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**Working Paper**

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# GROWING UP IN A POOR HOUSEHOLD IN BELGIUM: A RANK-BASED MULTIDIMENSIONAL PERSPECTIVE ON CHILD WELL-BEING<sup>1</sup>

*Koen Decancq<sup>2</sup> and Annemie Nys<sup>3</sup>*

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## **Abstract**

This article documents some consequences of growing up in a poor household in Belgium. We use data from a specific drop-off module on child well-being in the MEQIN data set, a broad probability-based Belgian household survey. We compare the percentile ranks of children growing up in poor households with children growing up in more favorable income groups (vulnerable, low and high middle class, and rich households, respectively) for several non-monetary dimensions of child well-being. We look at material deprivation, housing quality, physical health, and life satisfaction. Our results reveal a grim picture in which children growing up in poor (or vulnerable) households are not only found at the bottom of the income distribution, but are also more likely to have a low rank in the non-monetary dimensions, with the exception of the physical health dimension. We also use the broad and multidimensional nature of our data to examine the phenomenon of cumulative deprivation, finding that children in poor households are more likely to simultaneously occupy a low rank in all of the well-being dimensions considered.

**Keywords:** Child Poverty, Multidimensional Child Well-being, Cumulative Deprivation, Belgium.

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<sup>1</sup> We thank Zoé Rongé for useful comments and help with the data. This paper makes use of the MEQIN data set, collected by a team of researchers from Université catholique de Louvain, KU Leuven, Université libre de Bruxelles, and the University of Antwerp. The collection of the MEQIN data was enabled by the financial support of the Belgian Science Policy Office (BELSPO) through grant BR/121/A5/MEQIN. In addition, we are grateful to FWO/FNRS for financial support through grant EOS 30544469. This paper was partly developed when Koen Decancq was a Ludwig M. Lachmann Fellow at the Centre for Philosophy of Natural and Social Science of the London School of Economics, and he would like to thank the Centre for providing support.

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# 1. INTRODUCTION

One in five children in Belgium grow up in a household with an income level below the poverty line (Vandenbroucke and Vinck 2015). Notwithstanding its long tradition of social security, the level of child poverty in Belgium is high in comparison to neighboring countries. Moreover, there is ample evidence that it has been creeping upward over the last 15 years (Vinck et al. 2017).

Growing up below the income poverty line is perceived by many as deeply problematic, for at least two reasons. First, while it might be argued that some inequalities among adults are a justifiable consequence of their own choices, it is very hard to come up with a social theory that holds children responsible for the income level of the household in which they are growing up.<sup>4</sup> Second, the consequences of child poverty often give rise to intergenerational poverty traps, with the transmission of income poverty from parents to children.

Nevertheless, income in itself does not directly contribute to the well-being of children. At best, it can be used as a means to generate child well-being. However, moving beyond an instrumental perspective on income poverty requires an approach that can conceptualize and directly measure child well-being. Nobel prize laureate Amartya Sen (1985, 1999) has forcefully argued that well-being is best seen as a multidimensional notion consisting of several “functionings” or “capabilities.”<sup>5</sup> How many functionings or capabilities, and hence well-being, can be generated with the income of the household depends on a series of potentially heterogeneous conversion factors that determine how income is converted into well-being (Robeyns 2005). Therefore, the extent to which the income level of the household is informative about the well-being of children or, conversely, how much child well-being differs across income groups, remains an open empirical question.

In this paper, we focus on four dimensions of child well-being: material deprivation, housing quality, physical health, and life satisfaction.<sup>6</sup> In each dimension, we compare the percentile ranks of children who are growing up in a poor household with children from other, more favorable, income groups (vulnerable, low and high middle class, and rich households, respectively). For the first dimension, we make use of child-specific material deprivation items included in the EU-SILC special module in 2014 (see, e.g., Guio et al. 2018). These items focus on both material and social aspects of child well-being.

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<sup>4</sup> The consequences of child poverty can therefore clearly be considered as unfair according the theory of equality of opportunity (Roemer 1998; Fleurbaey 2008). Van Lancker and Vinck (2020) provide a recent review of the literature that addresses the consequences of growing up in a poor household.

<sup>5</sup> “Functionings” are the doings and beings of people (such as being healthy, being safe, being able to appear in public without shame and so on) and “capabilities” refer to the set of potential functionings that a person can obtain. Biggeri et al. (2010) discuss how the multidimensional capability approach can enrich the research on child well-being. Anand and Roope (2016) provide an empirical illustration using young children’s happiness.

<sup>6</sup> Housing quality, physical health, and life satisfaction have been identified as highly relevant to child well-being by focus group discussions organized by Biggeri et al. (2006). The authors discuss several other relevant capabilities for children, such love and care, social relationships, education, and respect. Data limitations do not permit us to include them here.

Housing quality, the second dimension, is measured by an index that is based on questions about the presence of housing problems and space in and outside the home. Physical health is measured by the physical health dimension of the Child Health Questionnaire (CHQ-PF28). Finally, the life satisfaction of the children is measured on a five-point scale.

Broadly speaking, there are two main approaches used to summarize and quantify child well-being when considering its multidimensional character. First, one can use a “dashboard” approach to rank countries, regions, or even individual children, by their outcomes in the different dimensions separately. The series of league tables of countries in the Innocenti Report Cards published regularly by UNICEF are an example of this dimension-by-dimension approach at the country level (see, e.g., UNICEF 2016). While interesting and highly policy-relevant, the dimension-by-dimension dashboard approach has a blind spot, whereby the structure of dependence between the dimensions is hidden. Indeed, it matters whether the same children are bottom-ranked in all dimensions, or whether low ranks in one dimension occur alongside high ranks in other dimensions (Decancq 2014). Dimension-by-dimension approaches remain, by definition, blind to this structure of dependence and the question of whether the same children are found at the bottom of each dimension. As an alternative approach, one can construct a composite index of child well-being, with work by Bradshaw et al. (2007) providing an example. However, constructing a composite index is methodologically challenging. In particular, the selection of the most appropriate weights of the dimensions remains a controversial issue (see Decancq and Lugo 2013, for a critical discussion).<sup>7</sup>

Here, we start with the dashboard approach and rank all children in our data set in each dimension to compare the distribution of the percentile ranks over the five different income groups. To throw light on the structure of dependence between the dimensions, we complement this dimension-by-dimension perspective with explicit information about cumulative deprivation. In a series of recent papers, Decancq (2020a, 2020b) proposed that people who occupy a low rank in *all* dimensions of well-being that were considered, should be identified as suffering from cumulative deprivation. For such children, the hardship in one single dimension is cumulative with hardships in other dimensions. By the very nature of the approach, this cumulative aspect of child poverty remains under the radar of existing dimension-by-dimension analyses of child well-being. Arguably, the main reason for this is pragmatic, as a broad data set that covers all relevant dimensions for the same children is required to measure the cumulative effects.

In our study, we use novel data for Belgium from the “Measuring Equivalent Income” (MEQIN) survey that was collected in 2016 on 3,404 individuals in 2,098 households by means of face-to-face

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<sup>7</sup> Decancq and Schokkaert (2016) proposed the construction of a multidimensional preference-sensitive well-being index based on equivalent incomes. This measure has the advantage of respecting the preferences of the individuals concerned (see also Decancq et al. 2015a, 2015b). How the equivalent-income method can be applied to construct an index of child well-being remains an open question.

interviews. The main data set contains rich information about different dimensions of well-being in a probability-based sample of Belgian households. This survey was complemented by a “drop-off” questionnaire for each child in these households. Our final sample consists of 433 children, for which we have all of the desired information from the main data set and the drop-off questionnaires. Although the resulting sample is relatively small, combining the information from the representative main data set with the detailed drop-off questionnaires makes the MEQIN data set a rich and unique source of information about the multidimensional well-being and poverty of Belgian children.<sup>8</sup>

The paper is structured as follows. Section 2 describes the data and methods, paying special attention to the MEQIN data set and its drop-off questionnaire, the classification of children into income groups, and the rank-based approach that we use in this paper. Section 3 compares the well-being situation of the children in the income groups by looking at material deprivation, housing quality, physical health status, and life satisfaction of the children. Section 4 looks at cumulative deprivation across these four dimensions. Section 5 concludes and discusses a few implications of the results for policy making and the measurement of child poverty in Belgium.

## **2. DATA AND METHODS**

### **2.1 DATA AND SAMPLE SELECTION**

The MEQIN data set was collected between February and July 2016 by a research consortium of four Belgian universities, aiming to measure individual well-being in a multidimensional manner and to document its distribution.<sup>9</sup> The target population of the MEQIN survey was adult individuals living in Belgium, represented in a probability sample drawn from the Belgian National Register after stratifying the population into 14 strata based on household composition and the age of the head of household. In the survey, some vulnerable groups were oversampled by doubling the selection probability of people belonging to a single parent household or a household with a head who was older than 60.

The questionnaire was implemented using a Computer Assisted Personal Interview (CAPI) of all adult members in the selected households. One respondent in each household, called the “reference person,” was asked to complete a long version of the questionnaire that included household-level questions. The main questionnaire contained household roster information, standard socio-demographic variables, detailed income information, data on health and health care use, information on work status and

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<sup>8</sup> The rank-based multidimensional approach of this paper complements the existing qualitative and quantitative work on child poverty in Belgium (see, e.g., Diericks et al. 2015; Vandenbroucke and Vinck 2015).

<sup>9</sup> The consortium consisted of researchers from the Université catholique de Louvain, KU Leuven, Université libre de Bruxelles, and the University of Antwerp. The questionnaire was administered by the survey agency Kantar. The data can be requested on <https://sites.google.com/view/meqin>. Capéau et al. (2019, 2020) provide additional details.

housing, a consumption and time use module, and specific modules on the measurement of well-being, including questions on willingness-to-pay for improvements in their health and work environments. Capéau et al. (2020) provide a summary of the initial research findings based on the MEQIN survey.

The survey was completed by 2,098 households, among which there were 614 households with at least one non-adult child. For each of the 1,089 children (534 girls and 555 boys) in these households, an additional 8-page paper-and-pencil drop-off questionnaire was left after the CAPI interview. It is not known which household member completed the drop-off questionnaire, but in a large majority of the cases the reference person of the household was a parent or the partner of a parent of the child reported on in the questionnaire. The drop-off questionnaire contained questions on the individual health status of the child (the 28-item Child Health Questionnaire [CHQ-PF28]) and a set of material deprivation items that were especially tailored to children.

The drop-off questionnaire was sent back to the survey agency by 365 households (equivalent to 59.4% of the households with children), of which 265 households also provided complete income information in the main survey. Our final sample thus consisted of 433 children, with 251 girls and 182 boys, spread evenly across the age distribution of 0 to 18 years old. While the main survey was designed to be representative of the entire Belgian population, biases may have arisen from non-random completion of the drop-off questionnaire. To adjust for the oversampling and these potential biases, we clustered some of the smaller strata and reweighted them to match the corresponding population sizes. These sample weights are used in all analyses in this paper. Nevertheless, the results and their representativeness of the underlying population should be treated carefully.

## 2.2 CLASSIFICATION INTO INCOME GROUPS

We classified the 433 children in the final sample into five income groups based on the equivalized disposable income of the household in which they were growing up. The main MEQIN survey contains detailed questions about several income sources of the adult members of the household.<sup>10</sup> These income sources were summed across all members of the household, corrected for differences in household size by the modified OECD equivalence scale, and then equally attributed to all household members. These equivalized disposable incomes were compared to the poverty threshold, which was set at 60% of the median equivalized disposable income, as is the standard practice for poverty analyses in Europe. For our data set, the poverty threshold is equal to 972 euros per month.

We classified the children into five income groups in the following way. First, all children in households with an equivalized disposable income below the poverty threshold were considered as living a *poor* household. Second, children in a household with an equivalized disposable income between the poverty

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<sup>10</sup> The income sources include: (1) total net wages for employees, (2) total net benefits, (3) total net pensions, (4) total net income from self-employment, (5) income from real estate, and (6) child benefits.

threshold and 1.5 times that amount (1,458 euros) were classified in a group which we called *vulnerable*. Third, children in households with an equivalized income between 1.5 and 2 times the poverty threshold (1,944 euros) formed the *lower middle class*. Fourth, children in households with an equivalized income between 2 and 3 times the poverty threshold (2,916 euros) formed the *higher middle class*. Finally, all children in a household with an equivalized income higher than 3 times the threshold were considered as living in *rich* households.

Figure 1 shows the distribution of the 433 children across the five income groups. The vertical line represents the poverty threshold. In line with previous studies, we found that 22.8% of the children were growing up in a poor household. In addition, there was a large group of children who were growing up in a vulnerable household.

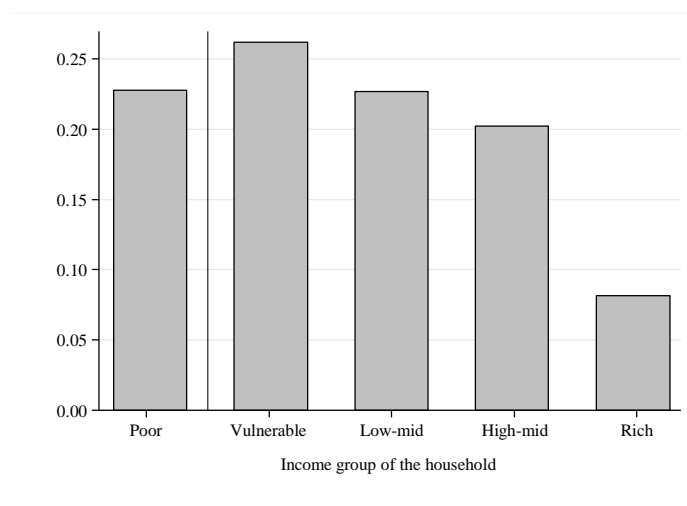


Figure 1 Percentage of children in the five income groups

Table 1 compares some household-level socio-demographic characteristics of the children in the five income groups. The first row shows that more than one quarter of the children in the poor group have at least one household member who is a first-generation migrant (hereafter referred to as children living in a “migrant household”). Furthermore, a clear gradient can be noticed across the income groups when looking at the share of children growing up in a higher educated household (a household is considered as higher educated, if at least one adult in the household completed higher education). More than 40% of poor children grow up in a household with a work intensity below 0.2 and are classified as jobless. This high number confirms previous findings that child poverty risks are concentrated in jobless households (OECD, 2011). We also see in Table 1 that poor households have more children than the other income groups. Finally, single parent households are clearly overrepresented among the children in the poor and vulnerable income groups.

Table 1 Socio-demographic characteristics in the five income groups (% of children)

	Poor	Vulnerable	Lower mid	Higher mid	Rich
Migrant household	26.9	13.5	11.7	6.1	19.5
Higher educated household	27.9	41.6	52.9	76.9	90.9
Jobless household	42.2	10.4	0	0	0
Number of children	2.1	1.7	1.6	1.5	1.6
Single parent household	54.5	52.4	32.4	11.2	9.3

## 2.3 RANK-BASED APPROACH

The league tables produced by the Innocenti Report Cards (see, e.g., UNICEF 2016) are a popular example of a dashboard of child well-being indicators. In each league table, a group of developed countries is ranked according to a single indicator. The starting point of the rank-based approach used in this paper is a similar league table of all 433 children in the data set. The rank  $r_i^j$  of child  $i$  in the distribution of variable  $j$  is given by its percentile rank or, equivalently, by the cumulative distribution function of variable  $j$ .<sup>11</sup> For each child, this equals the percentage of children who perform worse in the dimension under consideration. The worst-off child gets rank 0, the best-off child gets rank 100, while the child in the middle gets rank 50, etc.

The percentile ranks will play a central role in the remainder of our analysis. Indeed, using ranks rather than the levels of variables themselves allows us to focus on the information that we are interested in: the difference in the rank that children of different income groups have in the distribution of the relevant dimensions of child well-being. Moreover, ranks are invariant to monotonic transformations of the underlying variable. This property is useful for variables without a natural measurement unit, such as housing quality or physical health. While selecting another measurement scale affects the levels, it does not affect the ranks of the children. This invariance is also useful for indicators with an unknown, potentially non-linear, impact on child well-being. It is arguably better for a child to occupy a higher than a lower rank in the distribution of the variables considered, but how much better that is precisely, and whether the effect on child well-being is linear, remain unknown. The rank-based approach allows us to remain agnostic on the most appropriate transformation function of the variable considered.

Once the percentile ranks for each child were obtained for an aspect of well-being, we performed a graphical and a regression analysis to investigate the difference across income groups. In the graphical analysis below, we present and discuss two figures. First, a box plot by income group allows us to

<sup>11</sup> We took the appropriate sample weights into account to compute the ranks and percentile ranks. Children were ranked randomly when there was a tie in the underlying variable. This random rank assignment occurred independently in each dimension.



compare the median and spread of the ranks within the different income groups. Second, a smoothed area plot visualizes the income-group composition across the distribution of percentile ranks.<sup>12</sup>

In the regression analysis, we present three OLS models which take the percentile ranks as explained variables using different nested sets of explanatory variables. The first set only includes dummies for the vulnerable, lower middle class, higher middle class, and rich income groups. The second set adds child-level characteristics such as age and sex of the child. The third set also includes household-level characteristics such as migration, education and employment status of the household, the total number of children, and single parenthood. The full model for variable  $j$  can be stated as follows:

$$r_i^j = \alpha + \beta_1 Vul_i + \beta_2 LowMid_i + \beta_3 HighMid_i + \beta_4 Rich_i + \gamma X_i + \delta Y_i + \varepsilon_i,$$

where  $X_i$  captures the child-level characteristics and  $Y_i$  the household-level characteristics.<sup>13</sup> We are mainly interested in the estimated  $\beta$  parameters. However, it should be emphasized that our regression analysis is a descriptive one. The estimated parameters capture correlations (after controlling for the effect of other variables), but not necessarily causal relationships between the explanatory variables and the ranks. Reverse causality, for instance, may be present between the rank of the child in the dimensions considered (such as physical health of the child) and the income position of the household.

Finally, the rank-based approach is also useful to study the phenomenon of cumulative deprivation. Decancq (2020a, 2020b) presented a rank-based framework to measure cumulative deprivation based on the “copula function.”<sup>14</sup> Children suffer from cumulative deprivation when they are simultaneously ranked at the bottom on all dimensions of well-being considered. There is more cumulative deprivation in a society when there is more statistical dependence, that is, when the ranks coincide more across the dimensions. When all children are ranked exactly in the same way in all dimensions of well-being, statistical dependence is maximal. Statistical dependence is low, in contrast, when the dimensions of well-being are independent of each other and high ranks in some dimensions compensate for low ranks in others. In line with Decancq (2020b), we identified the children who suffer from cumulative deprivation by looking at the maximal percentile rank  $\bar{r}_i$  that each child obtained across all  $m$  considered dimensions:

$$\bar{r}_i = \max\{r_i^1, \dots, r_i^j, \dots, r_i^m\}.$$

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<sup>12</sup> The composition of the income groups was smoothed across the distribution of percentile ranks using a cubic spline function with five nodes.

<sup>13</sup> Decancq (2020b) used a similar rank-based regression. Chetty et al. (2014) used rank-rank regression to measure social mobility between parents and sons.

<sup>14</sup> A copula function is the multivariate cumulative distribution function of percentile ranks, see Decancq (2014, 2020a) and Nelsen (2006) for a formal treatment. Copula functions are useful to model the rank-based dependence structure of a multivariate distribution independently of the distribution of the marginal distributions.

A child who obtains percentile rank 80 for material deprivation, 30 for housing quality, 25 for physical health and 40 for life satisfaction, for example, has a maximal percentile rank equal to 80.

A child with a low maximal percentile rank suffers from cumulative deprivation. Indeed, if the maximal percentile rank is low, the child necessarily has a low rank in *all* dimensions of well-being. In Section 4, we compare the prevalence of cumulative deprivation across the income groups by looking at the distribution of the maximal ranks using the graphical and rank-based regression methods described above.

### **3. A RANK-BASED DASHBOARD OF CHILD WELL-BEING**

In this section, we look at four dimensions of child well-being: material deprivation, housing quality, physical health status, and life satisfaction.

#### **3.1 MATERIAL DEPRIVATION**

We used twelve child-level and five household-level deprivation items to rank the children with respect to material deprivation. The MEQIN drop-off questionnaire contains the same twelve child deprivation items as the 2014 EU-SILC ad-hoc module (listed in the top part of Table 2). Each item captures whether a child deprivation item can be afforded or not. Contrary to the SILC 2014 approach, however, the MEQIN data were collected separately for each child in the household, rather than for all children combined. This approach offers additional information about intra-household inequalities and makes it possible to study differences in child deprivation within the household (e.g., whether girls suffer more deprivation than boys, or teenagers more than younger children living in the same household).<sup>15</sup> We followed Guio et al. (2018) and included five household-level items in addition to the twelve child-level items (see bottom part of Table 2). While these household-level items do not solely refer to the situation of children, they may also affect child well-being.

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<sup>15</sup> In practice, however, there are very few households with more than one child that report different material deprivation levels for the different children.

Table 2 Prevalence of deprivation across the income groups (in percentages)

<b>Child deprivation items</b>	<b>Poor</b>	<b>Vuln.</b>	<b>Low Mid</b>	<b>High Mid</b>	<b>Rich</b>
Some new clothes	19.7	2.5	0	0	0
Two pairs of properly fitting shoes	0.6	0.2	0	0	0
Fresh fruit and vegetables once a day	0	0	0	0	0
One meal with meat, chicken, fish, or vegetarian equivalent at least once a day	2.9	0	0.5	0	0
Books at home suitable for their age	8.2	6.9	0.6	0	0
Outdoor leisure equipment	13.9	1.6	0	0	0
Indoor games	6.7	2.8	0	0	0
Regular leisure activity	6.5	3.8	2.9	0	0
Celebrations on special occasions	14.7	5.1	0	0	0
Invite friends round to play and eat from time to time	13.4	2.8	0	0	0
Annual vacation	60.1	21.1	5.9	0.9	0
Participate in school trips and school events that cost money	9.9	2.0	0	0	0
<b>Household deprivation items</b>					
To avoid arrears	50.7	22.8	7.0	9.1	8.4
To have adequate warmth in home	19.4	4.5	0	0	0
To have access to a car	22.4	4.8	0	0	0
To replace worn-out furniture	62.5	25.9	7.5	4.4	0
Internet	9.1	0.8	0	0	0

While the average number of deprivations across all children is 1.06, children from poor households suffer on average 3.15 deprivations. As can be seen in Table 2, about 60.1% of the children growing up in a poor household cannot afford an annual vacation. This figure declines to 21.1% among the children growing up in a vulnerable household and to 5.9% among the children in the lower middle class households. Almost no one in the richer income groups reported this deprivation. In a qualitative study with children from a poor background in Germany, Andresen and Fegter (2011) found that virtually all of the children surveyed considered an annual vacation to be very important. We also see that about 14.7% of the children in a poor household cannot afford celebrations on special occasions, and that 13.4% cannot afford to invite friends over to play or eat. In this respect, Andresen and Fegter (2011) documented the large degree of importance that children themselves give to having “good friends.”

All 433 children were ranked based on the value of their material deprivation index. The left-hand panel of Figure 2 shows the distribution of the ranks by means of a box plot for each income group. While

the median rank (indicated by the horizontal line inside the gray shaded box) of the children in the poorest group is 15.2, the median rank of the richest three groups is above 60. The boundaries of the box indicate the 75<sup>th</sup> and 25<sup>th</sup> percentile values of the ranks in the income group. The whiskers of the box plot indicate the upper and lower adjacent values, which were obtained by adding 1.5 times the interquartile range (the difference between the 75<sup>th</sup> and 25<sup>th</sup> percentile values) to the boundaries of the box (Tukey 1977). Values above or below these adjacent values can be considered outliers and are indicated by a dot. The ranks of the children in the vulnerable group, particularly, show a wide range, with the lower and upper adjacent values being 0 and 100, respectively.

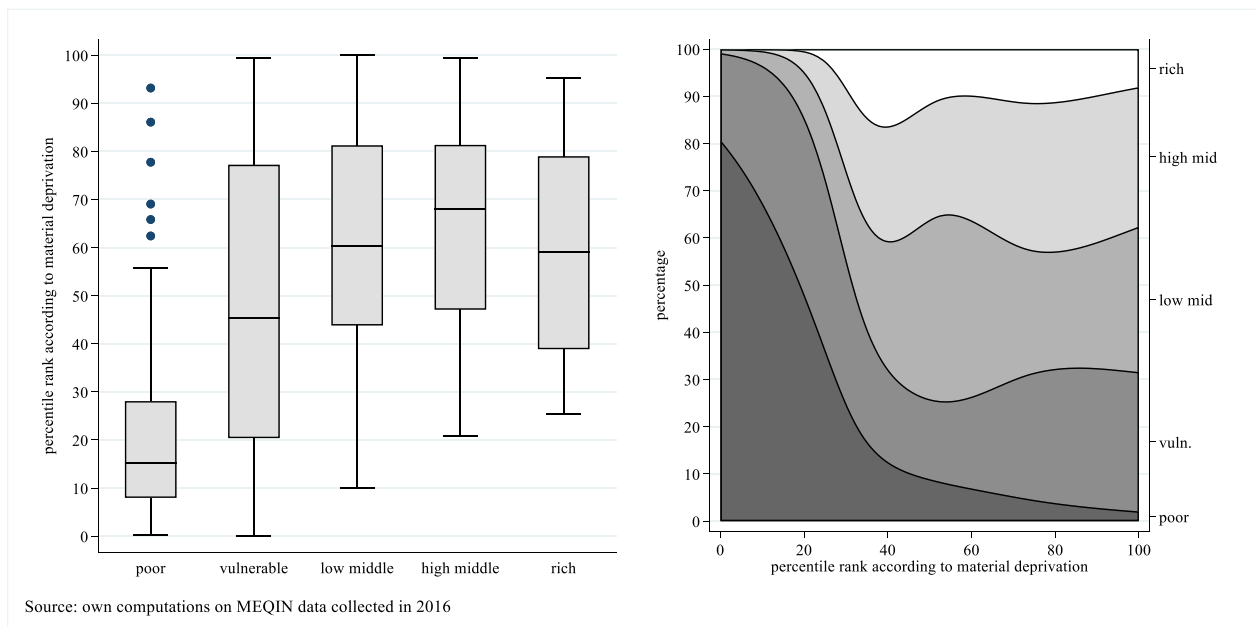


Figure 2 Percentile rank in the distribution of material deprivation in the five income groups

The area plot in the right-hand panel of Figure 2 illustrates where children from the different income groups can be found in the distribution of percentile ranks according to material deprivation. We see that children from the poorest group (shaded in dark gray) are predominantly found at the bottom of the distribution, while children from the middle class and rich households (indicated in lighter shades of gray) are more often found at the top of the distribution of percentile ranks. Conversely, all children with a low rank in the distribution of material deprivation belong to a poor or vulnerable household.

We complemented this graphical analysis with a regression analysis. Table 3 shows the coefficients of three regression models, where the rank of the child in the distribution of material deprivation is taken as the explained variable. The first model only takes dummy variables for the income groups as explanatory variables. We see that the difference between growing up in a poor household (the reference category) and all other income groups is large and significant at the 1% level. Moreover, we cannot reject the possibility that the coefficients of lower middle class, higher middle class, and rich income groups are identical to each other ( $p = 0.440$ ). Including child-level characteristics such as age and

sex in Model 2 does not substantially alter the conclusion, nor does the inclusion of household-level characteristics in Model 3. We see, however, that children growing up in a jobless household (i.e., with a household work intensity below 0.2) tend to occupy a substantially lower rank in the distribution of material deprivation, even after controlling for the income group to which they belong. However, children growing up in a household with at least one adult member with a degree in higher education have a higher rank. The  $R^2$  of all models is above 0.3. In general, the rather parsimonious models are able to explain a sizeable share of the variation in the percentile ranks according to the deprivation index.

Table 3 Regression of percentile ranks according to material deprivation

	(1) Percentile rank according to material deprivation	(2) Percentile rank according to material deprivation	(3) Percentile rank according to material deprivation
Vulnerable	27.535*** (3.371)	27.078*** (3.374)	21.939*** (3.685)
Low middle class	38.409*** (3.470)	37.304*** (3.688)	29.807*** (4.280)
High middle class	42.755*** (3.571)	42.765*** (3.699)	33.836*** (4.513)
Rich	38.893*** (4.746)	39.633*** (4.753)	29.234*** (5.379)
Age		0.144 (0.951)	-0.030 (0.972)
Age (squared)		0.014 (0.051)	0.022 (0.053)
Girl		-4.664* (2.518)	-4.611* (2.628)
Migrant household			4.398 (3.429)
Education household			6.378** (2.532)
Jobless household			-15.738*** (4.331)
Number of children			0.311 (1.243)
Single parenthood			-0.346 (2.981)
Constant	22.173*** (2.484)	22.246*** (4.857)	26.217*** (5.864)
Observations	433	433	433
$R^2$	0.303	0.312	0.349

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 3.2 HOUSING QUALITY

As a second dimension, we looked at the quality of the home in which the children were living. Housing quality has many aspects, and we focus here on two that are particularly relevant for the well-being of children, the absence of housing problems and housing size, using data from the main MEQIN survey (see Table 4).

Table 4 Housing items (average index scores over all children in the income groups)

<b>Housing problems</b>	<b>Poor</b>	<b>Vuln.</b>	<b>Low Mid</b>	<b>High Mid</b>	<b>Rich</b>
Leak in the roof	93.3	91.7	97.6	95.5	88.8
Moisture in the walls or in the floor	74.2	78.0	87.6	81.6	93.0
Rotting woodwork	92.4	88.2	95.9	94.7	98.0
Inadequate electrical system	76.9	89.7	97.3	89.8	94.3
Inadequate water system/piping	83.2	90.2	96.7	88.8	98.0
No hot running water	93.1	96.1	99.8	96.2	100.0
Too dark, not enough sunlight	91.5	92.1	93.4	87.3	95.5
Too noisy	85.1	79.4	87.5	82.9	88.9
<b>Housing size</b>					
Interior not spacious enough?	76.9	87.6	92.7	89.1	91.5
Outdoor area not spacious enough?	89.6	87.0	92.6	90.1	97.6

The first aspect, housing problems, was measured using a set of potential problems, such as the presence of a leaking roof, moisture in the walls, rotting woodwork, inadequate electricity or piping, lack of hot running water, lack of sunlight, or presence of noise. The reference person for each household evaluated the presence of these housing problems using a six-point scale. An index of housing quality was then constructed by taking the unweighted average of the normalized responses.<sup>16</sup> Higher values of the index reflect better housing quality (or the absence of housing problems). The second aspect, housing size, was measured by two questions about whether the reference person perceives that there is enough space inside and outside the house. We used a similar six-point scale and normalization procedure. Finally, both indices were averaged to obtain an overall housing quality index.

We assigned each child a rank in the distribution of the housing quality index. Figure 3 shows the distribution of these ranks across the income groups. As is shown in the left-hand panel, the median of the rank in the housing quality distribution increases across the income groups. However, this increase is not as steep as in Figure 2. The area plot in the right-hand panel of Figure 3 shows that children in poor households are predominantly found in the low ranks for housing quality. Moreover, while

<sup>16</sup> The six-point (Likert) scale was normalized as follows: strongly disagree (100); disagree (80); slightly disagree (60); slightly agree (40); agree (20); strongly agree (0).

children from lower middle class and rich households are more likely to be found at the top of the distribution of housing quality, children from vulnerable and higher middle class households are spread more evenly in the distribution.

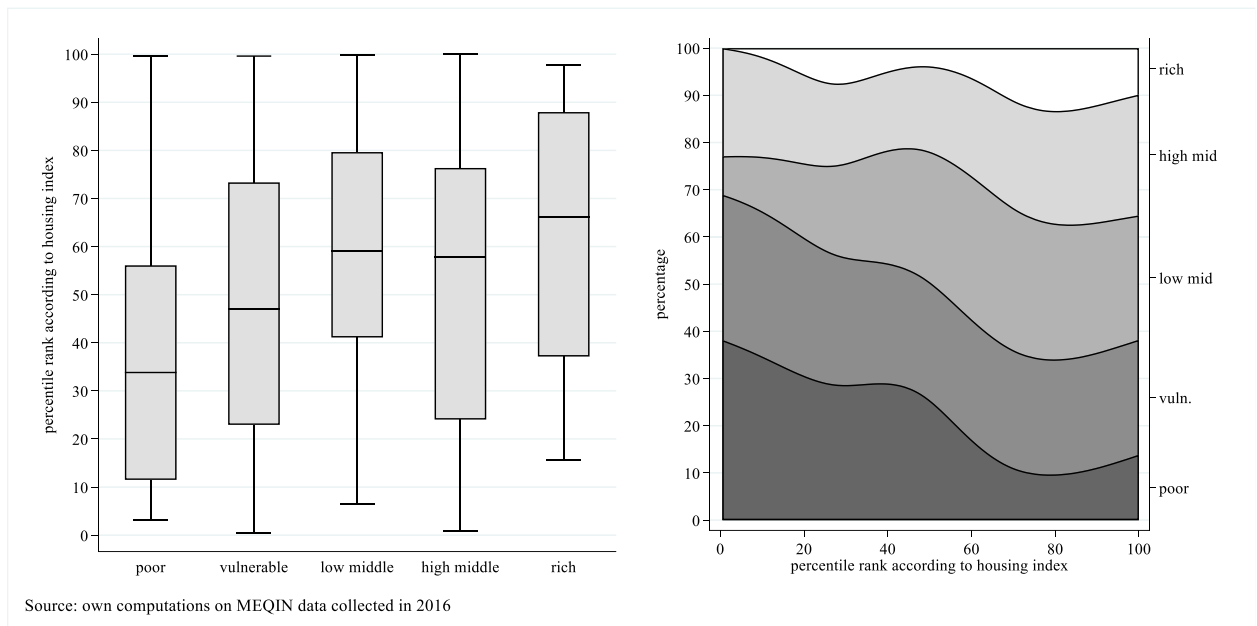


Figure 3 Percentile rank in the distribution of housing quality in the five income groups

The regression analysis in the first column of Table 5 shows that, in comparison to children growing up in a poor household, children from all other groups have a significantly higher rank. Notably, in Model 1 we see that children growing up in lower middle class households appear to occupy a higher rank than children in the higher middle class. However, this is not significantly different from 0 at any usual significance level ( $p = 0.239$ ) and it shrinks when including child and household characteristics in Models 2 and 3. Girls are found on average in lower quality housing compared to boys. However, since the information about housing quality was reported by a single reference person for each household, this finding reflects differences across households rather than differences within households. Finally, we note that the  $R^2$  of the models is considerably smaller than in Table 3.

Table 5 Regression of percentile ranks according to housing quality

	(1)	(2)	(3)
	Percentile rank according to housing index	Percentile rank according to housing index	Percentile rank according to housing index
Vulnerable	9.556** (3.913)	8.157** (3.816)	9.947** (4.270)
Low middle class	19.201*** (4.028)	17.001*** (4.171)	19.456*** (4.960)
High middle class	14.375*** (4.144)	15.761*** (4.183)	18.409*** (5.229)
Rich	23.370*** (5.509)	25.114*** (5.374)	27.506*** (6.233)
Age		2.794*** (1.075)	2.749** (1.126)
Age (squared)		-0.092 (0.058)	-0.087 (0.061)
Girl		-9.373*** (2.847)	-9.460*** (3.046)
Migrant household			3.291 (3.973)
Education household			-0.495 (2.935)
Jobless household			5.110 (5.019)
Number of children			-0.780 (1.440)
Single parenthood			-0.129 (3.455)
Constant	38.500*** (2.883)	28.595*** (5.493)	27.229*** (6.795)
Observations	433	433	433
$R^2$	0.068	0.127	0.133

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



### 3.3 PHYSICAL HEALTH

We now turn to the physical health status of the children, focusing on the physical health dimension of the Child Health Questionnaire (CHQ-PF28) that was included in the MEQIN drop-off questionnaire. Physical health itself was measured by four subdimensions: physical functioning, emotional and behavioral role functioning, physical role functioning, and bodily pain. A low score for the “physical functioning” subdimension means that the child is very limited in performing all physical activities, including self-care. A low score for the two “role functioning” subdimensions means that the child is very limited in school work or activities with friends as a result of emotional or behavioral problems on the one hand, or physical health on the other. Finally, a low score for the subdimension of “bodily pain” means that the child has extremely severe, frequent, and limiting bodily pain.<sup>17</sup> The scores in each of these subdimensions were normalized between 0 and 100 and the physical health index of each child was obtained as the unweighted average of the four subdimensions.

Table 6 Physical health (Average index scores by income group)

<b>Physical health</b>	<b>Poor</b>	<b>Vuln.</b>	<b>Low Mid</b>	<b>High Mid</b>	<b>Rich</b>
Physical functioning	96.0	93.8	90.4	94.0	98.6
Role functioning: Emotional and Behavior	93.3	90.8	90.8	98.7	98.2
Role functioning: Physical	97.5	91.7	92.3	94.8	98.4
Bodily pain	83.9	81.8	79.3	80.9	74.5

All children were ranked according to this index of physical health. The distribution of the ranks according to this index is represented in Figure 4. In the left-hand panel, we see that the ranks of all income groups are spread between 0 and 100. Contrary to the previous two dimensions and findings in the literature (see, e.g., Case et al. 2002), no gradient is apparent in this graph. In addition, no clear income gradient emerges in the right-hand graph. Thus, based on our graphical analysis, it appears that the distribution of the ranks in the health index is rather similar across the different income groups and not strongly correlated with the income rank of the household.

<sup>17</sup> Unfortunately, no information about chronic conditions of the children was available. This prevented us from testing the hypothesis of Case et al. (2002) relating a positive association between household income and child health to the advent and impact of chronic conditions.

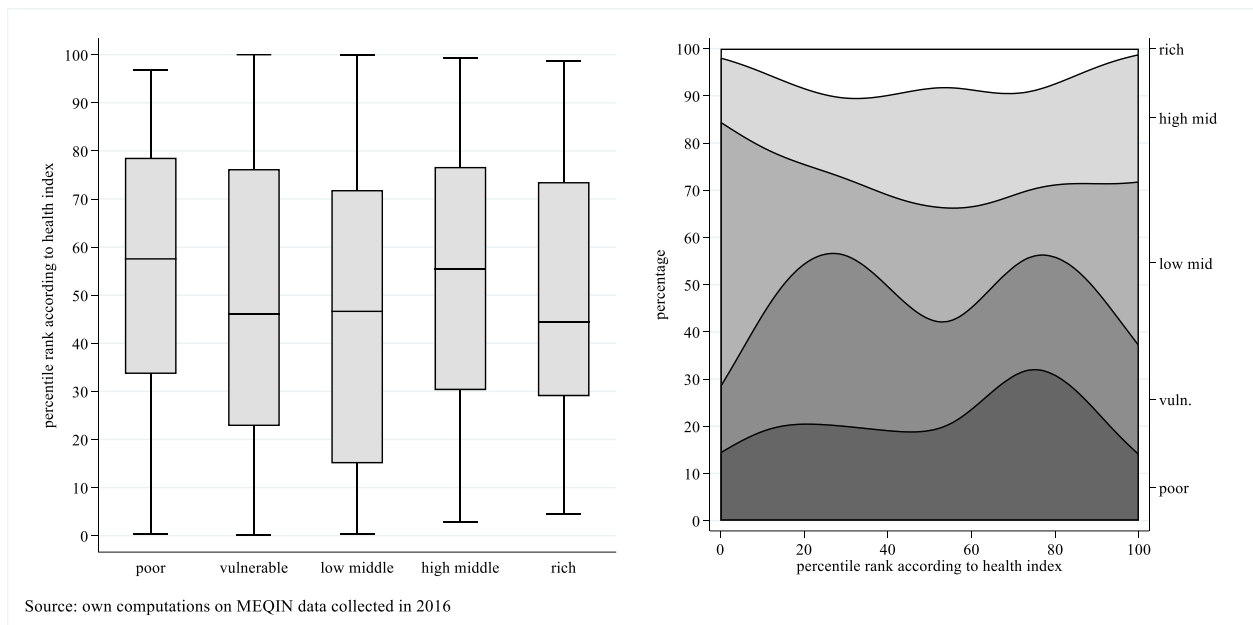


Figure 4 Percentile rank in the distribution of health status in the five income groups

The regression analysis of the rank of the children according to their physical health status also confirmed these findings. We failed to find a clear and significant relationship between the rank in the health dimension of children and the income group to which the household belongs. However, we did find a quadratic effect of age on the rank in the health distribution. A child of about 11 years old was perceived by their parents to be most healthy (the difference with a child of one year is sizeable and is equivalent to 25.6 percentile ranks). Moreover, we found that children in a migrant household were perceived by their parents as more healthy. More research is needed to determine whether this finding is related to what is called the “migrant mortality advantage” in Belgium (see, e.g., Deboosere and Gadeyne 2005) or whether it is a consequence of the reference frame of the respondent to the drop-off questionnaire being anchored in pre-migration experiences. We return to the latter issue in the next section.

Table 7 Regression of percentile ranks according to health status

	(1)	(2)	(3)
	Percentile rank according to health index	Percentile rank according to health index	Percentile rank according to health index
Vulnerable	-4.749 (4.027)	-6.255 (3.865)	-2.205 (4.250)
Low middle class	-7.970* (4.146)	-8.851** (4.224)	-2.946 (4.937)
High middle class	1.380 (4.266)	4.510 (4.237)	11.502** (5.205)
Rich	-4.929 (5.671)	-4.419 (5.443)	0.760 (6.204)
Age		7.047*** (1.089)	5.844*** (1.121)
Age (squared)		-0.345*** (0.058)	-0.274*** (0.061)
Girl		-1.455 (2.884)	-3.035 (3.031)
Migrant household			10.255*** (3.954)
Education household			5.512* (2.921)
Jobless household			6.157 (4.995)
Number of children			2.706* (1.433)
Single parenthood			8.198** (3.439)
Constant	53.596*** (2.968)	27.237*** (5.563)	14.390** (6.763)
Observations	433	433	433
$R^2$	0.015	0.107	0.144

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

### 3.4 LIFE SATISFACTION

The final dimension that we consider captures an emotional aspect of child well-being: the perceived satisfaction of the children with their life overall. As part of the Child Health Questionnaire (CHQ-PF28), the respondent (most often a parent) who completed the drop-off questionnaire was asked to what extent he or she thought that the child was satisfied with his or her life overall, answering on a five-point scale. Table 8 summarizes the responses by income groups. There is a clear gradient in relation to the higher response option, with children from rich households being perceived twice as often to be “very satisfied” by their parents.

Table 8 Rank according to life satisfaction (percentage of children)

<b>Satisfaction with life overall</b>	<b>Poor</b>	<b>Vuln.</b>	<b>Low Mid</b>	<b>High Mid</b>	<b>Rich</b>
Very unsatisfied	2.60	2.91	3.26	2.18	0
Unsatisfied	11.68	4.45	0.75	4.79	0
Not satisfied and not unsatisfied	15.46	10.90	8.42	1.59	12.61
Satisfied	53.15	63.62	58.40	60.55	51.69
Very satisfied	17.11	18.12	29.18	30.89	35.70

Based on these responses, all of the children were assigned a percentile rank between 0 and 100. Contrary to the health index, the left-hand panel of Figure 5 shows a mild increase in the median rank in the life satisfaction distribution across the income groups, with the median rank of children in the rich group being considerably higher than in the poor group. However, the difference between the three groups in the middle of the income distribution remains small. The right-hand panel of Figure 5 confirms the mild gradient. In addition, the area plot shows that the distribution of percentile ranks in both the poor and the rich income group is somewhat W-shaped, with a mode at the extremes of the bottom and top of the scale and one in the middle. Interestingly, the highest percentile ranks according to life satisfaction are mostly obtained by children in the poor or the rich income groups.

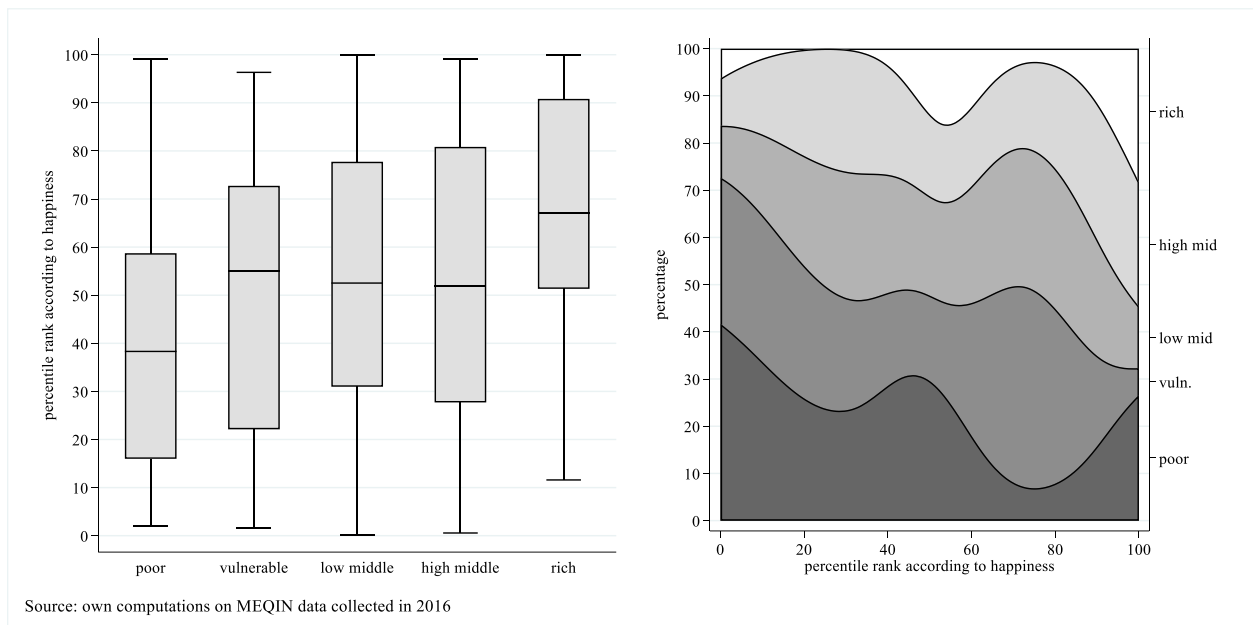


Figure 5 Percentile rank in the distribution of life satisfaction in the five income groups

The regression analysis in Table 9 sheds further light on these findings. The first column shows a clear income gradient. However, only the difference between the poor and rich income groups remains significant once child-level and household-level characteristics are included. We found that children in single parent households occupied a lower rank in the life satisfaction distribution. Interestingly, we can also see that children in households with at least one adult with a migration background have a higher rank in the distribution of life satisfaction. To understand these findings, it is important to keep in mind that the life satisfaction question in the drop-off questionnaire is completed by one of the adults in the household, who apply their own frame of reference to answer the question. Parents with a migration background, for example, may use a reference frame anchored to a greater or lesser extent in their own pre-migration childhood experiences.

Table 9 Regression of percentile ranks according to life satisfaction

	(1)	(2)	(3)
	Percentile rank according to happiness	Percentile rank according to happiness	Percentile rank according to happiness
Vulnerable	7.610* (3.948)	6.848* (3.795)	6.556 (4.081)
Low middle class	11.513*** (4.064)	4.555 (4.148)	3.335 (4.741)
High middle class	12.126*** (4.182)	5.724 (4.161)	2.327 (4.999)
Rich	22.596*** (5.558)	19.492*** (5.345)	12.999** (5.958)
Age		0.252 (1.069)	0.301 (1.076)
Age (squared)		-0.101* (0.057)	-0.096 (0.058)
Girl		-5.965** (2.832)	-2.368 (2.911)
Migrant household			15.508*** (3.798)
Education household			-0.116 (2.805)
Jobless household			-5.590 (4.797)
Number of children			-1.624 (1.376)
Single parenthood			-10.736*** (3.302)
Constant	41.228*** (2.909)	57.004*** (5.463)	60.572*** (6.495)
Observations	433	433	433
$R^2$	0.045	0.131	0.202

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 4. CUMULATIVE DEPRIVATION

In the previous section, we looked at four dimensions of child well-being separately. In this section, we focus on the children who had a low percentile rank in *all* of the dimensions considered and who thus can be said to suffer from cumulative deprivation (Decancq 2020a, 2020b). More specifically, we ask whether children growing up in a poor household are more likely to be found in the precarious situation of cumulative deprivation.

As discussed in Section 2.3, we started our analysis of cumulative deprivation by computing the maximal percentile rank for each child over the four dimensions considered. Subsequently, we ranked all children according to their maximal percentile rank and assigned them a new percentile ranking in the distribution of maximal ranks. Children with a low maximal rank necessarily have a low rank in all four dimensions. These children suffer from cumulative deprivation.

Figure 6 summarizes the distribution of maximal percentile ranks across income groups. A steady income gradient in the box plots of the left-hand panel of the figure is apparent. The median rank in the distribution of maximal ranks of poor children (28.6) is considerably lower than the other groups, especially when comparing this rank to the median of the rank of children born into the higher middle class (65.2) or rich households (70.1). The area plot in the right-hand panel allows us to investigate the composition of the group of children with a low maximal rank, that is, the children who suffer from cumulative deprivation. These children are found on the left side of the horizontal axis of the right-hand panel, where it is clear that children who are born in a poor or a vulnerable household are much more likely to have a low maximal rank. Notably, a number of poor children can be found on the right extreme of the horizontal axis. These children were growing up in a poor household but performing well on at least one of the dimensions of child well-being.

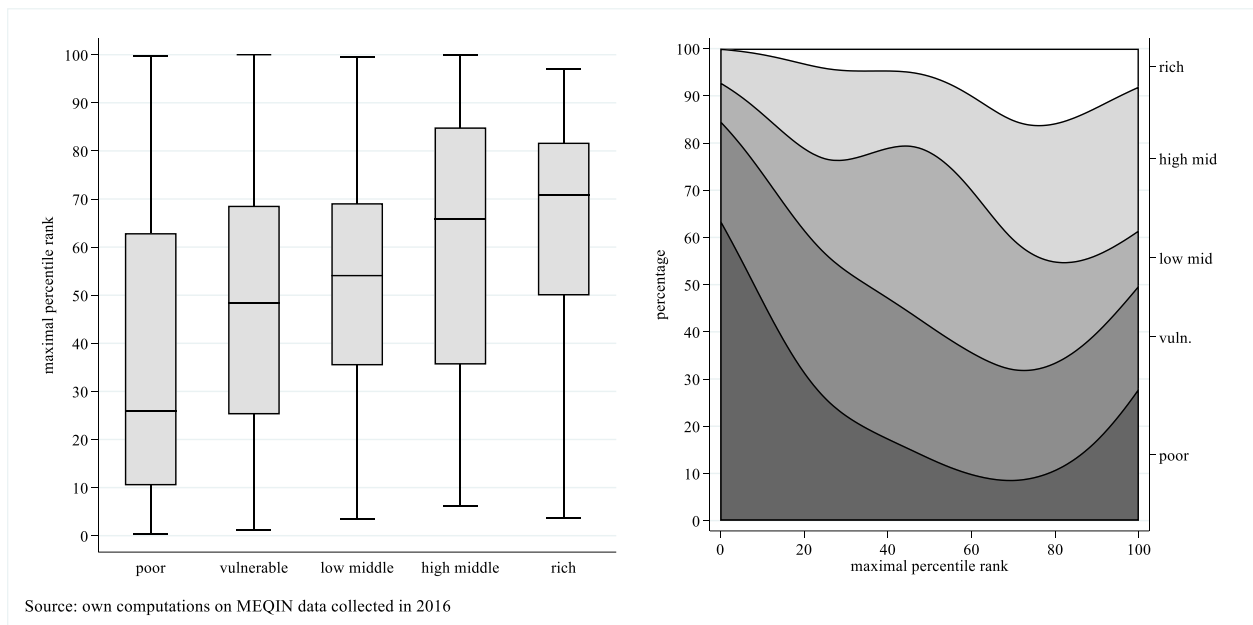


Figure 6 Percentile rank in the distribution of the maximal ranks in the five income groups

The regression analysis in the first column of Table 10 confirms the income gradient of Figure 6. Children growing up in poor household have a lower maximal rank than children from the vulnerable, middle class, or rich households. The second column reveals a U-shaped age effect, reaching a maximum at the age of 10 and a barely significant negative effect of being a girl on the maximal percentile rank. However, by including household-level characteristics in the third column, these child-level effects disappear. This model shows that children from a migrant household or a household with at least one member with higher education have a higher maximal rank.



Table 10 Regression of percentile ranks according to the maximal rank

	(1)	(2)	(3)
	Maximal	Maximal	Maximal
	percentile rank	percentile rank	percentile rank
Vulnerable	11.174*** (3.850)	10.158*** (3.840)	11.349*** (4.184)
Low middle class	15.284*** (3.963)	12.756*** (4.197)	13.329*** (4.860)
High middle class	22.071*** (4.078)	21.883*** (4.209)	19.572*** (5.124)
Rich	28.840*** (5.420)	28.996*** (5.408)	23.626*** (6.107)
Age		2.528** (1.082)	2.110* (1.103)
Age (squared)		-0.124** (0.058)	-0.091 (0.060)
Girl		-5.358* (2.865)	-4.456 (2.984)
Migrant household			13.373*** (3.893)
Education household			8.366*** (2.875)
Jobless household			4.005 (4.918)
Number of children			-1.788 (1.411)
Single parenthood			-5.170 (3.385)
Constant	36.852*** (2.837)	31.138*** (5.527)	29.347*** (6.658)
Observations	433	433	433
$R^2$	0.092	0.111	0.163

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ 

Finally, we looked at the overlap between the group of children with a low income and the group of children who suffer from cumulative deprivation in Table 11. To do this, we divided the children into five groups according to their maximal percentile rank. The cut-offs in the distribution of maximal ranks

were chosen such that the weighted number of children in the five cumulative deprivation groups approximately equaled the number of children in the five income groups. The first column of Table 11 gives the cut-offs in the distribution of maximal ranks. All children in the first group have a maximal rank below 66, with the rank increasingly rising in the other groups. If we compare the overlap between the children in this group (the first row) with the group of poor children (the second column), it is apparent that the overlap is rather low. Only 9.89% out of 22.77% of poor children also belong to the group of children with the lowest maximal rank. While we observed a clear income gradient in cumulative deprivation in Table 10, the overlap between both groups is certainly not perfect.

Table 11 Overlap between income groups and groups based on cumulative deprivation (percentage of children)

<b>Maximal percentile rank</b>	<b>Poor</b>	<b>Vuln.</b>	<b>Low Mid</b>	<b>High Mid</b>	<b>Rich</b>	<b>Total</b>
0-65.9	9.89	5.33	4.25	2.88	0.34	22.69
66-82.9	6.95	7.56	5.01	4.42	1.79	25.73
83-92.9	1.13	7.54	8.58	3.63	2.11	22.89
93-98.6	2.50	3.43	3.27	7.42	3.22	19.84
98.7-100	2.30	2.32	1.56	1.90	0.68	8.75
<b>Total</b>	<b>22.77</b>	<b>26.18</b>	<b>22.67</b>	<b>20.24</b>	<b>8.14</b>	<b>100</b>

## 5. CONCLUSION

In this paper, we documented some consequences of growing up in a poor household. We saw that children from poor households tend to have a lower percentile rank in several non-monetary dimensions of child well-being compared to children who grow up in more favorable circumstances. At the bottom of the distribution of material deprivation, for instance, we almost exclusively found children from poor or vulnerable households. Children from poor households were also more likely to occupy the bottom position in the distribution of housing quality. In contrast, we found no evidence that the percentile ranks in the physical health dimension were positively associated with the income group to which the children belonged. Nevertheless, we did find that poor children occupied a lower position in the distribution of life satisfaction compared to children from richer households.

Due to the multidimensional nature of our data, we were also able to study the phenomenon of cumulative deprivation. We observed that it is more likely that children from poor households occupy the bottom position in all four non-monetary dimensions of child well-being and thus are at greater risk of being in the precarious situation of cumulative deprivation. However, the overlap between the children who were growing up in a poor household and the children who suffered from cumulative deprivation was found to be far from perfect. Some children from vulnerable and middle class households were also found at the bottom of the four non-monetary dimensions of child well-being and,

thus, suffered from cumulative deprivation. Policy makers targeting social spending on poor children may be reaching some children who are suffering from cumulative deprivation but certainly not all.

Our findings illustrate, once more, the policy relevance of moving beyond an exclusive focus on income toward more direct measures of child well-being and cumulative deprivation. Also a non-negligible number of children in the better-off groups do not manage to convert their income into the non-monetary aspects of well-being. In addition, some children occupy a low position in all dimensions of well-being and suffer from cumulative deprivation. Unfortunately, the fate of these children has remained largely under the radar of the existing dashboards of dimension-by-dimension child indicators. To detect children whose hardships accumulate across the different dimensions of well-being, it is therefore crucial that current child indicators are complemented with measures that focus directly on overall child well-being and cumulative deprivation.

While the combination of the main MEQIN survey with the child-specific drop-off questionnaires provided a unique and broad data set on child well-being in Belgium, its cross-sectional nature did not permit us to unravel the underlying causal mechanisms in any detail. It was not possible with the data to address the fundamental and policy-relevant questions of *why* poor children are more likely to be found at the bottom of the non-monetary dimensions of child well-being and *why* some children suffer from cumulative deprivation. We leave these questions for future analysis, but end by emphasizing the need to collect broad and multidimensional panel data that follow the same children over time.

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