Intra-household inequality and adult material deprivation in Europe

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Abstract
In most research on living standards, material deprivation is also usually measured using household level material deprivation indicators. However, if resources are not shared equally within households, conventional material deprivation indicators may mask important variations in individual living standards. In this paper we make use of individual-level deprivation data included in the 2014 European Union Statistics on Incomes and Living Conditions (EU-SILC) ad-hoc material deprivation module to examine the implications of intra-household inequality on material deprivation measurement. Results from a series of regression models which examine how adult deprivation indicators vary by various household and individual characteristics suggest that individual income shares (which can be seen as a proxy of the distribution of the relative power within households) has a significant negative effect on the personal deprivation risk n most countries, pointing to the incomplete pooling of household resources, especially in multi-family households. In a second step we use the Alkire-Foster adjusted headcount methodology to construct an index of multi-dimensional deprivation by treating household and personal deprivation indicators as two separate dimensions of one overall measure. Our results suggest that in the majority of countries the personal deprivation dimension contributes over 50 percent of the overall multi-dimensional deprivation index. This suggest that personal level deprivation indicators can provide additional information about individual deprivation risk over and above the household level deprivation indicators and should be used as a separate dimension in the overall assessment of individual's deprivation risks.

Key words: deprivation, intra-household inequality, multi-family households

JEL classification: D13, D31, I31, I32

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1. Introduction

Household composition, including the proportion of people living in households consisting of two or more adult generations, varies dramatically across European countries. In 2013, nearly one-third of the population in Greece lived in households containing three or more adults, compared to less than a fifth of the population in the UK and fewer than 1 in 10 people in France (Eurostat database, 2015). The high prevalence of multi-family households may have important implications for poverty and income inequality measurement and the comparability of living standards estimates such are usually assessed using household level living standards indicators. For example the standard poverty statistics are computed based on income measured at household level and equivalised on the assumption that all members of the household share its resources equally. Similarly material deprivation is also usually measured at a household level (by indicators such as ability to afford to heat the home). The underlying assumption for the use of household level indicators is that household behaviour is characterised by a unitary model of household behaviour which assumes that individuals within the household pool and share resources equitably among all household members (Becker, 1974; 1981). However, if household resources are not shared to the equal benefit of all household members (as the overwhelming evidence indicates), then conventional measures of poverty, and deprivation (which are also usually rely on household level indicators) will give an inaccurate representation of the risks of low standards of living faced by different genders and generations within households. Since the equal sharing assumption is especially unlikely to hold in complex households, made up of more than one family unit, because income streams and preferences are more likely to differ across family units, especially among family units from different generations. This implies that conventional living standard estimates in countries like Greece, with a higher proportion of extended family households, are less valid than in countries like France or UK.

Though the role of intra-household inequality has long been recognised, most studies rely on household level indicators (e.g. household income, household expenditures) to assess individual livings standards. The main reason for the lack of individual-based approaches in the assessment of individual well-being is that there is little information available on consumption of different household members and the intra-household allocation of resources. There are three main factors which hinder such analysis, including the unobservability of individual's preferences, the presence of household public goods and the lack of sufficient data on individual consumption. In contrast to the income-based approaches to poverty and inequality measurement where the presence of household-public good and the unobservability of individual preferences make the assessment of individual living standards particularly difficult, outcome-based indicators can be collected and measured at individual level and therefore can be used to assess intrahousehold inequality. One measure which is part of the group of direct or outcome-based approaches to poverty is material deprivation as it is based on the observed satisfaction of needs (Fusco et al. 2010). One of the key advantages of outcome-based approaches is that they "can bring out what it means to be poor" (Nolan and Whelan 2010, p. 307). Recognising the importance of material deprivation indicators for the assessment of well-being, the EU adopted them as one of key poverty and social exclusion reduction goals of the Europe 2020 strategy, and are used to identify those individuals whose material, cultural and social resources are insufficient to allow them to participate fully in

their society (European Commission 2004, p.10). However, up until very recently the official EU material deprivation indicators used solely household level deprivation indicators for the assessment of individual deprivation risk.

In this paper we make use of individual-level deprivation data included in the 2014 European Union Statistics on Incomes and Living Conditions (EU-SILC) ad-hoc module on material deprivation, to examine to what extent intra-household inequality contributes to individual material deprivation outcomes and conversely to examine what we can infer from the analysis of the individual level deprivation data about the intra-household allocation of resources. We first calculate an index of adult deprivation based on these individual-level deprivation indicators to examine the sensitivity of deprivation estimates to using individual level rather than household level deprivation indicators – both in terms of country rankings and in terms of the characteristics of adults identified as deprived. Using a series of regression models we then examine how individual (adult) deprivation indicators vary by various household and individual characteristics focusing in particular on the effect of relative income shares of different household members (which can be seen as indicator of relative power within households). Controlling for household income, the coefficient on the relative income shares captures the extent to which the income pooling holds within household and the extent to which unequal distribution of resources is contributing to the adult deprivation outcome. We then examine the degree of inequality in the distribution of individual deprivation outcomes overall and in each of the countries and we perform a simple simulation exercise to illustrate a 'back of the envelope' assessment of the impact of the elimination of the within household inequality in deprivation status on national deprivation rates and the differences in deprivation rates across groups. Finally, in the last part of the paper we use the Alkire and Foster (2007; 2011) adjusted headcount approach to construct a deprivation index which treats the household and the individual level deprivation indicators respectively as two separate dimensions of the overall index.[1] In addition to providing a flexible way of summarising household and individual deprivations into a single index it can also decomposed by population subgroup and by dimension. Therefore it can reveal difference in the types of deprivations experienced by different countries and by different sub-groups within countries.

We find significant differences in the proportion of adults identified as deprived according to conventional household level material deprivation indicators and the alternative deprivation indicator based on the enforced lack of personal deprivation items at a range of thresholds. Significant differences are also identified both in countries' rank order as well as in the groups identified at high deprivation risk in terms of the two indicators, with the most pronounced being the case for single people either living alone or in multifamily households. Regression analysis reveals that relative income shares have a significant negative effect on the risk of experiencing personal deprivation (i.e. the deprivation risk decreases with the share of

[1] The Alkire and Foster adjusted headcount approach used 'counting' approaches but addresses the problem of identification, and provides axiomatic foundations. The main advantage of the approach is that in addition to allowing decomposition of different groups into the overall multidimensional poverty it also be used to decompose multi-dimensional poverty into its constituents dimensions (therefore allows one to examine how much each dimension contributes to the overall index).

income contributed by the individual). Finally, analysis of the distribution of material deprivation within households shows that around 15 percent of all adults in the sample of countries included in our analysis live in households with inequitable deprivation outcomes and this percentage is even higher in multi-family households. We conclude that both household level and individual level deprivation indicators should be used in the overall assessment of individual deprivation risks, but without losing the variation within households that is revealed by personal deprivation indicators. Our proposed multi-dimensional deprivation index which uses the Alkire-Foster adjusted headcount methodology provides one way to achieve that by treating household and personal deprivation as two separate dimensions of one overall measure. Decomposition of this multidimensional deprivation index suggests that the personal deprivation indicators provide complementary information to household deprivation indicators. We conclude proposing that the recent inclusion of individual-level deprivation items in EU-SILC is a welcome development and should be emulated by other national income and expenditure surveys. Furthermore, social security and other anti-poverty strategies need to be sensitive to the within-household distribution of resources, especially in countries with high rates of co-residence among generations and in low income households.

2. Related literature

Previous research has found that the association between income poverty and deprivation at household level is weaker than one might imagine. One possible explanation is that deprivation reflects the longer-term situation of the household whilst income poverty is in some cases transitory or recent. Whelan et al (2003) find that persistent income poverty over three years is much more strongly correlated with deprivation than cross-sectional poverty, and Kis and Gabos (2016) show that households that are both income poor and materially deprived tend to be larger, less well educated and have a looser connection to the labour market than households who are income-poor only.

The association between income poverty and household deprivation also varies between countries. A number of studies have concluded that economic and institutional factors, including the nature of the welfare state, play an important role in explaining this variation (Visser et al, 2013, using ESS and Figari et al, 2012, using ECHP). Barcena-Martin et al (2013), using EU-SILC, conclude that country-level effects are more important than individual-level characteristics in explaining the variation in country-level deprivation across the EU, but they also note that the two interact: the socio-demographic characteristics of the population are themselves shaped by institutions such as the labour market and broader economy.

One particular aspect of income that appears to matter for intra-household allocations of resources is the source, and the extent to which family members (usually, a couple) pool their incomes. Nagy et al (2012) find considerable variation in the degree of income pooling among couples across European countries, with higher prevalence of income pooling in Southern European countries than in Finland and Austria, for example, whilst Woolley and Marshall (1994) examined the association between inequality in individual incomes and inequality in control over resources.

These studies are focussed on inputs to, and processes within, the household. To ascertain the effect of decisions about income pooling and control over resources, we need to be able to analyse some measure of standard of living outcome. De Henau and Himmelweit (2013) use subjective satisfaction with household income and find that it depends on the share contributed by each individual, as well as on the source of the income: full-time employment is especially positive in this respect. Bonke and Browning (2009) use information on the allocation of different categories of consumption within the household (clothing, recreation, and so on), collected as an addition to the Danish Household Expenditure Survey. Although the shares for men and women vary widely between categories, they find mean shares of total assignable expenditure are similar for the two sexes.

A widely used measure of standard of living outcome is provided by material deprivation, although most indices have been based on household-level information. The construction of these indices has been the subject of some debate (Fusco et al, 2013). Even those that include individual-level information usually aggregate it to household level before incorporating it into a material deprivation measure. Guio, Gordon and Marlier (2012) and Guio and Marlier (2014, 2017a) challenge the robustness of the conventional EU-SILC material deprivation index and propose an alternative, retaining 6 of the current 9 items in the material deprivation (MD) index which pass their tests of reliability, validity and additivity, adding two further household level deprivation items, and for the first time including five personal deprivation items, making a new 13-item index allowing some variation in the intra-household sharing of deprivation (except in selected respondent countries).[2] In separate work Guio is exploring difference in personal deprivation between couples (personal communication). Likewise, Deutsch et al (2015), in their analysis of the order in which households curtail their expenditure when income is short, assign adult deprivation information to all household members if at least half of the adults lack and cannot afford the item in question.

Haddad and Kanbur (1990) assessed how serious is to neglect the intra-household distribution of resources using poverty in calorie intake based on Phillipine data. The authors show that 30 to 40 percent of all inequality is accounted for by intra-household inequality which would be overlooked if individual data was ignored. They also find that the ranking between men and women changes when assessments are based on individual data, with poverty rates among women being higher when using some poverty measures. Another important strand of work, initiated by Cantillon and Nolan (2001), attempts to use individual deprivation measures to open up the 'black box' of intra-household allocations. They illustrated the approach using the difference in deprivation scores between spouses in Irish data. Subsequently Cantillon (2013) examined social and leisure activities, and personal spending, of partners, again in Ireland, and found that the gap between partners is wider where the woman's independent income is a lower share of total household income, and especially if there are children in the household. Most recently, Cantillon, Maitre and Watson (2016) analysed pooling behaviour, household financial decision-making and whether differences in income shares and sources affect individual deprivation outcomes among couples in the 2010 Irish SILC special module. They use a

[2] A version of this proposal was accepted by the EU in March 2017 (see Guio, A.C. D. Gordon, H. Najera, M. Pomati, 2017b)

linear scale of five personal deprivation items and report that overall, men are not more deprived than women, but in 6-7% of couples only the woman is deprived, and in a similar percentage only the man. Somewhat surprisingly, there is no evidence of higher deprivation for the woman where she doesn't have an individual income. The results on income pooling are also counter-intuitive: where income is not fully pooled, the proportion of couples where both are deprived is lower than where there is full pooling (controlling for household income). Shared decision-making is beneficial for both members of a couple however. Having sole responsibility for decision-making is associated with higher levels of personal deprivation – perhaps a form of self-denial.

To summarise, the conclusions that we draw from this literature are, firstly, that cultural, economic and policy (especially welfare state) contexts matter, so we anticipate variation across countries in the relationship between household and personal deprivation. Secondly, it is clear that household income is an important determinant of deprivation risk, but is far from being the sole factor. Thirdly, family and household types vary in their propensities to pool income and, we might expect, in the extent to which the benefits of household income are equally shared by all. And finally, we note that individual income share may be associated with control over resources, and that women tend to have smaller income shares than men within couples. We will therefore pay particular attention to country, household income, family and household type, income share and gender in our analysis and modelling.

Our work builds on this literature, especially the work by Cantillon and colleagues, and extends the existing evidence in a number of ways. Our study is pan-European, includes and separately classifies households containing more than one family unit, investigates within-household inequality in material deprivation, and probes the role of income shares in explaining individual-level deprivation. Our study does not set out to propose a new measure of deprivation for the EU although we do argue that individual-level information and analysis is a useful complement to household-level analysis. The focus of this paper is on adults; child deprivation raises important but distinct methodological and conceptual issues.

3. Data

3.1 General information about the EU-SILC

Data for our analysis come from the European Union Statistics on Income and Living Conditions (EU-SILC) for 2014. The principal aim of the development of EU-SILC has been to compare deprivation and social exclusion across European countries and therefore provides micro data on a wide range of social indicators including income, poverty, social exclusion and living conditions. From 2007 onwards, the EU-SILC represents all 27 Member States, and includes Turkey and Switzerland as non-members alongside Norway and Iceland.

EU-SILC is output-harmonised: that is, rather than data from all countries being collected via a single standard survey instrument, member states are given a list of variables which must be present in the data, but allowed flexibility as to how these may be collected (Iacovou, 2012). This flexibility has several implications for how the data are collected and recorded in different countries. For example, some countries record income

data as net amounts, while other countries record gross amounts. Another example is the reference period for income data which in most countries is the calendar year preceding the year of data collection, but in Ireland it is the 12 months prior to the interview, and in the United Kingdom it refers to the period around the date of interview, with income totals subsequently converted to annual equivalents (for more discussion see Iacovou et al. 2012). Another crucial difference is that some countries rely on survey data while others also use administrative or 'register' data to collect several variables, and obtain other information via interviews with a representative person in the household i.e. the "selected respondent" in EU-SILC terminology (Eurostat, 2008). The countries that use register data are the Nordic countries (Denmark, Finland, Norway, Sweden and Iceland) as well as the Netherlands and Slovenia. We retain as many countries as possible for each analysis we conduct, but for the analysis of within-household inequality in personal deprivation reported in section 5 we are obliged to omit the register countries.

3.2 Measures of material deprivation in EU-SILC

The EU-SILC includes a range of data on material deprivation. These data indicate the inability of individuals to afford some items considered by most people to be desirable or even necessary to lead an adequate life. The official indicators used by the EU are based on the 'enforced lack' concept and distinguish between individuals who cannot afford a certain good or service, and those who do not have this good or service for another reason, e.g. because they do not want or do not need it. Until 2017, the official material deprivation measure used by the EU was constructed to define the proportion of people who cannot afford at least three of the following nine basic items: i) to pay their rent, mortgage or utility bills; ii) to keep their home adequately warm; iii) to face unexpected expenses; iv) to eat meat or proteins regularly; v) to go on holiday; vi) to have a television set; vii) to have a washing machine; viii) to have a car; ix) to have a telephone. A threshold of four of more items is deemed 'Severe Material Deprivation' by the EU and is one of the principal indicators which is used for the Europe 2020 Social inclusion target. Note that the basic deprivation risk in terms of both the above indicators are assigned to each household member but are collected at household level (i.e. only one household member provides information). Thus, they cannot be used to assess intra-household variation in the deprivation outcomes across household members.

The 2014 material deprivation module included a series of questions designed to establish material deprivation at the level of the individual rather than the household. [3] With these questions, each adult in the household had to indicate they lacked because they could not afford any of the following seven items: (i) replace worn out clothes by some new; (ii) to have two pairs of properly fitting shoes; (iii) get together with friends/family for drink/meal at least once per month; (iv) regularly participate in leisure activities; (v) spend a small amount of money each week on yourself; (vi) to have internet connection for personal use at home; (vii) to have regular use of public transport.[4] In survey countries the adult deprivation items were asked of

[3] Adult deprivation questions (along with questions collecting information on children's deprivation) were first included in the 2009 EU-SILC special deprivation module. These questions were refined in the 2014 material deprivation module. With minor modifications they 2014 they have been incorporated in subsequent years of data collection.

[4] For all items except from the regular use of public transport respondents were given the following two options to indicate the reason why they lack each particular item i) no – cannot afford it ii) no other reason. For the regular use of public transport

each household respondent, whereas in register countries only the household respondent was asked. The data from this 2014 module along with the core EU-SILC data from the same year are the data used in our analysis. Based on these items we construct a personal deprivation indicator, which defines an individual as being personally deprived if he cannot afford at least two out of the seven personal level deprivation items (we refer to this indicator as PD2). As there are seven items, our choice of a threshold of two or more items seems appropriate as it provides the closest equivalent to the conventional material deprivation indicator, both in terms of the proportion of items required (2/7 approx = 3/9) and the overall percentage of adults identified as deprived under each index (17.3% for the household deprivation indicator and 19.5% for personal level deprivation indicator – see section 4 for details). We also construct a stricter personal deprivation indicator (analogously to the conventional household level 'Severe material deprivation') by setting the personal deprivation threshold to 3 or more deprivation items. In line with many deprivation measures in common use, we use an enforced lack concept to define individuals' deprivation status, incorporating a subjective evaluation as to whether people are doing without due to inability to afford or for other reasons. While these measures can be thought as trying to capture the impact of financial constraints rather than preferences, there is still some concern that such responses may be influenced by adaptation to economic circumstances, rather than just tastes (McKay, 2004; Dominy and Kempson, 2006; Halleröd, 2006). Given these concerns it is therefore useful to look both at what people report as enforced deprivation and what they simply lack. The assumption of an "enforced absence" however can still be flawed, since preferences may still play a role (for example a person may be spending a high proportion of his or her income on 'unnecessary' types of goods and this person can still be lacking those goods deemed necessary for participating in society).

To examine the reliability of the index, appendix Figure B3 reports the Cronbach alpha statistic for pooled sample of countries is almost 0.80 which suggests that a very high degree reliability of the PD2 index. Though there is considerable variation in the levels of reliability of the index across countries (with Cronbach alpha ranging from 0.60 in Greece to 0.86 in Bulgaria), for the majority of countries the Cronbach's alpha it is over the 0.70 acceptable threshold (Nunally, 1978). The suitability of the different individual deprivation items comprising the index (as indicated by the proportion of people who either have or do not have an item due to financial constraints) is also fairly high, with the exception of public transport. In the pooled sample of all countries, all other items were either possessed or wanted by more than 70 per cent of the population.

3.3 Household and individual incomes

EU-SILC includes detailed information on household income. The official household income measure is defined as the sum of various gross personal income components of all household members plus the sum of gross household level gross income components.

There are ten personal income components included in the EU-SILC household income: i) Gross employee cash or near cash income; ii) Company car; iii) Gross cash benefits or losses from self-employment

respondents were given more options to indicate why they do not have the particular item: i) no ticket too expensive ii) no - station too far away iii) no –access too difficult iv) no private transport v) no other reasons.

(including royalties); iv) Pensions received from individual private plans (other than those covered under ESSPROS); v) Unemployment benefits; vi) Old-age benefits; vii) Survivor' benefits; viii) Sickness benefits; ix) Disability benefits; x) Education-related allowances.

In addition to the above, gross household income includes the following six income components which are collected/recorded at household level: i) imputed rent; ii) income from rental of a property or land; iii) family/children related allowances; iv) social exclusion income not elsewhere classified; v) housing allowances; vi) regular inter-household cash transfers received; v) interests, dividends, profit from capital investments in unincorporated business; vi) income received by people aged under 16. The total household disposable income in EU-SILC is derived by summing up all the above components and subtracting regular taxes on wealth; regular inter-household transfers paid and; iii) taxes on income and social security contributions.

The derivation of gross individual income is a relatively straightforward exercise.as many gross income components are recorded and/collected at individual level. For those recorded at a household level, we need to make some assumptions to allocate them to each household member, assumptions which are necessarily arbitrary given the unobservability of the recipient of these household income streams. Therefore with the exception of children benefits which we assign only to household members with children (applying an equal division principle among adults with children), all other household income components are divided equally across all adult household members.

The derivation of *net* individual income is a more complex exercise. The reason is that the net equivalents of the various individual income components are available only in a minority of countries. We use net individual income components where these are available. Where they are not, we follow the principle of allocating total tax payments (recorded or a derived estimate) in proportion to individuals' gross income shares. Details are given in Appendix A2.

3.4 Family and co-residence status classification

Identifying the different family units within each household plays a central role in the analysis in this paper. In constructing our family and household type variable we define a family unit an adult, plus his/her partner (if any), plus any dependent children. We classify family units into six categories: singles with no children; singles with children (i.e. lone parents); couples with no children; couples with children; elderly singles (aged 65 or over); or elderly couples (at least one aged 65 or over). We further distinguish between family units living alone, i.e. forming their own household, and family units living with others in what we term a 'multi-family household'. Examples include a couple (with or without dependent children) plus a grown-up son or daughter; a couple or a single person (with or without dependent children) plus an elderly parent; a couple or single person plus a lone parent who has moved back in with her parents when her partnership ended; or two unrelated individuals. A critical decision we had to make to identify the different family units within each household has been how to define a dependent child. For the purposes of consistency and comparability, we classify as a dependent child any person under age 18 unless he/she reports employment and self-employment

income. This is our central definition, though we also consider the robustness of our main results to a wider dependent children definition which defines as dependent to their parents any child under age 24. While we recognise that cultural norms may play a crucial role in the extent to and in the situation in which adult children are considered as dependent to their parents the crucial determinant of co-residence decision in most countries income. Indeed much of the evidence today suggests that even in countries with high rates of multigenerational co-residence privacy is a normal good; individuals with more resources choose to live alone (Bianchi et al,?) though evidence for parents is more mixed with some research suggesting that cohabitation is a normal good for Italian parents (Manacorda and Moretti, 2010).

Figure 1 shows the proportion of adults who live in multi-family households in different countries. The general pattern that may be observed is that there are large differences across European countries in the prevalence of multi-family households. Appendix Figure B1 shows the impact of adopting a wider dependent children definition. Reflecting the high co-residence rates of young adults with their parents results in a decrease in the proportion of people over 16 living in multi-family households and a corresponding increase in the proportion of one-family household consisting of couples with dependent children. The impact of the alternative definition of dependency is substantial in all countries.

Figure 2 presents the distribution of adults across different family types for each country separately and for all countries as a whole. Mirroring the results of Figure 1, overall across all countries, over a third of all adults live in multi-family households. The majority of adults overall and in most countries is belong in the couples with dependent children family type (19 per cent), followed by single adults who live in multi-family households (these are mainly grown up children over the age of 18 who are living with their parents). The next more prevalent family type is elderly and non-elderly couples who live in one-family households (14 and 12 per cent respectively) and single non-elderly adults living alone (9 percent). Couples with no dependent children and couples with dependent children who live in multi-family households follow with a prevalence of 8 per cent and 6 per cent respectively. Next are elderly couples and elderly single people living in multi-family households (each around 3 percent) and lone parents living in one-family households and multi-family households (2 and 1 per cent respectively).

Table 1 explores in more detail the composition of multifamily households. It shows that the majority of couples with dependent children live in households which include their grown up adult children (64 percent) a 23 percent in households which include their parents (mainly singles parents) and a further 9 percent live in households which include both their grown up children and parents. Compared to couples with dependent children, the proportion of couples with no dependent children who live with their grown up adult children is even higher (89 percent) whereas the proportion who live with their elderly parents is smaller. The majority of single adults live with their both their parents (who may or may not have children), although a substantial proportion live with their single non-elderly parents (around a fifth of all single adults in multifamily households) and elderly parents (another fifth). Looking at the living arrangements of elderly people, we see that the majority of elderly people (79 percent of couples and 54 percent of single people) live with their adult

children (who are either single or lone parents) and a much lower proportion with their married (or cohabiting) children.

Looking across countries we see that, though there is quite large variation across countries in the prevalence of different family types, in most countries the differences in the prevalence of multi-family households across countries mainly reflects differences in the co-residence patterns of singles adults and to a lesser extent differences in the co-residence patterns of elderly people. Appendix Figure B2 shows the sensitivity of our assessment about the household structure and living arrangements in different EU countries to the wider dependent children definition which treats all people under 24 as dependent children. As one would expect adopting this alternative dependent children definition, results in a decrease in the proportion of people falling in the couple with children living in a multifamily household and the single no children living with others family types and an increase in the proportion of individuals (over age 16) in couple with dependent children one family households.

4. Descriptive analysis of the

4.1 Country-level deprivation rates in terms of the household level and personal level deprivation indicators

Table 2 compares the proportion of adults identified as deprived in terms of the two household level deprivation indicators (cols. (1) and (2)) and in terms of the two personal level deprivation indicators (col. (3) and (4)). Focusing on aggregate country level comparisons first, we note that there are some important differences across the two indicators. In five countries the indicator based on enforced lack of two or more personal deprivation items (PD2) is more than 3 percentage points higher than in terms of the conventional material deprivation indicator based on the enforced of three or more household level deprivation items HD3 (BU, DE, MT, RO, UK) while for another eight countries the difference is between 1 and 3 percentage points (BE, ES, FR, LT, AT, IS, CH). But there are also countries where the deprivation rate is higher in terms of HD3 than the PD2 indicator. The HD3 rate is more than 3 percentage points higher than the PD2 rate in nine countries (CZ, EE, EL, HR, CY, LV, SK, FI, SE) while it is between 1 and 3 percentage points higher than the PD2 rate in six countries (IE, IT, PL, PT, SI). In further six countries the difference in terms of the two indicators is less than one percentage point (DK, LU, HU, NL, SE, NO).

Results in Table 3 indicate that the degree of overlap between individuals identified as deprived in terms of the household level and the individual level deprivation indicators is rather limited. In the pooled sample of all countries, it can be observed that 27 percent of all adults have been identified as deprived in terms of the household level deprivation indicator and/or the individual deprivation indicators but only 12 percent are identified as deprived in terms of both indicators. A further 9 percent of all adults are identified only as personally deprived and further 7 percent are identified as being only household level deprived. Country level results further indicate that the degree of variation in the degree of overlap between the two indicators varies substantially across counties: ranging from around 59 percent in Bulgaria to less than 21 percent in Finland. No consistent pattern can be observed across countries as to the extent to which the lack of overlap is correlated

with a higher household level of individual level deprivation risk (i.e. the proportion of deprived adults identified household level deprived or personal level deprived only varies substantially across countries).

Appendix Figure B4 considers the implications of basing our deprivation evaluations on the PD2 indicator as opposed to HD3 indicator in terms of country rankings. Mirroring the results discussed above we see some significant differences in the rank order of the countries if one bases his/her evaluation on the PD2 indicator as opposed to the HD3 indicator. Based on the HD3 indicator, Norway is coming as the least deprived country and Bulgaria the most deprived country whereas under the PD2 indicator the least deprived country is Sweden and the most deprived Romania. Though, generally movements are relatively short-distanced (the majority of the countries move only 1 or 2 places in the rank order), there are countries, that differences in the ranks in terms of the two indicators are quite substantial. The UK, MT and DE fell respectively 8 (from 13 to 21), 7 (from 18 to 25) and 5 places (from 10 to 15). On the other hand, HR, CY increase their rank by 9 and 7 places respectively while CZ and FI by 6 places and 5 places.

4.2 Differences in the characteristics of people identified as deprived in terms of the HD3 and PD2 indicators

In this section we compare the characteristics of people identified as deprived in terms of the personal and household level deprivation indicators. The characteristics that we examine include a set of individual and household characteristics that are identified in the relevant literature as being associated with a higher risk of material deprivation either by affecting the needs or the resources of the individual including their age, sex, family and household type, health status, income and working status. Figure 3 presents the proportion of adults in the pooled sample of all countries who are identified as deprived in terms of PD2 and the HD3 deprivation indicators by gender, age group and family type. Appendix Table B1a and B1b shows the results for each of the countries separately.

According to the statistics in this figure women face a higher deprivation risk in terms of both indicators but the gap between men and women is higher in terms of the deprivation indicator which is based on the personal deprivation items. This suggests that women are more over-represented in the population of deprived individuals in terms of the PD2 than the HD3 indicators.

The age profile of material deprivation is also different across the two indicators. In terms of the HD3 indicator the deprivation risk is found to be higher among age groups below 65 and especially among the 17-24 age group (22 percent) and lower for older age groups with the oldest age group (i.e. people 75+) being those with the lowest deprivation risk (of 15 per cent)[5]. The age profile of the in terms of the PD2 indicator is different. The PD2 rate is higher among the 45-64 age group (22 per cent), and then lower for subsequently older age groups (note that the fall in deprivation in term of the PD2 indicator is less steep than in terms of the HD3 indicator) to reach around 18 percent for people over 75. Except from differences in the age profile of

[5] For further discussion about the deprivation risk among older people see (McKay, 2004) and Dominy & Kempson (2006).

individuals who are HD3 deprived as opposed to those classified at PD2 deprivation risk, there are also significant differences in the relative risk of deprivation in terms of the two indicators across different age groups. More specifically, we see that up to the 25-35 age group the deprivation rate is higher in terms of HD3 indicator than the PD2 indicator whereas for older age groups the pattern is reversed (i.e. the risk is higher in terms of the personal deprivation than in terms of the household level deprivation).

Looking across family types we see there is a substantial variation in the material deprivation risk in terms of both the HD3 and the PD2 indicators. The variation across family types, however, appears to be stronger in terms of the HD3 indicator than the PD2 indicator. Also as a general pattern we observe that the PD2 rate is higher among people living in one-family households than those living in multi-family households (which most likely reflects differences in needs and available resources). Lone parents are at the highest risk of all family types of both household and personal deprivation. This is the case whether they are living alone or in a multi-family household; however those who are living with others have a lower risk of personal deprivation than those who are not. Elderly singles also have relatively high risks of household and personal deprivation. Living in a multi-family household is not associated with a lower risk of personal deprivation for this group, suggesting that living in a multi-family household does not fully insure against deprivation risk. Single adults with no children are more likely to experience household deprivation than personal deprivation, and their risk of personal deprivation is substantially lower if they are living in multi-family households. Couples, with or without children, generally have lower rates of household deprivation and of personal deprivation, than singles. This holds for both those in one-family households and multi-family households, although those in multi-family households have higher rates of deprivation (both household and personal) than those in one-family households.

Appendix Tables B2 and B3 break down the HD3 and PD2 risks by gender, age and family type for each of the countries in our analysis. Despite the substantial cross-country differences in the overall deprivation rates in terms of both indicators the relative differences in the deprivation risks across groups exhibit very similar patterns across countries.

5. Multivariate analysis

5.1 Baseline results

In this section, we estimate a series of probit models to explore which characteristics are associated with identifying an adult to be i) HD3 deprived and ii) PD2 deprived. In each regression, the deprivation indicator is the binary dependent variable which is regressed on a set of explanatory variables. The general formulation of our models is similar to that specified below:

$$Prob(\mathrm{D}_i = 1) = X_i\beta_i + \varepsilon_i \quad (1)$$

where D_i is the relevant deprivation status indicator of person i, X_i is a vector of individual and household characteristics which affect the probability of being deprived in terms of each indicators, β_i is a vector of parameters to be estimated and ε_i is an error term which we assume to follow a standard normal distribution.

In all equations, the vector X includes the individual's gender, age, quadratic in age, a set of dummies indicating individual's family type broken down by co-residence status, homeownership status and equivalised household income. In the PD2 equation the vector X_i also includes a set of dummies indicating the number of household level deprivation items lacked in the household the individual lives as well as the share of individual's personal income in total household income (i.e. the contribution of individual in total household income). The latter variable is used as a proxy of the distribution of relative power within the household.[6]

At baseline we estimate each equation for each type of deprivation risk for the pooled sample of all countries and family types including country and family type controls. Table 4 shows the results of the three probit models for each of the three deprivation indicators. To facilitate interpretation, we report average marginal effects instead of probit coefficients. A graphical representation of the effects of the main variables included in the models, is given by Figure 4 which plots the average predicted probabilities as a function of each of the main variables included in the models, with all other characteristics held constant at their observed values.[7]

Looking first at the effects of age we see that in terms of both indicator (i.e. HD3 and PD2) age exhibits a hump-shaped age profile. However, as can be seen more clearly in Figure 3, the deprivation age profile is much flatter in terms of HD3 indicator than the PD2 indicator. According to this people in late middle age (late 50s) are at significantly higher risk of personal deprivation than either younger or older people. The curve for household deprivation by age is flatter and peaks at a younger age (early 40s). Large and statistically significant differences are also estimated by family type in terms of both indicators even after controlling for differences in age, income, gender and for the PD2 indicator for the individual's contribution to total household income. Lone parents face the highest risk of all family types of both household and personal deprivation. This is the case whether they are living alone or within multi-family households; however those who are living with others have a lower risk of personal deprivation than those who are not. Elderly singles irrespective of whether they live in one-family or multi-family households also have relatively high risks of household and personal deprivation. On the other hand, single adults with no children are more likely to experience household deprivation than personal deprivation, and their risk of personal deprivation is substantially lower if they are living in a multi-family household. Couples, with or without children, generally have lower rates of household deprivation and of personal deprivation, than singles. This holds for both those in one-family households and

[6] In the intra-household allocation literature, an identification strategy of the parameters of the collective models is to assume that there is at least one assignable good and to examine how demands for these goods responds respond to distributional factors i.e. variables that influence 'who gets what' in the household through their impact on relative power within the household (e.g. the relative earnings power of husband and wife and societal factors such as the sex ratio) (Browning, et al., 1994; Chiappori 1994). Goods that have been used so far include men's and women's clothing, and leisure. The use of these leisure and clothing however is not without problem. For leisure it is problematic to assume that non-market time is private consumption of leisure is problematic if there is home production (Apps and Rees, 1997) while private consumption of men's and women's clothing is valid as private consumption if members of couples are indifferent to each other clothing choices.

[7] More specifically, to calculate these predicted probabilities we take our sample and predict each person's probability of being deprived based on regression coefficients from the models presented in Table 2 keeping all characteristics at their observed values except from the characteristic the effect of which we want to evaluate (e.g. family type). Then, for each family type, we compute the average probability of being deprived. The first panel in the Figure 2a starting from the left, for example, represents the average predicted probability of being deprived in terms of PD2 indicator for different family types while keeping all other characteristics at the observed values.

in multi-family households, although those in multi-family households have higher deprivation risks (both household and personal) than those in one-family households. As one would expect household income has a substantial and very similar effect on both types of deprivation risk. For the personal deprivation indicator, the individual income share also has a significant negative effect on the deprivation risk. This indicates that holding household income and other observed characteristics constant an increased individuals' income share decreases the individual deprivation risk, which in turns seems to provide evidence against the unitary model. A final remark that should be made with respect to the results in Table 4 is that the marginal effects on the country dummies suggest that country differences in the rate of deprivations are either fully explained or in some cases over-explained (i.e. countries with very high observed levels of deprivation risk come out as being those with significantly lower predicted deprivation risk levels) by cross-country differences in the distribution characteristics of their population. For example, controlling for household income and other characteristics of the population, adults in the Czech Republic are *less* likely to report being PD2 deprived than those in Belgium. Although this could be the result of structural differences that lead to the relationship between household income and deprivation being different across countries (including price differences), it also points to the possibility that deprivation questions are being interpreted differently, and/or that there are systematic differences in preferences. To explore the role of such differences appendix Table B2 explores the difference between the 'simple lack' and 'enforced lack' indicators of personal deprivation. Although the sizes of the estimates of some of the key variables included in the model, change slightly if we move from an 'enforced lack' to the 'simple lack' measure the results overall indicate only a partial role of preferences in explaining the results above.

In the rest of this section we examine the determinants of being deprived in terms of the personal deprivation indicator by family type and country. Table 5 presents results from models predicting the probability of being deprived estimated for each family type separately (including country dummies). The marginal effects on the log equivalised household income variable are very strong and significant across all family types, though they vary in magnitude quite substantially, with stronger effect estimated for people in family types who live in multi-family households (especially for single adults in multi-family households). Turning to the individual's income share, we find that the marginal effect on this variable also varies substantially across the family type models (a graphical representation of the effects is shown in Figure 5). Individual income shares are not significant predictors of the personal deprivation risk in one-family households (with the exception of couple with no children, where it has a small effect) whereas it has substantial effects in all multi-family households models and especially for lone parents; for single people with no children; and for couples with no children.

Country level models (Table 6) also reveal substantial variation in the strength of the association between different characteristics and the personal deprivation risk. Substantial differences are estimated for the effect of equivalised household income and homeownership status as well as for the effect of family type. But more notably for the analysis of the paper the estimates suggest substantial country differences in the effect of individual income shares (for a graphical representation of the estimated effects see Figure 6). The marginal

effect of the individual income share variable ranges from around 21 percentage points in Latvia (which implies that an individual who brings no income into the household face a 21 percentage points higher risk of personal deprivation than an individual who is the sole contributor of the household's income – or 65 percent higher than the country specific average deprivation risk) to non-significance in many countries including Ireland, Cyprus, Denmark and Sweden.

Country level estimates for each family type are reported in Table 7. For most countries, the effect of the income share variable varies substantially for individuals living in different family types. As a general patterns however, it can be observed that in most countries, the effect of individual income share are the largest for people living in multi-family households. However, the results also suggests that the individual income share variable also has some significant effect estimated for married or cohabiting individuals (with or without dependent children) who live in one-family households in a number of countries including Bulgaria, Italy, Latvia, Luxemburg, Hungary, Poland, Romania, Slovakia and Serbia. In further four countries the effect of the individual income share variable is significant for married (or cohabiting) individuals with dependent children but not those with no dependent children (Belgium, Czech Republic, France, and Finland) and in further six countries the effect is significant for those with no dependent children than for those without children (Germany, Estonia, Cyprus, Lithuania, Netherlands and Austria). The effects of the individual income share variables are even stronger for married (or cohabiting) individuals who live in multi-family households. The strongest effects however are estimated for single adults who live in multi-family households. Strong effects for the individual income share variables are also estimated for the lone parents in multi-family households but the small sample size raises concerns about the reliability of the estimates.

Differences between countries can potentially be explained by national differences in the labour markets, demographics and welfare states (including the tax system, provision of public goods and social protection policy). It is beyond the scope of the paper to further investigate the factors driving the relationships, but it is an issue that requires further investigation.

5.2 Sensitivity analysis

We perform several sensitivity analyses including analyses to explore the possibility of differential effects of the income share variable by gender and differential effects of the individual income share variables at different parts of its distribution.

Gender differences in the effect of individual income share: First we want to see whether the individual income share has a differential effect by gender. We estimate a series of models similar to that specified by equation (1) which also includes an interaction term between gender and the income share variable. We first estimate a model for the pooled sample of countries and family types (including family type and country dummies) and then we run separate models by family type (with country dummies controls). Table 8 reports the marginal effects on selected variables included in the models. In pooled model of countries and family types we find a statistically positive coefficient for the interaction between gender (female) and income share, implying that the negative effect of the income share variable is weaker for females than for males. However,

looking across the table (i.e. the models estimated for each family type separately) we see that the magnitude of interaction term in most family type models is very small and statistically insignificant. The only exception is the model estimated for single people living in multifamily household in which a positive and statistically significant effect is estimated for the interaction between gender (female) and income share.

Exploring non-linearities in the effect of the individual income share: All models discussed so far abstract from the possibility that the individual income share has differential effects at different parts of the individual income share distribution (i.e. they assume linearity in the income share effects). In this section we explore possible non-linearities in the relationship between individual income share and personal deprivation outcomes using a three segment linear spline function of the income share variable with knots at 25 and 50 percent. Table 9 reports marginal effect of the income share splines from family type level models. For most family types, a statistically significant negative effect is estimated only for the second income share spline (i.e. which capture the effect of increases in the individual's income share of between 25th and 50th percent) while it is insignificant for the low and the high income share splines (i.e. the ones that indicates increases in individual income share of between 0 and 25 percent and over 50 percent respectively). Single people in multi-family household is the only family type for which we find significant negative effects of the income share variable at low levels of income share distribution.

6. An assessment of the magnitude of the within household inequality in adult deprivation outcomes

In the section above we saw that holding everything else constant adult deprivation is affected by the individual's income share. The fact that the relative income share variable has a significant effect on adult deprivation outcomes implies that there is unequal distribution of personal deprivation outcomes across household members within households and that the relative income share is a significant distributional factor. In this section we will look closer at the degree of inequality in the personal deprivation outcomes between individuals within households and its variation by family type and co-residence status to determine the degree of the bias in the assessment of individual's living standards from household level indicators. We then perform a simple simulation exercise illustrate a 'back of the envelope' assessment of the impact that the elimination of the within household deprivation status inequality would have on national deprivation rates and the differences in deprivation rates across groups. Because this analysis requires information from all adult household members, not just the household reference person, we omit register countries. We also omit Ireland (because of high rates of missing data for other household members) and the UK (because the relevant questions are not asked of both members of a couple).

In order to examine the extent of inequality in personal distribution outcome across individuals within households we classify individuals in terms of their own (PD2) deprivation status and other adult household members' deprivation status into the following four groups:

(i) deprived individual who lives in a household where no other household member or only some household members are PD2 deprived;

(ii) deprived individual who lives in a household where all others household members are PD2 deprived;

(iii) non-deprived individual who lives in a household where at least someone else is deprived;

(iv) non-deprived individual who lives in household where everyone else is also non-deprived;

Figure 7 shows the percentage of adults falling in each of these four groups. The statistics are presented overall for all adults and by individuals' family and co-residence status. Overall across all family types, 11 per cent of adults live in households where there is some degree of inequality in the distribution of deprivation status across their adult household members. This proportion is much higher among the deprived than non-deprived adults: a third of deprived adults live in households where there are both deprived and non-deprived adults compared to around 10 per cent of non-deprived adults. This proportion is much higher among couples than among singles as well as among adults who live in multi-family household than those in one-family households. Overall, looking at both deprived and non-deprived individuals, household inequality in deprivation outcomes affects a quarter of adults in multi-family households compared to less than 5 per cent of adults in one-family households (note that this group includes single-adult households, where by definition there can be no inequality in adult deprivation). Though it is expected that the level of within household deprivation will be higher among multi-family households (since inequality naturally depends on household size) it is also indicative of the degree of inequality which one would not expect to be observed under the equal sharing assumption.

Results in Figure 8 indicate that the extent of inequality in personal deprivation outcomes (measured by the proportion of adults who live in households where household members do not share the same deprivation status) varies substantially across countries. The inequality ranges from over 20 per cent in Serbia, Bulgaria, Romania and Greece to less than 10 per cent in a number of countries including Austria (9 per cent), Estonia, France, Germany (8 per cent) Czech Republic and Belgium (6 per cent) and to less than 5 per cent in Switzerland (5 percent) and Luxemburg (4 per cent). This variation only partly reflects cross-country differences in living arrangements as can be seen by the variation in the level of inequality of countries with similar proportion of multi-family households.

Although the analysis above provides insights about the proportion of individuals living in households with unequal distribution in adult deprivation outcomes, the finding also give rise to another question. Namely, what effect would the elimination of within household inequality would have on country level adult deprivation rates? To answer this question, we undertake a simple simulation which illustrates a 'back of the envelope' assessment of the impact that the elimination of the within household deprivation status inequality would have on national deprivation rates and the differences in deprivation rates across groups. The simulation is undertaken under two scenarios. The first scenario (s1) assumes perfect equality in deprivation status within households where there is some inequality in the distribution of deprivation status across their household members. The second scenario (s2) imposes perfect equality in non-deprivation across all household members

i.e. all adults who live in household where household members do not share the same deprivation status are assumed to be non-deprived. In Figure 7 we report the results of this simulation exercise by presenting the deprivation rates under each of these two scenarios along with the observed deprivation rate overall for all countries and for each country separately. The lower point in each line shows the deprivation rate estimate under *s1* (i.e. the deprivation rate that would have prevailed if all adults who live in households with unequal deprivation outcomes were assigned a non-deprived status) while the upper point shows the deprivation rate estimate under *s2* (i.e. the deprivation rate that would have prevailed if all adults who live in households with unequal deprivation outcomes were assigned a non-deprived status). The *s1* and *s2* estimates can be thought as providing lower and upper bound deprivation estimates respectively under the perfect within household equality in deprivation assumption. Looking across countries we see under *s1* the deprivation rates decrease between 1 and 12 percentage points, with an average decrease across all countries of around 6 percentage points. As one would expect the countries for which *s1* has the largest impact are those characterised by higher within-household deprivation status inequality (Romania, Bulgaria, Serbia, Greece and Hungary). Scenario *s2* produces an increase in the deprivation rate of between 2 and 13 percentage points, with an average increase in all countries of around 6 percentage points. Note that on average and in some countries the effects of s1 and s2 are symmetric (the increase and decrease that they suggest is of the same magnitude) which suggests that within household where there is inequality in adult deprivation outcomes the proportion of deprived and non-deprived is very similar. However, in number of countries the decrease and the increase in deprivation rates implied by *s1* and *s2* are not symmetric. There are countries where the increase in deprivation implied by *s2* is higher than the decrease implied by *s1* suggesting that the observed within household distribution of deprivation outcomes in these countries are closer to the perfect equality in deprivation scenario. And vice versa there are countries where the observed deprivation outcomes are closer to the equality in non-deprivation scenario.

7. An adjusted headcount multi-dimensional deprivation index

The evidence above highlighted how our assessments about the deprivation risks in a given population depends on whether one bases his/her assessment on household level and the personal level deprivation indicators and provided robust evidence about the effect of within household inequality in the distribution of personal deprivation outcomes. Material deprivation indicators that combine information on personal level deprivation items can better approximate the individual well-being. In this section we propose combining the conventional EU material deprivation indicator and the alternative deprivation indicator based on the enforced lack of personal deprivation items to construct a multi-dimensional deprivation index using the approach developed by Alkire and Foster (2007, 2011). As highlighted by Whelan et al. (2011), this approach "…allows one to examine in a structured way the implications of key measurement choices for levels of multi-dimensional poverty, the dimensional profile and the socio-economic processes involved" (Whelan et al. 2011, p. 184).

The Alkire and Foster method consists of two main stages. The first stage counts the (weighted) number of indicators in which individuals experience deprivation; this requires the selection of dimensions, indicators for each dimension, as well as binary cut-offs for what constitutes deprivation in each dimension. The second

stage involves deciding which of these individuals experience a number of deprivations exceeding a chosen cut-off value. Individual above this cut-off are therefore identified as multi-dimensionally poor in this context while those below the cut-off are removed from consideration ('censored' in Alkire and Foster terminology). Three relevant statistics are defined by this approach. The first is the multi-dimensional poverty headcount *H* which indicates the proportion of all individuals who are multi-dimensionally poor (also known as multidimensional poverty incidence or censored headcount ratio); the second is the multi-dimensional poverty intensity *l* which measures the average number of deprivations experienced by those who are multi-dimensionally poor and; the third and the central statistic is the adjusted headcount ratio which is the product of the headcount rate and the average intensity of multi-dimensional poverty. The main advantage of the Alkire and Foster approach and very useful for our analysis is the dimensional and sub-group decomposability of the index.

In what follows we use the household level and personal level deprivation indicators as two separate dimensions for the implementation of the Alkire and Foster adjusted headcount approach. As discussed in section 2 the *personal level deprivation indicator* comprises of seven items relating to inability: to replace worn out clothes; to have two pairs of properly fitting shoes; get together with friends/family for drink/meal at least once per month; regularly participate in leisure activities; spend a small amount of money each week on yourself; to have internet connection for personal use at home; to have regular use of public transport. The *household level deprivation* items consists of nine items indicating inability to pay their rent, mortgage or utility bills; to keep their home adequately warm; to face unexpected expenses; to eat meat or proteins regularly; to go on holiday; to have a television set; to have a washing machine; to have a car.

We used the same threshold to define who is poor in each dimension as in earlier parts in the paper i.e. being household level deprived if the individual lives in household lacking 3 or more of the household level deprivation items and being deprived in terms of the personal level indicator if the individual lacks more than 2 personal level deprivation items (as we saw in the previous section this approach broadly identifies a similar proportion of individual as 'deprived' in each dimension). We apply equal weight in each of the two dimensions and we defined as 'multidimensionally' deprived those individuals who are above the deprivation specific threshold in at least one of the dimensions.

In Table 9 we show breakdowns by country for the adjusted headcount index, the headcount index and the mean intensity (note that both register and non-register countries are included in this analysis). Statistics for the pooled sample of all countries are also included in the table for comparison. The headcount statistics in column (1) indicates a large variation across countries in the proportion of individuals above the multi-dimensional poverty threshold (i.e. being above the poverty threshold on at least one of the two dimensions), with a range of around 4 per cent in Sweden to 65 per cent in Romania. By contrast the deprivation intensity statistics among those identified as multi-dimensionally deprived in column (2) exhibit considerably smaller variation. Variation in the adjusted headcount index in column (3) is generally comparable with the unadjusted headcount index, ranging from around 0.01 to 0.26. Columns (10) and (11) show the contribution of each of the two dimensions in the overall adjusted headcount index broken down by country. Again we see some

important variation in the relative importance of the two dimensions across countries. Personal deprivation dimension contributes from a low of just over a fifth in Finland (23 percent) to just under two thirds in Switzerland (65 percent) in the overall index. Other countries in which the personal level deprivation contributes over 60 per cent to the overall multi-dimensional deprivation include Romania (64 per cent), Malta (63 percent), Iceland (61 per cent) and Germany (60 percent) while in a number of countries (e.g. France, Belgium, Bulgaria, Luxemburg, Sweden and Spain) the contribution of personal deprivation indicator to the overall index ranges between 55 and 60 percent.

8. Conclusions

Material deprivation is usually assessed using household level deprivation indicators. In this paper we used individual level deprivation data from the 2014 EU-SILC ad-hoc material deprivation to illustrate the sensitivity of deprivation estimates to using individual level rather than household level deprivation indicators and to examine the implications of intra-household inequality on individual material deprivation outcomes focusing on, but not limited to, effects for multi-family households.

Analysis of the determinants of individual deprivation risk based on a pooled probit model predicting the probability of being deprived in terms of the individual level deprivation indicator, confirm that household income, gender, age, family type and co-residence status (i.e. whether living in one-family or multi-family households) are all independent predictors of the individual's deprivation risk. A statistically significant negative effect is also estimated on the share of total household income contributed by the individual suggesting that individuals who contribute a higher share of total household income are statistically significantly less likely to be deprived in terms of the individual level deprivation indicator than those who contribute a lower share of total household income. Separate models by country reveal a substantial variation across countries in the effect of individual's income share, which indicates that control over resources have a differential effect in individual deprivation outcomes in different countries. Separate models by family type and co-residence status show that individual income share is not significant predictor of the individual's deprivation risk in most types of one-family households whereas it is a significant predictor in most types of multi-family households, consistent with the interpretation that sharing of resources is less complete in these types of households. In the last part of the paper we presented a combined deprivation index which was constructed treating the conventional household level and the individual level deprivation indicators as two separate dimensions to the overall index following the Alkire and Foster adjusted headcount approach. Decomposition by dimension shows that the individual deprivation indicator contributes more than household level deprivation indicator in the overall index, though there are some substantial differences in the relative contribution of the two dimensions across countries. Overall, the evidence presented suggests that personal deprivation indicators provide complementary information to household deprivation indicators and that both should be used in the overall assessment of deprivation risks, but without losing the variation within households that is revealed by personal deprivation indicators.

The analysis in this paper confirms once again that the distribution of resources within households is not always to the equal benefit of all members. This is especially the case for complex households, where we find higher levels of within-household inequality in personal deprivation. Co-residence does not always protect against personal deprivation, even when others in the household are non-deprived. We find that income share matters more to personal deprivation risks in these complex households, and especially for lone parents; for singles with no children; and for couples with no children.

Personal deprivation indicators provide complementary information to household deprivation indicators. Both should be used in the overall assessment of deprivation risks, but without losing the variation within households that is revealed by personal deprivation indicators. The Alkire-Foster methodology provides one way to achieve that by treating household and personal deprivation as two separate dimensions of one overall measure.

References

Apps, P and R. Rees (2005) 'Collective Labour Supply and Household Production' *Journal of Political Economy*, University of Chicago Press, vol. 105 (1) pp. 178-190.

Alderman, H. Chiappori, P.-A. Haddad, L. Hoddinott, J. Kanbur, R. (1995) 'Unitary versus collective models of the household : is it time to shift the burden of proof? (English)'. *TheWorld Bank research observer. -- Vol. 10, no. 1 (February 1995), pp. 1-19*.

Alkire, S., Foster, J. (2007) Counting and Multidimensional Poverty Measurement. Oxford Poverty and Human Development Initiative OPHI Working Paper 7. Oxford: Oxford Department of International Development, University of Oxford

Alkire, S., Foster, J. (2011a) 'Understandings and Misunderstandings of Multidimensional Poverty Measurement', *Journal of Economic Inequality* 9, 289–314.

Alkire, S., Foster, J. (2011b) 'Counting and Multidimensional Poverty', *Journal of Public Economics* 95: 476–87.

Atkinson, A. (2003) 'Multidimensional Deprivation: Contrasting Social Welfare and Counting Approaches', *Journal of Economic Inequality* 1: 51–65.

Atkinson A. B., Guio A.C., Marlier E. (2015) "Monitoring the evolution of income poverty and real incomes over time." The London School of Economics and Political Science (LSE), CASEpapers n°188, 44 p.

Becker, (1974) 'A theory of Social Interactions', Journal of Political Economy Vol.82, pp. 1063-1094.

Becker, G.S. (1981) A Treatise on the Family (Cambridge, Mass: Harvard University Press).

Bradshaw, J. and Finch, N. (2003) 'Overlaps in Dimensions of Poverty', Journal of Social Policy 32(4): 513-525.

Berthoud, R., Bryan, M. and Bardasi, E. (2004) 'The Dynamics of Deprivation: the Relationship Between Income and Material Deprivation Over Time', Department for Work and Pensions , Research Report No. 219. Google Scholar

Boarini, R. and M. Mira d'Ercole (2006), "Measures of Material Deprivation in OECD Countries", *OECD Social, Employment and Migration Working Papers*, No. 37, OECD Publishing, Paris.

Bourguignon, F., Browning, M. and Chiappori, P-A. (2009), 'Efficient intra-household allocations and distribution factors: implications and identification', *Review of Economic Studies*, vol. 76, pp. 503–26.

Browning, M. and Bonke, J. (2009), 'Allocation within the household: direct survey evidence', University of Oxford, Department of Economics, Discussion Paper no. 429.

Browning, M., F. Bourgignon, P.A. Chiappori and V. Lechene (1994) 'Income and Outcomes: Structural Model of Intra-household Allocation' Journal of Political Economy, University of Chicago Press, vol. 102(6), pp. 1067-1096, December.

Browning, M. Chiappori, P.-A., Lechene, V. (2006), 'Collective and unitary models: a clarification', *Review of Economics of the Household*, vol. 4, pp. 5–14.

Browning, M. P.A. Chiappori and A. Lewbel (2013) 'Estimating Consumption Economies of Scale and Household Bargaining Power" Review of Economic Studies, Oxford University Press, vol.80(4) pp.1267-1303.

Browning, M. P.A. Chiappori and V. Lechene (2004) "Collective and Unitary models: A clarification" Centre for Applied Micro-econometrics, Institute of Economics, University of Copenhagen, Working paper 2004-15

Browning, Martin & Francois Bourguignon & Pierre-Andre Chiappori & Valerie Lechene, 1994. "Income and Outcomes: A Structural Model of Intrahousehold Allocation," Journal of Political Economy, University of Chicago Press, vol. 102(6), pages 1067-1096, December.

Browning, M. and Lechene, V. (2003), 'Children and demand: testing for exogeneity', Review of Economics of the Household, vol. 1, pp. 9–31.

Cowell, F. A. and Flachaire, E. (2017), Inequality with Ordinal Data. Economica, 84: 290–321. doi:10.1111/ecca.12232

Deutsch J., Guio A.C., Pomati M., Silber J. (2015) "Material Deprivation in Europe: Which Expenditures Are Curtailed First?" Social Indicators Research, vol. 120, n°3, pp. 723-740.

Dominy, N. and Kempson, E. (2006) Understanding Older People's Experiences of Poverty and Material Deprivation, Department for Work and Pensions Research Report No. 363. Leeds: Corporate Document Services

Eurostat (2012) "Measuring material deprivation in the EU: Indicators for the whole population and child specific indicators" Eurostat and Methodologies Working Papers 2012 edition. Eurostat, Luxemburg

Fusco A., Guio A.C., Marlier E. (2010) Income poverty and material deprivation in European countries. Eurostat Methodologies and Working Papers, http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-RA-10-030

Halleröd, B. D. Larsson, D. Gordon and Veli-Matti Ritakallio, (2006) "Relative deprivation: a comparative analysis of Britain, Finland and Sweden", *Journal of European Social Policy*, 16, 4, (328)

Haddad, L., & Kanbur, R. (1990). 'How serious is the neglect of intra-household inequality?' *Economic Journal*, 100(402), 866–881

Guio H., Guio A-C., Marlier E., Vanhercke B., Ward T. (2014) "Putting the fight against poverty and social exclusion at the heart of the EU agenda: A contribution to the Mid-Term Review of the Europe 2020 Strategy." OSE Paper Series, Research Paper No.15.

Guio A.C., Marlier E. (2013) "Alternative versus current measures of material deprivation at EU level: What difference does it make?" ImPRovE, 2013, ImPRovE Working Papers no. 7/2013.

Guio A.-C. and E. Marlier (2017a) "Amending the EU material deprivation indicator: impact on size and composition of deprived population" in Atkinson A.B., A.C. Guio and E. Marlier (eds.) Monitoring inclusion in Europe, Statistical books, Eurostat, 2017

Guio, A.C., D. Gordon, H. Najera, M. Pomati (2017b) "Revising the EU material deprivation variables", Eurostat Statistical Working papers, 2017 edition, Eurostat

Guio A. C., Marlier E., Gordon D., Fahmy E., Nandy S., Pomati M. (2016) "Improving the measurement of material deprivation at the European Union level". *Journal of European Social Policy* vol. 26, no.3, pp. 219-333.

McKay, S. (2004), Poverty or preference: what do 'consensual deprivation indicators' really mean?. Fiscal Studies, 25: 201-223. doi:10.1111/j.1475-5890.2004.tb00102.x

Lohmann, L. (2011) "Comparability of EU-SILC survey and register data: The relationship among employment, earnings and poverty" Journal of European Social Policy Vol 21, Issue 1, pp. 37 – 54

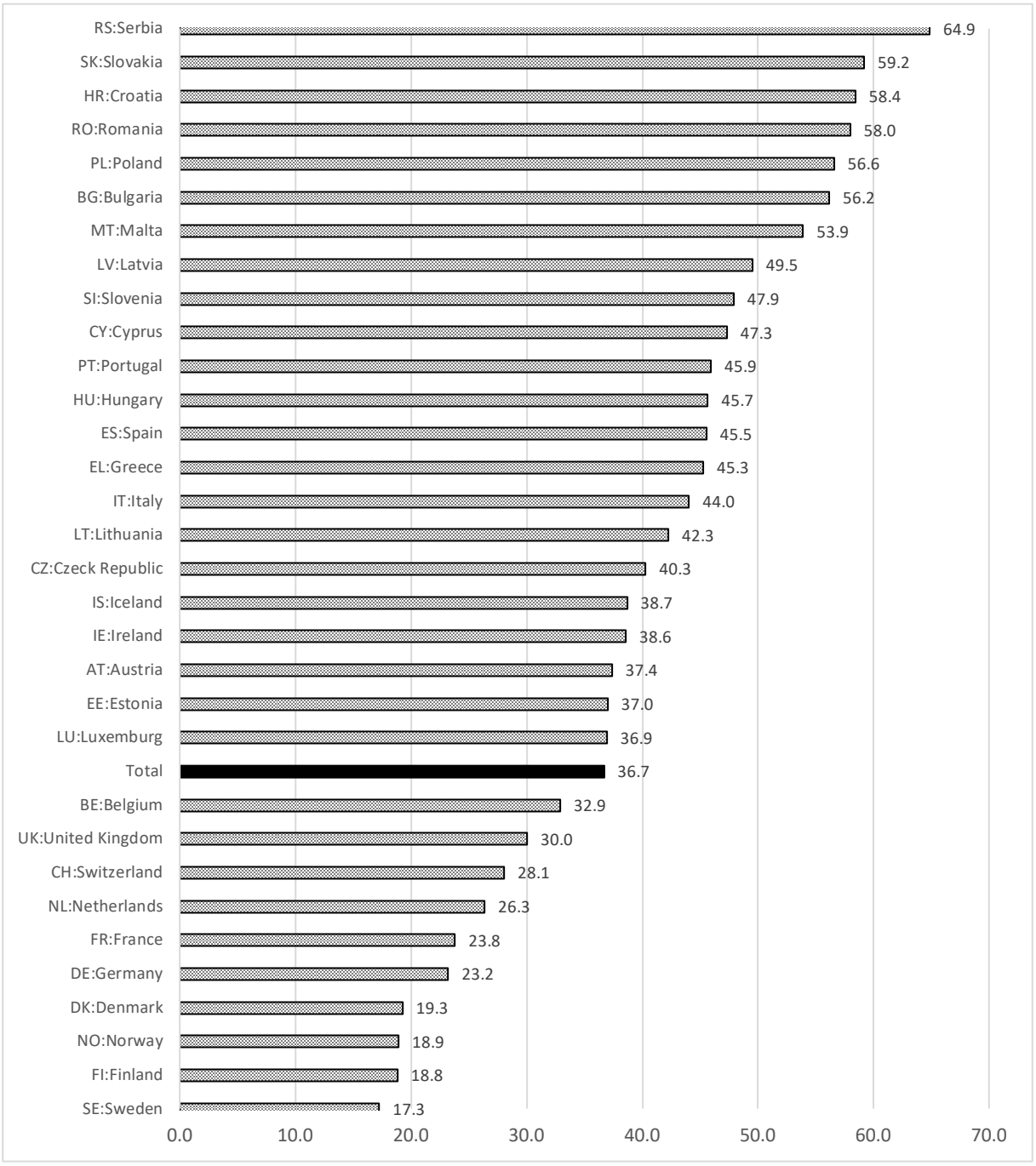
Iacovou, M. O. Kaminska, H. Levy (2012) "Using EU-SILC data for cross-national analysis: strengths, problems and recommendations*"* ISER Working paper no. 2012-03

Manacorda, M. and Moretti, E. (2006), "Why do most italian youths live with their parents? intergenerational transfers and household structure." *Journal of the European Economic Association*, 4: 800-829. doi:10.1162/JEEA.2006.4.4.800

Marlier E., Guio A.C. (2004) "The Laeken Indicators: Some Results and Methodological Issues in new EU Member States and Candidate Countries." EMERGO, Journal of Transforming Economies and Societies, vol.11, no.2, pp. 21-48.

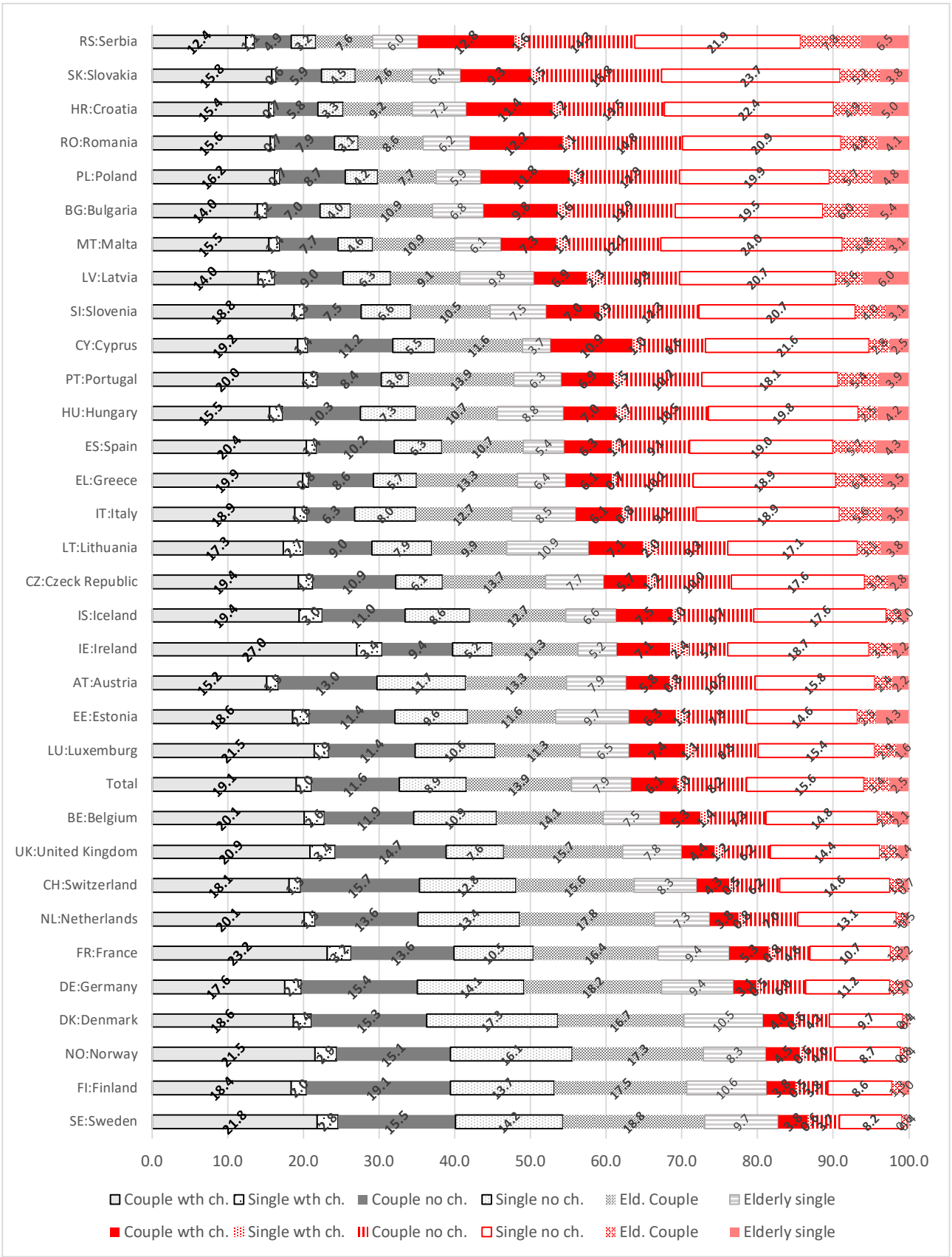
Nunally, J.C. (1978) *Psychometric Theory, 2nd edn.* New York: McGraw-Hill

Figure 1: Proportion of individuals aged 16+ who live in multi-family households



Source: Own calculation using EU-SILC 2014 cross-sectional data- User's database.

Figure 2: The distribution of adults in different family types classified by marital status, presence of dependent children and number of families with the household (one-family vs multi-family households)



Source: Own calculation using EU-SILC 2014 cross-sectional data- User's database.

Table 1: Percent of adults of different family types who live in multi-family households consisted of adult children and/or parents

	Couples with dependents who live with						Couples with no dependents who live with					Single (non-elderly) adults living with…					
	…adult children	…adult children and parents	…non-elderly parents	… elderly couples parents	…single elderly parents	N (weighted)	… adult children	… single others	… elderly couple parents	… elderly single parents	N (weighted)	… parents with no dep.	… parents with dep.	… elderly single parents	… elderly single others	… non-elderly single parents	N (weighted)
BE: Belgium	87.8	1.3	2.4	1.4	1.8	541	93.5	1.9	0.5	1.0	840	33.2	16.4	6.2	6.6	22.1	1644
BG: Bulgaria	25.8	16.3	6.8	15.1	28.1	810	76.2	1.5	0.8	5.2	919	32.6	7.6	11.5	13.1	21.2	1370
CZ: Czech Republic	79.1	6.3	1.4	2.5	8.9	613	93.7	0.7	0.2	1.7	1058	36.1	12.8	8.5	10.6	23.4	1845
DK: Denmark	93.1	0.8	0.7	0.0	0.5	250	94.2	4.7	0.2	0.5	243	25.5	21.5	1.9	2.0	28.0	557
DE: Germany	91.1	0.7	1.2	0.3	2.2	2298	94.6	1.2	0.8	1.6	5322	42.0	13.3	10.5	5.6	20.2	9435
EE: Estonia	66.3	8.5	3.0	1.4	17.6	89	80.9	2.1	0.7	7.7	100	27.4	16.0	6.9	17.2	21.0	188
IE: Ireland	81.6	1.5	1.9	0.2	6.5	289	85.8	9.9	0.0	1.1	229	17.0	16.1	10.3	7.7	14.4	810
EL: Greece	64.1	9.2	0.5	10.2	17.1	687	91.4	0.9	0.4	4.6	1101	35.1	11.3	18.6	12.2	13.3	2053
ES: Spain	69.3	6.7	2.8	3.9	11.7	3000	89.7	2.7	1.5	2.7	4155	30.3	12.1	14.9	14.6	14.4	8659
FR: France	92.2	1.4	0.1	1.8	1.0	3170	94.6	0.8	0.0	2.5	3017	27.3	23.7	5.6	6.1	24.1	6849
HR: Croatia	43.5	17.3	4.5	10.3	19.7	511	82.0	0.9	0.7	3.1	528	33.5	15.0	11.3	15.5	16.9	900
IT: Italy	73.3	4.2	2.8	4.1	11.3	3836	92.7	1.5	0.5	2.8	5904	33.4	12.3	16.5	12.4	15.8	11862
CY: Cyprus	82.9	4.5	1.0	1.7	2.5	89	91.3	1.9	1.0	1.1	70	28.0	27.8	5.7	4.7	16.8	186
LV: Latvia	46.8	15.0	2.7	7.3	24.3	148	75.9	2.9	1.4	9.0	188	23.8	8.5	7.2	18.0	25.6	402
LT: Lithuania	56.1	12.7	4.6	3.8	22.5	221	86.7	0.8	0.6	4.1	275	30.3	11.5	8.0	12.8	26.4	498
LU: Luxemburg	78.1	3.1	3.0	2.7	8.2	36	92.0	1.0	0.6	2.4	42	35.6	19.7	9.5	5.5	21.4	78
HU: Hungary	54.4	13.3	7.0	1.9	15.7	704	87.3	1.3	0.5	3.2	1028	31.7	10.5	5.1	12.5	25.6	1947
MT: Malta	86.4	3.7	0.1	3.5	5.0	35	94.2	0.5	0.4	0.6	52	37.8	16.5	13.9	6.8	16.2	101
NL: Netherlands	96.6	0.7	0.0	0.1	0.5	690	98.7	0.7	0.0	0.1	1250	38.9	17.3	5.3	2.4	19.5	2218
AT: Austria	74.0	4.2	3.2	7.5	10.1	548	92.8	1.1	0.5	3.4	852	41.2	16.5	5.9	5.4	18.1	1320
PL: Poland	32.6	21.8	4.3	16.1	24.4	4747	79.5	0.6	2.2	5.3	4028	33.7	14.2	11.4	14.0	15.1	6770
PT: Portugal	61.0	8.8	3.5	7.2	16.8	751	87.4	1.5	0.7	4.6	1085	31.8	11.7	14.8	11.5	18.4	1882
RO: Romania	37.3	15.3	6.7	12.0	17.8	2797	73.2	1.9	2.7	6.2	2720	33.4	15.4	8.7	11.5	16.3	4180
SI: Slovenia	68.5	9.4	3.8	4.9	10.9	150	90.9	0.9	0.8	2.6	245	38.0	13.1	9.8	10.6	19.1	414
SK: Slovakia	47.9	11.8	5.4	12.1	13.3	511	85.1	0.7	1.1	2.4	736	42.7	12.0	10.5	9.3	13.3	1170
FI: Finland	95.4	0.0	0.0	0.3	3.1	224	96.0	1.3	0.1	0.9	219	27.5	24.2	7.3	6.0	22.7	472
SE: Sweden	96.4	0.0	0.8	0.0	0.3	394	96.0	2.7	0.0	0.0	384	29.6	24.2	3.9	3.2	22.1	817
UK: United Kingdom	75.0	5.8	3.0	2.7	9.6	2682	88.8	4.8	0.7	1.3	3754	24.7	12.1	9.1	6.4	21.0	9059
IS: Iceland	87.1	2.5	0.7	0.3	0.7	26	91.1	3.3	0.0	0.2	29	35.4	22.6	5.8	2.4	16.8	52
NO: Norway	95.6	0.4	0.2	0.1	0.7	245	98.2	0.8	0.0	0.0	209	29.3	26.6	4.5	3.2	24.1	441
CH: Switzerland	84.0	2.4	0.0	1.3	6.1	386	92.6	3.5	0.5	2.0	527	33.9	19.2	8.6	4.3	19.5	1215
RS: Serbia	23.9	20.4	6.3	20.4	26.6	988	73.7	1.0	2.2	5.8	813	29.9	8.1	12.0	16.4	22.0	1423
All countries	64.3	9.0	3.1	6.8	12.6	32468	88.7	1.8	0.9	3.0	41922	32.6	14.3	10.9	9.8	18.7	80816

Continues in next page…

Table 1 (continues from previous page)

	Elderly couple living with…					Elderly singles living with…					
	… children who are couples with dependent children	…children in couples with no dependent children	…with single adult children	.. single other adults	N (weighted)	… children who are couples with dependent children	…children in couples with no dependent children	…with single adult children	.. single other adults	… elderly single children	Total
BE: Belgium	2.0	1.7	73.4	3.4	258	1.9	1.8	40.8	13.5	6.8	262
BG: Bulgaria	20.3	1.7	68.6	2.8	439	20.1	6.9	43.0	8.9	4.9	388
CZ: Czech Republic	2.9	0.5	82.9	4.2	356	5.0	3.0	59.2	8.8	7.9	324
DK: Denmark	0.2	1.6	79.2	16.1	27	0.0	5.7	44.4	5.8	3.8	24
DE: Germany	0.0	2.4	88.5	3.9	1395	2.3	8.8	49.8	1.6	11.6	854
EE: Estonia	1.4	2.0	66.3	9.4	35	9.5	7.0	52.2	5.5	7.7	61
IE: Ireland	0.4	0.0	84.0	12.9	149	6.9	1.8	55.3	4.3	0.4	109
EL: Greece	5.1	0.6	88.9	1.1	728	12.6	7.4	59.3	4.8	2.3	402
ES: Spain	2.8	2.5	81.5	5.2	2831	5.7	3.3	55.2	7.2	5.9	2117
FR: France	1.8	0.0	89.1	1.9	882	1.5	4.6	49.5	8.4	7.6	897
HR: Croatia	16.3	1.7	75.3	1.4	213	13.1	4.6	64.6	3.8	1.8	208
IT: Italy	3.1	0.7	87.9	2.2	3924	6.8	3.8	57.4	5.4	6.7	2452
CY: Cyprus	3.7	2.8	70.8	20.4	26	3.6	1.8	33.0	50.3	2.3	25
LV: Latvia	8.6	3.9	67.9	8.8	76	8.5	7.7	52.9	7.6	4.1	127
LT: Lithuania	6.7	1.9	72.6	2.8	96	13.1	5.5	55.4	6.3	4.1	113
LU: Luxemburg	3.2	1.6	88.0	3.4	15	14.9	7.8	46.3	4.3	9.7	9
HU: Hungary	3.1	2.1	73.0	5.0	261	8.8	4.2	57.8	6.4	6.1	442
MT: Malta	2.6	1.0	90.9	2.2	27	4.4	1.1	46.1	9.7	1.7	14
NL: Netherlands	0.4	0.0	94.7	0.0	209	1.9	0.9	51.0	8.8	5.9	98
AT: Austria	13.1	2.1	72.8	6.0	211	9.7	8.8	39.0	10.0	11.1	183
PL: Poland	25.8	4.5	57.8	1.4	2106	18.3	8.1	50.0	3.7	4.3	1593
PT: Portugal	4.2	1.3	78.8	4.9	616	9.3	6.8	48.8	7.4	3.7	433
RO: Romania	24.9	8.0	55.3	4.2	985	17.3	11.4	48.4	3.4	4.9	838
SI: Slovenia	5.2	2.4	84.5	2.9	86	7.7	5.5	63.5	6.4	3.4	66
SK: Slovakia	13.5	3.1	77.2	0.7	267	13.4	5.5	50.7	8.8	2.7	186
FI: Finland	1.0	0.3	91.7	1.6	75	5.8	1.8	51.8	6.5	8.6	60
SE: Sweden	0.0	0.0	96.6	3.4	62	1.6	0.0	71.1	6.6	9.4	41
UK: United Kingdom	2.0	1.6	84.8	8.0	1723	7.5	3.2	63.7	5.4	4.6	979
IS: Iceland	1.2	0.0	88.9	6.6	6	2.8	0.8	39.3	28.6	6.7	3
NO: Norway	0.0	1.0	95.1	1.3	43	2.9	0.0	72.4	5.6	3.3	21
CH: Switzerland	0.0	0.5	96.5	2.5	175	2.7	0.6	68.2	13.1	2.9	65
RS: Serbia	25.2	3.7	57.5	2.4	529	17.0	6.7	49.9	5.2	3.8	429
All countries	7.8	2.2	79.1	3.6	18833	9.1	5.4	53.7	6.0	5.9	13822

Source: Own calculation using EU-SILC 2014 cross-sectional data- User's database.

Table 2: Percentage of adults deprived using the conventional material deprivation indicators and alternative personal deprivation indicators according to different deprivation thresholds

	Conventional household level material deprivation indicators according to different thresholds			Personal level material deprivation indicators according to different thresholds	
	HD3: 3 items or more	**HD4: 4 items or more**		**PD2: 2 item or more**	**PD3: 3 items or more**
BE: Belgium	0.110	0.058		0.136	0.091
BG: Bulgaria	0.462	0.322		0.532	0.422
CZ: Czech Republic	0.155	0.061		0.083	0.046
DK: Denmark	0.071	0.029		0.078	0.041
DE: Germany	0.108	0.046		0.150	0.098
EE: Estonia	0.158	0.062		0.115	0.061
IE: Ireland	0.209	0.082		0.190	0.096
EL: Greece	0.380	0.207		0.331	0.151
ES: Spain	0.165	0.062		0.185	0.120
FR: France	0.113	0.046		0.140	0.087
HR: Croatia	0.336	0.139		0.167	0.096
IT: Italy	0.218	0.108		0.203	0.142
CY: Cyprus	0.325	0.129		0.169	0.085
LV: Latvia	0.343	0.189		0.313	0.193
LT: Lithuania	0.284	0.134		0.296	0.183
LU: Luxemburg	0.044	0.012		0.052	0.032
HU: Hungary	0.386	0.226		0.382	0.283
MT: Malta	0.193	0.095		0.279	0.191
NL: Netherlands	0.083	0.028		0.080	0.041
AT: Austria	0.083	0.035		0.098	0.050
PL: Poland	0.217	0.100		0.197	0.115
PT: Portugal	0.250	0.100		0.231	0.149
RO: Romania	0.412	0.234		0.577	0.446
SI: Slovenia	0.175	0.069		0.146	0.075
SK: Slovakia	0.212	0.090		0.155	0.095
FI: Finland	0.077	0.028		0.027	0.012
SE: Sweden	0.025	0.006		0.030	0.013
UK: United Kingdom	0.134	0.063		0.191	0.102
IS: Iceland	0.042	0.012		0.069	0.027
NO: Norway	0.030	0.011		0.026	0.013
CH: Switzerland	0.039	0.010		0.064	0.033
RS: Serbia	0.443	0.264		0.373	0.272
Total	0.177	0.085		0.194	0.126

Note: 1. The household deprivation indicator adopted by the Social protection committee measures the percentage of the population that cannot afford at least three of the following nine items: i) to pay their rent, mortgage or utility bills; ii) to keep their home adequately warm; iii) to face unexpected expenses; iv) to eat meat or proteins regularly; v) to go on holiday; vi) to have a television set; vii) to have a washing machine; viii) to have a car; ix) to have a telephone. The 'Economic strain' dimension consists of items (i)-(v). The 'durables' dimension items (vi)-(ix). 2. The personal deprivation items are: The personal material deprivation index we use, measures the proportion of people who cannot afford at least two out of the following seven personal deprivation items i) to replace worn out clothes; ii) to have two pairs of properly fitting shoes; iii) get together with friends/family for drink/meal at least once per month; iv) regularly participate in leisure activities; v) spend a small amount of money each week on yourself; vi) to have internet connection for personal use at home; vii) to have regular use of public transport). *Source*: Own calculation using EU-SILC 2014 cross-sectional data- User's database.

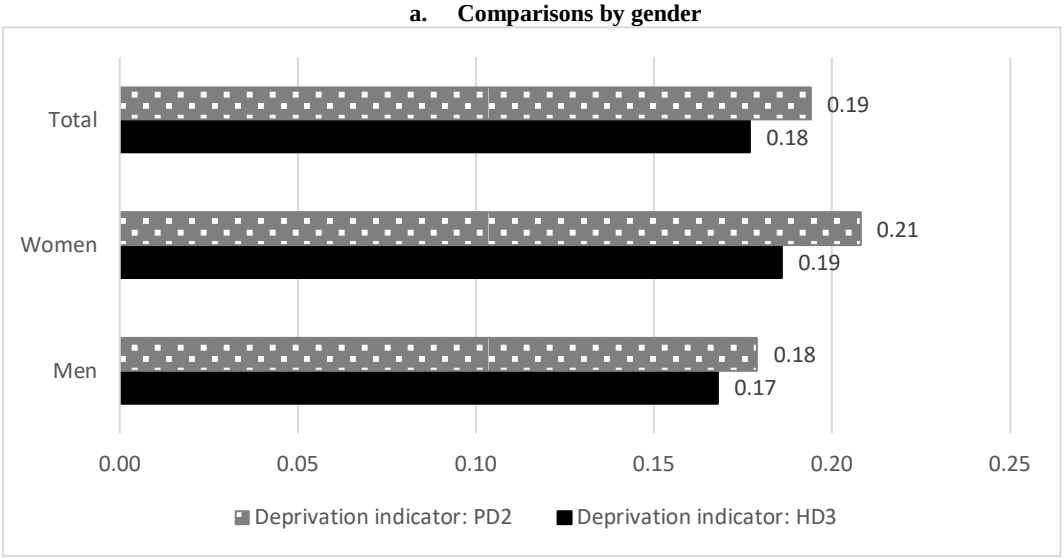
Table 3: Percentage of adults deprived in terms of both, none and in either the household level and personal level indicator

	HD3=0 & PD2=0 *(not deprived in either of the deprivation indicators)*	**HD3=1 & PD2=1** *(deprived in terms of both of the deprivation indicators)*	**HD3=0 & PD2=1** *(deprived in terms of the personal level deprivation indicator only)*	**HD3=1 & PD2=0** *(deprived in terms of the household level deprivation indicator only)*
BE: Belgium	82.98	7.63	6.01	3.37
BG: Bulgaria	37.52	37.01	16.24	9.23
CZ: Czech Republic	81.93	5.75	2.54	9.79
DK: Denmark	86.96	4.72	4.17	4.15
DE: Germany	81.12	6.97	8.08	3.84
EE: Estonia	79.84	7.1	4.39	8.67
IE: Ireland	72.73	12.57	6.39	8.32
EL: Greece	51.32	22.47	10.64	15.57
ES: Spain	74.73	9.66	8.8	6.81
FR: France	81.98	7.26	6.71	4.05
HR: Croatia	62.04	12.4	4.33	21.23
IT: Italy	70.18	12.29	7.97	9.55
CY: Cyprus	63.11	12.44	4.41	20.04
LV: Latvia	55.33	20.95	10.36	13.36
LT: Lithuania	60.29	18.23	11.36	10.12
LU: Luxemburg	92.46	2.08	3.16	2.3
HU: Hungary	50.92	27.73	10.48	10.87
MT: Malta	65.98	13.17	14.74	6.11
NL: Netherlands	85.96	5.11	4.13	4.81
AT: Austria	86.55	4.69	5.13	3.64
PL: Poland	69.88	11.23	8.45	10.44
PT: Portugal	66.33	14.5	8.63	10.54
RO: Romania	34.92	33.76	23.9	7.43
SI: Slovenia	76.95	9.05	5.6	8.4
SK: Slovakia	72.69	9.38	6.07	11.86
FI: Finland	89.5	2.16	0.83	7.51
SE: Sweden	94.97	1.64	1.9	1.5
UK: United Kingdom	76.26	8.77	10.37	4.6
IS: Iceland	89.72	2.85	4.81	2.63
NO: Norway	94.43	1.86	1.47	2.25
CH: Switzerland	91.88	2.18	4.22	1.72
RS: Serbia	45.34	26.89	10.38	17.38
Total	73.18	11.28	8.61	6.92

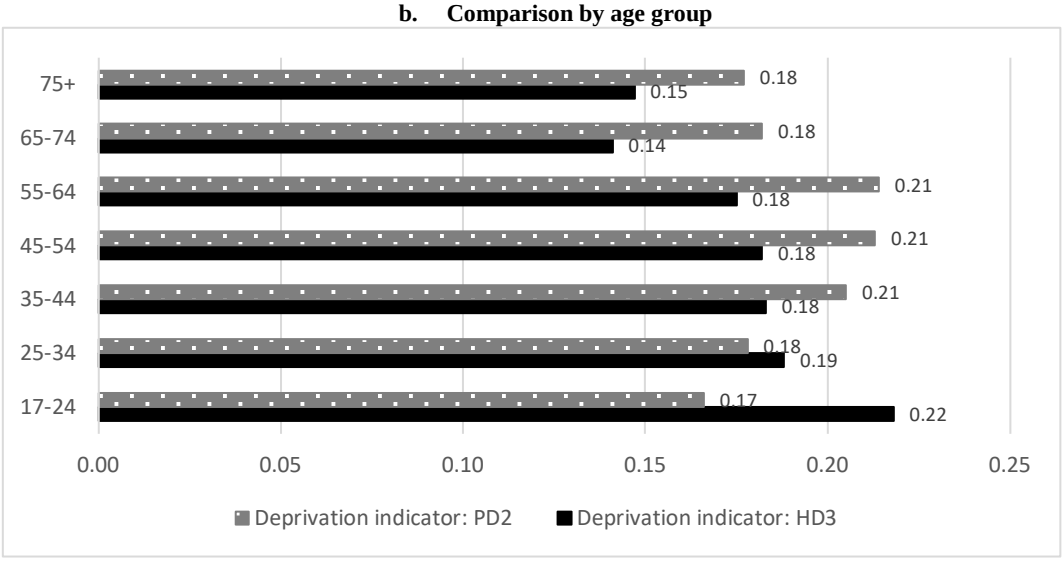
Source: Own calculation using EU-SILC 2014 cross-sectional data- User's database.

Figure 3: Across group differences in the deprivation rates in terms of HD3 and PD2 indicator

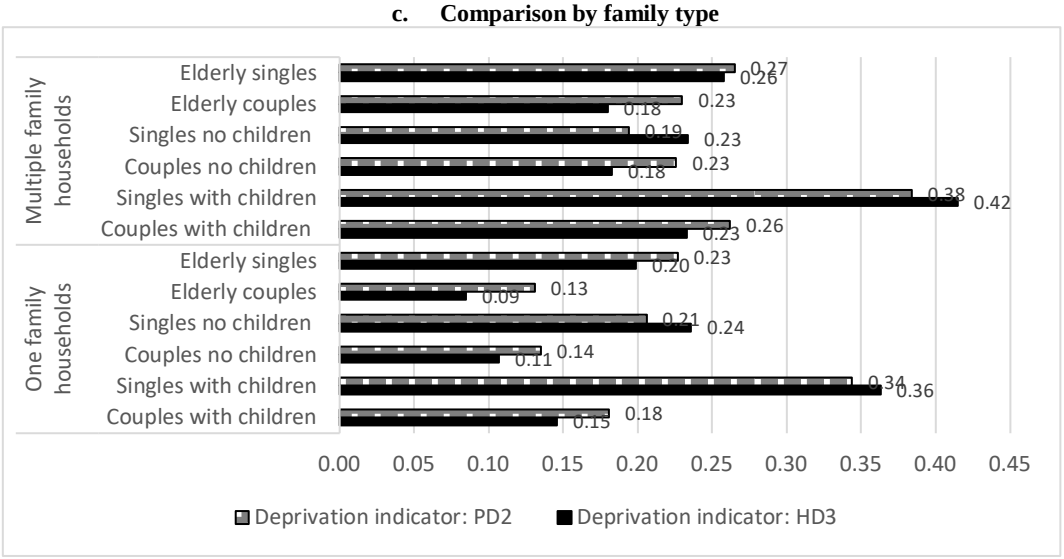
a. Comparisons by gender



b. Comparison by age group



c. Comparison by family type



Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Table 4: Marginal effects from probit models predicting the probability of being HD3 and PD2: pooled regression of all countries

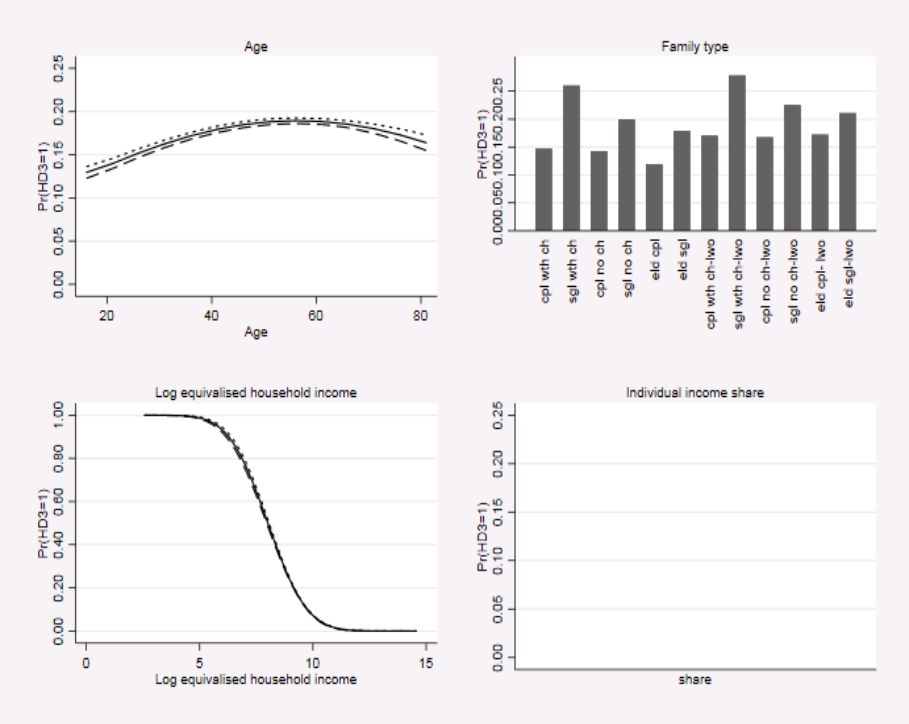
	Prob(HD3=1)	**Prob(PD2=1)**
Age	0.005***	0.007***
	(12.43)	(19.71)
Age squared	-0.000***	-0.000***
	(-10.63)	(-14.73)
Woman	0.005***	0.001
	(4.17)	(0.97)
Family type (ref: couple with children in one- family hhs)		
Single with children in one family household	0.113***	0.024***
	(14.12)	(3.59)
Couple no children in one family household	-0.004	-0.016***
	(-0.97)	(-3.86)
Single no children in one family household	0.053***	-0.025***
	(11.32)	(-6.07)
Couple elderly people in one family household	-0.028***	-0.026***
	(-5.85)	(-5.31)
Single elderly people in one family household	0.032***	-0.002
	(5.38)	(-0.41)
Couple with children in multi-family household	0.023***	-0.009*
	(4.34)	(-1.85)
Single with children in multi-family household	0.131***	0.016*
	(13.07)	(1.91)
Couple no children in multi-family household	0.020***	-0.015***
	(4.23)	(-3.58)
Single no children in multi-family household	0.078***	-0.026***
	(16.90)	(-6.98)
Couple elderly people in multi-family household	0.025***	-0.018***
	(3.74)	(-3.05)
Single elderly people in multi-family household	0.064***	-0.027***
	(9.04)	(-4.34)
Log equivalised household income	-0.158***	-0.062***
	(-57.37)	(-31.02)
Proxy respondent	0.003	-0.016***
	(1.15)	(-7.14)
Home-owner	-0.128***	-0.028***
	(-37.90)	(-11.19)
Individual's share in total household income		-0.056***
		(-20.65)
Lives in hh deprived from one household level deprivation item		0.102***
		(38.25)
Lives in hh deprived from two household level deprivation item		0.253***
		(64.25)
Lives in hh deprived from three household level deprivation item		0.405***
		(74.66)
Lives in hh deprived from four or more household level deprivation item		0.600***
		(98.22)
Country: (ref. BE: Belgium)		
BG: Bulgaria	-0.013	0.015*
	(-1.37)	(1.95)
CZ: Czech Republic	-0.072***	-0.142***
	(-9.48)	(-25.78)
DK: Denmark	-0.023**	-0.036***
	(-2.03)	(-4.32)
DE: Germany	-0.032***	0.009
	(-4.34)	(1.51)
EE: Estonia	-0.088***	-0.119***

	(-11.21)	(-20.35)
IE: Ireland	0.102***	-0.034***
	(9.88)	(-4.57)
EL: Greece	0.064***	-0.052***
	(7.23)	(-8.65)
ES: Spain	-0.012	-0.043***
	(-1.52)	(-7.29)
FR: France	0.008	-0.001
	(0.96)	(-0.23)
HR: Croatia	-0.014	-0.148***
	(-1.52)	(-26.60)
IT: Italy	0.068***	-0.031***
	(9.00)	(-5.90)
CY: Cyprus	0.166***	-0.096***
	(15.65)	(-16.21)
LV: Latvia	-0.018**	-0.070***
	(-2.05)	(-11.63)
LT: Lithuania	-0.046***	-0.058***
	(-5.11)	(-8.58)
LU: Luxemburg	-0.024**	-0.042***
	(-2.15)	(-5.12)
HU: Hungary	0.001	-0.053***
	(0.11)	(-8.89)
MT: Malta	0.026***	0.036***
	(2.86)	(4.94)
NL: Netherlands	-0.037***	-0.050***
	(-3.98)	(-6.97)
AT: Austria	-0.035***	-0.023***
	(-3.85)	(-3.24)
PL: Poland	-0.081***	-0.104***
	(-10.68)	(-18.50)
PT: Portugal	-0.016*	-0.067***
	(-1.92)	(-11.51)
RO: Romania	-0.083***	0.016**
	(-9.51)	(2.03)
SI: Slovenia	-0.007	-0.081***
	(-0.92)	(-14.63)
SK: Slovakia	-0.040***	-0.107***
	(-4.82)	(-18.08)
FI: Finland	-0.016**	-0.139***
	(-2.00)	(-22.38)
SE: Sweden	-0.106***	-0.084***
	(-12.83)	(-11.44)
UK: United Kingdom	0.027***	0.036***
	(3.25)	(5.76)
IS: Iceland	-0.059***	-0.036***
	(-5.96)	(-4.21)
NO: Norway	-0.024**	-0.059***
	(-2.50)	(-7.83)
CH: Switzerland	-0.037***	-0.003
	(-3.32)	(-0.36)
RS: Serbia	-0.075***	-0.110***
	(-8.78)	(-18.07)
Observations	482553	442470
Pseudo R-squared	0.235	0.374

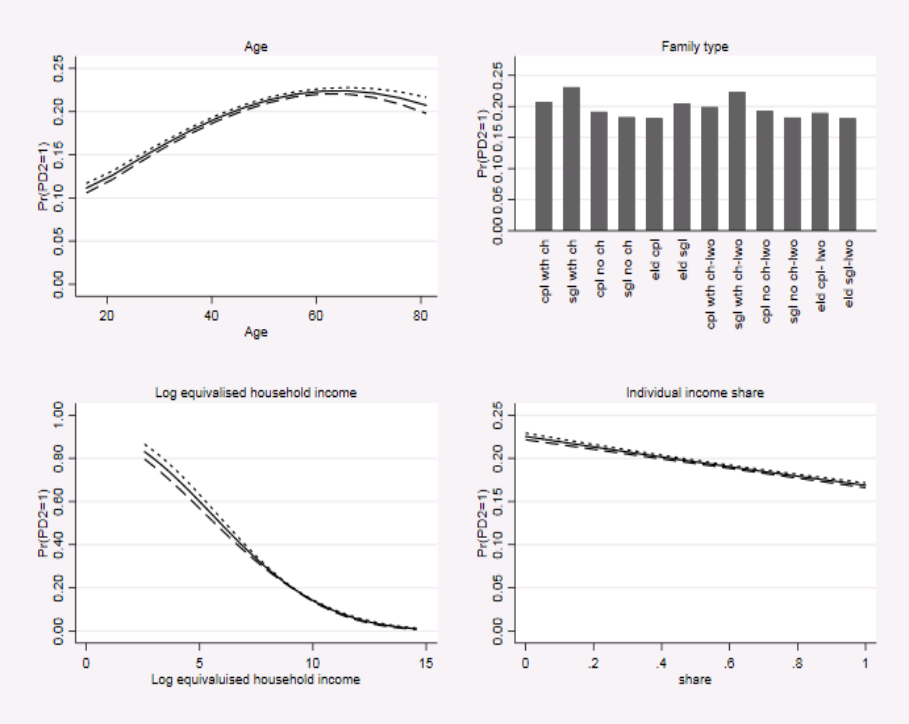
Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. Standard errors are clustered at household level. t-statistics in parentheses. *, **, ***, indicate statistical significance at 10, 5 and 1 percent level respectively.

Figure 4: Predicted probabilities of PD2 and HD3 by family type, age, equivalised household income and adult income share

a. Predicted probabilities of HD3=1



b. Predicted probabilities of PD2=1



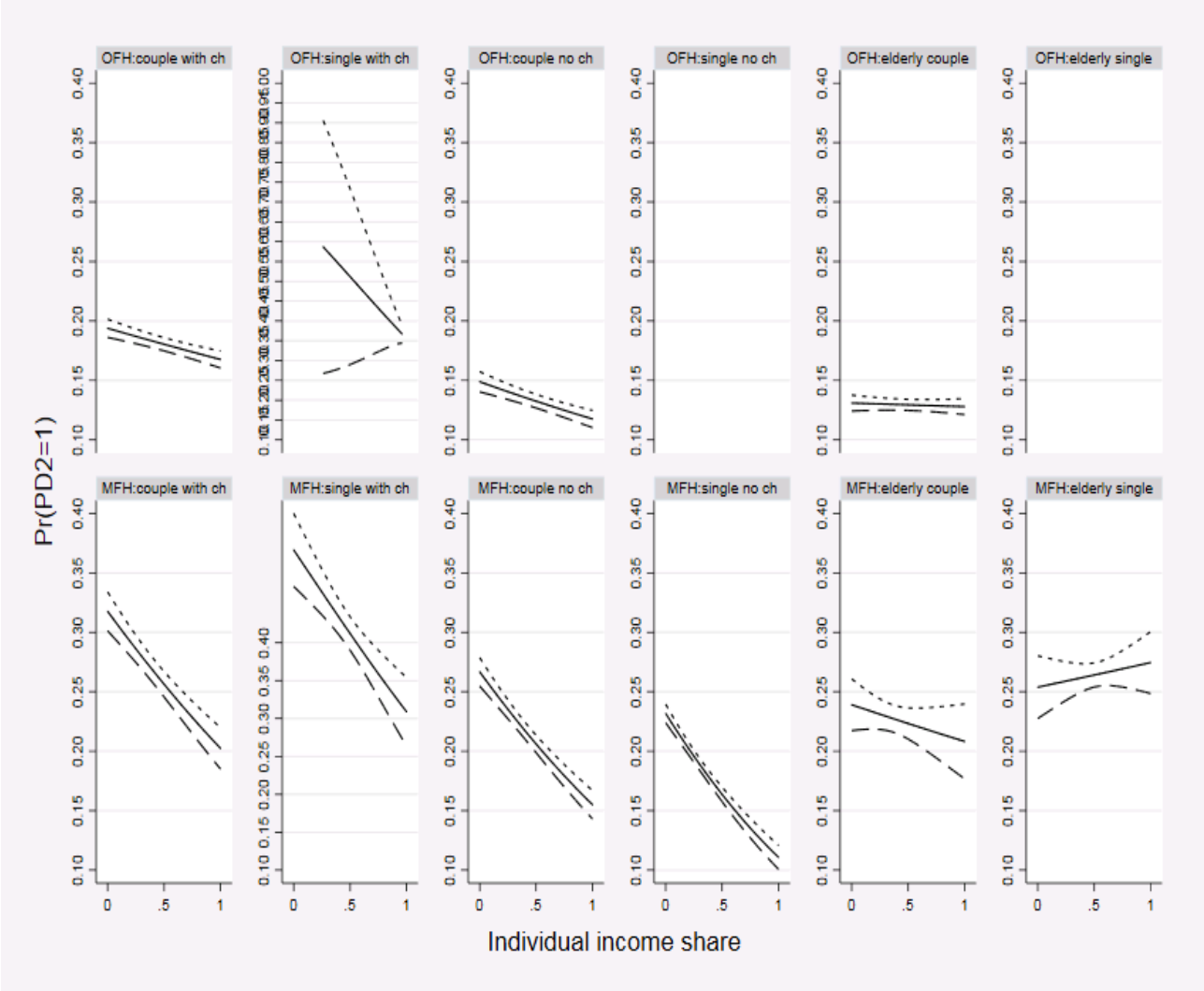
Note: The predicted probabilities in these graphs are calculated using the estimates in Table 2. *Source*: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Table 5: Marginal effects of probit models predicting the probability of being PD2 by family type

Family type models	Age	Age squared	Female	Log equivalised household income	Proxy respondent	Home owners	Individual income share	Obs.	Pseudo R-squared
One-family households									
couple with children	0.003	-0.000	0.006**	-0.052***	-0.010**	-0.032***	-0.029***	71884	0.407
	(1.32)	(-0.79)	(2.00)	(-11.82)	(-2.13)	(-5.68)	(-6.00)		
couple no children	0.004**	-0.000	0.005	-0.053***	-0.005	-0.021***	-0.032***	46003	0.429
	(2.31)	(-1.05)	(1.64)	(-13.24)	(-0.86)	(-3.43)	(-6.09)		
single no children	0.010***	-0.000***	0.016***	-0.039***	-0.032	0.003	0.000	28037	0.446
	(4.93)	(-3.72)	(2.79)	(-9.44)	(-0.44)	(0.43)	(.)		
elderly couple	0.002	-0.000	0.004*	-0.058***	-0.023***	-0.030***	0.000	70449	0.354
	(0.46)	(-0.57)	(1.77)	(-12.26)	(-5.21)	(-4.60)	(0.10)		
Multi-family households									
couple with children	0.001	-0.000	0.000	-0.065***	-0.026***	-0.016	-0.074***	28073	0.371
	(0.36)	(-0.52)	(0.02)	(-7.84)	(-3.18)	(-1.29)	(-5.96)		
single with children	0.003	0.000	-0.003	-0.083***	-0.062**	-0.049**	-0.179***	4417	0.315
	(0.58)	(0.00)	(-0.08)	(-4.10)	(-2.18)	(-2.02)	(-4.59)		
couple no children	0.004	-0.000	-0.002	-0.071***	-0.017***	-0.033***	-0.078***	42658	0.394
	(1.23)	(-0.81)	(-0.61)	(-11.89)	(-2.84)	(-3.44)	(-8.17)		
single no children	0.007***	-0.000**	-0.004	-0.074***	-0.009*	-0.037***	-0.154***	74366	0.341
	(6.06)	(-2.14)	(-0.90)	(-14.81)	(-1.83)	(-5.99)	(-17.70)		
elderly couple	0.004	-0.000	-0.006	-0.063***	-0.044***	-0.041**	-0.032	19538	0.336
	(0.36)	(-0.57)	(-0.95)	(-3.46)	(-4.03)	(-2.06)	(-1.53)		
elderly singles	0.026	-0.000	0.040***	-0.063***	-0.091***	-0.040***	-0.018	15711	0.309
	(1.36)	(-1.50)	(3.16)	(-4.71)	(-8.10)	(-2.88)	(-0.82)		

Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. Standard errors are clusters are household level. All models include country dummies. t-statistics in parentheses. *, **, ***, indicate statistical significance at 10, 5 and 1 percent level respectively.

Figure 5: Predicted probabilities of the effect of income share on the probability of PD by family type



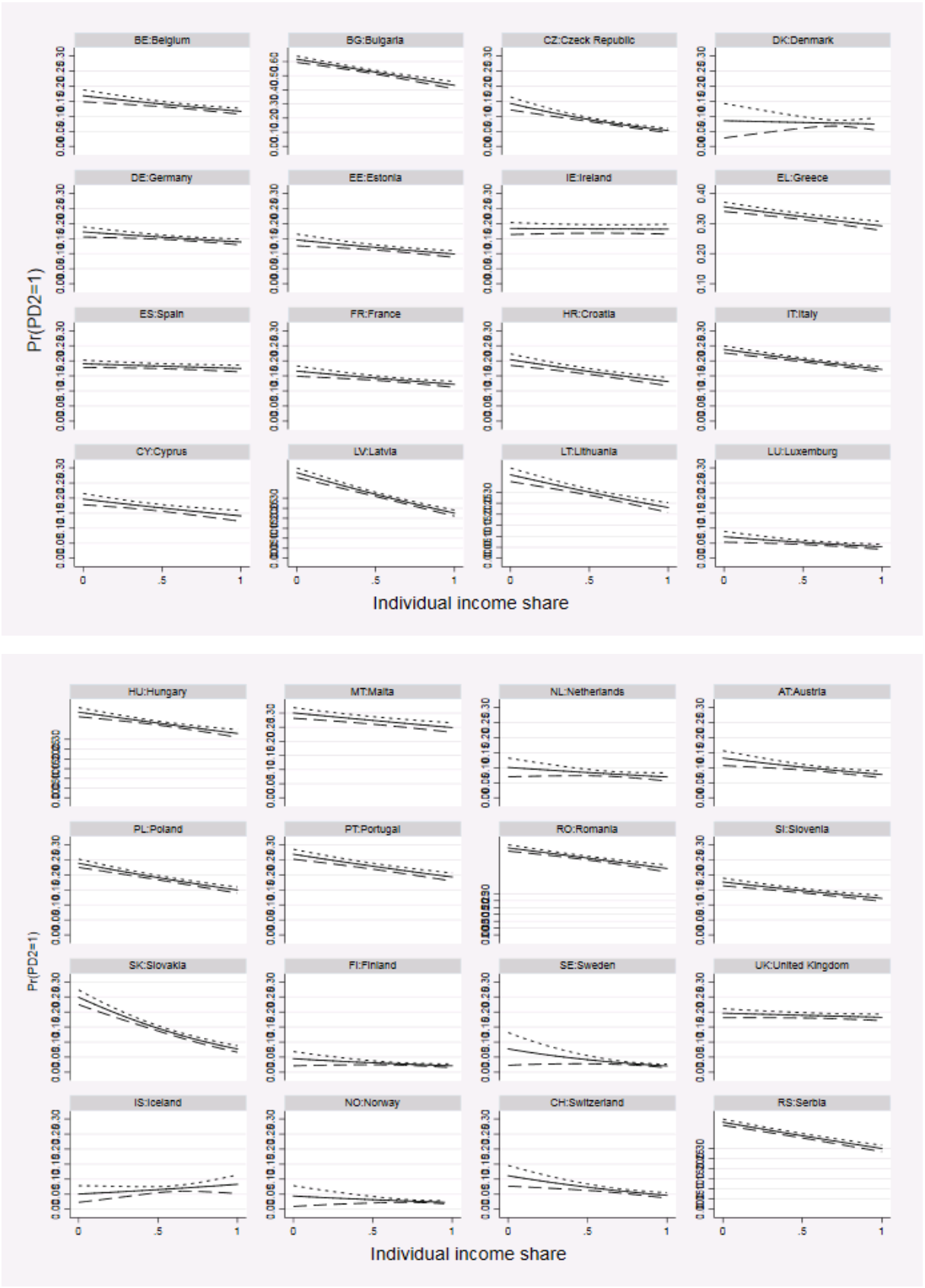
Note: The predicted probabilities in these graphs are calculated using the estimates in Table 5. *Source*: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Table 6: Marginal effects of the probability of being PD2 deprived by country

	Age	Age squared	Women	Log equivalised household income	Home-owners	Individual income share	Obs.	Pseudo R-squared
BE: Belgium	0.008***	-0.000***	-0.007	-0.059***	-0.042***	-0.048***	10910	0.480
	(6.23)	(-5.21)	(-1.29)	(-8.13)	(-4.63)	(-4.57)		
BG: Bulgaria	0.017***	-0.000***	0.015*	-0.113***	0.007	-0.234***	10358	0.288
	(8.50)	(-7.34)	(1.95)	(-10.61)	(0.40)	(-11.71)		
CZ: Czech Republi	0.005***	-0.000***	0.000	-0.083***	-0.019***	-0.090***	15155	0.374
	(5.31)	(-4.44)	(0.02)	(-11.10)	(-2.80)	(-7.25)		
DK: Denmark	0.004**	-0.000**	-0.018**	-0.030***	-0.005	-0.015	5537	0.398
	(2.10)	(-2.24)	(-2.20)	(-3.29)	(-0.53)	(-0.40)		
DE: Germany	0.009***	-0.000***	-0.000	-0.057***	-0.001	-0.050***	20184	0.352
	(7.62)	(-6.13)	(-0.02)	(-9.09)	(-0.20)	(-4.66)		
EE: Estonia	0.007***	-0.000***	0.002	-0.031***	0.001	-0.046***	11884	0.327
	(5.38)	(-3.44)	(0.36)	(-5.14)	(0.14)	(-3.66)		
IE: Ireland	0.003	-0.000	-0.000	-0.041***	0.006	-0.005	9403	0.384
	(1.61)	(-1.48)	(-0.00)	(-3.92)	(0.47)	(-0.55)		
EL: Greece	0.020***	-0.000***	-0.003	-0.117***	-0.001	-0.059***	17443	0.299
	(11.93)	(-12.32)	(-0.38)	(-11.54)	(-0.07)	(-5.36)		
ES: Spain	0.008***	-0.000***	0.010**	-0.055***	-0.022**	-0.015**	25123	0.334
	(6.77)	(-5.36)	(2.15)	(-9.30)	(-2.29)	(-1.98)		
FR: France	0.006***	-0.000***	0.012**	-0.053***	-0.023***	-0.040***	20113	0.413
	(5.80)	(-4.68)	(2.57)	(-8.12)	(-3.47)	(-3.89)		
HR: Croatia	0.011***	-0.000***	0.004	-0.104***	-0.030	-0.076***	11560	0.284
	(7.31)	(-6.01)	(0.49)	(-12.58)	(-1.53)	(-5.44)		
IT: Italy	0.011***	-0.000***	-0.015***	-0.059***	-0.037***	-0.059***	38866	0.341
	(10.35)	(-9.17)	(-3.57)	(-9.31)	(-5.20)	(-8.46)		
CY: Cyprus	0.018***	-0.000***	0.006	-0.108***	-0.032***	-0.045***	9592	0.297
	(9.69)	(-9.00)	(0.93)	(-9.46)	(-2.89)	(-3.08)		
LV: Latvia	0.015***	-0.000***	0.011	-0.138***	-0.025*	-0.207***	11365	0.307
	(8.83)	(-7.80)	(1.53)	(-16.37)	(-1.90)	(-11.87)		
LT: Lithuania	0.012***	-0.000***	-0.011	-0.141***	0.020	-0.152***	10108	0.295
	(4.64)	(-5.38)	(-1.16)	(-11.40)	(0.89)	(-7.08)		
LU: Luxemburg	0.002*	-0.000	-0.007	-0.036***	-0.020***	-0.035***	7654	0.438
	(1.92)	(-1.10)	(-1.52)	(-5.72)	(-3.10)	(-3.44)		
HU: Hungary	0.015***	-0.000***	0.014**	-0.159***	-0.033**	-0.101***	18144	0.349
	(10.08)	(-8.82)	(2.32)	(-13.72)	(-2.22)	(-5.83)		
MT: Malta	0.007***	-0.000***	-0.001	-0.164***	-0.025	-0.049***	9808	0.278
	(3.58)	(-2.77)	(-0.13)	(-11.71)	(-1.62)	(-4.24)		
NL: Netherlands	0.010***	-0.000***	0.015**	-0.038***	-0.027***	-0.040**	9906	0.438
	(7.34)	(-6.34)	(2.01)	(-4.01)	(-3.32)	(-2.40)		
AT: Austria	0.009***	-0.000***	0.002	-0.028***	-0.007	-0.059***	10589	0.381
	(7.23)	(-6.49)	(0.34)	(-5.54)	(-0.83)	(-4.38)		
PL: Poland	0.011***	-0.000***	-0.009*	-0.070***	-0.042***	-0.090***	26736	0.271
	(9.78)	(-8.92)	(-1.77)	(-10.23)	(-4.52)	(-9.51)		
PT: Portugal	0.010***	-0.000***	0.024***	-0.075***	-0.038***	-0.068***	14022	0.327
	(6.84)	(-6.17)	(4.34)	(-8.08)	(-3.74)	(-6.29)		
RO: Romania	0.006***	-0.000	-0.016**	-0.118***	-0.027	-0.153***	15112	0.242
	(2.77)	(-1.47)	(-2.06)	(-10.46)	(-0.71)	(-8.09)		
SI :Slovenia	0.006***	-0.000***	0.003	-0.053***	-0.009	-0.042***	23092	0.347
	(5.62)	(-4.48)	(0.76)	(-6.88)	(-1.15)	(-5.55)		
SK: Slovakia	0.008***	-0.000***	-0.004	-0.102***	-0.015	-0.182***	12744	0.285
	(5.17)	(-4.06)	(-0.65)	(-9.95)	(-1.06)	(-11.13)		
FI: Finland	0.002**	-0.000	0.007**	-0.005	-0.010**	-0.034***	10751	0.409
	(2.51)	(-1.51)	(1.97)	(-1.18)	(-2.33)	(-2.84)		
SE: Sweden	0.003***	-0.000**	0.010***	-0.008***	-0.005	-0.022	5378	0.502
	(3.34)	(-2.42)	(2.66)	(-2.59)	(-1.14)	(-1.54)		
UK: United Kingdom	-0.005***	0.000***	0.005	-0.047***	-0.038***	-0.021**	15218	0.346
	(-3.61)	(6.18)	(1.16)	(-7.09)	(-4.32)	(-2.43)		
IS-: Iceland	0.004**	-0.000*	0.011	-0.030***	-0.016	0.036	2760	0.273
	(1.99)	(-1.75)	(1.24)	(-2.90)	(-1.53)	(1.42)		
NO: Norway	0.002***	-0.000**	-0.001	-0.008***	-0.006	-0.027**	6988	0.426
	(3.39)	(-2.40)	(-0.28)	(-3.30)	(-1.31)	(-2.23)		
CH: Switzerland	0.006***	-0.000***	0.006	-0.039***	-0.034***	-0.054***	10976	0.395
	(5.25)	(-4.77)	(0.91)	(-6.34)	(-4.95)	(-3.73)		
RS: Serbia	0.014***	-0.000***	0.005	-0.106***	0.000	-0.139***	14843	0.258
	(8.55)	(-5.87)	(0.76)	(-10.82)	(0.00)	(-12.26)		

Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. Standard errors are clustered at household level. All models include additional controls for family type, proxy interview status, and household level deprivation. t-statistics in parentheses. *, **, ***, indicate statistical significance at 10, t and 1 percent level.

Figure 6: Predicted probabilities of the effect of income share by country



Note: The predicted probabilities in these graphs are calculated using the estimates in Table 4. Source: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Table 7: Marginal effects of the probability of being PD2 deprived by country

	All		Couple		Couple no dependent ch.		Elderly couple	
BE: Belgium	-0.048***	10910	-0.044**	2271	-0.013	1323	-0.021	1797
	(-4.57)	*0.48*	(-2.41)	*0.480*	(-0.76)	*0.557*	(-1.55)	*0.408*
BG: Bulgaria	-0.234***	10358	-0.109**	1007	-0.082*	846	-0.127***	1550
	(-11.71)	*0.288*	(-2.25)	*0.360*	(-1.86)	*0.433*	(-2.91)	*0.202*
CZ: Czech Republic	-0.090***	15155	-0.039**	2346	-0.031	1680	-0.041*	2911
	(-7.25)	*0.374*	(-2.35)	*0.429*	(-1.52)	*0.462*	(-1.88)	*0.302*
DK: Denmark	-0.015	5537	-0.090	939	-0.044	897	0.007	1376
	(-0.40)	*0.398*	(-1.42)	*0.417*	(-0.69)	*0.415*	(0.30)	*0.440*
DE: Germany	-0.050***	20184	-0.019	3301	-0.057***	3328	0.008	5326
	(-4.66)	*0.352*	(-0.76)	*0.328*	(-2.83)	*0.339*	(0.51)	*0.370*
EE: Estonia	-0.046***	11884	0.025	1949	-0.042**	1243	0.002	1790
	(-3.66)	*0.327*	(1.42)	*0.325*	(-2.25)	*0.443*	(0.08)	*0.247*
IE: Ireland	-0.005	9403	0.002	2312	0.006	908	0.004	1308
	(-0.55)	*0.384*	(0.56)	*0.379*	(0.86)	*0.415*	(1.54)	*0.400*
EL: Greece	-0.059***	17443	-0.029	2805	-0.031	1496	-0.017	3113
	(-5.36)	*0.299*	(-1.49)	*0.372*	(-1.29)	*0.357*	(-0.71)	*0.147*
ES: Spain	-0.015**	25123	-0.015	4587	-0.023	2061	0.037***	3193
	(-1.98)	*0.334*	(-1.17)	*0.423*	(-1.46)	*0.415*	(2.58)	*0.206*
FR: France	-0.040***	20113	-0.044**	4477	-0.022	2822	0.009	3994
	(-3.89)	*0.413*	(-2.17)	*0.381*	(-1.24)	*0.445*	(0.77)	*0.425*
HR: Croatia	-0.076***	11560	-0.028	1157	0.013	774	-0.003	1615
	(-5.44)	*0.284*	(-1.59)	*0.382*	(0.36)	*0.258*	(-0.14)	*0.285*
IT: Italy	-0.059***	38866	-0.035***	6638	-0.052***	2666	-0.021*	5958
	(-8.46)	*0.341*	(-2.78)	*0.385*	(-3.50)	*0.428*	(-1.68)	*0.308*
CY: Cyprus	-0.045***	9592	-0.026	1648	-0.109***	706	-0.030	1500
	(-3.08)	*0.297*	(-1.04)	*0.331*	(-3.58)	*0.403*	(-1.57)	*0.316*
LV: Latvia	-0.207***	11365	-0.091***	1315	-0.106***	979	-0.143***	1427
	(-11.87)	*0.307*	(-3.09)	*0.360*	(-3.24)	*0.392*	(-3.00)	*0.292*
LT: Lithuania	-0.152***	10108	-0.070	1045	-0.067***	1237	-0.050	1902
	(-7.08)	*0.295*	(-1.45)	*0.357*	(-2.97)	*0.424*	(-1.34)	*0.199*
LU: Luxemburg	-0.035***	7654	-0.061***	1689	-0.025**	961	0.009	921
	(-3.44)	*0.438*	(-2.83)	*0.472*	(-2.29)	*0.510*	(1.09)	*0.381*
HU: Hungary	-0.101***	18144	-0.093***	2590	-0.095**	1906	-0.013	2110
	(-5.83)	*0.349*	(-3.05)	*0.392*	(-2.46)	*0.395*	(-0.38)	*0.300*
MT: Malta	-0.049***	9808	-0.019	1378	-0.001	692	0.006	1394
	(-4.24)	*0.278*	(-1.63)	*0.358*	(-0.10)	*0.302*	(0.35)	*0.222*
NL: Netherlands	-0.040**	9906	-0.033	1995	-0.115***	1497	0.014	1704
	(-2.40)	*0.438*	(-1.05)	*0.464*	(-3.73)	*0.555*	(0.53)	*0.422*
AT: Austria	-0.059***	10589	-0.016	1767	-0.031**	1585	0.001	1762
	(-4.38)	*0.381*	(-0.56)	*0.375*	(-2.04)	*0.469*	(0.09)	*0.389*
PL: Poland	-0.090***	26736	-0.044***	4377	-0.044***	2607	0.010	3371
	(-9.51)	*0.271*	(-3.15)	*0.340*	(-2.78)	*0.358*	(0.55)	*0.268*
PT: Portugal	-0.068***	14022	-0.027*	2336	-0.014	1197	-0.021	2468
	(-6.29)	*0.327*	(-1.74)	*0.336*	(-0.77)	*0.458*	(-0.82)	*0.305*
RO: Romania	-0.153***	15112	-0.144***	1452	-0.018	1777	-0.051	2401
	(-8.09)	*0.242*	(-3.37)	*0.342*	(-0.71)	*0.222*	(-1.56)	*0.191*
SI: Slovenia	-0.042***	23092	-0.021*	2920	0.003	1344	-0.012	2494
	(-5.55)	*0.347*	(-1.78)	*0.334*	(0.18)	*0.390*	(-0.82)	*0.349*
SK: Slovakia	-0.182***	12744	-0.051**	1546	-0.102***	640	-0.054	1160
	(-11.13)	*0.285*	(-2.03)	*0.320*	(-3.49)	*0.430*	(-0.98)	*0.194*
FI: Finland	-0.034***	10751	-0.043*	2087	0.104*	432	-0.032	1935
	(-2.84)	*0.409*	(-1.94)	*0.456*	(1.94)	*0.239*	(-1.49)	*0.552*
SE: Sweden	-0.022	5378	-0.008	157	0.007	805	-0.004	1300
	(-1.54)	*0.502*	(-0.06)	*0.330*	(0.41)	*0.516*	(-0.28)	*0.395*
UK: United Kingdom	-0.021**	15218	-0.001	3534	0.002	2334	-0.001	3498
	(-2.43)	*0.346*	(-0.33)	*0.372*	(0.97)	*0.448*	(-0.35)	*0.251*
IS: Iceland	0.036	2760	0.055	535	0.054	284	0.035	404
	-1.42	*0.273*	(1.18)	*0.285*	(0.98)	*0.309*	(0.55)	*0.188*
NO: Norway	-0.027**	6988	-0.030	1422	-0.009	1112	0.014*	1194
	(-2.23)	*0.426*	(-1.36)	*0.405*	(-0.52)	*0.446*	(1.82)	*0.308*
CH: Switzerland	-0.054***	10976	-0.085**	2076	-0.002	1688	0.026	2093
	(-3.73)	*0.395*	(-2.49)	*0.318*	(-0.11)	*0.416*	(1.40)	*0.310*
RS: Serbia	-0.139***	14843	-0.076***	1285	-0.053*	693	-0.081**	1082
	(-12.26)	*0.258*	(-3.15)	*0.359*	(-1.72)	*0.324*	(-2.28)	*0.269*

	Couple with dep. ch		Couple no dependent ch.		Single adults lwo		Lone parents	
BE: Belgium	-0.129**	504	-0.003	739	-0.090**	1611	-0.042	78
	(-2.43)	*0.520*	(-0.09)	*0.595*	(-2.25)	*0.408*	(-0.15)	*0.317*
BG: Bulgaria	-0.172***	875	-0.324***	1337	-0.366***	1847	-0.241*	129
	(-2.72)	*0.310*	(-6.09)	*0.283*	(-8.27)	*0.306*	(-1.90)	*0.448*
CZ: Czech Republic	-0.048	588	-0.100**	1322	-0.177***	2385	-0.272**	93
	(-0.81)	*0.440*	(-2.44)	*0.384*	(-5.46)	*0.365*	(-2.05)	*0.485*
DK: Denmark	-0.189	74	-0.091	279	-0.342	172	0.000	10
	(-0.70)	*0.462*	(-1.12)	*0.240*	(-1.48)	*0.316*	(.)	*1.000*
DE: Germany	-0.095	531	-0.059*	1219	-0.198***	1854	-0.377	29
	(-1.58)	*0.256*	(-1.71)	*0.394*	(-4.58)	*0.256*	(-0.46)	*0.216*
EE: Estonia	-0.059	905	-0.070*	1097	-0.090***	2113	0.069	200
	(-1.55)	*0.385*	(-1.75)	*0.387*	(-2.90)	*0.361*	(0.54)	*0.334*
IE: Ireland	0.010	488	-0.024	272	0.069	1498	-0.490***	121
	(0.22)	*0.370*	(-0.38)	*0.247*	(1.51)	*0.413*	(-2.64)	*0.184*
EL: Greece	-0.026	861	-0.027	1707	-0.178***	3219	0.092	78
	(-0.62)	*0.260*	(-0.72)	*0.317*	(-4.97)	*0.278*	(0.80)	*0.369*
ES: Spain	-0.083**	1613	-0.028	2556	-0.066**	5188	-0.133	300
	(-2.32)	*0.333*	(-0.88)	*0.363*	(-2.50)	*0.315*	(-1.06)	*0.203*
FR: France	-0.069	956	-0.008	1087	-0.173***	2217	0.025	129
	(-1.35)	*0.413*	(-0.21)	*0.464*	(-4.40)	*0.300*	(0.17)	*0.355*
HR: Croatia	-0.082	1055	-0.133***	1269	-0.130***	2424	-0.230	82
	(-1.31)	*0.248*	(-2.71)	*0.253*	(-4.40)	*0.289*	(-1.21)	*0.295*
IT: Italy	-0.149***	2092	-0.068***	3640	-0.116***	7527	-0.250***	253
	(-4.24)	*0.325*	(-2.59)	*0.380*	(-6.05)	*0.319*	(-2.82)	*0.373*
CY: Cyprus	-0.049	900	-0.094*	994	-0.048	2118	-0.485*	49
	(-0.79)	*0.280*	(-1.80)	*0.289*	(-1.19)	*0.275*	(-1.81)	*0.324*
LV: Latvia	-0.198***	681	-0.202***	997	-0.287***	2062	-0.307***	224
	(-2.91)	*0.363*	(-3.19)	*0.246*	(-7.03)	*0.277*	(-2.83)	*0.292*
LT: Lithuania	-0.178**	589	-0.152**	998	-0.293***	1612	0.008	157
	(-2.19)	*0.313*	(-2.54)	*0.347*	(-5.83)	*0.313*	(0.06)	*0.437*
LU: Luxemburg	-0.054	504	0.006	690	-0.047*	1310	1.265	15
	(-1.55)	*0.428*	(0.18)	*0.470*	(-1.66)	*0.384*	(1.44)	*0.426*
HU: Hungary	-0.244***	1289	-0.130**	2006	-0.153***	3677	-0.086	305
	(-3.40)	*0.333*	(-2.05)	*0.335*	(-4.02)	*0.317*	(-0.87)	*0.401*
MT: Malta	-0.033	566	-0.081*	1337	-0.145***	2399	-0.406**	136
	(-0.70)	*0.262*	(-1.66)	*0.289*	(-3.69)	*0.238*	(-2.34)	*0.284*
NL: Netherlands	0.282***	313	-0.216***	445	-0.010	746	0.760	20
	(3.01)	*0.425*	(-2.65)	*0.594*	(-0.25)	*0.693*	(1.63)	*0.186*
AT: Austria	-0.139**	500	-0.068	839	-0.156***	1386	-0.255	73
	(-2.18)	*0.382*	(-1.15)	*0.322*	(-3.04)	*0.333*	(-1.13)	*0.353*
PL: Poland	-0.080**	2601	-0.051*	3021	-0.293***	4531	-0.274***	393
	(-2.41)	*0.208*	(-1.71)	*0.250*	(-9.35)	*0.250*	(-2.72)	*0.272*
PT: Portugal	-0.057	849	-0.091***	1410	-0.157***	2438	-0.354***	198
	(-1.12)	*0.354*	(-2.69)	*0.304*	(-4.82)	*0.283*	(-3.18)	*0.387*
RO: Romania	-0.029	1029	-0.239***	1916	-0.273***	2652	-0.176	59
	(-0.51)	*0.287*	(-4.00)	*0.217*	(-5.95)	*0.240*	(-0.73)	*0.193*
SI: Slovenia	-0.055**	2174	-0.042**	3942	-0.081***	6006	0.081	178
	(-2.16)	*0.394*	(-1.99)	*0.310*	(-4.01)	*0.322*	(0.66)	*0.354*
SK: Slovakia	-0.121**	1117	-0.205***	2024	-0.282***	3487	-0.341***	215
	(-2.30)	*0.402*	(-4.88)	*0.304*	(-7.60)	*0.318*	(-2.62)	*0.282*
FI: Finland	0.048	424	-0.638***	39	0.026	739		
	(0.97)	*0.520*	(-3.82)	*0.615*	(0.72)	*0.345*		
SE: Sweden	-0.000	30	0.057	202	-0.000	29	0.163	16
	(.)	*1.000*	(1.12)	*0.443*	(.)	*1.000*	(0.26)	*0.109*
UK: United Kingdom	0.034	210	-0.052*	486	-0.137***	1115	-0.456**	102
	(0.38)	*0.271*	(-1.82)	*0.392*	(-3.25)	*0.317*	(-2.15)	*0.139*
IS: Iceland	-0.044	212	0.030	262	-0.006	412	1.017***	22
	(-0.54)	*0.271*	(0.47)	*0.284*	(-0.11)	*0.319*	(3.18)	*0.553*
NO: Norway	-0.359**	49	-0.000	161	-0.081***	491	0.646	25
	(-2.14)	*0.426*	(.)	*1.000*	(-2.67)	*0.537*	(1.25)	*0.453*
CH: Switzerland	-0.162	446	-0.046	771	-0.100**	1429	0.000	24
	(-1.38)	*0.374*	(-0.60)	*0.501*	(-2.51)	*0.374*	(.)	*1.000*
RS: Serbia	-0.069**	2179	-0.189***	2489	-0.251***	3111	-0.535***	195
	(-1.97)	*0.245*	(-6.36)	*0.230*	(-8.34)	*0.258*	(-4.26)	*0.238*

Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. Standard errors are clustered at household level. All models include additional controls for proxy interview status, and household level deprivation. t-statistics in parentheses. *, **, ***, indicate statistical significance at 10, 5 and 1 percent level.

Table 8: Gender differences in the effect of income share on the personal deprivation

	All	Couple with dep. children	Couple with no dep. children	Elderly couple	Couple with dep. Children living in MFH	Lone parents living in MFH	Couple with no dep. Children living in MFH	Singles living in MFH	Elderly couple living in MFH	Elderly single living in MFH
Female	-0.009***	0.002	-0.002	0.000	-0.007	-0.003	-0.013	-0.020***	0.011	0.039
	(-3.08)	(0.19)	(-0.14)	(0.00)	(-0.54)	(-0.05)	(-1.36)	(-3.46)	(0.61)	(1.24)
Individual income share	-0.068***	-0.032***	-0.040***	-0.006	-0.082***	-0.167*	-0.092***	-0.182***	-0.005	-0.022
	(-16.77)	(-2.70)	(-3.37)	(-0.48)	(-4.32)	(-1.90)	(-6.00)	(-15.25)	(-0.14)	(-0.38)
Female*share	0.021***	0.007	0.014	0.008	0.026	-0.017	0.029	0.065***	-0.045	-0.005
	(3.79)	(0.34)	(0.65)	(0.37)	(0.75)	(-0.18)	(1.13)	(3.95)	(-0.85)	(-0.09)
N	4.35e+05	71120.000	45466.000	69625.000	27043.000	4310.000	41215.000	72895.000	18793.000	15293.000
ll	-1.33e+05	-2.01e+04	-1.03e+04	-1.74e+04	-9903.186	-1983.447	-1.33e+04	-2.36e+04	-6700.876	-6104.860
r2_p	0.376	0.407	0.430	0.356	0.379	0.323	0.397	0.343	0.342	0.311

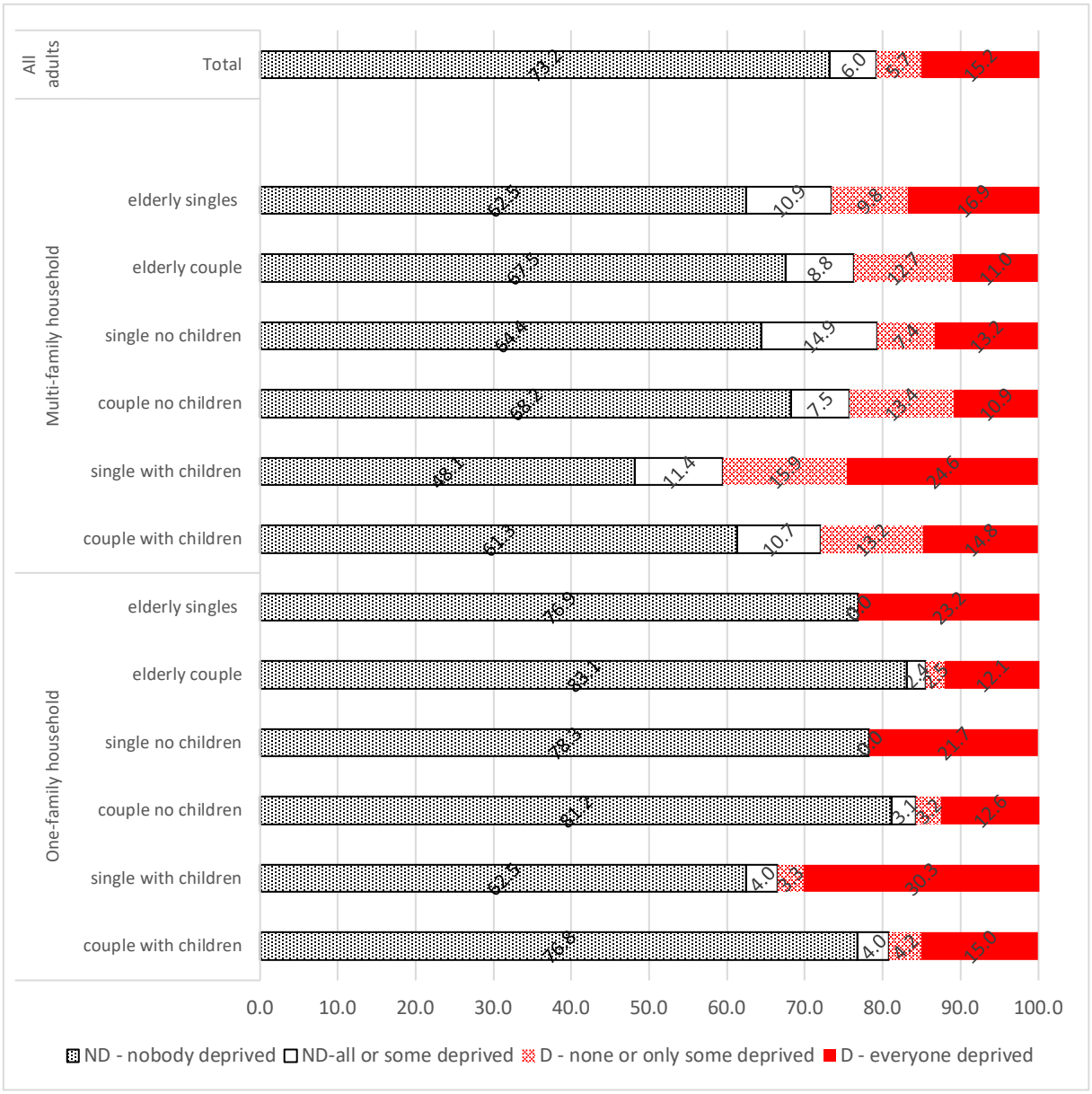
Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. Standard errors are clustered at household level. All model include additional controls for family type, proxy interview status, and household level deprivation. t-statistics in parentheses. *, **, ***, indicate statistical significance at 10, t and 1 percent level.

Table 9: Differences in the effect of income shares at different parts of the income share distribution

	Couple with dep. children	Couple no dep. children	Elderly couple	Couple with dep. children living in multi-family hh	Lone parents living in multi-family hh	Couple with no dep. children living multi-family hh	Singles living in multi-family hh	Elderly couple living in multi-family hh	Elderly single living in multi-family hh
Spline [0,.25]	0.002	0.062*	0.003	-0.064	-0.187	-0.050	-0.290***	-0.095	-0.193
	(0.05)	(1.65)	(0.09)	(-1.16)	(-1.03)	(-1.28)	(-10.38)	(-1.51)	(-1.43)
Spline [.25,.50]	-0.081***	-0.100***	0.005	-0.116**	-0.322**	-0.193***	-0.129***	-0.005	-0.058
	(-2.79)	(-3.11)	(0.18)	(-2.24)	(-2.12)	(-5.25)	(-3.85)	(-0.08)	(-0.92)
Spline [.50,100]	-0.006	-0.026*	-0.007	-0.035	-0.092	0.014	-0.031	0.014	0.029
	(-0.38)	(-1.68)	(-0.50)	(-0.91)	(-1.15)	(0.48)	(-1.23)	(0.26)	(0.73)
N	71120.000	45466.000	69625.000	27043.000	4310.000	41215.000	72895.000	18793.000	15293.000
ll	-2.11e+07	-1.09e+07	-1.44e+07	-7.35e+06	-1.37e+06	-1.02e+07	-1.93e+07	-4.55e+06	-3.98e+06
r2_p	0.407	0.430	0.356	0.379	0.324	0.397	0.344	0.342	0.312

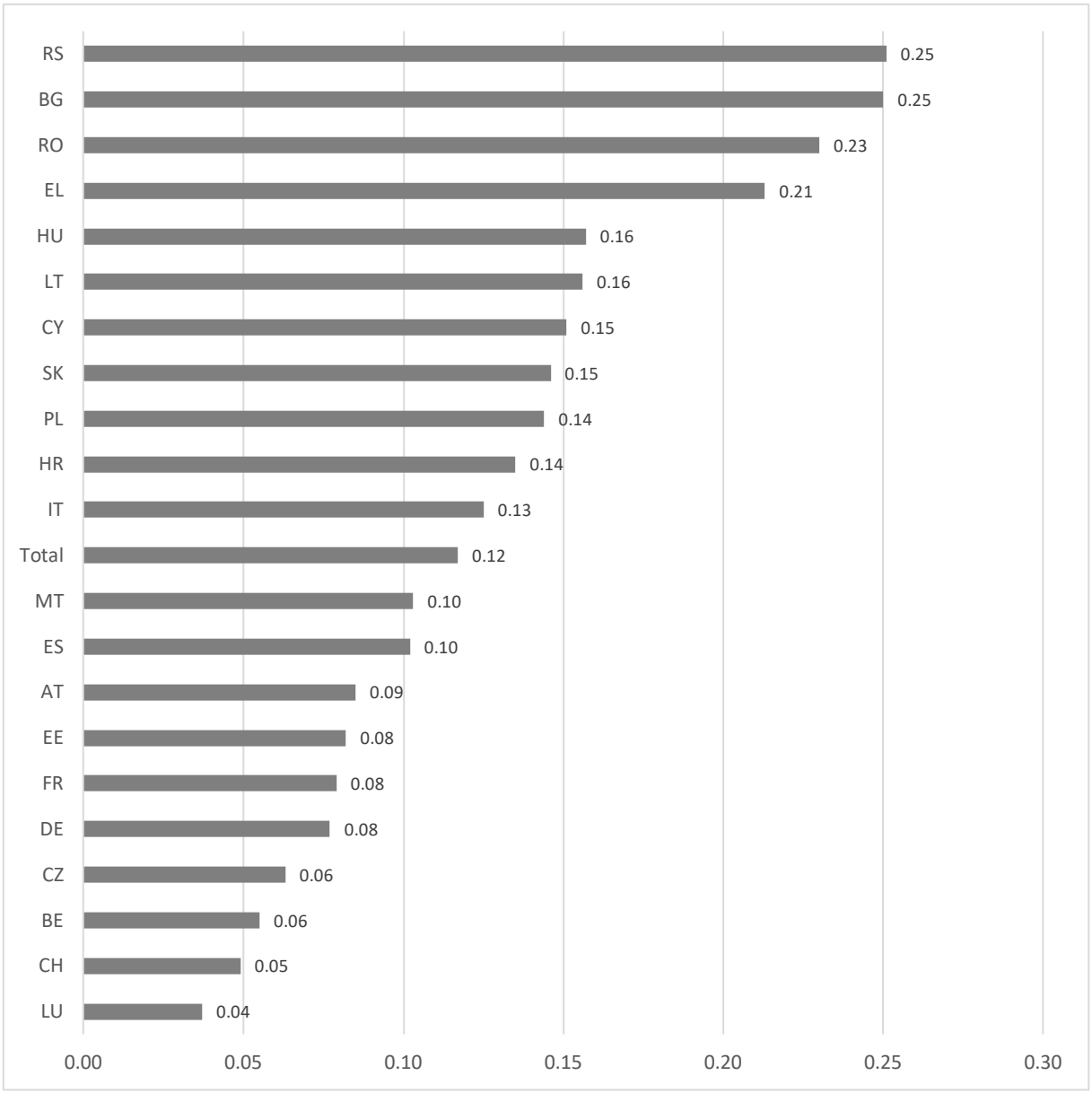
Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. Standard errors are clustered at household level. All model include additional controls for family type, proxy interview status, and household level deprivation. t-statistics in parentheses. *, **, ***, indicate statistical significance at 10, 5 and 1 percent level respectively.

Figure 7: Per cent of adults deprived by other household member's deprivation status and family type



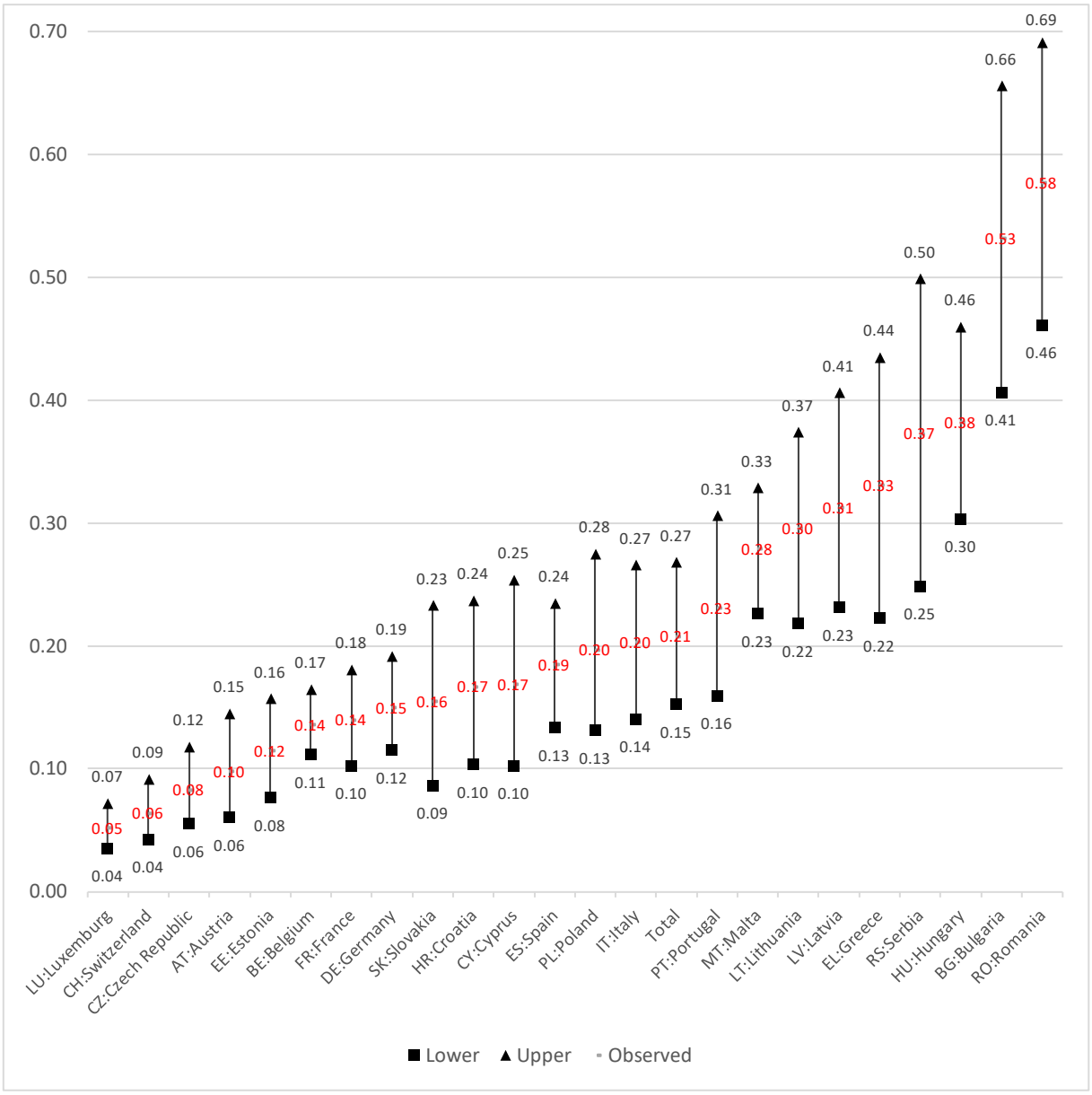
Note: Excludes register countries (future version needs to exclude the UK). *Source*: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Figure 8: Per cent of individuals living in household with unequal deprivation outcome across their household members



Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Figure 9: Observed and simulated PD2 risk under alternative equality in deprivation scenarios



Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Table 10: Combined household and personal deprivation MPI measure

	Combined HD3 and PD2 MPI type measure			**Dimension: HD3**			**Dimension: PD2**			**% contribution of each dimension in the combined HD3/PD2 adjusted headcount**	
	Headcount (1)	Intensity (2)	Adjusted headcount (3)	Headcount (4)	Intensity (5)	Adjusted headcount (6)	Headcount (7)	Intensity (8)	Adjusted headcount (9)	% contribution of HD3 (10)	% contribution of PD2 (11)
BE: Belgium	0.170	0.326	0.056	0.110	0.422	0.046	0.136	0.474	0.065	0.414	0.586
BG: Bulgaria	0.625	0.436	0.272	0.463	0.498	0.230	0.533	0.590	0.314	0.423	0.577
CZ: Czech Republic	0.181	0.270	0.049	0.155	0.399	0.062	0.083	0.431	0.036	0.633	0.367
DK: Denmark	0.109	0.270	0.029	0.070	0.398	0.028	0.076	0.404	0.031	0.475	0.525
DE: Germany	0.189	0.291	0.055	0.108	0.400	0.043	0.151	0.444	0.067	0.391	0.609
EE: Estonia	0.201	0.276	0.056	0.158	0.395	0.062	0.115	0.425	0.049	0.559	0.441
IE: Ireland	0.273	0.297	0.081	0.209	0.396	0.083	0.189	0.419	0.079	0.512	0.488
EL: Greece	0.488	0.297	0.145	0.381	0.434	0.165	0.332	0.374	0.124	0.571	0.429
ES: Spain	0.255	0.301	0.077	0.168	0.394	0.066	0.187	0.469	0.088	0.429	0.571
FR: France	0.180	0.302	0.055	0.113	0.396	0.045	0.140	0.458	0.064	0.413	0.587
HR: Croatia	0.381	0.278	0.106	0.338	0.406	0.137	0.169	0.444	0.075	0.646	0.354
IT: Italy	0.302	0.324	0.098	0.222	0.413	0.092	0.206	0.506	0.104	0.469	0.531
CY: Cyprus	0.369	0.262	0.097	0.325	0.389	0.127	0.169	0.395	0.067	0.655	0.345
LV: Latvia	0.448	0.330	0.148	0.344	0.438	0.151	0.314	0.461	0.145	0.510	0.490
LT: Lithuania	0.398	0.310	0.123	0.284	0.413	0.117	0.297	0.436	0.130	0.474	0.526
LU: Luxemburg	0.076	0.259	0.020	0.044	0.381	0.017	0.053	0.429	0.023	0.425	0.575
HU: Hungary	0.491	0.376	0.184	0.386	0.447	0.173	0.382	0.513	0.196	0.469	0.531
MT: Malta	0.340	0.314	0.107	0.193	0.414	0.080	0.279	0.480	0.134	0.374	0.626
NL: Netherlands	0.122	0.266	0.032	0.083	0.383	0.032	0.081	0.407	0.033	0.492	0.508
AT: Austria	0.135	0.267	0.036	0.083	0.397	0.033	0.098	0.395	0.039	0.458	0.542
PL: Poland	0.301	0.290	0.087	0.217	0.412	0.089	0.197	0.433	0.085	0.511	0.489
PT: Portugal	0.337	0.306	0.103	0.250	0.399	0.100	0.231	0.458	0.106	0.485	0.515
RO: Romania	0.652	0.399	0.260	0.412	0.453	0.187	0.577	0.577	0.333	0.360	0.640
SI: Slovenia	0.231	0.278	0.064	0.175	0.394	0.069	0.149	0.399	0.059	0.539	0.461
SK: Slovakia	0.274	0.287	0.078	0.213	0.407	0.087	0.155	0.453	0.070	0.554	0.446
FI: Finland	0.105	0.232	0.024	0.097	0.388	0.037	0.030	0.375	0.011	0.771	0.229
SE: Sweden	0.042	0.247	0.010	0.025	0.366	0.009	0.030	0.381	0.011	0.450	0.550
UK: United Kingdom	0.237	0.289	0.068	0.133	0.415	0.055	0.191	0.427	0.081	0.404	0.596
IS: Iceland	0.089	0.232	0.021	0.042	0.382	0.016	0.069	0.367	0.025	0.390	0.610
NO: Norway	0.042	0.262	0.011	0.030	0.395	0.012	0.026	0.398	0.010	0.545	0.455
CH: Switzerland	0.081	0.249	0.020	0.039	0.371	0.014	0.064	0.405	0.026	0.350	0.650
RS: Serbia	0.548	0.363	0.199	0.445	0.451	0.200	0.374	0.528	0.197	0.504	0.496
All	**0.263**	**0.319**	**0.084**	**0.179**	**0.418**	**0.075**	**0.195**	**0.477**	**0.093**	**0.446**	**0.554**

Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Appendix A1: Further information on EU-SILC

Registers countries in EU-SILC

The register countries in EU-SILC use a combination of data from registers and sample surveys to produce indicators in accordance with the EU-SILC definitions (Epland and Törmälehto, 2007). Domains where registers are used are for collecting data on *personal basic variables*, *income*, *housing*, *education* and *occupation* although various countries implement the use of different registers to various extent. For example almost all income variables are collected from the national income registers. For housing, labour, education and occupation the use of registers vary. In some cases the variable is based purely on register data, in some cases there is a mix of register and survey data and in other cases register data are used purely for checking information from the interviews. The various register used in different degree in different countries include:

- **National population registers:** Used mainly to record information on *basic demographic variables* (age, gender, date of birth, area of residence, marital status, country of birth, migration and citizenship) with sampling frame the end of the year t-1.
- **Income registers:** Include tax registers, social security registers and pension registers. Data from the income registers is usually available at the beginning of the year after the year of the interview (t+1). Income is recorded gross of taxes and social contributions.
- **Building and Dwellings**: Although most housing data (including housing costs) are mainly collected by interview registers can provide auxiliary information on the dwelling (e.g. address, age of the building, number of flats, size and number of rooms and whether the flat has got bath and toilet).
- **The national registers of education***:* Information regarding the level of *education* is mostly collected from the *national registers of education*.
- **Occupation data:** Most occupational related data are collected through interview since register data in most cases isn't timely enough and also not fully comparable to survey data. However, register data on occupation is sometimes used to check the data and sometimes (as in Finland) used for imputation of missing survey data.

Using register data as the basis for the EU-SILC has several effects on the survey including its design and the sampling frame. One of the main advantages of using register data is that it minimises the need to ask questions regarding issues that can be found in the administrative data saves both time and money and increases the quality of the data. For countries that use survey-based methods the statistical units are persons and households. For register countries the applicable survey design is the selected respondent method with sampling frames being the basic population registers. This means that the samples are drawn from individuals from the national registers of population and the sampled person has to turn 16 years during the survey year (though the sampling frame is performed slightly different in different Nordic countries). When using the sampled respondent design the household is composed around the selected respondent. Given this sampling design, the register countries collect a set of variables only on the sub-sample of 'selected adult respondents 16+', instead of all adult members; for instance personal health, access to health care, and certain labour status variables. For this reason the analysis of selected respondent variables In EU-SILC need to be made at the

level of persons only, using special selected respondent weights, without aggregation to household level (Eurostat, 2010).

The selected respondent is not to be confused with the household respondent i.e. the respondent that answer the household-level questions. Household respondent is defined in the interview, usually as the person in a household who is best aware of the household's economic situation. In register countries the selected respondent may differ from the household respondent, in which case two adults have to be interviewed, and re-contacts are needed if both are not present in the first interview. In particular, there should be differences in the tails of the age distribution: the youngest selected respondents who still live with their parents, or very old respondents, may not be aware of the household economy, childcare, housing items, or the other household members' activities.

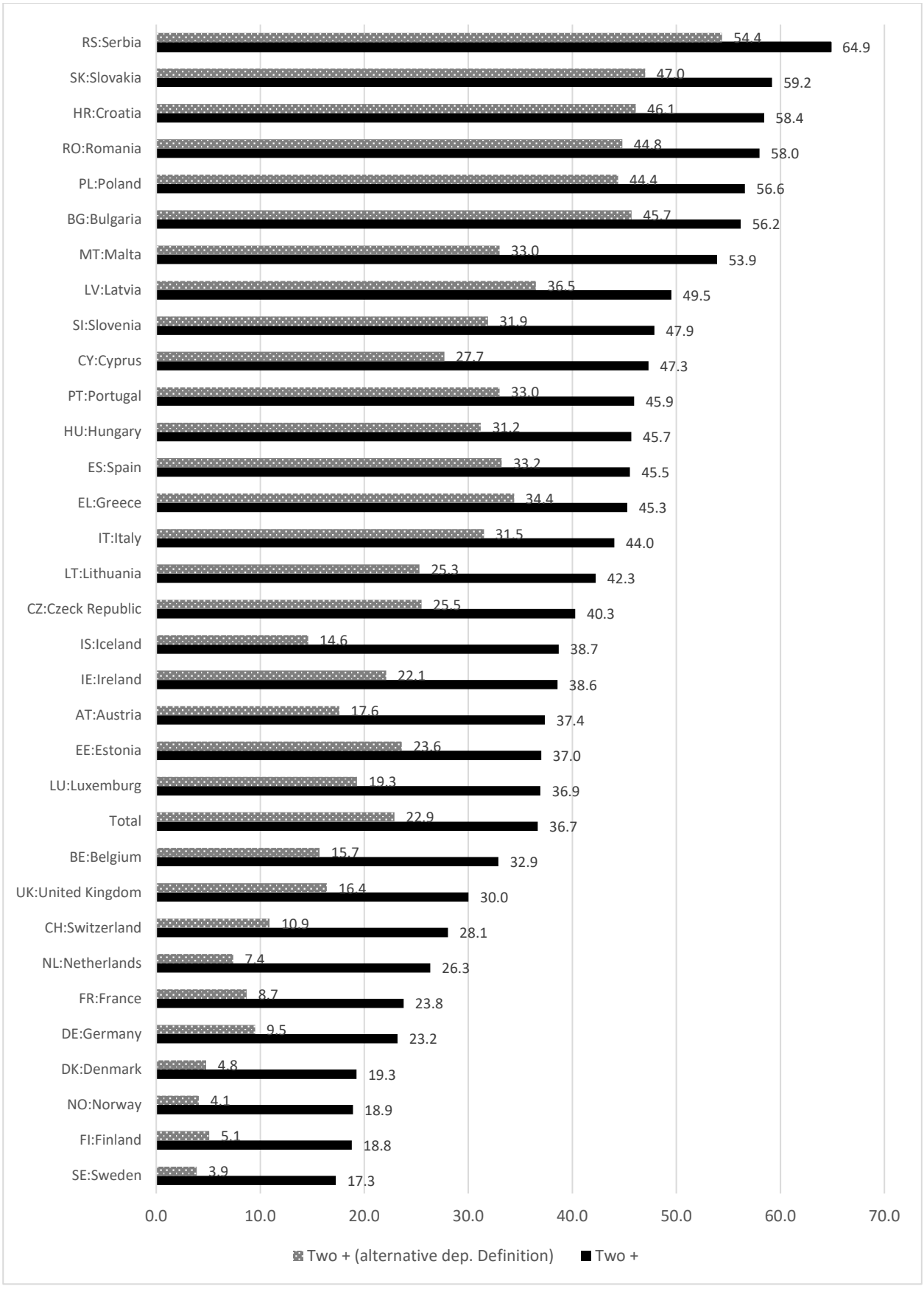
Household definition in EU-SILC

The *household* definition used in EU-SILC is common housekeeping, defined as sharing of income and expenses. In the register based statistics a household is defined according to the dwelling unit – the persons registered at the same address. However the dwelling-unit is not always identical to the household as defined in EU-SILC. The register household is therefore used as auxiliary information during the data collection and changed in order to agree with the household definition during the interview (Törmälehto, 2008)

Appendix A2: Derivation of individual net income variable

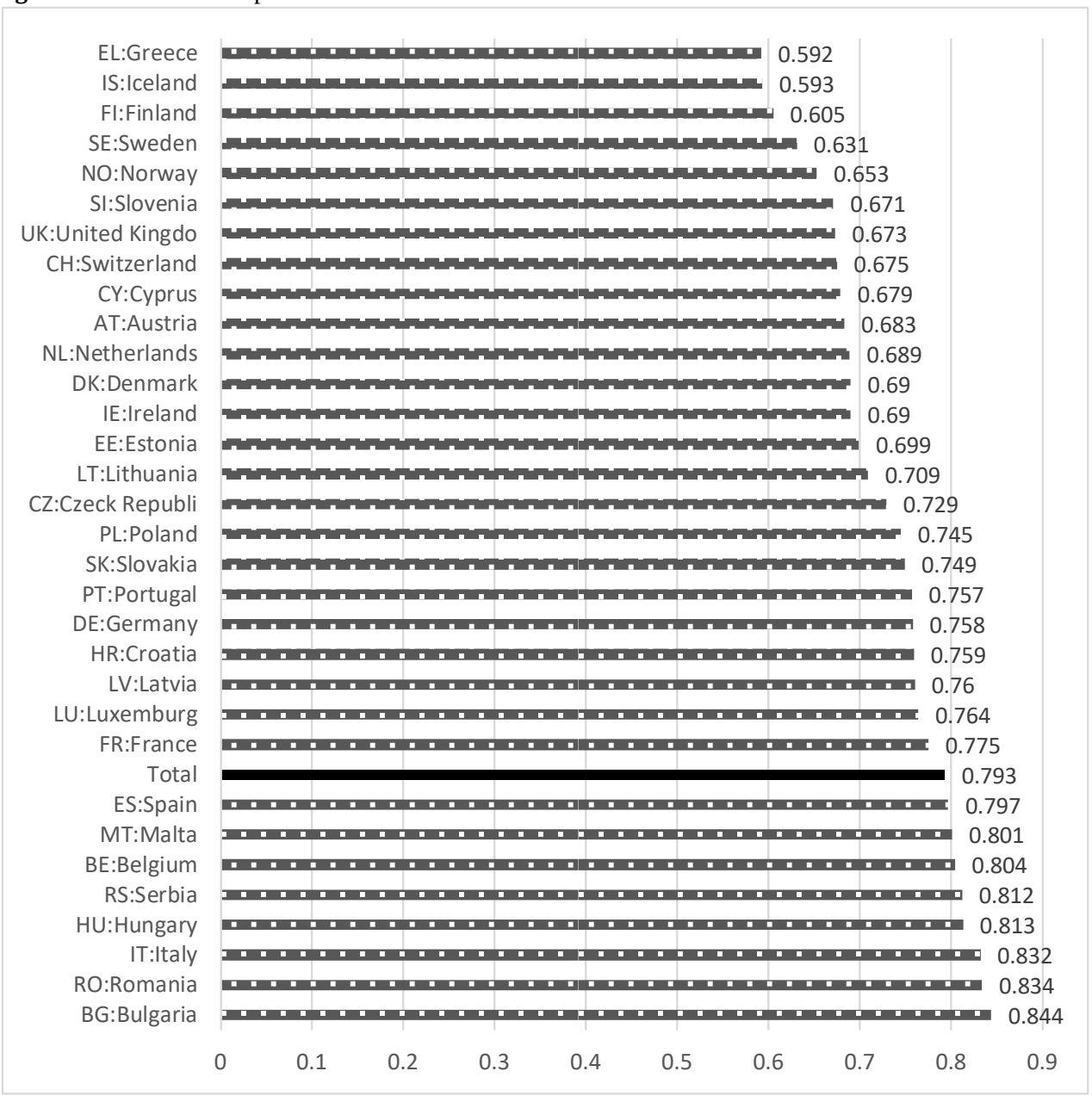
In some countries either all or some of the individual income components are recorded gross with the adjustment of the tax payments undertaken separately to construct total disposable household income. In order to allocate the tax payments to individual household members for each individual we calculate her/his individual income from available data and then we sum across all household members. The difference between this income measure and total disposable income is assumed to be the total tax payments and which we allocate to different household members according to their share in total taxable household income. Household level tax payments are allocated separately.

Figure B1: Per cent of adults living in multi-family households based on baseline and alternative dependent children definition



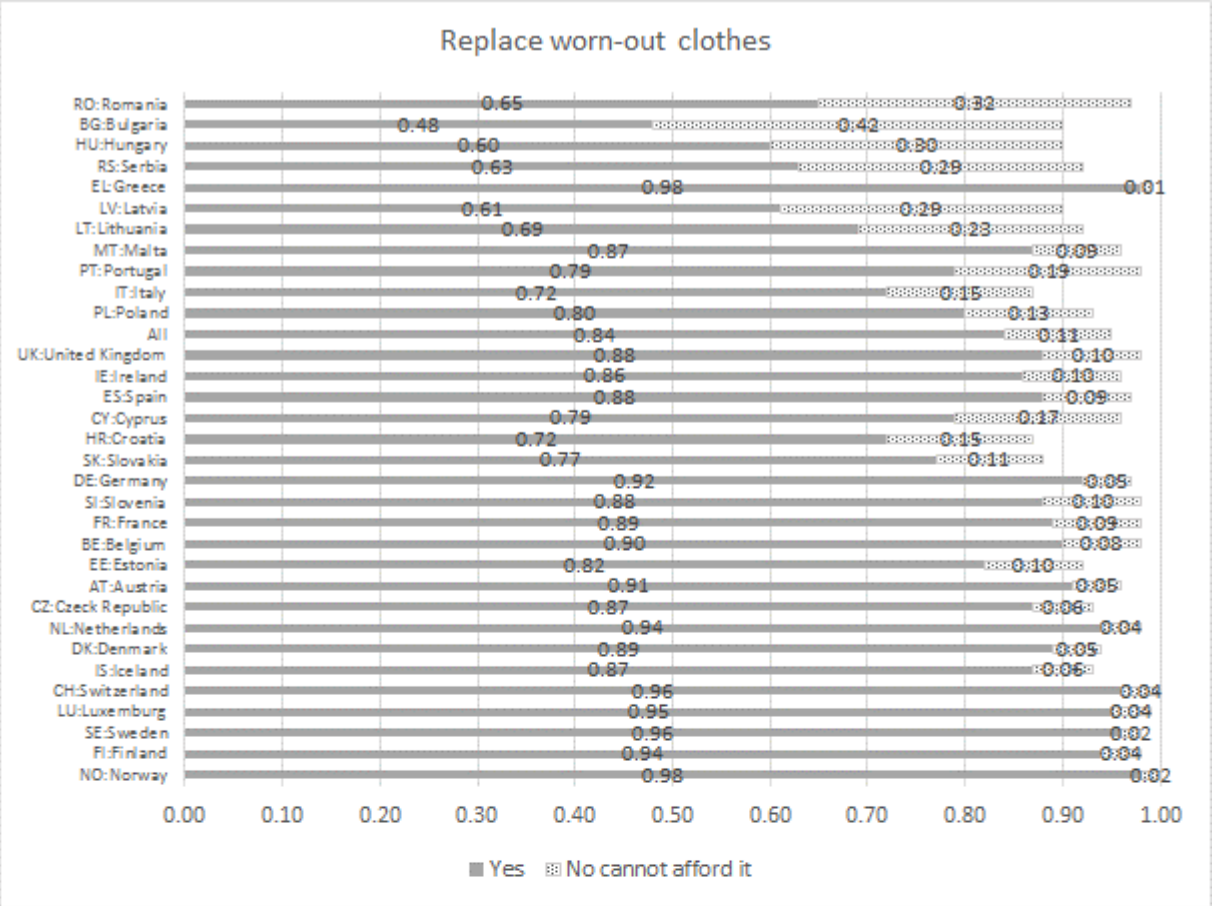
Note: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. The baseline definition assumes that all people under age 18 are dependnet children (unless they report employment and self-employment income). The alternative (wider) dependent children definition assumes that all people under age 24 are dependent children.

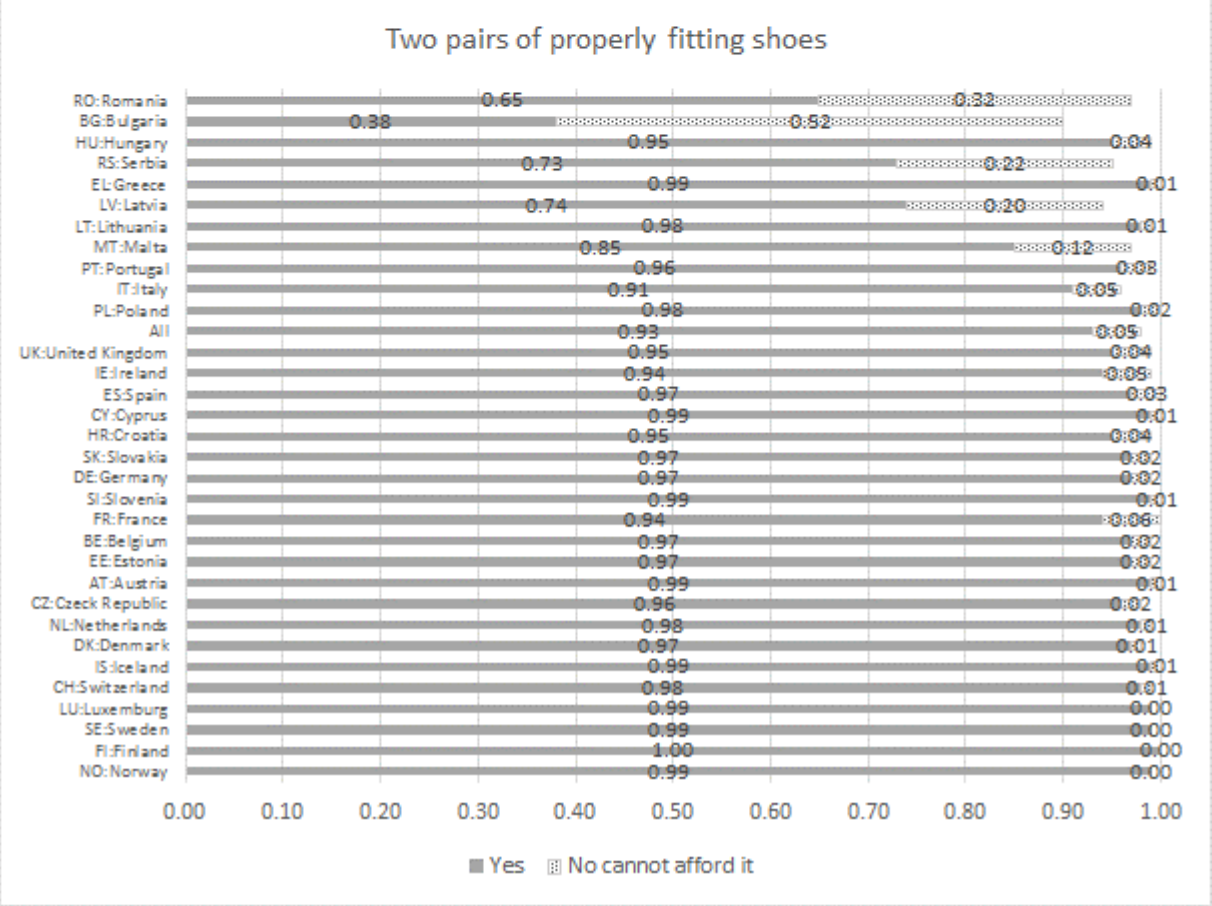
Figure B2: Cronbach's alpha

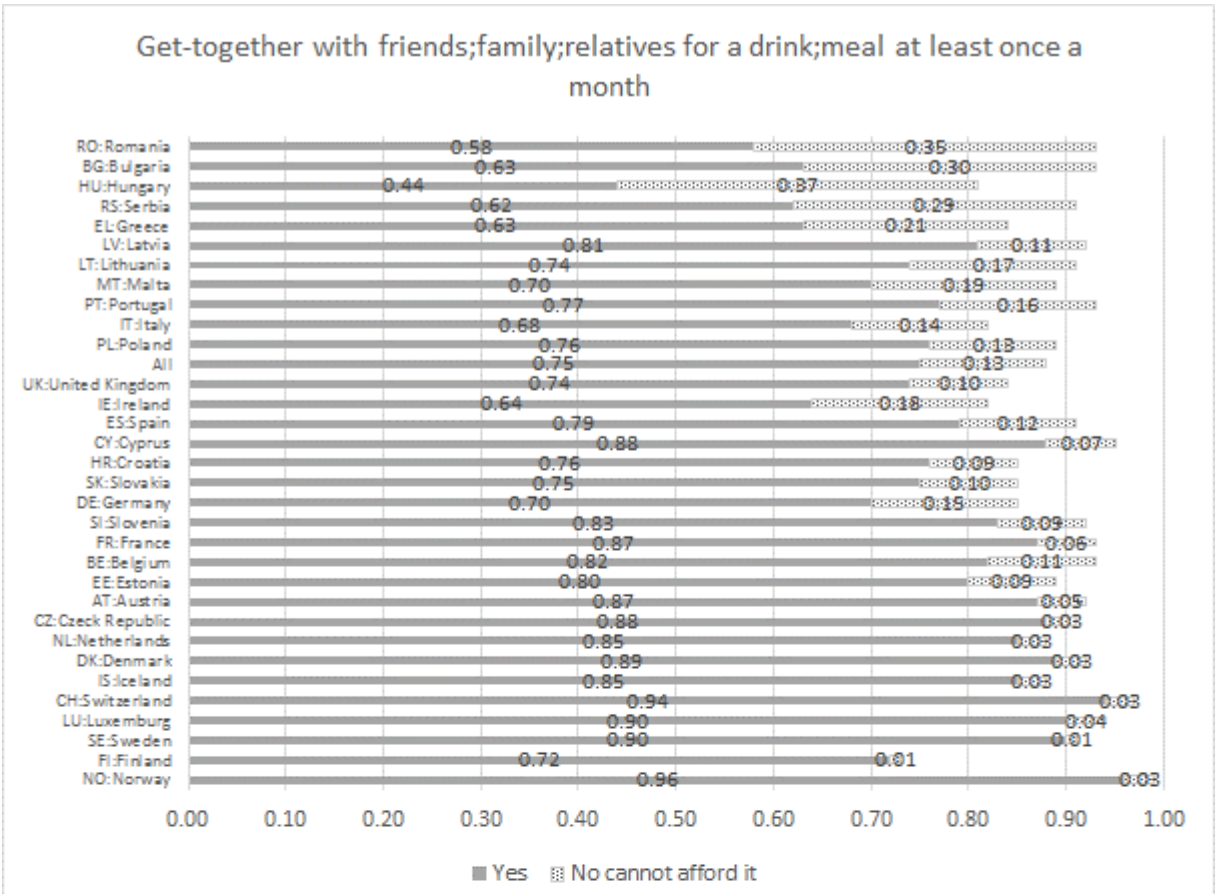


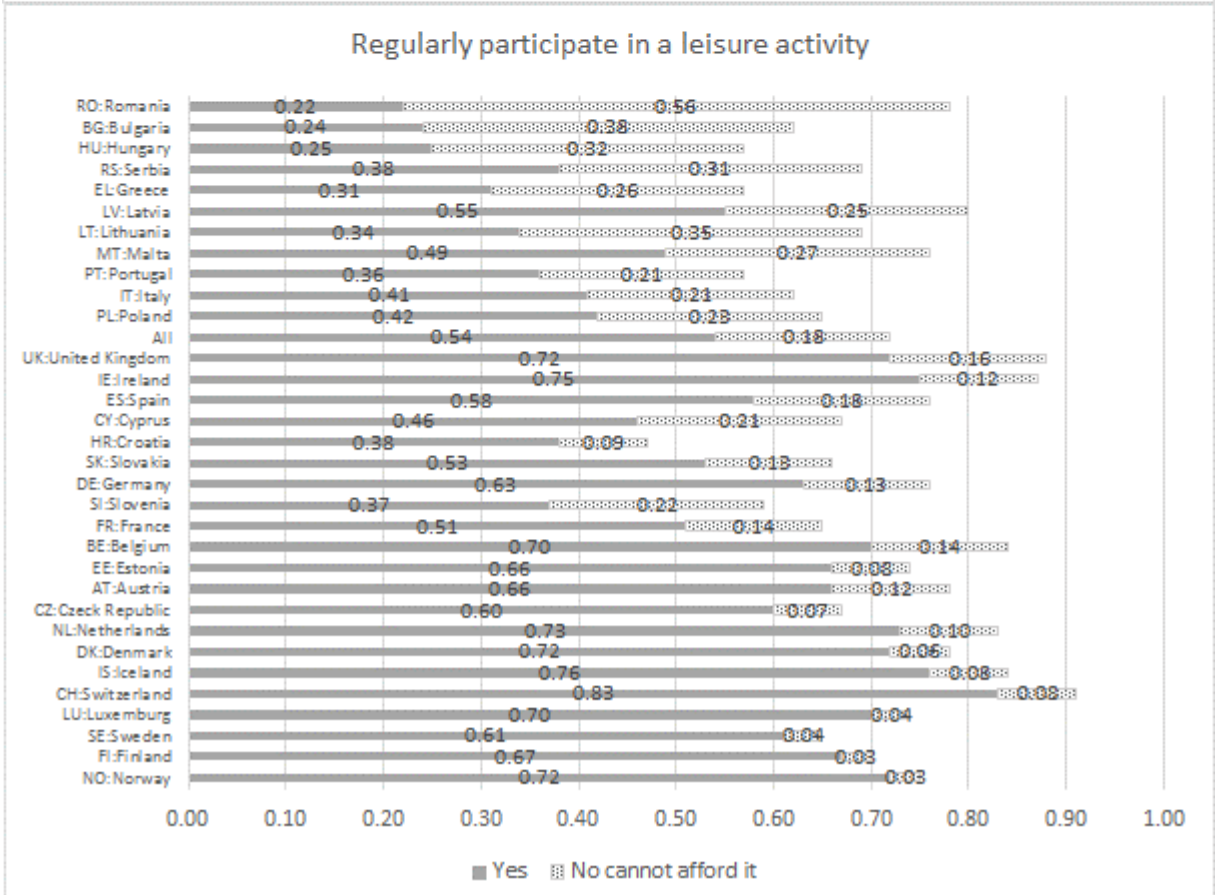
Source: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

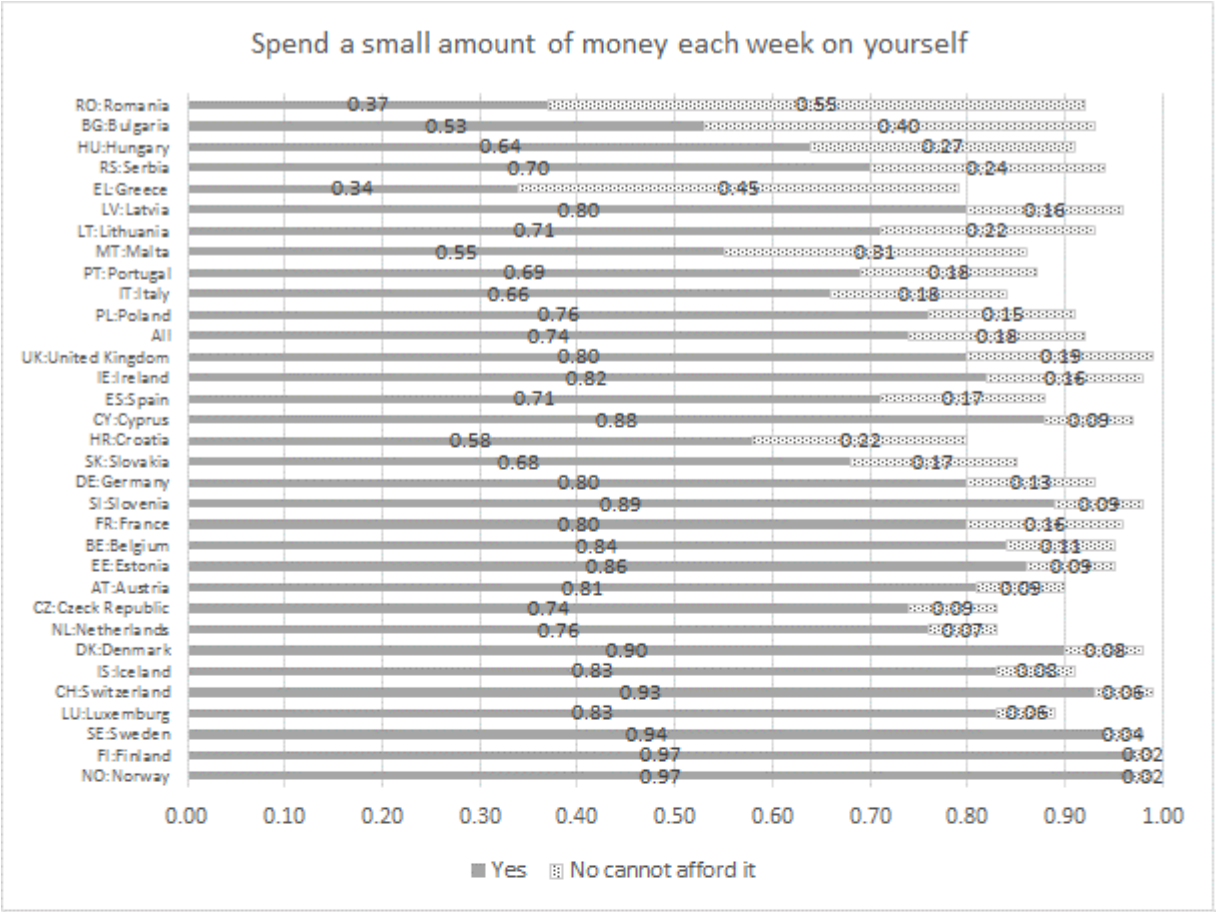
Figure B3: Proportion of people lacking different adult deprivation items because they cannot afford them or for other reasons

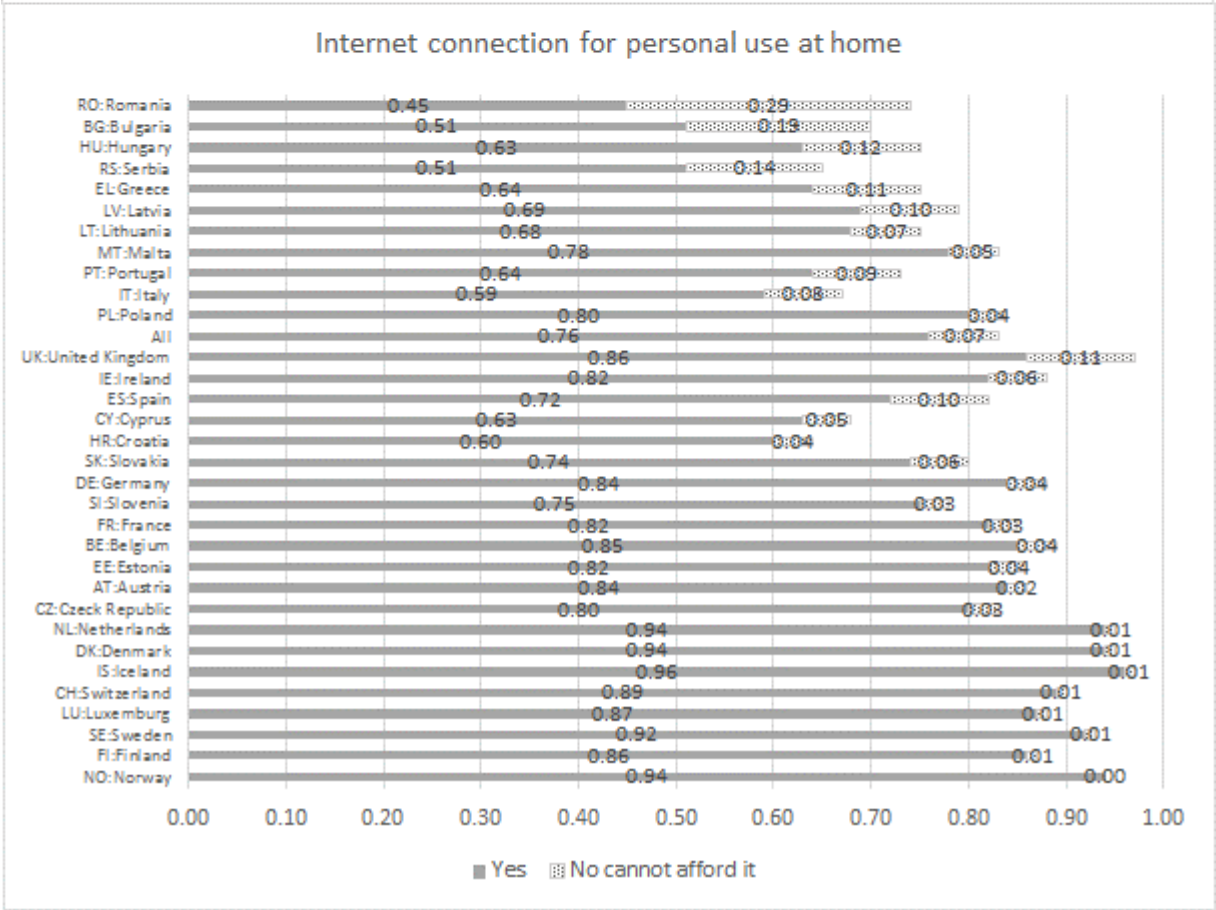


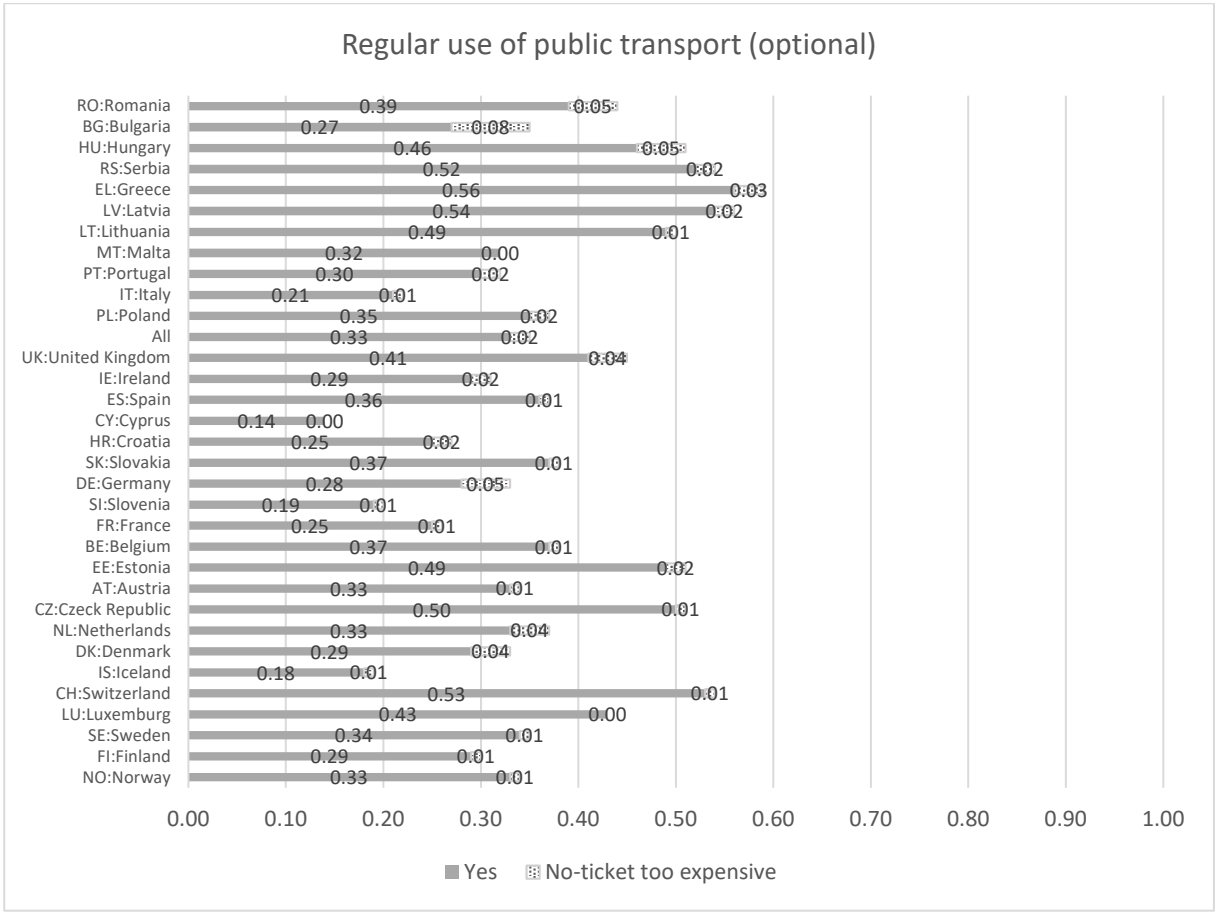



Get-together with friends;family;relatives for a drink;meal at least once a month
RO:Romania 0.58 0.35
BG:Bulgaria 0.63 0.30
HU:Hungary 0.44 0.37
RS:Serbia 0.62 0.29
EL:Greece 0.63 0.21
LV:Latvia 0.81 0.11
LT:Lithuania 0.74 0.17
MT:Malta 0.70 0.19
PT:Portugal 0.77 0.16
IT:Italy 0.68 0.14
PL:Poland 0.76 0.13
All 0.75 0.13
UK:United Kingdom 0.74 0.10
IE:Ireland 0.64 0.18
ES:Spain 0.79 0.12
CY:Cyprus 0.88 0.07
HR:Croatia 0.76 0.09
SK:Slovakia 0.75 0.10
DE:Germany 0.70 0.15
SI:Slovenia 0.83 0.09
FR:France 0.87 0.06
BE:Belgium 0.82 0.11
EE:Estonia 0.80 0.09
AT:Austria 0.87 0.05
CZ:Czeck Republic 0.88 0.03
NL:Netherlands 0.85 0.03
DK:Denmark 0.89 0.03
IS:Iceland 0.85 0.03
CH:Switzerland 0.94 0.03
LU:Luxemburg 0.90 0.04
SE:Sweden 0.90 0.01
FI:Finland 0.72 0.01
NO:Norway 0.96 0.03
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
Yes
No cannot afford it


Regularly participate in a leisure activity
RO:Romania 0.22 0.56
BG:Bulgaria 0.24 0.38
HU:Hungary 0.25 0.32
RS:Serbia 0.38 0.31
EL:Greece 0.31 0.26
LV:Latvia 0.55 0.25
LT:Lithuania 0.34 0.35
MT:Malta 0.49 0.27
PT:Portugal 0.36 0.21
IT:Italy 0.41 0.21
PL:Poland 0.42 0.23
All 0.54 0.18
UK:United Kingdom 0.72 0.16
IE:Ireland 0.75 0.12
ES:Spain 0.58 0.18
CY:Cyprus 0.46 0.21
HR:Croatia 0.38 0.09
SK:Slovakia 0.53 0.13
DE:Germany 0.63 0.13
SI:Slovenia 0.37 0.22
FR:France 0.51 0.14
BE:Belgium 0.70 0.14
EE:Estonia 0.66 0.03
AT:Austria 0.66 0.12
CZ:Czeck Republic 0.60 0.07
NL:Netherlands 0.73 0.10
DK:Denmark 0.72 0.05
IS:Iceland 0.76 0.08
CH:Switzerland 0.83 0.08
LU:Luxemburg 0.70 0.04
SE:Sweden 0.61 0.04
FI:Finland 0.67 0.03
NO:Norway 0.72 0.03
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
Yes
No cannot afford it

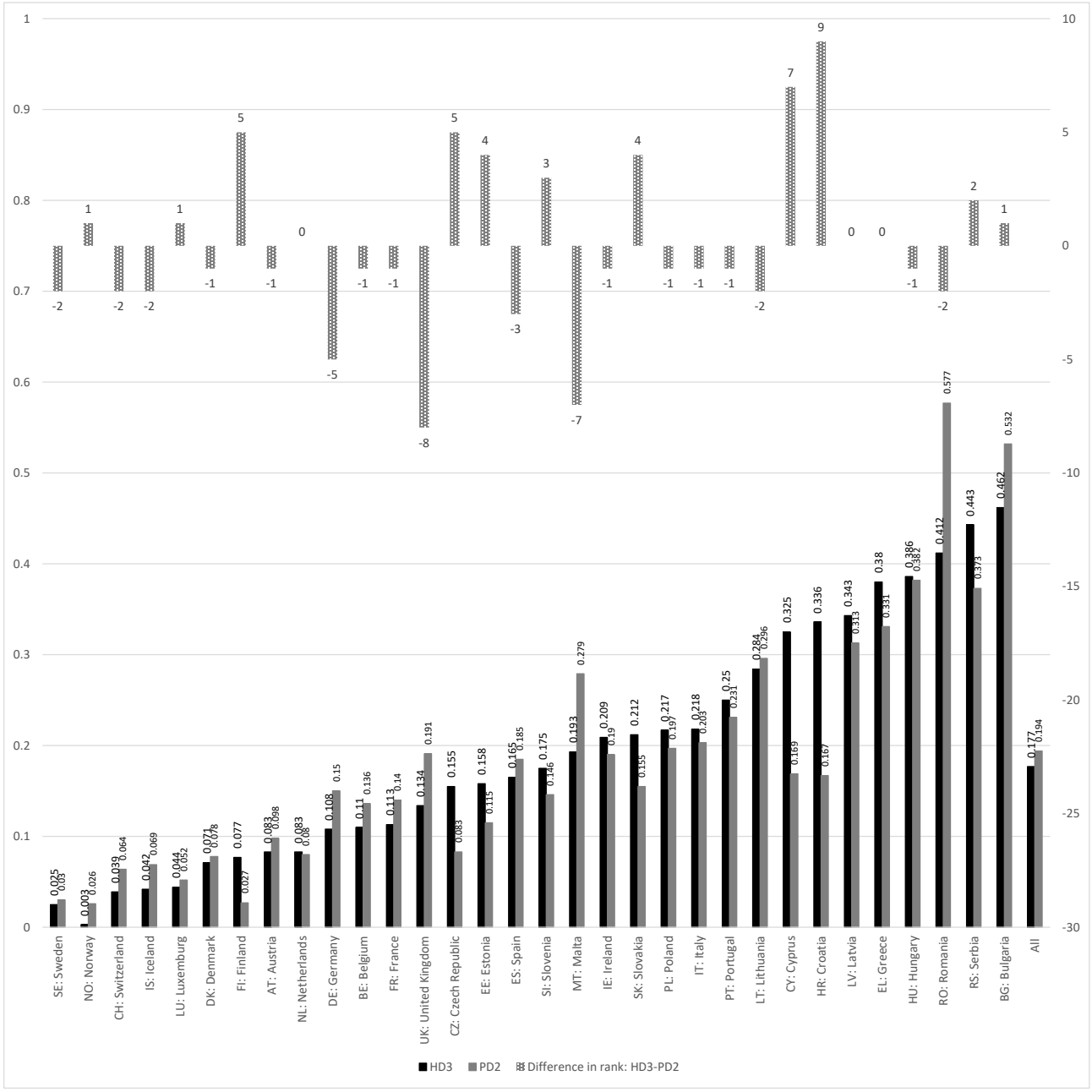

Spend a small amount of money each week on yourself
RO:Romania 0.37 0.55
BG:Bulgaria 0.53 0.40
HU:Hungary 0.64 0.27
RS:Serbia 0.70 0.24
EL:Greece 0.34 0.45
LV:Latvia 0.80 0.16
LT:Lithuania 0.71 0.22
MT:Malta 0.55 0.31
PT:Portugal 0.69 0.18
IT:Italy 0.66 0.18
PL:Poland 0.76 0.15
All 0.74 0.18
UK:United Kingdom 0.80 0.19
IE:Ireland 0.82 0.16
ES:Spain 0.71 0.17
CY:Cyprus 0.88 0.09
HR:Croatia 0.58 0.22
SK:Slovakia 0.68 0.17
DE:Germany 0.80 0.13
SI:Slovenia 0.89 0.09
FR:France 0.80 0.16
BE:Belgium 0.84 0.11
EE:Estonia 0.86 0.09
AT:Austria 0.81 0.09
CZ:Czech Republic 0.74 0.09
NL:Netherlands 0.76 0.07
DK:Denmark 0.90 0.08
IS:Iceland 0.83 0.03
CH:Switzerland 0.93 0.06
LU:Luxemburg 0.83 0.06
SE:Sweden 0.94 0.04
FI:Finland 0.97 0.02
NO:Norway 0.97 0.02
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
Yes
No cannot afford it


Internet connection for personal use at home
RO:Romania 0.45 0.29
BG:Bulgaria 0.51 0.19
HU:Hungary 0.63 0.12
RS:Serbia 0.51 0.14
EL:Greece 0.64 0.11
LV:Latvia 0.69 0.10
LT:Lithuania 0.68 0.07
MT:Malta 0.78 0.05
PT:Portugal 0.64 0.09
IT:Italy 0.59 0.08
PL:Poland 0.80 0.04
All 0.76 0.07
UK:United Kingdom 0.86 0.11
IE:Ireland 0.82 0.06
ES:Spain 0.72 0.10
CY:Cyprus 0.63 0.05
HR:Croatia 0.60 0.04
SK:Slovakia 0.74 0.06
DE:Germany 0.84 0.04
SI:Slovenia 0.75 0.03
FR:France 0.82 0.03
BE:Belgium 0.85 0.04
EE:Estonia 0.82 0.04
AT:Austria 0.84 0.02
CZ:Czech Republic 0.80 0.08
NL:Netherlands 0.94 0.01
DK:Denmark 0.94 0.01
IS:Iceland 0.96 0.01
CH:Switzerland 0.89 0.01
LU:Luxemburg 0.87 0.01
SE:Sweden 0.92 0.01
FI:Finland 0.86 0.01
NO:Norway 0.94 0.00
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
Yes
No cannot afford it



Source: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.

Figure B4: Comparison of country rankings in terms of HD3 and PD2 deprivation indicators (ordered by least HD3 deprived)



Source: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. For both HD3 and PD2 the deprivation risk is defined for all adults.

Table B1a: The risk of deprivation among adults in terms of PD2 and HD3 by gender, family type and whether live in one or multifamily household

	couple with children		single with children		couple no children		single no children		elderly couple		elderly singles	
	HD2	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**
BE: Belgium	0.078	0.101	0.412	0.429	0.057	0.083	0.237	0.267	0.018	0.056	0.106	0.171
BG: Bulgaria	0.412	0.489	0.716	0.612	0.404	0.472	0.571	0.471	0.589	0.584	0.799	0.681
CZ: Czech Republic	0.127	0.066	0.406	0.234	0.084	0.061	0.232	0.132	0.086	0.044	0.236	0.120
DK: Denmark	0.049	0.079	0.200	0.247	0.044	0.066	0.170	0.143	0.025	0.028	0.062	0.049
DE: Germany	0.080	0.147	0.304	0.278	0.066	0.129	0.242	0.227	0.036	0.099	0.156	0.197
EE: Estonia	0.111	0.077	0.295	0.187	0.118	0.088	0.200	0.126	0.094	0.109	0.221	0.224
IE: Ireland	0.210	0.207	0.495	0.413	0.136	0.124	0.319	0.195	0.056	0.067	0.159	0.102
EL: Greece	0.341	0.372	0.581	0.560	0.325	0.349	0.430	0.104	0.296	0.298	0.423	0.092
ES: Spain	0.166	0.201	0.309	0.294	0.119	0.152	0.207	0.206	0.062	0.128	0.115	0.168
FR: France	0.092	0.123	0.344	0.359	0.073	0.096	0.194	0.193	0.037	0.075	0.123	0.178
HR: Croatia	0.303	0.139	0.553	0.250	0.271	0.167	0.418	0.205	0.247	0.174	0.388	0.244
IT: Italy	0.218	0.218	0.307	0.256	0.176	0.184	0.222	0.171	0.146	0.179	0.220	0.196
CY: Cyprus	0.292	0.191	0.683	0.443	0.263	0.156	0.292	0.162	0.180	0.113	0.302	0.131
LV: Latvia	0.225	0.230	0.509	0.413	0.271	0.292	0.439	0.405	0.297	0.332	0.512	0.441
LT: Lithuania	0.199	0.263	0.459	0.423	0.180	0.243	0.376	0.352	0.269	0.294	0.502	0.404
LU: Luxemburg	0.039	0.073	0.193	0.189	0.042	0.031	0.085	0.086	0.003	0.016	0.019	0.039
HU: Hungary	0.351	0.361	0.679	0.658	0.321	0.352	0.477	0.442	0.236	0.253	0.431	0.368
MT: Malta	0.131	0.239	0.468	0.586	0.076	0.137	0.295	0.283	0.151	0.282	0.236	0.245
NL: Netherlands	0.063	0.076	0.260	0.188	0.036	0.066	0.194	0.132	0.023	0.053	0.078	0.095
AT: Austria	0.071	0.091	0.298	0.311	0.043	0.071	0.164	0.156	0.032	0.054	0.106	0.118
PL: Poland	0.165	0.176	0.406	0.310	0.155	0.161	0.324	0.246	0.144	0.122	0.338	0.276
PT: Portugal	0.188	0.187	0.372	0.399	0.192	0.200	0.309	0.244	0.189	0.186	0.320	0.286
RO: Romania	0.352	0.525	0.615	0.697	0.361	0.476	0.461	0.495	0.361	0.577	0.583	0.698
SI: Slovenia	0.104	0.117	0.313	0.211	0.184	0.159	0.279	0.226	0.099	0.116	0.281	0.194
SK: Slovakia	0.157	0.123	0.417	0.297	0.162	0.128	0.340	0.203	0.164	0.133	0.376	0.212
FI: Finland	0.048	0.033	0.237	0.072	0.051	0.014	0.212	0.047	0.015	0.010	0.098	0.030
SE: Sweden	0.022	0.031	0.111	0.115	0.009	0.016	0.071	0.056	0.002	0.009	0.014	0.035
UK: United Kingdom	0.125	0.197	0.447	0.459	0.073	0.092	0.275	0.264	0.029	0.135	0.099	0.329
IS: Iceland	0.032	0.060	0.158	0.224	0.013	0.058	0.144	0.091	0.011	0.042	0.052	0.091
NO: Norway	0.016	0.020	0.141	0.085	0.009	0.010	0.092	0.060	0.003	0.007	0.022	0.037
CH: Switzerland	0.023	0.059	0.145	0.139	0.017	0.032	0.115	0.114	0.008	0.030	0.030	0.103
RS: Serbia	0.325	0.303	0.672	0.489	0.425	0.396	0.583	0.439	0.373	0.348	0.563	0.439
Total	0.146	0.181	0.363	0.344	0.107	0.135	0.236	0.206	0.085	0.131	0.199	0.227
	couple with children		**single with children**		**couple no children**		**single no children**		**elderly couple**		**elderly singles**	
	HD2	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**
BE: Belgium	0.124	0.153	0.306	0.278	0.063	0.081	0.142	0.147	0.099	0.127	0.107	0.151
BG: Bulgaria	0.358	0.527	0.637	0.694	0.349	0.529	0.441	0.456	0.354	0.623	0.483	0.607
CZ: Czech Republic	0.161	0.088	0.404	0.250	0.123	0.060	0.186	0.092	0.103	0.048	0.266	0.141
DK: Denmark	0.014	0.038	0.117	0.121	0.011	0.047	0.090	0.080	0.030	0.096	0.000	0.000
DE: Germany	0.084	0.146	0.302	0.351	0.065	0.119	0.117	0.126	0.050	0.126	0.095	0.162
EE: Estonia	0.122	0.079	0.302	0.189	0.146	0.094	0.199	0.095	0.085	0.133	0.256	0.181
IE: Ireland	0.203	0.224	0.545	0.468	0.152	0.147	0.243	0.216	0.159	0.146	0.253	0.248
EL: Greece	0.487	0.469	0.682	0.636	0.405	0.440	0.421	0.342	0.336	0.319	0.407	0.289
ES: Spain	0.236	0.275	0.410	0.398	0.173	0.198	0.206	0.161	0.112	0.162	0.179	0.194
FR: France	0.130	0.167	0.309	0.318	0.064	0.110	0.167	0.157	0.110	0.171	0.132	0.184
HR: Croatia	0.318	0.161	0.500	0.245	0.327	0.171	0.373	0.139	0.335	0.164	0.388	0.202
IT: Italy	0.273	0.259	0.388	0.313	0.228	0.264	0.254	0.170	0.175	0.196	0.233	0.211
CY: Cyprus	0.382	0.194	0.550	0.235	0.387	0.209	0.388	0.143	0.321	0.178	0.340	0.162
LV: Latvia	0.342	0.303	0.475	0.408	0.219	0.248	0.381	0.282	0.287	0.329	0.418	0.337
LT: Lithuania	0.211	0.296	0.411	0.467	0.193	0.286	0.292	0.230	0.263	0.292	0.277	0.295
LU: Luxemburg	0.031	0.045	0.112	0.105	0.039	0.040	0.054	0.044	0.027	0.018	0.041	0.055
HU: Hungary	0.470	0.505	0.656	0.684	0.304	0.359	0.435	0.385	0.330	0.381	0.434	0.388
MT: Malta	0.213	0.374	0.536	0.602	0.169	0.296	0.229	0.253	0.166	0.342	0.233	0.369
NL: Netherlands	0.055	0.053	0.334	0.158	0.051	0.067	0.118	0.073	0.057	0.026	0.182	0.178
AT: Austria	0.108	0.114	0.297	0.350	0.043	0.104	0.097	0.069	0.035	0.090	0.072	0.110
PL: Poland	0.190	0.199	0.400	0.362	0.198	0.194	0.264	0.209	0.182	0.198	0.269	0.200
PT: Portugal	0.315	0.276	0.525	0.474	0.196	0.236	0.306	0.221	0.233	0.274	0.373	0.304
RO: Romania	0.469	0.664	0.567	0.803	0.353	0.578	0.448	0.533	0.319	0.613	0.445	0.676
SI: Slovenia	0.167	0.126	0.268	0.243	0.154	0.139	0.198	0.137	0.145	0.153	0.249	0.187
SK: Slovakia	0.265	0.215	0.383	0.290	0.147	0.138	0.217	0.132	0.189	0.192	0.244	0.149
FI: Finland	0.057	0.044	0.177	0.177	0.060	0.016	0.071	0.029	0.012	0.009	0.063	0.002
SE: Sweden	0.043	0.032	0.050	0.196	0.014	0.024	0.019	0.009	0.027	0.000	0.095	0.051
UK: United Kingdom	0.194	0.222	0.524	0.359	0.135	0.148	0.184	0.138	0.152	0.202	0.131	0.296
IS: Iceland	0.035	0.084	0.281	0.244	0.017	0.053	0.025	0.047	0.016	0.046	0.051	0.125
NO: Norway	0.029	0.017	0.109	0.109	0.003	0.003	0.025	0.024	0.014	0.000	0.000	0.000
CH: Switzerland	0.046	0.101	0.030	0.213	0.025	0.074	0.055	0.050	0.000	0.036	0.000	0.086
RS: Serbia	0.432	0.371	0.573	0.433	0.437	0.447	0.485	0.316	0.392	0.377	0.476	0.413
Total	0.233	0.262	0.415	0.384	0.183	0.226	0.234	0.194	0.180	0.230	0.258	0.265

Source: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. For both HD3 and PD2 the deprivation risk is defined for all adults.

Table B1b: The risk of deprivation among adults in terms of PD2 and HD3 by age group

	17-24		25-34		35-44		45-54		55-64		65-74		75+	
	HD2	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD2**	**PD2**	**HD3**	**PD2**
BE: Belgium	0.164	0.138	0.138	0.136	0.115	0.155	0.123	0.168	0.089	0.129	0.065	0.106	0.049	0.097
BG: Bulgaria	0.431	0.421	0.403	0.459	0.419	0.501	0.387	0.524	0.467	0.589	0.545	0.615	0.655	0.619
CZ: Czech Republic	0.191	0.061	0.148	0.079	0.152	0.089	0.155	0.096	0.141	0.088	0.155	0.083	0.158	0.072
DK: Denmark	0.144	0.118	0.084	0.111	0.092	0.105	0.053	0.074	0.048	0.06	0.03	0.032	0.047	0.034
DE: Germany	0.11	0.09	0.128	0.154	0.129	0.17	0.111	0.172	0.125	0.192	0.08	0.141	0.053	0.097
EE: Estonia	0.169	0.045	0.125	0.058	0.134	0.095	0.153	0.116	0.198	0.171	0.16	0.163	0.18	0.179
IE: Ireland	0.301	0.248	0.215	0.206	0.224	0.201	0.235	0.204	0.192	0.192	0.101	0.098	0.08	0.06
EL: Greece	0.489	0.306	0.392	0.323	0.383	0.398	0.375	0.398	0.354	0.364	0.322	0.268	0.376	0.186
ES: Spain	0.22	0.149	0.185	0.164	0.184	0.213	0.185	0.225	0.151	0.19	0.096	0.15	0.103	0.148
FR: France	0.163	0.139	0.126	0.13	0.122	0.153	0.124	0.154	0.098	0.145	0.066	0.123	0.077	0.116
HR: Croatia	0.371	0.109	0.312	0.114	0.312	0.155	0.351	0.19	0.353	0.211	0.316	0.198	0.337	0.192
IT: Italy	0.264	0.147	0.251	0.177	0.229	0.216	0.227	0.24	0.197	0.226	0.18	0.204	0.186	0.17
CY: Cyprus	0.437	0.125	0.324	0.161	0.301	0.194	0.363	0.234	0.283	0.192	0.221	0.125	0.255	0.09
LV: Latvia	0.352	0.249	0.271	0.211	0.311	0.28	0.333	0.322	0.346	0.391	0.396	0.397	0.429	0.351
LT: Lithuania	0.288	0.263	0.204	0.218	0.237	0.284	0.26	0.304	0.281	0.331	0.337	0.364	0.437	0.313
LU: Luxemburg	0.043	0.041	0.049	0.056	0.056	0.062	0.055	0.059	0.049	0.071	0.014	0.025	0.004	0.019
HU: Hungary	0.445	0.374	0.38	0.349	0.371	0.395	0.418	0.455	0.385	0.408	0.34	0.336	0.331	0.276
MT: Malta	0.23	0.255	0.172	0.236	0.189	0.268	0.194	0.284	0.201	0.351	0.174	0.283	0.192	0.262
NL: Netherlands	0.106	0.03	0.104	0.066	0.079	0.086	0.122	0.124	0.063	0.098	0.036	0.059	0.046	0.052
AT: Austria	0.118	0.063	0.085	0.097	0.102	0.118	0.081	0.118	0.078	0.133	0.057	0.074	0.045	0.057
PL: Poland	0.24	0.183	0.176	0.161	0.187	0.183	0.231	0.224	0.246	0.24	0.23	0.22	0.228	0.146
PT: Portugal	0.305	0.198	0.243	0.199	0.218	0.207	0.262	0.278	0.251	0.267	0.225	0.23	0.273	0.226
RO: Romania	0.457	0.591	0.409	0.507	0.388	0.549	0.384	0.574	0.401	0.604	0.41	0.616	0.479	0.669
SI: Slovenia	0.179	0.121	0.155	0.121	0.145	0.122	0.176	0.161	0.214	0.196	0.169	0.16	0.2	0.138
SK: Slovakia	0.248	0.152	0.18	0.122	0.193	0.142	0.211	0.164	0.202	0.177	0.225	0.177	0.306	0.164
FI: Finland	0.131	0.024	0.085	0.027	0.079	0.036	0.081	0.034	0.07	0.029	0.039	0.015	0.058	0.018
SE: Sweden	0.035	0.016	0.036	0.033	0.03	0.042	0.034	0.042	0.022	0.026	0.009	0.023	0.004	0.016
UK: United Kingdom	0.229	0.192	0.161	0.179	0.146	0.193	0.148	0.174	0.119	0.164	0.066	0.17	0.043	0.29
IS: Iceland	0.014	0.052	0.05	0.055	0.064	0.08	0.052	0.093	0.041	0.075	0.02	0.072	0.03	0.034
NO: Norway	0.059	0.03	0.04	0.027	0.038	0.034	0.036	0.031	0.02	0.023	0.007	0.016	0.003	0.013
CH: Switzerland	0.054	0.039	0.041	0.056	0.047	0.075	0.052	0.094	0.034	0.055	0.013	0.056	0.012	0.053
RS: Serbia	0.492	0.279	0.413	0.288	0.388	0.346	0.476	0.434	0.448	0.452	0.418	0.374	0.497	0.407
Total	0.218	0.166	0.188	0.178	0.183	0.205	0.182	0.213	0.175	0.214	0.141	0.182	0.147	0.177

Source: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16. For both HD3 and PD2 the deprivation risk is defined for all adults.

Table B2: Marginal effects of the probability of being PD2 deprived using a simple lack deprivation concept

	Prob(PD2=1) (based on simple lack concept)
Age	0.003***
	(6.57)
Age squared	0.000***
	(11.35)
Woman	0.008***
	(3.20)
Family type	
(ref: couple with children in one-family hhs)	
Single with children in one family household	0.121***
	(14.43)
Couple no children in one family household	-0.016***
	(-3.49)
Single no children in one family household	0.026***
	(4.37)
Couple elderly people in one family household	-0.110***
	(-20.58)
Single elderly people in one family household	-0.016**
	(-2.21)
Couple with children in multi-family household	-0.013***
	(-2.71)
Single with children in multi-family household	0.091***
	(8.72)
Couple no children in multi-family household	-0.030***
	(-6.57)
Single no children in multi-family household	-0.008*
	(-1.95)
Couple elderly people in multi-family household	-0.029***
	(-4.30)
Single elderly people in multi-family household	0.055***
	(6.11)
Proxy respondent	-0.011***
	(-3.72)
Log equivalised household income	-0.251***
	(-86.71)
Individual's share in total household income	-0.067***
	(-12.92)
Country: (ref. BE: Belgium)	
BG: Bulgaria	0.002
	(0.26)
CZ: Czech Republic	-0.069***
	(-11.39)
DK: Denmark	0.015
	(1.43)
DE: Germany	0.072***
	(12.52)
EE: Estonia	-0.199***
	(-33.25)
IE: Ireland	0.130***
	(18.18)
EL: Greece	0.096***
	(14.13)
ES: Spain	0.020***
	(3.44)
FR: France	0.105***
	(17.92)
HR: Croatia	-0.025***
	(-3.39)
IT: Italy	0.163***
	(30.09)

CY: Cyprus	0.095***
	(14.24)
LV: Latvia	-0.133***
	(-20.96)
LT: Lithuania	-0.128***
	(-17.97)
LU: Luxemburg	0.080***
	(10.20)
HU: Hungary	-0.005
	(-0.68)
MT: Malta	0.087***
	(12.94)
NL: Netherlands	-0.013
	(-1.62)
AT: Austria	0.098***
	(14.87)
PL: Poland	-0.149***
	(-25.36)
PT: Portugal	-0.002
	(-0.27)
RO: Romania	-0.077***
	(-9.32)
SI: Slovenia	0.004
	(0.77)
SK: Slovakia	-0.066***
	(-10.18)
FI: Finland	0.092***
	(13.66)
SE: Sweden	0.028***
	(3.61)
UK: United Kingdom	0.044***
	(6.94)
IS: Iceland	0.012
	(1.31)
NO: Norway	0.090***
	(11.73)
CH: Switzerland	-0.013
	(-1.48)
RS: Serbia	-0.192***
	(-29.07)
Observations	454955
Pseudo R-squared	0.200

Source: Authors' calculations based on 2014 EU-SILC cross-sectional data UDB ver. 2014-2 1-8-16.