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Child and Household Deprivation: A Relationship
beyond Household Socio-Demographic Characteristics

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Abstract

As recession and financial crisis spread across Europe an increasing number of people are at risk of poverty and social exclusion. Children are more exposed to the risk of poverty and social exclusion than the overall population of the EU. The current climate of economic downturn calls out for an urgent need to break the vicious circle of intergenerational transmission of poverty and social exclusion in order to improve the well-being of children in a systematic and integrated way. Using the EU-SILC 2009 module on deprivation, this paper aims to contribute to the literature on poverty and social exclusion by analysing the determinants of material deprivation among children. Special attention is given to the type of household children belong to, a characteristic that is strongly determined by adults' behaviour. We find that the level of child deprivation varies among household types. Moreover, we confirm that even after controlling for the socio-economic characteristics of the household and parents, there still exist households with a lack of certain items that are strongly correlated to children with intense deprivation. Therefore, we can conclude that there exists an association between child deprivation and the household-deprivation profile that surpasses the socio-demographic characteristics of the household and parents.

JEL CODES: I32, J13

KEYWORDS: Child deprivation, household deprivation, social exclusion, multilevel models

1. Introduction

Child poverty and social exclusion have been widespread and persistent phenomena over the last few decades in most developed countries. More than one in four children in the European Union (EU) lives at risk of poverty and social exclusion (Eurostat, 2014). Many of them are exposed to low-quality housing, poor nutrition, and inadequate, inaccessible or unaffordable healthcare and education. Children are usually the weakest parties in the household and within-country figures of risk-of-poverty rates are higher among children than among any other age group.

Tackling and preventing child poverty and social exclusion is essential for several reasons. Firstly, poverty and deprivation do not affect children only in the present, through higher risks of death in infancy and childhood, chronic childhood illness, birth weight and child mental health problems (Spencer, 2003), but can also last long into adult life, producing damaging effects on future life opportunities. In particular, poverty and deprivation among children lead to a much higher risk of impoverishment in adulthood (Corak, 2006) and have negative consequences on a variety of life and social adult domains, including health, education, employment, individual behaviour, finance, personal relationships and well-being (Ridge, 2004, Griggs and Walker, 2008). Thus, to the extent that disadvantages faced in childhood are compounded over life, the impact of child poverty and exclusion poses a serious threat to future generations in terms of both economic development and social stability (Haveman and Wolfe, 1995; Brooks-Gunn and Duncan, 1997; Duncan and Brooks-Gunn, 1997, Esping-Andersen et al., 2002). This highlights for the urgent need to break the vicious circle of intergenerational transmission.

Secondly, the on-going economic and financial crisis in the EU is causing a dramatic increase in inequality and social exclusion, with a special impact on children. As countries try to manage their budgets to address recession, key services and policies supporting children have started to be affected by budget cuts¹.

In 2012, almost 10% of the total population in the EU-28 were severely deprived as measured by the AROPE indicator. With a rate of 11.8%, children are more exposed to severe deprivation than the overall population of the EU-28¹. The percentage of children living in a severely deprived household ranges from 0.5% in Switzerland and 1.3% in Sweden, to more than 38% in Bulgaria and Romania. In Spain the proportion of

¹ In the UK for example budget cuts have fallen disproportionately on women and children (UK Women's Budget Group, 2010). See also Caritas Europa (2013). In Spain, the universal benefit for families with children was cut completely in 2010, and Child Benefit was also reduced significantly (Unicef 2012).

children living in a severely deprived household reaches 7.4%, while the corresponding number for adults is 5.8% (Eurostat 2014).

Finally, examples of childhood disadvantages, whether labelled as deprivation, exclusion or poverty, are often highlighted in the opening paragraphs of government reports, with special emphasis on the negative consequences on children's future life chances. In the case of Europe, combating child poverty and social exclusion contributes to the Europe 2020 strategy for stronger social cohesion and sustainable and inclusive growth. In this sense, a number of Member States have headlined the fight against child poverty and social exclusion as an important challenge in their National Reform Programmes (NRP). Nonetheless their efforts continue to give relatively low priority to the enhancement of the development and well-being of individuals during childhood. The Eurochild report (August, 2013) on 'The 2013 National Reform Programmes (NRP) from a child poverty and well-being perspective' reveals that in many Member States there are no specific measures outlined in the NRP to protect children from the worst effects of financial consolidation or austerity packages.²

Overall, the situation of children and their risk of deprivation are likely to be significantly influenced by three types of factors. First, the choices made by the society (or government) that determine the opportunities available to both children and their parents (social investment in children). Second, the choices made by parents regarding the quantity and quality of family resources devoted to children (parental investment in children). And, finally, the choices that children make given the investments and opportunities available to them. In this paper, we focus on the second factor. In this sense, we make the assumption that children's situation and their risk of deprivation are influenced by the socio-demographic characteristics of the household and parents, and the choices made by the parents regarding the quantity and quality of family resources devoted to children (parental investment in children)

Household income and parental labour market status are typical indicators for the identification of children at risk of poverty and deprivation. However, little is known about the intergenerational transmission mechanisms on the situation of the child. An

² In Spain, the 2006-08 'National Strategic Childhood and Adolescence Plan' (NSCAP) explicitly promotes the effective coordination of the different agents involved in the development and delivery of policies in relation to children, both at national and regional level. Until the approval of the NSCAP in June 2006, arrangements for coordinating the development and delivery of childhood policies between different levels of government were non-existent. The National Social Report (2012) mentioned child poverty as a priority to be included in the National Action Plan on Social Inclusion (2013) for this country. However, specific measures have still to be implemented and resources have yet to be allocated.

important aspect is how, conditional on income and labour market status, household deprivation translates into child deprivation. This transmission mechanism is frequently neglected in the literature because, due to the lack of appropriate data, child deprivation is typically unobserved and merely inferred using general indicators of the household as a whole.

This paper attempts to cover this gap. It uses the 2009 wave of the EU-SILC dataset to examine the determinants of child deprivation. An advantage of this dataset is the inclusion of children-specific items for the measurement of child deprivation.³ We hypothesize that child deprivation is not only a function of the household's socio-economic factors but also of the typology of deprivation at the household level. We categorize households according to their deprivation profile and examine whether, conditional on a set of household characteristics, household deprivation exerts a significant effect on child deprivation. It is likely that child deprivation is more dependent on specific household deprivation profiles, like financial strain, the inability to consume durable goods, etc. than on the intensity of deprivation faced by the household on a particular dimension. Therefore, both household characteristics and deprivation profiles, should be included. We take advantage of multilevel techniques that allow us to identify different household deprivation profiles that could be particularly harmful to children.

The main results are the following. First, we find evidence that there are specific household deprivation profiles that are significantly related to the level of child deprivation. This result holds even after controlling for the household socio-demographic characteristics, i.e., there is evidence of a deprivation transmission mechanism that goes beyond income and employment status, both of them conventional economic variables monitored by politicians and researchers. The results in this paper indicate that focusing exclusively on these indicators may be seriously misleading. Moreover, it is not the intensity of deprivation but the type of deprivation among adults that drives the link. Therefore, the identification of adult deprivation profiles is compelling in the search of children at risk of social exclusion.

It is therefore impossible to ignore the role that household norms and practices play in determining child deprivation, but it is also hard to incorporate these concerns in the analysis of child deprivation, due to the considerable heterogeneity in norms and arrangements. In this paper we have attempted to estimate the link between household

³ Some recent works have made use of this data set to model child deprivation (De Neubourg et al., 2012; Guio et al., 2012; Frazer and Marlier, 2014).

and child deprivation without introducing any assumption about the intra-household allocation of resources. Instead, we consider the multidimensionality of household deprivation to explore and identify the dimensions of household deprivation that are relevant for children's experience of deprivation. Understanding those dimensions of household deprivation that are most damaging for children will help policymakers in the design of the best policies and initiatives to combat child deprivation. Typically policymakers assume that increasing a household's income necessarily benefits all members to the same extent, ignoring intra-household differences in resources allocation. If such differences are non-negligible, it might be the case that the capacity for improvement attributed to income-based policies, which has been almost exclusively the governmental focus of attention, is lower than previously thought. Therefore, the way in which resources are allocated within the household should be taken into consideration when designing the most appropriate policies and targeting resources in the fight against child deprivation. Overall, a more profound understanding of the mechanisms, incentives and processes that surround adult decisions on households that, ultimately, affect their children's well-being is necessary in order to improve interventions.

The paper is structured as follows. The next section presents a background. Section 3 introduces the data and definitions used in the study. Section 4 explains the method of analysis. The results are presented and discussed in section 5 and 6 respectively, and the main conclusions are summarized in section 7.

2.- Background

The widespread acknowledgment that children deserve a special focus in the poverty debate has led to an increasing number of studies in the EU and OECD region concerned with the topic. These studies emphasize the need for a diversified picture on the basis of a set of indicators, which includes measures of both material and non-material deprivation (e.g. OECD, 2009; Richardson et al., 2008) and have contributed significantly to the scientific and policy debate about child poverty, social exclusion and well-being (Bradshaw et al. 2006; Bradshaw and Richardson, 2009; OECD, 2009; Richardson et al., 2008; Menchini and Redmond, 2009; TARKI Social Research Institute and Applica, 2010). These papers, however, rely on indicators of family income poverty and material deprivation. More recently, researchers have come to realize that these indicators are not enough to measure the extent of child welfare. The experiences of children tend to be hidden within their families and their disproportionate vulnerability to disadvantages

cannot be properly addressed using household deprivation indicators. However, child-specific deprivation indicators are scarce. In most surveys the unit of analysis is the family and adult household members, and information on children's conditions and well-being is generally missing. In this scenario, it is typically assumed that resources are pooled in the household and that, adults and children share not only similar deprivation conditions but also needs. This has obscured the monitoring of children and the identification of particular characteristics, needs relevant and, consequently, effective policies.

Recent studies have attempted to overcome this gap by gathering data on different aspects of children's life, including health, meals, education, social relations and safety, among others. The increasing child-centred focus is one of the major recent trends in the literature and conceptualizes the child as the unit of analysis (Fernandes et al. 2012). Child deprivation is best measured directly using indicators of children's standard of living rather than indirectly using household income or consumption measures. It has been shown that children's material situation explains more of their well-being than family income (Main and Bradshaw, 2012, Main, 2014). Furthermore, a multidimensional approach to define child deprivation has been also supported by the Convention on the Rights of the Child (CRC), which conceptualizes different domains that matter for child well-being.

In what follows, we review the literature on child deprivation and its determinants. First, we overview the international studies to illustrate what the dimensions are that are typically regarded as crucial for the measurement of child deprivation. Second, we examine the major determinants of child deprivation that emerge from the literature.

Gordon et al. (2003) is probably the largest and most accurate survey sample of children ever assembled at the international level. They use the Demographic and Health Surveys (DHS), a high quality household and individual survey data from 46 developing countries. They define child deprivation according to 8 domains (food, safe drinking water, sanitation facilities, health, shelter, education, information and access to services) and find that over half of the world's children in developing countries (56%) are severely deprived. Deprivation is defined as not having access to one or more basic human needs. Also, based on developing countries, Barnes et al. (2008) focus on child deprivation in South Africa, using census data from 2001 and 14 indicators, arranged into five basic dimensions such as education, living environment, adequate care, income and employment. There are a variety of studies that deal with child deprivation in developed countries. Land et al. (2001) use US data to identify different relevant domains, including

material well-being, health, social relationships, safety, productivity, civic engagement and emotional well-being. Based on 28 basic indicators, they construct a summary index of child well-being. A similar approach is adopted in Bradshaw et al. (2007) for the construction of an index at the European level. A total of 51 indicators are used and the list of domains is expanded to include housing and education. In the same line, Moore et al. (2007) gather information on child well-being using 29 indicators from the National Survey of America's Families (NSAF). They create an overall child well-being index based on indicators from the domains of health and safety, education, and socio-emotional development domains, as well as an overall index of the condition of children, which include information from the two additional contextual domains of family processes and socio-demographic risk. Domains of well-being (health, education and emotions) are related to the questions of how children are faring while contextual variables (family processes and family socio-economic profile) reflect aspects of children's environments that are likely to influence their well-being. In later work, Moore et al. (2008) exploit the National Survey of Children's Health (NSCH) to expand the list of well-being and contextual domains.

Well-being and contextual variables are also examined in Bastos and Machado (2009). They carry out sample surveys among Portuguese students in primary education and collect relevant information on the children's own views and perceptions. They construct a composite index of child deprivation based on selected well-being indicators in four domains (education, health, housing and social integration) and they investigate the socio-demographic characteristics of the households that either alleviate or aggravate the deprivation status of children.

The well-being dimensions of education, health and social integration, in addition to household income, are also considered in the paper of Wüst and Volkert (2012) in order to characterize child deprivation. They use data from the 2008 and 2009 waves of the German Socio-Economic Panel (SOEP) to derive factors that constitute a risk for children to be deprived in a multidimensional sense.

The key role that family/household circumstances play in determining the risk of child deprivation is the main focus of attention in Grodem (2008). She uses data from the Norwegian families survey 'Children's Level of Living – The Impact of Family Economy for Children's Lives' (Sandbæk and Sture, 2003; Sandbæk, 2004)⁴ to chart in what ways

⁴ The study was initiated by the Norwegian Women's Public Health Association (NKS), funded by NKS and NOVA, and carried out by NOVA. The interviews were carried out by Statistics Norway. The data consist of interviews with

family/household circumstances impact on the lives of children. Differently to previous papers, she develops parallel deprivation indicators for adults and children based on three key dimensions (housing, ownership of consumer durables and subjective experience of financial hardship). A strong association is found between the number of housing problems mentioned by the parents and housing deprivation indicators among children, although the effects are not necessarily linear.

Finally, there are several papers that use the EU-SILC survey to address the issue of child deprivation. Based on this database, de Neubourg et al. (2012), estimate a European Child Deprivation Index for 29 countries. Their child deprivation scale is based on 14 specific child-related variables made available by the child module of the EU-SILC (2009). Based on the same survey, Guio et al. (2012) propose an analytical framework for developing robust aggregate indicators that can be used for social monitoring purposes at national and EU levels. They complement the children's items with deprivation items collected at household level. Later studies have relied on Guio et al.'s index to provide a description of deprivation among children in the EU-27 (Frazer and Marlier, 2014).

As for the determinants of child deprivation, the literature in the field has documented meaningful relationships between household socio-economic factors and child deprivation. These factors are relevant from a policy point of view, insofar as programmes targeted at affecting family conditions are frequently regarded as a route to affecting child well-being. Although having a family income adequate for meeting basic material needs is certainly essential to any conception of child well-being, using income alone does not fully predict whether a child experiences deprivation under broader measures. In fact, there is evidence that some low-income households experience few additional deprivations and some higher-income households experience many (Whelan et al. 2001).

Apart from income, there are a number of important non-income risk factors that have also been associated with inferior child outcomes. Using data from the Panel Study of Income Dynamics, Ciula and Skinner (2014) examine the interplay between income and non-income contextual factors, and child deprivation in three different domains: health, emotional well-being, and learning skills. They find that although children in low-income families are more likely than children in higher-income families to experience

parents of children aged 6 through 12, as well as interviews with the children between 10 and 12 years of age.

deprivation, income is an inadequate proxy for some important developmental risk factors.

Many non-income variables indirectly affect well-being in childhood in different ways. For example, low parental education may affect the whole family as a result of scarce material means, but it also has consequences on the child through reduced incentives to study and different parent-child relationships. Several studies have shown that children with more educated parents are less deprived than children with less educated parents (Moore et al., 2007, 2008, Bastos and Machado, 2009, de Neubourg et al. 2012, Wüst and Volkert, 2012). This might be explained by the fact that parental education reduces the likelihood of unemployment and facilitates access to high-pay jobs, and this translates into an improved material situation within the household.

Child deprivation is also related to parental marital status, with lone parenthood having negative effects on the situation of the child (Social Protection Committee, 2008; Bradshaw and Chzhen, 2009, 2012; Atkinson and Marlier, 2010, de Neubourg et al. 2012, Wüst and Volker, 2012). This might be partially explained by the fact that lone parent households have lower incomes and depend to a larger extent on state support in the form of financial transfers (Budría and Díaz-Giménez, 2007). For instance, a lower income in lone parent households may hinder the ability of single parents to buy quality food. However, it is also the lack of time that might prevent single parents from nourishing their children in a more healthy way or from providing them with their basic needs in terms of education or leisure time. Bradshaw and Chzhen (2012) provide interesting insights into lone parent families. Using data from the EU-SILC, they find that, everything else being equal, children are less likely to be materially deprived than children with widowed parents if there are no more than two children in the household, if the lone parent is widowed, rather than divorced or never married, and if the lone parent is university-educated and working full-time. Moreover, a lone mother increases the extent of child deprivation, relative to a lone father, an observation that highlights the role of the gender component when accounting for deprivation. The relevancy of this group for deprivation-reducing policies is highlighted by the fact that lone parents are a growing group in Spain, as in most EU countries.⁵

Parental employment status is another important determinant of children's living standards. Parents' participation in the labour market is essential not only for enhancing

⁵ The National Institute of Statistics (INE) shows that in 2001 the percentage of lone parents over the total number of households was 20.3 while in 2011 they account for 23.2%.

the family's material situation, but also because it helps establish a family routine and strengthen the work-ethic and stability in children's lives. The available evidence indicates that children with parents in full-time employment are less likely to be deprived with respect to unemployed or part-time employed parents (Grodem, 2008, Bastos and Machado 2009, TARKY, 2010, de Neubourg et al., 2012).

The neighbourhood in which families reside also affects the risk of child deprivation (Daly et al., 2008; TARKY, 2010; de Neubourg et al., 2012; Sharkey et al., 2012). On the one hand, urbanization provides unique political, cultural, economic, and educational opportunities for children and families. On the other hand, to the extent that urban advances are uneven, this may lead to marginalized urban settings where children are exposed to high rates of crime, violence, substance use, abuse, housing deterioration and poverty. Consistent with this view, Daly et al. (2008) provide a spatial approach using Statistical Local Area (SLA) in Australia and show that child deprivation is strongly geographical dependent. As shown in TARKY (2010), the availability of childcare and the number of children in pre-school differs between rural and urban areas. De Neubourg et al. (2012), however find only mild differences between child deprivation rates in urban and rural areas. Finally, Sharkey et al. (2012), show that high levels of violence in a child's community environment alters the child's behaviour and functioning in the classroom setting.

Another factor that affects the risk of deprivation is the number and age of children within the household. The number of children determines the amount of resources that can be assigned to each child, whereas age is a key determinant of resources allocation inasmuch as the type and quantity of children's necessities tend to change as children get older. Consistent with this view, the literature typically finds a positive correlation between the number of children at home and child deprivation (Moore et al., 2007, Bastos and Machado, 2009) and a specific child deprivation profile for different child age groups (Wüst and Volkert, 2012)).

Other factors that have been found to be potentially relevant are whether the accommodation is owned or rented (Moore at al. 2007) and having an immigrant condition (Wüst and Volkert, 2012). Having bad health, reduces the extent of labour market productivity and participation and increases the necessary resources for a household (Atkinson and Marlier, 2010). Therefore, parental health status is also a key determinant of the situation of the child. Since in-work earnings typically show a strong

progression from the early twenties until the midfifties, parental age is also likely to affect the risk of poverty and deprivation among children.

It is interesting to note that these patterns are quite common across countries. In their international study, de Neubourg et al. (2012) show that across all countries children living in families with parents that have a lower educational level have a much higher risk of being deprived compared to children living in families where the adults are better educated. Lone parents and a low work intensity in the family is also positively related to child deprivation. Differentiating between urban and rural areas also helps to explain child deprivation, even though the pattern is not clear-cut across countries. Although their analysis is descriptive, not based on econometric regression, they detect international differences in the relative importance of each factor, arguably due to differences in demography, social conditions and public policies

Our paper is more in line with Grodem (2008), which is the only study that explicitly investigates the effect of household deprivation on child deprivation. She finds that deprivation reported by parents in key areas (housing, ownership of consumer durables and subjective experience of financial hardship) translates into deprivation for their children in the same areas. Moreover, they find that the effects of the household deprivation indicators are higher than those of other household characteristics, including income. As a limitation, this study focuses only on low-income families.

3. Data set and definitions

3.1 Data set

The Statistics on Income and Living Conditions (EU-SILC) was constructed with the aim of collecting timely and comparable cross-sectional and longitudinal micro-data (European Commission, 2009a). It contains information on household income and on relevant household characteristics including housing, labour, health, demography, education and deprivation. It thus allows researchers to follow a multidimensional approach for the study of social exclusion.

Launched in 2004, it contains information both at the household and personal level, consisting of primary (annual) and secondary (ad-hoc modules) target variables. The secondary target variables are introduced every four years (sometimes, less) only in the cross-sectional component. In this paper we use the 2009 wave. This wave contains a module that entails specific questions on children's material deprivation. This module

considers only children aged below 16. Therefore we restrict our analysis to this population. Furthermore, for the purposes of this paper we select the sample of Spanish households from the EU-SILC database.

The module provides information on specific child material deprivation items. This information is not collected from children themselves but from the household respondent. According to the survey protocol, if in a given household at least one child does not have an item it is then assumed that all the children belonging to that household lack that item. Therefore our unit of measurement is the household, while the unit of analysis is the child. The alarming rate of 33.8% of children at risk of poverty or social exclusion recorded in 2012 makes Spain an interesting country to analyse the main forces behind these numbers (Eurostat 2013).⁶ Our sample contains 3.662 observations, although due to lack of response in some variables we end up with 3.006 observations.

3.2 Deprivation indicators

Treating the problem of deprivation as multidimensional requires the aggregation of indicators into a single index. Although aggregation can lead to some opacity as to which are the most critical areas of well-being, it eliminates the problem of interpreting large batteries of indicators and facilitates comparison between years and population groups. Moreover, a composite index of deprivation requires judgment on the relative importance of each domain or indicator. While most studies are pragmatic and give equal weights to the domains/indicators (Land et al., 2001, Barnes et al., 2008, Moore et al., 2007, 2008, Wüst and Volkert, 2012), some others place more importance on indicators in which deprivation is not widespread (Whelan et al., 2004, Bastos and Machado, 2009, Figari 2011, Fusco 2012 and Decancq and Lugo 2013). One of the advantages of the data-driven weights is that they are constructed based on the distribution of achievements in society, without taking into consideration any value judgment about how the trade-offs between the items should be.

In our analysis we will consider data-driven weights where the weight associated to each child-specific item corresponds to the percentage of children having access to the item (frequency-based weighting approach). This choice is motivated by the idea that not having access to widely spread items (i.e., items accessed by a majority of children) should be a more relevant determinant of deprivation than less widely spread items.

6

(http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/People_at_risk_of_poverty_or_social_exclusion#Further_Eurostat_information)

Therefore, widely-spread items are assigned higher weights. The advantages of this approach are threefold. First, it allows the deprivation score of a given child to increase if his/her conditions do not change and the conditions of all other improves. Second, the index takes into account economic conditions and social and cultural preferences in the access of items. Third, this approach is robust to the inclusion of items that are relevant only for a small minority of the population. As a robustness check we also compute indices where all items are weighted equally (the counting approach).

The fourteen specific items we have considered for computing the child deprivation index refers to the affordability of: some new clothes; two pairs of properly fitting shoes; fresh fruit and vegetables once a day; three meals a day; one meal with meat, chicken or fish; books at home suitable for their age; outdoor leisure equipment; indoor games; regular leisure activities; celebrations of special occasions; inviting friends round to play and eat from time to time; participating in school trips or events that cost money; a suitable place to study; and outdoor space in the neighbourhood to play safely.⁷ The rest of the items are optional in the survey and there is no information on them in the Spanish sample. In our sample the average level of child deprivation measured as the weighting index is 3.31 over a maximum of 86.9, and in the case of the counting index is 0.495 over a maximum of 12. See Table 1 into Appendix A.

3.3 Link between child-specific and household deprivation

Some studies in the literature investigate child and household deprivation separately, suggesting that children and parents experience parallel deprivation (e.g. Cantillon et al. 2004; Skevik, 2008). Nonetheless, others have shown how parents and children may not experience deprivation to the same extent (e.g. Middleton et al, 1997; Gordon, et al., 2003; Whelan and Maitre, 2012), concluding that parents may be sacrificing spending on items for themselves in order to prioritize their children's needs and wants (see also Daly and Leonard, 2002), or, instead, that in some households children are not protected and experience more deprivation than their parents. A first look at our data provides evidence in favour of the latter.

At the household level, we build material deprivation measures using information on a set of enforced lack of goods and services that can be considered as necessary to enjoy a decent standard of living. In particular, at the household level, we follow the set of nine items proposed by Eurostat, which are: paying rent, mortgage or utility bills;

⁷ See Appendix B for the complete list of items available in EU-SILC.

keeping the home adequately warm; facing unexpected expenses; eating meat or proteins regularly; going on holiday; a television; a washing machine; a car; and a telephone.⁸

In Table 1 we cross-tabulate the incidence of deprivation among households and the extent of child deprivation. Deprivation in both cases is measured by the number of items the household/child lacks. The first row shows, for example, that 49.9% of the sample households are not deprived at all (i.e., they have access to all items). In this group, 83.5% of the children do not lack any of the items that are relevant for child deprivation, whereas 16.5% lack less than 6 items. In particular 16.3% lack only one items. The proportion of children without access to two or more items in this group is negligible. It is interesting to note that when the extent of household deprivation is low (fewer than four items), most children tend to be not deprived or, if at all, lack only one item. As expected, we find that the proportion of non-deprived children decreases as the extent of household deprivation increases. Among households deprived in 4 or more items, children are quite evenly distributed among categories. Thus, among households without access to four or more items, only 23.58% of the children are not deprived at all, whereas almost 56% lack less than six items. This proportion is 50% for the case of lacking at least three items.

----- Insert Table 1 and Table 1a around here -----

Thus, as suggested by Whelan and Maitre (2012), using household indicators of deprivation or parent reports of deprivation in data collection as a proxy for children's own experiences is inadequate as it does not help us to sufficiently identify or satisfactorily understand the actual experiences of deprived and non-deprived children living in deprived and non-deprived households. We agree that there is clearly a value in supplementing child deprivation indicators, usually measured through household deprivation, with child-specific measures, but we draw our attention to the fact that it would be extremely unwise to rely solely on the latter. Therefore there is a clear need to analyse child deprivation with specific items and at the same time to accomplish an in-depth study of the link with household deprivation.

In our analysis of household deprivation each household features a vector of nine zero-one components, representing access to the different items mentioned above. We

⁸ As shown in Table A in Appendix B, EU-SILC data set contains more non-monetary household deprivation indicators. Alternative groupings of those deprivation items and different indices, also based on the EU-SILC microdata, have been proposed (see Nolan and Whelan, 2007, Whelan and Maitre, 2010, Guio and Marlier 2013). However we follow the official definition of Eurostat in terms of household deprivation with the nine items listed above, although we have also made the analysis, for the sake of comparison, with the fourteen items included in Guio et al. (2013).

generate a matrix with all the existing household deprivation vectors (theoretically 128 types, but many fewer in practice), where each row comprises different combinations of “zeros” and “ones” for each household. We then classify all households in different groups following a cluster analysis. In the first stage, we define *aggregation centres* according to the following two alternatives: i) randomly chosen combinations of items; and ii) the more frequent types of combinations⁹. In the second stage, observations are assigned to the nearest *aggregation centre* using the Hamming-Minkowsky distance¹⁰. We end up with eighteen groups¹¹. The idea is to determine whether these eighteen groups of household deprivation profiles have different influences on child deprivation, before and after controlling for household socioeconomic characteristics.

3.4. Explanatory variables

Following the literature review in the background section, we consider two different groups of variables, those that describe the situation in the household and those that are specific of parents. The main descriptive statistics of these variables are reported in Table 2 into the Appendix.

----- Insert Table 2 around here -----

In the first group, we include the following variables. To capture the effect of the age and the number of children in the household we construct four variables: younger than three years old (*Nch_2*), which on average implies 0.19 children of that age; between three and five years old (*Nch_3_5*), about 0.38 number of children of that age; between six and eleven years old (*Nch_6_11*), with an average of 0.79; and between twelve and sixteen years old (*Nch_12_16*) with an average of 0.43. To assess the impact of the household type, we include two dummy variables for households with only one parent (*Single*) and with two adults (*Couple*). The reference category includes other types of households. In our sample, around 75% and 7% of the households have two and one adult respectively. In order to assess the impact of the degree of urbanization on child deprivation, we include two dummies *Urban_dense* and *Urban_thinly* to cover a densely (around 45% of the household in the sample) and thinly populated area (around 31% in the sample) respectively¹². To include the effect of whether the accommodation is owned

⁹ We have also considered different definitions of *aggregation centres*, for example the first observations.

¹⁰ See Kaufman and Rousseeuw (1990). That is the standard criterion for measuring distance in clustering literature.

¹¹ The number of groups is determined by the criteria that there has to be enough numbers of groups and each group should contain enough numbers of observations in order to apply the multilevel technique. The main conclusions presented in next section still remain when the analysis is performed using a larger number of groups.

¹² Densely populated area implies a density superior to 500 inhabitants per square kilometer, where the total population for the set is at least 50,000 inhabitants. Intermediate area means a density superior to 100 inhabitants per square

or rented, we consider a dummy variable (*Owner*) that takes value 1 to capture house ownership. More than 82% of the households in the sample own the accommodation¹³. The well-known relationship between deprivation and income is captured through the inclusion of *Income*, a variable for annual equivalised disposable household income.¹⁴ We also control for the ratio of household members who suffer from any chronic illness or condition, (*Perc_chronic*). This variable ranges from 0 to 1, with a sample average of 0.20 members of the households¹⁵.

In the second group, we include variables for parental characteristics. Concerning the employment status, we include a set of dummies to capture fathers and mothers working either full or part-time (*Full_father*; *Full_mother*, *Part_father*, *Part_mother*). In our sample around 95% and 1.4% of the fathers are full and part-time employed respectively, while those percentages for mothers are respectively about 60% and 16%. We include two dummy variables to capture either father and/or mother with tertiary education (*Tertiary_father*, *Tertiary_mother*), which in our sample are around 30% for fathers and 33% for mothers. We also introduce age of mother and father as explanatory factors of child deprivation. In particular, we consider whether they are younger than 30 (*Young_father*, which is about 2% of the sample, and *Young_mother*, around 6%), or older than 65 (*Old_father*, which represents around 0.5% and *Old_mother*, almost 1%). Finally, we include the effect of being immigrant with two dummies *Immigrant_father* and *Immigrant_mother*, which account for about 11% and 14%, respectively, in the sample.

4. The econometric model

We consider that children are grouped into different kinds of households according to their household deprivation profile. Our estimation sample shows, in this sense, a hierarchical structure in which we anticipate some dependency¹⁶, given that two children belonging to households with the same deprivation profile will display higher correlation

kilometer, and either with a total population for the set of at least 50,000 inhabitants or adjacent to a densely-populated area. Finally, thinly-populated area is the set of local areas belonging neither to a densely-populated nor to an intermediate area.

¹³ A person is owner if he possesses a title deed independently of whether the house is fully paid or not.

¹⁴ Total equivalised disposable household income is the sum for all household members of gross personal income components minus regular taxes on wealth, regular inter-household cash transfer paid, tax on income and social insurance contributions. Income refers to the previous calendar year.

¹⁵ Chronic illness or conditions refer to permanent situations that are expected to require a long period of supervision, observation or care. Temporary problems are not considered.

¹⁶ Recall that the household deprivation profile is defined by grouping households into different combinations of items with the criteria of enforced lack, as presented before.

in terms of deprivation than two children in households with different deprivation profiles. Multilevel techniques provide a suitable framework to account for this hierarchical structure. In particular, multilevel models allow us to understand the relation between the deprivation profile of the household to which the child belongs (second level) and the deprivation of children (first level).

Since household-deprivation profiles are of substantive interest to us, we need a model in which we can explore the information behind clustering. The multilevel approach is the appropriate estimation method for our goal because of two reasons. First, it assumes that the error term has a group structure; and second, it also allows the intercepts and slopes to vary (Snijders and Bosker 1999 and Gelman and Hill 2007).

Given that we have a continuous dependent variable, the child deprivation calculated following the weighting approach,¹⁷ we consider the linear specification of the multilevel model. Specifically our model is a multilevel varying intercept model that estimates child deprivation on socio-demographic characteristics of the household and of the parents. Therefore, we have a two-level structure where children, i (first level), are nested into groups with different deprivation profiles, h (second level).

We start with the simplest form of a multilevel model, a *Group Means* or *Null Model* (hereafter Model 0), which allows us for group differences in the mean of our dependent variable. The estimated equation is as follows:

$$y_{ih} = \beta_0 + \xi_h + \varepsilon_{ih} \quad (1)$$

where y_{ih} denotes child deprivation for children i in a household with deprivation profile h and β_0 is the overall mean of child deprivation (across all household profiles). The residual is split into two components, corresponding to the two levels in the data structure. The group random effect, ξ_h , represents the difference between mean child deprivation in group-deprivation-profile h and the overall mean child deprivation. And the child residual, ε_{ih} , reflects the difference between child i 's deprivation and his/her group-deprivation-profile mean. Therefore, mean child deprivation for group profile h is $\beta_0 + \xi_h$. Residuals at the individual and the group level are assumed to follow normal distributions with zero mean.

The random group effect is captured by the estimated variance of ξ_h (varying intercept), which is an extra parameter to be estimated. We define the between-group

¹⁷ We have also performed the analysis with child deprivation under the counting approach. In this case, the variable takes fourteen values, and can be considered as a continuous variable given the results provided by Ferrer-i-Carbonell and Fijters (2004)

variance in child deprivation, σ_{ξ}^2 , and the within-group variance, σ_{ϵ}^2 . If σ_{ξ}^2 is zero, then there is only variability in child deprivation between children within the same deprivation-profile and there is no difference in mean child deprivation between deprivation-profiles. Finally, if σ_{ϵ}^2 is zero, all variability is between deprivation-profiles.

In a second step we extend Model 0 by adding explanatory variables (Model 1 hereafter). Equation (1) thus becomes:

$$y_{ih} = \beta_0 + \boldsymbol{\beta}_1 \mathbf{x}_{ih} + \xi_h + \epsilon_{ih} \quad (2)$$

where vector \mathbf{x}_{ih} includes all variables described in the previous section. As it is usual in this literature, to set the proportion of the total variance due to between-group differences, we use the variance partition coefficient (VPC), $VPC = \sigma_{\xi}^2 / (\sigma_{\xi}^2 + \sigma_{\epsilon}^2)$. If the inclusion of different explanatory variables makes σ_{ξ}^2 not statistically different from zero, it is said that the explanatory variables fully capture the group-variation, and there is no significant group heterogeneity left.

Finally, it is important to notice that there are alternative approaches to deal with hierarchical data, but they present some disadvantages. One of these alternatives comprises fixed effects models at the group level. However, they are subject to some potential drawbacks. First, if the number of groups is large there would be a large number of additional parameters to estimate. Second, if there are groups with different sample sizes, the estimated group fixed effects may be unreliable due to the lack of control for different cell sizes, contrary to the random effects approach. Third, fixed effects models treat groups as fixed classifications and do not allow the making of inferences about groups outside the sample, while the random effects approach views groups as a random sample from the population and the estimate obtained for between-groups (second level) variance is an estimate of the variance between groups in the population.

Another alternative consists of fitting a single-level model and correcting standard errors for design effects, or fitting a marginal model in which the dependency is modeled directly. These approaches have been also discarded in this case because, although standard errors would be properly adjusted for clustering, they would be unable to assess the degree of between groups variation.

5. Results

5.1. The effect of different group deprivation profiles

We start by fitting the *Null Model* (Model 0, where the intercepts ξ_h varies across group-deprivation-profiles, see Table 3). The estimation of such a simple model allows us to determine whether belonging to a specific group affects the level of child deprivation. In this sense, we can figure out which deprivation-profiles are the most unfavourable (i.e. profiles that put a child below the mean child deprivation level in the sample, $\hat{\beta}_0$). We carry out this analysis considering two types of clustering, frequency and random clustering, and two types of measures for child deprivation, counting and data-driven weighted. For the sake of simplicity, our comments will focus on the results for frequency clustering and weighted child deprivation index. Nonetheless, the results are robust for different definitions of deprivation and clustering methods¹⁸.

Our first result indicates that there is evidence of differences in the level of child deprivation between children who live in households with different deprivation profiles. That is, profiles could locate children below or above the mean child deprivation level in the sample $\hat{\beta}_0$. This stems from the fact that σ_ξ^2 is found to be statistically different from zero (Table 3). Moreover the Likelihood ratio test of the multilevel model against the linear regression reveals a p-value of 0.00.

----- Insert Table 3 around here -----

The estimation of the *Null Model* (Model 0) with multilevel techniques gives us the possibility of calculating the residuals (ξ_h) corresponding to each group (see Table 4). We use this information to classify group deprivation profiles according to their relative position with respect to the overall mean child deprivation ($\hat{\beta}_0$). These values imply that the range of child deprivation among groups goes from 3.12, for those who suffer the lowest level of deprivation, to a level of 32.20 for those with the highest level, which is a level of deprivation ten times higher.¹⁹ Figure 1 displays the estimated values of the random intercepts of the different deprivation profiles with 95% confidence intervals.

¹⁸ Additionally, we have also estimated the two model specifications considering a wider number of items at the household level (as proposed in Guio et al. 2013) and alternative methods to fix the *aggregation centres*. Results are available upon request.

¹⁹ Note that the estimated residuals range from -7.78 to 20.38 which comprises 30% of the dependent variable range. Therefore, the highest level of deprivation corresponds to adding estimated overall mean child deprivation $\hat{\beta}_0$ to the highest value of the estimated group residual. For the case of random clustering the range goes from -9.48 to 20.70.

These random intercepts represent departures of deprivation-profiles from the overall mean.

----- Insert Table 4 and Figure 1 around here -----

Secondly, we find common patterns of household deprivation among children that are above the overall mean child deprivation.²⁰ This group comprises children in households that can afford neither unexpected expenses nor going on holidays. However, among those above the mean, there are two groups that clearly stay above the rest. Additional to the pattern described before, these groups fail to pay rent, mortgage or utility bills and to keep the home adequately warm. Therefore, they display the most severe child deprivation levels. From Figure 1, we observe that those groups below the mean are not statistically from each other.

Furthermore, we address the question of whether there is a relationship between the estimated varying intercept of child deprivation and the number of items that a household lacks. This analysis (Table 4 and Figure 2) reveals that there is no clear correspondence between the number of items that the household lacks and the intensity of child deprivation²¹. This implies that the relevant feature is the combination instead of the number of items that the household fails to afford (see also Figure 2).

----- Insert Figure 2 around here -----

Finally, the multilevel technique allows us to assess the degree of between-group variation. The VPC (0.57) shows that around 57% of the total variance in child deprivation is due to between-group differences²². The remaining 43% of the total variance is due to within-group idiosyncratic differences. This reveals the crucial role of the household deprivation profiles in determining the intensity of child deprivation.

5.2. The effect of household socioeconomic characteristics

We now extend the *Null Model* (Model 0) by controlling for household and parents socio-demographic characteristics (Model 1 in Table 3).

The main finding is that the group effect still holds (estimated σ_{ξ}^2 is again statistically different from zero), although the estimated values of the residuals (ξ_h) have

²⁰ Being above (below) the overall mean of child deprivation implies a positive (negative) estimated group residual (ξ_h).

²¹ We have performed a multinomial estimation of the error with respect to the number of items that each household lacks. The results confirm that there are no statistically significant differences in the effect of household deprivation level on the probability of belonging to a specific child deprivation group.

²² This value corresponds to the random clustering model. For the frequency clustering option, the VPC is about 58%.

decreased, and the pattern found in Model 0 remains unchanged. That is, children whose level of deprivation is above the overall mean belong to households that cannot afford neither unexpected expenses nor going on holidays. Additionally, comparison of the estimated group effects of Model 0 and Model 1 reveals that there is no group re-ranking (see Figure 3). In other words, even after controlling for household and parental characteristics, the significant impact of deprivation-profiles still remains.

Therefore, we can conclude that there exists an association between child deprivation and the household-deprivation profile that surpasses the socio-demographic characteristics of the household and the parents. Household-deprivation-profiles reveal coping strategies of the parents and how resources are allocated within the household which play a substantial role in shaping how children experience deprivation. The analysis of household deprivation profiles reveals patterns in the allocation of resources that help us attain a better understanding of the children-household deprivation link.

----- Insert Figure 3 around here -----

It is worth mentioning that, after controlling for socio-demographic characteristics of the household and parents, the VPC decreases to 0.52. This effect is driven by the decrease in the variance of the group error (between variance), due to the heterogeneous distribution of socioeconomic characteristics among groups, which exceeds the decrease in the variance of the individual error (within variance).

Regarding the effect of socioeconomic characteristics (Model 1 in Table 3), the estimated parameters show similar results to the literature. We find that there is a positive association between the number of children in the household and the level of child deprivation. The greatest impact is for the number of children aged between 12 and 16 years old (*Nch_12_16*). In line with the international evidence, in line with the international evidence, the level of child deprivation is reduced in households with two adults. Lone parenthood, in contrast, does not exhibit significant differences in terms of child deprivation with respect to the reference category, “other types of households”, which accounts for around 10% of the sample.

As expected, child deprivation is found to be negatively associated with the degree of urbanization (*Urban*) and household equivalent income (*Inc*). Home ownership (*Tenure*) increases the risk of child deprivation. This result may be explained by the impossibility of distinguishing between owners with and without outstanding mortgage debts. This is an important aspect to keep in mind, especially in the Spanish economy, where the current context of economic downturn has led to many households falling into

mortgage arrears.²³ As expected, higher levels of child deprivation are found in households reporting higher proportions of people with a chronic (long-standing) illness or condition (*Perc_chronic*).

Regarding parental characteristics, we find asymmetric effects. For instance, in terms of labour market participation, we find that working mothers, either full or part-timers (*Full_mother* and *Part_mother*), are associated with the lowest levels of child deprivation. However, among fathers the number of working hours plays a key role in determining the level of child deprivation. While a full-time employed father (*Full_father*) decreases the level of child deprivation, the opposite is found for part-timers (*Part_father*)²⁴.

Differences in terms of parental education also become apparent. Children whose mothers have a tertiary education (*Tertiary_mother*) exhibit lower levels of deprivation than those with less educated mothers. In contrast, fathers' education is not significantly related to child deprivation levels. Age also has an asymmetric effect. Children with fathers aged below 30 or above 65 are exposed to relatively high deprivation levels (*Young_father* and *Old_father*), while the age of the mother has no influence at all. Finally, having an immigrant father (*Immigrant_father*) increases the child deprivation level, while no significant effects are found among immigrant mothers.

6. Discussion

One of the main conclusions that can be extracted from our results is that intra-household resource allocation plays an important role in determining children's well-being and their level of deprivation. A number of studies on child poverty have emphasized the importance of taking intra-household inequality into account (Corak 2005; Gordon et al. 2003; Harpham 2003; Kanbur, 1991; Save the Children 2001). Intra-household inequalities are compatible and explicable with modern theories on household decision-making, which conceive the intra-household allocation of resources as the result of bargaining between the household members, each having distinct preferences, particularly with respect to children, and a certain bargaining power.

²³ According to the Bank of Spain, in June 2013 mortgages made up 94.32% of outstanding loans of private households to financial institutions in Spain.

²⁴ The reference category (around 20% of the total sample) includes fathers that are unemployed (11% of total sample), retired (around 1.2%) and other inactive categories, such as students, disabled, compulsory military service and other inactive. When we define the reference category to be all inactive, therefore including unemployed as a dummy in the regression, results for full and part-time fathers do not change and unemployed fathers do not have a different effect to the inactive ones.

Studying how resources are allocated among family members is thus a crucial exercise, particularly when vulnerable components, such as children, are concerned (Peluso and Trannoy (2007). Nonetheless, analysing how households allocate resources internally is a complex issue, because household arrangements are not only determined by individual preferences but are also strongly influenced by prevailing social and cultural norms in the long run, and by economic conditions in the short run. Bargaining and collective models have been used in the literature to analyze intra-household resource allocation. Empirical evidence based on this type of model has found, for instance, that reallocating income from fathers to mothers tends, on average, to increase children's consumption, nutrition, and well-being (for a review, see Lechene, 2008). In a similar vein, there is evidence of the importance of the identity of the recipient of a cash transfer in explaining children's outcomes (Barrientos and Dejong 2006). For instance, cash transfers targeted at women rather than men have a stronger impact on the living standards of their children, particularly girls (Haddad et al., 1997). Other studies suggest that the source of income in the household makes a difference to the types of goods purchased and consequently to their relative benefits for children (Lundberg et al. 1997 and Duflo, 2000).

The evidence thus suggests that neglecting the distributional dimension could lead to important measurement and identification errors. In our analysis we have tried to overcome this measurement error by measuring child deprivation through specific items. Moreover, in order to study the association between child deprivation intensity and household deprivation we have analysed the combination of items that the household cannot afford instead of the number of items it fails to afford, because it is not the intensity of deprivation but the type of deprivation in the household that drives the link.

Our results suggest that there are specific household deprivation profiles that are significantly related to the level of child deprivation. This result holds even when controlling for household socio-demographic characteristics, i.e., there is evidence of a deprivation transmission mechanism that goes beyond income and employment status, both of them conventional economic variables monitored by politicians and researchers. Moreover, it is not the intensity of deprivation but the type of deprivation among adults that causes the connection. Therefore, the identification of household deprivation profiles is compelling in the search for children at risk of social exclusion.

In view of the previous results, we can conclude that an association exists between child deprivation and the household-deprivation profile that surpasses the socio-

demographic characteristics of the household and parents. While in some instances children experience more deprivation than their parents, in others parents prioritize protecting their children from deprivation and household resources are directed towards making sure the children have an adequate standard of living, at the expense of the parents. Therefore, indicators measuring available resources at the household level (and thus capturing the overall deprivation of a group of people) are not enough to understand the level of deprivation experienced by children.

7. Conclusion

The recent credit crunch and the ensuing economic crisis have raised policy concerns on poverty and social exclusion particularly among children, who are more exposed than the overall population. Combating child poverty and social exclusion has recently been encouraged at the EU level in an attempt to contribute to the Europe 2020 strategy for stronger social cohesion and sustainable and inclusive growth. Tackling and preventing child poverty and social exclusion is essential inasmuch as it does not only affect the well-being of today's children, but can also last long into adult life, producing damaging effects on future life opportunities.

An important consideration is that assuming that children obtain an equal share of available household resources charts a middle road between the deprivation they may be subject to if parents consume a disproportionate share, and the extra protection they might receive if parents make sacrifices to ensure children do not go without. Therefore there is a clear need to analyse child deprivation with specific items and, at the same time, to accomplish an in-depth study of the link with household deprivation beyond the mere intensity of household deprivation. For this purpose we have used the module of the EUSILC (2009) that contains specific child-deprivation items. Furthermore, we have focused our attention on Spain, a country where children suffer a level of material deprivation above the average in the EU.

Making use of multilevel techniques, our results reveal that there exists an association between child deprivation and the household-deprivation profile that surpasses the socio-demographic characteristics of the household and parents. We interpret these findings as evidence that adult decisions on the allocation of resources among household members play a crucial role in child deprivation outcomes. This role is at least as important as the household ability to generate resources, at least as far as income is concerned. This observation suggests that the poverty-reducing scope typically

attributed to income-based policies may be more reduced than previously thought. Tackling child deprivation requires a more profound understanding of the mechanisms, incentives and processes that surround adult decisions on the households that, ultimately, affect their children's well-being.

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APENDIX A: Tables and Figures

Table 1. Descriptive Statistics of Deprivation

Variable	Mean	Std. Dev.	Max	Min
Household deprivation (weighting index)	8.352	11.37	0	75.28
Household deprivation (counting index)	0.956	1.218	0	7
Child deprivation (weighting index)	3.318	8.188	0	86.92
Child deprivation (counting index)	0.495	1.218	0	12

Table 1a. Descriptive Statistics of Deprivation

HOUSEHOLD		No deprived	Lack less than 4 items	Lack more than 4 items
		49.90%	45.66%	4.23%
CHILD	No deprived	70.98%	83.48%	61.63%
	Lack less than 6 items	27.43%	16.52%	36.71%
	Lack more than 6 items	1.60%	0.00%	1.66%

Table 2. Descriptive Statistics of Main Determinants

Variable	Mean	Std. Dev.
Household Characteristics		
<i>Nch_2</i>	0.191	0.409
<i>Nch_3_5</i>	0.381	0.539
<i>Nch_6_11</i>	0.793	0.671
<i>Nch_12_16</i>	0.426	0.594
<i>Couple</i>	0.751	0.432
<i>Single</i>	0.067	0.251
<i>Urbanization (dense)</i>	0.449	0.497
<i>Urbanization (thinly)</i>	0.273	0.446
<i>Owner</i>	0.822	0.383
<i>Income^(a)</i>	13.891	8.936
<i>Per_chronic</i>	0.202	0.295
Parents characteristics		
<i>Full_father</i>	0.777	0.416
<i>Part_father</i>	0.014	0.118
<i>Tertiary_father</i>	0.303	0.460
<i>Young_father</i>	0.019	0.138
<i>Old_father</i>	0.005	0.070
<i>Immigrant_father</i>	0.111	0.314
<i>Full_mother</i>	0.432	0.495
<i>Part_mother</i>	0.163	0.370
<i>Tertiary_mother</i>	0.335	0.472
<i>Young_mother</i>	0.060	0.237
<i>Old_mother</i>	0.001	0.029
<i>Immigrant_mother</i>	0.136	0.342

^(a) In thousands of Euros.

Table 3. Multilevel estimation results

<i>Clustering</i>	Weighting Approach				Counting Approach			
	Model 0		Model 1		Model 0		Model 1	
	Random	Frequency	Random	Frequency	Random	Frequency	Random	Frequency
<i>Nch_2</i>			0.995** (0.403)	0.938** (0.403)			0.136** (0.057)	0.128** (0.057)
<i>Nch_3_5</i>			1.325*** (0.310)	1.373*** (0.310)			0.184*** (0.044)	0.191*** (0.044)
<i>Nch_6_11</i>			1.174*** (0.240)	1.194*** (0.240)			0.166*** (0.034)	0.169*** (0.034)
<i>Nch_12_16</i>			1.656*** (0.293)	1.673*** (0.293)			0.230*** (0.042)	0.232*** (0.042)
<i>Single</i>			-0.949 (0.669)	-1.038 (0.666)			-0.132 (0.095)	-0.143 (0.095)
<i>Couple</i>			-0.931** (0.374)	-0.884** (0.374)			-0.129** (0.053)	-0.122** (0.053)
<i>Urban(dense)</i>			0.625* (0.346)	0.579* (0.346)			0.086* (0.049)	0.079 (0.049)
<i>Urban(tiny)</i>			0.229 (0.371)	0.218 (0.370)			0.025 (0.053)	0.023 (0.053)
<i>Tenure</i>			-1.401*** (0.378)	-1.387*** (0.377)			-0.201*** (0.054)	-0.199*** (0.054)
<i>Inc</i>			-0.042** (0.020)	-0.042** (0.020)			-0.006** (0.003)	-0.006** (0.003)
<i>Perc_chronic</i>			1.269*** (0.463)	1.259*** (0.463)			0.183*** (0.066)	0.181*** (0.066)
<i>Full_father</i>			-1.258*** (0.377)	-1.239*** (0.376)			-0.178*** (0.054)	-0.175*** (0.054)
<i>Part_father</i>			2.219* (1.195)	2.455** (1.193)			0.309* (0.171)	0.342** (0.170)
<i>Tertiary_father</i>			-0.017 (0.360)	0.065 (0.360)			-0.006 (0.051)	0.006 (0.051)
<i>Young_father</i>			3.073*** (1.024)	3.177*** (1.022)			0.426*** (0.146)	0.441*** (0.146)
<i>Old_father</i>			3.886*** (1.452)	3.890*** (1.450)			0.514** (0.207)	0.516** (0.207)
<i>Immigrant_father</i>			1.660*** (0.606)	1.687*** (0.605)			0.220** (0.086)	0.224*** (0.086)
<i>Full_mother</i>			-1.044*** (0.326)	-0.994*** (0.326)			-0.142*** (0.046)	-0.135*** (0.046)
<i>Part_mother</i>			-1.192*** (0.417)	-1.188*** (0.417)			-0.163*** (0.060)	-0.163*** (0.060)
<i>Tertiary_mother</i>			-0.529 (0.353)	-0.542 (0.353)			-0.080 (0.050)	-0.082 (0.050)
<i>Young_mother</i>			-0.954 (0.655)	-0.824 (0.654)			-0.128 (0.093)	-0.110 (0.093)
<i>Old_mother</i>			-4.284 (4.284)	-4.195 (4.280)			-0.637 (0.611)	-0.625 (0.611)
<i>Immigrant_mother</i>			0.614 (0.544)	0.624 (0.544)			0.082 (0.078)	0.083 (0.078)
<i>Constant</i>	10.514*** (2.100)	8.797*** (2.141)	10.12*** (1.995)	8.618*** (2.018)	1.509*** (0.294)	1.269*** (0.301)	1.461*** (0.279)	1.253*** (0.284)
<i>Observations</i>	3.006	3.006	3.006	3.006	3.006	3.006	3.006	3.006
<i>N.gro ups</i>	18	18	18	18	18	18	18	18
<i>Log Likelihood</i>	-10409.0	-10408.0	-10311.6	-10309.6	-4551.3	-4549.9	-4458.2	-4467.1
<i>Random-effects Parameters</i>								
σ_{ε}^2	76.24*** (26.74)	79.61*** (27.84)	61.08*** (21.73)	62.76*** (22.24)	1.493*** (0.524)	1.567*** (0.549)	1.191*** (0.424)	1.233*** (0.438)
σ_e^2	58.14*** (1.504)	58.07*** (1.503)	54.54*** (1.411)	54.45*** (1.409)	1.180*** (0.031)	1.179*** (0.031)	1.110*** (0.029)	1.108*** (0.029)
<i>CPV</i>	0.567	0.578	0.528	0.535	0.559	0.571	0.517	0.527

Table 4: Relationship between household and child deprivation

Frequency Clustering			Random Clustering		
Group residuals (estimated)	Mean Child dep.	Mean Household dep.	Group residuals (estimated)	Mean Child dep.	Mean Household dep.
-7.78	0.93	0.00	-9.48	0.96	0.00
-7.43	1.56	0.01	-9.04	1.62	0.00
-6.83	2.65	0.17	-8.59	1.98	0.09
-6.78	2.06	0.09	-8.07	2.13	0.10
-6.37	2.15	0.09	-7.16	3.46	0.12
-5.89	2.40	0.12	-6.95	4.28	0.11
-5.83	4.17	0.09	-6.29	3.70	0.21
-5.67	3.21	0.21	-5.24	4.59	0.18
-5.47	1.29	0.31	-4.02	4.44	0.21
-4.38	4.64	0.14	-2.66	6.95	0.30
-3.51	4.61	0.18	0.68	9.46	0.18
0.69	7.65	0.31	3.24	13.53	0.31
2.39	9.46	0.18	6.53	18.11	0.34
6.44	14.16	0.33	7.90	20.81	0.45
8.25	15.08	0.35	7.98	15.85	0.36
9.50	17.61	0.38	9.93	29.98	0.41
16.29	35.50	0.43	10.54	15.21	0.48
22.38	36.39	0.46	20.70	36.39	0.46

Figure 1: Estimated Varying Intercept (Null Model, Frequency Clustering)

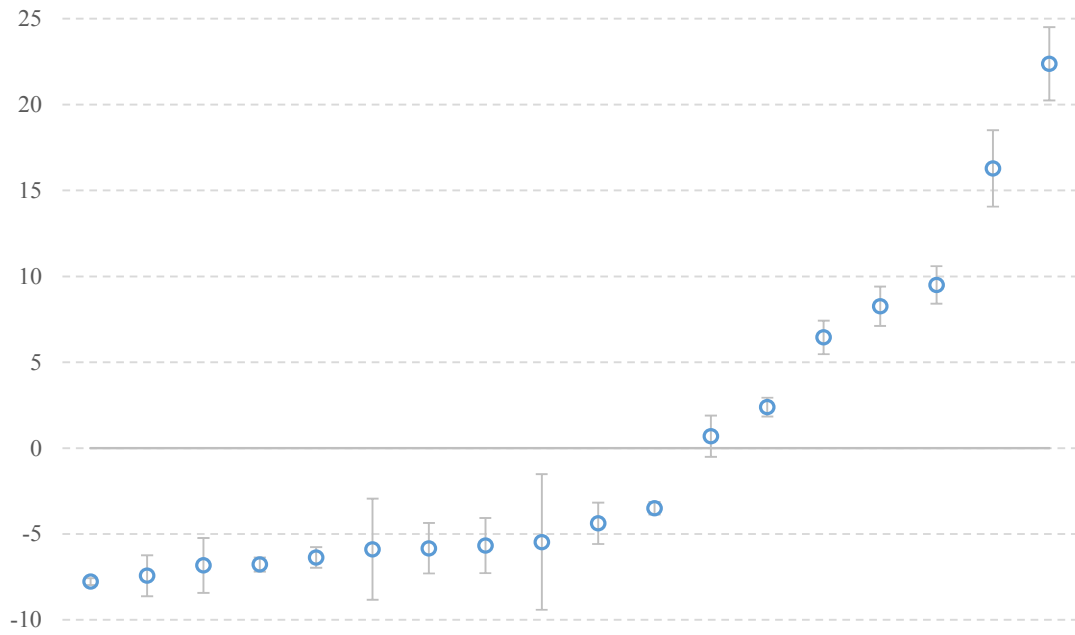


Figure 2: Household deprivation vs Child deprivation

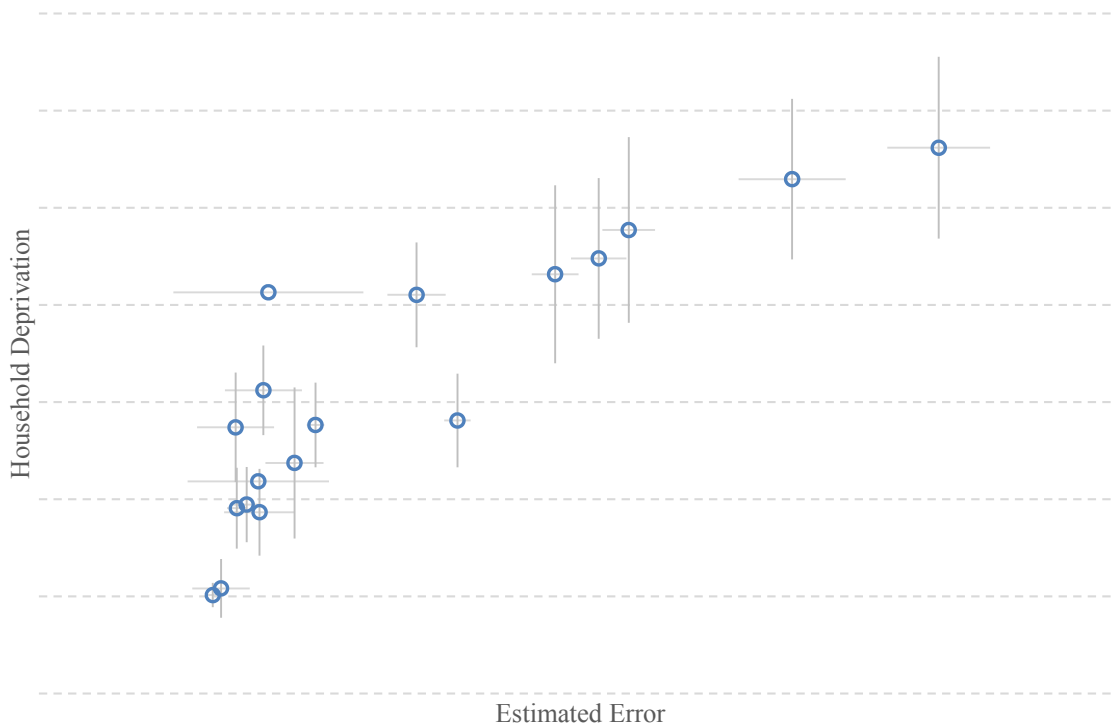
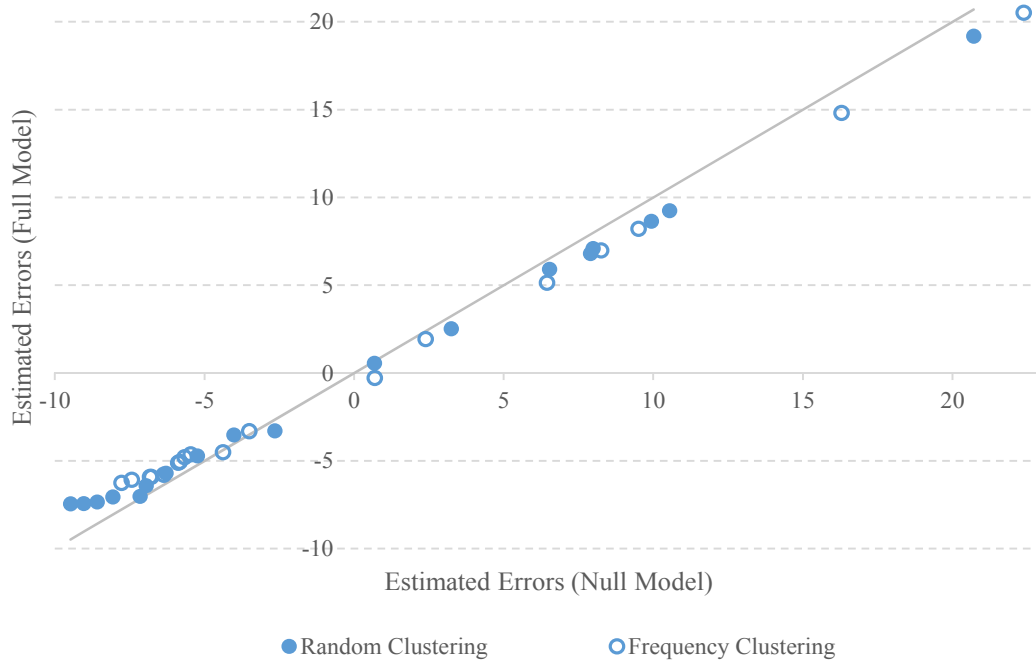


Figure 3: Estimated Varying Intercept



APENDIX B: Additional information

Table A. Non-monetary household deprivation indicators

Arrears on mortgage or rent payments
Arrears on utility bills
Arrears on hire purchase instalments or other loan payments
Capacity to afford paying for one week annual holiday away from home
Capacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day
Capacity to face unexpected financial expenses
Do you have a telephone (including mobile phone)?
Do you have a colour TV?
Do you have a computer?
Do you have a washing machine?
Do you have a car?
Ability to make ends meet
Lowest monthly income to make ends meet
Financial burden of the total housing cost
Financial burden of the repayment of debts from hire purchases or loans

Note. Variables from HS010 to HS150 in EU-SILC.

Table B. Non-monetary child deprivation indicators (2009 MODULE ON MATERIAL DEPRIVATION)

BASIC NEEDS
Some new (not second-hand) clothes
Two pairs of properly fitting shoes (including a pair of all-weather shoes)
Fresh fruit and vegetables once a day
Three meals a day
One meal with meat, chicken or fish (or vegetarian equivalent) at least once a day

EDUCATIONAL OR LEISURE NEEDS
Books at home suitable for their age
Outdoor leisure equipment (bicycle, roller skates, etc.)
Indoor games (educational baby toys, building blocks, board games, computer games, etc.)
Regular leisure activity (swimming, playing an instrument, youth organisations, etc.)
Celebrations on special occasions (birthdays, name days, religious events, etc.)
Invite friends round to play and eat from time to time
Participate in school trips and school events that cost money
Suitable place to study or do homework
Outdoor space in the neighbourhood where children can play safely
Optional: Go on holiday away from home at least 1 week per year

MEDICAL NEEDS
Optional: Unmet need for consulting a GP or specialist, excluding dentists and ophthalmologists
Optional: Main reason for unmet need for consulting a GP or specialist, excluding dentists and ophthalmologists
Optional: Unmet need for consulting a dentist
Optional: Main reason for unmet need for consulting a dentist

Note. Variables from HD100 to HD265 in EU-SILC 2009.