J Popul Econ (2018) 31:969–1004
https://doi.org/10.1007/s00148-017-0674-8

ORIGINAL PAPER

# The long-term effect of childhood poverty

**Rune V. Lesner**[1]

Received: 10 March 2016 / Accepted: 16 October 2017 / Published online: 4 November 2017


**Abstract** This paper uses variation among siblings to identify the consequences of childhood poverty on both labour and marriage market outcomes. In the labour market, individuals who experienced childhood poverty are found to have lower earnings and lower labour market attachment and to have worse jobs both vertically in terms of low-paying industries and horizontally in terms of job positions. In the marriage market, childhood poverty is found to have negative consequences for the probability of marriage, cohabitation, and having children around the age of 30. The effect sizes are found to exhibit an inverse u-shape in the age of the child, peaking during adolescence. Results on educational choices suggest that the mechanisms behind these results can be that childhood poverty affects the skill formation, networks, and decision making of the child.

**Keywords** Poverty · Child development · Family background · Siblings · Intergenerational mobility

**JEL Classification** D31 · I32 · J13

## 1 Introduction

In Western countries, childhood poverty is a sizable, persistent, and controversial feature of the modern economy. In 2012, on average across OECD countries,

*Responsible editor*: Erdal Tekin

✉ Rune V. Lesner
rlesner@econ.au.dk

[1] Department of Economics and Business Economics, Aarhus University, Fuglesangs Allé 4, 8210 Aarhus V, Denmark

around 13% of children were reported as living in income poverty.[1] Based on such observations, a growing literature has been concerned with documenting the potential consequences of childhood poverty. Yet, the long-term consequences and the mechanisms behind it are still not fully understood.

This paper identifies the effect of childhood poverty by using within-family variation among siblings in the experience of childhood poverty and by relying on a rich set of within-family controls. This is done in order to control for other, often unobservable, parental and environment factors. The potential difference in the number of years in childhood poverty between siblings will allow for identification of the marginal effect of one additional year in childhood poverty. Age differences among siblings and the timing of parental poverty will allow for identification of heterogeneous age effects of childhood poverty.

One concern is that childhood poverty might affect skill formation. The skill formation of children depends on individual endowments and investments (Cunha and Heckman 2007, 2008). Investments can be either public (school, daycare, social workers, public transfers) or private investments by the parents. The Scandinavian countries are characterised by high public investments. This paper will explore to what extent these public investments are sufficiently high such that a drop in the private investments due to parental poverty can be compensated for.

Models of skill formation with dynamic complementarity suggest the timing of the investment matters. In particular, early investments are expected to be of highest value. As the public investments in the Scandinavian countries are decreasing in age, it is however not clear that the marginal effect of a drop in private investments follows the same pattern.

A drop in parental income also has the potential to affect decision making by the child. The Danish educational system is structured such that the first major decision to be made (besides level of effort) takes place at the end of compulsory school in the 9th grade. At this point, the child has the choice of whether to enrol in further education or enter the labour market. Parental poverty around this time can potentially have long-lasting consequences if it for example affects individual discounting of expected future consumption possibilities and thereby pushes the individual towards an earlier labour market entry. Whether the effect of a drop in private investments due to parental poverty is age-dependent is an empirical question this paper attempts to answer.

Choices of type of education and occupation will affect not only future consumption possibilities and job stability, but also the types of networks the individual is exposed to. Both the income level and the types of networks are found to affect performance in the marriage market (Becker 1973; Angrist 2002; Svarer 2007). Thus, in order to understand the broad implications of childhood poverty, this paper studies the consequences in both the labour market and the marriage market. In addition, the choices of schooling, career, and networks are examined in order to explore the proposed mechanisms.

[1] see http://www.oecd.org/social/income-distribution-database.htm

I find that childhood poverty has consequences both in the labour market and in the marriage market. In the labour market, individuals who experience childhood poverty are found to have lower earnings and lower labour market attachment and to have worse jobs both vertically in terms of low-paying industries and horizontally in terms of job positions. In the marriage market, childhood poverty is found to have negative consequences for the probability of marriage, cohabitation, and having children around the age of 30.

I propose that a major part of the effect arises from carrier choices. Investigating the choice of education and time of labour market entry discloses that individuals who experience childhood poverty enter the labour market earlier, take shorter educations, and if they enter high school, obtain lower GPAs. These results are all in line with childhood poverty affecting the skill formation of the child. It is however also found that they end up in more gender-segregated educations and industries which in itself can affect the possibilities of a match in the marriage market.

The size of the estimates on most outcomes exhibits an inverted u-shape in the age of the child, peaking in the last years of compulsory school, where for example, one additional year in childhood poverty decreases the disposable income of the individual by 6.4%. Thus, the experience of poverty in the crucial ages where the major decision on carrier tracks has to be made is most important. It is also found that childhood poverty induces individuals to choose educations with a higher labour market return conditional on the educational duration. These two results could indicate that childhood poverty affects decision making, which is in line with a change in individual discounting of expected future consumption possibilities.

The effect of childhood poverty is not found to be accentuated by simultaneous shocks to the household due to parental divorce, job loss, or relocation. Furthermore, the effect does not seem to be driven by a potential intergenerational transferal of public transfer dependence. It is however the case that the size of the effect has a social gradient such that children with low-educated parents are harmed more by childhood poverty than children with high-educated parents, indicating that high-resource parents can compensate for their lack of monetary investment possibilities.

In this paper, I use a relative poverty measure to identify the families where children are socioeconomically deprived. The focus on the effect of poverty is chosen on account of previous empirical literature finding very large effects for children growing up in low-income families on educational attainment (Dahl and Lochner 2012; Løken et al. 2012). Similarly, the intergenerational income correlation is found to be very high at the bottom of the income distribution. An individual is defined as experiencing childhood poverty at a given age if the disposable income of the parents is below 50% of the median income of the full population of Danes in the given year.

The empirical literature attempting to causally estimate the link between the income of the parents and short- and medium-term outcomes of the child finds that parental income has an effect on educational attainment of the child both in terms of test scores and duration of schooling (Duncan et al. 2011; Dahl and Lochner 2012; Levy and Duncan 2000). Milligan and Stabile (2011) and Løken et al. (2012) also find impacts on mental and physical health as well as the IQ of the child. U.S. studies (Duncan et al. 1998; Levy and Duncan 2000) find that parental income seems

to matter more for small children, while Northern European studies (Humlum 2011; Jenkins and Schluter 2002) find that the impact is largest when the child is in its teens.

This study distinguish itself from this line of literature by specifically focusing on the long-term consequences of childhood poverty both in the labour market and in the marriage market. The study follows the previous literature by investigating the educational attainment, but it provides new insights by using this information to get a sense of the mechanisms behind the long-term consequences in the labour market and the marriage market.

The paper proceeds as follows. In the next section, I describe the data, the sample selection, and the definition of childhood poverty. The strategy for estimating the effect of childhood poverty is described in Section 3. Section 4 presents results. Section 5 shows robustness checks, and Section 6 concludes.

## 2 Data

This paper takes advantage of the comprehensive Danish full-population administrative data. The longitude and the richness of this data source is one of the major strengths of the paper. In this section, I describe the data source, sample selection, descriptive statistics, and how this data source is used to construct a measure of childhood poverty.

### 2.1 Data source

This paper uses the Integrated Database for Labour Market Research (IDA) provided by Statistics Denmark. IDA is a matched employer-employee longitudinal database including yearly socioeconomic information on all Danes. The version used in this paper consists of information from the period 1980 to 2011. In general, the annual IDA measurements refer to the last week of November in each year. From the database, I use information on biological families to establish links between individuals, parents, and siblings.

I extract the disposable income of the individual from the database. This measure is used to define childhood poverty. The disposable income measure consists of individual income such as wages, transfers, and interest excluding taxes. It is designed by Statistics Denmark such that it mirrors the available income for consumption and savings for the individual.

I also extract the following set of socioeconomic information: gender, age, employment, gross income, earnings, type and duration of schooling, accumulated labour market experience, household type, number of children, municipality of residence, birth weight, birth length, job position, and industry. Household type includes marriage, being single, and cohabitation. Job position can be used to disentangle regular work from self-employment and high-end job. The measure of annual earnings is the sum of all labour market income including fringe benefits and stock options reported to the tax authorities. The measure of gross annual income includes all income during the year before taxes.

### 2.2 Sample selection

The data sample used in the estimations is constructed by including all pairs of siblings where both are born between 1980 and 1983. In order to abstract from the issue of the parental choice of family size, only two-child families will be considered (Bagger et al. 2013). It is required that the mother can be observed from birth to the age of 21. Parental information from birth to the age of 21 is used to define childhood poverty.[2] It is further required that the siblings can be observed in all years from 2008 to 2011, where the outcome variables are measured. The small group of individuals who are still in school in 2008 is excluded from the sample.

The sample is constructed in this manner in order to be able to have yearly observations of childhood poverty from birth to the age of 21 as well as outcomes when the individuals are around the age of 30. The sample includes 126,989 observations on 32,357 individuals and their parents.[3]

### 2.3 Measuring childhood poverty

In this paper, the measure of childhood poverty is based on the disposable income of the parents in a given year. The disposable income of the parents is made comparable across household structures by using an equivalence scale. The OECD-modified scale is applied. The scale assigns a value of 1 to single households without children, a value of 0.5 for each additional adults, and a value of 0.3 for each additional child in the household. By using an equivalence scale, marriage is allowed to be an insurance against individual poverty and allows for public goods in the household.

Based on this measure of parental disposable income, the childhood poverty measure is defined as a relative measure for all Danes of ages between 18 and 55. A person is defined as experiencing childhood poverty at a given age if the disposable income of the parents is below 50% of the median income of the full population of Danes ages 18 to 55 in the given year. The advantage of this measure is its simplicity and that it follows the income dynamics of the rest of the country. This makes it easy to interpret the results from the model and avoid any politically loaded arguments on the selection of poverty.[4]

Since the poverty of students represents a distinct type of poverty which is not the focus of this paper, students falling below the poverty threshold will not be considered as poor.

Figure 8 in Appendix shows the percentage of the sample experiencing childhood poverty at a given age using the definition described above. From the figure, it can be seen that the percentage of children experiencing poverty is rather stable at around 6.5% of the sample from birth to around the age of 7, but it then decreases as the parents become older and stabilises at around 2.5% when the child turns 18.

[2]Using age cut-offs at 14, 18, or 25 yields similar results.

[3]Table 9 in Appendix shows the number of observations excluded from the sample in each selection step.

[4]Section 5 shows results where other poverty measures are used.

### 2.4 Descriptive statistics

Descriptive statistics on the sample of individuals can be found in Tables 1 and 2. Table 1 shows information on the individuals, and Table 2 shows information on their parents. Both Tables 1 and 2 are split into three columns. The first column presents information on all individuals, the second column presents information on individuals who never experience childhood poverty, and the third column presents information on individuals who experience at least 1 year of childhood poverty. The last row of the tables show that about 25% of the individuals in the sample experience poverty

**Table 1** Descriptive statistics of individual characteristics in 2011

| | All | Never experienced childhood poverty | Experienced childhood poverty at least once |
|---|---|---|---|
| Disposable income† | 26,472.53 | 26,687.16 | 25,880.86 |
| Gross income† | 38,758.02 | 38,970.40 | 38,172.54 |
| Earnings† | 32,734.58 | 33,354.57 | 31,025.42 |
| Women | 0.51 | 0.51 | 0.52 |
| Age | 29.54 | 29.53 | 29.57 |
| Employment rate | 0.83 | 0.84 | 0.80 |
| Labour market experience | 6.06 | 6.10 | 5.95 |
| High-end job | 0.28 | 0.29 | 0.24 |
| Self-employed | 0.03 | 0.03 | 0.04 |
| Regular worker | 0.51 | 0.51 | 0.52 |
| Poor (50% of median income) | 0.08 | 0.07 | 0.10 |
| Married | 0.30 | 0.30 | 0.32 |
| Have children | 0.45 | 0.45 | 0.46 |
| Birth weight (kg) | 3.38 | 3.37 | 3.38 |
| Birth length (m) | 0.52 | 0.52 | 0.52 |
| Residence in or close to Copenhagen | 0.27 | 0.28 | 0.24 |
| Years of education | 14.46 | 14.56 | 14.17 |
| Education | | | |
| Low | 0.25 | 0.24 | 0.28 |
| Medium | 0.57 | 0.57 | 0.56 |
| High | 0.17 | 0.19 | 0.14 |
| Number of individuals | 32,357 | 23,744 | 8,613 |
| Number of observations | 126,989 | 93,076 | 33,913 |

The first column shows means (statistics) for the entire sample, the second column shows statistics for those who never experienced childhood poverty, and the third column shows statistics for those who experienced poverty at least for 1 year during childhood. All statistics are measured in 2011. † reported in Euros in 2010 prices. The level of education is split into the three groups: low, medium, and high, such that the low-education group contains basic education including elementary school and high school, the medium-education group contains vocational educations and undergraduates, and the high-education group consists of graduates students

**Table 2** Descriptive statistics of parental characteristics

| | All | Never experienced childhood poverty | Experienced childhood poverty at least once |
|---|---|---|---|
| Age of father at birth | 29.44 | 29.24 | 29.98 |
| Age of mother at birth | 26.33 | 26.28 | 26.47 |
| At least one immigrant parent | 0.07 | 0.06 | 0.12 |
| Parents cohabiting at birth | 0.96 | 0.97 | 0.94 |
| Father in a UI-fund[†] | 0.71 | 0.76 | 0.56 |
| Disposable income in household[††] | 18,477.80 | 19,896.54 | 14,566.65 |
| Educational group of father[†] | | | |
| Low | 0.37 | 0.34 | 0.45 |
| Medium | 0.56 | 0.58 | 0.49 |
| High | 0.07 | 0.08 | 0.05 |
| Educational group of mother[†] | | | |
| Low | 0.41 | 0.38 | 0.49 |
| Medium | 0.55 | 0.59 | 0.49 |
| High | 0.03 | 0.04 | 0.02 |
| Number of individuals | 32,357 | 23,744 | 8,613 |
| Number of observations | 126,989 | 93,076 | 33,913 |

The first column shows means (statistics) for the entire sample, the second column shows statistics for those who never experienced childhood poverty, and the third column shows statistics for those who experienced poverty at least for 1 year during childhood. [†] measured in 2011. [††] in year 1991 in Euros measured in 2010 prices

at least 1 year during their childhood. By comparing the second and third columns in Table 1, it can be seen that individuals who experience poverty at least once during their childhood on average have a lower income in terms of disposable income, gross income, and earnings. They also have a lower employment level, less accumulated labour market experience, and shorter educations. Additionally, a higher fraction of them are observed as being poor in year 2011, and they are less likely to live in the metropolitan district of the capital.

Table 2 shows results on parental characteristics. Individuals who experience poverty at least once during childhood have slightly older parents with shorter educations. They grow up in households with lower disposable incomes, and their parents are more likely to be immigrants.

Overall, these numbers suggest that individuals who experience childhood poverty are doing worse than others in terms of long-term outcomes. They also suggest that their parents were doing worse. Whether the difference in long-term outcomes of the individuals can be attributed to the experience of childhood poverty or whether it is purely due to selection is the main question attempted to be answered in the later sections of this paper.[5]

[5]In the sample, it is found that the sibling income correlation is 0.43, which is in line with the literature (Solon 1999; Black and Devereux 2010).

## 3 Empirical method

The effect of childhood poverty is identified by exploiting the variation between siblings in the timing of experience of childhood poverty to take out between-family variation and by relying on a rich set of controls to take out irrelevant within-family variation.

The model is estimated by a linear regression with family fixed effects and controls to capture any unintended variation within the sibling pairs. The family fixed effects are allowed to vary by year as outcome variables are included for each year from 2008 to 2011.[6] The estimated model can be described as in Eq. 1 below.

$$y_{it} = \delta_1 X_i + \delta_2 Z_i + \sum_{j=0}^{7} \beta_j P_{ij} + \gamma_{ft} + \varepsilon_i, \tag{1}$$

where $y$ is the relevant outcome, $X$ represents a set of within-family controls, $Z$ are time-varying within-family controls, $\gamma$ is the family-year fixed effect, $\varepsilon$ is an iid error term, and $P$ is the number of years in childhood poverty within a given age interval.

I choose to pool the experience of childhood poverty into age intervals. The chosen age intervals are the year of birth, ages 1 to 3, 4 to 6, 7 to 9, 10 to 12, 13 to 15, 16 to 18, and 19 to 21. Each age interval represents the accumulated number of years in childhood poverty within the given age interval. A version of the model using the accumulated number of years in childhood poverty within the entire age interval from the year of birth to age 21 is also estimated.[7] I choose to pool the events in order to obtain more precision as using a family fixed effect method can potentially cause problems related to low power in the estimations and, as a result, large standard errors (Bagger et al. 2013; Black et al. 2005, 2011; Booth and Kee 2009).

The estimates of $\beta_i$ for $i \in [0, 7]$ are the main objects of interest in this paper. These represent the marginal effects of one additional year in childhood poverty within a given age interval. The identifying variation stems from sibling pairs with different histories of childhood poverty.[8] In the case of the age interval from the year of birth to age 21, the control group includes younger siblings where the parents were poor before birth of the sibling and older siblings where the parents were poor after the age of 21.[9] The reference group is the same in the case where more age intervals are used.

[6] The outcome years are treated as separate cross-sections by allowing for separate fixed effects for each outcome year. This assumption is preferred since it is less restrictive than the alternative of pooling the cross-sections and taking out only one family fixed effect. However, estimations that do not allow for year variation in the fixed effects deliver similar results.

[7] Cut-offs at ages 14, 18, and 25 were implemented with similar results.

[8] Table 9 in Appendix shows the identifying variation in the data. That is the number of sibling pairs with variation in accumulated childhood poverty within each age interval. The precision is increased by using 4 years of outcomes from 2008 to 2011.

[9] One might be concerned that the older siblings experienced substantially more childhood poverty than younger siblings. This is only the case for 55% of the sibling pairs. It thus raises no concern. Estimations where the control group is split into two by the birth order can be found in Section 5.2.

In order for the identification strategy to be valid, it is necessary to assume that the control group is unaffected by the change in parental income status. This assumption is questionable, and it is to be expected that the estimates will be biassed downwards if this assumption is violated.

Another concern when using variation among siblings to identify the effect is that children from families where the parents are permanently poor do not contribute to the identification. Not allowing these individuals to affect the results can potentially underestimate the effect of childhood poverty. Section 5.2 looks into the effect of persistent poverty.

The set of controls $X$ is included to take out irrelevant within-family variation. The controls are selected on the basis of the literature using within-family fixed effect methods (Behrman and Taubman 1986; Blake 1989; Black et al. 2005; Breining 2014). The controls include age dummies, a gender indicator, parental age dummies, birth order, interaction between siblings, gender and birth order, and dummy variables for length at birth. In order to capture non-linearity of low-weight children, birth weight is included as a linear variable and as dummy variable for each kilogram interval starting from 1.5 kilograms.

The set of controls $Z$ is include in order to take out within-family variation caused by shocks to the family besides poverty. These controls are whether the mother moved place of residence, whether the father lost his job, whether the biological father moved away from the biological mother, and family structure. Here, family structure is split into three groups: biological parents live together, biological mother lives with a new partner, and biological mother lives without a partner. All controls are included separately by age of the child. Some of these controls can be thought of as potentially capturing part of the non-monetary effect of childhood poverty. Thus, including them can bias the estimate of the effect of childhood poverty downwards. Because of this concern, the model was estimated without these controls in order to shed some light on their impact on the main results.

The set of within-family controls is extensive. It is however still a concern that within-family variation can affect the results. Arguably, the set of time-varying controls cannot capture all potential shocks to the household, and perhaps more problematically, the interaction between siblings is expected to bias the results. Sibling spillovers might arise directly between the children or through compensating investments by the parents. The results described in the following section should be read with these limitations of the identification strategy in mind.

## 4 Results

In this section, I present results on the consequences of childhood poverty in the labour market and marriage market. The consequences for educational choices are investigated in order to hint at potential mechanisms. The last part of the section looks into the implications of various causes of parental poverty.

**Table 3** The effect of childhood poverty by age on the disposable income of the individual

| | Log disposable income | | Log disposable income | | Log disposable income | |
|---|---|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years in childhood poverty | | | | | | |
| Birth year ($\hat{\beta}_0$) | − 0.000 | (0.007) | − 0.038** | (0.013) | − 0.038** | (0.013) |
| Ages 1 to 3 ($\hat{\beta}_1$) | − 0.008** | (0.003) | − 0.014* | (0.008) | − 0.010 | (0.008) |
| Ages 4 to 6 ($\hat{\beta}_2$) | 0.010** | (0.003) | − 0.018* | (0.010) | − 0.017* | (0.010) |
| Ages 7 to 9 ($\hat{\beta}_3$) | − 0.004 | (0.003) | − 0.026** | (0.011) | − 0.024** | (0.011) |
| Ages 10 to 12 ($\hat{\beta}_4$) | 0.008** | (0.004) | − 0.023* | (0.012) | − 0.019 | (0.012) |
| Ages 13 to 15 ($\hat{\beta}_5$) | − 0.015** | (0.004) | − 0.064** | (0.013) | − 0.064** | (0.013) |
| Ages 16 to 18 ($\hat{\beta}_6$) | − 0.006 | (0.005) | − 0.023 | (0.014) | − 0.020 | (0.014) |
| Ages 19 to 21 ($\hat{\beta}_7$) | − 0.003 | (0.005) | − 0.026** | (0.011) | − 0.025** | (0.011) |
| Ages 0 to 21† | − 0.002** | (0.001) | − 0.024** | (0.006) | − 0.022** | (0.006) |
| Within-family controls ($X$) | Yes | | Yes | | Yes | |
| Time-varying controls ($Z$) | No | | No | | Yes | |
| Family fixed effect ($\gamma$) | No | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. The disposable income is measure in 2010 prices. † estimates from separate regressions. $X$ includes age dummies, a gender indicator, parental age dummies, birth order, interaction between sibling gender and birth order, and dummy variables for birth length. Birth weight is included as a linear variable and with dummy variables for each kilogram interval starting from 1.5 kilograms in order to capture non-linearity of low-weight children. $Z$ includes indicator by age of the child of whether the mother moved place of residence, whether the father lost his job, whether the biological father moved away from the biological mother, and family structure. Here, family structure is split into three groups: biological parents live together, biological mother lives with a new partner, and biological mother lives without a partner

## 4.1 Labour market

### *4.1.1 Income*

Table 3 presents the results on the marginal effect of one additional year of childhood poverty on the disposable income of an individual at a given age.

The results from the full version of the model can be found in the third column of the table. These results show that the experience of childhood poverty has a significant negative impact on the disposable income of an individual. The effect is sizable such that one additional year of childhood poverty experienced between the age of birth and the age of 21 has a negative impact on the disposable income of the individual of 2.2%. This result suggests that parental investments in the child drop as a consequence of the lower income and that public investments are not able to fully compensate for this change.

The effect of childhood poverty is further decomposed by splitting the effect by age of the child. From this exercise, I arrive at the interesting result that the effect of childhood poverty is largest when the child is in his/her early teens and peaks in the age interval 13 to 15. In this period, one additional year of childhood poverty has a negative effect of 5.9% on the disposable income of the individual as adult. The effect size is found to be inverse u-shaped in the age of the child, with a notable spike at the year of birth. Interestingly, these timing effects are different from those found in Duncan et al. (1998) and Levy and Duncan (2000) for the U.S., where it is found that family income matters most in the early years for the educational achievement of the child. A decreasing age profile in the return to investments would be the prediction of a skill formation model with dynamic complementarity (Cunha and Heckman 2007, 2008). The result in this paper is not an argument against decreasing returns to investment. It merely states that the marginal return to private child investments in Denmark, a country characterised by high and age-decreasing public investments is inversely u-shaped in the age. The difference in public investments is expected to be a major source of the discrepancy between the results in this paper and the results in the U.S. studies.

Finding a peak in the size of the effect at ages 13 to 15 is in line with the prediction that a drop in parental investments at the point in time where the child has to make the choice of either enroling in higher education or entering the labour market can affect the decision making of the child. Section 4.3 below elaborates on the educational decisions.

Table 3 includes results from three types of regressions. The first column only includes the within-family controls $X$. The second column shows results where the family fixed effect is added, and the third column shows results including time-changing within-family controls $Z$. Comparing the estimates across these three regressions illustrates that the inclusion of the family fixed effect changes the estimates significantly. This gives confidence that the empirical model takes out an important part of the irrelevant variation in the data. Including the time-varying controls $Z$ seems to have very little impact on the relevant estimates.

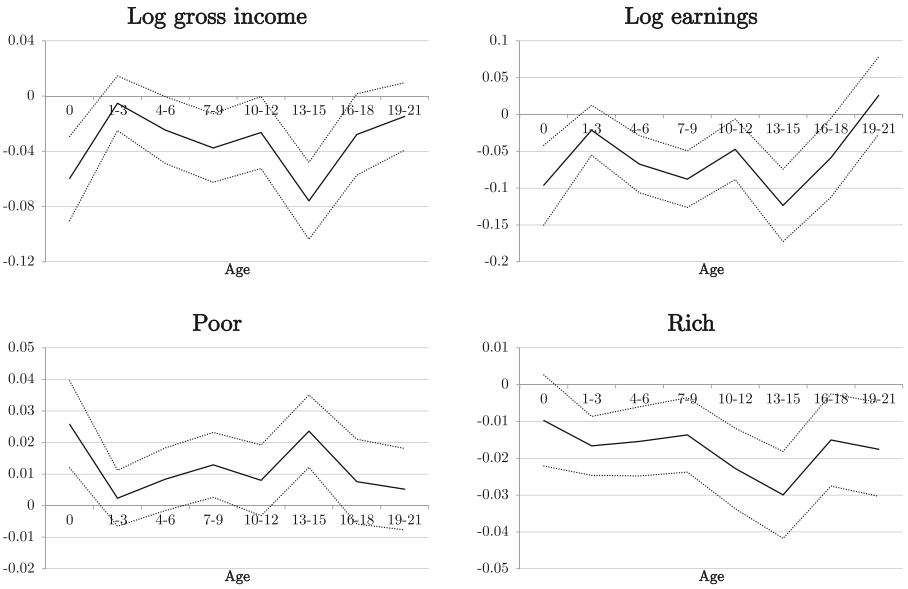


**Fig. 1** The effect of childhood poverty by the age of the child on log gross income, log earnings, being poor, and being rich. The solid line is the mean, and the dotted lines are 95% confidence intervals. See also Table 10 in Appendix. The estimates are from models including family-year fixed effects, constant within-family controls, and time-varying within-family controls as described in Section 3. Being poor is defined as below 50% and being rich is above 150% of the median disposable income in the full population of Danes age 18 to 55 in a given year. Outcomes are measured each year from 2008 to 2011

Figure 1 shows results on log earnings, log gross income, being poor, and being rich.[10] Comparing the results on the two income measures, log earnings and log gross income, to the results on log disposable income illustrates that the effect of childhood poverty is largest in earnings. Thus, the large effect of childhood poverty on earning of up to 12.4% at ages 13 to 15 is somewhat reduced by taxes and public transfers. The results on being poor and being rich show that childhood poverty increases the likelihood of being at the bottom of the income distribution and decreases the likelihood of being at the top of the income distribution.

### *4.1.2 Position in the labour market*

The previous section showed that the experience of childhood poverty has consequences for individual income later in life and that this relation is largest in labour market earnings. This section presents results on labour market attachment, labour market entry, and type of job in order to obtain a broader understanding of the labour

[10] An individual is defined as being poor if the disposable income of the individual is below 50% of the median income of the full population of Danes ages 18 to 55 in a given year. An individual is defined as being rich if the disposable income of the individual is above 150% of the median income of the full population of Danes ages 18 to 55 in a given year. The results can also be found in Table 10 in Appendix.

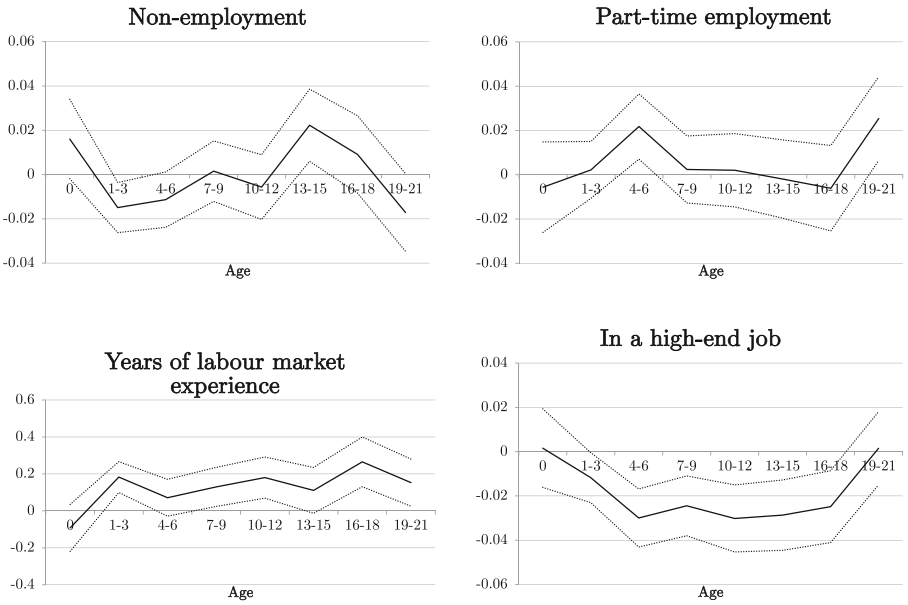


**Fig. 2** The effect of childhood poverty by the age of the child on non-employment, part-time employment, years of labour market experience, and being in a high-end job. The solid line is the mean, and the dotted lines are 95% confidence intervals. See also Tables 10 and 11 in Appendix. The estimates are from models including family-year fixed effects, constant within-family controls, and time-varying within-family controls as described in Section 3. Part-time employment is measured based on pension payments and is defined as working below 28 h per week. A high-end job is defined using information on the job description and includes high-end white-collar workers and regular workers with large salaries. Outcomes are measured each year from 2008 to 2011

market consequences of childhood poverty. Figures 2 and 3 present results on non-employment, part-time employment, years of labour market experience, being in a high-end job, average earning in industry, and log earnings at age 22.[11]

The results on earnings at age 22 and years of labour market experience show that individuals who experience childhood poverty have higher earnings at age 22 and accumulate more labour market experience. Both results indicate that childhood poverty induces the individual to enter the labour market earlier.

The results on non-employment and part-time employment show that childhood poverty implies lower labour market attachment. The results on being in a high-end job and on average earnings by industry show that individuals experiencing childhood poverty end up in worse jobs both vertically across industries and horizontally across job positions.

[11] Age 22 is chosen as it is the first age childhood poverty is no longer measured. Other early cut-offs yield similar results. A high-end job is defined using information on the job description and includes high-end white-collar workers and blue-collar workers with large salaries. The results can also be found in Tables 11–13 in Appendix.

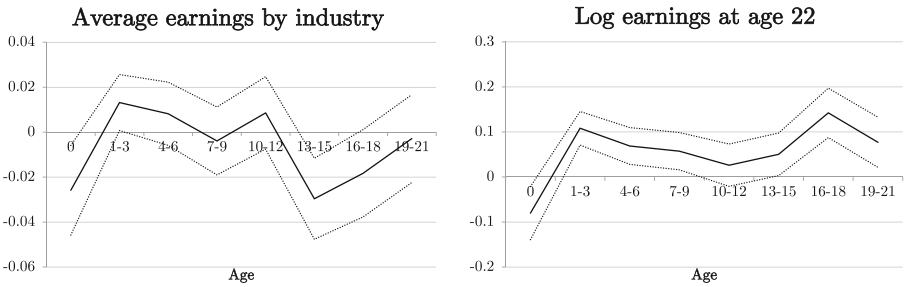


**Fig. 3** The effect of childhood poverty by the age of the child on the average earnings in the industry and on log earnings at age 22. The solid line is the mean, and the dotted lines are 95% confidence intervals. See also Tables 11 and 13 in Appendix. The industry is defined using a five-digit industry classification based on NACE rev. 2. Outcomes are measured each year from 2008 to 2011

### 4.2 Marriage market

This section describes the marriage market consequences of experiencing childhood poverty. Figures 4 and 5 present results on marriage, cohabitation, having children, and fraction of opposite gender with same education or within the same industry.[12]

These results show that the experience of childhood poverty decreases the likelihood of being married, cohabiting, and of having children around the age of 30. This less favourable position in the marriage market is in line with marriage market theory due to the lower income of the individual. Marriage market theory predicts that a lower income makes the individual a less attractive partner in the marriage market.

In this paper, I propose that the network caused by the choice of education and industry has consequences for the probability of a match in the marriage market (Angrist 2002; Svarer 2007). The results on fraction of opposite sex with same education and with same industry clearly show that the experience of childhood poverty prompt the individual to select into more gender-segregated educations and parts of the labour market. This selection makes the competition on the local marriage market harder and thereby decreases the probability of obtaining a match.

Note that the timing of the experience of childhood poverty is important. The negative consequences observed in the measures of marriage market outcome can primarily be seen for individuals experiencing childhood poverty at the end of compulsory school, ages from 13 to 15. At this point in time, the child has to choose which education to enrol in or whether to enter the labour market directly. This choice will not only affect future income but also the network the individual is exposed to in the marriage market.

### 4.3 Education

The description in the previous sections hints at the implications of childhood poverty for educational attainment as a decisive factor for the long-term outcomes in the

[12]The results can also be found in Table 12 in Appendix.

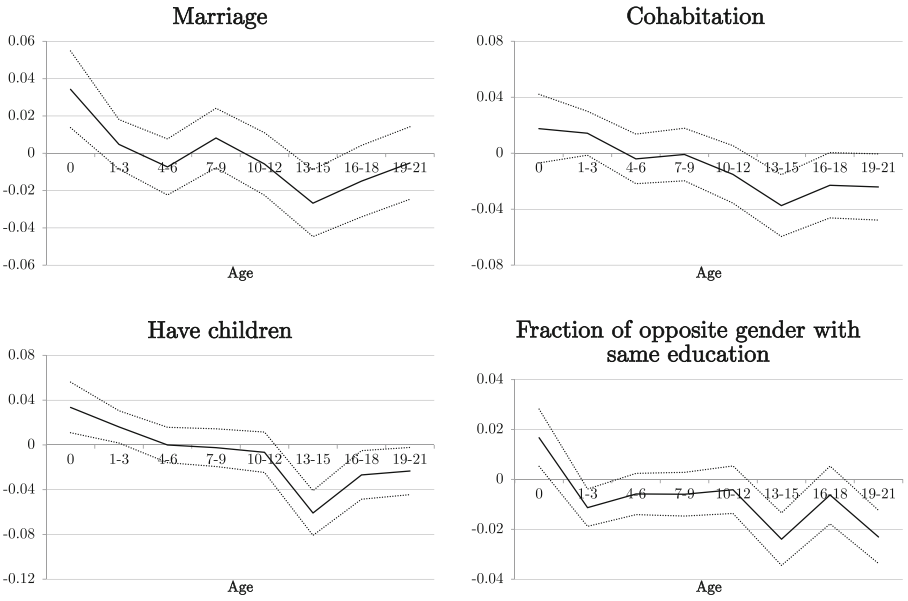


**Fig. 4** The effect of childhood poverty by the age of the child on being married, cohabiting, having children, and fraction of opposite gender with same education. The solid line is the mean, and the dotted lines are 95% confidence intervals. See also Table 12 in Appendix. The education is defined as using an eight-digit classification code. Cohabiting is defined as living at the same address with an individual of the opposite sex with an age span of less than 15 years. Children living with their parents are not included, but same sex-registered partnerships are. Outcomes are measured each year from 2008 to 2011

marriage and labour market. This section presents results on the consequences for educational attainment of the experience of childhood poverty.[13]

Figures 6 and 7 show results on years of schooling, high school degree at age 22, high school GPA, average earnings by education, and fraction non-employed with same education. From these results, it is clear that one additional year of childhood poverty reduces the duration of schooling by the individual (by about 2 months), and the individual ends up with an education with lower average earnings and lower labour market attachment.[14]

The longer educations in Denmark usually require a high school degree. The results show a negative effect of childhood poverty on the likelihood of having a high school degree at age 22.[15] This result indicates that the individuals select away from the long schooling tracks already at the end of compulsory school. It is worth noting here that the requirement for entering high school in Denmark is very low, and admission is free of charge, so the difference in the rate of high school enrolment can mostly be attributed to a choice of the individual.

[13]The results can also be found in Tables 11 and 13 in Appendix.

[14]Levy and Duncan (2000) and Løken et al. (2012) also find that parental income can affect the duration of schooling of the child.

[15]A similar result is found for high school enrolment. The estimates are available upon request.


**Fig. 5** The effect of childhood poverty by the age of the child on fraction of opposite gender with same industry. The solid line is the mean, and the dotted lines are 95% confidence intervals. See also Table 12 in Appendix. The industry is defined using a five-digit industry classification based on NACE rev. 2. Outcomes are measured each year from 2008 to 2011

In line with the results on test scores in Duncan et al. (2011), Milligan and Stabile (2011), and Dahl and Lochner (2012), I find for high school attendants that individuals who experience childhood poverty are likely to end up with a lower GPA. This result can be caused by childhood poverty affecting skill formation or childhood poverty inducing bright individuals to select away from high school enrolment.

The results described above illustrate that the experience of childhood poverty induces the individual to take a shorter and more gender-segregated education which has consequences both in the labour market and in the marriage market. The result on lower high school GPA could suggest that this is caused by a lower level of skill formation. These results can however also be a consequence of a change in individual depreciation of future expected consumption possibilities. If this is the case, then high-endowment individuals will chose to select away from the longer educations towards shorter educations with high returns in terms of labour market outcome. This potential mechanism is investigated by estimation the effect of one additional year of childhood poverty on the expected return to years of schooling. Here, expected return to years of schooling is measured as average earnings by education divided by the duration of the education. The results from this exercise can be found in Fig. 7. From these results, it is clear that an individual who experiences childhood poverty is more likely to choose an education with a higher return in the labour market conditional on the duration.

### 4.4 Causes of childhood poverty

The results in the previous section show that childhood poverty has negative long-term consequences for the individual. The circumstances through which the parents become poor are investigated in this section. This is done because the circumstances

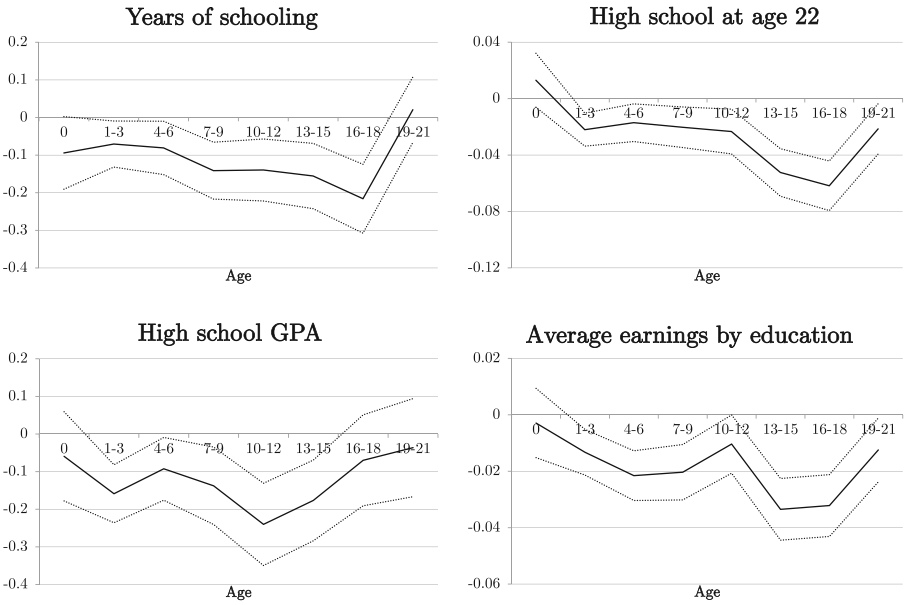


**Fig. 6** The effect of childhood poverty by the age of the child on years of schooling, high school degree at age 22, high school GPA, and average earnings by education. The solid line is the mean, and the dotted lines are 95% confidence intervals. See also Tables 11 and 12 in Appendix. The education is defined using an eight-digit classification code. Grades are standardized with mean zero and standard deviation of one by graduation year for the full population. Outcomes are measured each year from 2008 to 2011

might be important for the interpretation of the results. Children from high- and low-educated parents might be affected differently by childhood poverty. Childhood poverty in relation to a shock to the family, such as a divorce or parental job loss, might be different from poverty in families permanently on public transfers. This section looks into circumstances involving shocks to the family, the potential existence of welfare traps, differences across social classes, and differences across

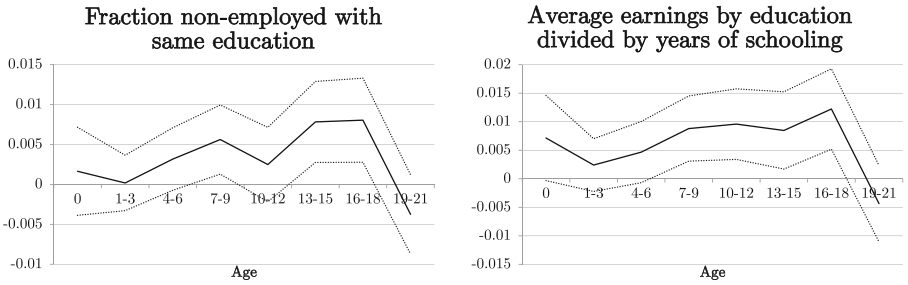


**Fig. 7** The effect of childhood poverty by the age of the child on fraction of non-employed with same education and on average earnings with with education divided by the duration of the education. The solid line is the mean, and the dotted lines are 95% confidence intervals. See also Table 13 in Appendix. The education is defined as using an eight-digit classification code. Outcomes are measured each year from 2008 to 2011

neighbourhoods in order to get a better understanding of the causes and implications of childhood poverty.

#### *4.4.1 Shocks to the family*

Shocks to the family such as parental divorce, parents moving, and a father losing his job can potentially have long-term effects on the child. Negative shocks like these might have an effect on the parents, non-monetary capacity to actively participate in the skill development of the child. They can affect the parents by lower well-being, depression, poor health, and less interaction with the child (Conger and Elder 1994; Elder and Caspi 1988; McLoyd 1990).

The purpose of this section is not to identify the long-term effects of these shocks. It is however to look into the impact of the experience of childhood poverty simultaneously with these potential causes of childhood poverty. In this paper, the three indicators parental divorce, parents moving, and a father losing his job are proposed to give insights on the role of parents' psychological distress in relation to their economic hardship. The base model described in Section 3 already controlled for such shocks by including the time-varying controls labelled $Z$. This section uses the same empirical strategy, but it includes indicators of whether the shocks to the household happened in a year where the child experienced childhood poverty.

The results in Table 3 establish that including controls for the shocks of parental divorce, parental relocation, and job loss of the father has very little impact on the estimates on the effect of childhood poverty. Table 4 shows results on the interaction between childhood poverty at a given age and these shocks to the family. From the table, it can be seen that the experience of the shocks job loss of the father and parental relocation in the same year as the parents become poor does not seem to have a major additional impact. While these shocks in themselves might have severe impacts on the skill formation of the child, the impacts of these do not seem to accentuate the effect of childhood poverty. On the other hand, childhood poverty becomes less important when the child experiences parental divorce in the same year.

The results in this section suggest that shocks to the family, such as parents moving, parental divorce, and a father losing his job, which potentially can cause psychological distress to the parents, do not seem to be a major driver behind the negative consequences of childhood poverty found in this paper.

#### *4.4.2 Welfare trap*

The results in Moffitt (1983), Solon et al. (1988), Gottschalk (1990), and Antel (1992) suggest that the experience of growing up in a family dependent on government transfers will decrease the stigma associated with receiving social transfers for the child later in life. This effect is then said to to spill over into lower educational ambitions and work ethics.

This paper looks into the possible existence of a welfare trap and its potential impact on the effect of childhood poverty in two ways.

**Table 4** The impact of other shocks to the family on the effect of childhood poverty by age

| | No. of years in childhood poverty in the same year as: | | | | | |
|---|---|---|---|---|---|---|
| | Mother moves | | Father losses his job | | Parents divorce | |
| | Log disposable income | | Log disposable income | | Log disposable income | |
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| Ages 1 to 3 | 0.024 | (0.028) | − 0.037 | (0.047) | 0.238** | (0.088) |
| Ages 4 to 6 | 0.005 | (0.037) | 0.068 | (0.057) | 0.236** | (0.087) |
| Ages 7 to 9 | − 0.020 | (0.044) | 0.013 | (0.062) | 0.187** | (0.086) |
| Ages 10 to 12 | 0.012 | (0.050) | 0.122* | (0.066) | 0.298** | (0.088) |
| Ages 13 to 15 | − 0.023 | (0.063) | − 0.046 | (0.074) | 0.055 | (0.086) |
| Ages 16 to 18 | 0.030 | (0.052) | − 0.094 | (0.064) | 0.009 | (0.065) |
| Ages 19 to 21 | 0.082** | (0.037) | 0.001 | (0.059) | 0.133** | (0.052) |
| Within-family controls ($X$) | Yes | | Yes | | Yes | |
| Time-varying controls ($Z$) | Yes | | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3

The first method uses an indicator of whether an individual is outside the labour market[16] as outcome measure, and looks at the impact of the father being outside the labour market during the childhood of the individual as a control. Here a positive correlation will be seen as an indication of a welfare trap.

Results from this exercise can be found in Table 5. The first column of the table shows results without family fixed effects. The second and the third columns show results where family fixed effects and time-varying controls are included. The results in the first column clearly show a positive intergenerational correlation in the tendency to be outside the labour market. This is in line with the existence of a welfare trap. The results in the second and third columns show that this positive correlation disappears once the family fixed effects are included. So there seems to be no evidence of a welfare trap but some evidence of intergenerational correlations in labour market attachment.

The second method is based on the baseline regression described in Section 3, but it includes controls for whether the father is outside the labour market at a given age of the child and interaction terms between childhood poverty and father outside the labour market at a given age. If a welfare trap could be detected, then the estimates on these interaction terms would show whether the welfare trap had an impact on the effect of childhood poverty. As expected from the results in Table 5, the results in Table 14 in Appendix show very little evidence of a welfare trap affecting the results on the effect of childhood poverty.

Thus, the results in this section imply no evidence of a welfare trap and very little impact of parental welfare recipiency on the effect of childhood poverty.

#### *4.4.3 Neighbourhood and social class of the parents*

The effect of childhood poverty can potentially differ across the social classes of the parents. Higher-educated parents might be able to compensate for the lack of income by borrowing money or by relying on their network. On the other hand, the social stigma of poverty can potentially be larger for higher educated parents, which could affect the child through the psychological distress of the parents. Similar arguments can be made for parents from expensive neighbourhoods.[17]

Table 6 shows results on the the effect of childhood poverty conditioning of the educational level of each of the parents and results on the effect of childhood poverty when controlling for the municipality of birth.

The second and the third columns of Table 6 show results on the variation in the consequence of childhood poverty across educational levels of the parents. These results reveal that the estimates decrease in the educational level of the parents, especially in the educational level of the father. This result is in line with the idea that the consequence of childhood poverty is more severe when the parents have a hard time compensating for the loss of income.

[16] Outside the labour market is defined as non-employed and not receiving UI-benefits.

[17] See Aaronson (1998), Case and Katz (1991), Galster et al. (2008), and Galster (2012).

**Table 5** The impact of the father being outside the labour market on the probability of the individual being outside the labour market by the age of the child

| | Outside the labour market† | | Outside the labour market | | Outside the labour market | |
|---|---|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years of the father being outside the labour market | | | | | | |
| Birth year | 0.059** | (0.008) | − 0.016 | (0.016) | − 0.023 | (0.018) |
| Ages 1 to 3 | 0.022** | (0.003) | 0.007 | (0.009) | − 0.012 | (0.013) |
| Ages 4 to 6 | 0.010** | (0.003) | 0.010 | (0.008) | 0.004 | (0.012) |
| Ages 7 to 9 | 0.007** | (0.003) | − 0.001 | (0.007) | 0.008 | (0.010) |
| Ages 10 to 12 | 0.014** | (0.003) | 0.009 | (0.007) | − 0.002 | (0.010) |
| Ages 13 to 15 | 0.015** | (0.003) | 0.001 | (0.007) | − 0.005 | (0.010) |
| Ages 16 to 18 | 0.003 | (0.003) | 0.024** | (0.007) | 0.059** | (0.010) |
| Ages 19 to 21 | 0.008** | (0.002) | − 0.005 | (0.006) | − 0.019* | (0.010) |
| Within-family controls ($X$) | Yes | | Yes | | Yes | |
| Time-varying controls ($Z$) | No | | No | | Yes | |
| Family fixed effect ($\gamma$) | No | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. † outside the labour market is defined as not being employed or receiving UI-benefits. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3

The first column of Table 6 shows results on the estimates of childhood poverty when the municipality of birth is included as a control. By comparing these results with the baseline results in Table 3, it can be seen that the municipality of residence at the age of birth does not seem to make a difference to the estimates.[18]

## 5 Robustness

The results in this paper rely on the definition of parental poverty and on the family fixed effect strategy. This section shows evidence on the robustness of the results when the definition of parental poverty is changed. This is done by estimating the model using various poverty thresholds and by taking the potential importance of persistent poverty into account. Secondly, the validity of the empirical strategy is investigated by taking a closer look at the choice of control group.

### 5.1 Different poverty measures

An individual is defined as experiencing childhood poverty at a given age if the disposable income of the parents is below 50% of the median income in the full population of Danes ages 18 to 55. Choosing a threshold in this manner has the advantage of making the results clear and easy to interpret without having to rely on normative arguments. Ultimately, the choice comes down to choosing a threshold. This paper follows the tradition of choosing a cut-off at 50% of the median income, but there is no objective argument as to why the cut-off should not be at a lower or a higher level.

To overcome this difficulty, I choose to present results using thresholds at 20, 30, 40, 60, and at 70%. The results from this exercise can be found in Table 7. In the table, it can be seen that results are stable across poverty thresholds. Yet they have a tendency to smaller effects for the thresholds 60 and 70%. The choice of threshold will affect the size of the estimate, but the interpretation of the overall message on the long-term consequence of childhood poverty is unaffected. The result gives confidence in the main conclusions of the paper. The stability of the estimate sizes across poverty thresholds can be seen as a product of the small variation in income at the lower end of the income distribution in Denmark due to the Danish social security system.

The experience of persistent poverty might be what carries the main long-term impact of poverty. A household experiencing temporary poverty may be able to borrow money from banks, friends, and family, but this will not be a possibility when experiencing persistent poverty. Contrary, a household moving from a year of non-poverty to a year of poverty may be more strongly psychologically affected than a family experiencing its second year of poverty.

[18] Clearly, most of the variation in the data across municipalities is captured by the family fixed effects. Thus, this result is in itself perhaps less surprising.

**Table 6** Heterogeneity in the effect of childhood poverty by the length of parental education and the importance of the municipality of birth

| | | | Interaction with: | | | |
|---|---|---|---|---|---|---|
| | Municipality of birth | | Education of father | | Education of mother | |
| | Log disposable income | | Log disposable income | | Log disposable income | |
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years in childhood poverty (a) | | | | | | |
| Birth year | − 0.041** | (0.013) | − 0.060** | (0.021) | − 0.022 | (0.018) |
| Ages 1 to 3 | − 0.006 | (0.008) | − 0.006 | (0.012) | − 0.009 | (0.010) |
| Ages 4 to 6 | − 0.018* | (0.010) | − 0.013 | (0.016) | − 0.007 | (0.012) |
| Ages 7 to 9 | − 0.025** | (0.011) | − 0.021 | (0.018) | − 0.037** | (0.014) |
| Ages 10 to 12 | − 0.018 | (0.012) | − 0.025 | (0.021) | − 0.022 | (0.018) |
| Ages 13 to 15 | − 0.067** | (0.013) | − 0.090** | (0.021) | − 0.078** | (0.018) |
| Ages 16 to 18 | − 0.021 | (0.014) | − 0.059** | (0.022) | − 0.054** | (0.020) |
| Ages 19 to 21 | − 0.025** | (0.011) | − 0.040** | (0.015) | − 0.023* | (0.014) |
| Parent medium education interaction with (a) | | | | | | |
| Birth year | | | 0.046* | (0.025) | − 0.033 | (0.025) |
| Ages 1 to 3 | | | − 0.006 | (0.013) | 0.001 | (0.012) |
| Ages 4 to 6 | | | − 0.010 | (0.017) | − 0.022* | (0.013) |
| Ages 7 to 9 | | | − 0.010 | (0.018) | 0.022 | (0.013) |
| Ages 10 to 12 | | | 0.003 | (0.021) | 0.009 | (0.018) |
| Ages 13 to 15 | | | 0.043* | (0.023) | 0.025 | (0.021) |
| Ages 16 to 18 | | | 0.076** | (0.025) | 0.079** | (0.023) |
| Ages 19 to 21 | | | 0.036* | (0.020) | 0.004 | (0.020) |
| Parent High education interaction with (a) | | | | | | |
| Birth year | | | − 0.107 | (0.115) | 0.020 | (0.086) |
| Ages 1 to 3 | | | 0.016 | (0.041) | − 0.058 | (0.046) |
| Ages 4 to 6 | | | 0.050 | (0.047) | 0.045 | (0.042) |
| Ages 7 to 9 | | | 0.055 | (0.055) | 0.056 | (0.041) |
| Ages 10 to 12 | | | 0.104* | (0.059) | − 0.041 | (0.047) |
| Ages 13 to 15 | | | 0.066 | (0.048) | 0.051 | (0.059) |
| Ages 16 to 18 | | | 0.049 | (0.068) | 0.008 | (0.079) |
| Ages 19 to 21 | | | 0.096 | (0.062) | − 0.173 | (0.132) |
| Municipality of birth | Yes | | No | | No | |
| Within-family controls ($X$) | Yes | | Yes | | Yes | |
| Time-varying controls ($Z$) | Yes | | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3

**Table 7** The effect of childhood poverty by the age of the child using other poverty thresholds

| Poverty measure | 20% Log disposable income | | 30% Log disposable income | | 40% Log disposable income | | 60% Log disposable income | | 70% Log disposable income | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years in childhood poverty | | | | | | | | | | |
| Birth year | − 0.013 | (0.018) | − 0.017 | (0.017) | − 0.027* | (0.016) | − 0.007 | (0.011) | 0.014 | (0.009) |
| Ages 1 to 3 | − 0.011 | (0.011) | − 0.002 | (0.011) | − 0.015 | (0.010) | − 0.009 | (0.007) | − 0.006 | (0.005) |
| Ages 4 to 6 | − 0.011 | (0.017) | − 0.026* | (0.014) | − 0.026** | (0.011) | − 0.012 | (0.007) | 0.001 | (0.006) |
| Ages 7 to 9 | − 0.027 | (0.019) | − 0.034** | (0.016) | − 0.041** | (0.012) | − 0.017** | (0.008) | − 0.012** | (0.006) |
| Ages 10 to 12 | 0.031 | (0.028) | 0.016 | (0.025) | − 0.027* | (0.016) | − 0.025** | (0.009) | − 0.023** | (0.007) |
| Ages 13 to 15 | − 0.055** | (0.028) | − 0.067** | (0.026) | − 0.070** | (0.019) | − 0.059** | (0.009) | − 0.036** | (0.007) |
| Ages 16 to 18 | − 0.027 | (0.028) | − 0.034 | (0.024) | − 0.029 | (0.019) | − 0.026** | (0.010) | − 0.030** | (0.007) |
| Ages 19 to 21 | − 0.059** | (0.016) | − 0.064** | (0.015) | − 0.053** | (0.014) | − 0.011 | (0.010) | − 0.033** | (0.008) |
| Ages 0 to 21 | − 0.024** | (0.008) | − 0.025** | (0.008) | − 0.030** | (0.007) | − 0.016** | (0.005) | − 0.015** | (0.004) |
| Within-family controls ($X$) | Yes | | Yes | | Yes | | Yes | | Yes | |
| Time-varying controls ($Z$) | Yes | | Yes | | Yes | | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | | Yes | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3

The results in this paper are on the marginal effect of one additional year of childhood poverty and not concerned with the persistence of childhood poverty. In order to gain some insight into the persistence, I estimate models using restricted poverty measures. It is required that the child experienced poverty in at least two out of three years or four out of six years. Using these restrictive definitions of childhood poverty and still relying on family fixed effects in the estimations raises the concern of lack of variation in the data. For this reason, the results from these estimations should only be thought of as suggestive. The results from the estimations can be found in Table 15 in Appendix. Even when using these persistent poverty measures, childhood poverty has a negative long-term effect on the disposable income of an individual.

Based on the considerations and results in this section, the choice of a poverty measure of 50% of the median income in a given year seems to be reasonable in providing evidence on the effect of childhood poverty, and the results in this paper are shown to be robust to variations of this measure.

### 5.2 Heterogeneous effects

In this section, I look into the variation in the results across gender and birth order. The variation across both of these gives additional information on the consequence of childhood poverty. Variation in the estimates across birth order can in addition be used to obtain a better understanding of the importance of choice of the control group.

The empirical strategy in this paper relies on variation between siblings in the age of the experience of childhood poverty to identify the effect. This means that the control group for an older sibling experiencing childhood poverty at a given age is the younger sibling who experiences childhood poverty at an earlier age and the control group for a younger sibling who experiences childhood poverty at a given age is the older sibling who experiences childhood poverty at a later age. As previously mentioned in Section 3, the cut-offs at ages 14, 18, and 25 were employed as alternatives to the cut-off age of 21. This had no significant impact on the conclusions of the paper. Another concern is that the control group for the older sibling is fundamentally different than the control group of the younger. This is the case if parental poverty matters more when the individual is above the age of 21 than before birth. As discussed in Section 3, merging the two control groups and assuming no impact of childhood poverty for these group can potentially downward bias the estimates. By showing the effects separately for the older and younger sibling, I am to some extent able to address this potential concern.

The results by gender and birth order can be found in Table 8. The first column shows results when allowing the effect of childhood poverty to vary across gender. The second column shows result when varying the effect across birth order.

The second column shows no major variation in the effect across birth order. The significant negative estimates on birth order interacted with number of year in childhood poverty at ages 4 to 6 and at ages 18 to 21 could be interpreted as a slight tendency of the measured effect to be larger for the older sibling. This would be an implication if the impact of parental poverty when the individual is above the age of

21 is larger than the impact before the individual is born. However, the difference in the estimates at ages 13 to 15 points in the opposite direction. The similarity of the results for the two different groups raises no concern on the validity of the main conclusion in this paper. It is however still possible that the control groups for the two groups are equally biassed.

**Table 8** The effect of childhood poverty by gender and birth order

| Interaction with: | Gender (women) Log disposable income | | Birth order (older) Log disposable income | |
|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E |
| No. of years in childhood poverty (a) | | | | |
| Birth year | − 0.068** | (0.016) | − 0.064** | (0.020) |
| Ages 1 to 3 | 0.001 | (0.008) | − 0.021 | (0.015) |
| Ages 4 to 6 | − 0.021* | (0.011) | 0.007 | (0.019) |
| Ages 7 to 9 | − 0.025** | (0.012) | 0.001 | (0.021) |
| Ages 10 to 12 | − 0.010 | (0.015) | 0.023 | (0.023) |
| Ages 13 to 15 | − 0.064** | (0.015) | − 0.067** | (0.025) |
| Ages 16 to 18 | − 0.030** | (0.015) | − 0.042 | (0.025) |
| Ages 19 to 21 | − 0.024* | (0.013) | − 0.020* | (0.011) |
| Gender or birth order interacted with (a) | | | | |
| Birth year | 0.060** | (0.020) | 0.033 | (0.022) |
| Ages 1 to 3 | − 0.023** | (0.009) | − 0.006 | (0.011) |
| Ages 4 to 6 | 0.007 | (0.009) | − 0.032** | (0.011) |
| Ages 7 to 9 | 0.001 | (0.010) | 0.003 | (0.012) |
| Ages 10 to 12 | − 0.016 | (0.014) | − 0.017 | (0.013) |
| Ages 13 to 15 | − 0.001 | (0.014) | 0.039** | (0.017) |
| Ages 16 to 18 | 0.020 | (0.014) | 0.009 | (0.018) |
| Ages 19 to 21 | − 0.003 | (0.014) | − 0.037** | (0.018) |
| No. of years in childhood poverty (a) | | | | |
| Ages 0 to 21 | − 0.022** | (0.006) | − 0.015** | (0.006) |
| Gender or birth order interacted with (a): | | | | |
| Ages 0 to 21 | − 0.000 | (0.002) | − 0.004** | (0.001) |
| Within-family controls ($X$) | Yes | | Yes | |
| Time-varying controls ($Z$) | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3

The results in the first column of Table 8 on the variation across gender show that the effect of childhood poverty is homogeneous in gender except for ages below 3. In the birth year, the effect of childhood poverty seems to be slightly worse for men than for women. The opposite seems to be the case at ages 1 to 3.

The results in this section raise no concern on the generality of the conclusions of the paper. The potential contamination of the control group can have undesired impacts on the results, but the results in this section raise no concerns.

## 6 Concluding remarks

In this paper, I provide evidence on the consequences of childhood poverty in the labour market and in the marriage market. The empirical strategy involves using within-family variation and a rich set of controls in order to account for other, often unobservable, parental and environment factors. I find that the impact of parental poverty during childhood is not fully compensated for by public investments despite the large public investments in children in Denmark. Considerable negative consequences are found both in the labour market and the marriage market. Results on educational outcomes are found to be consistent with the recent literature on the effect of parental income on schooling, and they are used to get a sense of the mechanisms. The results suggest skill formation, networks, and individual decision making as potential mechanisms.

In the labour market, individuals who experience childhood poverty are found to have lower earnings and lower labour market attachment and to have worse jobs both vertically in terms of low-paying industries and horizontally in terms of job positions. In the marriage market, childhood poverty is found to have negative consequences for the probability of marriage, cohabitation, and having children around the age of 30.

The choice of education and time of labour market entry disclose that individuals who experience childhood poverty enter the labour market earlier, take shorter educations, and obtain lower high school GPAs. Results which are all in line with childhood poverty affecting the skill formation of the child. I also find that they end up in more gender-segregated educations and industries which in itself can affect the possibilities of a match in the marriage market.

The size of the estimates on most outcomes exhibits an inverted u-shape in age of the child, peaking in the last years of compulsory school. Thus, the experience of poverty in the crucial ages where the major decision on career tracks has to be made is most important. Furthermore, childhood poverty affects individuals to choose educations with a higher labour market return conditional on the educational duration. One interpretation of these two results is that childhood poverty affects decision making in line with a change in individual discounting of expected future consumption possibilities.

The reliability of the above-described results and considerations are conditioned on the limitations of the empirical strategy. In order to argue that the observed relations

can be interpreted as causal, rather strong assumptions have to be made on the within-family relations, e.g. sibling spillovers might be a serious concern.

If a policy maker seeks to improve equality of opportunity, this paper and the related literature provide arguments for individuals experiencing childhood poverty to be the relevant target group. In Holzer et al. (2008), it is argued that the total cost for society in terms of foregone earnings, crime, and health costs from individuals experiencing childhood poverty can be sizable. This paper provides further evidence for this argument and takes the first step towards not only documenting the intergenerational relations but also following the mechanisms behind. Skill formation, networks, and individual decision making are suggested as potential mechanisms and backed by results on career choices. However, more research is needed in order to fully grasp the complex pattern through which childhood poverty can affect long-term outcomes, given the limitations of the empirical strategy applied in this paper.

**Acknowledgements** The author would like to thank the anonymous referees for helpful comments and suggestions. I express my thanks for useful comments on this paper and earlier drafts to Erdal Tekin, Rune Vejlin, participants in the European Economic Association Annual Congress 2015, and participants in the 8th Nordic Econometric Meeting. The usual disclaimer applies.

**Compliance with ethical standards**

**Conflict of interest** The author declares that he has no conflict of interest.

## Appendix

**Table 9** Sample selection

| Description | Number of observations | Number of individuals |
|---|---|---|
| All children born in Denmark from 1980 to 1983 | 860,680 | 239,871 |
| Information available for all years from 2008 to 2011 | 826,915 | 212,626 |
| Information on the mother | 795,371 | 200,105 |
| Only two-child families where both are born in the period from 1980 to 1983 | 135,232 | 33,810 |
| Excluding individuals still in school in 2008 | 126,989 | 32,357 |

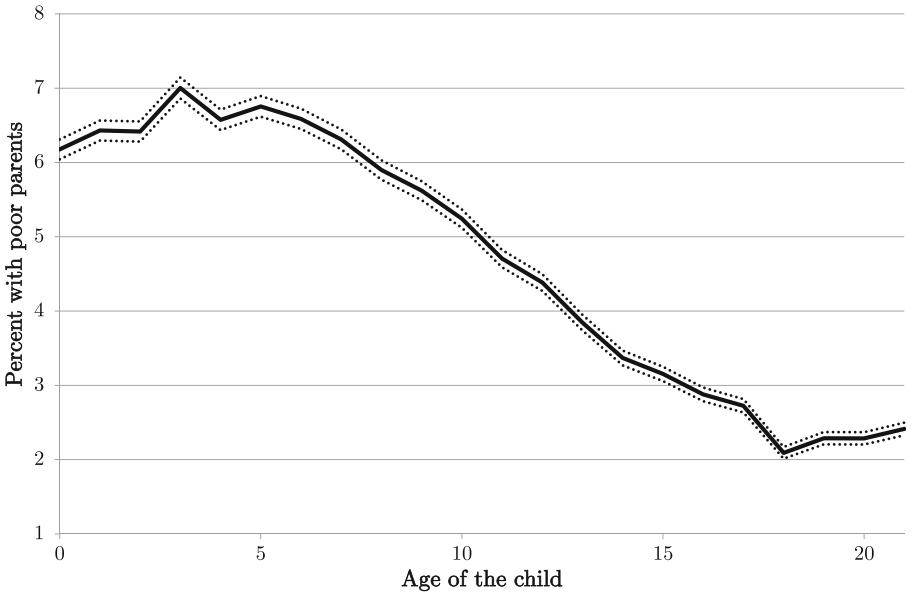


**Fig. 8** Percent of children experiencing childhood poverty in a given year by age of the child. Mean and 95% confidence intervals are presented in the figure

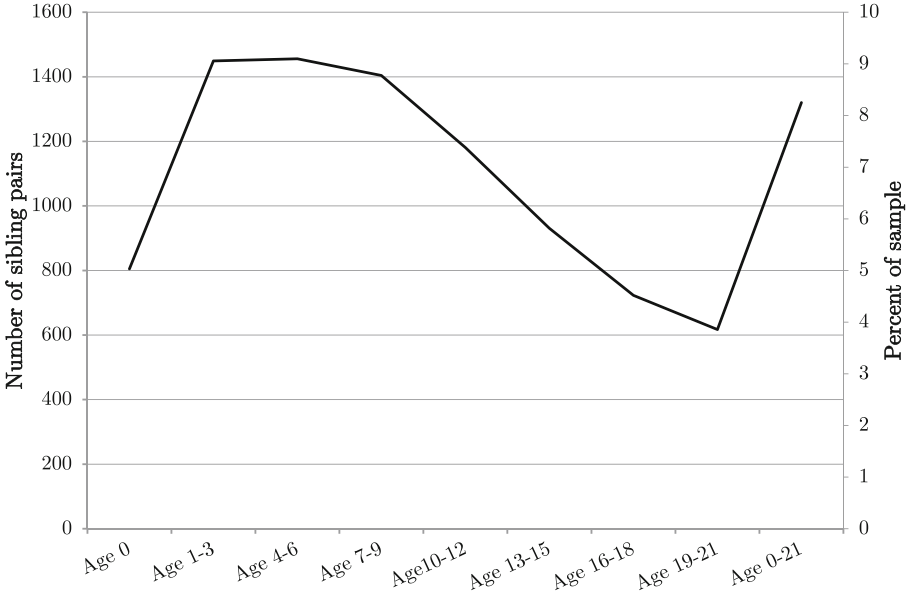


**Fig. 9** Number of sibling pairs and the percent of all sibling pairs in the sample where the number of years in childhood poverty within a given age interval varies between the siblings

**Table 10** The effect of childhood poverty by the age of the child on a series of adult outcomes. Part 1

| | Log earnings | | Log gross income | | Being poor | | Being rich | | Labour market experience | | In a high-end job | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years in childhood poverty | | | | | | | | | | | | |
| Birth year | − 0.096** | (0.028) | − 0.060** | (0.016) | 0.026** | (0.007) | − 0.010 | (0.006) | − 0.092 | (0.065) | 0.002 | (0.009) |
| Ages 1 to 3 | − 0.021 | (0.017) | − 0.005 | (0.010) | 0.002 | (0.005) | − 0.017** | (0.004) | 0.183** | (0.043) | − 0.012** | (0.006) |
| Ages 4 to 6 | − 0.067** | (0.020) | − 0.025** | (0.012) | 0.008* | (0.005) | − 0.015** | (0.005) | 0.071 | (0.051) | − 0.030** | (0.007) |
| Ages 7 to 9 | − 0.088** | (0.020) | − 0.038** | (0.013) | 0.013** | (0.005) | − 0.014** | (0.005) | 0.130** | (0.054) | − 0.024** | (0.007) |
| Ages 10 to 12 | − 0.047** | (0.021) | − 0.026** | (0.013) | 0.008 | (0.006) | − 0.023** | (0.006) | 0.180** | (0.057) | − 0.030** | (0.008) |
| Ages 13 to 15 | − 0.124** | (0.025) | − 0.076** | (0.014) | 0.024** | (0.006) | − 0.030** | (0.006) | 0.111* | (0.063) | − 0.029** | (0.008) |
| Ages 16 to 18 | − 0.059** | (0.027) | − 0.028* | (0.015) | 0.008 | (0.007) | − 0.015** | (0.006) | 0.265** | (0.069) | − 0.025** | (0.008) |
| Ages 19 to 21 | 0.026 | (0.027) | − 0.015 | (0.012) | 0.005 | (0.007) | − 0.018** | (0.007) | 0.153** | (0.065) | 0.001 | (0.008) |
| Ages 0 to 21† | − 0.043** | (0.013) | − 0.025** | (0.008) | 0.009** | (0.003) | − 0.016** | (0.003) | 0.128** | (0.034) | − 0.014** | (0.004) |
| Controls ($X$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Controls ($Z$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| $N$ | 113,330 | | 126,989 | | 126,989 | | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3. † estimates from separate regressions. Being poor is defined as below 50% and being rich is above 150% of the median disposable income in the full population of Danes age 18 to 55 in a given year. A high-end job is defined using information on the job description and includes high-end white-collar workers and regular workers with large salaries. Outcomes are measured each year from 2008 to 2011

**Table 11** The effect of childhood poverty by the age of the child on a series of adult outcomes. Part 2

| | Non-employed | | Part-time employed | | Log earnings at age 22 | | Years of schooling | | High school degree at age 22 | | High school GPA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years in childhood poverty | | | | | | | | | | | | |
| Birth year | 0.016* | (0.009) | − 0.006 | (0.010) | − 0.080** | (0.030) | − 0.094* | (0.049) | 0.013 | (0.010) | − 0.059 | (0.061) |
| Ages 1 to 3 | − 0.015** | (0.006) | 0.002 | (0.007) | 0.108** | (0.019) | − 0.070** | (0.031) | − 0.022** | (0.006) | − 0.159** | (0.039) |
| Ages 4 to 6 | − 0.011* | (0.006) | 0.022** | (0.008) | 0.069** | (0.021) | − 0.081** | (0.036) | − 0.017** | (0.007) | − 0.092** | (0.043) |
| Ages 7 to 9 | 0.002 | (0.007) | 0.002 | (0.008) | 0.057** | (0.021) | − 0.141** | (0.039) | − 0.020** | (0.007) | − 0.138** | (0.052) |
| Ages 10 to 12 | − 0.006 | (0.007) | 0.002 | (0.008) | 0.026 | (0.024) | − 0.139** | (0.042) | − 0.023** | (0.008) | − 0.240** | (0.056) |
| Ages 13 to 15 | 0.022** | (0.008) | − 0.002 | (0.009) | 0.050** | (0.024) | − 0.156** | (0.044) | − 0.052** | (0.009) | − 0.177** | (0.055) |
| Ages 16 to 18 | 0.009 | (0.009) | − 0.006 | (0.010) | 0.142** | (0.028) | − 0.216** | (0.047) | − 0.062** | (0.009) | − 0.070 | (0.062) |
| Ages 19 to 21 | − 0.017* | (0.009) | 0.025** | (0.010) | 0.077** | (0.028) | 0.021 | (0.044) | − 0.021** | (0.009) | − 0.036 | (0.067) |
| Ages 0 to 21† | − 0.006 | (0.004) | 0.007 | (0.005) | 0.066* | (0.014) | − 0.081** | (0.024) | − 0.021** | (0.005) | − 0.113 | (0.029) |
| Controls ($X$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Controls ($Z$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 111,072 | | 126,989 | | 126,989 | | 35,502 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3. † estimates from separate regressions. The education is defined using an eight-digit classification code. Grades are standadized with mean zero and standard deviation of one by graduation year for the full population. Outcomes are measured each year from 2008 to 2011

**Table 12** The effect of childhood poverty by the age of the child on a series of adult outcomes. Part 3

| | Cohabiting | | Married | | Have children | | Fraction of opposite gender | | | | Log average earnings in education | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | With same education | | Within same industry | | | |
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years in childhood poverty | | | | | | | | | | | | |
| Birth year | 0.018 | (0.013) | 0.034** | (0.010) | 0.033** | (0.012) | 0.017** | (0.006) | − 0.006 | (0.005) | − 0.003 | (0.006) |
| Ages 1 to 3 | 0.014* | (0.008) | 0.005 | (0.007) | 0.016** | (0.007) | − 0.011** | (0.004) | − 0.009** | (0.003) | − 0.013** | (0.004) |
| Ages 4 to 6 | − 0.004 | (0.009) | − 0.007 | (0.008) | − 0.000 | (0.008) | − 0.006 | (0.004) | − 0.013** | (0.004) | − 0.022** | (0.004) |
| Ages 7 to 9 | − 0.001 | (0.010) | 0.008 | (0.008) | − 0.002 | (0.009) | − 0.006 | (0.004) | − 0.018** | (0.004) | − 0.020** | (0.005) |
| Ages 10 to 12 | − 0.015 | (0.010) | − 0.006 | (0.009) | − 0.007 | (0.009) | − 0.004 | (0.005) | − 0.020** | (0.004) | − 0.010** | (0.005) |
| Ages 13 to 15 | − 0.037** | (0.011) | − 0.027** | (0.009) | − 0.061** | (0.010) | − 0.024** | (0.005) | − 0.025** | (0.005) | − 0.034** | (0.006) |
| Ages 16 to 18 | − 0.023* | (0.012) | − 0.015 | (0.010) | − 0.027** | (0.011) | − 0.006 | (0.006) | − 0.019** | (0.005) | − 0.032** | (0.006) |
| Ages 19 to 21 | − 0.024** | (0.012) | − 0.005 | (0.010) | − 0.023** | (0.011) | − 0.023** | (0.005) | − 0.014** | (0.005) | − 0.012** | (0.006) |
| Ages 0 to 21† | − 0.002 | (0.006) | 0.002 | (0.005) | − 0.001 | (0.006) | − 0.009** | (0.003) | − 0.013** | (0.003) | − 0.016** | (0.003) |
| Controls ($X$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Controls ($Z$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 126,989 | | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3. † estimates from separate regressions. The education is defined as using a eight digit classification code. Cohabiting is defined as living at the same address with an individual of the opposite sex with an age span of less than 15 years. Children living with their parents are not included, but same sex-registered partnerships are. The industry is defined using a five-digit industry classification based on NACE rev. 2. Outcomes are measured each year from 2008 to 2011

**Table 13** The effect of childhood poverty by the age of the child on a series of adult outcomes. Part 4

| | Log average earnings in industry | | Fraction non-employed with same education | | Log average earnings divided by years of schooling | |
|---|---|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years in childhood poverty | | | | | | |
| Birth year | − 0.026** | (0.010) | 0.002 | (0.003) | 0.007* | (0.004) |
| Ages 1 to 3 | 0.013** | (0.006) | 0.000 | (0.002) | 0.002 | (0.002) |
| Ages 4 to 6 | 0.008 | (0.007) | 0.003 | (0.002) | 0.005* | (0.003) |
| Ages 7 to 9 | − 0.004 | (0.008) | 0.006** | (0.002) | 0.009** | (0.003) |
| Ages 10 to 12 | 0.009 | (0.008) | 0.002 | (0.002) | 0.010** | (0.003) |
| Ages 13 to 15 | − 0.030** | (0.009) | 0.008** | (0.003) | 0.008** | (0.003) |
| Ages 16 to 18 | − 0.018* | (0.010) | 0.008** | (0.003) | 0.012** | (0.004) |
| Ages 19 to 21 | − 0.003 | (0.010) | − 0.004 | (0.003) | − 0.004 | (0.003) |
| Ages 0 to 21† | − 0.001 | (0.005) | 0.002 | (0.001) | 0.004** | (0.002) |
| Controls ($X$) | Yes | | Yes | | Yes | |
| Controls ($Z$) | Yes | | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3. † estimates from separate regressions. The education is defined as using a eight digit classification code. The industry is defined using a five digit industry classification based on NACE rev. 2. Outcomes are measured each year form 2008 to 2011

**Table 14** The impact of the father being outside the labour market on the effect of childhood poverty on the disposable income by the age of the child

| | Log disposable income | | Log disposable income | | Log disposable income | |
|---|---|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E | Coeff. | S.E |
| No. of years of the father being outside the labour market and the individual experiencing childhood poverty[†] | | | | | | |
| Birth year | − 0.027 | (0.023) | 0.134** | (0.054) | 0.133** | (0.055) |
| Ages 1 to 3 | − 0.004 | (0.010) | 0.004 | (0.027) | 0.000 | (0.027) |
| Ages 4 to 6 | 0.015* | (0.009) | 0.031 | (0.030) | 0.030 | (0.030) |
| Ages 7 to 9 | − 0.018** | (0.009) | − 0.022 | (0.031) | − 0.009 | (0.031) |
| Ages 10 to 12 | 0.028** | (0.009) | 0.088** | (0.037) | 0.091** | (0.036) |
| Ages 13 to 15 | 0.007 | (0.010) | − 0.000 | (0.032) | 0.002 | (0.032) |
| Ages 16 to 18 | − 0.016 | (0.011) | 0.009 | (0.030) | 0.017 | (0.030) |
| Ages 19 to 21 | − 0.008 | (0.013) | 0.064** | (0.025) | 0.067** | (0.026) |
| Within-family controls ($X$) | Yes | | Yes | | Yes | |
| Time-varying controls ($Z$) | No | | No | | Yes | |
| Family fixed effect ($\gamma$) | No | | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. [†] outside the labour market is defined as not being employed or receiving UI-benefits. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3

**Table 15** The effect of childhood poverty using measures of persistent poverty

| | Log disposable income | | Log disposable income | |
|---|---|---|---|---|
| | Coeff. | S.E | Coeff. | S.E |
| At least 2 out of 3 years in childhood poverty | | | | |
| Birth year | −0.028** | (0.013) | | |
| Ages 1 to 3 | 0.011 | (0.015) | | |
| Ages 4 to 6 | −0.014 | (0.016) | | |
| Ages 7 to 9 | −0.002 | (0.019) | | |
| Ages 10 to 12 | 0.003 | (0.017) | | |
| Ages 13 to 15 | −0.113** | (0.025) | | |
| Ages 16 to 18 | 0.034 | (0.030) | | |
| Ages 19 to 21 | 0.002 | (0.022) | | |
| At least 4 out of 6 years in childhood poverty | | | | |
| Birth year | | | −0.028** | (0.013) |
| Ages 1 to 6 | | | 0.002 | (0.013) |
| Ages 7 to 12 | | | 0.009 | (0.015) |
| Ages 13 to 18 | | | −0.055** | (0.022) |
| Ages 19 to 21 | | | −0.013 | (0.021) |
| Within-family controls ($X$) | Yes | | Yes | |
| Time-varying controls ($Z$) | Yes | | Yes | |
| Family fixed effect ($\gamma$) | Yes | | Yes | |
| $N$ | 126,989 | | 126,989 | |

** indicate significance at 5% and * at 10%. Within-family clustered standard errors in parentheses. $X$ and $Z$ are defined as in the main specification. See Section 3 or the note to Table 3

## References


Aaronson D (1998) Using sibling data to estimate the impact of neighborhoods on children's educational outcomes. J Hum Resour 33(4):915–946

Angrist J (2002) How do sex ratios affect marriage and labor markets? Evidence from America's second generation. Q J Econ 117(3):997–1038

Antel JJ (1992) The intergenerational transfer of welfare dependency: some statistical evidence. Rev Econ Stat 74(3):467–473

Bagger J, Birchenall JA, Mansour H, Urzúa S (2013) Education, birth order and family size. Discussion paper, National Bureau of Economic Research

Becker GS (1973) A theory of marriage: Part I. J Polit Econ 81(4):813–846

Behrman JR, Taubman P (1986) Birth order, schooling, and earnings. J Labor Econ 4(3, Part 2):121–145

Black SE, Devereux PJ (2010) Recent developments in intergenerational mobility. Discussion paper, National Bureau of Economic Research

Black SE, Devereux PJ, Salvanes KG (2005) The more the merrier? The effect of family size and birth order on children's education. Q J Econ 120(2):669–700

Black SE, Devereux PJ, Salvanes KG (2011) Older and wiser? Birth order and IQ of young men. CESifo Econ Stud 57(1):103–120

Blake J (1989) Family size and achievement, vol 3. University of California Press

Booth AL, Kee HJ (2009) Birth order matters: the effect of family size and birth order on educational attainment. J Popul Econ 22(2):367–397
Breining SN (2014) The sibling relationship dynamics and spillovers. Aarhus University
Case AC, Katz LF (1991) The company you keep: the effects of family and neighborhood on disadvantaged youths. Discussion paper, National Bureau of Economic Research
Conger RD, Elder GH Jr (1994) Families in troubled times: adapting to change in rural America. Social Institutions and Social Change. ERIC
Cunha F, Heckman J (2007) The technology of skill formation. Discussion paper, National Bureau of Economic Research
Cunha F, Heckman JJ (2008) Formulating, identifying and estimating the technology of cognitive and noncognitive skill formation. J Hum Resour 43(4):738–782
Dahl GB, Lochner L (2012) The impact of family income on child achievement: evidence from the earned income tax credit. Am Econ Rev 102(5):1927–1956
Duncan GJ, Morris PA, Rodrigues C (2011) Does money really matter? Estimating impacts of family income on young children's achievement with data from random-assignment experiments. Dev Psychol 47(5):1263
Duncan GJ, Yeung WJ, Brooks-Gunn J, Smith JR (1998) How much does childhood poverty affect the life chances of children? Am Sociol Rev 63(3):406–423
Elder GH, Caspi A (1988) Economic stress in lives: developmental perspectives. J Soc Issues 44(4):25–45
Galster G, Andersson R, Musterd S, Kauppinen TM (2008) Does neighborhood income mix affect earnings of adults? New evidence from Sweden. J Urban Econ 63(3):858–870
Galster GC (2012) The mechanism(s) of neighbourhood effects: theory, evidence, and policy implications. In: Neighbourhood effects research: new perspectives. Springer, pp 23–56
Gottschalk P (1990) AFDC Participation across generations. Am Econ Rev 80(2):367–371
Holzer HJ, Whitmore Schanzenbach D, Duncan GJ, Ludwig J (2008) The economic costs of childhood poverty in the United States. Journal of Children and Poverty 14(1):41–61
Humlum MK (2011) Timing of family income, borrowing constraints, and child achievement. J Popul Econ 24(3):979–1004
Jenkins SP, Schluter C (2002) The effect of family income during childhood on later-life attainment: evidence from Germany. Discussion paper, IZA
Levy DM, Duncan G (2000) Using sibling samples to assess the effect of childhood family income on completed schooling. Discussion paper, Northwestern University/University of Chicago Joint Center for Poverty Research
Løken KV, Mogstad M, Wiswall M (2012) What linear estimators miss: the effects of family income on child outcomes. American Economic Journal: Applied Economics 4(2):1–35
McLoyd VC (1990) The impact of economic hardship on black families and children: psychological distress, parenting, and socioemotional development. Child Dev 61(2):311–346
Milligan K, Stabile M (2011) Do child tax benefits affect the well-being of children? Evidence from Canadian child benefit expansions. Am Econ J Econ Pol 3(3):175–205
Moffitt R (1983) An economic model of welfare stigma. Am Econ Rev 73(5):1023–1035
Solon G (1999) Intergenerational mobility in the labor market. Handbook of labor economics 3:1761–1800
Solon G, Corcoran M, Gordon R, Laren D (1988) Sibling and intergenerational correlations in welfare program participation. J Human Res 23(3):388–396
Svarer M (2007) Working late do workplace sex ratios affect partnership formation and dissolution? J Hum Resour 42(3):582–595