Individuals |
| Belgium | Time of interview | 2009 | 2327 | 5506 |
| Finland | 31 December 2009 | 2009 | 10 989 | 27 009 |
| France | Time of interview | 2009 | 15 006 | 35 729 |
| Germany | Time of interview | 2009 | 3565 | 8134 |
| Italy | 31 December 2010 | 2010 | 7951 | 19 836 |
| Spain | Time of interview | 2007 | 6 197 | 15 850 |

*Source*: HFCN, 2013*a*, p. 74.

detailed information on household wealth[3] together with socio-demographics, income values gross of taxes and consumption information. An overview of the country-specific data reference periods and sample sizes is provided in Table 1. The HFCS dataset contains some interesting features, such as oversampling of the very wealthy to obtain a better coverage of the top of the wealth distribution and a multiple imputation technique (HFCN, 2013*a*).

A major drawback of the HFCS is that it only includes income values gross of taxes and SICs, which are not suitable for distributive analyses. By incorporating the survey as the underlying database for EUROMOD, the EU-wide tax–benefit microsimulation model (Sutherland and Figari, 2013), we have developed a unique tool which allows to derive disposable and CIs taking into account all important details of the social security and tax system (see Kuypers *et al.*, 2016). EUROMOD starts from MIs taken directly from the input dataset and then simulates non-contributory cash benefit entitlements and liabilities for direct taxes and SICs on the basis of the tax–benefit rules in place and the information available in the underlying datasets. Some instruments which cannot be simulated (due to data constraints), such as contributory benefits, are taken directly from the input dataset. In light of the present analyses, we enriched EUROMOD with the simulation of wealth-related policies and indirect taxes.[4] Wealth-related policies include the taxation of financial and non-financial assets, capital income and wealth transfers, tax incentives for asset accumulation and asset means testing in benefit eligibility. Real estate taxes, real estate transfer taxes and inheritance and gift taxes, although with a different tax design, exist in all countries considered A general wealth tax (a tax on all types of assets) exists in France and Spain, while Belgium taxes private pension accumulations. The inheritance and gift tax in Italy and Finland and also the real estate transfer tax in Finland cannot be simulated due to lack of information in the HFCS for these countries (see Table A1 in the Supplementary Appendix and Kuypers *et al.*, 2017).

3 We adopt in this paper the same wealth definition as used by the HFCS, i.e. net wealth defined as the sum of real and financial assets less liabilities. We only concentrate on privately held wealth, social security and public pension wealth are not included, nor is human capital (HFCN, 2013*a*).

4 These are not yet included in the public release of EUROMOD, but they are available from the authors upon request.

Regarding indirect taxes, the HFCS only covers limited information on consumption and is therefore not suited for a direct simulation of VAT and excises (Lamarche, 2017). Instead, we chose to use the most recent estimates of the incidence of VAT and excises (in terms of household disposable income) by income decile groups. Such estimates come from the standard version of EUROMOD where the underlying data from the European Statistics on Income and Living Conditions (EU-SILC) are enriched with household expenditures, by predicting Engel curves originally estimated on the Household Budget Survey Data, and VAT and excise tax parameters in place in each country are applied to the relevant consumption category (Bouckaert *et al.*, 2016; Cantó Sánchez *et al.*, 2016; De Agostini *et al.*, 2017). As a result, we jointly observe net wealth, market, disposable and CIs which serve to define the main reference framework for the analyses in this article. The outcomes in terms of disposable incomes have been compared with those obtained based on the widely used EU-SILC input database (for the latter, see Makovec and Tammik, 2017). Tax revenues of personal income taxes, wealth taxes, indirect taxes and cash benefit entitlements were validated against administrative statistics. The overall quality of outcomes is high and due to the oversampling, the HFCS covers tax payments at the top of the distribution relatively better than EU-SILC.

In common with other analyses of the redistributive effects of tax–benefit systems based on a microsimulation approach (e.g. Decoster and Van Camp, 2001; Piketty and Saez, 2007; Avram *et al.*, 2014), our empirical evidence considers the pre-transfer pre-tax income and wealth distribution as given. In the interpretation of the results, one needs to keep in mind that the direct impact of taxes and benefits on household income, wealth and consumption is only one way in which redistribution may happen (Boadway and Keen, 2000). One could consider, e.g. the impact of individual behavioural reactions (Bergh, 2005) such as decisions regarding labour supply, saving, consumption and investment, but also macroeconomic shocks which can be affected by the tax system as well as tax evasion and benefit non-take-up. For the countries studied in this article, some calibrations are included to take into account income tax evasion in Italy and benefit non-take-up in Belgium, France and Finland (Makovec and Tammik, 2017). Although tax evasion is also an important issue with respect to wealth taxation (Zucman, 2015), data limitations do not allow us to correct the underlying data. Moreover, although the HFCS oversamples the wealthy, it is still likely that it suffers from underrepresentation of wealth at the top of the distribution (e.g. Vermeulen, 2016) which can affect the analysis of wealth taxes. Finally, we focus here on the cash part of the income redistribution process, and not on the in-kind benefits people can derive from the use of publicly provided services. We recognize the importance of these services for people's living standards, but gauging their redistributive effect falls outside the scope of our study (examples of such analyses can be found in Paulus *et al.*, 2010; Verbist *et al.*, 2012).

Even if a life cycle perspective might be informative for the (re)distribution of resources among individuals (Bengtsson *et al.*, 2016), especially in case of wealth, our cross-sectional empirical analysis sheds light on the important impact of tax–benefit systems on the individual living standards as taxes and benefits affect current disposable and CI of households and implicitly determine a certain level of inter-generational redistribution. We focus on the redistribution between rich and poor at a particular point in time but distinguish the contribution to the overall redistribution of the instruments designed to redistribute across the lifecycle such as SICs and pensions. Moreover, as wealth taxation lowers the net return on financial investments relative to investments in human capital, it could enhance the

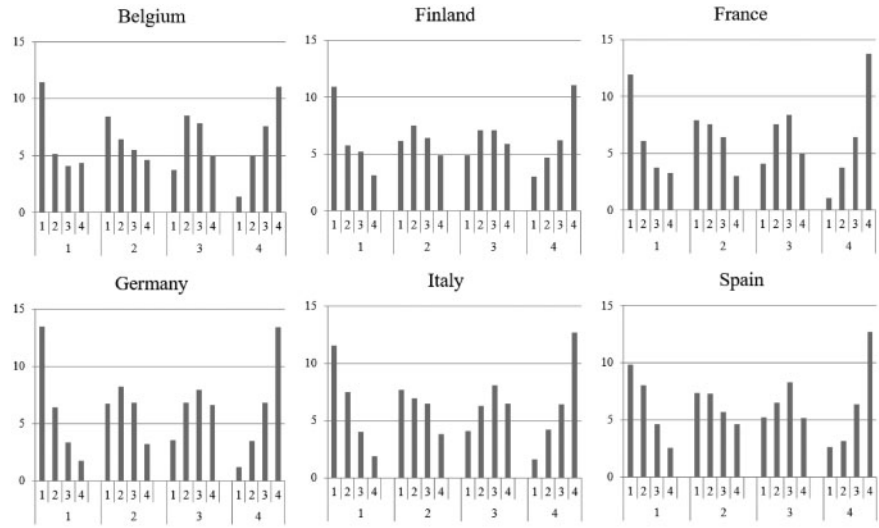


**Figure 2** Distribution across quartiles of CI and wealth (percentage of individuals). *Notes*: In each graph, bottom number refers to the income quartile and top number to the wealth quartile. Spearman rank correlations are 0.42 for Belgium, 0.37 for Finland, 0.54 for France, 0.57 for Germany, 0.50 for Italy and 0.57 for Spain. *Source*: Own calculations based on EUROMOD running on HFCS (EM-HFCS).

intergenerational social mobility and promote equality of opportunities across individuals if the revenue was redistributed to all individuals (directly or not). A quantification of the resources embedded in current or potential wealth taxes is then an essential piece of information for the definition of well-designed welfare policies.

## 3. The joint distribution of income and wealth

Although there exist clear links between income and wealth through savings and borrowing constraints, their correlation is far from perfect. Possible factors mitigating the income–wealth relationship include asset portfolio choices, life cycle effects and intergenerational transfers (Jäntti *et al.*, 2013). Based on our data, the Spearman rank correlations of equivalized CI and equivalized wealth range from 0.37 for Finland to 0.57 for Germany and Spain. Figure 2 shows the position of individuals in the quartile groups based, respectively, on the income and wealth distributions. In the case of a perfect correlation, the options '11' (i.e. individuals belonging to the first quartile group of income distribution and wealth distribution), '22', '33' and '44' should correspond to 25% each. This is, however, not the case, indicating that there is considerable reranking of individuals if one moves from one distribution to the other. In all countries, only around 11 and 14% of individuals are located in the bottom (top) quartile in both the income and wealth distributions (i.e. '11' or '44') and even a smaller share of individuals is located in the second and third quartiles of both distributions. Income poor individuals are not just concentrated in the bottom of the wealth distribution, but they are spread across the entire distribution. Around 50% of the individuals identified as poor on the basis of their income belongs to the second or higher quartile of the

wealth distribution. This growing phenomenon of 'income poor-wealth rich' households has important implications for tax and social policy design and their specific situations can be taken into account by defining living standards in terms of both income and wealth.

The lack of a clear correspondence between the position in the income and wealth distribution poses doubts about the reliability of a single concept to measure the individual well-being. Traditional measures of living standards disregard the role of assets and debt, with the exception of the direct income flow that is generated by certain types of assets (i.e. rents, dividends, …). However, increasingly, more researchers and policymakers acknowledge the role savings and assets play in the financial well-being of households (Brandolini *et al.*, 2010). There are households which can smooth consumption by relying on savings and assets, loans or the financial help of others and these are clearly better off than those who do not have these opportunities. In contrast, the presence of large financial liabilities may make households more economically vulnerable than their incomes suggest.

Several studies look at how these flow and stock variables can be integrated into a new living standards concept, but until now, these are mainly confined to poverty studies. In this article, we apply the approach first proposed by Weisbrod and Hansen (1968) to annuitize wealth into a flow of resources, which is then added to income, using the following formula:

$$\mathrm{AY} = Y + \left[\frac{\rho}{1-(1+\rho)^{-n}}\right] * \mathrm{NW}$$
$$n = T \text{ for unmarried, } T_1 + (T - T_1)b \text{ for married} \tag{1}$$

where AY refers to annuitized income, $Y$ equals income received from labour, pensions and other transfers,[5] NW is net worth (defined as the difference between gross wealth and liabilities), while $\rho$ and $n$ are the interest rate and length of the annuity. With regard to the latter $T_1$ refers to time to death of the first person, $T$ time to death of the survivor. These are expressed in country-specific life expectancies by age and gender. We equivalize both income and wealth by using the modified OECD scale with $b$ being the reduction in the equivalence scale which results from the death of the first person.

The position of individuals across quartiles of income and joint income–wealth is presented in Figure 3. A lower degree of reranking between the positions in the two distributions is observed compared with the situation when income and wealth were considered separately. However, there is still considerable reranking of individuals in the middle of the distribution. Reranking is lowest for France and Germany and relatively high for Belgium. Evidence indicates that the reranking effect (RR) is higher for elderly than for non-elderly, because pensions are typically relatively low compared with other income sources, while they have accumulated substantial wealth over their life time (Kuypers and Marx, 2018).

One of the contributions of this article is that we extend this annuitization approach to be able to evaluate the redistributive effects of tax and benefit systems. We do this by assuming that wealth taxes are not paid with income, but instead lower the amount of their tax base, i.e. wealth. In other words, we propose to define pre-tax and post-tax concepts of annuitized wealth based on the following choices. One-time event wealth taxes (i.e. inheritance and gift and real estate transfer taxes) are taken into account in the wealth that is subject to the annuitization, while the yearly recurrent wealth taxes (i.e. real property and

5 Capital income is not included as it no longer exists when wealth is depleted.

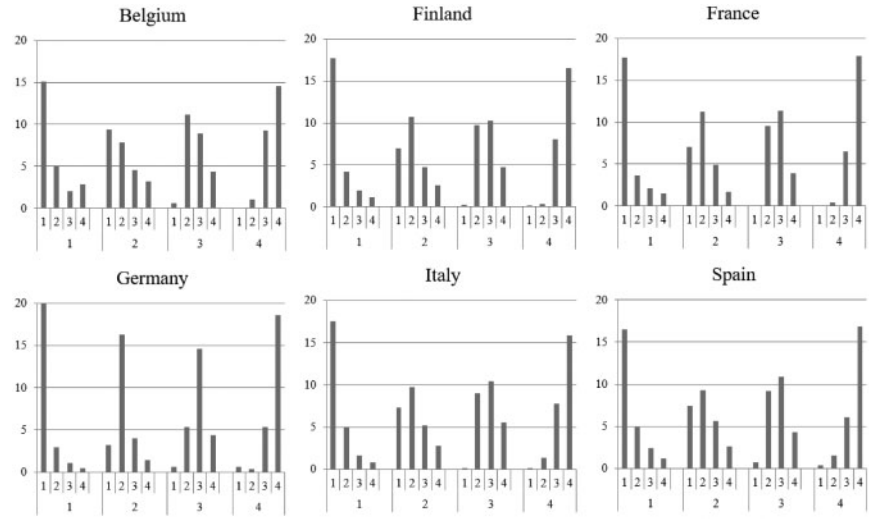


**Figure 3** Distribution across quartiles of income and joint income–wealth (percentage of individuals). *Note*: In each graph, bottom number refers to the income quartile and top number to the joint income–wealth quartile. *Source*: Own calculations based on EM-HFCS.

wealth taxes) are captured by the difference between a gross and a simulated net interest rate of the annuity ($\rho$). We start from a 5% gross interest rate for everyone (long-term pre-tax interest rate assumed in Piketty (2014)[6] and then simulate for each individual a net interest rate depending on the recurrent wealth taxes paid, which is on average equal to 4.87% in Belgium, 4.95% in Germany, 4.81% in Spain, 4.89% in Finland, 4.80% in France and 4.96% in Italy.

Figure 4 illustrates in detail the steps in the redistributive process in the two frameworks adopted in this article. In the traditional income framework, we start from MI and then add cash social benefits and subtract SICs, personal and capital income taxes. In contrast to most previous studies, we also subtract wealth taxes and indirect taxes to get a measure of CI and a more comprehensive overview of the redistributive effects of the tax–benefit system. In the joint income–wealth framework, the transition to CI still reflects the effects of benefits, SICs, income and indirect taxes, but now there is also a transition from gross annuitized wealth (GAW) towards net annuitized wealth (NAW) reflecting the impact of event and recurrent wealth taxes. See Kuypers *et al.* (2018) for a detailed explanation of the treatments of one-time event and recurrent wealth taxes in the income and joint income–wealth framework.

6 In practice, rates of return to wealth have been found to differ substantially between individuals, but due to information constraints, we have not been able to take this into account. However, the actual choice of the interest rate has only a limited impact on the results (see also Kuypers and Marx, 2018), it is the difference between the net and gross interest rate that is of main importance here.

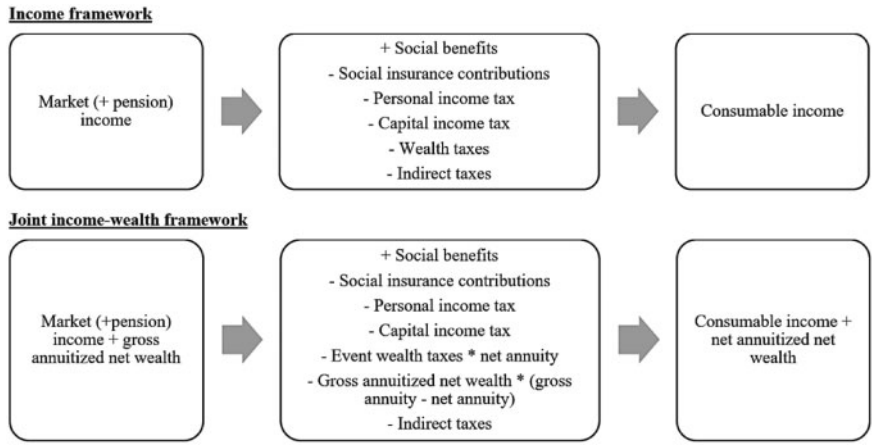


**Figure 4** Redistributive process in two frameworks.

## 4. A broader assessment of the redistributive effects of tax–benefit systems

The adoption of the joint income–wealth framework concept has important implications to determine living standards but as we will show in this section also for the evaluation of the (re)distribution of tax–benefit instruments.

### *4.1 Redistributive effects*

Following the well-established literature, the redistributive effects (REs) of tax–benefit systems are given by the difference between the Gini of a pre-transfer pre-tax concept and the Gini of a post-transfer post-tax concept. In order to facilitate cross-country comparability, such a difference is also shown as a percentage of the pre-transfer pre-tax Gini. In the traditional income approach used in the literature, the pre-transfer pre-tax concept usually refers to MI including income from (self-) employment, capital and private transfers. This approach, however, may be problematic for cross-country comparisons as it does not take into account the effects induced by the characteristics of the pension systems (Jesuit and Mahler, 2010). 'In countries with comprehensive public pension systems ... pensioners [will] make little other provision for retirement... Thus, pre-tax income inequality (and poverty) will be artificially high and the reduction in inequality also exaggerated' (Bradley *et al.*, 2003). Previous studies have identified two possible solutions to this problem. The first is to calculate redistributive effects only for the working age population (see e.g. Bradley *et al.*, 2003; Immervoll and Richardson, 2011; Gornick and Milanovic, 2015). This approach, however, has a drawback that not only public pensions, but also taxes paid by the elderly are excluded from the analysis. The second solution, proposed by Jesuit and Mahler (2010), treats public pensions not as part of the redistributive effect but rather as a source of postponed MI or compulsory savings by adding it to MI.[7] This approach has been used among others by

7 In principle, this approach also implies that social insurance contributions paid to build up public pension entitlements should not be subtracted from market income. However, as Mahler and Jesuit

Lustig (2016) and Popova *et al.* (2018). As there exists no consensus in the literature on the most appropriate approach, we show all three options. We start here by showing the results for the total population, including pensions either as government transfer (i.e. part of the redistributive process) or as MI. The results of excluding the elderly are shown in Section 5, but the overall conclusions remain largely the same.

With regard to the post-transfer post-tax concept, most studies add government transfers and subtract direct taxes on income and SICs to define the concept of disposable income. Here, we go a step further by also subtracting direct taxes levied on wealth as well as indirect taxes. The latter implies that we end up with a concept of income which is available for consumption, which we label CI. Hence, in what follows, we define the redistributive effect in the income framework by the difference between the Gini of MI (or market + pension income (MPI)) and CI:

$$\mathrm{RE} = \mathrm{Gini}_{\mathrm{M(P)I}} - \mathrm{Gini}_{\mathrm{CI}} \tag{2}$$

When wealth is brought into the picture, the value of annuitized wealth net of liabilities is added gross of wealth taxes (i.e. GAW) to the MI concept or to the MI and public pension income concept. The value of annuitized wealth net of wealth taxes (i.e. NAW) is added to the CI concept resulting in the overall redistributive effect in the joint income–wealth framework:

$$\mathrm{RE} = \mathrm{Gini}_{\mathrm{M(P)I+GAW}} - \mathrm{Gini}_{\mathrm{CI+NAW}} \tag{3}$$

The top panel of Table 2 provides an overview of the absolute and relative redistributive effects as traditionally done in the fiscal literature, i.e. redistributive effects assessed against the distribution of market (+ pension) incomes. In the bottom panel, the living standard concept takes into account all available household financial resources such that the redistributive effects are evaluated against the joint distribution of income and annuitized wealth.

The level of inequality observed in the different distributions shows important features that impact on the potential of the tax–benefit system to redistribute resources across individuals. First, across all countries the Gini coefficient of MI + GAW is lower than the Gini of MI alone. This is largely due to the fact that elderly often have zero MIs, while holding important amounts of wealth. The inclusion of these wealth holdings then by definition results in a decrease of inequality of MIs. Secondly, the inclusion of GAW increases the inequality of the distribution of market + pension incomes in particular in France, Germany and Italy, countries characterized by the highest wealth inequality. Finally, the high disparities observed in the distribution of wealth imply that the distribution of CI + NAW shows a higher inequality than the distribution of CI in all countries.

Comparing the redistributive effects in the top and bottom panel and considering public pensions as social transfers (fourth and fifth columns), we find that in the broader joint income–wealth framework, the tax–benefit system is still found to reduce overall inequality although to a much lesser extent than considering the traditional notion of income inequality. In all countries, the redistributive effect of the tax–benefit system is at least halved, with a particular large reduction in Italy and Spain. This is because the tax–benefit system is almost

(2010) point out, it is not always possible to differentiate between social insurance contributions for pensions versus for other entitlements and in several countries also resources from personal income taxes are used to finance public pension programmes.

**Table 2** Redistributive effects of tax–benefit system, overall population

| | Gini MI | Gini MPI | Gini CI | Abs. RE (MI−CI) | Rel. RE (as percentage of Gini MI) | Abs. RE (MPI−CI) | Rel. RE (as percentage of Gini MPI) |
|---|---|---|---|---|---|---|---|
| Income framework | | | | | | | |
| Belgium | 0.554 (0.011) | 0.469 (0.012) | 0.353 (0.011) | 0.201 (0.007) | 36.28 | 0.116 (0.006) | 24.73 |
| Finland | 0.372 (0.003) | 0.362 (0.003) | 0.258 (0.002) | 0.114 (0.001) | 30.65 | 0.104 (0.001) | 28.73 |
| France | 0.522 (0.003) | 0.421 (0.003) | 0.304 (0.003) | 0.218 (0.002) | 41.76 | 0.117 (0.002) | 27.79 |
| Germany | 0.515 (0.006) | 0.417 (0.005) | 0.319 (0.004) | 0.196 (0.005) | 38.06 | 0.098 (0.003) | 23.5 |
| Italy | 0.510 (0.004) | 0.374 (0.003) | 0.315 (0.003) | 0.195 (0.003) | 38.24 | 0.059 (0.001) | 15.78 |
| Spain | 0.476 (0.006) | 0.407 (0.006) | 0.379 (0.006) | 0.097 (0.003) | 20.38 | 0.028 (0.003) | 6.88 |
| | Gini MI + GAW | Gini MPI + GAW | Gini CI + NAW | Abs. RE (MI+ GAW − CI + NAW) | Rel. RE (as % of Gini MI + GAW) | Abs. RE (MPI + GAW – CI + NAW) | Rel. RE (as % of Gini MPI + GAW) |
| Joint income–wealth framework | | | | | | | |
| Belgium | 0.479 (0.009) | 0.458 (0.008) | 0.406 (0.007) | 0.073 (0.005) | 15.24 | 0.052 (0.004) | 11.35 |
| Finland | 0.366 (0.002) | 0.363 (0.002) | 0.300 (0.002) | 0.066 (0.001) | 18.03 | 0.063 (0.001) | 17.36 |
| France | 0.478 (0.004) | 0.445 (0.003) | 0.374 (0.003) | 0.104 (0.002) | 21.76 | 0.071 (0.001) | 15.96 |
| Germany | 0.503 (0.007) | 0.453 (0.007) | 0.416 (0.008) | 0.087 (0.004) | 17.3 | 0.037 (0.004) | 8.17 |
| Italy | 0.458 (0.005) | 0.418 (0.005) | 0.417 (0.005) | 0.041 (0.002) | 8.95 | 0.001 (0.001) | 0.24 |
| Spain | 0.425 (0.006) | 0.412 (0.005) | 0.407 (0.005) | 0.018 (0.002) | 4.24 | 0.005 (0.001) | 1.21 |

*Notes*: , RE, redistributive effect given by Gini differences as defined in Equations (2) and (3). Standard errors are shown between parentheses. All redistributive effects are statistically significant at 1% level with the exception of the Italian redistributive effect between MPI and CI in the joint income–wealth framework. Redistributive effects with respect to disposable income are presented in Authors (2018).
*Source*: Own calculations based on EM-HFCS.

unilaterally focused on reducing income inequalities, which do not necessarily coincide with wealth inequalities, as was shown in the previous section.

Considering public pension income as postponed MI, the redistributive effect of tax–benefit systems (sixth and seventh columns in Table 2) is, as expected, lower than evaluated against the distribution of MI alone, in particular in countries characterized by relatively generous pensions with respect to other social benefits. This is the case for Spain and even more so for Italy where pensions absorb more than half of the resources of the entire welfare state and the tax–benefit policies contribute to a reduction of inequality of around 16% relative to almost 40% when including pensions in the redistributive mechanism. An even larger reduction of the redistributive effect is observed in the joint income–wealth framework when pensions are not considered as part of the redistributive mechanisms.

As a consequence, the adoption of the broader reference framework slightly alters cross-country rankings of redistribution. Yet, the overall welfare types remain valid when wealth is taken into account with Scandinavian and Continental welfare states achieving higher levels of redistribution than Southern welfare states.

Next, we look into the contributions to overall redistribution of the different instruments of the tax–benefit system, notably social benefits (excluding public pension), SICs, personal income taxes, capital income taxes, indirect taxes and wealth taxes. From now on, the analyses will consider pensions as part of MIs and then we will focus on the difference between the elderly and non-elderly in Section 5. In order to analyse the contribution of benefits and taxes, we follow Lambert and Pfähler (1988) and decompose the overall redistributive effects shown in Equations (2) and (3) in a vertical equity (VE) effect and a RR that captures the impact of individuals that may swap positions in the income ranking before and after transfers and taxes:

$$\mathrm{RE} = \mathrm{VE} - \mathrm{RR} \tag{4}$$

The VE effect measures the total reduction of inequality that would occur if there were no reranking of income units and can be decomposed to highlight the contribution of each tax–benefit instrument ($i = 1 \ldots I$) in terms of average rate effect and progressivity. The decomposition of the difference between the Gini before redistribution and after redistribution takes the form:

$$VE = \frac{1}{(1-g)} \sum_{i=1}^{I} g_i \prod_i^K \tag{5}$$

The overall 'net fiscal rate effect' is given by $g = t - s$, where $t$ is the average tax rate and $s$ is the average benefit rate. Overall progressivity is measured as the weighted sum of the progressivity of each tax/benefit instrument.

The results of this decomposition formula are shown in Figure 5. Social benefits achieve the highest redistribution followed by personal income taxes, with the exception of Italy where the opposite is true. This is in line with Figure 1; social benefits and income taxes are also largest in terms of budget. SICs, capital income taxes and wealth taxes have a limited impact, while indirect taxes negatively contribute to redistribution in all countries. Furthermore, the results show that the decrease in overall redistribution between the income and joint income–wealth approach reflects a decrease in redistributive effects of all instruments. In general, the redistributive effects of taxes are characterized by a relative larger

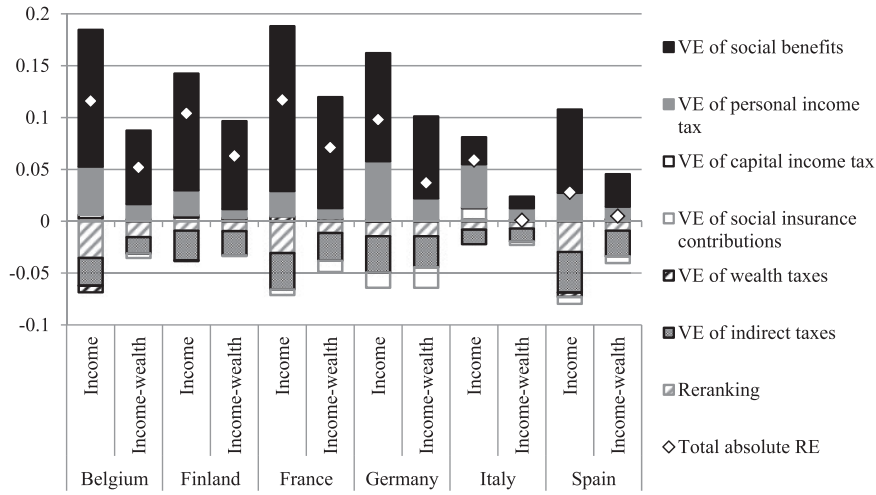


**Figure 5** Redistributive effects by tax–benefit instruments, overall population. *Notes*: Redistributive effects given by Gini differences as defined in Equations (2) and (3) and decomposed as in Equations (4) and (5). For France, the capital income tax is included in the personal income tax. Positive values reflect equalizing tax–benefit instruments, while negative values reflect disequalizing instruments. The total absolute redistributive effect presented by the diamond is then the result of the sum of these two opposing effects.
*Source*: Own calculations based on EM-HFCS.

reduction in the broader framework than those of social benefits. In the joint income–wealth framework, the redistributive effect of the personal income tax is about half that in the traditional income framework, while for social benefits it decreases by less than a third in all countries except Italy and Spain where the contribution of social benefits is already much lower than elsewhere in the income framework.

As formula (5) indicates the contribution to the overall redistribution of each tax–benefit instrument from Figure 5 is the result of the combination of the size of the respective instrument and its progressivity. First, the size of the instruments as a percentage of the underlying MPI is shown in Figure 6. As expected, personal income taxes are the largest redistributive instrument in all countries except France, where social benefits have a slightly larger size and Spain where indirect taxes are particularly important. In line with previous research (Verbist and Figari, 2014), personal income tax rates are high in Belgium and Finland, while SICs are important in Germany and France. Wealth taxes are in general small, with average tax rates in terms of income ranging from 3.5% in France and Spain (i.e. the two countries with a general wealth tax in place) to 0.6% in Finland (but not all wealth taxes are simulated, see Table A1 in the Supplementary Appendix). When wealth is included in the assessment framework the size of all instruments decreases due to the larger denominator. The size drops by 38% for Spain, 36% for Italy, 32% for Belgium, 26% for France, 21% for Germany and 19.5% for Finland. The size of wealth taxes decreases by a larger percentage as then not only the denominator changes, but also how wealth taxes are taken into account in the annuitization procedure (see Figure 4).

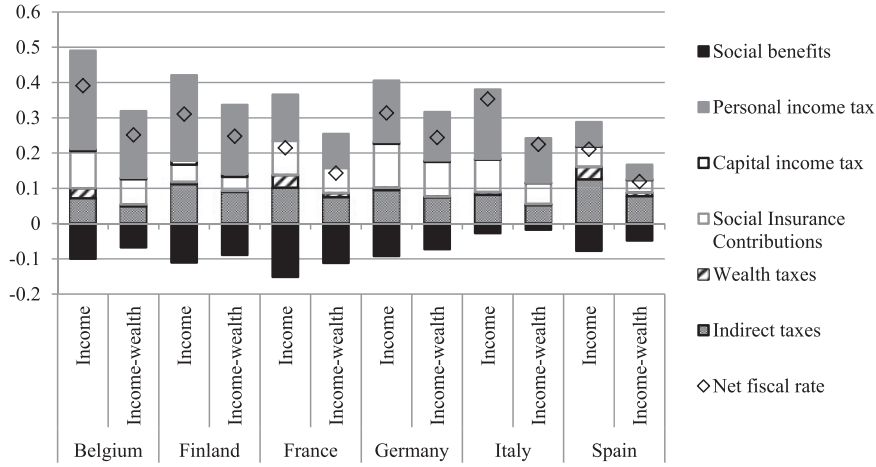


**Figure 6** Size of the tax–benefit instruments, overall population. *Notes*: Size of each instrument as a percentage of the underlying MPI plus GAW in the joint income–wealth framework. For France, the capital income tax is included in the personal income tax. Positive values reflect government revenues, while negative values reflect government expenses.
*Source*: Own calculations based on EM-HFCS.

The degree of progressivity of the instruments is presented in Table 3 by means of Kakwani indices given by the difference between the concentration index of taxes (transfers) and the Gini index of pre-taxes (pre-transfers) distribution. In line with previous studies, we find that social benefits are the most progressive instrument, followed by taxes on income. With the exception of Spain, taxes on capital income are more progressive than taxes on other types of income, which is what is expected given that capital income is in general more unequally distributed than income from work. Indirect taxes, on the other hand, have a clear regressive incidence in all countries. Evidence on SICs and wealth taxes is more mixed across the six countries, with regressivity in some cases and progressivity in others. Indeed, when assessed against the income distribution wealth taxes are regressive in Belgium, Finland and Spain, while they are progressive in France and Italy and proportional in Germany. Such a different pattern observed across countries is not yet investigated in the fiscal literature and might provide novel insights in the design of new fiscal and social policies which could give more prominence to wealth in the definition of ability to pay taxes and benefit eligibility.

The comparison of the two living standards frameworks shows that social benefits remain relatively strongly pro-poor when assessed against the joint income–wealth distribution, sometimes even more so than by the distribution of income alone. This implies that those receiving social transfers such as unemployment benefits are typically households with both low incomes and low wealth, such that they are concentrated at the very bottom of the joint distribution. In contrast, the progressivity of personal income taxes drops relatively drastically between the income and joint income–wealth frameworks. Capital income taxes become slightly more progressive when evaluated against the joint income–wealth distribution than against the income distribution in Finland and Italy, while the opposite is true for Belgium and Germany and the same pro-poorness is found for Spain. Indirect taxes are even

**Table 3** Progressivity of tax–benefit instruments (Kakwani indices), overall population

| Country/redistributive instrument | Income framework | Joint income–wealth framework |
|---|---|---|
| Belgium | | |
| Social benefits | 0.809 (0.018) | 0.787 (0.018) |
| Personal income tax | 0.102 (0.007) | 0.059 (0.010) |
| Capital income tax | 0.332 (0.047) | 0.327 (0.048) |
| SICs | 0.017 (0.007) | −0.047 (0.009) |
| Wealth taxes | −0.140 (0.034) | −0.004 (0.015) |
| Indirect taxes | −0.226 (0.005) | −0.241 (0.007) |
| *Total* | 0.236 (0.010) | 0.200 (0.011) |
| Finland | | |
| Social benefits | 0.703 (0.006) | 0.719 (0.006) |
| Personal income tax | 0.068 (0.002) | 0.033 (0.002) |
| Capital income tax | 0.146 (0.013) | 0.225 (0.012) |
| SICs | 0.050 (0.003) | −0.014 (0.003) |
| Wealth taxes | −0.080 (0.005) | 0.126 (0.004) |
| Indirect taxes | −0.177 (0.001) | −0.196 (0.002) |
| *Total* | 0.251 (0.004) | 0.220 (0.004) |
| France | | |
| Social benefits | 0.826 (0.005) | 0.824 (0.006) |
| Personal & capital income tax | 0.147 (0.002) | 0.089 (0.005) |
| SICs | −0.043 (0.003) | −0.129 (0.004) |
| Wealth taxes | 0.103 (0.013) | 0.210 (0.007) |
| Indirect taxes | −0.271 (0.002) | −0.306 (0.003) |
| *Total* | 0.541 (0.011) | 0.493 (0.012) |
| Germany | | |
| Social benefits | 0.779 (0.015) | 0.824 (0.015) |
| Personal income tax | 0.219 (0.003) | 0.114 (0.009) |
| Capital income tax | 0.293 (0.033) | 0.179 (0.046) |
| SICs | −0.081 (0.005) | −0.152 (0.007) |
| Wealth taxes | 0.001 (0.030) | 0.160 (0.012) |
| Indirect taxes | −0.254 (0.004) | −0.303 (0.006) |
| *Total* | 0.246 (0.009) | 0.159 (0.012) |
| Italy | | |
| Social benefits | 0.620 (0.045) | 0.499 (0.039) |
| Personal income tax | 0.137 (0.002) | 0.067 (0.004) |
| Capital income tax | 0.243 (0.018) | 0.281 (0.013) |
| SICs | 0.077 (0.004) | −0.045 (0.006) |
| Wealth taxes | 0.137 (0.019) | 0.268 (0.010) |
| Indirect taxes | −0.112 (0.002) | −0.184 (0.004) |
| *Total* | 0.123 (0.003) | 0.027 (0.005) |
| Spain | | |
| Social benefits | 0.822 (0.015) | 0.579 (0.018) |
| Personal income tax | 0.316 (0.006) | 0.249 (0.008) |
| Capital income tax | 0.203 (0.021) | 0.229 (0.025) |
| SICs | −0.092 (0.008) | −0.164 (0.008) |
| Wealth taxes | −0.098 (0.027) | 0.165 (0.009) |

*continued*

**Table 3** *Continued*

| Country/redistributive instrument | Income framework | Joint income–wealth framework |
|---|---|---|
| Indirect taxes | −0.245 (0.003) | −0.279 (0.003) |
| Total | 0.215 (0.011) | 0.104 (0.010) |

*Notes*: A positive Kakwani index refers to a pro-poor instrument. For social benefits, this means that the Kakwani reflects the difference between the Gini of market + public pension income and the concentration coefficient of benefits ($G_{MPI} - C_B$). Standard errors are shown between parentheses. All Kakwani indices are statistically significant at the 1% level with the exception of the wealth taxes of Belgium in the joint income–wealth framework and the wealth taxes of Germany in the income framework.
*Source*: Own calculations based on EM-HFCS.

more regressive when assessed in the joint income–wealth framework. As expected, wealth taxes become more pro-poor when wealth is included in the ranking variable (or less regressive in the case of Belgium). As a result, wealth taxes are more progressive than personal income taxes in Finland, France, Germany and Italy, while the opposite is true for Belgium and Spain.

Looking at alternative redistribution indices that put more weight on either the top or the bottom of the distribution (e.g. S-Gini indicator), the emerging relative redistributive effects are very similar as for the conventional Gini coefficient; welfare states are less redistributive when evaluated against the joint distribution of income and wealth compared with income alone (see Tables A2 and A3 in the Supplementary Appendix).

Finally, we also perform a sensitivity analysis considering only liquid assets for the annuitization as it implicitly assumes that income and wealth are perfectly fungible, while the conversion of non-liquid assets into cash is typically associated with a certain cost. As expected, the difference between the income and joint income–liquid assets frameworks is relatively small as a consequence of the fact that most households' wealth mainly consists of real estate wealth and/or that liquid assets are more strongly correlated with income than real assets (see Tables A4 and A5 in the Supplementary Appendix).

## 5. Decomposition by age

Age plays an important role when the redistributive effects assessed against joint income–wealth are compared with the traditional income approach. Due to the life cycle character of wealth accumulation, the elderly typically own large wealth. At the same time, they have short life expectancies resulting in relatively large annuities added to income, which in turn leads to high reranking among the elderly between the income and wealth distributions. However, the annuitization procedure does not take into account the large savings potential of non-elderly households. It is not likely that they will only have their current wealth available to annuitize until death; most of them will have plenty of opportunities throughout their working lives to accumulate wealth above and beyond the mere interest rate that is applied in the annuitization, for instance, by investing in real estate or the receipt of inheritances and gifts. Together with the previously mentioned issue of whether or not to treat

**Table 4** Overall redistributive effects of tax–benefit system, elderly vs. non-elderly population

| | Non-elderly | | | | | | | Elderly | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | Gini MI | Gini MPI | Gini CI | Abs. RE (MI−CI) | Rel. RE (as % of Gini MI) | Abs. RE (MPI−CI) | Rel. RE (as % of Gini MPI) | Gini MI | Gini MPI | Gini CI | Abs. RE (MI − CI) | Rel. RE (as % of Gini MI) | Abs. RE (MPI − CI) | Rel. RE (as % of Gini MPI) |
| Income framework | | | | | | | | | | | | | | |
| Belgium | 0.498 | 0.480 | 0.345 | 0.153 | 30.72 | 0.135 | 28.13 | 0.872 | 0.395 | 0.395 | 0.477 | 54.7 | 0.000 | 0 |
| | (0.013) | (0.013) | (0.011) | (0.006) | | (0.005) | | (0.022) | (0.033) | (0.042) | (0.034) | | (0.017) | |
| Finland | 0.369 | 0.368 | 0.257 | 0.112 | 30.35 | 0.111 | 30.16 | 0.357 | 0.299 | 0.236 | 0.121 | 33.89 | 0.063 | 21.07 |
| | (0.003) | (0.003) | (0.002) | (0.001) | | (0.001) | | (0.007) | (0.007) | (0.006) | (0.004) | | (0.002) | |
| France | 0.470 | 0.429 | 0.302 | 0.168 | 35.74 | 0.127 | 29.6 | 0.811 | 0.370 | 0.310 | 0.501 | 61.78 | 0.060 | 16.22 |
| | (0.003) | (0.003) | (0.003) | (0.002) | | (0.002) | | (0.008) | (0.007) | (0.006) | (0.007) | | (0.004) | |
| Germany | 0.448 | 0.432 | 0.321 | 0.127 | 28.35 | 0.111 | 25.69 | 0.789 | 0.339 | 0.314 | 0.475 | 60.2 | 0.025 | 7.37 |
| | (0.006) | (0.006) | (0.005) | (0.004) | | (0.004) | | (0.013) | (0.009) | (0.007) | (0.013) | | (0.003) | |
| Italy | 0.433 | 0.381 | 0.323 | 0.110 | 25.4 | 0.058 | 15.22 | 0.828 | 0.337 | 0.274 | 0.554 | 66.91 | 0.063 | 18.69 |
| | (0.004) | (0.004) | (0.003) | (0.002) | | (0.001) | | (0.007) | (0.007) | (0.006) | (0.007) | | (0.003) | |
| Spain | 0.419 | 0.395 | 0.385 | 0.034 | 8.11 | 0.010 | 2.53 | 0.787 | 0.449 | 0.335 | 0.452 | 57.43 | 0.114 | 25.39 |
| | (0.007) | (0.007) | (0.007) | (0.003) | | (0.003) | | (0.014) | (0.011) | (0.011) | (0.012) | | (0.008) | |
| | Gini MI + GAW | Gini MPI + GAW | Gini CI + NAW | Abs. RE (MI + GAW − CI + NAW) | Rel. RE (as % of Gini MI + GAW) | Abs. RE (MPI + GAW − CI + NAW) | Rel. RE (as % of Gini MPI + GAW) | Gini MI + GAW | Gini MPI + GAW | Gini CI + NAW | Abs. RE (MI + GAW − CI + NAW) | Rel. RE (as % of Gini MI + GAW) | Abs. RE (MPI + GAW − CI + NAW) | Rel. RE (as % of Gini MPI + GAW) |
| Joint income–wealth framework | | | | | | | | | | | | | | |
| Belgium | 0.466 | 0.458 | 0.374 | 0.092 | 19.74 | 0.084 | 18.34 | 0.537 | 0.415 | 0.430 | 0.107 | 19.93 | −0.015 | −3.61 |
| | (0.010) | (0.010) | (0.007) | (0.005) | | (0.005) | | (0.015) | (0.014) | (0.014) | (0.005) | | (0.004) | |
| Finland | 0.370 | 0.371 | 0.295 | 0.075 | 20.27 | 0.076 | 20.49 | 0.344 | 0.316 | 0.303 | 0.041 | 11.92 | 0.013 | 4.11 |
| | (0.003) | (0.003) | (0.002) | (0.001) | | (0.001) | | (0.006) | (0.006) | (0.005) | (0.003) | | (0.002) | |
| France | 0.456 | 0.442 | 0.356 | 0.100 | 21.93 | 0.086 | 19.46 | 0.598 | 0.417 | 0.401 | 0.197 | 32.94 | 0.016 | 3.84 |
| | (0.004) | (0.004) | (0.004) | (0.002) | | (0.002) | | (0.007) | (0.006) | (0.006) | (0.004) | | (0.002) | |
| Germany | 0.473 | 0.464 | 0.407 | 0.066 | 13.95 | 0.057 | 12.28 | 0.620 | 0.403 | 0.419 | 0.201 | 32.42 | −0.016 | −3.97 |
| | (0.008) | (0.008) | (0.010) | (0.005) | | (0.005) | | (0.013) | (0.009) | (0.010) | (0.008) | | (0.004) | |
| Italy | 0.435 | 0.414 | 0.405 | 0.030 | 6.9 | 0.009 | 2.17 | 0.553 | 0.414 | 0.421 | 0.132 | 23.87 | −0.007 | −1.69 |
| | (0.005) | (0.005) | (0.006) | (0.002) | | (0.002) | | (0.012) | (0.010) | (0.011) | (0.004) | | (0.002) | |
| Spain | 0.411 | 0.407 | 0.402 | 0.009 | 2.19 | 0.005 | 1.23 | 0.500 | 0.427 | 0.396 | 0.104 | 20.8 | 0.031 | 7.26 |
| | (0.007) | (0.007) | (0.006) | (0.002) | | (0.001) | | (0.009) | (0.008) | (0.007) | (0.004) | | (0.003) | |

*Notes:* RE, redistributive effect given by Gini differences as defined in Equations (2) and (3). Standard errors are shown between parentheses. All redistributive effects are statistically significant at the 1% level, with the exception of the Belgian redistributive effect between MPI and CI for the elderly in the income framework. *Source*: Own calculations based on EM-HFCS.

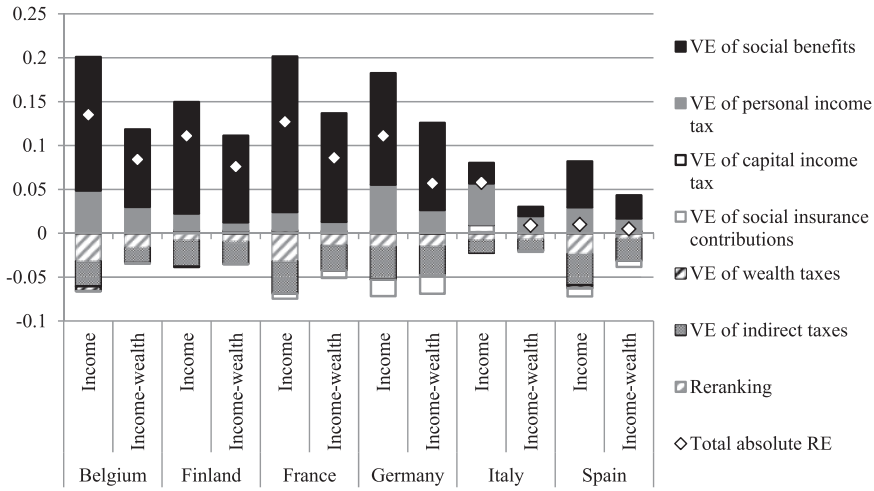


**Figure 7** Redistributive effects by tax–benefit instruments, non-elderly population. *Notes*: Redistributive effects given by Gini differences as defined in Equations (2) and (3) and decomposed as in Equations (4) and (5). For France, the capital income tax is included in the personal income tax. Positive values reflect equalizing tax–benefit instruments, while negative values reflect disequalizing instruments. The total absolute redistributive effect presented by the diamond is then the result of the sum of these two opposing effects.
*Source*: Own calculations based on EM-HFCS.

pensions as social transfer, these aspects imply that the situation of the elderly is very different and therefore hard to compare with that of the non-elderly.

Therefore, Table 4 presents Gini coefficients and redistributive effects for the elderly and non-elderly separately, again comparing the two assessment frameworks. In general, we find that inequality is considerably lower among the elderly than among their younger counterparts. Since elderly inequality is already very low for the original income concept, there is much less need for redistribution, which is confirmed by the fact that redistributive effects are lower than for the non-elderly. Exceptions are Italy and Spain, two countries characterized by relatively less generous redistributive systems for the non-elderly population. As before, the inclusion of wealth information results in an increase in the level of both before and after inequality and lower redistributive effects. Wealth holdings are relatively more important for the elderly which implies that the redistributive effects of the elderly are much stronger affected by the broader reference framework than those of the non-elderly.

In Figure 7, we present the contribution to the redistributive effects of each separate tax–benefit instrument as in Figure 5, but this time only the non-elderly are included. We largely find the same trends as for the total population; social benefits achieve the highest redistribution in all countries except Italy, and also personal income taxes have an important redistributive effect. Indirect taxes negatively contribute to redistribution, while SICs, capital income and wealth taxes have a very small effect. Again the redistributive effects of all instruments decrease when wealth is taken into account to determine living standards. As for the total population, wealth taxes have a negative redistributive impact in Belgium, while they contribute positively to redistribution (but to a very limited extent) in France and Italy. Also the

further decomposition in terms of size and progressivity components remains largely similar when considering only the non-elderly population (See Table A6 in the Supplementary Appendix). Hence, although reranking between the income and wealth distributions is more significant among the elderly, taking into account wealth information results in lower redistributive effects irrespective of which of the three approaches to deal with the specific elderly issues is used; our results are robust to whether or not the elderly are included and whether pensions are included as part of MI or of the redistributive process.

## 6. Conclusion

In the last decades, there has been a renewed interest in inequality. Various studies have pointed towards increases in inequality in both income and wealth. Rising MI inequalities have only partially been offset by the redistributive effects of taxes and transfers (see e.g. OECD, 2011, 2015). This assessment, however, depends on the framework used to evaluate the redistributive effect. Consensus grows among scholars that income is a too narrow concept to assess living standards. In this article, we argue that also wealth should be incorporated and, hence, we assess redistributive instruments against the joint distribution of income and wealth. We also broaden the scope of tax–benefit instruments considered in our analysis with respect to the existing literature by including taxes related to wealth and indirect taxes.

We verified the hypothesis according to which welfare states across Europe are less redistributive when evaluated against the joint income–wealth framework than if considered under a partial income perspective only. Interestingly, this is the case for all tax-transfer instruments we consider. This follows on the one hand from the fact that the size of the redistributive instruments is smaller when using the joint income–wealth framework, and the other hand from a lower degree of progressivity. As taxes and benefits are largely income-related, their size is relatively smaller when measured against a living standards concept that is broadened with wealth. Existing wealth taxes are indeed relatively small in size, and thus cannot have a large redistributive impact; this illustrates that wealth considerations are largely absent when designing redistributive instruments. Also progressivity turns out to be lower when moving from the income to the joint income–wealth framework. In particular, personal income taxes and SICs are not as progressive as they are traditionally thought to be as they are levied on those with the highest labour incomes, which are not necessarily those with the highest wealth. The hypothesis about indirect taxes regressivity is confirmed: indirect taxes are not only regressive when assessed against income, but even more so when also wealth is taken into account. On the contrary, the hypothesis of progressivity of wealth taxes is not confirmed. Indeed, currently wealth taxes are hardly redistributive not only because they are very small in size, but in some countries, they are also proportional or even regressive. Moreover, although capital income taxes are more progressive than personal income taxes, they also achieve almost no redistribution because they are too small in size. Yet, social benefits do remain strongly pro-poor in the joint income–wealth framework. We also find that the strength of the impact of adding wealth information on redistributive outcomes may differ across countries depending on the level of wealth inequality and wealth taxation as well as the correlation between income and wealth.

Our analysis shows that the tax–benefit system is almost unilaterally focussed on reducing income inequality, while wealth considerations are largely absent. Our integration of the

HFCS data in EUROMOD raises interesting future research possibilities on potential wealth policy reforms and their distributive, work incentive and budgetary consequences in a cross-country perspective. These are highly relevant for policy makers too. Welfare states may increase their redistributive efforts in terms of overall inequality by including the wealth perspective in the design of the tax–benefit system. First, regarding the current debate on wealth taxation there is a special focus on policy reforms aimed at shifting some of the tax burden from labour to wealth taxation as well as the potential of wealth taxation to raise new government revenues in order to address current fiscal imbalances. Secondly, the broader income–wealth framework can imply new insights for social policy design. While social policies have traditionally focused on income maintenance, it is argued that encouraging asset accumulation among the poor is a potential new social policy strategy complementing existing ones. These so-called 'asset-based social policies' provide incentives to households to build up savings and assets. The policies that currently exist in most European countries typically encourage asset accumulation through tax incentives, which often make them unavailable for the poor (Kuypers, 2018).

## Supplementary material

Supplementary material is available at *SOCECO* online.

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