The association between early-life poverty and adult economic status in Sweden from 1930 to 2015

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Introduction

Over the last decades, increasing attention has been devoted to the long-term effects of childhood conditions, including health, biology and socioeconomic aspects. One of the most studied topics concerns how childhood poverty have long-lasting effects over the life course. There is a consensus that being poor during childhood increases the likelihood of being poor or performing worse than others in terms of socioeconomic outcomes as an adult. However, in each context and period the mechanisms mediating (negatively or positively) this pattern are different and may vary from individual and household effects to more societal and institutional influences. We know more about the effects of childhood poverty in modern context than about the past as most available studies on childhood poverty effects only extend back to the late 1960s and give no insights into the changing influence of poverty as societies modernise and welfare states develop. Moreover, the experiences of men are better understood than those of women.

In this paper, we assess the effects of childhood poverty on the economic outcomes of individuals in adulthood, and to what extent education mediated these effects. We study individuals born 1930-1975 for whom we have information both on childhood poverty and on adult economic status (in ages 40-49, or 40-45 for the last cohorts). The study area in southern Sweden consists of an industrial port town (with a population of about 20,000 in 1930 and 27,500 in 2000) and five rural or semi-urban parishes (over 6000 inhabitants in 1900 and 10,000 in 2000). We use individual-level longitudinal data and annual individual income for the entire period, allowing the assessment of poverty levels and individual characteristics as permanent incomes for males and females. We analyse how childhood poverty affected adult economic status, including adult poverty, and the mediating role of education in this association. A main contribution of the paper is that we look at the development over a longer period and study how the welfare state and social policy, which were greatly expanding during the period we are studying, changed the long-run effects of growing up poor.

Background

The long-term effects of childhood poverty have been extensively studied for contemporary societies, but the same is not true for cohorts born before 1970. Hence, we lack knowledge

about the long-term development of the effects of childhood poverty. Consequently, the period characteristics of the studies on the effects of child poverty in most part of developed countries assume a low poverty rates with a transient incidence rather than persistent (Mood 2015).

The international literature on the effects of childhood poverty argue that being poor as a child increases the likelihood of being poor as an adult, although depending on the context this relationship might vary in strength, as might the mediating mechanisms (Bowles, Gintis, and Groves 2009). In most developed countries, with higher institutional and public support in the fight against poverty, the main factors driving childhood poverty prevalence in adult ages are related to family and individual aspects, from family structures to cognitive skills, which hamper the ability to increase and invest in human capital (Boggess, Corcoran, and Jenkins 1999). Accordingly, when tackling the potential consequences of growing up poor in the long-term, researchers have distinguished between different effects suffered during childhood that may have lasting impacts until or towards adulthood, which are separated by broad age groups (Duncan and Brooks-Gunn 1997). For instance, in early childhood years the potential and lasting impacts of poverty relate more to physical health effects. Conversely, in late childhood and adolescence, those effects revert majorly on psychological and social effects. Albeit these differences in effects by age, many authors argue that a more even income distribution a comprehensive welfare state and a large and effective public sector, mainly on education are the main tools against the abovementioned effects of childhood poverty. Accumulating human capital through educational achievements are considered among the best way to escape from the threat of lasting poverty in adulthood, which in part explains a more effective reduction of poverty among some developed countries than in developing countries (Blanden, Gregg, and Macmillan 2007; Jonsson, Mood, and Bihagen 2013; Moore 2005)

Therefore, some developed contexts, such as the Nordic countries, with extensive social welfare are among those performing better in terms of protecting children from poverty and mitigating the risk of it in adulthood through social policies and incentives for education (Lindquist and Lindquist 2012). Nevertheless, other scholars have also argued, based in findings for the United States, that there is a risk of establishing a "welfare culture", where extensive welfare traps people in poverty by eliminating incentives to work or to invest in human capital (Gottschalk, McLanahan and Sandefur 1994).

Research on child poverty and its effects in adulthood has not been as common in the Nordic countries as in in some other Western countries (e.g. the US), and has focused mainly on the period after 1990. This is partly explained by the overall decrease in poverty rates since the end of the 1960's (Gustafsson 2018). In Sweden, this decrease was continuous at least until economic recession of the 1990s, but the levels of poverty and childhood poverty are still among the lowest of all countries (Björklund, Jäntti, and Lindquist 2009; Lindquist and Lindquist 2012; Mood and Jonsson 2016). Moreover, the long-term effects of childhood poverty seem to have decreased after the turn of the 21st century, mainly as a result of social policies and the prevalence of the dual-earner family model (Mood and Jonsson 2016). The contemporary studies about child poverty and its effects in Sweden, and other Western European countries, point out that deprivation affects mainly single-parent families and those not gainfully employed, and especially immigrants (Galloway et al., 2015). Most studies have dealt with contemporary periods, going back to the 1970s and mainly focusing on the last decade. Finally, among developed countries, the general assumption defined poverty as main transient phenomena; however, some studies recently have observed that the recurrence of poverty among the same individuals were common even after escaping from deprivation temporarily (Mood 2015).

The main contribution of this paper is to assess how childhood poverty affected income and the risk of poverty in adulthood over a longer period of time, taking into account persistent poverty and the role of education, going back to the cohorts born in the 1930s.

Data and methods

We use data from the Scanian Economic-Demographic Database (SEDD). These data consist of individual-level longitudinal information from five rural and semi-urban parishes and a port town (Bengtsson et al. 2018). The database is one of very few that can follow individuals across multiple generations from preindustrial times up until the present, and with detailed information on both occupation and income, as well as different demographic outcomes. The parishes included are not a representative sample of Sweden in a statistical sense, but the area is not atypical and reflects conditions shared by most rural and semi-urban areas of the time studied (see Dribe, Helgertz, and Van de Putte 2015). In this paper, we study the period 1930-2015 for which we have information about total labor income (including self-employment) from individual tax returns. As the income-based benefits (unemployment, sickness, parental leave) are introduced these are included in total income. This is mainly an issue for the post-1970 period.

Information is provided from continuous population registers (a household-based register where information at the individual level is continuously updated), with information on demographic events, including migration to and from households for all individuals in the selected parishes.

From 1968 onwards, individual-level information covering the entire country is available in various administrative registers at Statistics Sweden and the National Board of Health and Welfare. Data from these registers have been linked to the historical sample, which has allowed an extension of the database along several dimensions. First, individuals who ever lived in the area prior to 1968 and who were still alive in that year were followed until 2015, or until death or emigration, regardless of their geographic location in Sweden. In addition, spouses, parents, grandparents, children and siblings of individuals belonging to the original population in Scania were added to the database if they were alive and living in Sweden sometime after 1967. All individuals added to the sample population were similarly followed until 2015, death, or emigration from Sweden. Importantly, this means that we are able to follow the individuals observed in childhood in the study area all over Sweden in adulthood without any biases related to migration.

We use a relative measure of childhood poverty. Children are considered poor if they lived in a family where the income was below 60% of the median income in a given year. A similar approach is taken in much of the contemporary poverty research in Europe as well as the official measure applied by EUROSTAT. We calculate the equivalised income of each family with at least one child under 14 and label as poor all families below the poverty line. For carrying out the equivalisation of family income, we first add up all income within a same family in a given year and then divide it by the weighted family size applying the official OCDE scale, which assigns 1 to household heads, 0.5 to all other family members older than 14 and 0.3 to children under 14. These children growing up in the area under study are followed to adulthood no matter where in Sweden they lived. The follow-up period starts in 1968 (when then oldest individuals are 38 years old) and ends in 2015. The outcome variables are measured in ages 40-49. We focus on two different adult oucomes: relative poverty in adulthood (individuals that spent at least five years with equivalised earnings below 60% of the median income at each year) and a proxy of permanent income computed as the log of the mean of all income observations in ages 40-49.

We use ordinary least squares (OLS) for measuring permanent income and linear probability models (LPM) for knowing the probability of poverty in adulthood and attaining more than the upper secondary education respectively. Secondly, we adopt a *potential outcomes approach* (Bellani and Bia 2019) in order to disentangle the effects in adulthood of having experienced poverty in childhood relative to children who did not grow up in poverty. In addition, we also apply a *mediation analysis* (Imai, Keele, and Tingley 2010) testing to which extent education played a role on explaining lower levels of income as well as if education attainment could have been a channel to get out of poverty among the poor.

For the *potential outcomes*, we apply an *average treatment effects* model for observational data, which follows an experimental research design using our observed individuals on childhood. In this way, we assess the differential effect of a 'treatment group' (being a poor child) versus a 'control group' (not being a poor child) on the economic outcomes in adulthood, which is similar to a difference in differences analysis. Similarly, in the mediation analysis, we also employ potential outcomes for income levels for poor and not poor children taking into account levels of education among both "treatment" and "control" groups. Therefore, the mediation effect of education on the treated (being a poor child) is computed as the average difference in permanent income among those who experienced poverty in childhood across the levels of educational (higher than Upper-secondary education) for the case of having and not having experienced poverty. In all the models, apart from poverty in childhood and education attainment we use other predictors as sex, migration, and decadal cohorts (1930's, 1940's, 1950's and 1960's).

Preliminary results

As shown in Table 1, there is a clear relationship between childhood poverty and adult economic status. For both permanent income and the probability of being poor in adulthood growing up poor increases the likelihood of poor economic outcomes in adulthood. Conversely, as expected attaining a higher level than the Upper-secondary school had an economic positive effect. Additionally, differences between males and females show that women were more likely to have lower earnings and higher probability of poverty when compared to men.

Among the four different decadal cohorts analysed we can find a clear gradient increasing over time and favouring younger cohorts in terms of permanent income. Such gradient still holds also in separate models for males and females and displaying a more pronounced increase in income for the latter, which coincides with progressively female participation in the Swedish labour market since the 1960's (Björklund 1992). Conversely, the cohort differences in the probability of poverty in adulthood, shows a different pattern where the younger cohorts had a higher probability of being poor. Moreover, the interaction models show that the impact of childhood poverty on adult poverty did not diminish for men over time. More importantly, in the case of males, the association got mainly stronger for cohorts born in the 1950s, and in a lesser degree for cohorts of the 1960s. The special situation for the cohorts born in the 1950s is probably connected to the severe economic crisis in Sweden in the 1990s when the adult outcomes of these cohorts were measured. Nevertheless, the same associations were not substantial or statistically significant for women.

Next, in table 2, we replicate similar models with attaining a higher level than the Upper-secondary school as dependent variable. For both sexes as well as for males and females separately, the *pre*-effect of having faced poverty during childhood was more detrimental to the likelihood of education attainment than the *post*-effect of adult poverty in 40's as a possible consequence, although both statuses were negatively correlated with the analysed educational outcome. However, across generations it is clear that the education attainment increased over time in any case, for both males and females as well as interacting the childhood poverty status

by cohorts. Interestingly, in the last two models, we interact both childhood and adulthood poverties on the likelihood of educational attainment and for both males and females the results were positive. Such interaction results contrasting with the effects of childhood or adult poverties *per se* might show that education could have played the differential role on mitigating the intergenerational transmission of poverty, which reinforces the interest of conducting an analysis with education as mediator variable.

On Table 3, the *Total Effect* displays the average differences (percentage) between poor and not-poor children in permanent income on adulthood. In this sense, we can observe a clear opposite gradient between males and females across cohorts. For males, the difference among poor and not poor children was about 10% less permanent income for the 1930's cohort and such gap doubled in the two youngest cohorts, 1950's and 1960's, with 22% and 18% less permanent income respectively. Conversely, among females the gap in permanent income over time decreased from 22% for the 1930´s cohort to about 11-13% in the youngest cohorts.
The role mediated by education in these differences is assessed through the *Average Mediation*, which quantifies the portion of the gap in permanent income due to education attainment. On overall, among males and females we also observe an inverse gradient. For men education explained 89% of the permanent income gap in the 1930´s cohort and about 33%-38% for cohorts from 1950's and 1960´s, whilst for women this portion increased from 15% (1930's) to almost 30% (1950´s and 1960´s).

Finally, in Table 4 we select only those individuals who were considered poor in childhood and apply an *average treatment effects* differentiating those who achieved a higher level than the Upper-secondary education or not on the likelihood of being poor when adult. This step was done in order to assess if education had a remedying effect among the poor. The results display increasing differences across cohorts and over time among males, as poor-children with educational attainment were about 5% less likely to be poor in the cohort 1930's and 11% less in the youngest cohorts (1960's). For females, the results for the oldest cohorts show even a contrary effect or not statistically significant, which might be related to their later educational expansion, although in the youngest cohort of 1960´s, the difference in the likelihood of adult poverty was also 12% lower for women who were poor during childhood but with educational attainment.
These preliminary results provide insights of the prevalence of childhood poverty during adult life. However, it is striking that although poverty was reduced in Sweden during the study period, the probability of being poor in adulthood continued to be higher for individual that were poor in childhood. Interestingly, there is a gender dimension to this with childhood poverty effects being stronger and increasing over time for men but not for women, despite better access to education and higher-paying low qualification jobs for the former group. The decrease in the role of education as mediator for males over time as well as the relative low values it had for females might be related to the expansion and configuration of the Swedish educational system in that periods. The first one is intrinsic to the process of expansion in the Swedish education during the second half of the twentieth century increasing progressively from the 1960´s onwards (Breen and Jonsson 2007). However, the portion not explained by education attainment in the mediation analysis increasing over time, may mean that the different options within the same education system (e.g. vocational vs general training itineraries) could have led to more beneficial or detrimental effects in economic terms (Murray 1988), which are not controlled in a binary variable of educational attainment. Furthermore, other sociodemographic factors as the role of family formation might have been important especially in the case of females. This indicates that childhood determinants should be assessed from a gender perspective and that we should look for gendered pathways and more mediators.

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Table 1: OLS and PLM models on Permanent Income and Adult poverty

	Both sexes Permanent Inc	Both sexes Adult poverty	Males Permanent Inc	Females Permanent Inc	Males Adult poverty	Females Adult poverty
Poor Child (PC)	-0.0833***	0.0191***	-0.0228**	-0.151***	-0.0151***	0.0142***
	(0.00291)	(0.00109)	(0.00790)	(0.00978)	(0.00336)	(0.00337)
Migrant (Child)	-0.00963***	0.00546***	0.0134***	-0.0227***	-0.00443***	0.0127***
	(0.00250)	(0.000933)	(0.00300)	(0.00396)	(0.00127)	(0.00136)
Female	-0.435***	0.00759***				
	(0.00232)	(0.000864)				
Education	0.329***	-0.0299***	0.331***	0.306***	-0.0372***	-0.0201***
	(0.00238)	(0.000887)	(0.00282)	(0.00382)	(0.00120)	(0.00132)
Ref 1930's						
1940's	0.688***	0.00888***	0.576***	0.770***	-0.00250	0.0144***
	(0.00327)	(0.00122)	(0.00455)	(0.00566)	(0.00193)	(0.00195)
1950's	1.093***	0.0291***	0.931***	1.257***	0.0181***	0.0197***
	(0.00362)	(0.00135)	(0.00492)	(0.00636)	(0.00209)	(0.00219)
1960's	1.379***	0.0438***	1.212***	1.543***	0.0378***	0.0331***
	(0.00427)	(0.00159)	(0.00576)	(0.00753)	(0.00244)	(0.00259)
PC*1940's			-0.0326***	0.0947***	0.0132**	0.00421
			(0.00963)	(0.0121)	(0.00409)	(0.00415)
PC*1950's			-0.129***	0.0655***	0.0818***	0.00535
			(0.0103)	(0.0133)	(0.00437)	(0.00456)
PC*1960's			-0.105***	0.0627***	0.0522***	0.00912
			(0.0122)	(0.0155)	(0.00516)	(0.00535)
N	302907	303891	149395	153512	149671	154220
adj. R^2	0.427	0.009	0.370	0.390	0.020	0.004

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: PLM models on Education attainment

	Education Both sexes	Education Males	Education Females	Education Males	Education Females
Poor Adult	-0.124***	-0.172***	-0.0751***	-0.181***	-0.0839***
	(0.00370)	(0.00554)	(0.00491)	(0.00645)	(0.00571)
Poor Child (PC)	-0.175***	-0.239***	-0.123***	-0.209***	-0.148***
	(0.00220)	(0.00719)	(0.00649)	(0.00331)	(0.00312)
Migrant (Child)	0.0319***	0.0270***	0.0434***	0.0277***	0.0434***
	(0.00190)	(0.00273)	(0.00263)	(0.00273)	(0.00263)
Female	-0.0547***				
	(0.00176)				
Ref 1930's					
1940's	0.0887***	0.0586***	0.112***	0.0640***	0.104***
	(0.00248)	(0.00415)	(0.00375)	(0.00368)	(0.00333)
1950's	0.138***	0.0473***	0.220***	0.0576***	0.214***
	(0.00275)	(0.00449)	(0.00419)	(0.00400)	(0.00375)
1960's	0.189***	0.0229***	0.335***	0.0390***	0.334***
	(0.00324)	(0.00526)	(0.00493)	(0.00470)	(0.00443)
PC*1940's		0.0214*	-0.0369***		
		(0.00879)	(0.00801)		
PC*1950's		0.0486***	-0.0300***		
		(0.00941)	(0.00881)		
PC*1960's		0.0763***	-0.00523		
		(0.0111)	(0.0103)		
Poor Adult*PC				0.0406**	0.0337**
				(0.0124)	(0.0112)
N	303891	149671	154220	149671	154220
adj. R^2	0.040	0.037	0.057	0.037	0.057

Table 3: Mediation analysis on the treated: Education mediating permanent income by childhood poverty status

Males	Cohort 1930-39 Perm- Inc	95% C.I		Cohort 1940-49 Perm- Inc	95% C.I		Cohort 1950-59 Perm- Inc	95% C.I		Cohort 1960-69 Perm- Inc	95% C.I	
Total Effect	**-0.10**	*-0.13*	*-0.07*	**-0.14**	*-0.15*	*-0.13*	**-0.22**	*-0.23*	*-0.20*	**-0.18**	*-0.20*	*-0.16*
Average Mediation	**-0.09**	*-0.10*	*-0.08*	**-0.06**	*-0.07*	*-0.06*	**-0.07**	*-0.08*	*-0.07*	**-0.07**	*-0.08*	*-0.06*
Average Direct Effect	**-0.01**	*-0.04*	*-0.01*	**-0.08**	*-0.09*	*-0.06*	**-0.15**	*-0.16*	*-0.13*	**-0.11**	*-0.13*	*-0.09*
% of Total effect med.	**0.89**	*0.70*	*1.23*	**0.46**	*0.42*	*0.51*	**0.33**	*0.31*	*0.36*	**0.38**	*0.34*	*0.44*
Poor (Adults)												
Mediation	**-0.09**	*-0.10*	*-0.08*	**-0.07**	*-0.07*	*-0.06*	**-0.07**	*-0.07*	*-0.06*	**-0.07**	*-0.07*	*-0.06*
Direct Effect	**-0.01**	*-0.04*	*-0.02*	**-0.08**	*-0.10*	*-0.07*	**-0.14**	*-0.16*	*-0.12*	**-0.11**	*-0.13*	*-0.08*
% of Total effect med.	**0.88**	*0.69*	*1.21*	**0.50**	*0.45*	*0.55*	**0.31**	*0.28*	*0.33*	**0.36**	*0.32*	*0.42*
Non-poor (Adults)												
Mediation	**-0.09**	*-0.10*	*-0.07*	**-0.06**	*-0.07*	*-0.05*	**-0.08**	*-0.09*	*-0.07*	**-0.07**	*-0.08*	*-0.06*
Direct Effect	**-0.01**	*-0.04*	*-0.01*	**-0.07**	*-0.08*	*-0.06*	**-0.15**	*-0.17*	*-0.14*	**-0.12**	*-0.14*	*-0.09*
% of Total effect med.	**0.89**	*0.71*	*1.24*	**0.42**	*0.38*	*0.47*	**0.36**	*0.33*	*0.39*	**0.41**	*0.36*	*0.47*

Females	Cohort 1930-39 Perm- Inc	95% C.I		Cohort 1940-49 Perm- Inc	95% C.I		Cohort 1950-59 Perm- Inc	95% C.I		Cohort 1960-69 Perm- Inc	95% C.I	
Total Effect	**-0.22**	*-0.26*	*-0.17*	**-0.10**	*-0.12*	*-0.09*	**-0.11**	*-0.13*	*-0.10*	**-0.13**	*-0.15*	*-0.11*
Average Mediation	**-0.03**	*-0.04*	*-0.03*	**-0.04**	*-0.05*	*-0.04*	**-0.03**	*-0.03*	*-0.03*	**-0.04**	*-0.04*	*-0.03*
Average Direct Effect	**-0.18**	*-0.23*	*-0.14*	**-0.06**	*-0.08*	*-0.04*	**-0.08**	*-0.10*	*-0.07*	**-0.09**	*-0.12*	*-0.07*
% of Total effect med.	**0.15**	*0.13*	*0.20*	**0.42**	*0.36*	*0.51*	**0.27**	*0.24*	*0.31*	**0.27**	*0.23*	*0.33*
Poor (Adults)												
Mediation	**-0.07**	*-0.08*	*-0.06*	**-0.05**	*-0.05*	*-0.04*	**-0.03**	*-0.03*	*-0.03*	**-0.04**	*-0.05*	*-0.03*
Direct Effect	**-0.22**	*-0.27*	*-0.17*	**-0.06**	*-0.08*	*-0.04*	**-0.08**	*-0.10*	*-0.07*	**-0.10**	*-0.12*	*-0.08*
% of Total effect med.	**0.31**	*0.26*	*0.40*	**0.45**	*0.38*	*0.54*	**0.28**	*0.25*	*0.32*	**0.31**	*0.26*	*0.37*
Non-poor (Adults)												
Mediation	**0.00**	*-0.01*	*-0.01*	**-0.04**	*-0.05*	*-0.04*	**-0.03**	*-0.03*	*-0.02*	**-0.03**	*-0.04*	*-0.03*
Direct Effect	**-0.15**	*-0.20*	*-0.10*	**-0.06**	*-0.08*	*-0.04*	**-0.08**	*-0.09*	*-0.07*	**-0.09**	*-0.11*	*-0.07*
% of Total effect med.	**0.00**	*0.00*	*0.00*	**0.40**	*0.34*	*0.49*	**0.26**	*0.23*	*0.30*	**0.24**	*0.20*	*0.29*

Table 4: Average treatment effects on Adult poverty among poor individuals in childhood by education attainment

ATE Males

Cohorts	Prob. Differences	Std. Err.	[95% Conf.	Interval]
1930***	**-0.049**	0.006	*-0.060*	*-0.038*
1940***	**-0.037**	0.005	*-0.047*	*-0.027*
1950***	**-0.050**	0.008	*-0.066*	*-0.033*
1960***	**-0.114**	0.009	*-0.132*	*-0.096*

ATE Females

Cohorts	Prob. Differences	Std. Err.	[95% Conf.	Interval]
1930***	**0.055**	0.017	*0.021*	*0.088*
1940***	**-0.023**	0.007	*-0.036*	*-0.009*
1950	**0.008**	0.007	*-0.006*	*0.022*
1960***	**-0.121**	0.009	*-0.138*	*-0.104*

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$