A Longitudinal Look at Child Poverty Using Both Monetary and Non-Monetary Approaches [*]

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Abstract

In this paper, we broaden the analysis of child poverty by using both monetary and non-monetary measures of poverty and by comparing these over time. We use a composite of questionnaire answers from children regarding possession of socially perceived necessities and participation in social activities to develop two non-monetary child-centric concepts of disadvantage: *material deprivation* and *social exclusion*. The empirical analysis is based on two cross-sections and a panel of children in the Swedish Level-of-Living Survey matched with parental survey data and administrative income records. Consistent with previous findings we find that relative income poverty among children increased significantly between year 2000 and 2010. The overlap between the monetary and non-monetary measures is relatively small (0.9-6.8 percent) but increases significantly during the period of study. The modest size of the overlap suggests that the measures capture different dimensions of disadvantage, thereby pointing to the importance of alternative poverty indicators.

Keywords: child poverty indicators, material deprivation, social exclusion

1   Introduction

Children are typically considered to be a vulnerable group in society with higher relative risks of poverty compared to the overall population. Importantly, exposure to disadvantage in the domains of social life during childhood may have significant long term consequences in terms of both social and economic outcomes (Heckman 2006). The commodification of childhood necessitates more comprehensive measures of the living standard of children. Moreover, well-informed policy formation calls for more attention to be devoted to children's own reports of level of living.

This paper broadens the set of measures of assessing child poverty by introducing measures based on children's self-reported level of living. We investigate the general living standard of children in Sweden using an income-based measure of poverty and compare it with non-monetary concepts of poverty derived from children's self-reported living conditions. Finally, we test the predictive power of these measures for later educational and labor market outcomes. To the best of our knowledge, this is the first study that both develops indices of self-assessed level of living among children and tests their predictive power for later educational and labor market outcomes against more conventional income-based measures of child poverty. Furthermore, we elaborate on how different measures of poverty affect the analysis of economic status and welfare.

Child poverty is a complex and context-specific phenomenon. According to a recent report from the OECD, entitled *In It Together: Why Less Inequality Benefits All* (2015), Sweden experienced the largest growth in income inequality among all the OECD countries during the 1980's and 2010's, albeit from a low base. Recent decades of increased refugee immigration and rising income inequality has given new impetus to social issues such as ethnic integration, life chances and social cohesion in Western European societies. Being one of the highest per capita recipients of refugees in Europe, questions concerning redistribution and welfare are central in the popular debate in Sweden. Although there is already a large body of evidence of child poverty and its consequences in the US, the generalizability of the results beyond the US context is questionable. Understanding the evolution of child poverty in Sweden is necessary in its own right, and all the more important during periods of demographical changes and rising inequality.

We use a panel of survey data in the Swedish Level of Living Survey (LNU, n=924) collected in 2000 when the respondents were in the ages 10-18 and ten years later, in early adulthood (ages 20-28).[1] The LNU is a longitudinal cohort survey conducted in Sweden since 1968. Since the data set we use is a panel we

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[1] The cross-section data sets consist of 1,288 and 910 individuals respectively. Due to non-response and attrition, the final panel analysis sample consists of 801 individuals.

can also compare which measure of child poverty monetary or non-monetary best predicts socioeconomic outcomes later in life. We address the following questions: (i) how well do standard income-based measurements of child poverty coincide with children's self-reported standard of living? and (ii) how well do they predict socioeconomic outcomes in young adulthood?

The analysis is structured as follows. First, we use information on children's self-reported conditions to investigate which children were poor in year 2000 and 2010 respectively. We use a composite of questionnaire answers regarding possession of items and participation in social activities to create the indices *material deprivation* and *social exclusion.* The indices are constructed using factor analysis and alternative thresholds of poverty status are considered. We next explore the persistence of poverty during the period 2000-2010 using both the income-based measure and the material deprivation and social exclusion indices. We also give an overview of child poverty trends in selected European countries. Finally, we compare the income-based measure to our indices of self-reported poverty and explore to what extent these overlap.

Welfare norms and perceptions of what poverty means can change over time. Our data allows us to study welfare dimensions longitudinally. In a final step, we use the panel to see whether the children who were poor according to each of these measures in 2000 were poor also as young adults in 2010. We ask the following question: who moves on to study at university and who is employed? We compare which measure of child poverty monetary or non-monetary best predicts socioeconomic outcomes later in life.

Our findings suggest a significant increase in child poverty estimated using monetary measures: from 6.6 percent in 2000 to 14.8 percent in 2010. Although the overlap between the monetary and non-monetary measures is relatively small (0.9-6.3 percent) it grows significantly during the period of study. The modest size of the overlap suggests that the measures are complementary rather than competing, i.e. they capture different individuals and different dimensions of scarcity. We also find that income status in childhood strongly predicts adult socio-economic outcomes. Being classified as income poor in 2000 makes one significantly more likely to be labeled as income poor as an adult and less likely to study at university. Thus, experiences of economic deprivation in childhood seem to be related to adverse economic outcomes in adulthood. Finally, our findings suggest that the monetary measure of child poverty is the most powerful predictor of socioeconomic outcomes later in life.

The paper proceeds in the following way. Section 2 gives an literature review. Section 3 introduces the data and the poverty measures we use. Our results are presented in sections 4-6. In section 7 we discuss the policy implications of our findings and conclude.

2   Conceptual framework

How to measure an individual's opportunities to live a full life and participate normally in society remains an open question. Previous literature on child poverty and its dynamics is extensive (Jäntti & Danziger (1994), Duncan et al. (1993), Oxley et al. (2000)). The aforementioned studies and their various measures of poverty bear witness to the lack of a consensus on a universal definition of poverty.[2] Thus, a number of conceptual and practical issues need to be addressed when studying a complex and multifaceted phenomenon such as poverty (Jäntti & Danziger 2000). These are essentially a matter of choices with regard to the resource measure (income or consumption?), the poverty cut-off (absolute or relative?) and the equivalence scale (how to account for economies of scale within a family).

The first issue concerns the space of poverty measurement. The utilitarian approach to measuring poverty, which is very much the convention within the economics field, is based on income and individual preferences. Thus, a common feature in the literature on child poverty is to use some type of monetary measure, such as administrative data on household income and survey-based reports on income or consumption expenditure.[3] Although income and consumption data have their apparent advantages, for instance being comparably easy to interpret and measure over time, other measures of level of living and well-being that could supplement income poverty are increasingly being demanded by scholars and public policy makers alike (see for example Chen & Corak (2008) and Mood & Jonsson (2015)).[4] Furthermore, there are a number of concerns with using income-based measures, for example as a measure it is volatile – it can change significantly from year to year, it assumes equal distribution of resources within a household and the choice of poverty threshold can appear to be rather arbitrary (Bradshaw & Finch 2003).

Household income and consumption is only telling part of the story of children's level of living. Consumption such as clothing and participation in social activities can play an important social role in children's lives. These are welfare dimensions that can, in essence, only be captured by asking individuals directly about their level of living and well-being. In spite of stretched household finances parents may still give priority to their children's conspicuous consumption over basic goods.[5] Owning the "right" cellphone could for instance be valued more than other personal

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[2]See also Lindquist & Sjögren Lindquist (2012), Mood & Jonsson (2013), Mood & Jonsson (2015), Galloway et al. (2009), Hansen & Wahlberg (2009) for the Swedish case.

[3]In general, welfare statistics are country-specific and higher-income countries typically use relative measures.

[4]See discussion of MPI's in Aaberge & Brandolini (2015).

[5]See for example Middleton et al. (1997) for a discussion on parent sacrifice and cushioning of children.

and social needs within the family. Low income can in some cases lead to parental poverty but not child poverty if parents prioritize certain aspects of their childrens' material living standard. Thus, children's own reports of their standard of living are becoming increasingly important for assessing both household and child poverty.

This paper relates to both the income and subjective poverty literature by using a combination of income-based and self-reported deprivation measures to analyze the incidence of child poverty. In some respects, the self-assessed level of living measure falls somewhere in between the income-based and subjective measures of poverty. While it is based on individual reports it concerns both material and psychological aspects of well-being and as such, it covers a broader range of life circumstances.

There is also a strand of the poverty literature that instead of income data uses survey respondents' self-assessments of economic welfare, for example if they "feel poor". Household poverty can be measured using individuals' qualitative perceptions of income or consumption adequacy derived from questions such as "the economic ladder question" (ELQ), "satisfaction with life" (SWL) or the minimum income question (MIQ).[6] An alternative non-monetary way of measuring poverty is to use individuals' self-assessments of economic welfare or own perception of well-being on social welfare concepts. This approach moves beyond individual preferences and economic resources (Allardt 1976, Nussbaum & Sen 1993, Sen 1985, Townsend 1985). In the seminal work of Allardt (1976) level of living is defined as "... material and impersonal resources with which individuals can master and command their living conditions"(p. 228). Our study draws on the Swedish Level of Living Survey (LNU) which is a longitudinal cohort survey specifically designed for measuring broader dimensions of individual wellbeing such as material resources, participation and consumption.[7]

The second conceptual issue has to do with the choice of poverty cutoff, i.e. should welfare be assessed using absolute or relative measures? An individual is classified as poor according to the absolute measure if his or her resources fall short of the poverty line which is *fixed* at the estimated cost of a basket of consumption goods (also called minimum income standard) (Foster 1998). The relative threshold is set in relation to the distribution of incomes or resources. A common poverty

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[6]The study of Van den Bosch et al. (1993) uses the MIQ concept and exploits comparative socioeconomic surveys in seven European countries to define so-called subjective poverty lines indicated by survey questions such as: "What is the minimum amount of income you need to make ends meet?". A somewhat different but related approach is presented in Pradhan & Ravallion (2000) which measures poverty using qualitative perceptions of consumption adequacy. A related topic is happiness and life satisfaction. The influential work of Cantril (1965) and Van Praag (1968) capture non-income dimensions of welfare.

[7]Mood & Jonsson (2013) use the LNU child survey in order to study trends in child poverty in Sweden. They do, however, not make use of the child panel (2000-2010). See Veenhoven (2004) for a discussion on substance and assessment of social indicators.

threshold is 50 or 60 percent of the median income. We address this issue by using both a fix and a moving threshold.

We address the third and final issue regarding family structure and the division of resources within the household using conventional equivalence scales (see section 3.2 for more details). Equivalence scales account for variations in family configurations and differences in family size. A related conceptual issue concerns the intra-household division of resources. An advantage of the child survey is that the questions are directed towards the children themselves rather than their parents. Hence, we can identify potential intra-household inequalities and thus gain a broader picture of how children fare in various family constellations and economic conditions. Unlike adults, children typically do not have control over money in the household which is another argument for studying their self-reported relative deprivation.

Related literature can be found within sociology, where a handful of studies have investigated the overlap between income-based poverty and indicators of deprivation (Gross-Manos 2015, Bradshaw & Finch 2003, Mood & Jonsson 2013).[8] Table 1 gives an overview of the related literature and common child poverty measures.

[TABLE 1 HERE.]

Our study is most closely related to Gross-Manos (2015) and Main & Bradshaw (2012). Both of these studies develop child-centric indicators but in contrast to the latter, Gross-Manos (2015) also investigates the overlap between them. They find a 4.7 percent overlap between the material deprivation and social exclusion measure (the sample size was 1081, aged twelve, conducted during 2011-2012).[9] Two other studies worth mentioning are Bradshaw & Finch (2003) and Saunders et al. (2008) which also explore the overlap but contrary to Gross-Manos (2015) and this paper focus on poverty among adults. Bradshaw & Finch (2003) explore the overlap between three measures of poverty, namely lacking socially perceived necessities; being subjectively poor and having a relatively low income. They find an overlap of 30-40 percent. Saunders et al. (2008) investigate the overlap between income poverty, material deprivation and social exclusion and find that the overlaps of income poverty and the two other indicators are in the same range.[10] We contribute

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[8]For studies using Swedish data, see for example Mood & Jonsson (2013) which compares child reported and parent reported deprivation over time. See also Mood & Jonsson (2016) which looks at the impact of economic hardship for social outcomes such as close social relations and political participation.

[9]In this paper we develop a child-centric material deprivation measure similar to that of Main & Bradshaw (2012). Their study is based on data from two surveys conducted by the Childrens Society (n=2000, children aged 8-16). They also have information on income data provided by parents.

[10]See also Saunders & Bradbury (2006) for a discussion on the incidence and trends in child

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to this body of literature by exploring the overlap between the monetary and non-monetary measures *over time*. We also test their predictive power, which to the best of our knowledge, has not yet been done.

3   Data and measures

The data set we use, the Swedish Level of Living Survey (LNU), is a longitudinal cohort survey conducted in Sweden since 1968.[11] LNU is a panel survey of the level of living of the Swedish population and has been carried out six times (approximately every tenth year since 1968). It consists of a representative sample of the Swedish population (ages 19-65 in 2000 and 19-75 in 2010). The survey is conducted by Statistics Sweden (SCB) and respondents are re-interviewed in subsequent waves given that they remain in the age span, have not died or moved abroad. The respondents are interviewed either in person in their homes or by telephone.

In 2000, LNU also included a child interview module. The child respondents, aged 10-18 and living at home, filled in a questionnaire by listening to recorded questions with a tape recorder using headphones. The child interviews took place in their homes while the parent was being interviewed. It lasted for approximately 30 minutes and covered a broad range of areas, such as material living conditions and financial resources, leisure time activities, health, neighborhood characteristics and education. The respondents answered questions like: "Do you have a mobile phone?" and "Do you feel safe in your neighborhood?" See all the relevant questionnaire items in Appendix B.

The total number of respondents in the LNU 2000 child survey is 1,304. In 2010, the survey was supplemented with a separate child survey of the children of foreign-born individuals in the LNU (called the Swedish Level of Living Survey 2010 – Immigrants and their children, LNU-UFB). The questionnaires were identical to the LNU child forms. The number of respondents in the LNU-UFB child sample is 435.

The latest wave of the LNU survey was carried out during the period 2010-2012 and included interviews with a total of 6,259 individuals. Both LNU 2000 and 2010

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poverty and on related policy questions (how to measure hardship etc.). This paper also relates to that of Kingdon & Knight (2006) as it uses subjective well-being as criterion for poverty and compare subjective with income-based measures of poverty by testing whether these are competing or complementary. Children' self-stated level of living is addressed in for example Mood & Jonsson (2015) which presents four indicators of individual level of living: material resources (deprivation), cash margin, participation and consumption. See also Ridge (2011) and Jonsson & Östberg (2010). An example of a cross-country study within this field is Sarriera et al. (2015).

[11]See for example Mood & Jonsson (2013), Jonsson & Östberg (2009) or Jonsson & Östberg (2004). The later offers detailed information on the Child-LNU survey.

include postal questionnaire answers from the respondents' partners. The partner questionnaires are short versions of the respondent's interviews.

We utilize both the cross-sectional and panel element of the LNU survey. We use the child survey from 2000 and a matched follow up of these individuals in the LNU 2010 survey hence our analysis sample consists of both a pooled cross-section of children, the LNU child surveys of 2000 and 2010, and a panel of respondents from the 2000 and 2010 waves of LNU. Each respondent is linked to a parent included in LNU 2000 hence we have data on household disposable income, parents' employment biography in 2000 and individual education history. All in all we are able to match 924 individuals with the LNU 2000 child survey. In 2010 these individuals were aged 20-28.

The response rate of the main sample was approximately 77 percent in 2000 and 72 percent in 2010. Not all children in the sampled households took part in the survey implying a potential selection bias. The non-response among their children was less than 30 percent.[12] As demonstrated in figure C.1 in Appendix C, a substantive part of the sample consists of siblings. Large families could potentially cause an overestimation of the number of poor compared to the overall population and we address this issue by using sampling weights for children provided by SCB.

We use administrative data from LISA (Longitudinal integration database for health insurance and labor market studies) to obtain reliable income measures and additional information on the parents background. LISA was constructed by Statistics Sweden, the Social Insurance Agency and the Swedish Agency for Innovative Systems and consists of annual registers since 1990. It includes all individuals 16 years of age and older that were registered in Sweden as of December 31 each year.

3.1 Descriptive statistics

Descriptive statistics for the analysis samples are provided in table 2. The cross-section samples of year 2000 and 2010 comprise 1,304 and 918 individuals respectively. The average age is approximately 14 and half the sample is female in both cross-sections.

[TABLE 2 HERE.]

Overall, children in Sweden have a high material living standard. A little more than a half of the first wave sample reports owning an own TV (see table 3). The proportion of children owning an own TV in the second wave sample is close to 60

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[12]More information about the calibration of sampling distributions and non-response in the LNU survey can be found in SCB (2012).

percent. One third of the 2010 wave reported a lack of an own computer and more than 4 percent of the children lacked a mobile phone.

The social activities are presented in table 4. The proportion of children reporting that they use the Internet every day is about 55 percent in 2010 compared to 11 percent in 2000. The social activities involving spending time with friends seem to be relatively stable from 2000 to 2010 (see the distributions of the variables *friends home*, *home friends* and *meet friends* in table 4).

[TABLE 3 HERE.]

[TABLE 4 HERE.]

3.2 Monetary poverty measures

A common income-based measure of poverty is the needs adjusted income per family member based on disposable income. We use the equivalence scale as defined by Statistics Sweden for comparability of the incomes in HEK. The HEK equivalence scale is presented in table C3 in Appendix C. The unit of analysis is the individual but income is calculated based on the family.

We follow the RTB (The total population register) family definition where the family consists of all individuals with family ties that are registered at the same address.[13] Unfortunately, the RTB family does not always correspond to the actual household. For example it excludes individuals with children who are not living together (partners who are not cohabiting). In these instances, we probably understate the family resources and thus overstate the number of children defined as poor. In addition, in case lifestyles change over time, for instance if single parenthood is more common in 2010 than in 2000, the bias will have a trend. Different definitions may produce different results and levels should therefore be interpreted with caution. Since we also have the parents' answers to questions about the household we utilize this information in the sensitivity analysis (see section 3.4 for a further discussion of the aforementioned issues).

We assume that the resources are shared equally among all family members.[14] Family disposable income is defined as the sum of the household's total pretax incomes, sickness and unemployment benefits, net income from capital plus all government transfers (positive and negative) less taxes.[15] The needs-adjusted income per family member is calculated by adding all the incomes of the family members

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[13]An interesting future extension is to consider both the HEK and the RTB family definition.

[14]Although there is evidence of parents' cushioning their children. This topic is discussed in for example Mood & Jonsson (2015).

[15]Lindquist & Sjögren Lindquist (2012) provide an overview of Swedish family-oriented transfers.

and dividing them by the number of adults and the weighted number of children in the household in ages 0-17. Children are assumed to require less than their parents (see table C3 in Appendix C). We make us of the administrative variables in both waves and the income data covers the year before each wave of the survey, namely 1999, 2009 and 2010. Since some of the respondents in the LNU 2010 survey were interviewed one year later in 2011, we match these with the registers from 2010 instead of 2009.

As a starting point we use the median value in SEK of equalized disposable yearly income in 2014 prices of all households ages 20 and older (see alternative cutoffs in the sensitivity analysis presented in Appendix A). The median equivalized disposable family income was SEK 156,700 in 1999, SEK 209,000 in 2009 and SEK 211,900 in 2010 (2014 year's prices). We use nominal incomes corrected for inflation using SCB's CPI calculator (SCB (2016)). It is worth noting that all public statistics of Statistics Sweden on disposable incomes are taken from the Household Finances Survey (HEK, previously called Swedish Household Income Survey (HINK)). Family disposable income is calculated using survey respondents answers about the household composition and incomes are taken from registers. Hence, the HEK family definition captures more family members than the RTB.

We use a relative poverty line defined as 50 per cent of the median equivalent disposable income.[16] For comparability of incomes over time (year 1999 and 2009/2010) we also present the results based on real incomes corrected for inflation using the index year 1999. Individual children are classified as disposable income poor (henceforth referred as income poor) if their equivalized disposable income falls below this threshold. We use both a fixed and moving threshold. The *absolute* or *fixed* poverty line in 2010 corresponds to 50 percent of the median disposable income in 1999 corrected for inflation.

We choose a relative poverty measure since the focus in this paper is children's welfare. The relative poverty measure is affected by the income distribution and changes in the economic conditions which is also why it is our preferred measure of poverty. The threshold is set based the income distribution of the overall population, thus we define the poverty status of the children in relation to all households in Sweden and not only those comprised of children. We consider alternative income distributions in the sensitivity analysis in Appendix A.

We remove all cases with missing data on the questions underlying the non-monetary indices of poverty. With regard to sampling weights, we use the weights provided in the technical report by SCB of the both waves of LNU (SCB (2012)).

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[16]Oxley et al. (2000).

3.3 Non-monetary measures of poverty

In order to define deprivation among children based on the 2000 and 2010 LNU child interview modules, we have in principle several different alternative available to us. We are, however, constrained in a few different ways that affect our choices. Obviously, we can only use information that the LNU actually asked. As we wish to study changes across time, it appears prudent (although not strictly necessary) to use questions asked in both 2000 and 2010. We thus restrict interest to questions asked in both periods. Some questions were asked of only older children; as we wish to examine all children, we focused on those of all. While LNU examines several different domains – many deal with health and general wellbeing – we chose to focus on two domains in particular, namely the material and social interactions, comprising of 5 and 7 indicators, respectively.

The next issue to address is how to summarize the information. One pragmatic option would be to define a simple deprivation index in each domain by simply counting the number of items or activities. The more complex approach, followed by Gross-Manos (2015), is to use exploratory factor analysis to find the latent variable(s) onto which the indicators load, assessing the appropriate number of factors based on statistical criteria. We opted for an in-between solution and simply estimated (using confirmatory factor analysis) on factor per domain in each of the LNU waves, and generated the fitted factor scores for every observation.

One reason we did not pursue exploratory factor analysis is that a proper factor analysis in each wave should probably use more information than we currently do, as we restrict ourselves for purposes of over-time comparisons to questions available in both waves. Finally, to generate deprivation indices similar to the binary income poverty indicators we use, we need to define a way to separate the deprived from the non-deprived. Here we use two different approaches, one defining the socially excluded or materially deprived as those whose latent score is less than half the median score, the other treating a child as deprived if he or she is in the lowest fifth in the distribution of the score. The results from the former approach is presented in Appendix A.[17]

The underlying questionnaire items for the *material deprivation* and *social exclusion* indices are found in Appendix B. The material deprivation index is constructed using questions regarding children's material living conditions: if they have their own room, a pet, own TV, own mobile phone, own computer, or none of these. Having an own room is likely more common in rural areas than in larger cities where hous-

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[17]We follow the setup of the Multidimensional Poverty Index (MPI) in the study of Alkire & Santos (2010) by first choosing dimensions of welfare and then indicators within each dimension. See also Aaberge & Brandolini (2015) for a discussion.

ing is more expensive and compact.[18] The importance of having an own room can also vary with respect to the age of the child. Young children may want to share rooms with siblings while older children may prefer having a room of their own. For this reason we control for age in all of the regressions. There could also be a gender dimension: same-sex siblings could be more likely to want to share rooms than others.

The social exclusion index is derived from respondents' answers to the question: "How many days during a normal week do you: have friends at home, visit friends in their home, spend time with friends in some other place (e.g. outside), and participate in some organized sports activity". The respondents have been given the options every day, several times a week, once a week, (more) seldom, and never.[19] Table 2 in section 3.1 shows summary statistics for the underlying variables. Each panel, A and B, includes a dimension and several domain-specific indicators (underlying variables).

We only consider observations with non-missings on all the underlying questionnaire items. The manifest variables *read*, *news*, *other activities* and *leisure* are excluded. We are thus left with the following variables underlying the social exclusion index: *play*, *internet*, *friends home*, *home friends*, *meet friends* and *sport*. We estimate factor loadings and the implied ("fitted") factor scores in both domains for the respective years. Suppose we observe a $p \times 1$ vector $\boldsymbol{x}$ outcomes that we believe to be linearly related to $q \times 1$ latent factors $\boldsymbol{f}$. The factor model relates $\boldsymbol{x}$ and $\boldsymbol{f}$ by a $p \times q$ matrix of factor loading Λ and an error term.

$$\boldsymbol{x}' = \boldsymbol{f}\Gamma' + \boldsymbol{e} \tag{1}$$

denoting the correlation matrix of $\boldsymbol{x}$ by Σ, estimation is based on

$$\Sigma = \Gamma\Omega\Gamma' + \Psi \tag{2}$$

The factor loadings Γ are estimated using maximum likelihood (but the same set of estimates can be shown to emerge also without assuming multivariate normality). Table 5 reports the factor loadings of the underlying manifest variables.

[TABLE 5 HERE.]

The results show that factor loadings are stable for all variables except mobile phone and computer. Social activities such as meeting friends at home or at their homes seem to matter most. Chi square tests of the hypothesis that one factor is sufficient indicate that in all cases we cannot reject the null (not shown here).

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[18]An interesting extension in future work would be to control for geographic differences.

[19]We follow the previous literature (e.g. Gross-Manos (2015)) when choosing relevant variables.

Figure 1 shows the distributions of material deprivation and social exclusion indices in 2000 and 2010 respectively. The material score index has a multi-modal distribution (two large peaks). We discuss the implications of this result in section 4.1.

[FIGURE 1 HERE.]

3.4 Validity and reliability

Following previous literature (Main & Bradshaw 2012, Gross-Manos 2015, Bradshaw & Finch 2003) we assess the validity of our constructed measures by investigating the correlation between the measures and indicators of socioeconomic status and well-being, as suggested in the related literature on child-centric poverty indicators. In contrast to Gross-Manos (2015) who use the mean income of the locality of the child's school, we utilize individual incomes from registers which reduces potential measurement error.

Table 6 indicates the correlations between our indicators and the variables household equivalized income, self-reported psychological health and neighborhood quality (proxied by feeling safe). Based on these associations, we find that our measures are valid.

[TABLE 6 HERE.]

With regard to reliability, Gross-Manos (2015) develops and tests two measures and use focus groups to identify relevant necessary items. If the lack of an item was owning to choice by more than 20 percent of the sample it was removed from the list. We use the existing questionnaire items in LNU 2010 and base our indicators on items similar to the ones used by Gross-Manos (2015) to attain reliable child poverty measures.

4   Incidence and persistence of poverty

In this section, we study the incidence and persistence of poverty during the period 2000-2010. First, we give an overview of previous findings on the incidence and dynamics of poverty in Sweden and in selected western European countries. We then turn to our data in order to deepen the analysis of poverty in our two survey years. The two cross-sections 2000 and 2010 are comprised of different samples hence the analyses only give one-shot poverty snapshots. In the following step, we explore to what extent material deprivation and social exclusion measures overlap with the income-based measure. The results are discussed in section 5. In section

we introduce the time dimension by utilizing the panel element in LNU which consists of respondents who were children during the first wave and young adults at the time of the subsequent wave in 2010.

4.1 Child poverty trends 2000-2010

The economic recession of the 1990's left its mark on the poverty rates in many European countries and Sweden was no exception. In less than a decade the proportion of poor children according to an absolute poverty line increased from 8 to 19 percent (Mood & Jonsson 2015). Figure 2 and 3 show the trends in child poverty in selected north European countries during the period of study.

[FIGURE 2 HERE.]

[FIGURE 3 HERE.]

Figure 2 and 3 demonstrates a positive trend in the number of poor households in Europe. The economic downturn during of the 2000's with rising unemployment rates lowered the market incomes for many households. In Sweden, a country known for its extensive welfare state, the child poverty rate surged from approximately 3 percent to more than 9 percent during 2000-2010 as reported in figure 3 where poverty status is defined as having a yearly disposable income below 1/2 of the median of the overall population (OECD statistics). Although all Nordic countries were faced with rising child poverty rates, the Swedish child poverty level stands out as strikingly high. As indicated in figure 3, Norway, Finland and Sweden start out at similar levels of income-based child poverty in 2000 but by the end of the period the Swedish child poverty rate is estimated to more than 9 percent (compared to 3 percent in Finland and approximately 6 percent in Norway).[20]

Overall, the trends in child poverty across our selected countries are similar to those of the overall poverty rate and among the elderly (76+). The age group 76+, a subgroup particularly vulnerable to changes in economic conditions, seem to have suffered the most during the period of study: 15 percent of the elderly were labeled as income poor in 2010.

In 2006, the Swedish government introduced a workforce reform and along with this reform a number of transfer cuts were made (benefits of various kinds). The rolling tax reduction, the so-called "Jobbskatteavdraget", lowered the tax burden for wage earners. The reform was aimed at increasing labor supply at the extensive margin by reducing tax on employment. In addition, during the first part of the

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[20]Naturally, all the data sets suffer from similar measurement error issues as the Swedish data hence the numbers should be interpreted with caution.

2000's real wages grew rapidly but the real value of transfers did not (Gustafsson & Österberg 2016).

Sweden experienced a rapid growth in inequality in the 00's (*In It Together: Why Less Inequality Benefits All* (2015)). While the overall poverty rate returned to it's pre-recession levels in 2005/2006, disposable income inequality continued to grow. Much of the rising inequality can be explained by flows in and out of the labor market. In the years following the workforce reform, the proportion of poor children with non-employed parents suddenly increased. A potential explanation for this development is that the anticipated positive labor supply response to the work incentives was not sufficient to compensate for the cuts in transfers. The economic crisis was, however, relatively short-lived in Sweden and it has been argued that the economic downturn in 2008-2009 had a limited impact on the number of poor children in Sweden compared to other European countries (Mood & Jonsson 2015). Similarly to the aftermaths of the economic downturn in the early 1990's, the gap in market incomes seems to be the driver of the growing income inequality of the 2000's.

Children growing up in households in the lowest quintile of the disposable income distribution are especially vulnerable to changes in taxes and transfers since these families are more likely to rely on social benefits. The households labor market status is a key predictor of the poverty status of the children within the household. Single parent households and immigrants, two categories that are often found at the lower end of the income distribution, are to a large extent exposed to poverty risk through changes in social transfers and benefits. Prior to, as well as during the period of study, Sweden experienced an increased inflow of refugees.

Mood & Jonsson (2015) goes further back in time than we do by demonstrating the trends in different child poverty measures from the 1980's and onwards.[21] Their results reveal striking changes in relative poverty but not in absolute poverty. While the absolute poverty rate has decreased since the 1990's and remained fairly stable after 2006, relative poverty has increased significantly. Their child-centric measures of poverty include economic and material deprivation. Despite of rising income inequality and relative income poverty they do not find a positive trend in any of these measures during this period.

Moving on to our data, table 7 reports the proportions of poor children in 2000 and 2010, respectively. The proportion of income poor children is 6.6 percent in year 2000 and 14.8 percent in year 2010, implying a significant increase in income-based child poverty of 8.2 percentage points. We perform an adjusted Wald test (t-test

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[21]Domeij & Floden (2010) document a rising inequality in disposable income and earnings net taxes and transfers in the early 1990's.

for survey data) on all the differences.[22]

[TABLE 7 HERE.]

A related study, Mood & Jonsson (2014), finds that the proportion of poor children aged 0-19 is approximately 4 percent in year 2000. Their results are based on HEK (using the same relative poverty line) and show a positive trend in child poverty with a rate of 9 percent in 2010 implying a more than doubling of the proportion of poor children. These results are consistent with the OECD estimates demonstrating an increase from almost 4 percent to more than 9 percent as indicated in figure 3. Overall, the trends in child poverty are similar across the different data sources. We find somewhat larger levels of child poverty than for example Mood & Jonsson (2014) which has to do with differences in data and measures but our estimates lie within the margin of error.[23]

We define material deprivation and social exclusion as belonging to the bottom quintile in our sample, thus the proportion of children labeled as poor according to these measures is set at 20 percent. In the sensitivity analysis in section A we also use the definition 1/2 of median of the index score distribution. We choose this particular threshold because we are interested in the overlap of these measures with the income-based measure. The overlaps of these measures are discussed in section 5.

Table 8 and 9 show the results divided by age and gender. Poverty rates refer to the number of children below the poverty line, expressed as a percentage of all children in our sample.

[TABLE 8 HERE.]

[TABLE 9 HERE.]

At first glance the differences in the means of material deprivation of the two cross-sections may seem worrying as it should be close to 0.20 by definition. The proportion of materially deprived children is 23 percent (>20) because the underlying distribution is not continuous. The distribution of the material score index as presented earlier is multi-modal with two large peaks. In part this is also due to a small sample size and sampling weights (we have adjusted the estimates using sampling weights provided by the SCB). The difference between the proportions is however not statistically significant (0.235 cf 0.254).

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[22]We test the equality of the means using a two-sided Wald test (α=0.05) which takes into account the sampling weights.

[23]The research report of Mood & Jonsson (2014) does not report confidence intervals.

Tables 8 and 9 show that age seems to be negatively related to material deprivation. Consistent with previous findings our results suggest a significant increase in child poverty estimated using monetary measures: from 6.6 percent in 2000 to 14.8 percent in 2010. The proportion of absolute income poor children is 4.4 percent (s.e.=0.0081) which is in line with the aforementioned studies. Interestingly, the proportion of boys in this category seems stable.

A closer inspection of the results divided by gender in table 8 and 9 reveals that the proportion of girls that are income poor is higher than that of boys. This seems to be the case in both cross-sections. Moreover, the proportion of socially excluded boys is higher than that of girls (both in 2000 and 2010). We will inspect these differences closer in section 4.2 when we estimate the relative risks and can control for age. Table 10 below shows the corresponding estimates for the panel sample. The age and gender differences are still there but much less pronounced.

[TABLE 10 HERE.]

As a final part of the "snapshot" analysis we also calculate the proportion of poor according to a *fixed* poverty level which can also be interpreted as an absolute poverty measure. We set the poverty line in 2010 to 50 percent of the median disposable income in 1999 corrected for inflation.

All in all, we find a significant positive trend in relative child poverty which is consistent with previous findings. The results also suggest interesting age and gender differences which we examine closer using relative risk estimations in the section that follows.

4.2 Relative poverty risks

In this section, we investigate the relative poverty risks of different household level characteristics using binary logistic regression where the dependent variable is a dummy indicating either childhood material deprivation or social exclusion. The mathematical expression of the logit model is:

$$P(y_j = 1 | x_j) = \frac{exp(x_j \beta)}{1 + exp(x_j \beta)} \quad (3)$$

We assume that the error terms are independent and follow a logistic distribution. Since the model is estimated by logistic regressions we estimate the following latent linear response model:

$$Indicator_i^* = \alpha + \beta SingleParent_i + \sigma NrChildren_i$$
$$+ \lambda Immigrant_i + \mathbf{x_i}' \gamma + \epsilon_i, \quad (4)$$

where we only observe $Indicator_i = I(y_i^* > 0)$ for the latent variable $Indicator_i^*$ above.

Material deprivation and social exclusion, our two non-monetary indicators, are defined as belonging to the lowest quintile of the respective index distribution. The unit of analysis is the child i. α is a constant, $SingleParent_i$ indicates whether the child lives in a single parent household, $NrChildren_i$ represents the number of children in the household and $Immigrant_i$ indicates whether the child has two parents born abroad. $\mathbf{x_i}'$ represents a vector of control variables including age, gender and the socioeconomic background. We use the Swedish standard socio-economic classification (SEI, Statistics Sweden) to create a dummy indicating whether a child has at least one parent whose occupation belongs to the non-manual employee or employee category of SEI. Potential key risk factors of poverty identified in previous literature include living in a single parent family, number of children in the household and having foreign-born parents (Chen & Corak 2008, Lindquist & Sjögren Lindquist 2012).

We use 50 percent of median disposable equivalent income of all households ages 20 and older in Sweden in the year prior to the survey. We do the same for the income poor outcome for the years 2000 and 2010 respectively and the results are shown in table 11. The estimates represent the relative risks of poverty (odds ratios).

[TABLE 11 HERE.]

The pseudo R^2 of the specifications in table 11 ranges from 0.09 to 0.16 indicating a fairly good model fit. In contrast to the other models, the pseudo R^2 is only about 0.01 for the model predicting social exclusion.

We find a negative association of child poverty status and age. However, the relationship is only significant in the specifications where the dependent variable is the material deprivation indicator. There seems to exist significant gender differences in poverty status: Material deprivation is more likely among girls than boys. Only gender comes out as a significant explanatory variable in the specification for social exclusion: Being a girl makes one significantly less likely to be labeled as socially excluded (OR=0.649 in 2000 and OR=0.743 in 2010).

When studying child poverty an important sub-group is single parent households. Children who grow up with single parents are typically at a higher risk of poverty (see for example Gornick & Jäntti (2011)). Unfortunately, the analysis sample is too small to conduct a separate analysis on this subgroup. Hence, we address the aforementioned issue by including a dummy for single parent households in the regressions. The results in table 11 demonstrate that the odds of being income poor or materially deprived are significantly higher for children growing up in single

parent families: They are almost four to five times as high with respect to income poverty and close to two times as high for material deprivation.

The odds of being income poor and materially deprived are significantly higher for children living in larger households (higher number of children) and with single parents. One potential measurement issue refers to the resources of lone parents. There could be income transfers between parents that cannot be observed in the data. The issue can, however, be explored further using survey answers to question regarding time spent with the other parent (who is not registered at the same address). Bearing this in mind, our findings suggest that living in a single parent household makes one between 4 and 5 times more likely to be income poor during the period of study compared to living with two parents. The relative risks of being materially deprived when living with a lone parent is almost twice as high. We do, however, not find such an relationship in the specifications where the dependent variable is our social exclusion indicator.

As mentioned above, there seems to exist significant gender differences in poverty status. The results presented in table 11 suggest that boys and girls experience different forms of childhood scarcity. For example, material deprivation is more likely among girls than boys. Only gender comes out as a significant explanatory variable in the specification for social exclusion: Being a girl makes one significantly less likely to be labeled as socially excluded.

Immigrant children are overrepresented among poor children (Gustafsson & Österberg 2016, Lindquist & Sjögren Lindquist 2012, Galloway et al. 2009). However, the likelihood of being classified as poor among immigrant children declines with years since migration. Table 11 shows that having immigrant parents makes one significantly more likely to be labeled as income poor in 2010 and materially deprived (both in 2000 and 2010). The odds of being materially deprived are around three times as high for children with immigrant parents compared to children with native-born parent. In 2010, the odds ratio of being income poor between children with foreign-born parents and children with native-born parents is 5.79 ($p<0.05$).

In sum, the relative risk factors of child poverty seem to be stable from year 2000 to 2010. In line with previous findings of for example Gornick & Jäntti (2011), we find that children at-risk are those living with single parents and in larger families (constituted of a higher number of siblings). Taken together, these results point to the importance of following vulnerable subgroups such as single parent households and immigrants closely over time and even more so during periods of increasing inequality. The data that we use consists of a small number of immigrant families and due to both statistical and ethical considerations a separate analysis of this group is not possible. The Swedish Level of Living Survey 2010 – Immigrants and their children (LNU-UFB), conducted in parallel with the LNU 2010, was designed

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for the purpose of studying this group closer and allows for deeper analysis of the economic and social well-being of foreign-born individuals and their children. Such analyses are outside the scope of this paper but it is undoubtedly an interesting and important avenue of future research. Finally, the results suggest that social exclusion seems to be more common among boys than girls. Such gender differences could have long-lasting individual consequences which suggest that they should be studies further, preferably over longer periods of time.

5 Overlap of measures

In this section, we investigate to what extent the child poverty measures overlap in 2000 and 2010 respectively.[24] Table 8 shows child poverty according to income, material deprivation and social exclusion and the overlap between these three. The corresponding results for 2010 are shown in table 9. Overall, the overlaps between the income-based measure and the other two are relatively low in year 2000: only 2.8 percent of the sample is classified as both income poor and materially deprived. The overlap between the former and the social exclusion indicator is even smaller (<1 percent). The largest overlap is observed between our two non-monetary indices: 4 percent of the children in the sample are both materially deprived and socially excluded.[25] The overlap is larger in year 2010 than 2000 for income and material deprivation (6.8 percent versus 2.8 percent) income and social exclusion (3.2 percent versus 0.009 percent) as well as material deprivation and social exclusion (4.4 percent versus 4.0 percent).

Going back to table 7, the overlap between the income measure and the non-monetary measures increased significantly from year 2000 to 2010. While the overlap in income poverty and material deprivation increased by 4.0 percentage points and the overlap between income and social exclusion increased by 2.3 percentage points.

A potential issue with non-monetary indicators is that they are sensitive to technological and cultural consumption trends could make them less consistent over time compared to standard monetary measures. If this is the case, non-monetary measures could be measuring consumption trends rather than changes in poverty levels. The factor loadings underlying the material deprivation index that stand out from the loadings of the other variables in table 5, Panel A, are owning a mobile

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[24]See for example Bourguignon & Chakravarty (2003) on correlations between different dimensions of poverty.

[25]Although not in relative terms as for example the overlap between income poverty and material deprivation is larger than the overlap between material deprivation and social exclusion: 0.028/(0.066*0.235)>0.04/(0.235*0.2)). The largest overlap in both cross-sections is then between income poverty and material deprivation (without any trend). The only overlap category which displays a trend is the one between the two non-monetary measures and its trend is positive.

phone and owning a computer. The observed increase in the overlap between the income poverty and material deprivation measures could be mainly driven by the mobile phone and computer question (if material deprivation is better captured in 2010 than 2000).

According to the results in table 7, the overlap between the two non-monetary measures increased, but this change was insignificant. The results show that the children who were income poor in 2010 were to a larger extent than those who were labeled as income poor in 2000 also poor in other dimensions. A larger proportion of children were classified as both income poor and materially deprived or socially excluded in 2010 than 2000.

The small overlap between the measures could be explained by a number of factors, some of which are discussed by Bradshaw & Finch (2003). First, a household can transition between different poverty statuses. For example, a household previously labeled as poor according to the income poverty measure *and* the material deprivation measure a certain year can move into the non-poor category with respect to the income measure the following year as income is more volatile. However, the household may still not have acquired the necessities needed to move to the non-poor state with respect to possession of goods (material deprivation) and thereby still be labeled as materially deprived. The same applies to movements in the opposite direction. Transitions like these can in part be explained by income transfers across generations with for example grandparents chipping in when times are especially hard.

The results in table 7 seem to suggest that parents are not able to cushion their children to the same extent as before. Stagnating incomes at the lower end of the distribution along with changing consumption norms, i.e. increasing commodification along with increasing consumption costs, could be an explanation behind this development. If it is harder for these families "to keep up with the Joneses" this could have detrimental effects on childrens' non-cognitive skills which in turn could lead to adverse social outcomes in adulthood. Not being able to take part in social activities that are considered normal or lacking socially perceived necessities may have long-term consequences. We investigate some potential long-term effects in section 6 below.

In sum, the overlap between the income measure and the non-monetary measures increased significantly from year 2000 to 2010 and this rise was mainly driven by an increase in the proportion of income poor and the material deprivation score distribution. The 2010-sample was to a larger extent than the 2000-sample also poor in other dimensions. The overlap between the two non-monetary measures increased: the increase in the income and material deprivation overlap was 4.0 ppt and that between income and social exclusion was 2.3 ppt, however both changes

were insignificant. Interestingly, the overlaps seem to be somewhat larger (not significantly) for younger children than older ones in both cross-sections. A larger proportion of children were classified as both income poor and materially deprived or socially excluded in 2010 than 2000. Finally, we find that the largest overlap is between income and material deprivation in 2010. With rising relative income poverty as demonstrated in table 7 and growing income inequality, this could be a indication of those at the lower end of the income distribution not being able to keep up with the others with respect to material possessions.

5.1 Why modest overlap?

There are a number of potential explanations behind the modest overlap between monetary and non-monetary indicators of child poverty (see e.g. discussion in Bradshaw & Finch (2003) covering most of the explanations presented below). One explanation could be that our monetary and non-monetary measures identify different individuals (Bradshaw & Finch 2003). Children who are socially deprived could in some (observed or unobserved) respects be different from those who are materially deprived. The result could also be an indication of the phenomenon of "birds of a feather flocking together". In socially segregated societies disadvantaged children will more likely play with disadvantaged peers (due to for example social and geographical distance). Our measure of social exclusion will inherently fail to capture social deprivation in segregated societies.

Another reason could be lagged adjustment of living standards (Saunders et al. 2008). There could be cases in transition between the states deprived/non-deprived which will not show up in our overlap categories (as discussed in section 5). The modest overlap could also be due to compensating behavior within reconstituted families (divorced parents competing with material gifts as only one of the parent's income shows up in our data for reconstituted families) or by grandparents cushioning children during periods of economic distress. These and related issues could be explored further using the detailed survey questions to both parents and children in LNU.[26]

Finally, as noted by Saunders et al. (2008): "Income is not the only determinant of the living standards that ultimately affect whether deprivation and exclusion exist... Low income may be a barrier to some forms of inclusion, but there are many other areas where social exclusion is caused by factors other than poverty" (p. 16).

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[26]There could also be technical issues with the measures with respect to the index score distributions, for example those discussed in section 3.3.

6 Predictive power of measures

In this section, we proceed by exploring the predictive power of our monetary and non-monetary poverty measures. We investigate the size of the overlap between the child poverty status measures and selected adult outcomes. We ask for instance how many percent of children labeled as income poor are also labeled as income poor as adults.

The analysis is based on a panel of 801 individuals who filled in the child questionnaire in 2000 and who were later re-interviewed as adults in the main LNU survey in year 2010. It is the same individuals that were analyzed in the cross-section analysis above less the twins since these could not be uniquely matched with the register data from 2010. The outcomes in early adulthood consist of three different dummy variables which are used as proxies for economic status in early adulthood. These include whether or not an individual is income poor in 2010 defined in terms of equivalent disposable household income being below 50 percent of the median in the overall population in 2010, whether or not an individual has any university studies and finally whether he or she was employed in year 2010. *Any university* indicates completed university degree or currently studying at university. An individual is considered *employed* if he or she has a SEI code for current work (socio-economic group for respondents occupation in 2010). There are 12 missing cases on the employment outcome variable and these individuals are excluded from the analysis. The results are presented in table 12.

The row totals do not add up to 100 since an individual can belong to more than one outcome category. For example, an individual that is labeled as socially excluded in childhood can both have a university degree and be employed. Table 12 reports sample means and the estimates are therefore not corrected for age differences between the respondents. We control for age in the logistic regressions presented further below.

[TABLE 12 HERE.]

The proportion of children that are income poor in young adulthood, given that they are classified as poor in childhood, is close 23 percent (table 12, column (1). Income poverty in childhood seems to be closer related to income poverty in adulthood than than are material deprivation and social exclusion. Among the income poor children, a substantial proportion is employed (62.1 percent). An important point to make here is that the age range in the sample is 20-28, hence some of the individuals may still be living at home with their parents and may not yet have started university careers. In an international perspective, young adults in Sweden

tend to start their university studies at later ages (not immediately after high school graduation).

Table 12 also shows similar patterns in the adult outcomes of individuals who were classified as materially deprived or socially excluded in childhood. Among those who belonged to the lowest quintile of the material deprivation index distribution 16.5 percent were classified as income poor as adults. Furthermore, 10.1 percent were income poor among the lowest quintile of the social exclusion index. The proportions that go on to study at university or that are employed are about 37 percent and more than 60 percent respectively.

At first glance, the proportions of employed in each of the childhood poverty status categories look fairly similar: They all found within the rage 61-64 percent. The overlap is largest between the employment for all childhood indicators. Amongst all the indicators, social exclusion and employment have the largest overlap.

Moving on to the overlap categories income poor 2000 and material deprivation (I and M), income poor 2000 and social exclusion (I and S) and material deprivation and social exclusion (M and S), the lower panel of table 12 shows that these seem to overlap with being employed to about 60 percent. There seems to be larger variation in the overlap between these childhood statuses than the other two adult outcome categories (in the upper panel). Moreover, the proportion of individuals who are labeled as income poor in adulthood, given that they are classified as both income poor and materially deprived in childhood, is approximately 36 percent.

Due to potential composition bias we run logistic regressions where we control for age. In what follows we estimate the relationship between the later life outcomes presented above and our three indicators of poverty status in 2000: relative income poverty, material deprivation and social exclusion. As before, the model is estimated by logit regressions and the latent linear response model we estimate is the following:

$$AdultOutcome_i^* = \alpha + \beta Indicator_i + \mathbf{x_i}'\gamma + \epsilon_i \qquad (5)$$

where we only observe $AdultOutcome_i = I(y_i^* > 0)$ for the latent variable $AdultOutcome_i^*$ above. We assume that the error terms are independent and follow a logistic distribution. $AdultOutcome_i$ is a dummy variable of poverty in early adulthood, $\mathbf{x_i}'$ represents a vector of the individual characteristics birth year and gender. The standard errors are robust and clustered at the family level. The estimation results are found in table 13 below.

[TABLE 13 HERE.]

Income poverty in childhood seems to be a strong predictor of being poor as a young adult: The odds of being poor are more than twice as large for those who

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were classified as income poor as children (panel A, column (1)) and less likely to be employed (although insignificant). Being income poor as a child makes one significantly less likely to study at university (OR=0.433). Material deprivation in childhood is positively associated with being income poor in young adulthood ($p<0.10$) while social exclusion is negatively associated with the same, although the estimate is insignificant. We do not find a significant relationship between neither material deprivation nor social exclusion with being employed in 2010 or university studies (shown in panels B and C, column (2) and (3)). We exclude the overlap categories in the logistic regression since the number of individuals who fall into these categories is too small and including these would produce trivial results.[27]

To summarize, income poverty in childhood seems to be a strong predictor of being poor as an young adult. The odds of being impoverished with respect to income are more than twice as high for those who were classified as income poor as children (OR=2.606, $p<0.01$). Material deprivation in childhood is positively related to income poverty in adulthood (OR=1.666, $p<0.10$). In addition, being income poor in childhood makes one significantly less likely to study at university (OR=0.433). We do not find any significant relationship between our monetary and non-monetary child poverty indicators and the outcome variable employment.

7   Discussion

The debate about what poverty means and how welfare should be assessed is age-old. Are income-based indicators more reliable than self-reported deprivation measures and are these competing or complementary? The aim of this study was to broaden the analysis of child poverty by introducing supplementary measures based on children's self-reported level of living to further investigate the general living standard of children in Sweden over time.

Consistent with previous findings, we find that relative income poverty among children increased significantly between year 2000 and 2010 (8.2 ppt). Overall, we find that factor loadings of the material and social indices are stable between 2000 and 2010. The results also suggest that risk factors of child poverty are stable over time. In line with previous findings, we find that children at-risk are those living with single parents and in larger households. Moreover, our results demonstrate that the overlap between the monetary and non-monetary measures is relatively small which is consistent with the findings of Bradshaw & Finch (2003), Gross-Manos (2015),

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[27]A potential issue when using survey data is that the sample size is to small to identify a true effect which is why we do not consider the overlapping categories in the regression analysis. Table 10 shows the proportions: 1.1-3.5 percent of the sample which corresponds to less than 10 to 30 individuals.

Saunders et al. (2008), and Saunders & Bradbury (2006). The modest size of the overlap suggests that these measures are complementary rather than competing i.e. they capture different dimensions of scarcity.

Our results point to the importance of not only relying on monetary measures but on several multidimensional measures that can capture welfare more broadly. Poverty is a multifaceted phenomenon which necessitates more comprehensive measures of welfare and well-being. Household-centered measures may overlook the needs of children growing up in materially impoverished families since they do not take into account the distribution of income within families. Child-centric measures will less likely overlook the possessions and activities that define membership in a community from the viewpoint of children.

Amongst our three indicators, the monetary measure is the best predictor of adult outcomes. We find that income status in childhood is significantly related to income poverty in adulthood and studying at university. Moreover, experiences of material deprivation in childhood seem to be related to adverse economic outcomes in young adulthood. Our measure of participation, the social exclusion indicator, is not related to any of our selected adult outcomes. The next step would therefore be to explore other outcomes that could be associated with our non-monetary indicators such as for example social networks. With growing income inequality in several European countries and Sweden being one of them, new measures are needed to study the life trajectories of children growing up in economic and social hardship.

An important policy question is to what extent the Swedish welfare system is cushioning children from poverty. Are those at the bottom part of the distribution able to keep up with others with respect to consumption and participation during periods of economic distress?

Children's consumption and participation can suffer directly from cutbacks in social benefits. For example Hjalmarsson & Mood (2015) find evidence suggesting that children who lack their own room receive on average fewer friendship nominations and are thus at higher risk of social isolation. Moreover, workforce policies directed at parents can, through their detrimental effect on household consumption, also have long-lasting consequences for children's later life educational and labor outcomes. The lack of certain socially perceived necessities in childhood may affect children's position in their society and consequently result in lower earnings potential in the long-run.

During the last four decades Sweden has experienced a significant influx of immigrants and their children. Since the migration status of parents has been shown to be an important predictor of child poverty (Gustafsson & Österberg 2016, Lindquist & Sjögren Lindquist 2012, Galloway et al. 2009), changes in the macroeconomic and demographic conditions makes it all the more important to follow the life-course tra-

jectories particular of subgroups. Living a life on par with others seems to matter but what is the relevant reference group if poor children only play with other poor children? And what are the longterm consequences of socio-economic segregation?

We suggest that more research should be devoted to studying the well-being and the social networks of poor children longitudinally. The next wave of the LNU survey will be conducted in a couple of years and hopefully it will consist of a new child survey and a follow-up of the individuals studied in this paper. A longitudinal comparative study is already made possible by the Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU) which contains information similar to that in the LNU survey.

It should be mentioned that the findings of this paper are based on normative assumptions of what adequate standard of living is and on subjective methodological choices (as discussed by for example Kingdon & Knight (2006)), which undeniably complicates the policy conclusions. The results should be interpreted with caution although taken together with previous evidence within the field, overall findings tend to point to the importance of alternative poverty indicators (Bradshaw & Finch 2003, Gross-Manos 2015).

The limitations of our study refer mainly to the reliability and validity of our measures and a power problem. The size of analysis sample is relative small resulting in an efficiency problem. One way to test the internal validity is to investigate the correlation between non-monetary measures and other non-monetary and monetary measures not used for the indices. We perform several tests showing that our measures are valid but more research in this field is needed to validate existing findings. With regard to the external validity of the results, the findings of this paper could be generalized to other European countries with extensive welfare states.

Finally, our findings suggest that children who grow up in poverty are significantly less likely to study at university and that income-based measures are strongly related: Being poor in 2000 makes one significantly more likely to be income poor as an adult. An important next step is to investigate who these poor children are. Another related question that would be interesting to look at is the correlation between our non-monetary measures and other child measures of well-being such as somatic and psychological health, two growing concerns in many European countries today.

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Table 1: Literature review

Study	Poverty measure		
	Absolute income	*Relative income*	*Material deprivation/Social exclusion*
Duncan et al. (1993)		✓	
Jäntti & Danziger (1994)		✓	
Oxley et al. (2000)		✓	
Bradshaw & Finch (2003)		✓	✓
Saunders et al. (2008)		✓	✓
Chen & Corak (2008)	✓	✓	
Jonsson & Östberg (2010)			✓
Mood & Jonsson (2013)	✓	✓	✓
Main & Bradshaw (2012)			✓
Mood & Jonsson (2015)	✓	✓	✓
Gross-Manos (2015)			✓

Table 2: Summary statistics, cross-sections 2000 and 2010 and panel

Variable	Mean	Std. Dev.	Min.	Max.	N
Panel A: LNU 2000					
Age	13.569	2.529	10	18	1288
Girl	0.514	0.5	0	1	1288
Immigrant parents	0.02	0.141	0	1	1288
Number of children in hh	2.24	1.165	1	8	1288
Lone parent	0.175	0.38	0	1	1288
Intact family	0.825	0.38	0	1	1288
Non-manual/Employers	0.404	0.491	0	1	1288
Panel B: LNU 2010					
Age	14.192	2.601	10	18	910
Girl	0.501	0.5	0	1	910
Immigrant parents	0.047	0.212	0	1	910
Number of children in hh	2.027	1.151	0	8	910
Lone parent	0.199	0.399	0	1	910
Intact family	0.819	0.385	0	1	910
Non-manual/Employers	0.73	0.444	0	1	883
Panel C: LNU panel 2000-2010					
Age (wave 1)	13.422	2.532	10	18	801
Age (wave 2)	23.662	2.596	20	29	801
Girl	0.521	0.5	0	1	801
Immigrant parents	0.014	0.116	0	1	801
Number of children in hh	2.267	1.143	1	8	801
Lone parent	0.134	0.34	0	1	801
Intact family	0.866	0.34	0	1	801
Non-manual/Employers	0.409	0.492	0	1	801

Table 3: Do you have any of the following..., as a percentage of the sample (n=1304 in 2000 and n=918 in 2010)

	2000		2010	
Necessity	Do not have	Have	Do not have	Have
Room	10.81	89.19	8.71	91.29
Pet	56.29	43.71	50.44	49.56
TV	48.39	51.61	41.18	58.82
Mobile phone	58.05	41.95	4.03	95.97
Computer	74.39	25.61	33.01	66.99
Have not (things)	98.08	1.92	99.46	0.54

Table 4: How many days a normal week do you..., as a percentage of the sample (n=1304 in 2000 and$n$=918 in 2010)

Activity	Every day	Several times a week	Once a week	Seldom	Never	Missing values
2000						
Read	17.87	26.07	17.18	27.45	11.20	0.23
News	18.63	36.43	16.64	18.40	9.66	0.23
Play	15.87	34.28	18.33	21.55	9.89	0.08
Internet	11.20	27.76	17.48	21.63	21.78	0.15
Friends home	5.75	45.55	23.93	22.09	2.38	0.31
Home friends	6.13	54.68	21.63	15.80	1.69	0.08
Sport	5.52	44.56	15.57	8.21	25.84	0.31
Other activities	0.92	6.06	15.11	14.95	62.12	0.84
Meet friends	34.28	36.58	12.42	12.35	3.91	0.46
Leisure	10.12	38.11	26.69	21.63	3.07	0.38
2010						
Read	13.18	25.60	14.81	32.57	13.51	0.33
News	14.38	33.01	21.02	21.35	9.69	0.54
Play	29.74	30.50	11.33	18.19	9.91	0.33
Internet	55.56	30.50	4.79	5.56	3.27	0.33
Friends home	2.72	40.31	28.00	25.05	3.59	0.33
Home friends	2.18	47.06	28.00	20.92	1.63	0.22
Sport	6.10	45.86	13.51	8.39	26.03	0.11
Other activities	1.09	7.19	14.16	11.98	64.81	0.76
Meet friends	34.53	38.67	12.75	11.33	2.29	0.44
Leisure	6.86	38.34	26.80	23.64	3.27	1.09

Table 5: Factor loadings of the manifest variables underlying the latent variable *material deprivation* and *social exclusion*, year 2000 and 2010 respectively

	Factor loadings	
	2000	2010
Panel A: Material deprivation		
Room	0.61	0.53
Pet	0.17	0.17
TV	0.33	0.32
Mobile	0.25	0.53
Computer	0.18	0.35
Have not	-0.61	-0.50
Panel B: Social exclusion		
Play	0.190	0.074
Internet	0.130	0.126
Friends home	0.600	0.697
Home friends	0.850	0.883
Meet friends	0.280	0.216
Sport	0.150	0.133

Figure 1: Distributions of *material deprivation* and *social exclusion* indices, 2000/2010
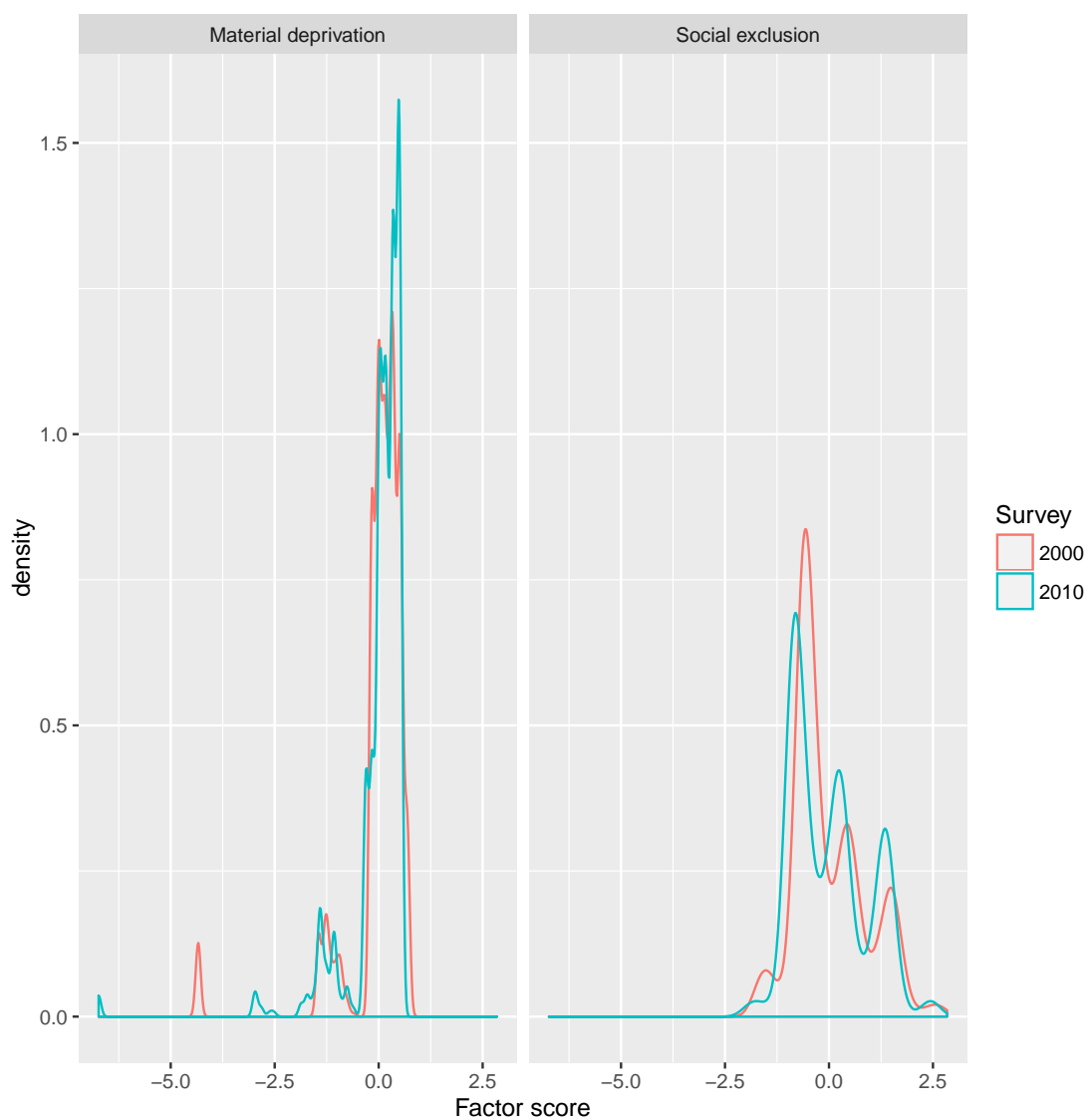
Table 6: Correlations of indicators with proxies for socio-economic status

	Material deprivation		Social exclusion	
	2000	2010	2000	2010
Income	−0.000457***	−0.0000358	0.000153	0.0000862
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1288	910	1288	910
Sad or down	0.0285	−0.0161	−0.0835***	−0.111***
	(0.033)	(0.041)	(0.031)	(0.038)
Observations	1284	909	1284	909
Feel safe	−0.166***	0.0483	0.0288	0.0755
	(0.039)	(0.076)	(0.037)	(0.072)
Observations	1288	910	1288	910

Standard errors in parentheses

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

Notes: Results from OLS regressions. Material deprivation and social exclusion is defined as belonging to the lowest quintile of the respective index. Income is defined as equivalized disposable family income. The variable *Sad or down* is created using the questionnaire item "I often feel sad or down" ("Matches roughly", "Matches exactly"). The variable *Feel safe* is a dummy variable drawn from the question: "Do you feel safe in your neighborhood?".

Figure 2: Trends in poverty, all and children (Source: OECD IDD)
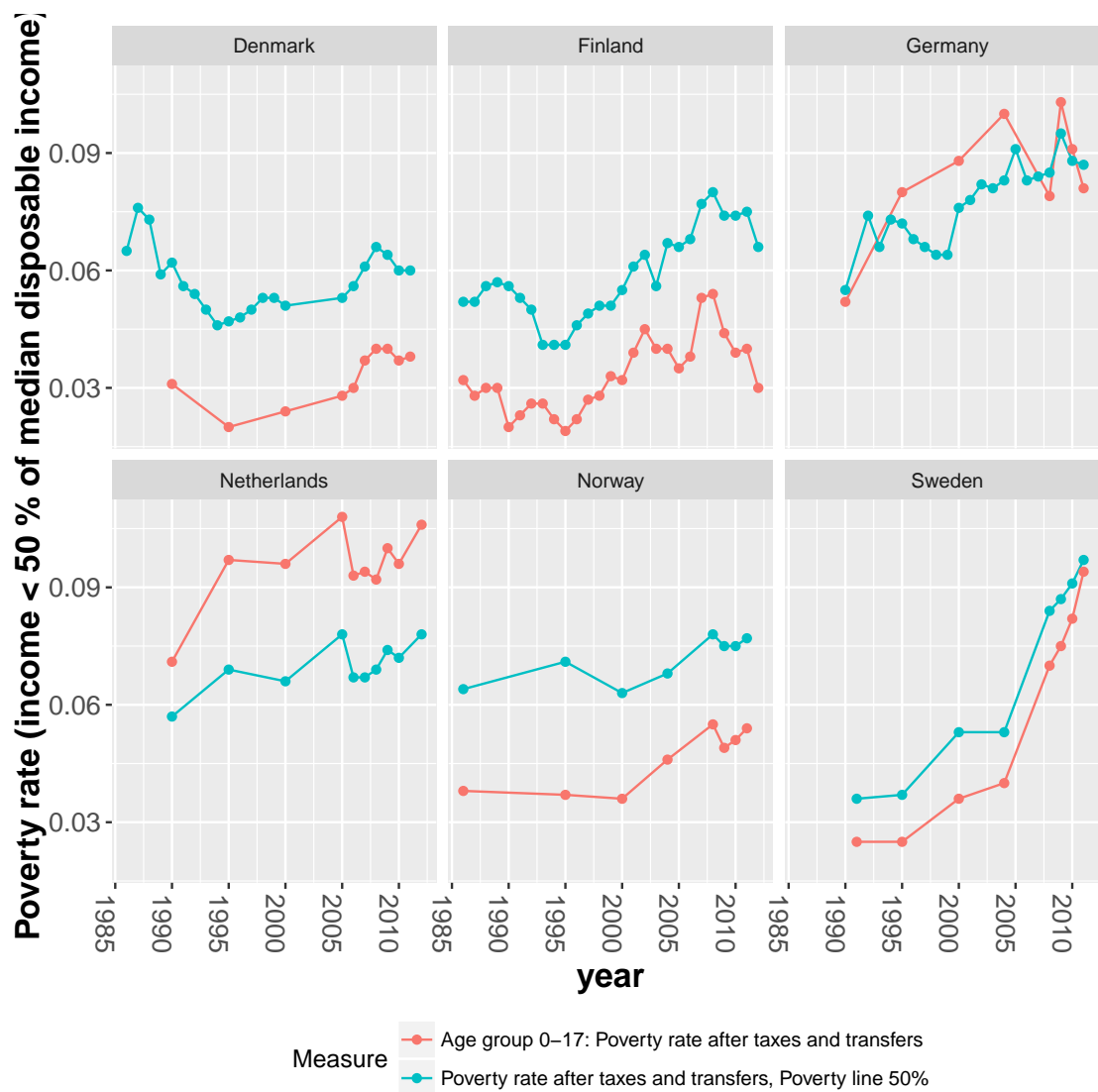
Figure 3: Trends in poverty, children and the elderly (Source: OECD IDD)

Table 7: Child poverty according to monetary and non-monetary measures in 2000 (n=1288) and 2010 (n=910), means and s.e., lowest quintile in score

| | Income | Material | Social | Overlap | | |
				I and M	I and S	M and S
2000	0.066	0.235	0.200	0.028	0.009	0.040
	(0.008)	(0.012)	(0.012)	(0.005)	(0.003)	(0.006)
2010	0.148	0.254	0.205	0.068	0.032	0.044
	(0.014)	(0.016)	(0.014)	(0.011)	(0.007)	(0.008)
Difference	0.082	0.019	0.005	0.040	0.023	0.005

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as belonging to the lowest quintile of the respective index.

Table 8: Child poverty according to monetary and non-monetary measures in 2000, means and s.e., lowest quintile in score, $n=1288$

	Income	Material	Social	Overlap		
				I and M	I and S	M and S
All	0.066	0.235	0.200	0.028	0.009	0.040
	(0.008)	(0.012)	(0.012)	(0.005)	(0.003)	(0.006)
All in ages 10-14	0.070	0.290	0.212	0.033	0.011	0.051
	(0.011)	(0.017)	(0.015)	(0.007)	(0.004)	(0.008)
All in ages 15-18	0.058	0.149	0.181	0.019	0.007	0.022
	(0.013)	(0.017)	(0.019)	(0.007)	(0.005)	(0.007)
Girls	0.074	0.228	0.163	0.023	0.011	0.034
	(0.012)	(0.017)	(0.015)	(0.006)	(0.005)	(0.008)
Girls in ages 10-14	0.078	0.275	0.183	0.031	0.014	0.040
	(0.015)	(0.023)	(0.020)	(0.009)	(0.006)	(0.011)
Girls in ages 15-18	0.068	0.162	0.136	0.013	0.008	0.026
	(0.020)	(0.025)	(0.024)	(0.006)	(0.008)	(0.010)
Boys	0.057	0.243	0.239	0.032	0.007	0.046
	(0.011)	(0.018)	(0.018)	(0.008)	(0.003)	(0.009)
Boys in ages 10-14	0.062	0.305	0.242	0.035	0.007	0.062
	(0.015)	(0.025)	(0.023)	(0.010)	(0.004)	(0.013)
Boys in ages 15-18	0.047	0.134	0.236	0.027	0.005	0.018
	(0.015)	(0.023)	(0.029)	(0.012)	(0.005)	(0.009)

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as belonging to the lowest quintile of the respective index.

Table 9: Child poverty according to monetary and non-monetary measures in 2010, means and s.e., lowest quintile in score, $n=910$

	Income	Material	Social	Overlap		
				I and M	I and S	M and S
All	0.148	0.254	0.205	0.068	0.032	0.044
	(0.014)	(0.016)	(0.014)	(0.011)	(0.007)	(0.008)
All in ages 10-14	0.150	0.309	0.227	0.072	0.031	0.056
	(0.020)	(0.024)	(0.021)	(0.015)	(0.009)	(0.012)
All in ages 15-18	0.145	0.197	0.182	0.064	0.033	0.032
	(0.021)	(0.021)	(0.020)	(0.015)	(0.012)	(0.009)
Girls	0.154	0.258	0.172	0.069	0.026	0.042
	(0.020)	(0.023)	(0.020)	(0.015)	(0.010)	(0.011)
Girls in ages 10-14	0.153	0.306	0.214	0.072	0.025	0.048
	(0.028)	(0.033)	(0.030)	(0.020)	(0.013)	(0.017)
Girls in ages 15-18	0.156	0.207	0.128	0.066	0.026	0.037
	(0.030)	(0.030)	(0.025)	(0.021)	(0.015)	(0.015)
Boys	0.140	0.251	0.238	0.067	0.038	0.047
	(0.021)	(0.023)	(0.021)	(0.016)	(0.011)	(0.011)
Boys in ages 10-14	0.146	0.312	0.241	0.072	0.036	0.065
	(0.029)	(0.034)	(0.029)	(0.023)	(0.014)	(0.018)
Boys in ages 15-18	0.134	0.188	0.236	0.061	0.039	0.027
	(0.029)	(0.031)	(0.031)	(0.022)	(0.018)	(0.011)

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as belonging to the lowest quintile of the respective index.

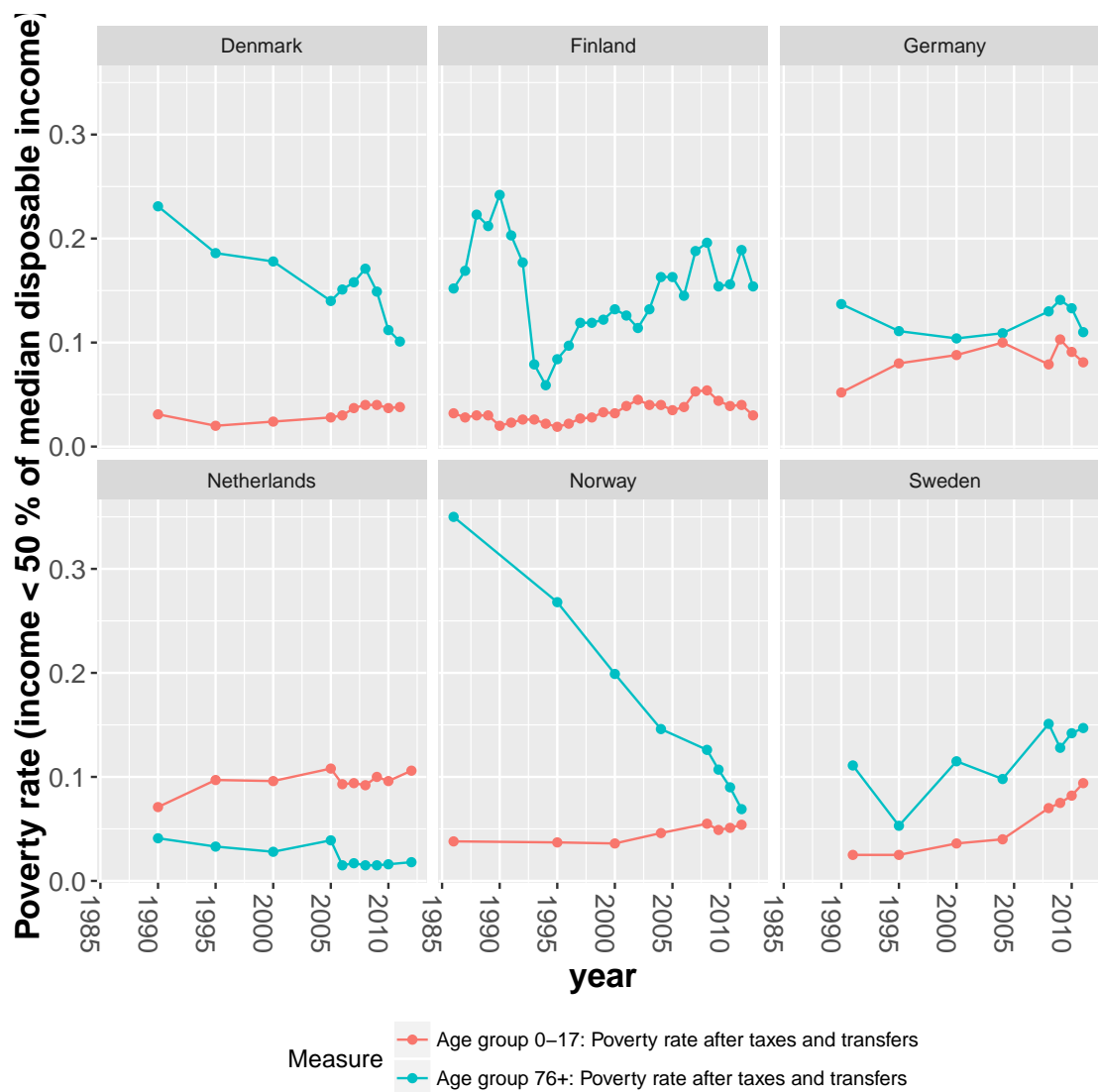**Table 10:** Child poverty according to monetary and non-monetary measures in 2000, panel, means and s.e., lowest quintile in material and social indices, $n=801$

	Income	Material	Social	Overlap		
				I and M	I and S	M and S
All	0.064	0.236	0.201	0.035	0.011	0.032
	0.010	0.016	0.014	0.007	0.004	0.006
All in ages 10-14	0.069	0.296	0.211	0.042	0.014	0.043
	0.012	0.021	0.018	0.009	0.005	0.009
All in ages 15-18	0.055	0.130	0.185	0.022	0.006	0.014
	0.016	0.022	0.024	0.009	0.006	0.007
Girls	0.067	0.232	0.173	0.028	0.013	0.030
	0.014	0.022	0.019	0.008	0.006	0.009
Girls in ages 10-14	0.064	0.282	0.210	0.030	0.015	0.040
	0.017	0.028	0.025	0.010	0.007	0.013
Girls in ages 15-18	0.073	0.146	0.110	0.023	0.011	0.013
	0.026	0.032	0.028	0.012	0.011	0.009
Boys	0.060	0.241	0.232	0.042	0.008	0.035
	0.014	0.023	0.022	0.012	0.005	0.009
Boys in ages 10-14	0.074	0.312	0.211	0.054	0.012	0.047
	0.019	0.031	0.026	0.016	0.007	0.013
Boys in ages 15-18	0.035	0.112	0.271	0.021	0.000	0.015
	0.018	0.028	0.039	0.015	0.000	0.010

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as belonging to the lowest quintile of the respective index.

Table 11: Relative risks of child poverty, monetary and non-monetary measures 2000 and 2010

	Income poor		Material deprivation		Social exclusion	
	2000	2010	2000	2010	2000	2010
Age	0.961	1.065	0.855***	0.915**	1.014	0.965
	(−0.78)	(1.06)	(−4.96)	(−2.44)	(0.51)	(−1.00)
Girl	1.165	1.088	0.822	1.584***	0.649***	0.743*
	(0.53)	(0.34)	(−1.27)	(2.63)	(−2.79)	(−1.65)
Number of children in hh	1.758***	1.557**	1.893***	1.533***	1.015	0.946
	(3.83)	(2.23)	(7.23)	(4.55)	(0.21)	(−0.50)
Single parent	4.752***	3.716***	1.722**	1.117	0.769	0.956
	(4.03)	(2.86)	(2.52)	(0.42)	(−1.06)	(−0.17)
Immigrant parents	0.668	5.785**	2.622**	3.230***	0.818	0.656
	(−0.35)	(2.46)	(2.03)	(3.32)	(−0.37)	(−0.91)
Non-manual/Employers	0.507*	0.321***	1.040	0.691*	1.018	0.996
	(−1.83)	(−2.96)	(0.24)	(−1.70)	(0.12)	(−0.02)
Observations	1288	883	1288	883	1288	883
Pseudo R^2	0.112	0.160	0.115	0.088	0.010	0.007

Exponentiated coefficients; t statistics in parentheses

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

Notes: Results from logistic regressions with robust standard errors clustered at the family level. Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as belonging to the lowest quintile of the respective index.

Table 12: Selected adult outcomes in 2010 by poverty status in 2000, panel, means and s.e., $n=801$

	Income poor 2010	Any university	Employed
Income poor 2000	0.229	0.196	0.621
	(0.062)	(0.065)	(0.080)
Material deprivation	0.165	0.365	0.607
	(0.028)	(0.037)	(0.038)
Social exclusion	0.101	0.370	0.641
	(0.023)	(0.038)	(0.038)
Overlap			
I and M	0.361	0.268	0.584
	(0.097)	(0.096)	(0.102)
I and S	0.215	0.299	0.697
	(0.148)	(0.190)	(0.191)
M and S	0.168	0.457	0.588
	(0.071)	(0.100)	(0.098)

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as belonging to the lowest quintile of the respective index. *Any university* is an indicator variable for whether an individual has a completed university degree or is currently studying at university. *Employed* indicates whether an individual has a SEI code for current work. 12 individuals are omitted from the analysis due to missing values on the employment outcome variable.

Table 13: Predictive power of monetary and non-monetary measures for selected adult outcomes

	OR (s.e.)	OR (s.e.)	OR (s.e.)	OR (s.e.)
	(1)	(2)	(3)	(4)
Panel A: Income poor 2010				
Demographics				
Age	0.814***	0.827***	0.810***	0.826***
	(0.044)	(0.046)	(0.044)	(0.046)
Female	0.744	0.757	0.745	0.757
	(0.188)	(0.191)	(0.186)	(0.191)
Indicators				
Income poor 2000	2.606***			2.294**
	(0.932)			(0.813)
Material deprivation		1.666*		1.497
		(0.444)		(0.407)
Social exclusion			0.960	1.017
			(0.272)	(0.294)
Observations	801	801	801	801
Panel B: Employed				
Demographics				
Age	1.254***	1.251***	1.256***	1.252***
	(0.042)	(0.042)	(0.042)	(0.043)
Female	1.209	1.206	1.197	1.195
	(0.196)	(0.196)	(0.195)	(0.195)
Indicators				
Income poor 2000	0.882			0.902
	(0.316)			(0.331)
Material deprivation		0.916		0.911
		(0.176)		(0.177)
Social exclusion			0.842	0.833
			(0.163)	(0.162)
Observations	789	789	789	789
Panel C: Any university				
Demographics				
Age	1.012	1.019	1.015	1.019
	(0.030)	(0.030)	(0.030)	(0.030)
Female	1.107	1.102	1.108	1.118
	(0.176)	(0.174)	(0.176)	(0.179)
Indicators				
Income poor 2000	0.433*			0.408**
	(0.190)			(0.176)
Material deprivation		1.118		1.230
		(0.215)		(0.238)
Social exclusion			1.125	1.137
			(0.206)	(0.211)
Observations	801	801	801	801

Exponentiated coefficients; Standard errors in parentheses

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

Notes: Results from logistic regressions with robust standard errors clustered at the family level. Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as belonging to the lowest quintile of the respective index. *Any university* is an indicator variable for whether an individual has a completed university degree or is currently studying at university. *Employed* indicates whether an individual has a SEI code for current work. 12 individuals are omitted from the analysis due to missing values on the employment outcome variable.

Appendices

A Sensitivity analysis

In this section, we investigate the sensitivity of our findings. We try out alternative methods and definitions. First, we present the correlations between each underlying item and the income poverty indicator conditional on a set of individual and background characteristics (shown in table A1, A2, A3 and A4). The only variables that are significant, conditional on age, gender etc., are indicators for having an own room and computer (table A2). With regard to social exclusion, having friends at home and other activities are significant.

Next, in order to test the robustness of our results we set an alternative threshold for material deprivation and social exclusion. Tables A5, A6, A7 and A8 show the results with material deprivation and social exclusion defined as having an index score below 1/2 of the median of the respective index score. Table A5 gives an overview of the results. The proportion of children labeled as materially deprived in year 2000 is 42.2 percent while the proportion of socially excluded children is 56.0 percent compared to 42.6 percent and 52.0 percent respectively in year 2010. The largest overlap is between the material and social indices (22.6 percent in 2000 and 21.1 percent in 2010). The overlap between income poverty and material deprivation is 3.7 percent and the overlap between income poverty and social exclusion is 2.4 percent in 2000. These overlaps increased significantly during the period of study (5.4 and 4.9 percentage points respectively). The results suggest that these overlaps are relatively stable with respect to the choice of threshold. The overlap between the two non-monetary measures decreased, although insignificantly.

Tables A6 and A7 display a larger overlap between the two non-monetary measures than the previous results based on the definition of lowest quintile in the material and social indices. For completeness the corresponding proportion for the panel are displayed in table A8 below. Overall, the results are consistent with the findings in the main analysis.

As a supplemental sensitivity test we utilize an alternative measure, namely a deprivation index score, defined as the number of necessities the child is missing (Bradshaw & Finch 2003, Saunders et al. 2008). The index score ranges between 0 and 5. The results from this approach suggest that material deprivation is positively related to income poverty, all else equal (wave 2). We also find weak evidence that the number of missing social activities is positively related to income poverty (wave 1).

Table A1: Lacking certain necessary items, correlations with income poverty indicator, 2000

Dependent variable: Income poor					
Room	0.0671				
	(0.045)				
Pet		-0.000478			
		(0.019)			
TV			0.0172		
			(0.020)		
Mobile				0.00414	
				(0.018)	
Computer					0.0276
					(0.017)
Age	0.000405	-0.000171	0.000650	0.000194	0.000250
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Girl	0.0154	0.0139	0.0122	0.0141	0.0100
	(0.016)	(0.016)	(0.017)	(0.017)	(0.016)
Number of children in hh	0.0381**	0.0443***	0.0431**	0.0440**	0.0431**
	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)
Single parent	0.0947***	0.102***	0.102***	0.102***	0.103***
	(0.034)	(0.033)	(0.033)	(0.032)	(0.032)
Constant	-0.0617	-0.0609	-0.0769	-0.0679	-0.0829
	(0.062)	(0.062)	(0.066)	(0.062)	(0.065)
Observations	1288	1288	1288	1288	1288

Standard errors in parentheses
$^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Notes: Results from OLS regressions with robust standard errors clustered at the family level.

Table A2: Lacking certain necessary items, correlations with income poverty indicator, 2010

Dependent variable: Income poor					
Room	0.183**				
	(0.078)				
Pet		0.0381			
		(0.032)			
TV			0.0349		
			(0.032)		
Mobile				0.108	
				(0.084)	
Computer					0.0989***
					(0.035)
Age	0.00836	0.00647	0.00783	0.00806	0.0108*
	(0.005)	(0.006)	(0.006)	(0.005)	(0.006)
Girl	0.0104	0.0187	0.0104	0.0151	0.0105
	(0.023)	(0.024)	(0.023)	(0.023)	(0.023)
Number of children in hh	0.0596***	0.0727***	0.0738***	0.0746***	0.0703***
	(0.019)	(0.020)	(0.021)	(0.020)	(0.019)
Single parent	0.187***	0.199***	0.205***	0.202***	0.205***
	(0.049)	(0.049)	(0.048)	(0.048)	(0.047)
Constant	-0.170*	-0.178*	-0.192*	-0.189*	-0.244**
	(0.094)	(0.100)	(0.105)	(0.098)	(0.105)
Observations	910	910	910	910	910

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results from OLS regressions with robust standard errors clustered at the family level.

Table A3: Lack of participation, correlations with income poverty indicator, 2000

Dependent variable: Income poor					
Seldom or never...					
Friends home	0.0275				
	(0.022)				
Home friends		0.0615*			
		(0.033)			
Meet friends			0.00151		
			(0.023)		
Sport				-0.00300	
				(0.017)	
Other activities					0.0360***
					(0.014)
Age	-0.00105	-0.000522	-0.000144	-0.000126	-0.000837
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Girl	0.0144	0.0103	0.0139	0.0143	0.0159
	(0.016)	(0.016)	(0.017)	(0.016)	(0.017)
Number of children in hh	0.0434**	0.0424***	0.0443***	0.0444***	0.0450***
	(0.017)	(0.016)	(0.017)	(0.017)	(0.017)
Single parent	0.0999***	0.0959***	0.102***	0.103***	0.0998***
	(0.032)	(0.031)	(0.033)	(0.033)	(0.032)
Constant	-0.0537	-0.0599	-0.0617	-0.0612	-0.0819
	(0.062)	(0.061)	(0.065)	(0.062)	(0.063)
Observations	1288	1288	1288	1288	1288

Standard errors in parentheses

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

Notes: Results from OLS regressions with robust standard errors clustered at the family level.

Table A4: Lack of participation, correlations with income poverty indicator, 2010

Dependent variable: Income poor					
Seldom or never...					
Friends home	0.0419				
	(0.032)				
Home friends		0.0466			
		(0.037)			
Meet friends			-0.000146		
			(0.048)		
Sport				0.0429	
				(0.029)	
Other activities					0.0236
					(0.035)
Age	0.00589	0.00638	0.00663	0.00486	0.00618
	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
Girl	0.0147	0.0145	0.0149	0.0126	0.0152
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)
Number of children in hh	0.0732***	0.0738***	0.0746***	0.0734***	0.0742***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Single parent	0.203***	0.203***	0.204***	0.200***	0.203***
	(0.048)	(0.048)	(0.048)	(0.049)	(0.048)
Constant	-0.162*	-0.169*	-0.164	-0.150	-0.175*
	(0.098)	(0.098)	(0.103)	(0.098)	(0.101)
Observations	910	910	910	910	910

Standard errors in parentheses

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

Notes: Results from OLS regressions with robust standard errors clustered at the family level.

Table A5: Child poverty according to monetary and non-monetary measures in 2000 (n=1288) and 2010 (n=910), cross-sections, means and s.e., less than 1/2 of median in material and social indices

	Income	Material	Social	Overlap		
				I and M	I and S	M and S
2000	0.065	0.422	0.560	0.037	0.024	0.226
	0.008	0.015	0.015	0.006	0.005	0.012
2010	0.152	0.426	0.520	0.091	0.073	0.211
	0.015	0.018	0.018	0.012	0.011	0.015
Difference	0.087	0.004	-0.040	0.054	0.049	-0.015

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as having an index score below 1/2 of the median of the respective index score.

Table A6: Child poverty according to monetary and non-monetary measures in 2000, cross-section, means and s.e., less than 1/2 of median in material and social indices, n=1288

	Income	Material	Social	Overlap		
				I and M	I and S	M and S
All	0.065	0.422	0.560	0.037	0.024	0.226
	0.008	0.015	0.015	0.006	0.005	0.012
All in ages 10-14	0.070	0.486	0.584	0.041	0.025	0.275
	0.010	0.018	0.018	0.008	0.006	0.016
All in ages 15-18	0.058	0.321	0.522	0.031	0.022	0.150
	0.013	0.023	0.024	0.009	0.008	0.017
Girls	0.074	0.443	0.516	0.035	0.031	0.231
	0.012	0.021	0.021	0.008	0.007	0.017
Girls in ages 10-14	0.078	0.520	0.538	0.040	0.030	0.291
	0.015	0.026	0.026	0.010	0.009	0.024
Girls in ages 15-18	0.068	0.334	0.485	0.029	0.031	0.145
	0.020	0.032	0.034	0.012	0.012	0.023
Boys	0.056	0.399	0.606	0.039	0.017	0.221
	0.011	0.020	0.021	0.009	0.006	0.017
Boys in ages 10-14	0.063	0.454	0.629	0.042	0.021	0.259
	0.014	0.026	0.026	0.012	0.009	0.023
Boys in ages 15-18	0.046	0.304	0.565	0.034	0.011	0.155
	0.015	0.032	0.034	0.013	0.008	0.026

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as having an index score below 1/2 of the median of the respective index score.

Table A7: Child poverty according to monetary and non-monetary measures in 2010, cross-section, means and s.e., less than 1/2 of median in material and social indices, n=910

	Income	Material	Social	Overlap		
				I and M	I and S	M and S
All	0.152	0.426	0.520	0.091	0.073	0.211
	0.015	0.018	0.018	0.012	0.011	0.015
All in ages 10-14	0.155	0.502	0.551	0.100	0.080	0.258
	0.020	0.025	0.025	0.017	0.015	0.022
All in ages 15-18	0.149	0.347	0.488	0.082	0.066	0.162
	0.021	0.025	0.025	0.017	0.015	0.019
Girls	0.165	0.449	0.522	0.096	0.081	0.220
	0.021	0.025	0.025	0.017	0.016	0.021
Girls in ages 10-14	0.164	0.516	0.550	0.103	0.093	0.267
	0.029	0.035	0.035	0.024	0.023	0.032
Girls in ages 15-18	0.166	0.377	0.491	0.088	0.068	0.171
	0.031	0.035	0.036	0.025	0.021	0.027
Boys	0.139	0.403	0.518	0.087	0.065	0.201
	0.020	0.025	0.025	0.018	0.015	0.020
Boys in ages 10-14	0.145	0.487	0.552	0.097	0.067	0.248
	0.029	0.035	0.035	0.026	0.019	0.030
Boys in ages 15-18	0.132	0.317	0.484	0.076	0.064	0.154
	0.029	0.035	0.036	0.024	0.022	0.027

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as having an index score below 1/2 of the median of the respective index score.

Table A8: Child poverty according to monetary and non-monetary measures in 2000, panel, means and s.e., less than 1/2 of median in material and social indices, $n=801$

	Income	Material	Social	Overlap		
				I and M	I and S	M and S
All	0.064	0.436	0.552	0.039	0.024	0.221
	0.010	0.018	0.019	0.007	0.005	0.015
All in ages 10-14	0.069	0.494	0.577	0.045	0.026	0.267
	0.012	0.023	0.023	0.010	0.007	0.020
All in ages 15-18	0.055	0.333	0.508	0.030	0.019	0.142
	0.016	0.030	0.032	0.012	0.009	0.022
Girls	0.067	0.464	0.512	0.033	0.033	0.230
	0.014	0.026	0.026	0.009	0.009	0.022
Girls in ages 10-14	0.064	0.531	0.543	0.033	0.032	0.293
	0.017	0.032	0.032	0.011	0.010	0.029
Girls in ages 15-18	0.072	0.349	0.459	0.032	0.036	0.121
	0.026	0.043	0.045	0.016	0.017	0.029
Boys	0.061	0.406	0.595	0.046	0.013	0.212
	0.013	0.026	0.026	0.012	0.006	0.021
Boys in ages 10-14	0.075	0.456	0.613	0.056	0.020	0.238
	0.018	0.033	0.033	0.016	0.009	0.027
Boys in ages 15-18	0.034	0.314	0.563	0.028	0.000	0.165
	0.018	0.043	0.045	0.016	0.000	0.034

Notes: Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. Material deprivation and social exclusion is defined as having an index score below 1/2 of the median of the respective index score.

Table A9: Risk factors of income poverty in childhood, number of missing necessary items

	2000		2010	
Number of missing necessary items	0.394**	0.271	0.450***	0.389***
	(0.160)	(0.178)	(0.121)	(0.138)
Age		0.0212		0.0797
		(0.064)		(0.054)
Girl		0.257		0.111
		(0.297)		(0.213)
Number of children in hh		0.494***		0.408***
		(0.155)		(0.132)
Single parent		1.504***		1.416***
		(0.373)		(0.332)
Constant	−3.725***	−5.540***	−2.494***	−4.981***
	(0.510)	(1.226)	(0.238)	(0.975)
Observations	1288	1288	910	910
Pseudo R^2	0.027	0.109	0.045	0.141

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results from logistic regressions with robust standard errors clustered at the family level. Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population.

Table A10: Risk factors of income poverty in childhood, number of missing social activities

	2000		2010	
Number of missing necessary items	0.394**	0.271	0.450***	0.389***
	(0.160)	(0.178)	(0.121)	(0.138)
Age		0.0212		0.0797
		(0.064)		(0.054)
Girl		0.257		0.111
		(0.297)		(0.213)
Number of children in hh		0.494***		0.408***
		(0.155)		(0.132)
Single parent		1.504***		1.416***
		(0.373)		(0.332)
Constant	−3.725***	−5.540***	−2.494***	−4.981***
	(0.510)	(1.226)	(0.238)	(0.975)
Observations	1288	1288	910	910
Pseudo R^2	0.027	0.109	0.045	0.141

Standard errors in parentheses

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

Notes: Results from logit regressions with robust standard errors clustered at the family level. Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population.

Table A11: Relative risk factors of income poverty in childhood, number of missing social activities

	2000		2010	
Number of missing social activities=1	1.268	1.376	0.598	0.697
	(0.602)	(0.697)	(0.299)	(0.347)
Number of missing social activities=2	1.515	1.540	1.089	1.034
	(0.739)	(0.793)	(0.507)	(0.486)
Number of missing social activities=3	2.335	1.865	0.788	0.706
	(1.373)	(1.116)	(0.480)	(0.387)
Number of missing social activities=4	3.880**	2.874*	1.358	1.292
	(2.174)	(1.776)	(0.805)	(0.810)
Number of missing social activities=5	4.039**	3.203	4.873**	3.786*
	(2.488)	(2.301)	(3.456)	(2.702)
Age		0.962		1.022
		(0.049)		(0.049)
Girl		1.231		1.133
		(0.367)		(0.234)
Number of children in hh		1.721***		1.561***
		(0.239)		(0.196)
Single parent		4.248***		3.878***
		(1.550)		(1.251)
Observations	1272	1272	903	903
Pseudo R^2	0.021	0.109	0.029	0.119

Exponentiated coefficients; Standard errors in parentheses

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

Notes: Results from logistic regressions with robust standard errors clustered at the family level. Income poverty is defined in terms of equivalent disposable household income being below 1/2 of the median in the overall population. *Number of missing social activities* is based on dummies indicating whether or not an individual has reported missing a social activity (i.e. having responded either "Seldom" or "Never" on the question: "How many days during a normal week do you..." with the following options: "Every day", "Several times a week", "Once a week", "Seldom", "Never"). The reference category consists of individuals with zero missing social activities.

B   Questionnaire items

- (Wave 1, 2000) Do you have any of the following: own room; pet; own TV; own VCR; own computer games; own CD-player; own mobile phone; own computer; or none of these?

- (Wave 1, 2010) Do you have any of the following: own room; pet; own TV; own mobile phone; own computer; or none of these?

- How well does this statement match? Options: does not match at all, matches poorly matches roughly and matches exactly. Coded as 1 (does not match at all) to 4 (matches exactly).

  - I am almost always in a good mood
  - I find it hard to sit still and concentrate
  - I rarely start fights
  - I am often tense and nervous
  - I have no worries
  - I often feel sad or down
  - I can cope with a lot
  - I get angry easily
  - I am mostly happy with myself
  - I am often grumpy and annoyed
  - I dare to express my own opinion
  - I am satisfied with my looks
  - I have a positive outlook on the future

- During the past 6 months, how often have you had the following: headache, stomachache, troubles sleeping, or feeling stressed? Options: every day, several times a week, once a week, a couple of times a month, or more seldom. Coded as 1 (more seldom) to 4 (every day).

- (Wave 1, 2000) Do you feel safe in the following places?

  - Outside in my neighborhood
  - On your way to school
  - In the classroom
  - At break
  - On your way home from school
  - None of the above

- (Wave 2, 2010) Do you feel safe in the following places?

  - Outside in my neighborhood, at daytime

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- – Outsider in my neighborhood, at night
- – On your way to and from school
- – In the classroom
- – At break
- – None of the above

- How many days during a normal week do you... Options: every day, several times a week, once a week, (more) seldom, never.

  - – ...read books
  - – ...follow the news on TV, radio or the newspaper
  - – ...use the Internet
  - – ...play computer or TV-games
  - – ...have friends at home
  - – ...visit friends in their home
  - – ...spend time with friends in some other place (e.g. outside)
  - – ...participate in some organized sports activity
  - – ...participate in some organized activity other than sports such as the scouts, theater or chess
  - – ...have time that is free from duties or responsibilities (for example relax and listen to music)
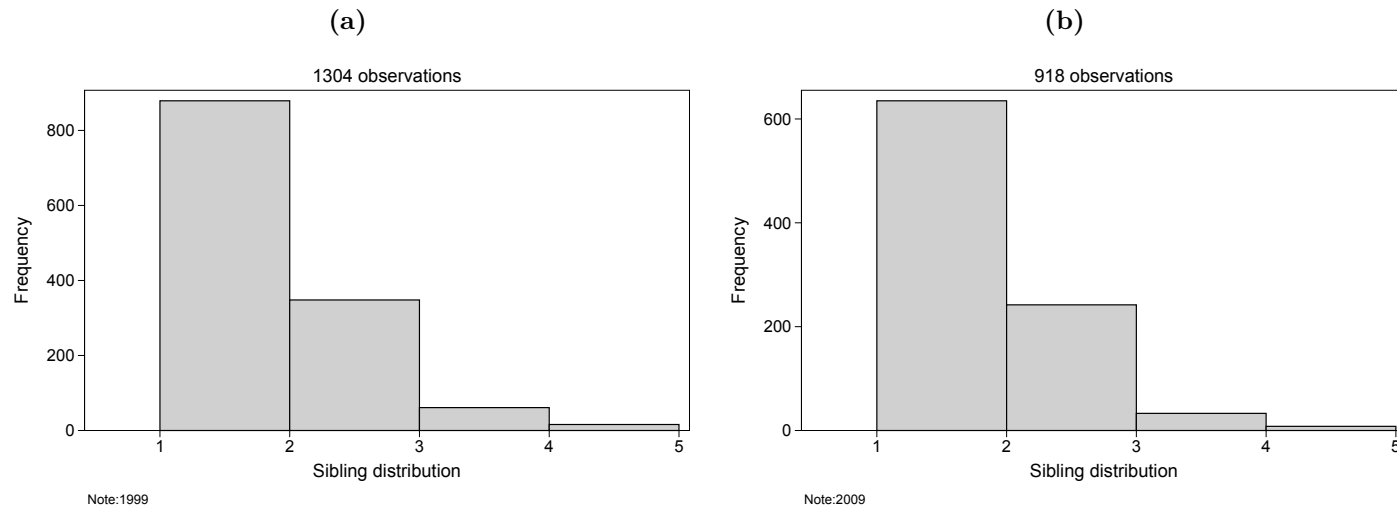
C   Figures and Tables

Figure C.1: Sibling distributions, 2000 and 2010

(a)

(b)

Table C1: Do you have any of the following..., as a percentage of the sample (n=1304 in 2000 and n=918 in 2010), unweighted

	2000		2010	
Necessity	Do not have	Have	Do not have	Have
Room	10.81	89.19	8.71	91.29
Pet	56.29	43.71	50.44	49.56
TV	48.39	51.61	41.18	58.82
Mobile phone	58.05	41.95	4.03	95.97
Computer	74.39	25.61	33.01	66.99
Have not (things)	98.08	1.92	99.46	0.54

Table C2: How many days a normal week do you..., as a percentage of the sample (n=1304 in 2000 and n=918 in 2010), unweighted

Activity	Every day	Several times a week	Once a week	Seldom	Never	Missing values
2000						
Read	17.87	26.07	17.18	27.45	11.20	0.23
News	18.63	36.43	16.64	18.40	9.66	0.23
Play	15.87	34.28	18.33	21.55	9.89	0.08
Internet	11.20	27.76	17.48	21.63	21.78	0.15
Friends home	5.75	45.55	23.93	22.09	2.38	0.31
Home friends	6.13	54.68	21.63	15.80	1.69	0.08
Sport	5.52	44.56	15.57	8.21	25.84	0.31
Other activities	0.92	6.06	15.11	14.95	62.12	0.84
Meet friends	34.28	36.58	12.42	12.35	3.91	0.46
Leisure	10.12	38.11	26.69	21.63	3.07	0.38
2010						
Read	13.18	25.60	14.81	32.57	13.51	0.33
News	14.38	33.01	21.02	21.35	9.69	0.54
Play	29.74	30.50	11.33	18.19	9.91	0.33
Internet	55.56	30.50	4.79	5.56	3.27	0.33
Friends home	2.72	40.31	28.00	25.05	3.59	0.33
Home friends	2.18	47.06	28.00	20.92	1.63	0.22
Sport	6.10	45.86	13.51	8.39	26.03	0.11
Other activities	1.09	7.19	14.16	11.98	64.81	0.76
Meet friends	34.53	38.67	12.75	11.33	2.29	0.44
Leisure	6.86	38.34	26.80	23.64	3.27	1.09

Table C3: Equivalence scale, HEK, Statistics Sweden

One person	1,00
Two adults	1,51
First child	0,52
Later children	0,42
Children over 19 and other adults in the household	0,60