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SUSTAINABLE DEVELOPMENT GOAL 1.2: MULTIDIMENSIONAL CHILD POVERTY IN THE EUROPEAN UNION

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Abstract: The new universal Sustainable Development Goals (SDGs) call for "reducing at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions" by 2030. Since few European Union (EU) countries have an official national multidimensional poverty measure for monitoring progress towards the SDGs, this paper proposes and evaluates a child-specific multidimensional poverty measure using data from ad hoc material deprivation modules of the European Union Statistics on Income and Living Conditions (EU-SILC) 2009 and 2014. The proposed measure can be used both for national and EU-wide SDG monitoring without replacing either national or EU-wide indices of material deprivation. Comparing child multidimensional poverty rates between 2009 and 2014, the paper ranks EU countries based on the 2014 headcount rates and changes over time.

Key words: Sustainable Development Goals, multidimensional poverty, child well-being, European Union, EU-SILC.

Country abbreviations

AT	Austria	**ES**	Spain	**LV**	Latvia
BE	Belgium	**FI**	Finland	**MT**	Malta
BG	Bulgaria	**FR**	France	**NL**	Netherlands
CH	Switzerland	**HR**	Croatia	**PL**	Poland
CY	Cyprus	**HU**	Hungary	**PT**	Portugal
CZ	Czech Republic	**IE**	Ireland	**RO**	Romania
DE	Germany	**IS**	Iceland	**SE**	Sweden
DK	Denmark	**IT**	Italy	**SI**	Slovenia
EE	Estonia	**LT**	Lithuania	**SK**	Slovakia
EL	Greece	**LU**	Luxembourg	**UK**	United Kingdom

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1. INTRODUCTION

Although there is a broad consensus that childhood poverty is harmful for the children themselves and the societies in which they live (Brooks-Gunn and Duncan, 1997; Corak, 2006; Esping-Andersen and Myles, 2009; Gregg and Machin, 2001; Griggs and Walker, 2008), there is less agreement on how to define and measure child poverty. Although it is still common to calculate the child poverty rate as the share of children living in income- or consumption-poor households (Cantillon et al., 2017; Davis et al., 2016), there is a growing emphasis on direct non-monetary definitions of child poverty. Household-based monetary poverty measures rely on assumptions about the intra-household distribution of resources inherent in the equivalence scales used to adjust for household size and composition (Roelen and Gassmann, 2008), but in reality children have little say in household allocation of resources (Feeny and Boyden, 2004). Moreover, some of the goods and services that are particularly key to children's development do not have competitive markets (e.g. health and education) or any markets at all (e.g. protection from violence), so monetary measures alone cannot fully capture what it means for a child to be poor (Chzhen and Ferrone, 2016).

The Sustainable Development Goals (SDGs) call for "reducing at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions" (Target 1.2) by 2030. While Target 1.1 calls for eradicating extreme poverty, "currently measured as people living on less than $1.25 a day", Target 1.2 is explicitly multidimensional and can be understood as focusing on non-monetary aspects of poverty (see World Bank, 2017). As the SDGs are universal, higher income countries are also called on to monitor progress towards halving the multidimensional poverty rate. While work is under way to analyse material deprivation among children across the European Union (EU) (Guio et al., 2016), member states may engage in a national consultative process to align such cross-national indices to their local contexts or use existing national measures of multidimensional child poverty. It is important that any such construct reflects the multidimensionality of children's experiences of poverty.

The goal of this paper is to draw attention to multidimensional poverty among children in higher income countries in light of the universal post-2015 development agenda. It examines multiple dimensions of child poverty through a normative child rights lens to inspire national efforts to focus on multiple and overlapping experiences of child poverty. Following UNICEF's rights-based approach to multidimensional child poverty measurement (Gordon et al., 2003; UNICEF, 2007; de Neubourg et al., 2012), the study constructs and evaluates a child-specific measure using data for 31 European countries from the most recent thematic material deprivation module of the EU Statistics on Income and Living Conditions (EU-SILC) 2014. The proposed measure can be used both for national and EU-wide SDG monitoring.

First, we briefly review existing approaches to defining and measuring multidimensional child poverty. We then describe the construction of our proposed multidimensional measure, plot differences in the child poverty rate across 31 European countries in 2014 and track changes since 2009. We also analyse variation in the probability of being poor in multiple dimensions by key household-level characteristics, investigate which dimensions drive the child poverty rate across the EU and explore the extent of overlap across the key dimensions of poverty among children. The paper concludes with a summary of the key findings.

2. LITERATURE REVIEW

At least since the Human Development Index (HDI) interpreted poverty as "the denial of opportunities and choices… to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-esteem and the respect of others…" (United Nations Development Programme, 1997: 5), poverty has been seen internationally as more than just a lack of monetary resources. The language of the SDG Target 1.2 reflects that the multidimensional nature of poverty is now widely accepted, but there is still debate about how to best measure poverty multidimensionally within the post-2015 development agenda (Lang and Lingnau, 2015). The Atkinson Commission on Global Poverty distinguishes between subjective, basic needs, capabilities and minimum rights perspectives on non-monetary poverty, but judges only the latter two as "intrinsically multidimensional" (World Bank, 2017: 155).

The capabilities approach views poverty as more than just lack of resources but deprivation of a person's opportunities to "achieve those things that she has reason to value" (Sen, 2009: 231). Thus income is an input to achieve individual's capabilities and functioning rather than a direct measure of well-being (Sen, 1999). The capabilities perspective informed the construction of the Global Multidimensional Poverty Index based on three dimensions: health, education and the standard of living (Alkire et al., 2015; Alkire and Santos, 2010).

However, the capabilities approach does not necessarily lend itself to the study of child poverty because, dependent on those around them, "children might not have the power to fully utilize their set of capabilities" (Roelen et al., 2010: 131). Instead, most studies of multidimensional child poverty rely on the rights-based approach to define its dimensions (but see, for example, Trani et al., 2013). In a pioneering comparative analysis of multidimensional child poverty in all the developing regions of the world that informed UNICEF's (2007) *Global Study in Child Poverty and Disparities*, Gordon et al. (2003) drew on specific articles of the Convention on the Rights of the Child (United Nations, 1989) to operationalise dimensions of child poverty, such as food, water, sanitation, health, shelter, education, information and access to basic services. Roche (2013) used these dimensions in a national study of child poverty in Bangladesh. Building on Gordon et al. (2003) as well as on the analysis of multidimensional child poverty in Vietnam by Roelen et al. (2010), studies of child poverty that use UNICEF's Multidimensional Overlapping Deprivation Analysis (MODA) framework (de Neubourg et al., 2012) define its dimensions using the child rights approach (e.g. Chzhen et al., 2016; Chzhen and Ferrone, 2016; De Milliano and Handa, 2014; de Milliano and Plavgo, 2014).

The 'rights-based' approach to poverty broadens the political focus from the lack of material resources to social and power relationships thus embracing the way in which people in poverty are treated (Walker, 2014). As rights are defined on the individual basis (World Bank, 2017), they justify an empirical focus on children as active agents, rather than solely as dependents. This can be reflected at all stages of research (e.g. children as units of analysis; deprivations defined at the level of the child). The child rights perspective also informed the construction of several well-known macro-level dashboard indices of child well-being (Bradshaw et al., 2007; Bradshaw and Richardson, 2009; OECD, 2009; Save the Children, 2008; Unicef Innocenti Research Centre, 2007; UNICEF Office of Research, 2013).

Meanwhile, Guio et al. (2012, 2016) developed an alternative approach to studying child poverty. Rather than referring to children's rights, they built on the relative deprivation framework formulated by Townsend (1979) and developed in the British Poverty and Social Exclusion (PSE) studies (Gordon et al., 2000; Pantazis et al., 2006). Using a list of child- and household-level deprivation questions available in the EU-SILC 2009, Guio et al. (2012, 2016) assessed their suitability and validity for inclusion into a deprivation scale. They produced an 18-item child deprivation index, drawing the deprivation cut-off at three or more items. Using data from the EU-SILC 2014, they have re-evaluated the index and produced a 17-item version (Guio et al., 2016). Their composite index is not necessarily multidimensional (Bourguignon and Chakravarty, 2003; also see de Neubourg et al., 2014), but it is developed with the view to children's rather than adults' or households' needs.

Using data from the EU-SILC 2014, in this paper we follow UNICEF's rights-based approach to multidimensional child poverty measurement (Gordon et al., 2003; UNICEF, 2007; de Neubourg et al., 2012) and define seven dimensions of child poverty rooted in the CRC: nutrition, clothing, educational resources, leisure activities, social activities, information access and quality of housing. We refer to the share of children in the national population who lack access to a particular dimension as the "dimensional deprivation rate" or "dimensional poverty rate", while the share of children who are deprived in at least two out of seven dimensions is referred to as the "multidimensional child poverty" rate.

3. DATA AND METHODS

3.1 Data, indicators and dimensions

In order to count the number of dimensions that a child is poor in and analyse the extent to which different dimensions overlap with each other, we have to rely on a single data source. Hence, the choice of dimensions is limited by the data. This paper uses data for 28 EU member states plus Iceland, Norway and Switzerland from the EU-SILC 2014. The ad hoc material deprivation module (previously collected in 2009 and, as an optional module, in 2013) collects information about children's access to nutrition, clothing, educational resources, leisure activities and social activities. The rest of the survey also contains questions about information access and quality of housing. These two dimensions are defined at the level of the household, providing information about children's living environment. See Table 1 (page 10) for full details of indicator and dimension definitions as well as the associated survey items from the EU-SILC User Database.[1]

Each dimension is operationalised using two indicators, which are combined using the union approach: if a child is deprived in just one of the two indicators forming a particular dimension, they are counted as deprived in the entire dimension. This implies that a lack of deprivation in one indicator cannot make up for deprivation in another: the two indicators are implicitly weighted equally. Compared with a weighting and aggregation method of the Global Multidimensional Poverty Index (where indicators are only notionally assigned to dimensions and are aggregated into an index directly, with equal weighting of dimensions but different weights across indicators), this tends to produce multidimensional poverty headcount rates that are less sensitive to improvements in just one indicator within a dimension (see Hjelm et al., 2016).

Although the EU-SILC material deprivation module contains 13 items related to children's access to resources and activities, children are not interviewed themselves: household members provide information on their behalf. Child-specific items refer to children aged 1-15, apart from the two items related to school education that apply to school-age children only. If one child in the relevant age category lacks an item, all children in the household are flagged as lacking this item. This is a limitation of the EU-SILC survey for child-centred multidimensional poverty measurement: we cannot study differences in poverty risks between children in the same household and have to assume that all children in the household are equally deprived of a given resource.

Material deprivation questions in the EU-SILC tend to have three potential responses: yes; no – because the household cannot afford it; no – for some other reason. Most analyses of material deprivation in the EU focus on non-affordability only (de Neubourg et al., 2012; Fusco et al., 2010; Guio, 2009; Guio et al., 2012; Nolan and Whelan, 2010; Whelan and Maître, 2012), including the official EU social inclusion indicators, but we count both non-affordability and any other reason in our

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[1] We use all but two of the 13 child-specific material deprivation items: 'a suitable place to do homework' because it has not passed the robustness checks in Guio et al. (2016) and 'a holiday away from home at least one week per year' because it does not fit easily into any of the seven chosen dimensions (e.g. it could be classified as either a leisure or a social relationships indicator).

Table 1 – *Definition of indicators*

Dimension	Indicator	Indicator definition	EU-SILC user database variable
Nutrition	Fruit/vegetables once a day	At least one child aged 1-15 in the household does not have *fresh fruit and vegetables once a day* because the household cannot afford it or for some other reason.	HD120
	One meal with proteins once a day	At least one child aged 1-15 in the household does not have *one meal with meat, chicken or fish (or vegetarian equivalent) at least once a day* because the household cannot afford it or for some other reason.	HD140
Clothing	Some new clothes	At least one child aged 1-15 in the household does not have *some new (not second hand) clothes* because the household cannot afford it or for some other reason.	HD100
	Two pairs of shoes	At least one child aged 1-15 in the household does not have *two pairs of properly fitting shoes (including a pair of all-weather shoes)* because the household cannot afford it or for some other reason.	HD110
Educational resources	Books at home	At least one child aged 1-15 in the household does not have *books at home suitable for their age* because the household cannot afford it or for some other reason.	HD150
	ECEC (from three to minimum compulsory school age)	The child does not spend *at least one hour a week in formal child care* (preschool, compulsory school, centre-based services, or day-care centre). Children aged 1-2 are assumed to be non-deprived on this indicator.	RL010, RL020, RL030, RL040
	School trips (from minimum compulsory school age to 15)	At least one child under 16 attending school does not *participate in school trips and school events that cost money* because the household cannot afford it or for some other reason.	HD210
Leisure activities	Games (outdoor, indoor)	At least one child aged 1-15 in the household does not have *outdoor leisure equipment (bicycle, roller skates, etc.)* or *indoor games (educational baby toys, building blocks, board games, computer games, etc.)* because the household cannot afford it or for some other reason.	HD160, HD170
	Regular leisure activity	At least one child aged 1-15 in the household does not have *a regular leisure activity (swimming, playing an instrument, youth organisations, etc.)* because the household cannot afford it or for some other reason.	HD180
Social relationships	Celebrations on special occasions	At least one child aged 1-15 in the household does not have *celebrations on special occasions (birthdays, name days, religious events, etc.)* because the household cannot afford it or for some other reason.	HD190
	Having friends round to play	At least one child aged 1-15 in the household does not *invite friends round to play and eat from time to time* because the household cannot afford it or for some other reason.	HD200
Information access	Computer	The household does not have *a computer* because it cannot afford it or for some other reason.	HS090
	Internet	2013 and 2014: At least half the adults in the household (for whom information is available) *do not have internet access* because they cannot afford it or for any other reason. Following Guio et al. (2016).	PD080
		2009: The household does not have *an internet connection* because it cannot afford it or for some other reason.	HD090
Housing	Overcrowding	The household does *not have at its disposal a minimum number of rooms** equal to: • one room for the household; • one room per couple in the household; • one room for each single person aged 18 or more; • one room per pair of single people of the same gender between 12 and 17 years of age; • one room for each single person between 12 and 17 years of age and not included in the previous category; • one room per pair of children under 12 years of age.	HX120
	Multiple housing problems	The dwelling suffers from at least one of the following: • a leaking roof • damp walls/floors/foundation • rot in window frames or floor.	HH040

* A room is defined as a space of a housing unit of at least 4 square metres such as normal bedrooms, dining rooms, living rooms and habitable cellars and attics with a height over 2 metres and accessible from inside the unit. Kitchens are not counted unless the cooking facilities are in a room used for other purposes; only excluded if the space is used only for cooking. Thus for example, kitchen-cum-dining room is included as one room in the count of rooms. In a housing unit the following do not count as rooms: bathrooms, toilets, corridors, utility rooms and lobbies. Verandas, lounges and conservatories do count only if they are used all year round. See EU-SILC Description Target Variables (HH030) at:
http://epp.eurostat.ec.europa.eu/portal/page/portal/income_social_inclusion_living_conditions/documents/tab/Tab/Household%20data%20-%20housing%20data%2Bchange%20in%20HH071.pdf

definition of poverty. Including 'other reasons' predictably produces somewhat higher item-specific poverty counts and tends to reduce their correlation with household-level income poverty (Guio et al., 2016). However, unlike the EU material deprivation indices, we conceptualise multidimensional child poverty as non-fulfilment of children's rights, whether it is due to the lack of financial resources or other constraints (Chzhen et al., 2016; Chzhen and Ferrone, 2016; de Neubourg et al., 2014). For example, if a child lacks access to leisure activities for a reason other than non-affordability (e.g. parental or children's own preferences), it is still considered a violation of a child's right and counts as a deprivation in the construction of the multidimensional poverty measure.

All dimensions are operationalised the same way for all children aged 1-15 except educational resources. It is based on the availability of children's books at home as well as an indicator of formal childcare services attendance for children between the age of 3 and compulsory school age and ability to participate in school events that cost money for school-age children. Children aged 1-2 are assumed to be non-deprived on the second indicator, so their deprivation in the education resources dimension depends entirely on the 'books at home' indicator.

3.2 Treatment of missing data

The analysis is limited to children aged 1-15 who have valid (non-missing) data on all indicators. The vast majority of the countries have at least 95 per cent of children aged 1-15 included in the study using data for 2014, except Romania (80 per cent), Latvia (90 per cent), the United Kingdom (91 per cent), Germany (92 per cent), Sweden (93 per cent), Poland (93 per cent) and Ireland (93 per cent). Missing data on the education dimension (more precisely on the "school trips" indicator) tend to drive exclusions from the sample in these countries.[2] To check if missing values are missing at random or are related to household material resources, we estimate the association between the probability of being included in the study and household income poverty, which does not suffer from missing data. The results are mixed. Among the seven countries with more than 5 per cent cases excluded from the multidimensional child poverty estimation sample, the probability of exclusion does not vary significantly with income poverty in Ireland, Romania or the United Kingdom. This is particularly good news for Romania, with its high percentage of excluded cases.

However, there is a statistically significant association between the probability of exclusion and household income in the other four countries: Germany, Latvia, Poland and Sweden. Moreover, the direction of potential bias varies.

In Germany[3] and Sweden[4] children from poor households are more likely to be excluded from the study, suggesting that the 2014 child multidimensional poverty rate is somewhat under-estimated in these countries. In contrast, in Latvia[5] and Poland[6] children from poor households are more likely to

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[2] Children of minimum compulsory school age who do not attend school and, therefore, have missing data on the "school trips" indicator would be treated as missing.

[3] 87 per cent and 93 per cent of income poor and non-poor children, respectively, are included in the multidimensional child poverty estimation sample in Germany in 2014.

[4] 85 per cent and 94 per cent of income poor and non-poor children, respectively, are included in the multidimensional child poverty estimation sample in Sweden in 2014.

[5] 88 per cent and 94 per cent of non-poor and poor children, respectively are included in the multidimensional child poverty estimation sample in Latvia in 2014.

[6] 93 per cent and 95 per cent of non-poor and poor children, respectively are included in the multidimensional child poverty estimation sample in Poland in 2014.

be included in the multidimensional poverty estimation sample, leading to a potential over-estimation of multidimensional child poverty rates. This is because children from large families (with three or more children aged 1-15) are significantly more likely to have valid data, while large families are also more likely to be income poor. It appears that having more children in the household makes it less likely for children aged 1-15 to be misclassified as belonging to a 'non-applicable' age group in Latvia and Poland,[7] the main reason resulting in missing data for child deprivation items in the EU-SILC.

Finally, data for Norway have been treated differently to other countries. All four indicators in the Nutrition and Clothing dimensions have 80 per cent missing data, so we imputed zero deprivation in these dimensions in 2014. There were virtually no missing data for Norway in the 2009 child deprivation module, with the resulting deprivation rates in nutrition and clothing being only 2 per cent. Although Norway is included in most of the analyses in this paper, the results are not fully comparable to those of other countries and have to be treated with caution.

3.3 Multidimensional child poverty count

Following Alkire and Foster (2011), we analyse multidimensional child poverty using the 'dual cut-off' headcount ratio. First, we establish the child's deprivation status for each indicator and dimension, and then calculate the multidimensional poverty headcount as the share of children deprived in a certain number of dimensions simultaneously. Deprivation headcounts are FGT_0 measures that share all proprieties of this family of indices (Foster et al., 1984). The dimensional deprivation headcount ratio is calculated as follows:

$$h_{j,r} = \frac{q_{j,r}}{n_r}$$

$$q_{jr} = \sum_{i=1}^{n_r} y_j$$

Where

$h_{j,r}$ - headcount ratio of children deprived in dimension j of the reference population r;

q_j - number of deprived children in dimension j of the reference population r;

n_r - total number of children in the reference population r;

y_j - deprivation status of child i in dimension j, with $y_j = 1$ if $x_j < Z_j$ (deprivation) and $y_j = 0$ if $x_j \geq Z_j$ (no deprivation);

x_j - value of dimension j for child i;

Z_j - threshold of the dimension j.

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[7] This may be related to the way the surveys were carried out in these countries. It is not a function of higher prevalence of large families or families with school-age children.

Counting the number of deprivations each child is deprived in, we can then calculate the headcount for each chosen cut-off – the multidimensional child poverty rate. We report the results for the cut-off of two or more dimensions because it exhibits the greatest degree of cross-country variation (measured as the standard deviation of the multidimensional child poverty rate across 31 countries). It is also the most conservative example because children who are deprived in just one dimension are not, in fact, multidimensionally poor, while drawing the cut-off at three or more dimensions would produce substantially lower poverty rates.

To sum up, our multidimensional child poverty measure differs from the EU child material deprivation index (Guio et al., 2012; 2016; 2016) in several key operational ways. This is largely because the two measures are embedded in different conceptual approaches. First, we include all reasons why children lack access to goods and activities in our item-specific measures of poverty, rather than non-affordability only, because we think that they all reflect a violation of a child's right, even if this is by (children's/parents') choice. Moreover, for dimensions more related to local infrastructure, such as leisure, information and housing, there may be 'supply-side' restrictions[8] that are separate from the 'demand-side' issues of affordability or preferences. Although Guio et al. (2016) showed that focusing only on the enforced lack of items leads to a more reliable and valid indicator, as it is more highly correlated with household income, we use a more conservative approach to avoid under-reporting the prevalence of multidimensional child poverty.

Second, we combine survey items into dimensions first and then count the number of dimensional deprivations a child suffers from rather than adding up the items themselves into a composite index. Although the seven dimensions load on one latent factor both in the combined sample and in each country separately in the 2014 sample, suggesting that they do measure one underlying construct, we are interested in dimensional deprivation prevalence, relationships between individual dimensions and the degree to which some of them may drive the overall multidimensional poverty rate.

Third, we do not include exactly the same survey items in our measure of multidimensional poverty as Guio et al. (2016). While we exclude items that have not passed robustness checks in their analysis, such as "a suitable place to do homework",[9] for substantive reasons we include others (such as enrolment in formal childcare facilities for pre-school age children as an indicator of educational resources and multiple housing problems[10] as well as overcrowding as indicators of housing). We intentionally exclude several (mostly household-level) items that feature in the proposed EU material deprivation index: car ownership, holidays away from home (although this item is collected at the level of children), as well as inability to replace worn-out furniture and to pay arrears, because they do not fit in any of the rights-based dimensions studied. However, there remains a large degree of overlap in the child-specific items used in the two measures.

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[8] Findings of higher incidence of multidimensional child poverty in rural than in urban areas at different levels of household consumption (Chzhen and Ferrone, 2016 for BiH; Singh and Sarkar, 2015 for Bangladesh) suggest that inequalities in access to markets, public services and infrastructure also play a role.

[9] This item did pass robustness checks in 2009 and has been included in both Guio et al. (2012) and Chzhen et al. (2016).

[10] However, this indicator has not passed the checks in the 2009 analysis in Guio et al. (Guio et al., 2012).

4. RESULTS

4.1 Cross-country variation in dimensional child poverty rates

Figures 1-7 show the rates of child poverty in each of the seven dimensions studied here, as well as in the associated indicators. On average across 31 countries, poverty is highest in housing, leisure, and social activities, while poverty in nutrition, clothing and educational resources tends to be low, except in Bulgaria, Hungary and Romania. All dimensional poverty rates are significantly correlated with each other, with the Pearson correlation coefficient ranging from the low of 0.64 between nutrition and housing to the high of 0.92 between educational resources and information access. The dimensional poverty rates form a highly reliable scale (alpha=0.95) across 31 countries in 2014.[11] They are all significantly negatively correlated with national wealth (GDP per capita $PPP): the correlation coefficient varies from -0.47 (p<0.01) for clothing to -0.66 for housing (p<0.001).[12]

The rate of poverty in nutrition ranges from one in a hundred children (1 per cent) in Sweden to one in two (48 per cent) in Bulgaria, where 41 per cent of children do not have fruit or vegetables once a day and 43 per cent do not have a meal with proteins at least once a day (Figure 1). Between one in five and one in three children in Hungary, Romania and Slovakia are deprived in nutrition, while the rates are below 20 per cent in the rest of the countries studied.

**Figure 1** *– Nutrition poverty headcount rate, 2014*
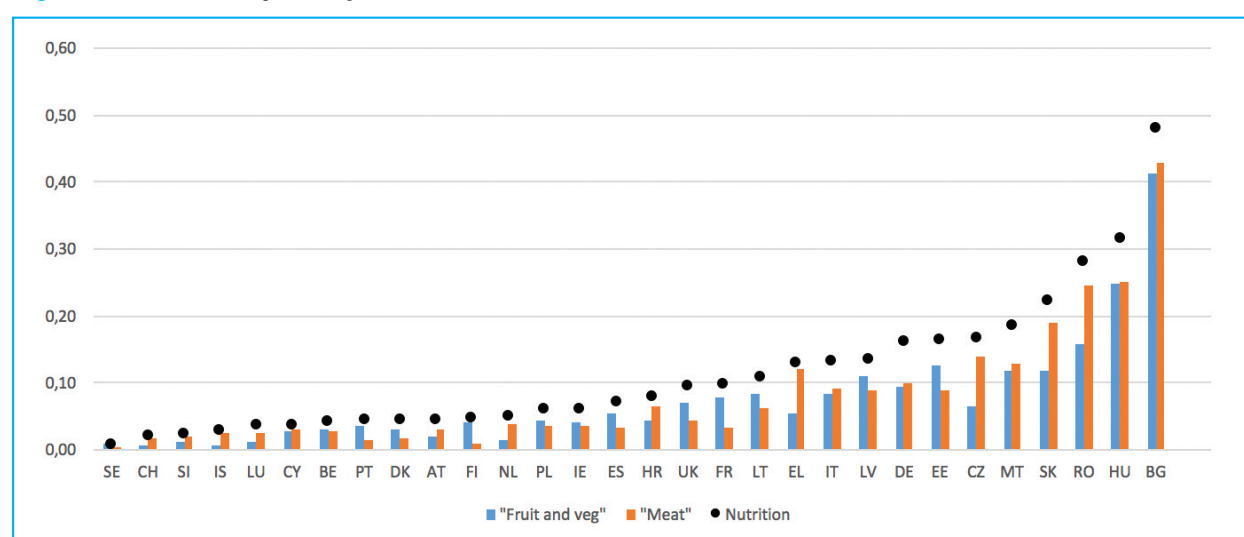
Data source: EU-SILC (version 01.08.2014). No data for Norway.

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[11] However, on the child level, the seven dimensions form a less reliable scale in the pooled sample (alpha=0.73), ranging from just 0.33 in Iceland to 0.84 in Bulgaria. The reliability would increase somewhat in all analyses if the housing dimension were excluded.

[12] Allowing for a non-linear association with national wealth would produce a much better fit because two of the least wealthy countries in the comparison (Romania and Bulgaria) and the wealthiest country (Luxembourg) tend to have higher dimensional deprivation rates than a linear extrapolation would suggest.

Figure 2 shows that the rate of poverty in clothing varies from just 2 per cent in Greece and Sweden to 51 per cent in Bulgaria, where 36 per cent of children aged 1-15 do not have at least some new clothes and 50 per cent do not have two pairs of properly fitting shoes. (While these are very high rates, it has to be kept in mind that in the EU-SILC child deprivation questions are asked for all children as a group, and if one child does not have an item, all children in the household are counted as deprived). Between one in five and two in five children in the Czech Republic, Hungary, Malta, Romania and Slovakia are deprived in clothing, while the rates are below 20 per cent in the rest of the countries studied.

Figure 2 – *Clothing poverty headcount rate, 2014*
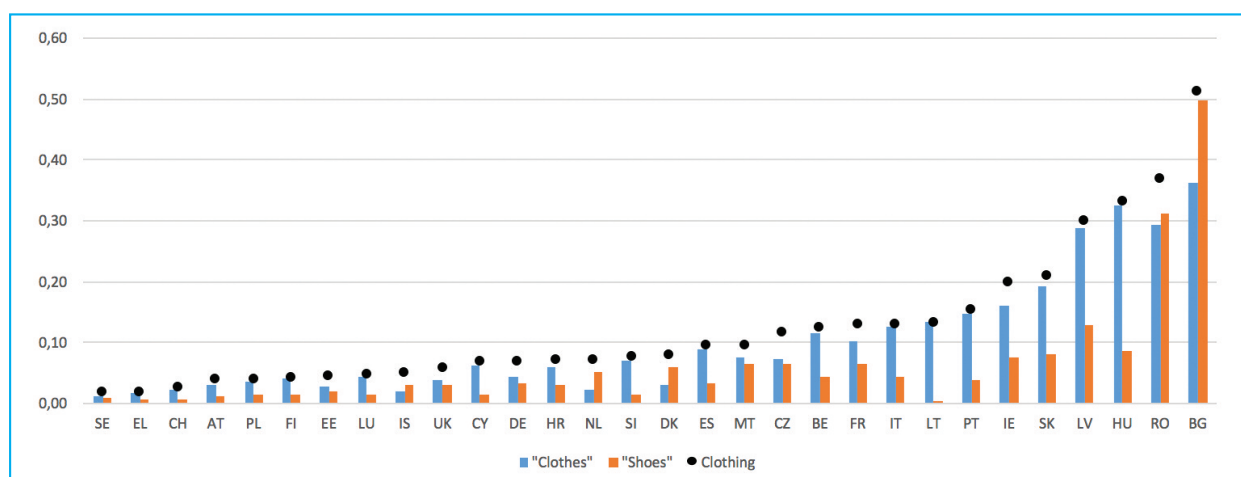
Data source: EU-SILC (version 01.08.2014). No data for Norway.

Poverty in educational resources ranges from just 3 per cent in Iceland and Norway to over one-half in Bulgaria and Romania (Figure 3). Between one in five and one in three children are deprived in educational resources in Croatia, Greece, Hungary, Italy and Latvia, while the rates are below 20 per cent in the rest of the countries studied.

Figure 3 – *Educational resources poverty headcount rate, 2014*
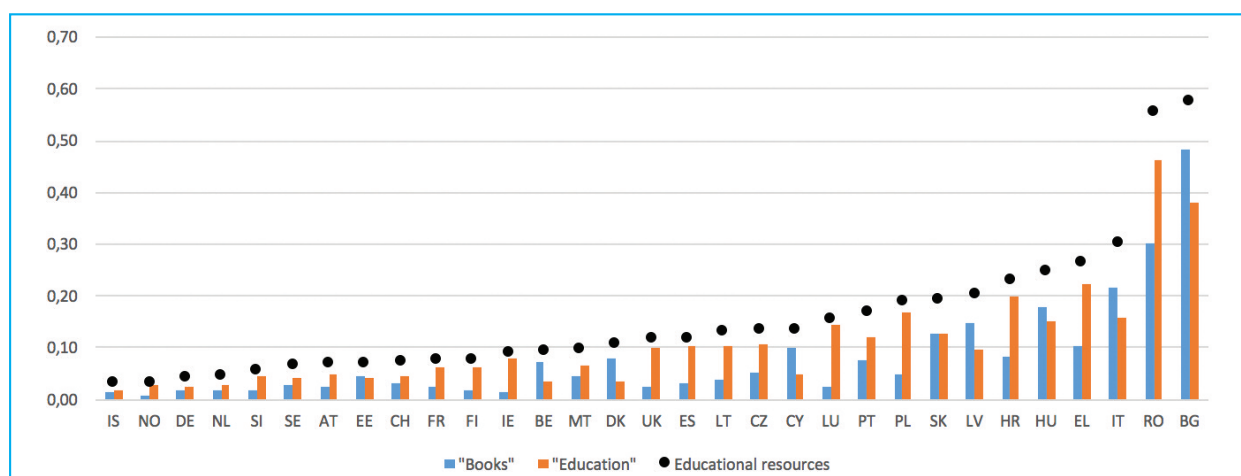
Data source: EU-SILC (version 01.08.2014).

Figure 4 shows that deprivation in leisure ranges from one in ten children (11 per cent) in Switzerland to at least three in four in Bulgaria (75 per cent) and Romania (85 per cent). Between two in five and one in two children are deprived in this dimension in Cyprus, Lithuania, Portugal and Slovakia. In all countries children are more likely to lack access to a regular leisure activity than to indoor or outdoor games.

Figure 4 *– Leisure activities poverty headcount rate, 2014*
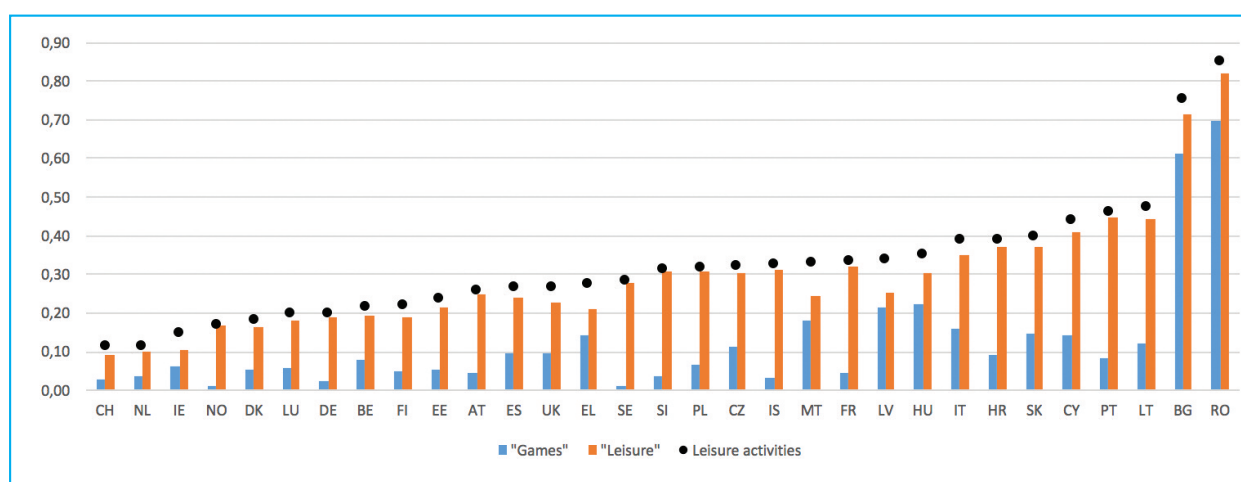
Data source: EU-SILC (version 01.08.2014).

The rate of poverty in social activities varies from 1 per cent in Norway to 48-49 per cent in Bulgaria and Romania (Figure 5). In all countries, children tend to be more likely to lack access to play-dates ("friends around to play") than to celebrations on special occasions.
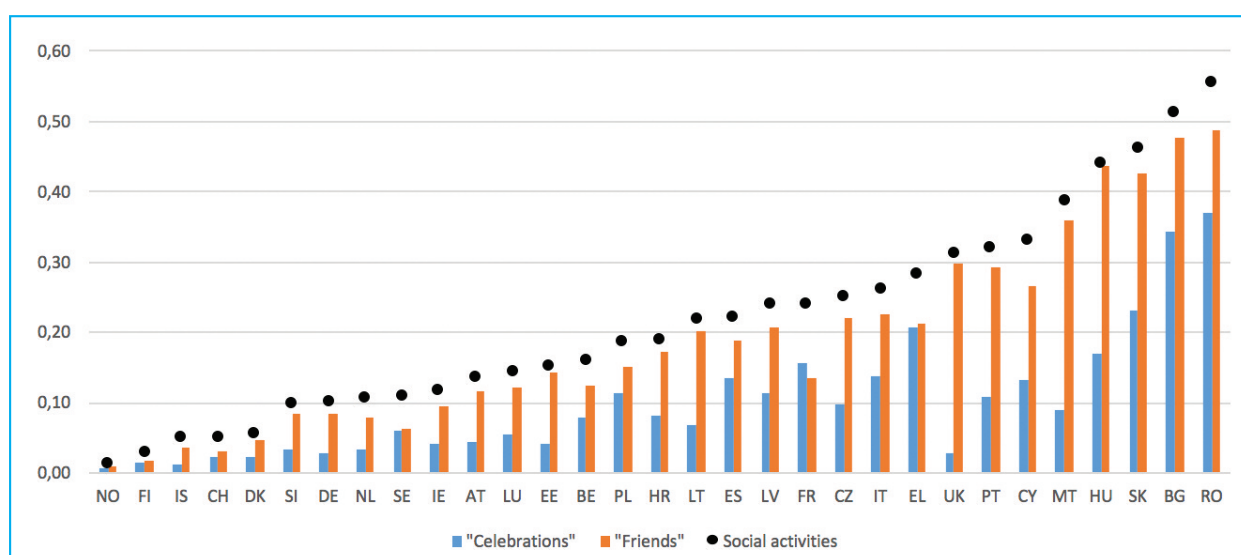
Figure 5 *– Social activities poverty headcount rate, 2014*

Data source: EU-SILC (version 01.08.2014).

The rate of poverty in information access varies from fewer than one in 20 children in the five Nordic countries as well as Austria, Estonia, Germany, the Netherlands, and Switzerland to at least one in five children in Bulgaria, Croatia, Cyprus, Hungary, Italy, Portugal, Romania and Spain (Figure 6). Deprivation in information access tends to be driven by the lack of internet access.

Figure 6 – *Information access poverty headcount rate, 2014*
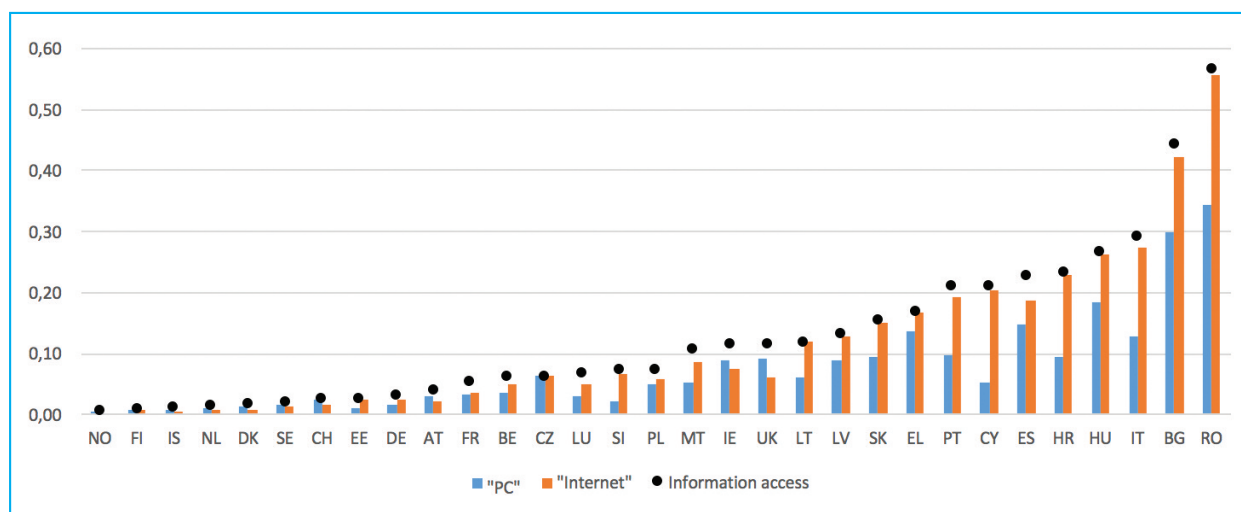
Data source: EU-SILC (version 01.08.2014).

Housing poverty ranges from 11 per cent in Norway to 73 per cent in Romania, where 72 per cent of children live in overcrowded accommodation and 17 per cent live in poor quality housing. Housing poverty tends to be higher in Eastern European countries as well as in Greece and Italy, driven by high rates of overcrowding. Portugal also has one of the highest housing poverty rates, largely due to multiple housing problems. Older EU member states as well as Cyprus and Malta tend to have lower rates of housing poverty, which arises primarily from multiple housing problems.

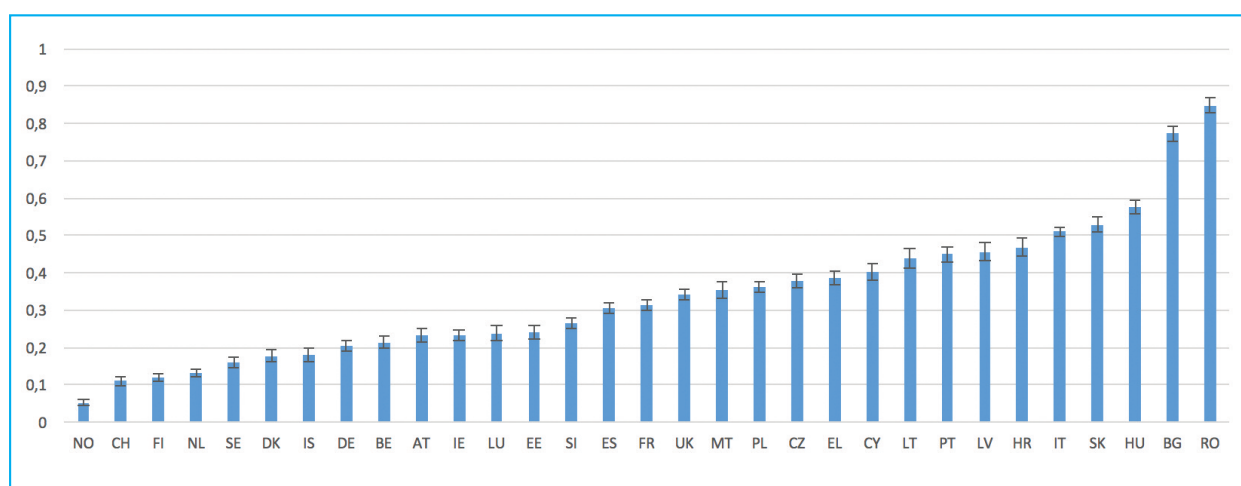**Figure 7** – *Housing poverty headcount rate, 2014*
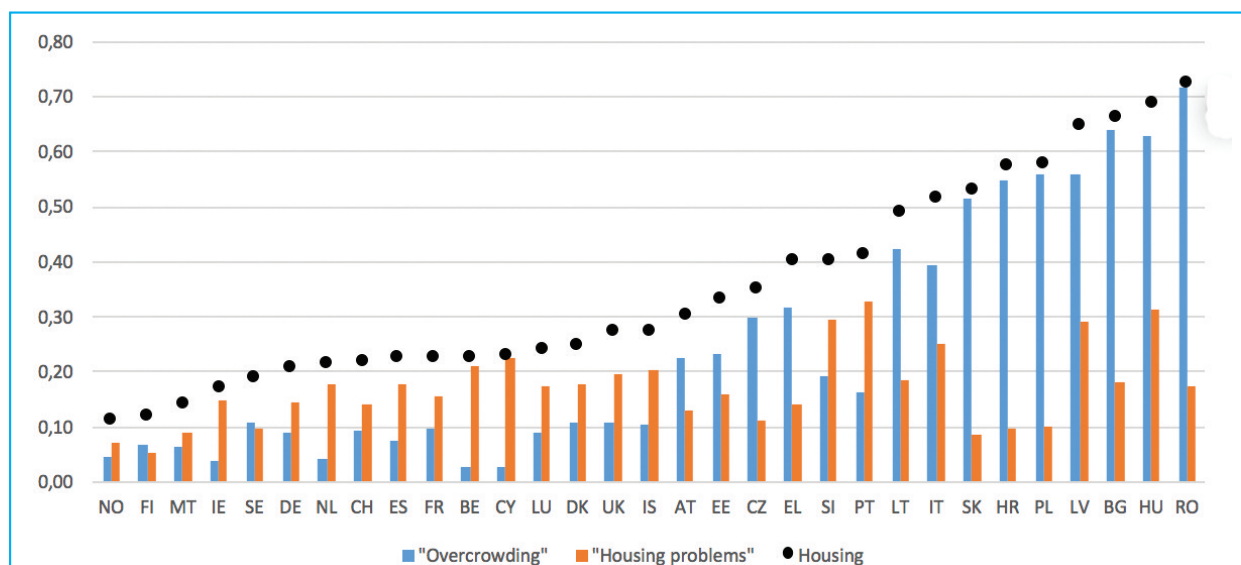
Data source: EU-SILC (version 01.08.2014).

4.2 Cross-country variation in the multidimensional child poverty headcount rate

In this paper we report multidimensional poverty rates at the cut-off of two or more dimensions out of seven because it exhibits the greatest degree of cross-country variation. Figure 8 shows the distribution of the multidimensional child poverty rates across 31 European countries in 2014. The multidimensional poverty rate ranges from the low of 5 per cent in Norway to the high of 85 per cent in Romania. While fewer than one in five children are poor in two or more dimensions in Nordic countries as well as in the Netherlands, at least one in two children are poor in two or more dimensions in Bulgaria, Hungary, Italy and Slovakia. Between one in five and one in three children are poor in two or more dimensions in Austria, Belgium, Estonia, France, Germany, Ireland, Luxembourg, Slovenia and Spain. The remaining countries, including Cyprus, Greece and the United Kingdom, have multidimensional child poverty rates between 33 per cent and 50 per cent.

Figure 8 *– Multidimensional child poverty (two or more dimensions), 2014*

Data source: EU-SILC (version 01.08.2014). Error bars represent 95% confidence intervals.

The large amount of cross-country variation in the multidimensional child poverty rate is not surprising, since we are using an EU-wide poverty threshold rather than a country-specific one. The multidimensional child poverty headcount is not significantly correlated with the relative income poverty rate for children under 16 (those in households with disposable incomes below 60 per cent of the national median). However, it is significantly negatively correlated with national wealth measured as GDP per capita ($ PPP) (r= -0.66, p<0.001),[13] as poorer countries tend to have higher multidimensional child poverty rates (Figure 9). The relationship, however, is not linear. For example, Bulgaria and Romania have much higher multidimensional child poverty rates than countries at a similar level of national wealth, such as Croatia or Latvia. Meanwhile, a much higher proportion of children are multidimensionally poor in Luxembourg than one could expect given its high GDP per capita.

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[13] The strength of the relationship rises to -0.85 (r-squared of 0.72) if the non-linear association is modelled explicitly by controlling for the GDP per capita squared.

Figure 9 – *Multidimensional child poverty rate and national wealth (2014)*
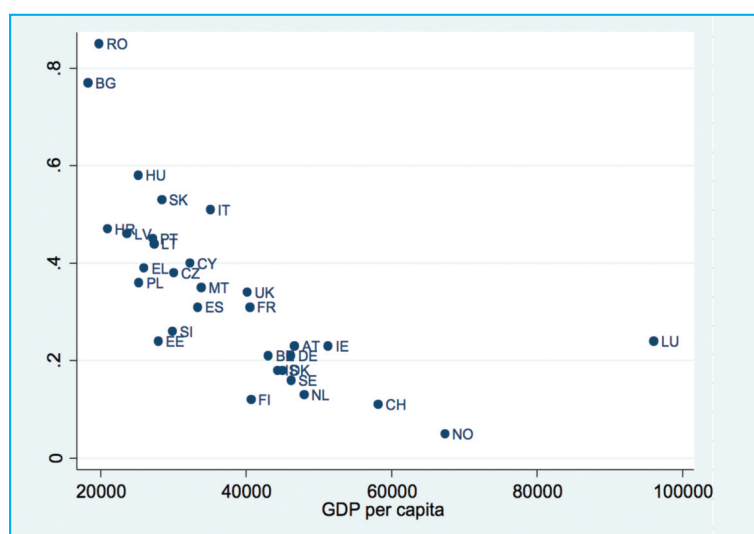
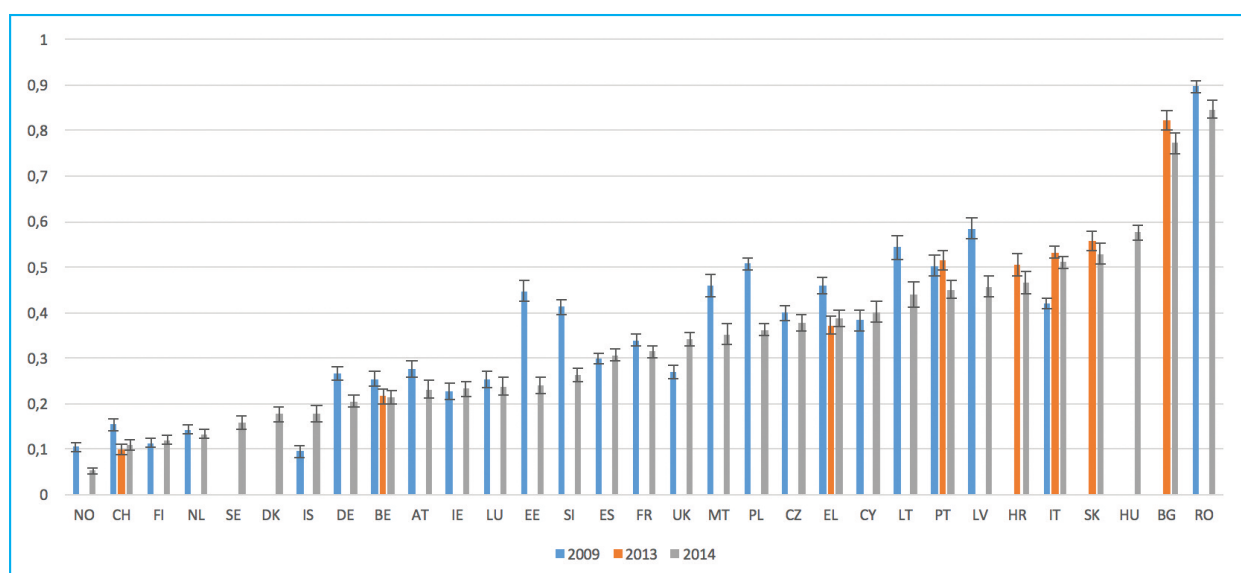*Data source:* EU-SILC (version 01.08.2014). IMF WEO (April 2016).

Based on comparable data[14] from the EU-SILC 2009, which included a compulsory thematic material deprivation module for the first time, and the EU-SILC 2013, which included an optional module, we investigate the evolution in the multidimensional child poverty rate between 2009 and 2014. We also check if the multidimensional child poverty rate varied over just one year, between 2013 and 2014 for the countries that collected child-specific information in 2013. This serves as a robustness check on the multidimensional measure because the rates of child poverty are not expected to fluctuate substantially year on year. Unfortunately only nine countries opted to collect data in 2013 on all of the child-specific indicators used in the multidimensional child poverty measure and one of them, Romania, had to be excluded from the analysis due to high shares of missing values. Among the eight remaining countries – Belgium, Bulgaria, Croatia, Greece, Italy, Portugal, Slovakia and Switzerland – there have not been any significant changes in the multidimensional child poverty rate between 2013 and 2014, except (marginally) in Bulgaria and Portugal (Figure 10). Assuming that there were no real changes in multidimensional child poverty between 2013 and 2014 in these countries, this suggests that the multidimensional poverty measure is robust to changes in the underlying sample of children.

However, there have been significant decreases in the multidimensional child poverty rate over five years in 14 of 25 countries that have valid data from the compulsory material deprivation modules for both 2009 and 2014. This is not surprising, since 2009 represented the peak of the global economic crisis (in terms of contraction in economic output and increases in unemployment). However, another two countries saw significant increases in the multidimensional child poverty rate: Iceland and Italy. (So did the United Kingdom, but the trend may be driven by the break in the series due to changes in data collection methods.) Yet there is still a high degree of correlation between the country multidimensional rates (Pearson's correlation = 0.92, p<0.001) and the rankings (Spearman's rho=0.87, p<0.001), with largely the same countries showing the lowest and highest multidimensional child poverty rates in both 2009 and 2014.

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[14] Due to changes in the collection of data regarding access to the internet in the EU-SILC (see Table 1), the 2009 results are not fully comparable to those for 2013 and 2014.

Only Estonia and Slovenia visibly improved their relative rankings with reductions in the multidimensional child poverty rate of 46 per cent and 36 per cent, respectively. Thus, these two countries came close to halving the multidimensional child poverty rate in five years between 2009 and 2014, while the SDG Target 1.2 calls for halving multidimensional poverty within 15 years. Both countries saw the greatest relative reductions in dimensional poverty in clothing, information and housing. However, in absolute terms the reduction was largest in the housing dimension, driven by falling rates of overcrowding. Most notably, these two countries increased the share of children who are not poor in any of the seven dimensions by substantially cutting the share of children who are poor in two or more dimensions at once, even if the share of children poor in just one dimension increased (as it did in Estonia). This suggests that in order to make progress towards Target 1.2 it is important to reduce the number of multiple dimensions a child is simultaneously deprived in. However, to avoid a 'mechanistic' approach to halving multidimensional poverty, improvements in all dimensions need to be encouraged.

Figure 10 *– Changes in multidimensional child poverty rate between 2009 and 2014*

Data source: EU-SILC (version 01.08.2014). Error bars represent 95% confidence intervals. Break in the series in the UK. Data sorted by the 2014 value.

4.3 Household-level predictors of multidimensional child poverty

To investigate the variation in child multidimensional rates associated with differences in household-level features, we use the following predictors: very low household work intensity, large family, highest level of completed education among adult household members, one or more adult migrants in the household, and one or more lone parents in the household. Very low work intensity is defined as below 20 per cent of "the ratio of the total number of months that all working-age household members have worked during the income reference year and the total number of months the same household members theoretically could have worked in the same period".[15] Large families are households with three or more children under 16. Migrant status is based on the country of birth

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[15] http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Persons_living_in_households_with_low_work_intensity (accessed on 12/01/2016).

being different from the country of the interview. The highest level of education of adult household members is coded as "lower secondary or below", "upper secondary" and "further/higher". Using unique personal, maternal, paternal and partner identifiers, lone parent status is based on having one's own children in the household (including step or adopted children) while not having a partner in the same household. Having a partner who is not the children's parent still counts as being a couple parent. Following Chzhen and Bradshaw (2012), this definition includes lone parents living in multi-unit and/or multi-generational households.[16] We include all these predictors into logistic regression models of child multidimensional poverty, estimated separately by country (and year). We report the results as 'average marginal effects', i.e. differences in the estimated probability of a child being multidimensionally poor associated with a one-unit difference in the predictor, everything else being equal.

In nearly every country in the analysis,[17] children are significantly more likely to be poor in multiple dimensions if they live in very low work intensity households, large families, those with lower educated adults, migrant households or lone parent families. Table 2 (page 22) shows the average marginal effects of all predictors, estimated using logistic regression models, as percentage point differences in the probability of living in multidimensional poverty for children in different types of families, adjusted for the sample distribution of all other predictors in the model. Estimated differences by household work intensity are largest in Belgium, Czech Republic, Greece, Portugal, Slovakia and Spain where, on average, children in very low work intensity households are 33-35 percentage points more likely to be poor in multiple domains.

Living in a large family as a driver of multidimensional poverty is most prominent in Croatia (18 points). Education differences are greatest in Poland, where the probability of being poor in two or more dimensions is respectively 35 points and 60 points lower for children living with adults who have upper secondary education or further/higher education, compared to those in households where no one has more than lower secondary education.[18] Large net differences by education are also observed in Austria, Czech Republic and Slovakia. Differences by migrant status are largest in Greece, Italy and Spain, where children in migrant families have an estimated multidimensional poverty rate from 21 to 25 points higher than those in non-migrant households. In contrast, children in migrant households in Slovakia are 22 points less likely to be poor in multiple domains. However, migrant households in Greece, Italy and Spain tend to contain at least one adult born outside the EU, while migrants in Slovakia are nearly all from another EU country.[19] Moreover, only two in a hundred children in the study live in migrant households in Slovakia, compared with around one in five in Greece, Italy or Spain. Finally, estimated differences by lone parent status are largest in Latvia, Malta, Poland and Slovakia (16-18 points).

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[16] When compared with the lone parent rates based on the traditional EU-SILC household type definition of one adult with dependent children, this more nuanced definition makes a large difference in Eastern and Southern European states, where lone parents tend to live in multi-unit households (Chzhen and Bradshaw, 2012).

[17] There are 30 countries in the analysis because Norway is excluded.

[18] However, only 3 per cent of children in the Polish (effective) sample live with low educated adults, compared with 53 per cent and 44 per cent of those in households with adults educated to 'upper secondary' and 'further/higher' levels, respectively, so the estimates need to be interpreted with caution.

[19] EU migrants in Slovakia (in households with children) tend to be more highly educated than the local population, while non-EU migrants in Greece, Italy and Spain tend to be lower educated than both the local population and EU migrants.

Table 2 – *Average marginal effects of household-level predictors of multidimensional child poverty (deprived in two or more dimensions out of seven)*

	AT	BE	BG	CH	CY	CZ	DE	DK	EE	EL
Very low work intensity	0.131**	0.340***	0.156***	0.267***	0.315***	0.348***	0.169***	0.208**	0.313***	0.329***
Large family	0.081***	-0.022	0.104*	0.060**	-0.048	0.145***	0.090***	-0.004	0.079**	0.100***
Highest level of education (upper secondary)	-0.363***	-0.161***	-0.091***	-0.198***	-0.094	-0.388***	-0.088	-0.278**	-0.158**	-0.227***
Highest level of education (further/higher)	-0.462***	-0.247***	-0.357***	-0.265***	-0.301***	-0.523***	-0.213***	-0.319***	-0.318***	-0.429***
Migrant household	0.098***	0.077***	-0.089	0.091***	0.036	0.117**	0.086***	0.172***	0.069*	0.215***
Lone parent family	0.129***	0.050*	0.048	0.008	0.157***	0.042	0.154***	0.041	0.147***	0.123**
Observations	2,043	2,547	1,396	2,476	1,905	2,439	3,118	2,255	2,347	2,756

	ES	FI	FR	HR	HU	IE	IS	IT	LT	LU
Very low work intensity	0.339***	0.121***	0.119***	0.209***	0.226***	0.276***	0.197*	0.234***	0.233***	-0.001
Large family	0.098***	-0.028*	-0.011	0.181***	0.095***	-0.032*	0.022	0.039	0.133**	-0.049
Highest level of education (upper secondary)	-0.145***	-0.012	-0.214***	-0.174**	-0.277***	-0.188***	-0.030	-0.168***	-0.085	-0.124***
Highest level of education (further/higher)	-0.289***	-0.064	-0.398***	-0.424***	-0.569***	-0.175***	-0.202***	-0.313***	-0.320**	-0.188***
Migrant household	0.207***	0.081***	0.183***	0.020	0.132*	0.065***	0.031	0.252***	0.199***	0.117***
Lone parent family	0.048*	0.011	0.146***	0.067	0.158***	0.132***	0.058	0.070**	0.042	0.136***
Observations	4,754	5,050	4,972	1,609	3,336	3,055	1,710	6,428	1,236	1,771

	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
Very low work intensity	0.262***	0.162**	0.117*	0.156***	0.326***	0.084	0.196***	0.238***	0.343***	0.251***
Large family	0.113***	0.052	0.058**	0.083***	0.095*	0.014	-0.017	0.043*	0.150***	-0.006
Highest level of education (upper secondary)	-0.167***	-0.134***	-0.090**	-0.354***	-0.171***	-0.038*	-0.142*	-0.261***	-0.428***	-0.069*
Highest level of education (further/higher)	-0.339***	-0.205***	-0.155***	-0.600***	-0.382***	-0.363***	-0.218***	-0.421***	-0.467***	-0.213***
Migrant household	0.045	0.041	0.149***	0.005	-0.013		0.134***	0.138***	-0.219**	0.108***
Lone parent family	0.163***	0.173***	0.046	0.171***	0.067*	0.137***	0.075**	0.067*	0.183***	0.069**
Observations	1,759	1,661	4,639	5,326	2,296	1,218	2,337	3,684	2,011	3,916

Data source: EU-SILC 2014 (version 01.08.2014). *** p<0.001, ** p<0.01, * p<0.05

4.4 Overlaps between dimensions

To analyse which dimensions mainly drove multidimensional poverty among the 31 European countries in 2014, we calculated the proportion of children poor in three dimensions at a time for each of the 35 unique combinations of seven dimensions. The most frequent combination was in leisure activities, social activities and housing, which are also the three dimensions with the highest (marginal) poverty counts overall. This suggests that children living in overcrowded and/or poor quality accommodation tend to lack suitable indoor or outdoor toys as well as access to a regular leisure activity and have few opportunities for having friends around to play or for special occasions. The share of children deprived in all three dimensions simultaneously ranges from less than 5 per cent in the five Nordic countries, Austria, Germany, Luxembourg and Switzerland as well as in Ireland and the Netherlands to 12-20 per cent in Croatia, Italy, Latvia, Lithuania, Poland, Portugal and Slovakia and at least 25 per cent in Bulgaria, Hungary and Romania (Figure 11). Middling rates of 5-10 per cent are observed in Belgium, Cyprus, the Czech Republic, Estonia, France, Greece, Malta, Slovenia, Spain and the United Kingdom.

Figure 11 – *Share of children poor in leisure, social and housing dimensions simultaneously*
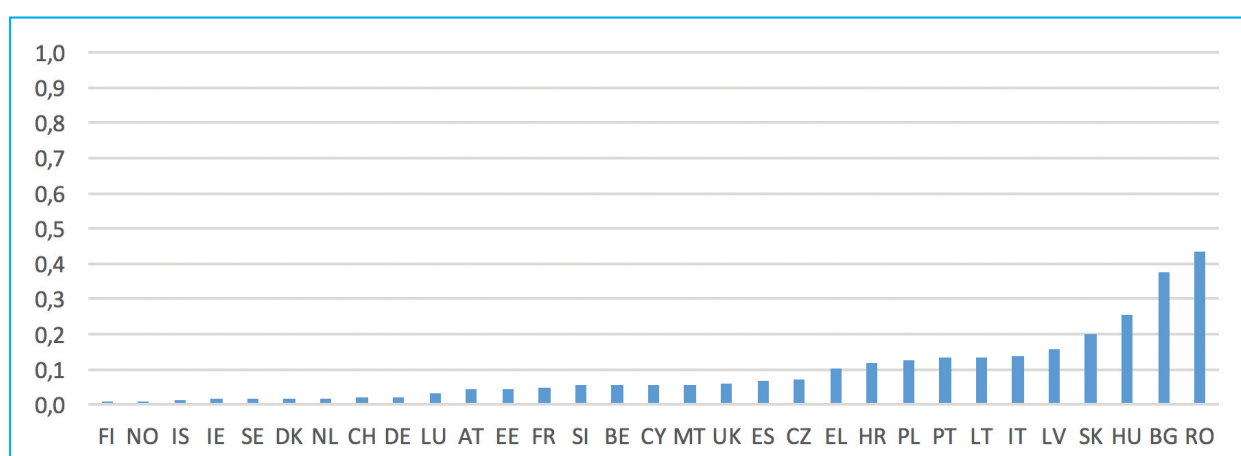
Data source: EU-SILC (version 01.08.2014).

5. DISCUSSION AND CONCLUSION

All nations made a commitment to reduce "at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions." Building on the analysis of the previous deprivation wave of the EU-SILC by Chzhen et al. (2016), this study applied UNICEF's child rights based MODA framework to 31 European counties using data from the EU-SILC 2014. It demonstrated the potential of using living conditions surveys with a child deprivation module to design a child-focused multidimensional poverty measure which can be adapted to a national context for SDG monitoring and/or used for international comparison.

The analysis has shown substantial variation in the living condition of children in 31 European countries. Over half of all children aged 1-15 are poor in two or more dimensions in Bulgaria, Hungary, Italy and Slovakia compared to under one-fifth in the Nordic countries, the Netherlands and Switzerland. A strong negative relationship between multidimensional child poverty and national wealth indicates that the poorest countries in the region face the greatest challenge in meeting the SDG Target 1.2 by 2030 if the same multidimensional poverty measure is used across the EU. However, Estonia and Slovenia serve as positive examples to other countries as they nearly halved multidimensional child poverty in just five years between 2009 and 2014. Meanwhile, increases in multidimensional poverty rates in countries such as Ireland and Italy suggest that progress can also stall or reverse.

Among the seven child rights based dimensions of poverty, housing poverty tends to dominate in all countries. Growing up in poor quality and overcrowded accommodation appears to be the most problematic and urgent aspect of children's lives in the EU. Housing poverty often overlaps with the lack of leisure and social activities in the same group of children, pointing to the wide-ranging role of housing conditions in child well-being. This suggests that an effective policy response would involve provision of opportunities for children's play and socialisation within their communities.

The analysis of multidimensional poverty based on a child rights approach captures a broader conceptualisation of poverty as the lack of means and opportunities for children to prosper in the society. The drivers of multidimensional poverty in European countries are highly consistent with factors which are associated with child relative income poverty, such as living in a low work intensity household, large families, lone parent families and migrant households. This suggests the need for policy synergies across different sectors and further integration of policy responses.

We find a high degree of consistency across countries between the multidimensional child poverty rate and the EU child material deprivation rate proposed in Guio et al. (2016), with the correlation of 0.90 (p<0.01). The two measures produce very similar rankings of countries. This is not surprising, since they use the same survey and many of the same items. Based on the (largely illustrative) cut-offs used in the two studies, the Guio et al. child deprivation rates tend to be somewhat lower. The only exceptions are Greece and Ireland, which have higher deprivation rates based on the Guio et al. index. This is probably because these two countries do relative badly (compared to their performance on other indicators) on some of the items that are present in the Guio et al. index,

but not in the child multidimensional measure proposed here: capacity to afford avoiding arrears, to keep the home adequately warm, and to replace worn-out furniture (in Greece), and ability to afford holidays away from home (in Ireland).

This reflects different conceptual approaches embedded in the two measures. Household level financial strain plays an important role in the relative deprivation approach but does not fit as easily in a child rights framework focusing on children's access to particular goods and services, irrespective of their families' resources. However, it is up to individual countries to adopt an approach that suits the needs of their children best, as the SDG Target 1.2 calls for national definitions of multidimensional poverty. There are inevitable trade-offs between international comparability of a child poverty measure and its suitability to the national context.

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