LUND UNIVERSITY

The Long-Term Effects of Childhood Poverty in Adult's SES Attainment. How Important Is the Neighborhood? (Sweden, 1947-2015)

Brea-Martinez, Gabriel; Hedefalk, Finn; de Souza Maia, Vinicius

2023

Document Version:
Early version, also known as pre-print

Link to publication

Citation for published version (APA):
Brea-Martinez, G., Hedefalk, F., & de Souza Maia, V. (2023). *The Long-Term Effects of Childhood Poverty in Adult's SES Attainment. How Important Is the Neighborhood? (Sweden, 1947-2015)*. (pp. 1-50). (Lund Papers in Economic Demography; Vol. 2023:2). Centre for Economic Demography. https://www.ed.lu.se/media/ed/papers/working_papers/LPED%202023%202.pdf

Total number of authors:
3

General rights
Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.
• Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: https://creativecommons.org/licenses/

Take down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

The Long-Term Effects of Childhood Poverty in Adult's SES Attainment: How Important Is the Neighborhood? (Sweden, 1905-2015)

GABRIEL BREA-MARTINEZ, FINN HEDEFALK, VINICIUS SOUZA-MAIA

LUND PAPERS IN ECONOMIC DEMOGRAPHY 2023:2

Centre for Economic Demography
Lund University School of Economics and Management
P.O. Box 7083
SE-220 07 Lund, Sweden

www.ed.lu/publications/Lund-Papers-in-Economic-Demography/

The Long-Term Effects of Childhood Poverty in Adult's SES Attainment. How Important Is the Neighborhood? (Sweden, 1947-2015)

Gabriel Brea-Martinez[1]

Finn Hedefalk[1]

Vinicius Souza-Maia[1]

Abstract

This article studies the consequences of adult income resulting from exposure to poverty at the neighbourhood and family levels for children aged 1-17 in Southern Sweden from 1947 to 1967. We used geocoded information at the address level to identify k-neighbourhoods of various sizes and applied both relative and absolute poverty measurements, all yielding similar results. Moreover, our longitudinal data allowed for consecutive observations of individuals during childhood, enabling the capture of cumulative aspects of poverty exposure. Among our main findings, we identified that poverty in neighbourhoods had an independent association, even after accounting for familial poverty experience. This association appeared to be more substantial for men at younger ages, especially from 1 to 6, where ever living in a considered poor neighbourhood had a clear negative impact on adult income. However, for women, the general increase in university education attainment seemed to have neutralised any neighbourhood effect. The role played by neighbourhood poverty remained constant over time and across cohorts, even though our observational period coincided with the first expansion of the Swedish welfare estate.

KEYWORDS: Childhood poverty, Social Mobility, Neighbourhood, Sweden, Long-term longitudinal.

Acknowledgements: This study is part of the research program "Landskrona Population Study", funded by the Swedish Foundation for the Humanities and Social Sciences (RJ) and the project "The long reach of the neighborhood: Health, education and earnings in Landskrona, Sweden, 1904-2015" funded by the Swedish Research Council (VR) and The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS).

---

[1] Centre for Economic Demography, Department of Economic History, Lund University.

1 Introduction

Being poor in childhood or adolescence can have long-term socioeconomic and demographic consequences later in life. Research has shown that growing up in poverty increases the risk of being poor as an adult; it is also associated with worsened other social outcomes, such as limited access to networks, unemployment, low education, psychological and health problems, and risks of social exclusion in adulthood (Duncan & Brooks-Gunn, 1997; Halleröd & Larsson, 2008; Jonsson & Mood, 2014). This holds for places with high inequality such as the US, and more egalitarian societies like Nordic countries (Duncan & Magnuson, 2013; Mood, 2015).

In addition to childhood family poverty, growing up in deprived and segregated neighbourhoods also increases the risk of certain negative behaviours that may have long-term consequences (South & Crowder, 2010; Wodtke, 2013). For example, peer interaction in poor neighbourhoods may contribute to maintaining a culture of poverty by emulating negative role models connected to non-participation in school and work (Ludwig et al., 2012; Wilson, 2012). Moreover, living in economically deprived areas may lead to *segregation traps* as residential mobility is lower among individuals living in poor neighbourhoods, and their mobility is usually towards other poor areas (Huang et al., 2021; Van Ham et al., 2014). Hence, these individuals staying in poor locations are more exposed to the accumulated socioeconomic disadvantage at the individual, family, and neighbourhood levels (Jencks & Mayer, 1990; Massey & Denton, 2019). On the other hand, those that break this trap and move out of impoverished neighbourhoods could alleviate the socioeconomic consequences of childhood poverty (Chetty et al., 2016).

Family and neighbourhood poverty also interact; for example, the family's economic status may moderate the neighbourhood effects on educational attainment in adulthood

(Wodtke et al., 2016). However, there is mixed evidence on the exact relationships. Some studies focusing on childhood poverty and educational outcomes suggest that family poverty intensifies the adverse effects of impoverished neighbourhoods (Wheaton & Clarke, 2003). In contrast, other studies argue that deprived children surrounded by non-poverty tend to have more erratic and risky behaviours, leading to lower socioeconomic outcomes (Turley, 2002). However, recent research has shown that being surrounded by well-off children can be beneficial for low-SES children (Chetty et al., 2022; Hedefalk & Dribe, 2020). Few studies have evaluated the impact of interactions between family and neighbourhood economic status on adult SES outcomes, and those have shown mixed and inconclusive evidence (Brooks-Gunn et al., 1993). Exposure age and timing are also crucial factors, with adolescence being a critical time for network formation (Wodtke et al., 2016). Conversely, other studies emphasise the critical ages for human capital formation, usually until age 7 (Duncan et al., 1998; Heckman, 2006; Heckman & Mosso, 2014).

Despite much research on neighbourhood effects in recent decades, most of it has focused on contemporary times, typically from the 1970s onwards. In addition, cross-sectional data sources have often been used, which may bias the results because neighbourhood effects are longitudinal. Besides, most of the research dealing with the spatial component of long-term consequences of disadvantages suffer from a geographical bias, usually set in great metropoles of the US, in which important specific characteristics such as racial segregation explain much of the socioeconomic inequality (Galster, 2012; South & Crowder, 2010; Timberlake, 2009). On the other hand, studies in different geographic contexts, such as the UK, Sweden, or the Netherlands, despite their innovative nature, usually cover contemporary periods (Andersson et al., 2022; Knies et al., 2021). In this context, it is essential to examine the geographic role of the transmission of disadvantages in the past, its long-term development, and among less racially segregated and populated areas.

Therefore, this paper aims to study how poverty at the family and neighbourhood level influences income in adulthood. We also investigate whether the impact of poverty changes depending on the age of exposure (ages 1-6, 7-12, and 13-17), and how family and neighbourhood poverty interacts. We use longitudinal geocoded microdata at the address level to measure individual neighbourhoods for the industrial city of Landskrona in Southern Sweden from 1947 to 1967. These data are linked to national registers from 1968 to 2015, and they allow us to establish a historical and long-term nationwide follow-up of children who grew up in post-WWII Sweden until the early 1970s.

We try to answer the following research questions. What spheres of poverty exposure are the most critical for future socioeconomic attainment, only poverty within the family or poverty at the neighbourhood level too? At what ages are individuals most sensitive to exposure to poverty? May poverty in the neighbourhood also affect individuals from non-poor families, or does neighbourhood poverty only amplify the effect of familial poverty? This paper provides a more historical and long-term perspective on the association between childhood neighbourhood poverty exposure and adult income. It highlights the need to consider the geographic and temporal context when studying these phenomena. Combining familiar and neighbourhood data provides unique insights into children's life courses and poverty exposure.

2 Literature review

Scholars have long hypothesised that peer interaction in poor neighbourhoods may contribute to maintaining a culture of poverty by emulating negative role models in areas such as non-participation in school and work. Therefore, individuals exposed to deprived and segregated neighbourhoods during childhood and adolescence would have a higher risk of adverse outcomes throughout their lives (Ludwig et al., 2012; Wilson, 2012). Living in

economically deprived areas could also lead to "segregation traps," as the likelihood of residential mobility is lower among individuals living in poor neighbourhoods, and their mobility is usually towards other poor areas (Huang et al., 2021; Van Ham et al., 2014). However, some studies have argued that it is unclear whether this neighbourhood effect is determined directly by the place of residence or a reflection of accumulated disadvantaged individual and family contexts (Jencks & Mayer, 1990). In this regard, some authors have focused more on the socioeconomic composition of neighbourhoods as the primary driver of stratification and a booster of likely detrimental consequences for individuals later on (Massey & Denton, 2019).

Studies that primarily deal with educational outcomes have stressed different theoretical insights from psychology about the interaction between family poverty and exposure to neighbourhood deprivation (Wodtke, 2016). Accordingly, these studies suggest that a family's economic status moderates the neighbourhood's socioeconomic influences, particularly in educational contexts. However, these theoretical approaches differ in how and in what direction familial moderation occurs. For example, the Compound disadvantage theory argues that family poverty intensifies the adverse effects of impoverished neighbourhoods. Children tend to depend more on their community without family capacity (Wheaton & Clarke, 2003). In other words, compounded disadvantages from families and neighbourhoods can have multiplicative negative effects.

Conversely, the relative deprivation theory argues that deprived children at the family level, surrounded by non-poverty, tend to have more erratic and risky behaviours and, therefore, achieve lower SES outcomes (Turley, 2002). This happens because, as parental resources decrease, it becomes more challenging to acquire networks (Jencks & Mayer, 1990). However, recent articles that deal with neighbourhood effects have shown the contrary. Being surrounded

by well-off children was beneficial for children of low SES (Chetty et al., 2022; Hedefalk & Dribe, 2020).

Some researchers have attempted to evaluate interactions between family and neighbourhood economic status in recent decades. However, only a few studies have measured the impact of such interactions, and these studies have often found mixed and inconclusive evidence, with education being the primary outcome (Brooks-Gunn et al., 1993). Moreover, scholars typically argue that exposure age and timing are crucial factors. Accordingly, few studies have shown that neighbourhood exposure is crucial, particularly during adolescence when network intensity is higher (Wodtke et al., 2016). Conversely, other theoretical insights emphasise the critical ages for human capital formation. (Baulos & Heckman, 2022; Duncan et al., 1998; Heckman & Mosso, 2014). More recent research on the long-term effects of disadvantaged neighbourhoods has shown that living in poor areas during childhood and adolescence could increase the risk of certain behaviours, such as adolescent parenthood (South & Crowder, 2010; Wodtke, 2013). Similarly, recent studies have demonstrated that moving out of impoverished neighborhoods could alleviate the socioeconomic consequences of childhood poverty (Chetty, Hendren, & Katz, 2016).

Despite the research on neighbourhood effects improved substantially in the last decades, most of it focused on contemporary times, typically from the 1970s onwards, often with cross-sectional data sources. However, segregation has been recognised as a longitudinal phenomenon for a long time. Besides, most of the research dealing with the spatial component of long-term consequences of disadvantages suffered from a geographical bias, usually set in great metropoles of the US, where important specific characteristics such as racial segregation explained a significant part of socioeconomic inequality (Galster, 2012; South & Crowder, 2010; Timberlake, 2009). On the other hand, studies in different geographic contexts, such as the UK, Sweden, or the Netherlands, although with unprecedented levels of technical

sophistication (e.g., use of bespoken neighbourhoods), usually cover contemporary periods (Andersson et al., 2022; Knies et al., 2021). Finally, recent research using historical and modern data in Sweden showed that residing in wealthier neighbourhoods during childhood is linked to improved life prospects, and it would remain consistent irrespective of one's social background (Brandén et al., 2022; Hedefalk & Dribe, 2020).

We still know little about the geographic role of the transmission of disadvantages in the past, its long-term development, and among less racially segregated and populated areas (e.g., medium-sized European cities). Therefore, in such contexts: What spheres of exposure could be more critical, only poverty at the family or the neighbourhood level too? Which ages matter most for exposure? Could poverty in the neighbourhood also affect individuals from non-poor families? Or did it only work as an amplificative effect of familial poverty?

3 Materials and methods

We measure childhood poverty at three stages (ages 1-6, 7-12 and 13-17) and two dimensions: exposure to familial poverty and neighbourhood poverty. In this regard, we consider the entire age-specific exposure to poverty throughout different childhood stages (ages 1-6, 7-12, and 13-17) as a proxy for different and competing critical ages at the family and neighbourhood levels (Baulos & Heckman, 2022; Wodtke, 2013; Wodtke et al., 2016)

We estimate Ordinary Least Square (OLS) regressions to analyse the association between childhood family and neighbourhood poverty and lifetime income obtained at ages 40-49. We measure childhood poverty using binary variables, indicating whether the child ever experienced poverty in their family or neighbourhood[2]. We also used propensity score matching

[2] The reason for only differentiating between poverty and non-poverty categories of exposure, rather than measuring its intensity, responds to the fact that most children living in poverty during this period did so for only one year, as has also been observed in previous studies using the same data (Brea-Martinez et al., 2023).

to isolate the effect of ever or never living in a poor area on adult income. Additionally, we ran a series of interactions between family, neighbourhood poverty, sex, and birth cohorts. Because education may moderate the adverse effects of poverty, we also estimated the association between childhood poverty and obtaining a university degree by age 40.

3.1 Data, study area and sample

This study uses register and geographical data from historical sources for the childhood conditions from 1947-1967, and national register data for the follow-up in 1968-2015.

The study area for childhood conditions is the medium-sized industrial port-town Landskrona, located in southern Sweden. Landskrona experienced economic and demographic development like other industrial towns in Sweden throughout the twentieth century (Schön, 2010). During the study period, the town's population grew from 20 000 in 1940 to 30 000 in 1970. It saw industrial expansion from early in the century until about 1970, when the city was hit by the industrial crisis, particularly in the shipyard sector that had driven the city's economic structure for most of the century (Dribe & Svensson, 2019). Landskrona represents a classic working-class town, with average income levels lower than in most Swedish cities in the early and late twentieth century. On the other hand, the city's income inequality was consistent with national trends (Brea-Martinez, 2023). The follow-up in adulthood includes all individuals that resided in Sweden.

The data on the childhood conditions in Landskrona (1947-1967) comes from the Scanian Economic-Demographic Database (SEDD) (Bengtsson et al., 2021). The SEDD contains longitudinal and individual-level information on demography (births, marriages, deaths), migration (internal and external), and annual data on occupation and income. Moreover, the entire population in Landskrona is geocoded at the address level for the period.

Each individual in the town has been linked to all the addresses they lived at, and because the internal moves are traced, the information on the residential histories is continuous. Approximately 97% of the individual's survival time is geocoded for the period. These address points are linked to buildings on which we have time-accurate information. This also adheres to roads, schools, and major industries, which can be used to recreate some of the physical properties within the town.

With the help of personal numbers available from 1947, the individuals in the SEDD and their descendants are linked to various national administrative registers from Statistics Sweden (SCB), which allows for a nationwide follow-up. Therefore, we can track individuals observed in childhood in Landskrona throughout Sweden in adulthood, avoiding biases related to selective out-migration from the city. We obtain annual information on income and education from these linked registers.

We select all children from age 1 to 17 who resided in Landskrona at some time between 1947 and 1967 (born between 1930 and 1966) and follow them until adulthood at ages 40-49. In total, 14,936 individuals [49% women] could be followed up. Moreover, we also followed individuals with six consecutive observations within the three different age ranges we followed (ages 1-6, 7-12 and 13-17), allowing us to control children's exposures for entire *critical ages*.

3.3 Outcome variables: Lifetime adult income and educational attainment

The main outcome studied is the lifetime income of adults. We first have access to the individual total gross (before tax) income from sources related to labour (including self-employment) and income from capital and real estate information for the modern periods (1968-2015). Our main outcome is the total income in adulthood from men and women. Sweden had separate taxation compulsory since 1970, for which the fact of married individuals did not affect estimations, especially in a country with high female labour participation as early as the 1970s (Gustafsson, 1992; Gustafsson & Jacobsson, 1985). Second, we proxied lifetime income for those individuals by averaging their total income between ages 40-49, aligned with most of the

literature on income mobility (Mazumder, 2016). Finally, we estimated the income percentile ranks at ages 40-49 separated by sex and birth year, using the income information from all similar individuals at the national registers to approach economic status at the national level, as done in other studies that deal with economic mobility (Brea-Martinez, 2023; Chetty et al., 2014).

Our second outcome variable is educational attainment, which indicates whether an individual has completed a 3-year university degree or higher. This information is based on the highest level of education an individual obtained at age 40. The likelihood of getting a university degree is an essential mechanism for human capital accumulation in Sweden during the second half of the twentieth century (Breen & Jonsson, 2007).

3.4 Childhood family poverty

Income information, defined as total gross income (before tax), comes from individual tax returns detailing total income from labor-related sources (including self-employment) and capital and real estate income. Poverty during childhood and adolescence is measured using income in the SEDD from 1947 to 1967, whereas economic outcomes in adulthood are measured using income data from Statistics Sweden (SCB).

Our primary analysis uses a relative measure of poverty. This means that children are considered poor in a given year if they lived in a family whose *equivalized* income in a given year was below 60% of the median family income in Landskrona for the same year. First, we compute the equivalized family income for each family j in a specific year t, normalising the total family income by dividing it by the square root of the sum of all individuals residing in the same household. We encompass all families, irrespective of whether they had children or not. This equivalence approach adheres to the OECD guidelines commonly used in most research addressing family poverty and economic inequality (OECD, 2011). The relative approach using the threshold of 60% of the median income is similar to the one used by the European Statistical Office (Eurostat, 2013). We, therefore, categorise an individual to have

ever lived in a low-income family or not for each of the three age groups and calculate the proportion of observations lived in poverty for all observed ages between 1-17.

As a robustness check, we also measure poverty in absolute terms. We use an annual minimum threshold value of poverty in Sweden, calculated by Rauhut (2002) for 1918-1990 (Rauhut, 2002). This poverty norm was estimated based on the costs of resolving disputes across municipalities. That is, payments were made between municipalities for poor individuals registered in one municipality but receiving payments in another where they resided. As for the relative poverty measure, we define children as poor for each age group if their equivalized family income for at least one year was below the poverty threshold values extracted from the poverty norm.

3.5 Childhood neighbourhood poverty

We measure the poverty within each child's individual neighbourhood, using the k-nearest neighbours approach, for the period 1947-1967. That is, all children are the centre of their own neighbourhood at the address level (Hedefalk & Dribe, 2020; McPherson et al., 2001). In this regard, we approach the neighbourhood by counting the number of family heads (as a proxy for families) surrounding each child between ages 1-17. We measure five different "k" values (25 closest family heads, 50, 100, 200, 400), and we compute the percentage of families that were considered in poverty. In addition, we apply geographical weights when calculating the proportion of poor neighbours. We do this because the importance of spatial relationships are commonly modelled to follow a Gaussian distance-decay function (Fotheringham et al., 2003); that is, the closest neighbours are assumed to have a much higher importance compared to those neighbours furthest away (see details and equation in Hedefalk and Dribe (2020).

The geographically weighted (GW) approach is employed for each age group and *"k."* We define our main neighbourhood (NB) variable, Ever-poor NB, as follows: Children are

assumed to have lived in a poor NB for at least one year (for each age group) if the GW proportion of neighbours belonging to a poor family was, on average, more than 30% during the observed year. For instance, if the GW share of the 25 nearest families (family heads) was, on average, 34% between the ages 5-9 of a child, the Ever-poor NB variable would have the value 1 for the age group 5-9 at *k=25* for the child in question.

In the main analysis, we focus on the *k=25* nearest neighbouring families, although in the supplementary material, we also conduct analyses for all other sizes of *k*. Furthermore, for the sake of sensitivity, in the supplementary material, we set the neighbourhood poverty to a lower bound (more than 25% of poor neighbours) and an upper bound (more than 40% of poor neighbours).

3.6 Other individual and family controls

We control for sociodemographic and socioeconomic variables during childhood, including both time-invariant and averaged time-variant factors. These variables are sex, birth year, sibship size (number of siblings per family), birth order, average income during childhood (for each age group) in quintiles, the mean age of the family head at each age group of ego's, the maximum distance to the furthest neighbour, and the number of observations in childhood (per age group) (See Table 1).

3.7 Statistical analysis

We estimate Ordinary Least Square (OLS) models to analyse the association between childhood family and neighbourhood poverty and the income percentile ranks in adulthood. First, we estimate models by adding only the family poverty status plus all stated controls (Model 1) for all different age groups (separately). Second, in Model 2, we add the neighbourhood poverty status. And in Model 3, we add the quintile of averaged childhood. With these models, we investigate which poverty exposure during childhood (familial or neighbourhood) is more strongly associated (negatively) with adult income.

Model 1: y (Adult income)$_i$ = $\alpha + \beta X_i$ (ever lived in poor Family) + θX_i (Sociodemographic controls) + ε_i [1]

Model 2: *y (Adult income)*$_i$ = $\alpha + \beta X_i$ (ever lived in poor Family) + λX_i (ever lived in a poor NB) + θX_i (Sociodemographic controls) + ε_i [2]

Model 3: *y (Adult income)*$_i$ = $\alpha + \beta X_i$ (ever lived in poor Family) + λX_i (ever lived in a poor NB) + θX_i (Sociodemographic controls) + + ηX_i (Childhood income) + ε_i [3]

We also attempt to control for unobservable family characteristics that might influence the results by estimating family fixed effects (FE) in Model 4. Moreover, to analyse potential differences by sex, we also estimated separate models for only men (Model 5) and women (Model 6). All these models have the exact same covariates and controls as in Model 3.

Finally, to isolate the potential effect of ever living in a poor neighbourhood on adult life income, we apply propensity score matching methods (PSM) to create groups of control (never poor at the NB) and treatment (ever poor at the NB) but with highly similar characteristics in all other variables. The PSM allows us to mimic the randomisation process, which is impossible in an observational study like ours (Caliendo & Kopeinig, 2008; Shiba & Kawahara, 2021). Firstly, the PSM estimates a propensity score using logistic regression, which calculates the probability of receiving the treatment (in this case, being poor at the NB) based on all the childhood variables (family poverty status, demographic and socioeconomic variables, as in Model 3). Once this logistic regression is calculated, the method estimates the propensity score for each individual. Secondly, it matches control and treatment groups for all those individuals with as similar as possible propensity scores, therefore only having a difference if they ever lived in a poor NB or not. In this last part, the PSM method estimates the

average treatment effect, which shows, on average, the causal difference between ever living in a poor NB or not in terms of adult income attainment (Model 6).

We also included interactions between family and neighbourhood poverty to assess whether neighbourhood exposure could amplify or signify the consequences of familial poverty (based on Model 3). From this model, we predict different sets of average percentile ranks (Model 7), and we do similarly by interacting neighbourhood poverty status with sex and 5-year birth cohorts (Model 8). Finally, to study the likely mechanisms mediating the relationship between neighbourhood poverty status and adult income, in a model similar to Model 3, we estimate a Linear Probability Model (LPM) having as an outcome the binary variable of whether our studied children had or not attained a university degree by age 40 (Model 9). All the results of Models 7, 8, and 9 are displayed as figures, plotting the average predicted income in adulthood (Models 7 and 8) or the probability of having a university degree (Model 9).

[INSERT TABLE 1 ABOUT HERE]

4 Results

4.1 Descriptive results

Figure 1A shows the annual proportion of children aged 1-6, 7-12, and 13-17 between 1947 and 1967, who were exposed to poverty at the family level. Meanwhile, Figure 1B shows the percentage of children in the same age ranges considered to be living in a poor neighbourhood (k=25) yearly, using the relative poverty measurement (family income below 60% of the median income). The proportion of poor children aged 1-6 at the family level remained relatively stable throughout the period, although it increased slightly from 1958 onwards. The poverty level was approximately 20% until 1958, then rose gradually, reaching around 25% in the 1960s (Figure 1A).

On the other hand, the percentage of children aged 7-12 and 13-17 considered to belong to families living in poverty was lower, around 15%, and did not show a significant increase

during the 1960s (see Figure 1A). The reason for this difference in poverty levels between different age groups can be linked to the early deindustrial crisis that began affecting Landskrona in the 1960s, which particularly impacted younger workers (who are more likely to have children at early ages). This notable increase in poverty culminated in 1967 and may be attributed to the closure of the Landsverk Kockums foundry, which was one of the major employers in the shipyard sector of the town at that time, employing many young adults (Dribe & Svensson, 2019). However, it has to be pointed out that, in any case, the family's relative poverty during childhood was almost always a transient phenomenon rather than structural. Children living in poverty usually lived in it for only one year. (See more details in Brea-Martinez et al. 2023 and Figure S4 in the Supplementary Material).

In Figure 1B, we can observe the evolving patterns of exposure of children living in individualised poor neighbourhoods (k=25), where more than 30% of families were considered to be in poverty. In contrast to the other figure, the levels of exposure to neighbourhood poverty were stable over time and quite similar across age groups. Unlike family poverty, the constant nature of these levels and their lack of fluctuation can be attributed to two reasons.

Firstly, Landskrona, being a good example of a mid-sized European city in the mid-twentieth century, did not experience high levels of segregation, as observed in its US counterparts (Dribe & Svensson, 2019; Hedefalk & Dribe, 2020). Therefore, even if poverty increased among certain sections of the population, these shocks would not clearly translate into the poverty composition of neighbourhoods. Secondly, another reason for neighbourhood poverty occasionally being higher than family poverty (e.g., in ages 7-12 and 13-17) is related to the fact that single households with individuals older than 50 (e.g., widows) tended to have higher levels of poverty (Hagen, 2013), and their distribution was more random across the city (See Figure S1 in the Supplementary Material). In any case, the consistent levels of

neighbourhood poverty exposure over time make the analysis of its potential consequences to adult income less biased by contextual fluctuations.

[INSERT FIGURE. 1 ABOUT HERE]

4.2 Empirical results

Table 2 shows the regression estimates for the association between adult income percentile rank and childhood exposure to poverty for the different models (Model 1 to 6) at both family and neighbourhood levels (k = 25) for all three age groups with consecutive observations. The full models, including all displayed coefficients for the different controls, can be found in the Supplementary Material (Tables S1-S3).

Starting in the first column (Model 1), we only see the coefficients displayed for the regressions involving ever being exposed to family poverty during childhood or not. For the youngest age group (1-6), facing family poverty was negatively associated with adult income, resulting in a reduction of approximately 6.5 rank positions compared to children who never lived in a poor family. These results are statistically significant ($p < 0.001$) (Table 2, Model 1). However, there appears to be a certain age gradient. Although the negative association persists, the intensity of the coefficients is lower for older age groups. On average, the ranks are 5.6 positions lower for ages 7-12 and 3.6 positions lower for ages 13-17.

Next, when adding to the models the variable regarding whether individuals were ever exposed to an individualised neighbourhood considered poor, it can be seen that even when controlling for family poverty status, neighbourhood poverty is also negatively associated with income in adulthood. Such an association was negative and statistically significant for ages 1-6 (lower by four rank positions) and ages 7-12 (lower by around three positions), but it was not significant for the older age group (13-17) (See Table 2, Model 2).

In Model 3, we added the quintiles of the average family income during childhood for children in each age group. Here, the only coefficient among both family and neighbourhood

poverty ones to be statistically significant was the exposure to neighbourhood poverty at ages 1-6. Besides, by replicating model 3 separately for men and women, it can be seen that the exposure to poverty (either at the family or neighbourhood level) seemed to have consequences only in adulthood for men aged 1-6, but not for women. The coefficients were only substantial and statistically significant for men at these ages.

Finally, we also attempted to control for unobserved characteristics that could bias our results and confound the association observed for exposure to neighbourhood poverty. In model 4, we employed family fixed effects, comparing only siblings who might have experienced neighbourhood poverty (or not) at different points in time but shared the same socioeconomic familial background, similar to previous studies (Chetty et al., 2016). The coefficients revealed negative values for neighbourhood poverty but were never statistically significant, likely due to the small sample size (See tables S1-S3).

Therefore, in order to effectively isolate the effect of exposure to neighbourhood poverty without limiting our sample size, we applied propensity score matching methods (PSM) (see section 3.7) to match treatment (individuals who were ever poor in the neighbourhood) and control (individuals who were never poor in the neighbourhood) groups with the most similar socioeconomic and demographic characteristics. The results for the average treatment effects (ATE) comparing the treatment and control groups showed that only men who were ever exposed to neighbourhood poverty were negatively impacted, losing an average of 4 income rank positions in adulthood (see ATEs in Table 2). Overall, all these results might indicate that being exposed to families in poverty was consequential only for the youngest children, recalling the idea of adverse exposure at critical ages (Baulos & Heckman, 2022).

[INSERT TABLE 2 ABOUT HERE]

Besides identifying the potential independent associations of poverty in the neighbourhood with adult outcomes, this study aimed to delve deeper into the interrelation between exposure to family and neighbourhood deprivation and its likely consequences on adults' socioeconomic status (SES). We estimated a regression model that interacted family and neighbourhood poverty exposures to predict differences in adults' average percentile rank attainment. The interactions did not reveal any additional statistically significant aspects than those already seen in the single coefficient. However, it allowed us to predict the average adult income positions depending on their exposure to poverty at the family or neighbourhood level and by sex.

Figure 2 shows the predicted average percentile rank for men and women who ever lived or not in a family in poverty during their childhood, conditional on whether they ever lived in a poor NB between the three different age ranges. Overall, when comparing the different age groups, we find some evidence for the Compounded disadvantage theory, as generally, ever experiencing poverty in childhood and being surrounded by poor peers would be more negatively consequential to adult income attainment than only facing poverty at some point at the family level. This relationship was true again, especially among men in the youngest ages, and tended to dissipate across childhood toward older ages.

However, perhaps the most interesting finding is the comparison between being part of a non-poor family but living in a poor neighbourhood and being from a family in poverty but never living in a poor neighbourhood. In this regard, we find that for men, only being surrounded by poor peers (without ever experiencing poverty in the family) would result in a lower income attainment than those who have experienced poverty in the family but have never lived in a poor neighbourhood. Such a situation occurred for men aged 1-6 but never for women. These results suggest that exposure to poverty in the neighbourhood appears to affect only boys, while for girls, being part of a low-income family or not is the only determining factor. Similar

divergent gendered results were found in other neighbourhood studies with the data source, such as education (Hedefalk & Dribe, 2020).

[INSERT FIGURE 2 ABOUT HERE]

As we observed gendered results, we also tested the hypothesis of changes across birth cohorts in the relationship between family and neighbourhood exposure to poverty. It is reasonable to expect changes over time in the consequences of the existing poverty in neighbourhoods as the cohorts born between the 1930s and 1960s grew up during a crucial period of Sweden's welfare state expansion (Björklund & Jäntti, 2009). Therefore, we predicted the average percentile rank of individuals whether they had ever resided in a considered poor neighbourhood between ages 1-17. This resulted from the interaction model between family, neighbourhood poverty and 5-year birth cohorts (See Table S5).

The results in Figure 3 show constant differences in income across time and no changes across five-year birth cohorts. Therefore, based on these inconclusive results, we would reject the hypothesis of a clear improvement for younger cohorts who benefited more from welfare policies. At the same time, we also found no amplification of differences due to the so-called welfare culture (Dahl et al., 2014; Lindbeck et al., 1999).

[INSERT FIGURE 3 ABOUT HERE]

Some of the previous results have shown a constant and independent association of childhood neighbourhood poverty (net of the family) with worsened income outcomes in adulthood. However, although family and neighbourhood exposures of poverty coincided in the association direction and relatively on its size, we also found that neighbourhood seemed to be only consequential for boys and not for girls. It is unclear whether the mechanisms through

which NB poverty correlated more with negative outcomes for men, while only the family poverty seemed to count only for girls. In this regard, we should be able to evaluate if being exposed to poverty in the neighbourhood would only amplify or complement disadvantaged familial exposure and if it would move by different channels for men and women. For instance, at least in the US context, it has been suggested by some studies that boys may be more susceptible to the adverse effects of deprived neighbourhoods than girls, especially in relation to behavioural problems and delinquency (Leventhal & Brooks-Gunn, 2000; Wodtke et al., 2011). However, this might be unlikely in less segregated contexts such as the one of Landskrona, a medium-sized Swedish town.

Therefore, we chose to examine this dichotomy from a different perspective by considering what factors could have helped women avoid suffering the consequences of exposure to a poor neighbourhood. To this end, we evaluated the likelihood of obtaining a university degree, which is perhaps the most well-known mechanism for human capital accumulation in Britain during the second half of the twentieth century (Breen, 2010; Breen & Jonsson, 2007).

As shown in Figure 4, individuals who were surrounded by low-income families at some point in their lives were always less likely to attend university than those who never lived in a poor neighbourhood. However, while the probability of obtaining a university degree for men did not change significantly across birth cohorts in either group, the opposite was true for women. Women substantially increased their educational attainment, surpassing that of men in the 1950s birth cohorts (See Figure 4). This may have contributed to reducing existing neighbourhood inequality consequences for girls but not boys. Moreover, this pattern was not only seen in urban areas as Landskrona but across the whole country as it can be seen for the university attainment for men and women in Sweden born between 1930s and 1960s (See Figure S3 in the Supplemenatary Material).

[INSERT FIGURE 4 ABOUT HERE]

5 Discussion

One of the main findings from our study is an independent association between neighbourhood poverty exposure and adulthood outcomes. This association persisted even after controlling for family poverty, as the neighbourhood coefficients remained significant. This finding was particularly pronounced for the youngest age group (1-6 years old). Previous studies that have examined family poverty alone also suggest that early exposure to poverty can have long-term consequences for socioeconomic status (Brea-Martinez et al., 2023).

Furthermore, our models that considered both family and neighbourhood exposure to poverty revealed substantial gender differences in how each type of poverty affected adulthood outcomes. Living in a poor neighbourhood was associated with lower income in adulthood for both men and women. However, for women, family poverty seemed to be the more of a critical factor, as previously observed in other studies that examined outcomes such as education and health in Landskrona (Hedefalk et al., 2022; Hedefalk & Dribe, 2020). Finally, by selecting a quasi-experimetnal approach with Propensity Score Mathcing (PSM) we confirmed a strong negative impact of that only fact of ever being exposed to a poor Nb for men aged 1 to 6.

Interestingly, we did not observe any changes in the importance of neighbourhood poverty across different cohorts, despite significant macro-level changes in Sweden's welfare state during the period studied. Additionally, our results were consistent regardless of the size of the individualised neighbourhoods we used (k) and whether relative or absolute poverty measures were used (See Tables S7 and S8 in the Supplementary Material).

Relating our findings to the two most applied theories in neighbourhood-family poverty studies, we see insights favouring the compound disadvantage theory. Neighbourhood poverty appeared more consequential and negative among individuals who also faced poverty at the

family level, which can be understood as a potential multiplicative "effect" of poverty on individuals (Wodtke et al., 2016). Nevertheless, we also found evidence suggesting that poverty in neighbourhoods per se could also be consequential independently, as it lowered adult income even for those who never faced poverty in their families. In this regard, individuals who had families in low and middle socioeconomic positions seemed more sensitive to poverty in the neighbourhoods.

Overall, we argue that childhood exposure to poverty in the neighbourhood had similar associations in level and direction to lower income in adulthood as in family poverty. This was clear through analysing the potential mechanisms through which poverty could hinder income progress in adulthood, such as the lower probability of attaining a university degree. On the other hand, access to higher education could have alleviated the negative consequences of living surrounded by poverty. Finally, the fact that these associations for neighborhood poverty appear even in a less segregated society with a strengthening welfare system and prevalent transient societies might only grant food for thought that neighbourhood poverty can be much more consequential in communities with a higher prevalence of segregation.

References

Andersson, E., Janssen, H., Ham, M. van, & Malmberg, B. (2022). Contextual poverty and obtained educational level and income in Sweden and the Netherlands: A multi-scale and longitudinal study. *Urban Studies*, 00420980221120492.

Baulos, A., & Heckman, J. (2022). The Importance of Investing in Early Childhood Development and the Role of Families. In *Handbook of Research on Innovative Approaches to Early Childhood Development and School Readiness* (pp. 38–54). IGI Global.

Bengtsson, T., Dribe, M., Quaranta, L., & Svensson, P. (2021). The Scanian Economic Demographic Database: Version 7.2 (Machine-readable database). *Lund: Lund University, Centre for Economic Demography*.

Björklund, A., & Jäntti, M. (2009). Intergenerational income mobility and the role of family background. *Oxford Handbook of Economic Inequality*, *491*, 521.

Brandén, M., Haandrikman, K., & Birkelund, G. E. (2022). Escaping one's disadvantage? Neighbourhoods, socioeconomic origin and children's adult life outcomes. *European Sociological Review*.

Brea-Martinez, G. (2023). Materfamilias: The association of mother's work on children's absolute income mobility, Southern Sweden (1947–2015). *European Review of Economic History*, *27*(1), 1–23. https://doi.org/10.1093/ereh/heac010

Brea-Martinez, G., Dribe, M., & Stanfors, M. (2023). The price of poverty: The association between childhood poverty and adult income and education in Sweden, 1947–2015. *The Economic History Review*.

Breen, R. (2010). Educational expansion and social mobility in the 20th century. *Social Forces*, *89*(2), 365–388.

Breen, R., & Jonsson, J. O. (2007). Explaining change in social fluidity: Educational equalization and educational expansion in twentieth-century Sweden. *American Journal of Sociology*, *112*(6), 1775–1810.

Brooks-Gunn, J., Duncan, G. J., Klebanov, P. K., & Sealand, N. (1993). Do neighborhoods influence child and adolescent development? *American Journal of Sociology*, *99*(2), 353–395.

Caliendo, M., & Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys*, *22*(1), 31–72.

Chetty, R., Hendren, N., & Katz, L. F. (2016). The effects of exposure to better neighborhoods on children: New evidence from the moving to opportunity experiment. *American Economic Review*, *106*(4), 855–902.

Chetty, R., Hendren, N., Kline, P., Saez, E., & Turner, N. (2014). Is the United States still a land of opportunity? Recent trends in intergenerational mobility. *American Economic Review*, *104*(5), 141–147.

Chetty, R., Jackson, M. O., Kuchler, T., Stroebel, J., Hendren, N., Fluegge, R. B., Gong, S., Gonzalez, F., Grondin, A., & Jacob, M. (2022). Social capital I: measurement and associations with economic mobility. *Nature*, *608*(7921), 108–121.

Dahl, G. B., Kostøl, A. R., & Mogstad, M. (2014). Family welfare cultures. *The Quarterly Journal of Economics*, *129*(4), 1711–1752.

Dribe, M., & Svensson, P. L. (2019). Landskrona 1900–2000: A comparative analysis of the economic and demographic development. 2019; 59. *Lund Papers in Economic Demography*, *3*.

Duncan, G. J., & Brooks-Gunn, J. (1997). *Consequences of growing up poor*. Russell Sage Foundation.

Duncan, G. J., & Magnuson, K. (2013). The long reach of early childhood poverty. In *Economic stress, human capital, and families in Asia* (pp. 57–70). Springer.

Duncan, G. J., Yeung, W. J., Brooks-Gunn, J., & Smith, J. R. (1998). How much does childhood poverty affect the life chances of children? *American Sociological Review*, *63*(3), 406.

Eurostat. (2013). *The Measurement of Poverty and Social Inclusion in the EU: Achievements and Further Improvements*. Seminar 'The Way Forward in Poverty Measurement'2–4 December 2013, Working Paper 25.

Fotheringham, A. S., Brunsdon, C., & Charlton, M. (2003). *Geographically weighted regression: The analysis of spatially varying relationships*. John Wiley & Sons.

Galster, G. C. (2012). The mechanism (s) of neighbourhood effects: Theory, evidence, and policy implications. In *Neighbourhood effects research: New perspectives* (pp. 23–56). Springer.

Gustafsson, S. (1992). Separate taxation and married women's labor supply. *Journal of Population Economics*, *5*(1), 61–85.

Gustafsson, S., & Jacobsson, R. (1985). Trends in female labor force participation in Sweden. *Journal of Labor Economics*, *3*(1, Part 2), S256–S274.

Hagen, J. (2013). *A history of the Swedish pension system*. Department of Economics, Uppsala University.

Halleröd, B., & Larsson, D. (2008). Poverty, welfare problems and social exclusion. *International Journal of Social Welfare*, *17*(1), 15–25.

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, *312*(5782), 1900–1902.

Heckman, J. J., & Mosso, S. (2014). The economics of human development and social mobility. *Annu. Rev. Econ.*, *6*(1), 689–733.

Hedefalk, F., & Dribe, M. (2020). The social context of nearest neighbors shapes educational attainment regardless of class origin. *Proceedings of the National Academy of Sciences*, *117*(26), 14918–14925.

Hedefalk, F., van Dijk, I. K., & Dribe, M. (2022). *Childhood neighborhoods and cause-specific adult mortality in Sweden 1939-2015*.

Huang, Y., South, S. J., Spring, A., & Crowder, K. (2021). Life-course exposure to neighborhood poverty and migration between poor and non-poor neighborhoods. *Population Research and Policy Review*, *40*(3), 401–429.

Jencks, C., & Mayer, S. E. (1990). The social consequences of growing up in a poor neighborhood. *Inner-City Poverty in the United States*, *111*, 186.

Jonsson, J., & Mood, C. (2014). *Poverty and welfare among children and their families 1968-2010*. Institute for Futures Studies, Stockholm.

Knies, G., Melo, P. C., & Zhang, M. (2021). Neighbourhood deprivation, life satisfaction and earnings: Comparative analyses of neighbourhood effects at bespoke scales. *Urban Studies*, *58*(13), 2640–2659.

Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. *Psychological Bulletin*, *126*(2), 309.

Lindbeck, A., Nyberg, S., & Weibull, J. W. (1999). Social norms and economic incentives in the welfare state. *The Quarterly Journal of Economics*, *114*(1), 1–35.

Ludwig, J., Duncan, G. J., Gennetian, L. A., Katz, L. F., Kessler, R. C., Kling, J. R., & Sanbonmatsu, L. (2012). Neighborhood effects on the long-term well-being of low-income adults. *Science*, *337*(6101), 1505–1510.

Massey, D. S., & Denton, N. A. (2019). American apartheid: Segregation and the making of the underclass. In *Social stratification* (pp. 660–670). Routledge.

Mazumder, B. (2016). Estimating the intergenerational elasticity and rank association in the United States: Overcoming the current limitations of tax data☆. In *Inequality: Causes and consequences*. Emerald Group Publishing Limited.

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, *27*(1), 415–444.

Mood, C. (2015). The not-very-rich and the very poor: Poverty persistence and poverty concentration in Sweden. *Journal of European Social Policy*, *25*(3), 316–330.

OECD. (2011). *Divided we stand: Why inequality keeps rising*. OECD Publishing Paris.

Rauhut, D. (2002). *Fattigvård, socialbidrag och synen på fattigdom i Sverige 1918-1997* (Vol. 18). Almqvist & Wiksell International Stockholm.

Schön, L. (2010). *Sweden's road to modernity. An economic history*. SNS förlag.

Shiba, K., & Kawahara, T. (2021). Using propensity scores for causal inference: Pitfalls and tips. *Journal of Epidemiology*, *31*(8), 457–463.

South, S. J., & Crowder, K. (2010). Neighborhood poverty and nonmarital fertility: Spatial and temporal dimensions. *Journal of Marriage and Family*, *72*(1), 89–104.

Timberlake, J. M. (2009). Effects of household and neighborhood characteristics on children's exposure to neighborhood poverty and affluence. *Social Science Research*, *38*(2), 458–476.

Turley, R. N. L. (2002). Is relative deprivation beneficial? The effects of richer and poorer neighbors on children's outcomes. *Journal of Community Psychology*, *30*(6), 671–686.

Van Ham, M., Hedman, L., Manley, D., Coulter, R., & Östh, J. (2014). Intergenerational transmission of neighbourhood poverty: An analysis of neighbourhood histories of individuals. *Transactions of the Institute of British Geographers*, *39*(3), 402–417.

Wheaton, B., & Clarke, P. (2003). Space meets time: Integrating temporal and contextual influences on mental health in early adulthood. *American Sociological Review*, 680–706.

Wilson, W. J. (2012). *The truly disadvantaged: The inner city, the underclass, and public policy*. University of Chicago Press.

Wodtke, G. T. (2013). Duration and timing of exposure to neighborhood poverty and the risk of adolescent parenthood. *Demography*, *50*(5), 1765–1788.

Wodtke, G. T., Elwert, F., & Harding, D. J. (2016). Neighborhood effect heterogeneity by family income and developmental period. *American Journal of Sociology*, *121*(4), 1168–1222.

Wodtke, G. T., Harding, D. J., & Elwert, F. (2011). Neighborhood effects in temporal perspective: The impact of long-term exposure to concentrated disadvantage on high school graduation. *American Sociological Review*, *76*(5), 713–736.

	A: All ages 1-17				B: Ages 1-6			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Birth year	1951	8.40	1930	1966	1954	4.77	1946	1961
Women	0.49	0.50	0	1	0.47	0.50	0	1
Birth order	1.56	0.83	1	7	1.72	0.92	1	7
Sibship	2.11	1.09	1	7	2.22	1.09	1	7
Fraction time lived in poverty (Family)	0.29	0.36	0	1				
Fraction time lived in poverty (Neighborhood)	0.30	0.34	0	1				
Ever lived in poverty (Family)					0.37	0.48	0	1
Ever lived in poverty (NB)					0.56	0.50	0	1
Mean age Family head	36.65	8.99	13.5	84	34.18	6.72	18.5	62.5
Mean Income rank at ages 40-49	53.52	28.72	1	100	54.30	27.84	1	100
Quintile of income at childhood	2.66	1.47	1	5	3.03	1.39	1	5
N	14936				2366			
	C: Ages 7-12				D: Ages 13-17			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Birth year	1948	4.58	1940	1955	1943	4.74	1934	1950
Women	0.50	0.50	0	1	0.50	0.50	0	1
Birth order	1.57	0.82	1	7	1.33	0.65	1	6
Sibship	2.28	1.16	1	7	2.04	1.12	1	7
Ever lived in poverty (Family)	0.30	0.46	0	1	0.24	0.43	0	1
Ever lived in poverty (NB)	0.52	0.50	0	1	0.50	0.50	0	1
Mean age Family head	40.87	6.84	25.5	74.5	46.73	6.42	33	79
Mean Income rank at ages 40-49	53.77	28.05	1	100	55.43	29.24	1	100
Quintile of income at childhood	3.15	1.33	1	5	3.23	1.39	1	5
N	2005				1649			

Table 1: Descriptive statistics of the main variables used in the analysis

Note: Panel A gathers all observations from children aged 1-17 between 1947 and 1967, regardless of the number of years they lived in Landskrona. On the other hand, Panel B, C, and D contain information only for those children who were present and observable in Landskrona for a continuous period of 6 years within the respective age ranges. For instance, in Panel B, the children were observed at ages 1, 2, 3, 4, 5, and 6. All income assessed between 1947 and 2015 was adjusted for CPI at the 1990-fixed level (SCB, 2020). Source: SEDD (Bengtsson, Dribe, Quaranta, & Svensson, 2021).

Figure 1: Annual proportions of children living in poor families (A) and poor neighborhoods (B) by age ranges in Landskrona (1947-1967)

Note: Children are considered tobelong to a poor family if their annual equivalized income was lower than 60% of the annual family equivalized median income in Landskrona. Children were considered to live in a poor neighborhood if more than 30% of their neighbors (nearest 25 family heads) were in family poverty. Source: Same as Table 1.

	Model 1	Model 2	Model 3	Model 4 (Fam. FE)	Model 5 (Men)	Model 6 (Women)	ATE Men	ATE Women
Ages 1-6								
Ever poor (Family level)	-6.40***	-5.78***	-2.39	-1.01	-5.30**	0.99		
Ever Poor (Neighborhood)		-4.03***	-2.71*	-2.45	-3.49*	-1.43	-4.17*	-1.19
Ages 7-12								
Ever poor (Family level)	-5.62***	-4.55**	-0.95	2.57	-1.83	-0.41		
Ever Poor (Neighborhood)		-2.78*	-2.22	-1.49	-2.67	-2.03	-4.09	-2.21
Ages 13-17								
Ever poor (Family level)	-3.58*	-3.01	2.19	-6.30	1.48	2.93		
Ever Poor (Neighborhood)		-2.24	-1.34	4.36	-1.29	-1.31	-1.09	-2.36

Tab 2: Estimates of family-level and neighborhood poverty exposure on estimated adult income rank of children aged 1-6, 7-12, and 13-17, who lived in Landskrona (1947-1967)
Note: Estimates derived from Regression Models (1-6) and Average Treatment Effects (ATE) using the Propensity Score Matching Method. Only individuals observed in all age ranges (six consecutive observations) were included. Relative poverty measurement applied, defining children as ever living in a poor family if their annual equivalized income was below 60% of the annual family equivalized median income in Landskrona. Children also considered living in a poor neighborhood if over 30% of their neighbors (nearest 25 family heads) were in poverty. All models control for sex, birth order, sibship size, birth year, income quintile during childhood observation, mean age of the family head in observed years and maximum distance to the furthest neighbor. Full models 1-6 in Table S1 (Ages 1-6), Table S2 (Ages 7-12) and Table S3 (Ages 13-17). Average treatment effects calculated using STATA 18 command *teffects* (see section 3 "Material and methods"). *p-values:* *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Source: Same as Table 1.

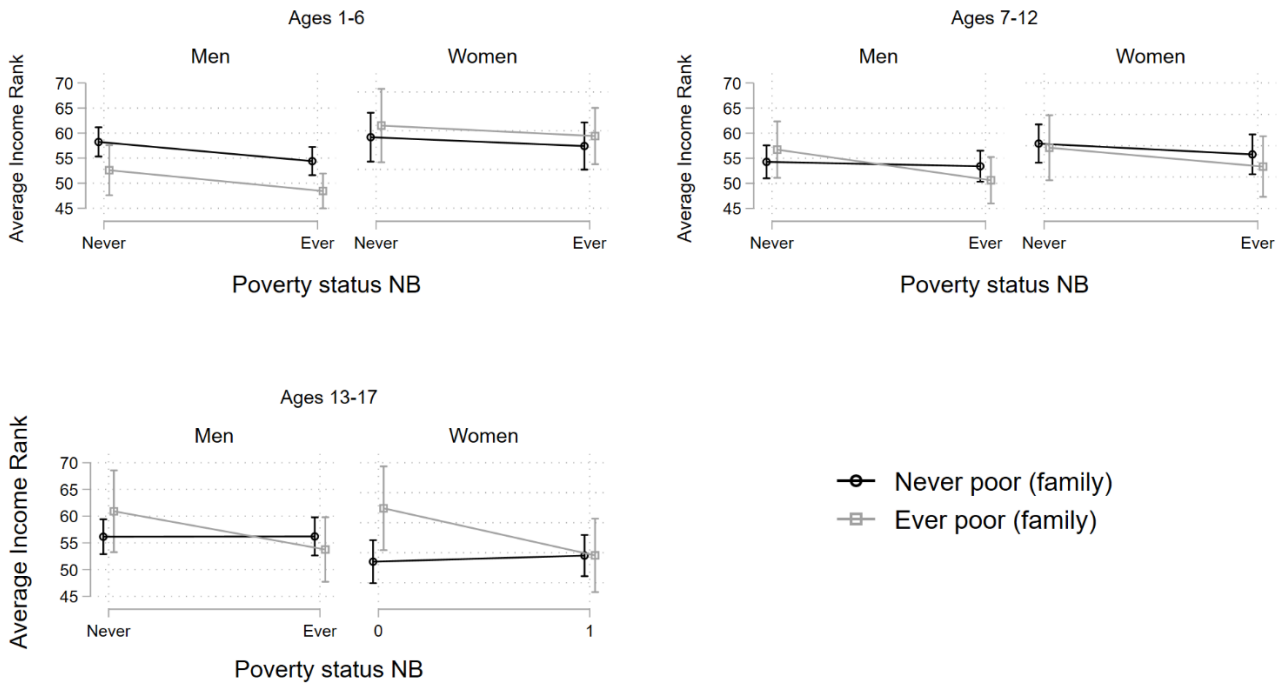

Figure 2: Average prediction of adult income rank interacting individuals' exposure to poverty at both family level and neighborhood (NB) during their childhood by age range and sex in Landskrona (1947-1967)

Note: Average predictions based on Model 7, which includes interactions between family poverty status, neighborhood poverty, and sex (full model in Table S4). Same controls as in Table 2. Source: Same as Table 1.

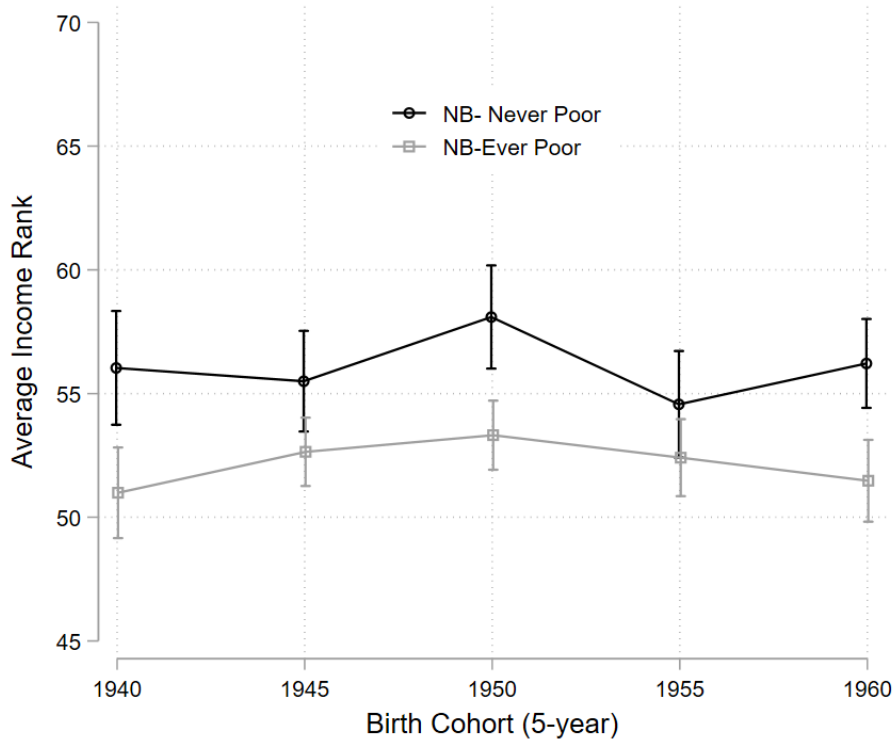

Figure 3: Average prediction of adult income rank interacting individuals' 5-year birth cohort exposure with their poverty status in the neighborhood (NB) during childhood in Landskrona (1947-1967)

Note: Average predictions based on Model 8, which includes interactions between family poverty status, neighborhood poverty, and sex (full model in Table S5). Same controls as in Table 2. Source: Same as Table 1.

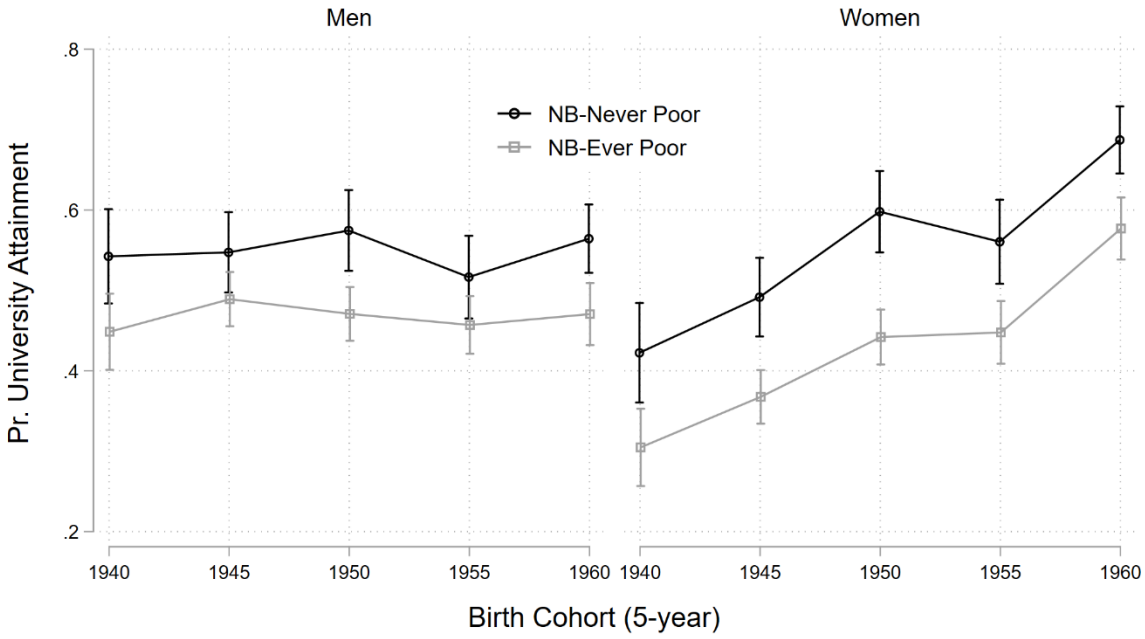

Figure 4: Probability of attaining a University degree at age 40 interacting individuals' 5-year birth cohort exposure with their poverty status in the neighborhood (NB) during childhood in Landskrona (1947-1967)

Note: Probabilities based on Model 9 (Linear probability model), which includes interactions between family poverty status, neighborhood poverty, and sex (full model in Table S6). Same controls as in Table 2. Source: Same as Table 1.

Supplementary Information

Ages 1-6	Model 1	Model 2	Model 3	Model 4 (Fam. FE)	Model 5 (Men)	Model 6 (Women)
Ever poor (Family)	-6.40***	-5.78***	-2.39	-1.01	-5.30**	0.99
Women	0.01	-0.02	0.05	2.99		
Birth Order	-1.52	-1.64	-2.83**	-2.63	-1.90	-4.20*
Sibship size	-0.84	-0.67	0.44	0.00	0.17	1.20
Birth year	-0.02	0.03	-0.11	0.05	-0.37*	0.18
Ever poor (NB)		-4.03***	-2.71*	-2.45	-3.49*	-1.43
Quintile of Childhood Income (Q1 ref)			0.00	0.00	0.00	0.00
Q2			4.45*	-3.69	6.68*	2.64
Q3			4.51*	-7.73	6.33*	3.28
Q4			7.67***	-14.86	9.62**	6.29
Q5			12.45***	-26.24	16.07***	9.17**
Mean Age of the Family Head			-0.03	0.48	-0.19	0.17
Max distance to the furthest neighbor (k=25)			0.05**	-0.00	0.04	0.05*
N	2213	2213	2119	636	1118	1001
adj. R-sq	0.018	0.022	0.041	0.300	0.071	0.018

Table S1: OLS regression on adult income rank of children aged 1-6, who lived in Landskrona (1947-1967)

Note: Models 1-3 include all men and women observed consecutively within the selected age range. Model 4 estimates family fixed effects, while Models 5 and 6 analyze men and women separately, respectively. p-values: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Source: Same as Table 1.

Ages 7-12	Model 1	Model 2	Model 3	Model 4 (Fam. FE)	Model 5 (Men)	Model 6 (Women)
Ever poor (Family)	-5.62***	-4.55**	-0.95	2.57	-1.83	-0.41
Women	0.47	0.34	0.40	-2.08		
Birth Order	-0.44	1.15	0.20	0.87	1.18	-0.45
Sibship size	0.18	0.19	0.19	-0.34	0.13	0.23
Birth year		-2.78*	-2.22	-1.49	-2.67	-2.03
Ever poor (NB)		-1.86*	-1.14	0.00	0.07	-2.13
Quintile of Childhood Income (Q1 ref)			0.00	0.00	0.00	0.00
Q2			5.16*	3.10	5.72	4.12
Q3			5.89*	5.53	7.48	4.21
Q4			7.51**	-1.30	6.83	8.01*
Q5			12.13***	-3.06	10.30*	13.41***
Mean Age of the Family Head			-0.01	0.00	0.04	-0.05
Max distance to the furthest neighbor (k=25)			0.03*	0.01	0.01	0.04*
N	1848	1848	1771	449	870	901
adj. R-sq	0.007	0.012	0.024	0.278	0.009	0.039

Table S2: OLS regression on adult income rank of children aged 7-12, who lived in Landskrona (1947-1967)

Note: Models 1-3 include all men and women observed consecutively within the selected age range. Model 4 estimates family fixed effects, while Models 5 and 6 analyze men and women separately, respectively. p-values: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Source: Same as Table 1.

Ages 13-17	Model 1	Model 2	Model 3	Model 4 (Fam. FE)	Model 5 (Men)	Model 6 (Women)
Ever poor (Family)	-3.58*	-3.01	2.19	-6.30	1.48	2.93
Women	-0.96	-0.89	-1.29	-8.30*		
Birth Order	-3.18**	-2.35	-3.47*	-9.93*	-2.48	-5.23*
Sibship size	0.02	0.03	0.04	1.71	0.11	-0.01
Birth year		-2.24	-1.34	4.36	-1.29	-1.31
Ever poor (NB)		-0.87	-0.21	0.00	-0.81	0.30
Quintile of Childhood Income (Q1 ref)			0.00	0.00	0.00	0.00
Q2			4.34	-1.61	3.73	4.60
Q3			7.33*	-11.57	10.23*	3.61
Q4			6.63*	-23.75	5.81	7.44
Q5			12.06***	-28.70	13.97**	9.55*
Mean Age of the Family Head			0.17	1.00	0.07	0.28
Max distance to the furthest neighbor (k=25)			0.02	0.04	0.06*	0.01
N	1515	1515	1452	285	736	716
adj. R-sq	0.005	0.006	0.018	0.107	0.027	0.008

Table S3: OLS regression on adult income rank of children aged 13-17, who lived in Landskrona (1947-1967)

Note: Models 1-3 include all men and women observed consecutively within the selected age range. Model 4 estimates family fixed effects, while Models 5 and 6 analyze men and women separately, respectively. p-values: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Source: Same as Table 1.

Model 7	Ages 1-6	Ages 7-12	Ages 13-17
Ever poor Family (F)	-5.65	2.43	4.76
Ever poor Neighborhood (NB)	-3.83	-0.87	0.05
Ever poor F X Ever poor NB	-0.32	-5.23	-7.21
Women	-4.08	1.06	-2.65
Ever poor F X Women	7.15	-3.10	4.14
Ever poor NB X Women	2.69	-0.86	0.96
Ever poor F X Ever poor NB X Women	0.10	3.95	-1.66
Birth order	-2.94**	0.18	-3.46*
Sibship size	0.56	-1.11	-0.17
Birth year	-0.10	0.18	0.03
Quintile of Childhood Income (Bottom Q ref)			
Q2	4.55*	5.00*	4.41
Q3	4.54*	5.79*	7.54*
Q4	7.76***	7.39**	6.67*
Q5	12.46***	12.06***	12.21***
Average age of the Family Head	-0.02	-0.01	0.17
Max distance to the furthest neighbor (k=25)	0.05**	0.03*	0.02
N	2119	1771	1452
adj. R-sq	0.044	0.022	0.019

Table S4: OLS regression based on model 7 on adult income rank of children aged 1-6, 7-12, 13-17, who lived in Landskrona (1947-1967)

Note: The model includes include all men and women observed consecutively within the selected age range. p-values: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Source: Same as Table 1.

	Model 8
Ever poor Family	0.45
Birth Cohorts (1935-39 ref)	0.00
1940-44	1.38
1945-49	0.84
1950-54	3.43
1955-59	-0.09
1960-65	1.56
Ever poor Neighborhood (NB)	-0.22
1940-44 X Ever poor (NB)	-4.82
1945-49 X Ever poor (NB)	-2.63
1950-54 X Ever poor (NB)	-4.55
1955-59 X Ever poor (NB)	-1.93
1960-65 X Ever poor (NB)	-4.52
Women	-1.04
Birth order	-1.69***
Sibship size	-0.19
Quintile of Childhood Income (Bottom Q ref)	0.00
Q2	3.59***
Q3	4.65***
Q4	6.08***
Q5	11.63***
Average age of the Family Head	0.05
Max distance to the furthest neighbor (k=25)	0.03***
N of Observations	YES
N	11391
adj. R-sq	0.030

Table S5: OLS regression based on model 8 on adult income rank of children aged 1-17 observed at least once and who lived in Landskrona (1947-1967)

Note: p-values: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Source: Same as Table 1.

	Model 9
Ever poor Family	0.03**
Women	0.34
Ever poor Neighborhood (NB)	-0.09**
Women X Ever poor NB	-0.02
Birth Cohorts (1935-39 ref)	0.00
1940-44	-0.18
1945-49	-0.18
1950-54	-0.15
1955-59	-0.21
1960-65	-0.16
Women X 1940-44	-0.46
Women X 1945-49	-0.40
Women X 1950-54	-0.32
Women X 1955-59	-0.30
Women X 1960-65	-0.22
Ever poor NB X 1940-44	-0.00
Ever poor NB X 1945-49	0.04
Ever poor NB X 1950-54	-0.01
Ever poor NB X 1955-59	0.03
Ever poor NB X 1960-65	0.03
Women X Ever poor NB X 1940-44	-0.01
Women X Ever poor NB X 1945-49	-0.05
Women X Ever poor NB X 1950-54	-0.04
Women X Ever poor NB X 1955-59	-0.04
Women X Ever poor NB X 1960-65	-
Birth order	0.04***
Sibship size	-0.01*
Quintile of Childhood Income (Bottom Q ref)	0.00
Q2	0.03*
Q3	0.08***
Q4	0.10***
Q5	0.26***
Average age of the Family Head	0.00***
Max distance to the furthest neighbor (k=25)	0.00***
N of Observations	YES
N	10264
adj. R-sq	0.073

Table S6: LPM regression based on model 9 on the probability of attaining a university degree by age 40 for children aged 1-17 observed at least once and who lived in Landskrona (1947-1967)

Note: p-values: *** p < 0.001; ** p < 0.01; * p < 0.05. Source: Same as Table 1.

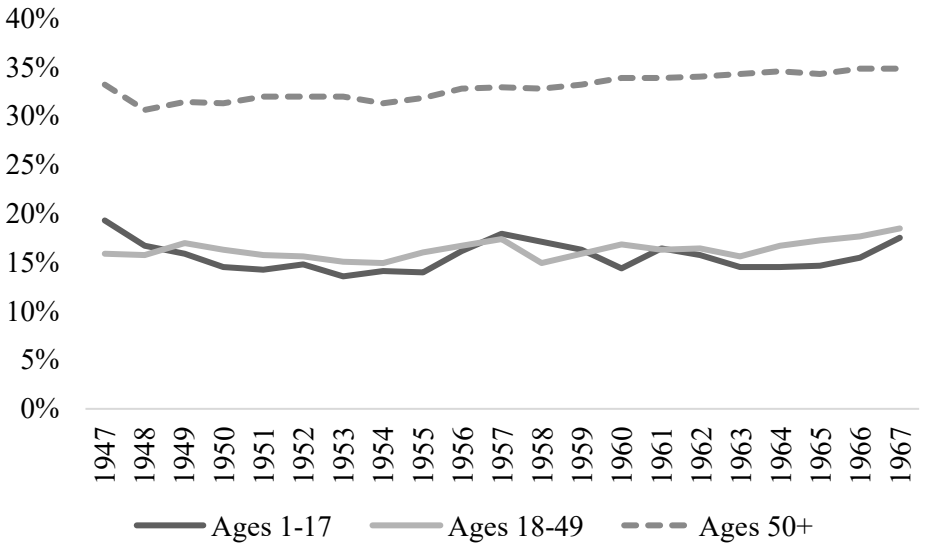

Figure S1: Annual proportions of individuals living in relative poverty by age group in Landskrona (1947-1967)

Note: All individuals present in Landskrona yearly, including also single households. Source: Same as Table 1.

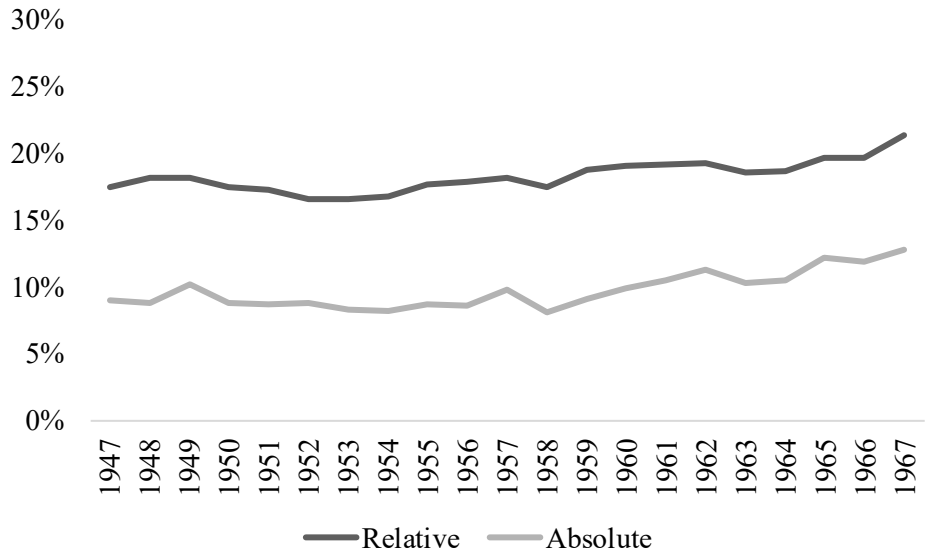

Figure S2: Annual proportions of children aged 1-17 living in poor families measured with relative poverty and absolute poverty in Landskrona (1947-1967)
Source: Same as Table 1.

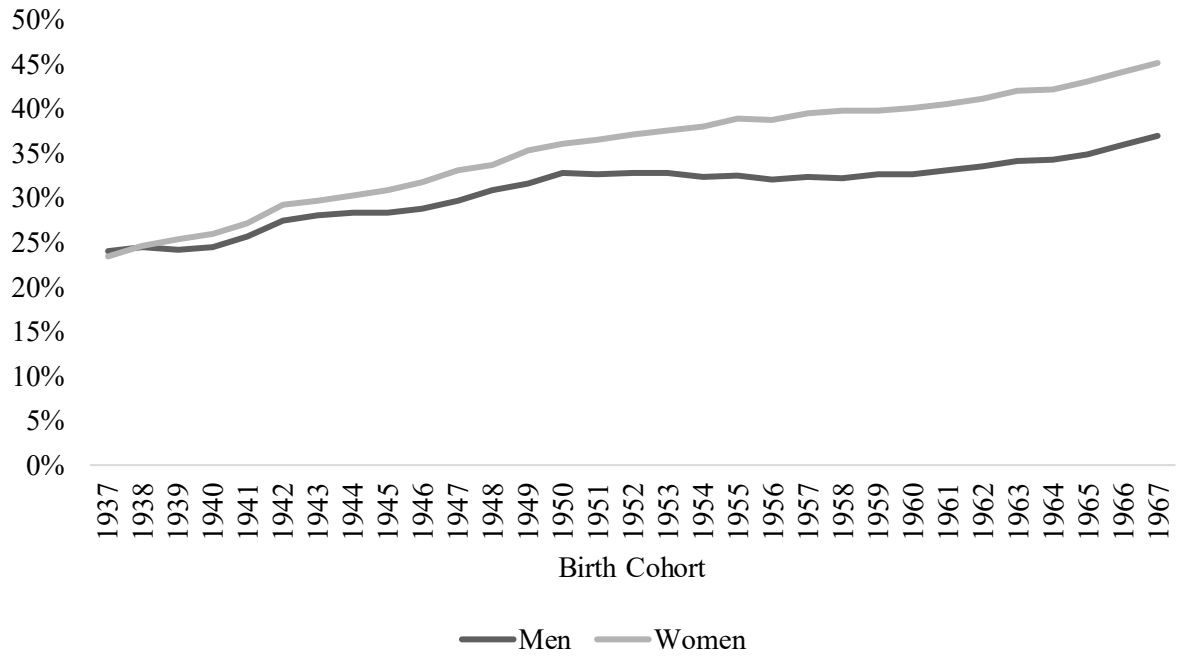

Figure S3: Proportions of men and women in Sweden attaining a university degree by birth cohort.
Source: Statistics Sweden (SCB).

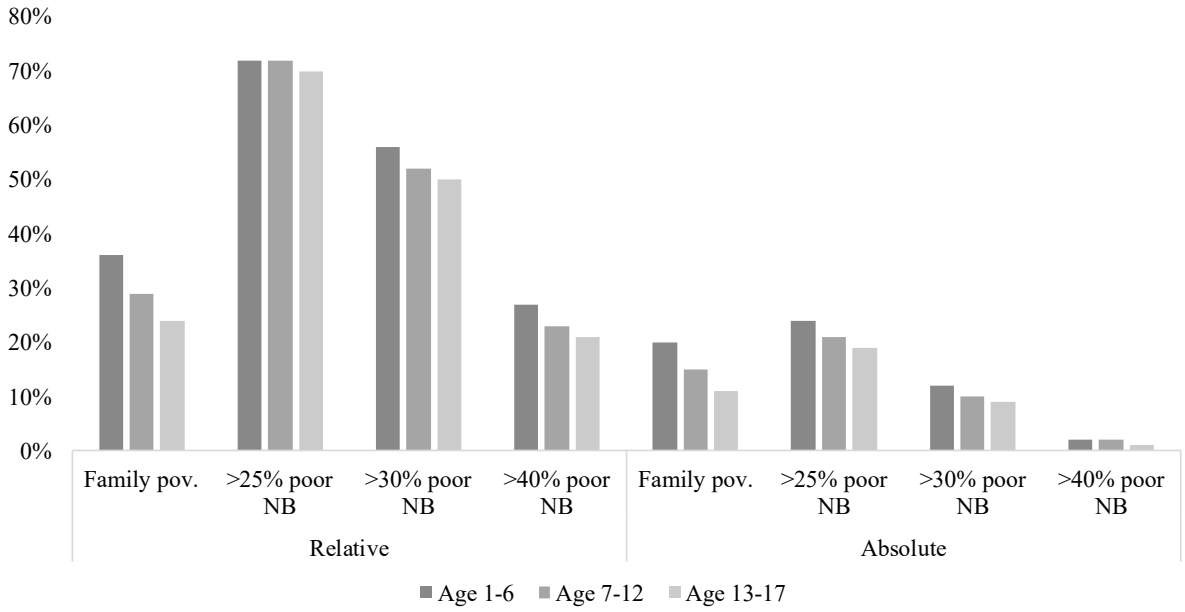

Figure S4: Proportion of children who ever lived in a poor family and poor neighborhoods with different definitions of neighborhood poverty, following both relative and absolute poverty measurements by age ranges in Landskrona (1947-1967).

Note: Children's neighborhood was considered to be the nearest 25 family heads. Source: Same as Table 1.

	k=25	k=50	k=100	k=200	k=400
Fraction time lived in poverty (Family)	-1.60	-1.91	-2.26	-2.35	-2.23
Fraction time lived in poverty (NB)	-7.02***	-5.64***	-1.86	-2.14	-2.58*
Women	-1.00	-1.01	-0.99	-0.96	-0.95
Birth Order	-1.66***	-1.69***	-1.65***	-1.67***	-1.67***
Birth year	0.01	0.01	-0.02	-0.02	-0.01
Sibship	-0.15	-0.16	-0.20	-0.16	-0.10
Quintile of Childhood Income (Bottom Q ref)	0.00	0.00	0.00	0.00	0.00
Q2	2.94**	3.02**	3.14**	3.14**	3.19**
Q3	3.69**	3.76***	3.88***	3.93***	4.05***
Q4	4.99***	5.10***	5.32***	5.39***	5.53***
Q5	10.56***	10.57***	10.87***	11.14***	11.53***
Mean age Family Head	0.07	0.07	0.07	0.07	0.08
Max distance to the furthest neighbor (k=25)	0.03***	0.03***	0.02***	0.01***	0.00**
Ever poor at ages 1-6 (Family)	0.96	0.95	1.00	1.16	0.92
Ever poor at ages 7-12 (Family)	0.04	-0.01	0.13	0.12	0.08
Ever poor at ages 13-17 (Family)	1.60	2.01	2.32	2.15	2.28
Ever poor at ages 1-6 (NB)	-0.41	-0.61	-1.91	-2.06*	-1.08
Ever poor at ages 7-12 (NB)	1.15	1.05	-0.42	0.20	0.93
Ever poor at ages 13-17 (NB)	0.93	-0.44	-2.16	-1.03	-0.63
Sum of Obs at ages 1-6	-0.16	-0.18	-0.13	-0.12	-0.13
Sum of Obs at ages 7-12	-0.12	-0.15	-0.13	-0.15	-0.16
Sum of Obs at ages 13-17	-0.33	-0.28	-0.30	-0.33	-0.33
N	11517	11517	11517	11517	11517
adj. R-sq	0.032	0.032	0.030	0.029	0.027

Table S7: OLS regression on the adult income rank of children aged 1-17 observed at least once and who lived in Landskrona (1947-1967) by different sizes of k-nearest neighborhoods

Note: The models apply a relative poverty measurement. p-values: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Source: Same as Table 1

	When >30% of poor neighbors (k=25)		When >25% of poor neighbors (k=25)		When >40% of poor neighbors (k=25)	
	Relative Poverty	Absolute Poverty	Relative Poverty	Absolute Poverty	Relative Poverty	Absolute Poverty
Fraction time lived in poverty (Family)	-1.60	1.23	-1.58	1.25	-2.12	0.57
Fraction time lived in poverty (NB)	-7.02***	-3.08	-6.70***	-1.73	-6.28***	13.64
Women	-1.00	-1.00	-1.05*	-1.03	-1.03	-0.97
Birth Order	-1.66***	-1.62***	-1.66***	-1.65***	-1.69***	-1.66***
Birth year	-0.15	-0.13	-0.18	-0.07	-0.10	-0.12
Sibship	0.01	-0.09	-0.00	-0.09	0.00	-0.09
Quintile of Childhood Income (Bottom Q ref)						
Q2	2.94**	4.87***	3.02**	4.85***	2.90**	4.94***
Q3	3.69**	6.08***	3.78***	6.00***	3.66**	6.16***
Q4	4.99***	7.59***	5.07***	7.52***	4.97***	7.72***
Q5	10.56***	13.40***	10.64***	13.32***	10.65***	13.57***
Mean age Family Head	0.07	0.06	0.08	0.06	0.07	0.06
Max distance to the furthest neighbor (k=25)	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***
Ever poor at ages 1-6 (Family)	0.96	2.03*	0.79	2.12*	1.15	1.99*
Ever poor at ages 7-12 (Family)	0.04	1.61	0.17	1.91	0.26	1.82
Ever poor at ages 13-17 (Family)	1.60	2.09	1.42	2.49	1.60	2.52
Ever poor at ages 1-6 (NB)	-0.41	-3.24*	0.57	-3.44**	-2.79*	-9.94***
Ever poor at ages 7-12 (NB)	1.15	0.95	1.28	-1.53	0.01	-1.81
Ever poor at ages 13-17 (NB)	0.93	-1.99	1.77	-4.09**	0.53	-13.24**
Sum of Obs at ages 1-6	-0.16	0.04	-0.17	0.05	-0.13	0.04
Sum of Obs at ages 7-12	-0.12	-0.20	-0.11	-0.21	-0.11	-0.16
Sum of Obs at ages 13-17	-0.33	-0.31	-0.37	-0.27	-0.33	-0.32
N	11517	11517	11517	11517	11517	11517
adj. R-sq	0.032	0.028	0.032	0.030	0.031	0.028

Table S8: OLS regression on the adult income rank of children aged 1-17 observed at least once and who lived in Landskrona (1947-1967) by different definitions of neighborhood poverty (intensity)

Note: The models apply a relative poverty measurement. p-values: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Source: Same as Table 1.

CENTRE FOR ECONOMIC DEMOGRAPHY

The Centre for Economic Demography (CED), established in 2006 as a Linnaeus Centre of Excellence, is a multidisciplinary research centre at Lund University with members from the School of Economics and Management, the Faculty of Medicine and the Faculty of Social Sciences. The mission of CED is to promote research and training in population studies. Researchers at the Centre study demographic issues from different perspectives and in a variety of contexts across time and space. More information at www.ed.lu.

Copyright is held by the author(s). Lund Papers in Economic Demography are circulated for discussion and have not been peer-reviewed or reviewed by the Centre for Economic Demography. The views expressed are those of the author(s).