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*Sarah Kuypers and Ive Marx*

**Working Paper**
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# POVERTY IN THE EU USING AUGMENTED MEASURES OF FINANCIAL RESOURCES: THE ROLE OF ASSETS AND DEBT

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## Abstract

Poverty research in the rich world overwhelmingly relies on income-based measures despite their clear limitations. Households may have significant savings and assets that they can draw on to boost their living standards, but may also have debts that depress the living standard they can actually achieve with their disposable income. Using data from the Eurosystem Household Finance and Consumption Survey (HFCS) this paper offers a picture of poverty in 17 EU countries that takes into account assets and debt, using various approaches. While earlier studies have found that poverty rates tend to be lower when wealth is taken into account, this study highlights the situation of those who become or remain poor even when savings and assets are included. It focusses both on within country patterns of joint income-wealth poverty as cross-country differences. It is shown that the elderly are generally less prone to being poor once assets are accounted for. However, for renter households with a young, female, low educated, unemployed or inactive and single head, the risk of being poor when assets and debt are accounted for remains high and in some cases even increases. That is generally the case because they have few assets, rather than because of high debts. The substantial variation in poverty rates observed across countries can to some extent be accounted for by socio-demographic factors but a lot of variation still remains unaccounted for.

## Introduction

Income, usually household disposable income adjusted in some way for household size and composition, is the workhorse variable in most contemporary poverty research. Yet, despite their widespread use income-based poverty measures have some well-known limitations. For instance, apart from the income they may generate, assets and savings are not taken into account. Previous research has discussed some of the ways asset ownership matters for living standards and for social and psychological wellbeing (Killewald et al., 2017; Lerman & McKernan, 2008). Since income and assets are imperfectly correlated it is crucial to take this information into account when determining who is poor or financially vulnerable (Kuypers & Marx, 2019). Previous studies (e.g. Brandolini et al., 2010; Kuypers & Marx, 2018) suggest that poverty rates are lower when net wealth (i.e. assets minus debt) is taken into account as several households with an income below the poverty line own a sufficient amount of assets and savings to lift them above the poverty line. This certainly matters for cost-effective and fair minimum income protection. The Covid-19 pandemic has magnified the role of asset holdings in cushioning severe negative income shocks, as the economic crisis has often hit workers loosely protected by the social safety net (e.g. self-employed, gig workers). Yet, households may also have debts that weigh severely on the living standard they can realise with their income. In

these cases including net wealth in fact shows that some households fall below the poverty line or have a larger poverty gap because their debt is larger than their assets.

This paper contributes to the literature in several ways. First, it offers a picture of poverty in Europe taking into account assets and debt, using various approaches. While earlier studies have focused on a single or a few country case studies (e.g. Azpitarte, 2012; Brandolini et al., 2010; Kuypers & Marx, 2018), this is one of the first papers to provide joint income-wealth poverty estimates for a set of 17 EU countries (Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Poland, Portugal, Slovak Republic, Slovenia, Spain). These countries differ in income poverty rates, the levels and distributions of wealth as well as the extent to which income and wealth are correlated (Table A.1 in Appendix 1), hence showing the effects of including wealth in poverty measurement in varying institutional settings. Second, while previous studies have mainly focused on the extent to which poverty decreases, we rather highlight the situation of those that become or remain poor even when wealth is included. We show the socio-demographic profile of those households who are both income and wealth poor, which slightly differs from those categorised as income poor as traditionally measured. Furthermore, we show to which extent wealth poverty can be attributed to households owning few assets and/or needing to pay off large amounts of debt. Making this distinction is very important as they may imply very different policy actions, i.e. state investment in asset-building policies versus debt relief programs. Finally, this paper takes a first step in explaining cross-country variation in joint income-wealth poverty rates, based on decompositions that distinguish between differences in the countries' socio-demographic structure and other country level factors (such as institutional, economic, historical and cultural factors).

This paper is organised as follows. In Section 2 we briefly explain the different approaches to measure joint income-wealth poverty and provide an overview of previous studies. The data and methods are discussed in Section 3. In Section 4 we present joint income-wealth poverty figures for the total population as well as by age groups (children, active age, elderly). In Section 5 we focus on explaining poverty patterns within countries by showing who remains (or becomes) poor when wealth is accounted for (i.e. socio-demographic profile) and why they are poor (i.e. low assets and/or high debt). Explaining cross-country variation in joint income-wealth poverty rates is discussed in Section 6. The last section concludes and puts forward some policy recommendations.

## Literature review

This paper provides a picture of poverty in Europe based on augmented measures of financial resources which include not only income, but also assets and debt. In European and other developed countries financial wellbeing and poverty is traditionally measured using disposable household incomes adjusted for household size. Gradually, income based measures have been complemented by material deprivation indicators. However, both have important limitations. Income measures only capture the income generating function of assets (i.e. the fact that assets yield capital income). Yet assets also provide an insurance against income and consumption shocks, they constitute collateral to borrow against and asset ownership is associated with economic and political power. Moreover, wealth also has an effect – independently from income – on subjective well-being and satisfaction of

life (D'Ambrosio et al., 2009; Headey & Wooden, 2004; Headey et al., 2008). Material deprivation indicators take account of assets only insofar they actually contribute to the (potential) purchase of the items included in the indicator. Perhaps most importantly, both income and material deprivation indicators neglect the potential negative effects of debt. While public perception and the experience of many people is that debt is one of the most serious problems facing low-income people, debt is still the missing variable in poverty research. Large debt burdens hamper savings possibilities and for people living on a low income existing debt can spiral out of control when faced with events such as divorce or job loss. Moreover, high indebtedness also has a profound impact on social and psychological well-being (Fitch et al., 2011).

Hence, income measures overstate poverty among households with low income but median to high net wealth (i.e. assets minus debt), while they overlook the financial precarious situation of households with incomes above the poverty line but with very low assets or bearing a large debt burden. For those who are poor in both dimensions combining them in one indicator acknowledges the interdependence between them and the fact that not having enough of each resource reinforces vulnerability (Keister & Lee, 2017; Kuypers & Marx, 2019). Given the fact that income and wealth are far from perfectly correlated suggests that poverty rates and also the socio-demographic profile of those in poverty might be relatively different when wealth is included. Therefore, an expanding literature is arguing in favour of combining information on income and net wealth to study well-being and poverty (e.g. Jäntti et al., 2008; OECD, 2013; Stiglitz et al., 2009).

Two main approaches have been proposed. The first approach, developed by Weisbrod & Hansen (1968), integrates income and wealth into a single indicator by transforming the stock of wealth into an annual annuity and adding it to yearly income:

$$AY_t = Y_t + \left[\frac{\rho}{1-(1+\rho)^{-n}}\right] NW_{t-1}$$

$$n = T\ for\ singles, \qquad T_1 + (T - T_1)b\ for\ couples$$

In this formula $AY_t$ refers to annuitized income in year $t$, $Y_t$ equals income received in year $t$, $NW_{t-1}$ is net wealth held at the beginning of the year and $\rho$ and $n$ are the interest rate and length of the annuity respectively. The latter is expressed in terms of life expectancies by country, age and gender, where $T_1$ refers to time to death of the person who dies first, $T$ time to death of the survivor and $b$ is the reduction in the equivalence scale coefficient which results from the death of the first person. Income ($Y_t$) should be interpreted as net of the yield from net wealth because this yield would be lost if net worth is depleted (Weisbrod & Hansen, 1968, p.1317).

The second approach applies a two-dimensional framework by applying a separate poverty line to each dimension and counting the number of dimensions in which people are poor. In this framework income poverty is defined and calculated as traditionally done, while net wealth poverty is considered as having insufficient net wealth to live at a minimally acceptable living standard without any income for a certain period of time (Brandolini et al., 2010; Haveman & Wolff, 2004). Usually, this minimally acceptable living standard is defined as a percentage ($\zeta$) of the official income poverty line ($Z_t$):

$$Net\ wealth\ poverty: NW_{t-1} < \zeta Z_t$$

$$Income\ poverty: Y_t < Z - r_t NW_{t-1}$$

Four groups can be distinguished: (1) those who are income poor, but not wealth poor ('only income poor'), (2) those who are not income poor, but have low assets and/or high debt such that they are wealth poor ('only wealth poor')[1], (3) those who are poor in both dimensions ('twice poor') and (4) those who are neither income nor wealth poor. We refer to Brandolini et al. (2010) and Kuypers & Marx (2018) for a detailed discussion of the two approaches and the impact of methodological choices.

Table 1 provides a (non-exhaustive) list of recent studies that have applied these two approaches to study poverty. Most studies adopt the two-dimensional approach (or only study wealth poverty based on this methodology). In order to provide a broad perspective on joint income-wealth poverty we use both approaches. Also, most studies are limited to one or a few country case studies. In early applications the US was mostly used as case study, which is largely due to wealth data being available much sooner than in other countries. Müller & Schmidt (2018) and Balestra & Tonkin (2018) are the only two papers that provide estimates for an equally large variation of countries and the HFCS collectors' network also provides some brief insights (HFCN, 2016b). Yet, an important shortcoming is that they use the original HFCS incomes, which are gross of taxes and social insurance contributions. Since poverty rates are normally calculated based on disposable incomes we have simulated these using EUROMOD (see Methods section). The listed studies generally conclude the following: (1) poverty rates are lower when wealth is taken into account, (2) the decline in poverty rates is stronger for the elderly than for the non-elderly, and (3) the decline is stronger when housing wealth is taken into account compared to when only liquid or financial assets are accounted for (Kuypers & Marx, 2018). Hence, the focus lies primarily on the positive effects of asset ownership in that it lifts some households out of poverty. We rather highlight the situation of those that become or remain poor even when wealth is included. Finally, we are also one of the first papers to apply decomposition methods to explain the cross-country variation in wealth poverty rates. So far only Azpitarte (2012, 2011) and Rothwell & Giordono (forthcoming) have used such techniques in relation to wealth poverty, but they each only compare two countries.

[1] In the literature the only income poor are also referred to as the protected poor, while the only wealth poor are labelled vulnerable non-poor.

**Table 1. Overview of recent studies of wealth poverty and/or joint income-wealth poverty**[2]

| Study | Approach | Countries | Years | Income and wealth definition | Population | Factors studied |
|---|---|---|---|---|---|---|
| **Aratani & Chau (2010)** | Only wealth poverty | US | 2001, 2007 | Net wealth (with and without owner-occupied housing) & gross liquid assets | Families with children | Debt |
| **Azpitarte (2011)** | Only wealth poverty | ES, UK | 2002 for ES, 2000 for UK | Net wealth, net housing wealth & net non-housing wealth | All households | Socio-demographics |
| **Azpitarte (2012)** | Two-dimensional | ES, US | 2002 for ES, 2001 for US | Gross income, net wealth (with and without owner-occupied housing) | All households | Socio-demographics |
| **Balestra & Tonkin (2018)** | Two-dimensional | 28 OECD countries | Mostly 2015 | Gross/disposable income depending on country, net wealth & gross liquid assets | All households | Socio-demographics |
| **Blumenthal & Rothwell (2018)** | Income & wealth poverty (*) | Canada | 1999, 2012 | Disposable income, net wealth & gross liquid assets | Households with head 18-64 | Socio-demographics |
| **Brandolini et al. (2010)** | Both (**) | CA, FI, DE, IT, NO, SE, UK, US | 1998-2002 depending on country | Disposable income, net wealth & gross financial assets | All, households with head > 55 years | Sensitivity to interest rate and wealth concept |
| **Caner & Wolff (2004)** | Only wealth poverty | US | 1984, 1989, 1994, 1999 | Net wealth (with and without owner-occupied housing) & gross liquid assets | All households | Socio-demographics |
| **EUROSTAT (2013)** | Two-dimensional | 15 Euro Area countries | 1st HFCS wave (mostly 2010) | Disposable income, net wealth & net financial assets | All households | Results HFCS vs. imputed in SILC |
| **Gornick et al. (2009)** | Two-dimensional | US, UK, DE, IT, SE | 1999-2001 depending on country | Disposable income, net wealth | Older women | |
| **Haveman & Wolff (2004)** | Two-dimensional | US | 1983-2001 | Gross income, net wealth & gross liquid assets | All households | Socio-demographics |
| **Heady (2008)** | Three-dimensional (***) | Australia | 2005-2006 | Disposable income, net wealth | All households | |
| **HFCN (2016b)** | Two-dimensional | 20 Euro Area countries | 2nd HFCS wave (mostly 2014) | Gross income, gross financial assets | All households | Socio-demographics |

[2] See Table A.1. in the Appendix of Brandolini et al. (2010) for several older, and more limited, studies combining information on income and wealth.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Huang et al. (2013)** | Two-dimensional | China | 2002 | Disposable income, net wealth (with and without owner-occupied housing) & gross liquid assets | Urban households | Region & socio-demographics |
| **Kim & Kim (2013)** | Only wealth poverty | South Korea | 2007 | Net wealth & gross liquid assets | All households | Region & socio-demographics |
| **Kuypers & Marx (2018)** | Both | BE, DE | 2010 | Disposable income, net wealth (with and without owner-occupied housing) & gross liquid assets | All, active age, elderly | Sensitivity to parameter choices |
| **Müller & Schmidt (2018)** | Both | 15 Euro Area countries | 1st HFCS wave (mostly 2010) | Gross income, net wealth & net liquid assets | All households | Portfolio & socio-demographics |
| **Rothwell et al. (2020)** | Only wealth poverty | US, Canada | 1998/1999-2016 | Gross financial assets | Households with head 25-54 & below median market income | Welfare generosity & socio-demographics |
| **Rothwell & Robson (2018)** | Income & wealth poverty (*) | Canada | 1999, 2005, 2012 | Disposable income, net wealth & gross financial assets | Households with head <65 | Socio-demographics |
| **Van den Bosch (1998)** | Annuitization | BE | 1992 | Disposable income, net wealth (with and without owner-occupied housing) & gross financial assets | All, elderly vs non-elderly | |

Notes: (*) Both income and wealth poverty rates are shown, but not the intersection between the two as is done in the two-dimensional approach. (**) Both approaches are studied for FI, DE, IT and US, while for CA, NO, SE and UK only the two-dimensional approach is applied. (***) Includes consumption poverty as a third dimension. All studies rely on information on income and wealth at the household level.

Source: Authors' compilation Besides poverty measurement, similar indicators have been used to study affluence with the aim to differentiate between the 'elite' and 'super-elite' (Keister & Lee, 2017; Peichl & Pestel, 2013) and to study inequality and redistribution (Galluser & Krapf, 2019; Kuypers et al., 2020, 2019).

## Data and methods

We use data from the second wave of the Eurosystem Household Finance and Consumption Survey (HFCS). This is the first survey that provides combined information on incomes and wealth in a comparative way across European countries. We analyse 17 out of the 20 countries participating in the second wave: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Poland, Portugal, Slovak Republic, Slovenia, Spain. The Netherlands, Malta and Latvia are not included because of small sample sizes. In order to deal with item non-response, the HFCS applies a multiple imputation technique[3]. We present the mean over these imputations.

An important discussion in the literature is which assets and debts need to be taken into account in the net wealth concept. As can be seen in Table 1 most previous studies use total net wealth and/or gross liquid assets. Net wealth refers to the difference between all privately owned[4] assets and all liabilities. The concept of liquid assets[5] refers to the sum of all assets which can be easily transformed into cash. Liquid assets are usually studied gross of debts although there are some exceptions listed in Table 1. While the first provides information on the financial security of households in the long-run, the latter focuses on funds which are immediately available to households in times of need. The inclusion of owner-occupied housing and pension wealth is, however, hotly debated such that most studies use concepts of net wealth both including and excluding owner-occupied housing. Since we focus in the current paper on poverty and its relation to social policy, we decided to align the wealth definition to the one that is used in asset-tests of minimum income schemes. Hence we take into account those wealth components that households ought to spend down (partially) before becoming eligible to minimum income benefits. In most European countries the value of owner-occupied housing and private pensions are exempted from being considered in the asset test (see Marchal et al., 2020), not surprisingly the two asset components most often debated. Therefore, the wealth concept that is used in this paper excludes the net value of the owner-occupied home (i.e. value of the home less the value of the mortgage) and private pension savings. Rothwell et al. (2020) rely on a similar logic, but use gross financial assets in their calculations as this is the wealth concept relevant for most social benefits in the US and Canada. Interested readers can refer to Table A.2. in Appendix 1 for poverty rates calculated taking into account total net wealth.

Income refers to the sum of (self-)employment income, financial income, rental income, public and private pensions, public and private transfers and other types of income (financial and rental income are not included in the annuitization approach). Since the HFCS only covers these incomes gross of taxes and social security contributions, we have used the EU-wide tax-benefit microsimulation model EUROMOD to estimate disposable incomes. Incomes, assets and debts have been uprated from their survey reference period to price levels of 2017 such that 2017 policies are applied to simulate disposable incomes. A brief description of how disposable incomes have been derived is provided in

[3] For more information on the imputation strategy see HFCN (2016a). Finland, France, Italy and Ireland do not use multiple imputations.

[4] Public wealth such as entitlements to public pensions are not included.

[5] Some studies use financial assets rather than liquid assets. Although they largely overlap, the first may include less liquid financial assets such as private pensions and may exclude relatively liquid real assets such as vehicles.

Appendix 2, for more detailed information we refer to Boone et al., 2019). Both income and wealth are equivalised using the OECD modified equivalence scale[6].

Poverty rates are calculated as follows. For the income poverty rate we apply the EU at-risk-of-poverty line, defined as 60 percent of national median equivalised disposable income. The two approaches to joint income-wealth poverty are calculated based on the formulas above and applying the standard methodological choices of the literature. For the annuitization approach this means that the stock of wealth[7] is transformed into an annuity by applying a 2% interest rate ($\rho$) and life expectancies by country, age and gender ($n$) that were taken from EUROSTAT.[8] Typically the poverty line is kept at the same level as for traditional income poverty, which is in line with the idea that the current poverty line reflects a truly minimally acceptable living standard. Yet, it could also be argued that the poverty line should be adapted to the augmented concept as well (Brandolini et al., 2010). Since this distinction has an important effect on the obtained results (Kuypers & Marx, 2018), we show both options. Although some authors have used absolute poverty lines for wealth (e.g. Headey, 2008), we stick to relative poverty lines. In this way we adhere to the European Union's view on poverty as being relative and makes it easier to interpret the differences in poverty rates with traditional income poverty. Also, net wealth levels vary considerably across countries (Table A.1. in Appendix 1) such that it would be difficult to determine a poverty threshold. Hence, in that case the poverty line is set at 60% of the national median equivalised income + annuitized net wealth. In the two-dimensional approach the wealth poverty line is set at 1/4$^{th}$ of the income poverty line; i.e. households are considered wealth poor when they own insufficient wealth to be able to sustain a living standard at the income poverty line for three months. Although essentially arbitrary, the three-month poverty line is most often used. Table A.3. in Appendix 1 lists the country specific poverty lines.

In Section 5 we run a logistic regression to determine the socio-demographic profile of those at risk of joint income-wealth poverty. We include dummy variables for the age, gender, educational attainment and labour status of the household head, the household type and tenure status. Having a migrant background is not included because it is missing for Spain. Finally, in Section 6 we aim to explain the cross-country variation in poverty rates by decomposing them into a part that is explained by cross-country differences in the above socio-demographic characteristics and another residual part that covers all other possible explanatory factors, such as institutional, economic and cultural factors. In particular we apply a Blinder-Oaxaca decomposition for binary variables (Fairlie, 2005) and also further disaggregate the explained part into the separate contributions of each of the socio-demographic characteristics (see e.g. Sierminska & Doorley, 2018 for a more detailed explanation).

[6] There is no consensus in the literature on whether it is appropriate to apply an equivalence scale to wealth and if so which scale is relevant. Yet, when considering wealth as a resource supporting current consumption, as we do in this paper, it is generally considered appropriate to apply the same equivalence scale to income and wealth (OECD, 2013, p.178). The majority of literature also uses equivalence scales.

[7] The formula takes net wealth at the beginning of the income reference period, while the HFCS observes net wealth at the end or even several months after the income reference period. To tackle this issue we subtract from net wealth observed in the HFCS the amount of financial income that is received throughout the year as a proxy for the growth of net wealth.

[8] Since age is top coded at 85 years in the HFCS, we cannot assign the correct life expectancies to these individuals. Therefore we restrict our sample to households where both partners are maximum 84 years old.

## Patterns of joint income-wealth poverty in Europe

We first discuss poverty rates when applying the different approaches to joint income-wealth poverty. Table 2 shows the results for the total population as well as for each broad age group (children/active age/elderly).[9] In line with previous research we find that poverty rates for the total population as well as for each age group decrease when annuitized net wealth is added to income and compared to the same poverty line. Yet, there are large cross-country variations. For the total population, the headcount poverty rate decreases by between 0.1 percentage points in Finland and 3.9 percentage points in Cyprus, with a cross-country average of 2.1 percentage points. When using a fully relative approach, the poverty line increases (Table A.3. in Appendix 1). This results in higher poverty rates. For children and those at active age, poverty rates in the fully relative approach are higher than the conventional income poverty rates. This follows from the fact that wealth is far more unequally distributed than income. Only for the elderly do we find joint income-wealth poverty rates to be often lower than their income poverty rates. In Cyprus, France, Hungary, Slovak Republic, Slovenia and Spain elderly joint income-wealth poverty rates are also higher than the income poverty rate. In Poland it is the other way around; the elderly have higher poverty rates, while the active age and children have lower poverty rates. Hence, for the majority of the population the conclusion of the literature that poverty is lower when wealth is taken into account does not hold if a fully relative approach is chosen.

Applying the two-dimensional approach shows that on average about 55 percent of the income poor own sufficient assets to bridge a three-month period at the income poverty line. The remainder of the income poor do not. They are both income and asset poor and therefore the most vulnerable. Yet, again important differences exist across countries. Only about 27 percent of the income poor are also wealth poor in Spain, while this is more than 60 percent in Finland and Slovak Republic. Furthermore, between 7.6 percent of people in Spain and 33.5 percent in Finland are currently not regarded as poor, but they have little net wealth such that they are vulnerable to income or consumption shocks. Again, in most countries poverty is lower among the elderly than among their younger counterparts.

A cross-country comparison shows that the ranking of best performing countries remains relatively similar across the different approaches (scatterplots are presented in Figure A.1. in Appendix 1). For instance, Austria and Finland have low poverty rates in all approaches. Finland, interestingly, has the highest share of 'only net wealth poor'. In contrast, Italy, Ireland and Estonia score badly on all poverty approaches. Yet, interestingly countries with low income poverty rates do not necessarily have low wealth poverty rates and vice versa. Spain, for instance, has one of the highest income poverty rates, but a relatively low share of people who are both income and wealth poor.

[9] Children are defined as individuals aged less than 18 years, active age are individuals between 18 and 64 years old and elderly are individuals aged 65 and older. In contrast to the logistic regression, where we use the age of the household head, here the age of each individual is used.

**Table 2. Poverty rates, total population and by age group**

| Country | Age group | Income poverty | Income + annuitized net wealth poverty (same poverty line) | Income + annuitized net wealth poverty (adapted poverty line) | Multidimensional poverty | | |
|---|---|---|---|---|---|---|---|
| | | | | | Only income poor | Only net wealth poor | Twice poor |
| **Austria** | **Total** | **7.4%** | **6.3%** | **9.3%** | **4.7%** | **9.4%** | **2.7%** |
| | Children | 7.5% | 7.3% | 11.5% | 4.3% | 11.0% | 3.2% |
| | Active age | 7.2% | 6.7% | 9.3% | 4.2% | 9.1% | 3.1% |
| | Elderly | 7.8% | 3.9% | 7.2% | 6.6% | 8.7% | 1.2% |
| **Belgium** | **Total** | **14.3%** | **12.7%** | **16.3%** | **6.8%** | **11.4%** | **7.5%** |
| | Children | 17.8% | 15.7% | 20.5% | 7.6% | 14.3% | 10.2% |
| | Active age | 14.0% | 13.2% | 16.4% | 6.3% | 11.3% | 7.7% |
| | Elderly | 10.9% | 6.6% | 10.3% | 7.5% | 8.3% | 3.4% |
| **Cyprus** | **Total** | **18.5%** | **14.6%** | **21.0%** | **11.5%** | **9.1%** | **7.0%** |
| | Children | 20.9% | 17.1% | 23.6% | 11.2% | 9.1% | 9.7% |
| | Active age | 17.4% | 14.0% | 19.9% | 12.0% | 8.2% | 5.4% |
| | Elderly | 20.3% | 13.7% | 21.9% | 9.2% | 13.4% | 11.1% |
| **Estonia** | **Total** | **26.5%** | **22.8%** | **25.7%** | **14.6%** | **13.4%** | **12.0%** |
| | Children | 25.5% | 24.4% | 26.3% | 13.1% | 13.0% | 12.4% |
| | Active age | 23.8% | 21.6% | 23.9% | 12.4% | 14.7% | 11.4% |
| | Elderly | 37.9% | 25.6% | 31.7% | 24.4% | 8.6% | 13.5% |
| **Finland** | **Total** | **7.8%** | **7.8%** | **8.4%** | **2.9%** | **33.5%** | **5.0%** |
| | Children | 8.0% | 8.5% | 9.3% | 2.7% | 37.6% | 5.3% |
| | Active age | 8.4% | 8.6% | 9.1% | 2.8% | 35.4% | 5.6% |
| | Elderly | 5.6% | 4.1% | 4.8% | 3.4% | 22.2% | 2.2% |
| **France** | **Total** | **10.2%** | **9.6%** | **10.4%** | **6.8%** | **14.6%** | **3.4%** |
| | Children | 11.5% | 10.6% | 11.7% | 7.0% | 19.1% | 4.5% |
| | Active age | 11.1% | 10.5% | 11.3% | 7.4% | 14.6% | 3.6% |
| | Elderly | 4.9% | 4.8% | 5.0% | 3.9% | 8.4% | 1.0% |
| **Germany** | **Total** | **13.4%** | **12.4%** | **14.4%** | **6.5%** | **19.6%** | **6.9%** |
| | Children | 12.6% | 12.2% | 14.4% | 4.5% | 27.1% | 8.2% |
| | Active age | 11.7% | 11.2% | 13.1% | 5.9% | 21.0% | 5.8% |
| | Elderly | 19.9% | 16.5% | 18.5% | 10.5% | 8.3% | 9.4% |
| **Greece** | **Total** | **15.9%** | **14.5%** | **15.8%** | **8.2%** | **20.3%** | **7.7%** |
| | Children | 19.3% | 19.1% | 20.6% | 8.9% | 17.2% | 10.4% |
| | Active age | 17.2% | 15.7% | 17.2% | 9.1% | 19.6% | 8.2% |
| | Elderly | 8.2% | 5.8% | 6.3% | 4.5% | 25.9% | 3.8% |
| **Hungary** | **Total** | **17.4%** | **15.5%** | **18.2%** | **9.5%** | **18.6%** | **7.9%** |
| | Children | 21.3% | 19.7% | 22.6% | 10.5% | 16.2% | 10.7% |
| | Active age | 18.0% | 16.1% | 18.4% | 10.4% | 16.3% | 7.7% |
| | Elderly | 10.8% | 8.7% | 13.1% | 4.9% | 30.4% | 5.9% |
| **Ireland** | **Total** | **22.6%** | **20.0%** | **23.9%** | **11.9%** | **15.0%** | **10.7%** |
| | Children | 27.7% | 26.2% | 31.0% | 13.0% | 18.0% | 14.7% |
| | Active age | 22.3% | 20.5% | 23.7% | 11.6% | 15.2% | 10.7% |
| | Elderly | 16.4% | 7.9% | 14.1% | 11.9% | 9.4% | 4.5% |
| **Italy** | **Total** | **19.5%** | **17.9%** | **19.8%** | **9.5%** | **8.6%** | **10.0%** |
| | Children | 24.3% | 22.3% | 24.6% | 10.9% | 11.3% | 13.5% |
| | Active age | 20.5% | 19.2% | 21.1% | 10.1% | 8.2% | 10.4% |
| | Elderly | 12.3% | 9.8% | 11.5% | 6.4% | 7.8% | 5.9% |
| **Luxembourg** | **Total** | **12.8%** | **9.5%** | **17.7%** | **8.2%** | **9.3%** | **4.6%** |
| | Children | 15.1% | 10.9% | 22.2% | 8.6% | 14.3% | 6.5% |
| | Active age | 13.1% | 10.1% | 18.6% | 8.5% | 8.8% | 4.7% |
| | Elderly | 7.2% | 4.5% | 5.7% | 5.9% | 4.3% | 1.4% |
| **Poland** | **Total** | **16.4%** | **12.7%** | **16.2%** | **10.0%** | **21.8%** | **6.5%** |
| | Children | 15.6% | 11.6% | 15.0% | 9.2% | 22.9% | 6.3% |
| | Active age | 17.3% | 13.3% | 16.9% | 10.8% | 19.8% | 6.4% |
| | Elderly | 13.4% | 10.9% | 14.5% | 6.7% | 30.3% | 6.7% |
| **Portugal** | **Total** | **17.9%** | **15.3%** | **19.0%** | **8.6%** | **14.5%** | **9.4%** |
| | Children | 23.7% | 21.3% | 25.6% | 9.9% | 14.9% | 13.8% |
| | Active age | 18.4% | 15.8% | 19.7% | 9.1% | 14.0% | 9.3% |
| | Elderly | 10.6% | 7.7% | 10.2% | 5.4% | 15.9% | 5.2% |
| **Slovak Republic** | **Total** | **14.8%** | **14.5%** | **15.5%** | **5.8%** | **18.3%** | **9.1%** |
| | Children | 20.5% | 19.5% | 20.3% | 7.3% | 16.6% | 13.2% |
| | Active age | 13.4% | 13.4% | 14.2% | 5.3% | 18.0% | 8.1% |
| | Elderly | 14.5% | 13.7% | 15.5% | 6.2% | 22.2% | 8.3% |
| **Slovenia** | **Total** | **8.3%** | **6.4%** | **9.5%** | **4.5%** | **19.6%** | **3.9%** |
| | Children | 2.1% | 1.6% | 2.8% | 1.2% | 21.8% | 0.9% |
| | Active age | 8.4% | 6.5% | 9.8% | 4.2% | 18.9% | 4.2% |
| | Elderly | 14.9% | 11.1% | 15.2% | 8.9% | 20.0% | 6.0% |
| **Spain** | **Total** | **21.0%** | **17.4%** | **24.0%** | **15.4%** | **7.6%** | **5.6%** |
| | Children | 30.7% | 24.9% | 33.5% | 22.9% | 4.5% | 7.7% |
| | Active age | 22.0% | 18.4% | 24.3% | 16.1% | 6.7% | 5.9% |
| | Elderly | 5.4% | 4.1% | 11.6% | 3.7% | 15.0% | 1.6% |

Source: Authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

## Within country explanations of joint income-wealth poverty

In order to explain joint income-wealth poverty patterns within countries, we need to address two main questions. First, who remains (or becomes) poor even when net wealth is accounted for? And why are they poor in that approach? Regarding the first question, we already saw that age is an important determinant of poverty risk when wealth is taken into account. Table 3 provides further insight into the socio-demographic profile of joint income-wealth poverty as compared to conventional income poverty. In particular, logistic regressions are run on the annuitized approach with the adjusted poverty line, the twice poor rate and the income poverty rate. We find that particularly households who are tenants or free users of the residence they live in and those who have a young, female, low educated, unemployed or inactive and single household head are at high risk of remaining or becoming poor even when net wealth is taken into account. The risk profile is similar to the one for income poverty, but the correlation of some characteristics is stronger or weaker. For instance, the education gradient is more outspoken when net wealth is included, as is the case for tenure status. Since we do not take into account the value of the main residence in net wealth the latter implies that tenants do not make up the wealth they are missing in real terms by owning financial wealth. In contrast, the self-employed generally have a high risk of income poverty, but their risk decreases substantially when net wealth is accounted for. They have a much lower risk of being twice poor than any other labour market status.

**Table 3. Socio-demographic profile of joint income-wealth poor (pooled across countries)**

| | Annuitized poor (adjusted poverty line) | | Twice poor | | Income poor | |
|---|---|---|---|---|---|---|
| **Age (ref:55-74 years)** | | | | | | |
| 16-34 years | 1.58 | *** | 1.27 | *** | 1.28 | *** |
| 35-54 years | 1.46 | *** | 1.29 | *** | 1.26 | *** |
| 75+ years | 0.66 | *** | 0.65 | *** | 0.83 | *** |
| **Gender (ref: male)** | 1.55 | *** | 1.58 | *** | 1.48 | *** |
| **Educational attainment (ref: tertiary)** | | | | | | |
| No or primary | 5.37 | *** | 7.33 | *** | 3.97 | *** |
| Secondary | 3.13 | *** | 3.70 | *** | 2.70 | *** |
| **Labour market status (ref: employee)** | | | | | | |
| Self-employed | 1.43 | *** | 0.66 | *** | 2.21 | *** |
| Unemployed | 8.75 | *** | 8.27 | *** | 8.90 | *** |
| Retired | 2.18 | *** | 2.31 | *** | 2.25 | *** |
| Inactive | 6.19 | *** | 6.33 | *** | 6.34 | *** |
| **Household type (ref: couple)** | | | | | | |
| Single | 2.11 | *** | 2.44 | *** | 2.18 | *** |
| Single parent | 1.63 | *** | 2.29 | *** | 1.68 | *** |
| Couple with children | 1.55 | *** | 1.88 | *** | 1.67 | *** |
| Other | 1.95 | *** | 2.37 | *** | 2.02 | *** |
| **Tenure status (ref: outright owner)** | | | | | | |
| Owner with mortgage | 0.99 | | 1.08 | | 0.87 | *** |
| Tennant/free user | 2.16 | *** | 3.53 | *** | 1.79 | *** |
| **Country (ref: Austria)** | | | | | | |
| Belgium | 2.34 | *** | 3.46 | *** | 2.46 | *** |
| Cyprus | 2.80 | *** | 2.99 | *** | 2.97 | *** |
| Estonia | 4.61 | *** | 7.25 | *** | 6.01 | *** |
| Finland | 0.80 | *** | 1.76 | *** | 0.96 | |
| France | 0.86 | ** | 0.84 | * | 1.13 | ** |
| Germany | 1.63 | *** | 2.47 | *** | 2.00 | *** |
| Greece | 1.75 | *** | 3.35 | *** | 2.14 | *** |
| Hungary | 2.99 | *** | 4.96 | *** | 3.43 | *** |
| Ireland | 3.30 | *** | 4.26 | *** | 3.81 | *** |
| Italy | 2.33 | *** | 4.01 | *** | 2.79 | *** |
| Luxembourg | 2.30 | *** | 1.67 | *** | 1.98 | *** |
| Poland | 2.19 | *** | 3.19 | *** | 2.75 | *** |
| Portugal | 1.77 | *** | 2.80 | *** | 2.20 | *** |
| Slovak Republic | 2.25 | *** | 6.24 | *** | 2.51 | *** |
| Slovenia | 1.06 | | 1.67 | *** | 1.11 | |
| Spain | 2.64 | *** | 1.48 | *** | 2.67 | *** |
| **Constant** | 0.01 | *** | 0.00 | *** | 0.01 | *** |
| $R^2$ | *0.1883* | | *0.2371* | | *0.1743* | |

Notes: Odds ratios are shown. *** significant at 1%, ** significant at 5%, * significant at 10%

Source: Authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

The second question we address in this section is the reason why these households remain (or become) poor when wealth is taken into account. Low net wealth may be the consequence of having low assets and/or having high debt. The overall poverty figures shown in Table 2 do not provide any information on this, but as they reflect very different precarious situations they require different policy responses. Households being wealth poor because of low assets may be supported by so-called asset-building policies, while those struggling mainly with high debt may benefit from debt relief programs. Therefore, Table 4 divides the overall poverty rates of the fully relative annuitization approach and the twice poor rate by main reason for being poor, i.e. reason for having low (or negative) net wealth. The division is made as follows: non-over-indebted households are those who have zero debt or a debt-to-

asset ratio lower than 75%[10], when the debt-to-asset ratio is higher than 75% but the household would no longer be regarded as poor if gross wealth would be used to calculate poverty rates (i.e. assets are sufficiently high to not be considered poor) they are labelled as over-indebted asset-non-poor, and when the debt-to-asset ratio is higher than 75% and the household would still be poor if gross wealth was used to calculate poverty they are labelled as over-indebted asset-poor. In other words, the first group has low assets, but no immediate debt issues, the second group has sufficient gross assets, but the high debt makes them wealth poor, while the last group has both low assets and high debt. Table 4 shows the incidence of these reasons. Although there is some cross-country variation, in all countries the majority of people who are counted as both income and wealth poor qualify as such because they have low assets. The second reason why they are counted as such is having both low assets and high debt. In particular, in the fully relative annuitization approach having low assets is the main reason for remaining poor for on average 78% of the joint income-wealth poor, while this is about 60% in case the twice poor rate is used. In other words, the majority would still be considered poor if they had no debt.

**Table 4. Reason for being joint income-wealth poor**

| | Annuitized poor (adapted poverty line) | | | | Twice poor | | | |
|---|---|---|---|---|---|---|---|---|
| | All | Non-over-indebted | Over-indebted asset-poor | Over-indebted asset-non-poor | All | Non-over-indebted | Over-indebted asset-poor | Over-indebted asset-non-poor |
| Austria | 9.3% | 7.2% | 1.9% | 0.2% | 2.7% | 1.7% | 0.8% | 0.2% |
| Belgium | 16.3% | 14.3% | 1.8% | 0.1% | 7.5% | 6.0% | 1.1% | 0.4% |
| Cyprus | 21.0% | 15.0% | 4.4% | 1.6% | 7.0% | 3.4% | 1.0% | 2.7% |
| Estonia | 25.7% | 22.5% | 3.1% | 0.1% | 12.0% | 8.9% | 2.8% | 0.3% |
| Finland | 8.4% | 5.2% | 2.5% | 0.7% | 5.0% | 2.6% | 1.4% | 1.0% |
| France | 10.4% | 9.2% | 0.7% | 0.5% | 3.4% | 2.4% | 0.3% | 0.6% |
| Germany | 14.4% | 11.0% | 2.8% | 0.5% | 6.9% | 4.2% | 2.2% | 0.4% |
| Greece | 15.8% | 12.0% | 3.7% | 0.1% | 7.7% | 4.4% | 2.8% | 0.5% |
| Hungary | 18.2% | 12.8% | 5.0% | 0.4% | 7.9% | 3.6% | 3.7% | 0.7% |
| Ireland | 23.9% | 19.3% | 4.2% | 0.3% | 10.7% | 6.3% | 3.4% | 1.0% |
| Italy | 19.8% | 16.7% | 3.1% | 0.0% | 10.0% | 6.9% | 2.5% | 0.5% |
| Luxembourg | 17.7% | 14.3% | 2.9% | 0.5% | 4.6% | 3.1% | 0.8% | 0.7% |
| Poland | 16.2% | 12.3% | 3.9% | 0.0% | 6.5% | 3.0% | 3.2% | 0.2% |
| Portugal | 19.0% | 15.6% | 3.2% | 0.2% | 9.4% | 6.6% | 2.4% | 0.4% |
| Slovak Republic | 15.5% | 8.9% | 6.6% | 0.0% | 9.1% | 2.9% | 5.8% | 0.4% |
| Slovenia | 9.5% | 7.4% | 1.9% | 0.2% | 3.9% | 2.4% | 1.3% | 0.2% |
| Spain | 24.0% | 21.0% | 2.4% | 0.6% | 5.6% | 3.7% | 1.0% | 0.8% |

Source: Authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

[10] A debt-to-asset ratio of more than 75% is generally considered the limit for being over-indebted (see for instance Balestra & Tonkin, 2018).

In Table A.4. in Appendix 1 we also provide the results of multinomial logistic regressions of socio-demographics on the different reasons for being joint income-wealth poor. It shows among others that the effect of education is lower for having high debt, but sufficient gross assets as main reason for being poor than for the other two reasons. The impact of unemployment or inactivity is strongest for the over-indebted asset-poor. The same is true for tenure status.

## Cross-country explanations of joint income-wealth poverty

As Table 2 shows there is substantial cross-country variation in the incidence of joint income-wealth poverty. In this section we study to which extent this variation can be explained by differences in the socio-demographic structure of the populations of these countries. As Table 3 showed, households who are tenants or free users and those who have a young, female, low educated, unemployed or inactive and single household head are at high risk of being poor. Hence, countries where relatively more of such people live might have higher wealth poverty rates. Besides socio-demographic characteristics also differences in institutional, economic and cultural factors can influence wealth poverty rates. Brady et al. (2017) refer to the first as prevalences, i.e. the share of the population belonging to a risk group, while the latter are considered the penalties, defined as the increased probability of poverty associated with belonging to a risk group. In order to differentiate between these two groups of explanatory factors we decompose the total difference in poverty rates between a base country and each other country ('raw difference') in an explained part (i.e. variation due to differences in socio-demographics) and a residual unexplained part (i.e. variation due to differences in other factors), where the first is further disaggregated to show the contribution of each characteristic.[11] For the base country we use Austria as it has the lowest poverty rate. Hence, the figures for the explained part provide counterfactual poverty rates, i.e. how poverty rates would change if the other countries would have the same socio-demographic structure as Austria.

The results of the decomposition are shown in Table 5. First, we find that in most cases less than a third of the poverty gap is explained by differences in socio-demographics or the explained effect goes in the opposite direction (i.e. negative explained difference). The latter implies that based on socio-demographics alone a smaller difference in poverty between Austria and the respective country is expected. In other words, in these cases country level factors increase the relative poverty risk in the respective country compared to Austria. The explained difference is higher than the raw difference for France in both poverty approaches and for Luxembourg and Spain for the twice poor rate. This means that the differences in socio-demographics would predict an even larger poverty gap with Austria than is actually observed such that country level factors reduce the relative poverty risk of those who are at high risk of being wealth poor in these countries. Finally, tenure status appears to be an important variable explaining poverty risks within countries (Table 3), but also between countries. For most countries tenure has a negative sign, such that it contributes to decreasing the gap in poverty rates with Austria, i.e. differences in tenure status result in lower poverty rates. Labour market status is generally the second most important household factor explaining differences in joint income-wealth

[11] We apply random sequencing to determine the separate contributions of the different characteristics.

poverty rates. While age is a relatively important factor explaining poverty risk within countries, it hardly explains differences between countries.

**Table 5. Cross-country decomposition of joint income-wealth poverty (base country: Austria)**

| | Annuitized poor (adjusted poverty line) | | | Twice poor | | |
|---|---|---|---|---|---|---|
| | absolute | | relative | absolute | | relative |
| **Belgium** | | | | | | |
| Raw difference | 7.01 | *** | | 4.80 | *** | |
| Explained difference | -0.38 | | -5% | 0.91 | * | 19% |
| Age | -0.01 | | 0% | 0.06 | | 1% |
| Gender | -0.16 | ** | -2% | 0.02 | | 0% |
| Education | -0.11 | | -2% | 1.24 | * | 26% |
| Labour market status | 2.23 | *** | 32% | 1.23 | *** | 26% |
| Household type | 0.10 | | 1% | 0.08 | | 2% |
| Tenure status | -2.42 | *** | -35% | -1.72 | *** | -36% |
| **Cyprus** | | | | | | |
| Raw difference | 11.70 | *** | | 4.31 | *** | |
| Explained difference | -0.06 | | -1% | 0.40 | | 9% |
| Age | 0.45 | | 4% | -0.22 | | -5% |
| Gender | 0.09 | * | 1% | -0.03 | | -1% |
| Education | 0.62 | | 5% | 3.16 | | 73% |
| Labour market status | 2.51 | *** | 21% | 1.08 | *** | 25% |
| Household type | -0.21 | | -2% | -0.38 | ** | -9% |
| Tenure status | -3.53 | *** | -30% | -3.20 | *** | -74% |
| **Estonia** | | | | | | |
| Raw difference | 16.40 | *** | | 9.23 | *** | |
| Explained difference | -0.53 | | -3% | -0.16 | | -2% |
| Age | 0.58 | | 4% | 0.06 | | 1% |
| Gender | 0.09 | | 1% | 0.00 | | 0% |
| Education | -0.17 | | -1% | 0.36 | * | 4% |
| Labour market status | 1.43 | *** | 9% | 1.11 | *** | 12% |
| Household type | 0.37 | | 2% | 0.14 | | 2% |
| Tenure status | -2.84 | *** | -17% | -1.83 | *** | -20% |
| **Finland** | | | | | | |
| Raw difference | -0.84 | | | 2.23 | *** | |
| Explained difference | 0.35 | | -42% | 0.86 | *** | 38% |
| Age | 0.38 | | -45% | -0.04 | | -2% |
| Gender | 0.02 | | -3% | 0.00 | | 0% |
| Education | -0.24 | | 28% | 0.36 | ** | 16% |
| Labour market status | 2.25 | *** | -270% | 1.61 | *** | 72% |
| Household type | 0.15 | | -18% | 0.18 | ** | 8% |
| Tenure status | -2.21 | *** | 265% | -1.25 | *** | -56% |
| **France** | | | | | | |
| Raw difference | 1.15 | | | 0.69 | * | |
| Explained difference | 2.78 | ** | 242% | 2.68 | ** | 391% |
| Age | 0.39 | | 34% | -0.04 | | -6% |
| Gender | 0.08 | | 7% | -0.03 | | -4% |
| Education | 0.38 | | 33% | 2.44 | * | 356% |
| Labour market status | 2.41 | *** | 210% | 1.31 | *** | 191% |
| Household type | 0.12 | | 10% | -0.11 | | -16% |
| Tenure status | -0.60 | *** | -53% | -0.89 | * | -129% |
| **Germany** | | | | | | |
| Raw difference | 5.09 | *** | | 4.18 | *** | |
| Explained difference | 1.06 | *** | 21% | 1.21 | *** | 29% |
| Age | 0.38 | | 7% | -0.01 | | 0% |
| Gender | 0.02 | | 0% | -0.01 | | 0% |
| Education | -0.06 | | -1% | 0.59 | ** | 14% |
| Labour market status | -0.02 | | 0% | 0.35 | * | 8% |
| Household type | 0.13 | | 3% | -0.03 | | -1% |
| Tenure status | 0.62 | *** | 12% | 0.32 | *** | 8% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Greece** | | | | | | |
| Raw difference | 6.56 | *** | | 5.02 | *** | |
| Explained difference | 1.18 | | 18% | 1.26 | | 25% |
| Age | 0.28 | | 4% | 0.02 | | 0% |
| Gender | -0.18 | ** | -3% | 0.02 | | 0% |
| Education | 0.68 | | 10% | 2.88 | | 57% |
| Labour market status | 2.73 | *** | 42% | 0.86 | *** | 17% |
| Household type | 0.02 | | 0% | -0.16 | | -3% |
| Tenure status | -2.35 | *** | -36% | -2.36 | ** | -47% |
| **Hungary** | | | | | | |
| Raw difference | 8.97 | *** | | 5.19 | *** | |
| Explained difference | -2.10 | *** | -23% | -1.24 | *** | -24% |
| Age | 0.17 | | 2% | 0.07 | | 1% |
| Gender | 0.11 | * | 1% | -0.01 | | 0% |
| Education | -0.15 | | -2% | 0.15 | | 3% |
| Labour market status | 0.88 | ** | 10% | 0.58 | *** | 11% |
| Household type | 0.19 | | 2% | -0.02 | | 0% |
| Tenure status | -3.29 | *** | -37% | -2.01 | *** | -39% |
| **Ireland** | | | | | | |
| Raw difference | 14.62 | *** | | 7.96 | *** | |
| Explained difference | 1.51 | | 10% | 1.79 | ** | 22% |
| Age | 0.50 | | 3% | 0.04 | | 0% |
| Gender | 0.07 | | 0% | -0.03 | | 0% |
| Education | 0.23 | | 2% | 2.00 | * | 25% |
| Labour market status | 3.60 | *** | 25% | 1.72 | *** | 22% |
| Household type | -0.16 | | -1% | -0.08 | | -1% |
| Tenure status | -2.74 | *** | -19% | -1.85 | *** | -23% |
| **Italy** | | | | | | |
| Raw difference | 10.52 | *** | | 7.26 | *** | |
| Explained difference | 0.46 | | 4% | 2.09 | | 29% |
| Age | -0.62 | | -6% | -0.08 | | -1% |
| Gender | -0.11 | ** | -1% | 0.00 | | 0% |
| Education | 0.87 | | 8% | 3.13 | * | 43% |
| Labour market status | 1.71 | *** | 16% | 0.96 | *** | 13% |
| Household type | 0.19 | | 2% | -0.02 | | 0% |
| Tenure status | -1.59 | *** | -15% | -1.90 | ** | -26% |
| **Luxembourg** | | | | | | |
| Raw difference | 8.43 | *** | | 1.90 | ** | |
| Explained difference | -0.96 | | -11% | 2.19 | | 115% |
| Age | 0.45 | | 5% | 0.15 | | 8% |
| Gender | -0.14 | ** | -2% | 0.02 | | 1% |
| Education | 0.60 | | 7% | 3.53 | * | 185% |
| Labour market status | -0.41 | | -5% | 0.07 | | 4% |
| Household type | 0.18 | | 2% | -0.04 | | -2% |
| Tenure status | -1.65 | *** | -20% | -1.54 | ** | -81% |
| **Poland** | | | | | | |
| Raw difference | 6.98 | *** | | 3.73 | *** | |
| Explained difference | -1.11 | | -16% | 0.21 | | 6% |
| Age | 0.53 | | 8% | 0.04 | | 1% |
| Gender | -0.04 | | -1% | 0.00 | | 0% |
| Education | 0.46 | | 7% | 1.88 | * | 50% |
| Labour market status | 0.41 | | 6% | 0.53 | *** | 14% |
| Household type | 0.17 | | 2% | 0.05 | | 1% |
| Tenure status | -2.65 | *** | -38% | -2.29 | *** | -61% |
| **Portugal** | | | | | | |
| Raw difference | 9.75 | *** | | 6.65 | *** | |
| Explained difference | 1.93 | | 20% | 4.37 | | 66% |
| Age | 0.14 | | 1% | -0.04 | | -1% |
| Gender | 0.08 | | 1% | -0.03 | | 0% |
| Education | 1.80 | | 18% | 6.72 | | 101% |
| Labour market status | 2.92 | *** | 30% | 1.58 | *** | 24% |
| Household type | -0.03 | | 0% | -0.09 | | -1% |
| Tenure status | -2.98 | *** | -31% | -3.78 | ** | -57% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Slovak Republic** | | | | | | |
| Raw difference | 6.24 | *** | | 6.34 | *** | |
| Explained difference | -1.26 | *** | -20% | -0.86 | *** | -14% |
| Age | 0.78 | ** | 13% | 0.29 | | 5% |
| Gender | -0.15 | ** | -2% | 0.05 | | 1% |
| Education | 0.09 | | 1% | 0.23 | * | 4% |
| Labour market status | 1.12 | ** | 18% | 0.77 | *** | 12% |
| Household type | 0.33 | | 5% | 0.02 | | 0% |
| Tenure status | -3.43 | *** | -55% | -2.23 | *** | -35% |
| **Slovenia** | | | | | | |
| Raw difference | 0.24 | | | 1.15 | * | |
| Explained difference | -0.27 | | -115% | -0.15 | | -13% |
| Age | 0.13 | | 55% | 0.13 | | 12% |
| Gender | 0.05 | | 20% | 0.00 | | 0% |
| Education | 0.08 | | 35% | 0.59 | ** | 51% |
| Labour market status | 1.35 | *** | 566% | 0.47 | ** | 40% |
| Household type | 0.34 | | 141% | 0.14 | | 12% |
| Tenure status | -2.23 | *** | -931% | -1.48 | *** | -128% |
| **Spain** | | | | | | |
| Raw difference | 14.77 | *** | | 2.86 | *** | |
| Explained difference | 2.20 | | 15% | 3.27 | | 114% |
| Age | -0.14 | | -1% | -0.05 | | -2% |
| Gender | -0.07 | | 0% | -0.01 | | 0% |
| Education | 1.32 | | 9% | 5.64 | | 197% |
| Labour market status | 5.14 | *** | 35% | 2.46 | *** | 86% |
| Household type | 0.07 | | 0% | -0.06 | | -2% |
| Tenure status | -4.11 | *** | -28% | -4.72 | *** | -165% |

Notes: *** significant at 1%, ** significant at 5%, * significant at 10%. The relative column shows the explained differences as a percentage of the raw differences.

Source: Authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

In short, despite the important impact of tenure status, household level variables often account for only a small part of the total variation in joint income-wealth poverty rates. Hence, this leaves a lot of room for explanatory factors at the country level. One can think of a host of factors playing a role. Pension policies influence the propensity to accumulate private savings. These may be amplified by factors like mistrust in government competence or foresightedness. Housing policies, especially tax incentives encourage house acquisition in some countries. The cost of education may play a role as student debt is a major source of debt in some countries. One can think of lots of other factors playing a role, including restrictions on consumer credit or bank lending.

## Conclusion and policy discussion

Measures of financial vulnerability and poverty overwhelmingly build on household disposable income, usually adjusted for household size and composition. Yet we know that income poor people sometimes hold significant assets on which they can draw to make up for income shortfalls. However, they may also face significant debts that weigh on the living standards they can effectively realize with their income.

This article has looked at poverty in Europe taking account of assets and debt in various ways. The literature has generally concluded that poverty declines when wealth is taken into account. We have demonstrated that this only holds when wealth is accounted for in certain ways. It does not hold in

relative approaches, i.e. when (annuitized) wealth is also taken into account in determining the poverty line itself. If we consider people "wealth poor" when they do not own sufficient net wealth that would enable them to sustain a living standard at the income poverty line for three months the picture is generally more favourable. This holds especially for the elderly. The effect of including net wealth in poverty measurement differs across countries, but in general the ranking of best performing countries remains relatively similar across the different approaches. Austria and Finland, for example, have low poverty rates in all approaches, while Italy, Ireland and Estonia score badly on all of them. Yet, interestingly countries with low income poverty rates do not necessarily have low wealth poverty rates and vice versa. Spain, for instance, has one of the highest income poverty rates, but a relatively low share of people who are both income and wealth poor. Hence, taking into account wealth in poverty measurement has an important effect on within country poverty patterns, but sometimes also for between country poverty rankings. We therefore encourage researchers to include wealth in poverty analyses – and more broadly distributional analyses – as much as possible. Although all approaches shown in this paper have their benefits and slightly focus on different aspects of poverty, in the context of the European Union's view on poverty the annuity approach is probably preferred over the two-dimensional one.

This paper also set out on explaining why households remain or become poor even when wealth is accounted for. Explaining first within-country patterns of joint income-wealth poverty we find that particularly households who are tenants or free users of the residence they live in and those who have a young, female, low educated, unemployed or inactive and single household head are at high risk of being both income and wealth poor. The risk profile is similar to the one for income poverty, but the education gradient is more outspoken when net wealth is included. That is also the case for tenure status – the vulnerable situation of renters becomes even more obvious once assets and debt are accounted for. Since we do not take into account the value of the main residence in net wealth the latter implies that tenants do not make up the wealth they are missing in real terms by owning financial wealth. Aiming to answer the question of why households remain or become poor when wealth is included we looked at the main reason for being counted as poor: either they only have low assets, or only have high debt or the balance between assets and debt is unhealthy. Although there is some cross-country variation, in all countries the majority of people who are categorized as both income and wealth poor qualify as such because they have few assets. The second reason why they are counted as such is an unbalanced ratio between assets and debt. In other words, the majority would still be considered poor even if debt would not be taken into account.

These results have important policy implications. First, they allow to construct a more accurate profile of the most vulnerable groups in society, who should make up the main target group of social policies. Second, it is crucial to understand the main reason why households remain poor even when wealth is accounted for – or in other words the reason why they have low net wealth – as it implies very different policy actions. Those who have high debt would benefit from debt mediation or even alleviation. However, most households with low net wealth simply have very few assets. This calls for an investigation into the possibilities of so-called asset-building policies. Although most European countries encourage the ownership of real estate and financial assets through tax reliefs, these policies are typically unavailable to the poor. Therefore, exploring new types of asset policies might prove an interesting addition to existing income-based social provisions. One can think of short-term policies in

the spirit of the US' Individual Development Accounts (IDA's) (Sherraden, 1991) and/or longer-term policies such as a minimum inheritance or endowment received at the start of adulthood (Atkinson, 2015). However, social policy research still largely focuses on income-based policies and how policies affect the distribution of income. Our results show that future research should pay more attention to the ways in which policies affect the distribution of wealth and how policies could be reformed in such a way that they address joint income-wealth poverty and inequality.

This paper has also investigated to what extent variation in joint income-wealth poverty rates across countries are accounted for by differences in the socio-demographic compositions of their populations. We find that tenure status is again the most important explanatory variable, but in most cases household level variables account for only a small part of the total variation in joint income-wealth poverty rates. This paper thus opens up further avenues for research since a lot of variation across countries remains unaccounted for. Of course, wealth accumulations occur over many generations. They are the product of ownership patterns that have long histories. Yet, there remains an important research agenda for scholars of contemporary social and economic policy to account for the vast differences one observes across countries, especially when it comes to asset ownership and debt patterns among those who are conventionally classified as income poor. Housing and public pension policies stand out as particularly relevant in this context. In future research the effects of such variation in institutional settings, economic environments, historical divides and cultural backgrounds may be studied for instance by means of multilevel modelling in which the impact of country level variables can be studied alongside individual level characteristics. Verbunt & Guio (2019) use multilevel modelling to explain within and between country differences in the risk of income poverty, severe material deprivation and their overlap. A similar strategy could be applied to income and wealth poverty.

In the current paper we focus on calculating and explaining poverty patterns based on income and wealth observed at a single point in time. Although adding information on wealth provides more information on the long-term economic (and social) security of households, permanent income and permanent wealth would be even better measures of economic and social well-being (e.g. Brady et al., 2018; D'Ambrosio et al., 2020). Because of data limitations such analyses are not yet commonplace. However, with increasingly more data becoming available we encourage researchers to consider expanding the time horizon in their analyses.

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## Appendix 1: Additional tables and figures

**Table A.1. Summary statistics of the distributions of income and wealth and their correlation, 2017.**

| Country | Gini disposable income | Gini net wealth | Median net wealth (€) | Rank correlation income-net wealth | Net wealth to income ratio bottom 20%, active age | Net wealth to income ratio bottom 20%, elderly |
|---|---|---|---|---|---|---|
| Austria | 0.200 | 0.641 | 186,300 | 0.434 | 5.7 | 7.4 |
| Belgium | 0.250 | 0.589 | 257,800 | 0.466 | 7.2 | 20.9 |
| Cyprus | 0.324 | 0.762 | 228,900 | 0.395 | 18.9 | 24.1 |
| Estonia | 0.401 | 0.678 | 64,300 | 0.387 | 9.8 | 9.5 |
| Finland | 0.233 | 0.676 | 105,500 | 0.415 | 2.4 | 5.9 |
| France | 0.260 | 0.648 | 136,700 | 0.665 | 7.4 | 11.7 |
| Germany | 0.318 | 0.586 | 89,600 | 0.568 | 4.2 | 8.1 |
| Greece | 0.296 | 0.785 | 60,500 | 0.298 | 6.1 | 11.0 |
| Hungary | 0.329 | 0.628 | 41,300 | 0.405 | 12.0 | 16.9 |
| Ireland | 0.331 | 0.599 | 155,000 | 0.377 | 7.8 | 17.6 |
| Italy | 0.340 | 0.599 | 162,700 | 0.565 | 8.9 | 9.7 |
| Luxembourg | 0.296 | 0.731 | 564,700 | 0.598 | 7.5 | 28.9 |
| Poland | 0.333 | 0.698 | 75,400 | 0.187 | 19.6 | 17.7 |
| Portugal | 0.330 | 0.646 | 80,000 | 0.443 | 9.0 | 13.2 |
| Slovak Republic | 0.252 | 0.587 | 60,700 | 0.409 | 6.1 | 11.3 |
| Slovenia | 0.264 | 0.603 | 98,600 | 0.338 | 10.6 | 15.4 |
| Spain | 0.383 | 0.691 | 247,400 | 0.641 | 19.4 | 30.9 |

Notes: Net wealth to income ratios are calculated for the bottom 20% of the disposable income distribution. Median net wealth is presented in euros for all countries as the HFCS also covers amounts in euros for Poland and Hungary.
Source: Authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

**Table A.2. Poverty rates for net wealth.**

| Country | Age group | Income poverty | Income + annuitized net wealth poverty (same poverty line) | Income + annuitized net wealth poverty (adapted poverty line) | Multidimensional poverty | | |
|---|---|---|---|---|---|---|---|
| | | | | | Only income poor | Only net wealth poor | Twice poor |
| **Austria** | **Total** | **7.4%** | **5.2%** | **13.1%** | **4.8%** | **7.7%** | **2.6%** |
| | Children | 7.5% | 6.6% | 18.2% | 4.3% | 9.4% | 3.2% |
| | Active age | 7.2% | 5.5% | 12.4% | 4.3% | 7.6% | 2.9% |
| | Elderly | 7.8% | 2.7% | 11.0% | 6.9% | 6.7% | 0.8% |
| **Belgium** | **Total** | **14.3%** | **9.9%** | **16.4%** | **8.5%** | **4.6%** | **5.7%** |
| | Children | 17.8% | 13.7% | 20.6% | 10.0% | 4.7% | 7.7% |
| | Active age | 14.0% | 10.6% | 16.7% | 7.8% | 4.4% | 6.2% |
| | Elderly | 10.9% | 2.4% | 9.3% | 9.5% | 5.0% | 1.5% |
| **Cyprus** | **Total** | **18.5%** | **8.3%** | **19.3%** | **15.5%** | **5.2%** | **2.9%** |
| | Children | 20.9% | 10.5% | 22.6% | 17.7% | 4.9% | 3.2% |
| | Active age | 17.4% | 7.7% | 18.9% | 15.3% | 5.1% | 2.1% |
| | Elderly | 20.3% | 8.1% | 16.2% | 13.3% | 6.4% | 6.9% |
| **Estonia** | **Total** | **26.6%** | **15.9%** | **23.7%** | **21.3%** | **4.9%** | **5.2%** |
| | Children | 25.5% | 18.9% | 26.0% | 20.1% | 5.3% | 5.4% |
| | Active age | 23.9% | 16.2% | 23.5% | 18.4% | 5.5% | 5.4% |
| | Elderly | 38.1% | 11.4% | 22.2% | 33.8% | 2.0% | 4.3% |
| **Finland** | **Total** | **7.8%** | **5.4%** | **11.8%** | **4.8%** | **18.0%** | **3.0%** |
| | Children | 8.0% | 5.5% | 13.5% | 6.2% | 19.3% | 1.8% |
| | Active age | 8.4% | 6.7% | 13.3% | 4.3% | 20.2% | 4.1% |
| | Elderly | 5.6% | 1.0% | 4.6% | 5.0% | 8.6% | 0.6% |
| **France** | **Total** | **10.2%** | **6.8%** | **12.6%** | **7.7%** | **8.9%** | **2.4%** |
| | Children | 11.5% | 7.9% | 17.3% | 8.3% | 12.4% | 3.3% |
| | Active age | 11.1% | 7.8% | 13.3% | 8.4% | 8.8% | 2.7% |
| | Elderly | 4.9% | 1.2% | 3.1% | 4.6% | 4.6% | 0.3% |
| **Germany** | **Total** | **13.4%** | **10.3%** | **18.2%** | **8.0%** | **14.6%** | **5.4%** |
| | Children | 12.6% | 11.7% | 22.9% | 5.9% | 21.5% | 6.7% |
| | Active age | 11.7% | 9.6% | 17.1% | 7.3% | 15.4% | 4.4% |
| | Elderly | 19.9% | 11.3% | 17.9% | 12.3% | 5.7% | 7.6% |
| **Greece** | **Total** | **16.0%** | **11.1%** | **17.6%** | **11.5%** | **8.7%** | **4.5%** |
| | Children | 19.5% | 15.0% | 24.6% | 12.5% | 8.9% | 7.1% |
| | Active age | 17.3% | 12.5% | 19.4% | 12.4% | 9.5% | 4.8% |
| | Elderly | 8.2% | 2.2% | 4.6% | 7.1% | 5.4% | 1.1% |
| **Hungary** | **Total** | **17.4%** | **10.0%** | **19.4%** | **14.8%** | **4.7%** | **2.6%** |
| | Children | 21.3% | 14.9% | 27.7% | 17.3% | 6.5% | 4.0% |
| | Active age | 18.1% | 10.6% | 19.9% | 15.5% | 4.3% | 2.6% |
| | Elderly | 10.8% | 2.6% | 8.8% | 9.6% | 4.3% | 1.1% |
| **Ireland** | **Total** | **22.6%** | **16.3%** | **24.5%** | **15.1%** | **9.9%** | **7.5%** |
| | Children | 27.7% | 22.6% | 35.7% | 16.3% | 12.0% | 11.5% |
| | Active age | 22.3% | 17.0% | 24.6% | 14.8% | 10.7% | 7.5% |
| | Elderly | 16.4% | 3.2% | 7.1% | 14.9% | 2.3% | 1.5% |
| **Italy** | **Total** | **19.5%** | **13.1%** | **24.3%** | **12.7%** | **4.6%** | **6.8%** |
| | Children | 24.3% | 18.0% | 32.8% | 14.1% | 6.4% | 10.2% |
| | Active age | 20.5% | 14.3% | 26.1% | 13.5% | 4.7% | 7.0% |
| | Elderly | 12.3% | 5.0% | 11.6% | 9.1% | 2.9% | 3.2% |
| **Luxembourg** | **Total** | **12.7%** | **5.8%** | **23.3%** | **9.6%** | **5.4%** | **3.0%** |
| | Children | 15.0% | 6.1% | 33.4% | 11.2% | 8.5% | 3.8% |
| | Active age | 13.0% | 6.5% | 23.6% | 9.8% | 5.0% | 3.3% |
| | Elderly | 7.2% | 1.4% | 5.8% | 6.6% | 2.6% | 0.7% |
| **Poland** | **Total** | **16.4%** | **7.0%** | **15.5%** | **13.4%** | **7.2%** | **3.1%** |
| | Children | 15.6% | 6.5% | 16.7% | 11.6% | 9.9% | 4.0% |
| | Active age | 17.3% | 7.5% | 16.2% | 14.3% | 6.6% | 2.9% |
| | Elderly | 13.4% | 4.6% | 10.6% | 10.9% | 6.8% | 2.5% |
| **Portugal** | **Total** | **17.9%** | **11.1%** | **19.6%** | **12.4%** | **7.7%** | **5.6%** |
| | Children | 23.7% | 17.0% | 28.1% | 14.7% | 8.9% | 9.0% |
| | Active age | 18.4% | 11.5% | 20.2% | 12.9% | 7.8% | 5.5% |
| | Elderly | 10.6% | 4.2% | 9.2% | 8.0% | 6.3% | 2.5% |
| **Slovak Republic** | **Total** | **14.8%** | **10.2%** | **14.5%** | **11.3%** | **4.1%** | **3.5%** |
| | Children | 20.5% | 16.2% | 22.2% | 13.5% | 6.2% | 7.0% |
| | Active age | 13.4% | 9.7% | 14.0% | 10.5% | 4.0% | 2.8% |
| | Elderly | 14.5% | 4.5% | 6.6% | 12.0% | 2.1% | 2.5% |
| **Slovenia** | **Total** | **8.3%** | **2.1%** | **11.6%** | **7.0%** | **7.0%** | **1.3%** |
| | Children | 2.1% | 0.9% | 9.8% | 1.6% | 9.0% | 0.5% |
| | Active age | 8.3% | 2.7% | 13.0% | 6.5% | 7.0% | 1.8% |
| | Elderly | 15.2% | 1.4% | 8.5% | 14.9% | 4.9% | 0.4% |
| **Spain** | **Total** | **21.0%** | **10.5%** | **24.0%** | **17.8%** | **2.4%** | **3.2%** |
| | Children | 30.7% | 16.7% | 36.1% | 25.4% | 1.9% | 5.2% |
| | Active age | 22.0% | 10.9% | 24.8% | 18.7% | 2.4% | 3.3% |
| | Elderly | 5.4% | 1.2% | 6.2% | 4.8% | 3.0% | 0.5% |

Source: Authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

**Table A.3. Poverty lines applied in the different approaches.**

| Country | EUROSTAT poverty line | Income poverty line | Wealth poverty line | Income-annuitized net wealth poverty line (restricted net wealth, main text) | Income-annuitized net wealth poverty line (net wealth, appendix) |
|---|---|---|---|---|---|
| Austria | 14,851 | 13,040 | 3,260 | 14,246 | 16,334 |
| Belgium | 13,670 | 12,509 | 3,127 | 13,443 | 16,158 |
| Cyprus | 8,698 | 7,465 | 1,866 | 8,818 | 10,391 |
| Estonia | 5,631 | 6,001 | 1,500 | 6,502 | 7,395 |
| Finland | 14,392 | 14,829 | 3,707 | 15,046 | 16,923 |
| France | 13,246 | 10,853 | 2,713 | 11,048 | 12,623 |
| Germany | 13,152 | 12,598 | 3,149 | 13,127 | 14,749 |
| Greece | 4,560 | 5,617 | 1,404 | 5,890 | 6,815 |
| Hungary | 2,993 | 2,626 | 656 | 2,813 | 3,477 |
| Ireland | 13,727 | 13,416 | 3,354 | 14,585 | 16,340 |
| Italy | 9,925 | 8,286 | 2,071 | 8,668 | 10,918 |
| Luxembourg | 21,645 | 20,758 | 5,189 | 23,010 | 29,476 |
| Poland | 3,567 | 3,946 | 987 | 4,259 | 5,185 |
| Portugal | 5,443 | 5,298 | 1,325 | 5,875 | 6,724 |
| Slovak Republic | 4,310 | 4,144 | 1,036 | 4,268 | 5,066 |
| Slovenia | 7,628 | 5,293 | 1,323 | 5,732 | 6,955 |
| Spain | 8,522 | 8,127 | 2,032 | 9,260 | 11,863 |

Note: The income poverty line refers to traditional poverty line of 60% of national median equivalised household disposable income calculated based on the EUROMOD simulated disposable incomes for the HFCS gross incomes, this poverty line is also used in the annuitization approach without adapting the poverty line and in the two-dimensional approach. The wealth poverty line is equal to $1/4^{th}$ of the income poverty line. The income-annuitized net wealth poverty line is calculated as 60% of national median equivalised household disposable income+ annuitized net wealth (net value of owner-occupied housing and private pension savings not included in the restricted wealth concept which is used in the main text, while they are included in the net wealth concept for which poverty rates are shown in the appendix). All poverty lines are in euros.

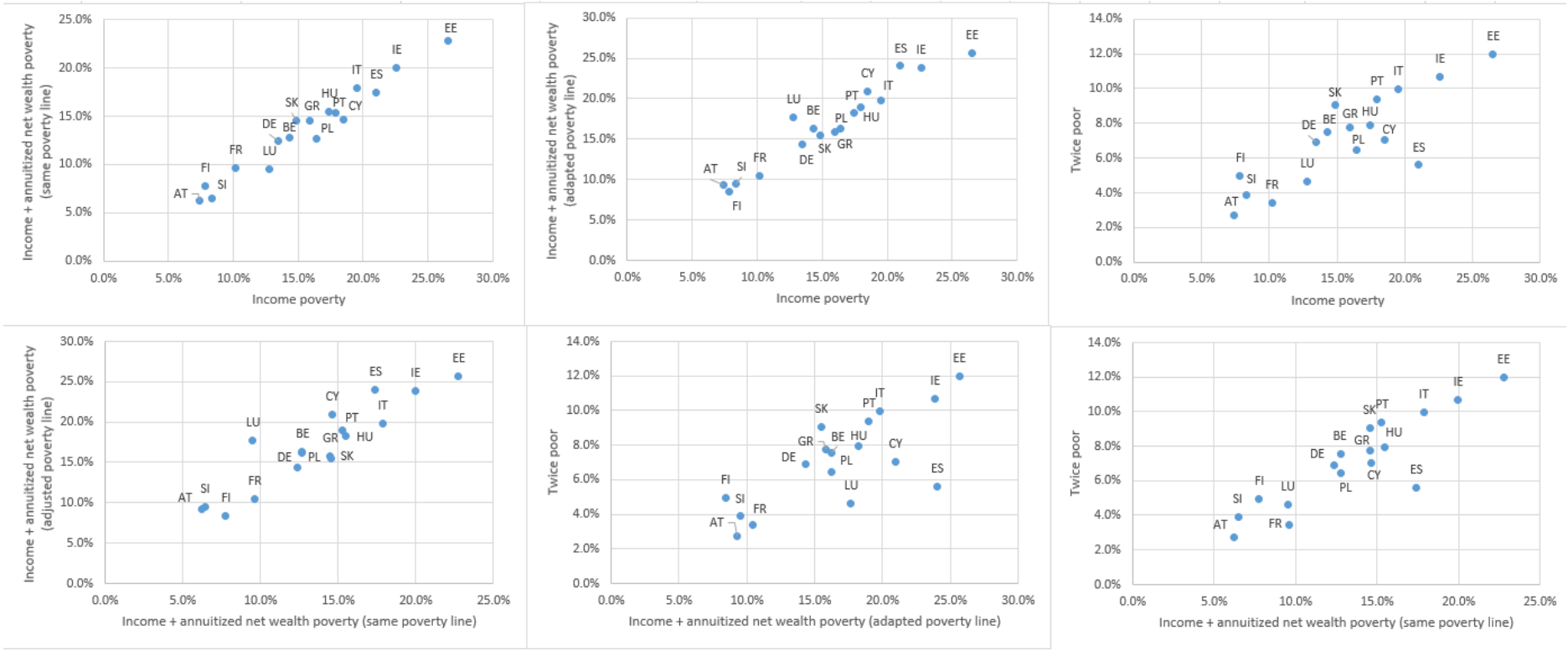
Source: EUROSTAT and authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

**Table A.4. Socio-demographic profile of joint income-wealth poor by reason for being poor.**

| | Annuitized poor (adjusted poverty line) | | | | | | Twice poor | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Non-over-indebted | | Over-indebted asset poor | | Over indebted asset non-poor | | Non-over-indebted | | Over-indebted asset poor | | Over indebted asset non-poor | |
| **Age (ref:55-74 years)** | | | | | | | | | | | | |
| 16-34 years | 1.56 | *** | 1.73 | *** | 1.87 | *** | 1.26 | *** | 1.25 | ** | 1.49 | ** |
| 35-54 years | 1.47 | *** | 1.46 | *** | 1.41 | * | 1.29 | *** | 1.25 | *** | 1.49 | *** |
| 75+ years | 0.67 | *** | 0.65 | *** | 0.29 | *** | 0.67 | *** | 0.65 | *** | 0.19 | *** |
| **Gender (ref: male)** | 1.56 | *** | 1.54 | *** | 1.32 | ** | 1.63 | *** | 1.62 | *** | 1.17 | |
| **Education (ref: tertiary)** | | | | | | | | | | | | |
| No or primary | 5.05 | *** | 8.10 | *** | 3.14 | *** | 8.06 | *** | 9.17 | *** | 2.70 | *** |
| Secondary | 3.02 | *** | 3.97 | *** | 2.72 | *** | 3.97 | *** | 3.82 | *** | 2.71 | *** |
| **Labour market status (ref: employee)** | | | | | | | | | | | | |
| Self-employed | 1.48 | *** | 0.92 | | 2.90 | *** | 0.31 | *** | 0.69 | ** | 2.50 | *** |
| Unemployed | 7.74 | *** | 15.54 | *** | 4.40 | *** | 6.89 | *** | 14.30 | *** | 5.32 | *** |
| Retired | 2.02 | *** | 3.26 | *** | 1.44 | | 2.06 | *** | 3.11 | *** | 1.95 | *** |
| Inactive | 5.81 | *** | 9.48 | *** | 1.50 | | 5.71 | *** | 9.23 | *** | 4.41 | *** |
| **Household type (ref: couple)** | | | | | | | | | | | | |
| Single | 1.94 | *** | 3.27 | *** | 1.67 | ** | 2.16 | *** | 3.41 | *** | 1.39 | |
| Single parent | 1.43 | *** | 2.04 | *** | 5.23 | *** | 1.93 | *** | 1.24 | | 6.11 | *** |
| Couple with children | 1.51 | *** | 1.94 | *** | 0.96 | | 1.90 | *** | 1.81 | *** | 1.56 | ** |
| Other | 1.82 | *** | 2.90 | *** | 1.78 | *** | 2.22 | *** | 2.94 | *** | 1.75 | *** |
| **Tenure status (ref: owner)** | | | | | | | | | | | | |
| Owner with mortgage | 0.92 | ** | 1.33 | *** | 1.09 | | 0.99 | | 1.27 | *** | 0.94 | |
| Tennant/free user | 1.94 | *** | 3.56 | *** | 1.85 | *** | 3.50 | *** | 4.50 | *** | 1.80 | *** |
| **Country (ref: Austria)** | | | | | | | | | | | | |
| Belgium | 2.66 | *** | 1.23 | | 0.58 | | 4.70 | *** | 1.47 | | 2.15 | ** |
| Cyprus | 2.53 | *** | 3.18 | *** | 8.18 | *** | 2.30 | *** | 1.25 | | 11.52 | *** |
| Estonia | 5.05 | *** | 3.04 | *** | 0.46 | | 9.01 | *** | 5.83 | *** | 1.56 | |
| Finland | 0.66 | *** | 1.01 | | 3.40 | *** | 1.53 | *** | 1.46 | ** | 4.21 | *** |
| France | 1.00 | | 0.24 | *** | 1.77 | ** | 1.00 | | 0.24 | *** | 2.12 | ** |
| Germany | 1.64 | *** | 1.50 | *** | 2.58 | *** | 2.47 | *** | 2.66 | *** | 1.89 | * |
| Greece | 1.68 | *** | 2.27 | *** | 0.38 | ** | 3.22 | *** | 4.07 | *** | 2.00 | ** |
| Hungary | 2.63 | *** | 5.02 | *** | 2.65 | *** | 3.72 | *** | 8.42 | *** | 3.86 | *** |
| Ireland | 3.44 | *** | 2.86 | *** | 1.95 | ** | 4.26 | *** | 4.15 | *** | 4.50 | *** |
| Italy | 2.49 | *** | 1.89 | *** | 0.26 | *** | 4.56 | *** | 3.32 | *** | 2.34 | *** |
| Luxembourg | 2.37 | *** | 1.89 | *** | 3.04 | *** | 1.82 | *** | 0.85 | | 3.43 | *** |
| Poland | 2.09 | *** | 3.05 | *** | 0.20 | *** | 2.51 | *** | 5.42 | *** | 1.14 | |
| Portugal | 1.89 | *** | 1.35 | ** | 0.82 | | 3.27 | *** | 2.00 | *** | 1.76 | |
| Slovak Republic | 1.62 | *** | 6.43 | *** | 0.23 | *** | 3.45 | *** | 15.65 | *** | 1.91 | |
| Slovenia | 1.05 | | 1.09 | | 0.95 | | 1.73 | *** | 1.75 | *** | 0.99 | |
| Spain | 2.93 | *** | 1.27 | | 3.33 | *** | 1.64 | *** | 0.75 | | 3.23 | *** |
| **Constant** | 0.01 | *** | 0.00 | *** | 0.00 | *** | 0.00 | *** | 0.00 | *** | 0.00 | *** |
| $R^2$ | | | *0.1711* | | | | | | *0.2182* | | | |

Source: Authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

**Figure A.1. Correlation between poverty rates across approaches.**




Source: Authors' calculations based on HFCS wave 2 data and EUROMOD simulations.

## Appendix 2: Summary of HFCS-EUROMOD simulations

An important shortcoming of the HFCS data as they are supplied by the European Central Bank is that they cover income components gross of taxes and social insurance contributions[12]. Therefore, we have included the HFCS as input data for the EU-wide tax-benefit microsimulation model EUROMOD. In this appendix we provide a brief overview of how the HFCS data and the model have been combined and how the results compare to those of the EU-SILC dataset, which is standardly used in the EU to calculate poverty rates and is also the standard input dataset for EUROMOD. For more details we refer to Boone et al. (2019).

EUROMOD is a tax-benefit microsimulation model covering all 27 EU countries and the UK within a harmonised framework. It takes information on market incomes and other relevant information from an underlying database in order to simulate non-contributory cash benefit entitlements and liabilities for direct taxes and social-insurance contributions based on the tax-benefit rules in place (Sutherland & Figari, 2013). In order to construct the HFCS input dataset for EUROMOD we largely followed the same procedures as those that are used for the EU-SILC input dataset. The majority of the variables needed for the simulations of taxes and benefits are available in the HFCS. Although social benefits are already included in the original HFCS dataset, we decided to use the amounts simulated by EUROMOD if these turned out to be larger than the ones observed in the original data. The reason for this is that social benefits appear to be underestimated in the original data as they are surveyed only with a limited set of questions (with the exception of pensions and unemployment benefits all benefits are taken together in a single variable). In EUROMOD we can simulate several important social benefits based on other observed information, i.e. mainly child benefits and social assistance. Of course there are some benefits which are not observed in HFCS and can also not be simulated in EUROMOD, but these often entail small benefits received by a limited number of people, so that the effects on the simulation results are likely to be small. The simulations of liabilities for personal income taxes and social insurance contributions can be carried out relatively straightforward, with the exception of a few very specific tax deductions or credits in some countries.

A comparison of some summary statistics of market and disposable incomes between the HFCS-based EUROMOD simulations and the EU-SILC based simulations is presented in Table A.5 (for the income reference year). It is clear that comparability between the results of EM-HFCS and EM-SILC varies widely across countries. Results are close to each other for Finland, Portugal and Slovakia, while they diverge rather strongly for Austria, Estonia, France and Slovenia. Differences are usually larger for market income than for disposable income and larger for the mean than for the median. The differences mostly reflect higher amounts in EM-HFCS than in EM-SILC, which might be related to the oversampling that is applied in the HFCS (see HFCN, 2016a). Gini coefficients are often also higher in EM-HFCS than in EM-SILC.

As mentioned in the data and methods section of the paper, we have used the 2017 tax and benefit rules to simulate disposable incomes. To this end monetary variables related to income, but also assets

[12] For Italy and Poland the non-core variable list of the HFCS provides information on disposable incomes and for Finland on taxes and social contributions paid, but the definition of disposable incomes "varies country by country, and has not been harmonised" (HFCN, 2016a, p.73 footnote 38).

and debts, have been uprated from their HFCS income reference period to 2017 price levels. The HFCS income reference period is mostly 2013, it is 2010 for Spain, 2012 for Estonia, Portugal and Ireland and 2014 for France, Italy and Hungary (HFCN, 2016a). For income related variables the uprating is as for EU-SILC mostly done using the Consumer Price Index (CPI), while assets and debt are uprated based on their corresponding aggregates in the national accounts.

**References**


Boone, J. et al., 2019. *EWIGE 2 - Update and extension of the EUROMOD wealth taxation project,* sl: JRC Working papers on Taxation and Structural Reforms No. 2019/07.

Eurosystem Household Finance and Consumption Network (HFCN), 2016a. *The Household Finance and Consumption Survey: methodological report for the second wave,* sl: ECB Statistics Paper No.17.

Sutherland, H. & Figari, F., 2013. EUROMOD: the European Union tax-benefit microsimulation model. *International Journal of Microsimulation,* 6(1), pp. 4-26.

**Table A.5. Comparison of summary statistics HFCS and EU-SILC based EUROMOD simulation.**

| Country | Mean | | | | Median | | | | Gini-coefficients | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Market income | | Disposable income | | Market income | | Disposable income | | Market income | | Disposable income | |
| | HFCS | SILC | HFCS | SILC | HFCS | SILC | HFCS | SILC | HFCS | SILC | HFCS | SILC |
| Austria | 27,274 | 32,553 | 21,627 | 25,185 | 24,575 | 28,198 | 20,174 | 22,519 | 0.288 | 0.364 | 0.200 | 0.250 |
| Belgium | 30,623 | 26,686 | 21,623 | 21,023 | 27,227 | 24,206 | 19,863 | 20,038 | 0.374 | 0.396 | 0.250 | 0.221 |
| Cyprus | 16,098 | 18,652 | 15,404 | 19,100 | 12,600 | 14,229 | 12,790 | 15,115 | 0.404 | 0.412 | 0.324 | 0.338 |
| Estonia | 10,353 | 8,112 | 9,345 | 7,502 | 7,869 | 6,727 | 7,291 | 6,356 | 0.468 | 0.381 | 0.401 | 0.317 |
| Finland | 31,601 | 30,329 | 26,359 | 25,573 | 27,736 | 26,760 | 23,962 | 23,211 | 0.364 | 0.379 | 0.233 | 0.241 |
| France | 22,079 | 28,914 | 20,033 | 23,994 | 19,138 | 24,485 | 17,467 | 20,802 | 0.401 | 0.371 | 0.260 | 0.276 |
| Germany | 31,375 | 28,600 | 23,852 | 22,061 | 24,222 | 24,379 | 19,641 | 19,526 | 0.431 | 0.378 | 0.318 | 0.280 |
| Greece | 14,339 | 11,161 | 12,621 | 9,886 | 11,780 | 8,990 | 10,511 | 8,549 | 0.386 | 0.409 | 0.346 | 0.330 |
| Hungary | 6,225 | 5,889 | 4,897 | 4,429 | 4,998 | 5,199 | 4,067 | 4,030 | 0.412 | 0.355 | 0.329 | 0.286 |
| Ireland | 28,790 | 22,744 | 24,531 | 22,156 | 21,886 | 18,134 | 21,145 | 19,573 | 0.493 | 0.518 | 0.331 | 0.275 |
| Italy | 20,137 | 22,020 | 15,484 | 22,021 | 16,290 | 18,338 | 13,340 | 15,557 | 0.407 | 0.388 | 0.340 | 0.314 |
| Luxembourg | 48,971 | 44,526 | 39,801 | 37,874 | 36,800 | 37,039 | 33,225 | 33,816 | 0.424 | 0.385 | 0.296 | 0.242 |
| Poland | 8,898 | 7,434 | 6,978 | 6,040 | 7,410 | 6,309 | 5,956 | 5,265 | 0.378 | 0.367 | 0.333 | 0.304 |
| Portugal | 11,693 | 11,903 | 10,395 | 10,501 | 8,725 | 8,960 | 8,582 | 8,726 | 0.433 | 0.438 | 0.330 | 0.319 |
| Slovakia | 7,841 | 7,933 | 6,945 | 7,026 | 7,046 | 7,105 | 6,277 | 6,461 | 0.352 | 0.322 | 0.252 | 0.236 |
| Slovenia | 11,436 | 14,731 | 9,587 | 12,648 | 9,650 | 12,988 | 8,580 | 11,728 | 0.388 | 0.363 | 0.264 | 0.241 |
| Spain | 16,883 | 15,651 | 16,495 | 14,714 | 13,043 | 13,067 | 13,186 | 13,384 | 0.451 | 0.400 | 0.383 | 0.313 |

Notes: Market income includes public pensions. White cells refer to differences of less than 5%, light grey cells refer to differences of between 5% and 10%, medium grey cells refer to differences of between 10% and 20% and dark grey cells refer to differences of more than 20%.

Source: Own calculations based on EUROMOD and micro-data from HFCS and EU-SILC.