MAX-PLANCK-INSTITUT FÜR SOZIALRECHT UND SOZIALPOLITIK
MAX PLANCK INSTITUTE FOR SOCIAL LAW AND SOCIAL POLICY

mea Munich Center for the Economics of Aging

The long-lasting effects of family background: A European cross-country comparison

Fabrizio Mazzonna

245-2011

MEA DISCUSSION PAPERS

mea – Amalienstr. 33_D-80799 Munich_Phone +49 89 38602-355_Fax +49 89 38602-390_www.mea.mpisoc.mpg.de

The long-lasting effects of family background: A European cross-country comparison*

Fabrizio Mazzonna
MEA at the Max-Planck-Institute for Social Law and Social Policy (MPISOC)

August 2011

Abstract

This paper investigates how and to what extent disparities in family socio-economic status (SES) during childhood have long-lasting effects on old-age health, income and cognition. Further, it examines the variability of these effects across 13 European countries using the Survey on Health, Aging and Retirement in Europe (SHARE) and SHARELIFE that collect retrospective information on respondents' family backgrounds during their childhoods. The results confirm the crucial role of family SES during childhood in determining old-age outcomes and show large cross-country variability. Education seems to be the main channel for this gradient and explains most of the estimated cross-country differences. We argue that such a result can be explained with the different efforts of the European countries in promoting full time education.

Keywords: Intergenerational transmission; human capital; education; childhood; aging; SHARE.

JEL codes: I28, J14, J24, J62.

*This paper uses data from SHARE release 2.3.1. SHARE data collection in 2004-2007 was primarily funded by the European Commission through its 5th and 6th framework programmes (project numbers QLK6-CT-2001- 00360; RII-CT- 2006-062193; CIT5-CT-2005-028857). Additional funding by the US National Institute on Aging (grant numbers U01 AG09740-13S2; P01 AG005842; P01 AG08291; P30 AG12815; Y1-AG-4553-01; OGHA 04-064; R21 AG025169) as well as by various national sources is gratefully acknowledged (see http://www.share-project.org for a full list of funding institutions). We thank James Banks, Agar Brugiavini and Franco Peracchi for insightful comments on the earlier version of this paper.

1 Introduction

The extent to which parental socio-economic status (SES) affects human capital accumulation for children and therefore their adult socio-economic outcomes has always been of particular interest to social science for both equity and efficiency reasons. From an equity point of view social and economic mobility is a desirable feature for any modern society. Efficiency reasons arise in particular in the case of credit constraints where poor parents cannot borrow to optimally invest in their children's human capital accumulation (Becker and Tomes 1986). To this end, recent literature has analyzed the dynamic relationship between intergenerational mobility, wage inequality and economic growth, showing that mobility increases the correlation between ability and human capital accumulation and hence economic growth (see Galor 2011 for a review study).

In the past, there was a tendency in the economic literature to consider differences among children from different socio-economic background only as a consequence of different genetic endowments. Recent works, instead, suggest that the distinction between innate ability and acquired skills is obsolete. In their model of skill formation, Cunha and Heckman (2009) argue that the early childhood environment interacts with genes to produce cognitive and non-cognitive skills. The large epidemiological literature known as the "fetal origins hypothesis" arrives at a similar conclusion about the interplay between genes and environment (Gluckman and Hanson 2005).

At the same time, a growing literature has analyzed empirically the association between parental SES and those of their children when adult. While sociologists have focused on the intergenerational mobility between different class positions (Erikson and Goldthorpe 2002), economists typically have examined the intergenerational transmission of income or wealth (Solon 1999). More recently, researchers are examining whether intergenerational mobility varies among countries. Cross-country comparisons may be valuable because they can improve our understanding of how and why socio-economic status is transmitted across generations by examining the effects of different institutional and cultural environments. These comparisons are mainly based on the intergenerational earnings elasticity by applying least squares to the regression of the logarithm of fathers' earnings on the logarithm of sons' earnings. What emerges from this literature is that the United States and United Kingdom seem to be less mobile societies than are Canada, Finland and Sweden (Jäntti et al. 2006). However, there is little evidence concerning the other European countries.

The main limitations of these cross-country comparisons are that they are usually based on different datasets, different time periods, and often different ways of measuring the wealth of different generations across countries. At the same time, the empirical literature focuses only on one main economic outcome, usually income or wealth, without considering other important dimensions of human capital like health and cognition. Moreover, few studies try to explain the reasons for the observed cross-country heterogeneity and therefore they do not sharpen our understanding of the mechanisms behind intergenerational persistence of socio-economic status.

This paper tries to overcome these limitations by taking advantage of the Survey of Health, Aging, and Retirement in Europe (SHARE), a large household panel which contains data on the individual life circumstances of about 30,000 individuals aged 50+ in thirteen European countries including information on their income, health and cognitive abilities. SHARE is designed to be cross-nationally comparable, so it is suitable for cross-country comparison of the level of intergenerational persistence of SES across countries. The paper explores the richness of retrospective information on respondents' family backgrounds during their childhood provided in the third wave of SHARE, called SHARELIFE. Since SHARELIFE does not contain direct information on income or wealth of the respondent's parent, we use several types of retrospective information on respondent socio-economic background when he or she was a child (i.e. household characteristics, number of books at home, and main breadwinner's occupation) to proxy for his or her parental SES.

Two main issues are examined. First, we analyze how and to what extent disparities in family SES during childhood have long-lasting effects on old-age health, income and cognition. Second, we show how and to what extent intergenerational mobility of SES varies across European countries.

The results confirm the crucial role of family background during childhood in determining old-age health, cognitive and economic outcomes. The main channel for this effect seems to be education that has a strong effect on old-age outcomes even after controlling for childhood school performance and health status. At the same time, the cross-country comparison shows large variations in the role of family background across countries, with Italy and Spain being characterized by the highest intergenerational persistence of SES. Cross-country differences seem to be mainly driven by the crucial role that SES in childhood plays in determining individuals' educational attainment—in particular in Mediterranean countries. In these countries we observe the largest gap in educational attainment between individuals with different socio-economic backgrounds during childhood. We links this result to the different efforts of the European countries in promoting full-time education. Mediterranean countries, in fact, introduced later than other European countries educational reforms aimed at increasing the educational attainment of the whole population (e.g. compulsory schooling laws). This interpretation is consistent with the theoretical framework proposed by Becker and Tomes (1986) in which public investments in children's human capital are desirable in the presence of imperfect capital markets because they may reduce the investment gap between poor and rich children. At the same time, we confirm the presence of a strong link between inequality and intergenerational transmission of human capital as predicted by the literature (Solon 2004, Galor 2011).

Finally, our results show that public provision of education may not be sufficient to fully offset the gap between individual from different socio-economic background. This gap, in fact, starts to widen beginning with early childhood, as shown by the respondent's self-reported school performances in math and languages at the age of 10. Still the results show a large cross-country heterogeneity in this gap suggesting that differences at early stages might be the result not only of different genetic endowments but also of different institutional and cultural settings across European countries.

The remainder of this paper is organized as follows: Section 1.1 presents a brief review of the major theoretical contributions to the literature on intergenerational mobility; Section 2 describes the data used for this study; Section 3 describes the empirical strategy of the paper; Section 4 presents our results; and Section 5 offers some conclusions.

1.1 Intergenerational mobility: theoretical literature

From a theoretical point of view, the Becker and Tomes (1986) model is one of the first and best attempts to describe the mechanism of intergenerational transmission of earnings and human capital. Their model describes how the decisions of a family to invest in the human capital of its children and the transfer of income interact with genetic transmission of human capital endowments. Basically, parents allocate their time and money between current consumption and investments in the human capital of their offspring. Their choice is determined by their preferences and by the rate of return on human capital investments. Nevertheless, the children's economic success depends also on other elements like market luck and the cultural and genetic endowments that are transmitted from parent to children by a stochastic-linear or Markov equation:

$$E_t = \alpha + hE_{t-1} + v_t, \tag{1}$$

where E_t is the vector of endowments in the tth generation, h is the degree of heritability, and v_t is the unsystematic component or luck in the transmission process. In the absence of borrowing constraints, the model implies that earnings are exclusively transmitted by endowment and therefore determined by the degree of heritability of personal traits and ability in the society. In this setting, there is a limited role for public intervention because an increase in public expenditure would then induce a decrease in private (parental) expenditure, and the accumulation of human capital would be unchanged. By contrast, imperfect capital markets imply that poor parents cannot borrow to finance their children's human capital accumulation. In such a case, social interventions towards less advantaged children are desirable because they are equivalent to an improvement in the efficiency of capital markets.

Taking the Becker and Tomes model as starting point, Solon (2004) analyzes the role of the market and that of public policies in determining cross-country and within-country (over time) differences in intergenerational transmission of earnings. The main implication of his model is a strong link between inequality and intergenerational persistence. The model suggests that higher return to human capital investment (i.e. rate of return to education) and lower progressive public investment in children's human capital imply higher intergenerational persistence.

The interplay between inequality and mobility has been also underlined by a growing body of literature surveyed by Galor (2011). This literature shows how a more equal distribution of income, in the presence of credit constraints, has stimulated investment in human capital and economic growth (Perotti 1996, Maoz and Moav 1999, Galor et al. 1999). In particular, Galor et al. (2009) motivate the historical cross-country differences in the implementation of human capital–promoting institutions (e.g. public schooling) as a consequence of different distributions of landownership. Given the low degree of complementarity between human capital and land, they argue that large inequalities in landownership may adversely affect the implementation of public educational reforms because landowners may affect public policy and delay such important reforms. As explained in detail in Section 4, this fascinating theory may be particularly relevant in explaining the cross-country heterogeneity in the implementation of educational reforms aimed at increasing the educational attainment of the whole population.

Most of the reported theoretical predictions seem to be consistent with the empirical evidence that identifies the Scandinavian countries as the most equal and mobile societies among developed counties, in contrast to the US and the UK that are characterized by higher inequality and lower mobility (Jäntti et al. 2006). Further, Corak (2006) shows a very high correlation between father-son earning elasticity and return to tertiary education. Corak argues that one of the reasons for the elevated rate of returns is a restriction in the supply of university graduates, which can be the result of different structures and policies in terms of access to higher education. This means that educational policy may directly affect income mobility by reducing the cost of education for poor (constrained) parents and indirectly by reducing the rate of return of education.

It is worth noting that it is not the higher return per se that causes low mobility because it only creates incentives for people to invest in more human capital. The cause, instead, is the fact that only children from richer families are able to take advantage of the higher return because of both credit constraints and initial human capital endowments transmitted from parents to children. These endowments include cognitive ability, physical appearance, attitudes, and family connections as well as cultural and genetic traits. Hence, if on one hand one would expect welfare state redistribution and educational policy to have a major effect on opportunities, on the other hand they cannot be sufficient to fully address the problem of the intergenerational persistence of SES. This does not mean that nothing can be done to reduce the degree of heritability in a society, but public policies should be redirected towards early life interventions that are crucial for the subsequent evolution of cognitive and non-cognitive abilities (Heckman 2007). Recent evidence from Programme for International Student Assessment (PISA) data (Esping-Andersen 2008) shows large cross-country differences in the effect of parental economic and cultural status on their children's cognitive abilities at the age of 15. This evidence indicates that the extent to which parental cognitive and non-cognitive baggage is transmitted to their offspring is determined not only by fixed "genetic rules", but is also influenced by cross-country differences in public policies and cultural background.

2 Data and descriptive statistics

This paper uses data from waves II and III (2006 and 2008) of the Survey of Health, Ageing and Retirement in Europe (SHARE), a multidisciplinary, cross-national bi-annual household panel survey. The survey collects data on health, socio-economic status, and social and family networks for nationally representative samples of elderly people in the participating countries. SHARE is designed to be cross-nationally comparable and is harmonized with the U.S. Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA). The second and third waves cover 13 countries[1], representing different European regions, from Scandinavia (Denmark, Sweden) through Central Europe (Austria, Belgium, France, Germany, the Netherlands, Switzerland) and Mediterranean countries (Greece, Italy, Spain) to Eastern European (Poland and Czech Republic). The target population consists of individuals aged 50 and over who speak the official language of each

[1] The countries now covered by SHARE are 22 but only 13 participated to both wave 2 and 3.

country and do not live abroad or in an institution, plus their spouses or partners irrespective of age. The common questionnaire and interview mode, the effort devoted to translation of the questionnaire into the national languages of each country, and the standardization of fieldwork procedures and interviewing protocols are the most important design tools adopted to ensure cross-country comparability (Börsch-Supan and Jürges 2005).

In addition, the third wave of SHARE, called SHARELIFE, has been implemented to collect the retrospective histories of the SHARE respondents in order to obtain information about the lives of respondents before the baseline year of the survey (2004). The use of retrospective questionnaires about childhood health and social conditions is a way to overcome the lack of large nationally representative cohort studies connecting the earliest years of life to later stages of the life course. This is especially important, since much research has demonstrated the importance of early life events for later life outcomes (see Currie 2009 for an extensive survey). This method has many benefits over regular longitudinal data collection. It is "faster, less costly and the risk of respondents dropping out of the study is much smaller than in longitudinal study" (Schröder 2010). On the other hand, this method suffers from recall bias, as a respondent may misreport whether, when and how an event took place in the past. In order to improve the respondents' recall ability SHARE orders the different interview modules according to what is usually most important for the respondent and thus remembered most accurately. Moreover, the interview is supported with a life grid—a computerized version of the life history interview that serves as the basis for the SHARELIFE interview. Basically, as the respondent answers, the information appears in the calendar for both the respondent and the interviewer to see, so that the interviewer has an easy way of linking questions to personal events. There is a growing literature on the accuracy of retrospective surveys. What emerges clearly from this literature is that the reliability of any retrospective survey is based on the accuracy of the collected information. In a comparison of archival data with childhood information collected at old age using a life grid, Berney and Blane (1998) revealed that a substantial majority of subjects had recalled simple sociodemographic information, such as a father's occupation and simple residential information, after a period of 50 years with a useful degree of accuracy. Similar conclusions are presented in the work of Krall et al. (1988), where the recall at age 50 of several childhood diseases and other illnesses was validated by comparison to longitudinal childhood health records. Using data from the Panel Study of Income Dynamics (PSID) and HRS, Haas (2007) shows that the retrospective measure of overall childhood health is reliably reported over time, while Smith (2009a) shows that the prevalence rates of the reported diseases in childhood are consistent with the external historical record. In SHARELIFE, the accuracy of the collected information was assessed by Garrouste and Paccagnella (2010) by comparing the collected information with the information reported at the time of occurrence of the events in the two past waves of SHARE. They find an overall strong consistency across waves (with less than 10% recall errors over all events) and conclude that gender, age and family status are the main determinants in the recall capacity.

This paper restricts attention to individuals aged 50–80 at the time of the second wave interview who also answered to the third wave with no missing value on the variables of interest (see Section 2.2). These selection criteria give a working sample of 19763 individuals from 13 European countries. Table 1 shows the composition of the working sample by country and sex. The analysis is cross-sectional because SHARELIFE (wave 3) contains only information on respondents' life history and thus is merged with the second wave, which contains information on health and cognitive and economic status when old.

2.1 A general index of childhood SES

The discussion in this section shows how the index of childhood SES used in the empirical analysis of the paper has been constructed. Standard economic measures of SES use monetary information such as income or consumption expenditure. The literature on intergenerational transmission, for instance, uses father's income to measure son's earnings elasticity. Although it provides a very simple measure for evaluation of intergenerational transmission of income, it presents some important empirical limitations that have been largely discussed in Solon (1999). Such empirical limitations, however, are not discussed here, because the difficulty is that SHARELIFE contains no data on income or wealth of the respondents during their childhood.

For this reason, we use some proxies of the household SES extracted from the retrospective information on childhood socio-economic background collected in SHARELIFE. In particular, a specific module of the survey asks the respondents for information on their living conditions when they were 10 years old. From this module, four indicators of the household SES are constructed: rooms per capita in their accommodation (excluding bathrooms and kitchens); facilities in the accommodation (fixed bath, cold and hot running water supply, inside toilet and central heating); estimated number of books at home; and the occupation of the main breadwinner. As underlined in Section 2, simple information about household characteristics and parents' occupation should be recorded with useful accuracy. The first two indicators concern the household's dwelling and are usually considered as asset indicators and hence proxies for household long-run wealth (McKenzie 2005). In particular, the number of rooms per capita should capture the relative dimension of the accommodation, while the number of facilities is clearly related with its quality. The estimated number of books—asked in terms of number of shelves and bookcases that can be filled—should be a good proxy for the cultural background in the household (as reported in Esping-Andersen 2008 using PISA data) and thus related with parents' education. In Appendix A we show that this proxy is consistent with Barro-Lee data on educational attainment in these countries in 1960. Finally, the breadwinner's main occupation is recorded according to the first digit of the ISCO-88 code. As in Case et al. (2009), occupations are divided into three groups that refer to their assumed skill level: 1 "high", 2 "medium" and 3 "low". This recoding provides both a good proxy for educational level (which should be reflected in the occupation's skill level) of the main breadwinner and for its income level. Table 2 reports summary statistics by country for these four indicators with standard errors in parentheses, and in the last column the average GDP per capita in the period 1920–1960 expressed in thousands of 1990 international Geary-Khamis dollars (Maddison 2010). The first two columns show the average number of rooms per capita and facilities in the accommodation (which range from 0 to 4). The third shows the proportion of respondents with at least a number of books sufficient to fill a bookcase, while the last one shows the proportion of them with a breadwinner with a low-skill occupation. All indicators show large variation between and within countries. In particular, Mediterranean countries and Poland show the lowest values for each indicator, therefore the biggest fraction of respondents that grew up in poor households. On the other hand, Scandinavian countries and Switzerland show the biggest fraction of respondent that grew up in better off households. Such a result seems to be consistent with the historical data on GDP per capita for the reference period that show lowest values for Mediterranean countries and Poland and higher level for Scandinavian ones and Switzerland.

It is not obvious how to use these indicators to proxy for household SES. The simplest solution may be to enter all variables separately in a linear multivariate regression equation. Despite its simplicity, this approach presents an important drawback, because these variables may have both direct and indirect effects on the outcomes of interest. For instance, the availability of running water or an inside toilet might be a proxy not only for household wealth but also for the hygienic and health conditions in the household and thus has an independent effect on children's health.

The alternative approach is to construct a single index that is able to summarize the information provided by these proxies. To this end, the principal component analysis (PCA) provides a linear weighting system of the variables that should provide a good approximation of the household SES. Recent literature, in fact, started with the work of Filmer and Pritchett (2001) who evaluated and promoted the use of PCA to construct an index of household long-run wealth and well-being based on several indicators of the household SES such as asset ownership, access to utilities, household characteristics, occupation of the main breadwinner, and demographic conditions. The first principal component, which explains the largest proportion of the total variance, is taken to represent the household's wealth. It was shown that the resulting index, now adopted by the World Bank[2], provides a reasonable measure of wealth level effects and inequality in many developing countries like Indonesia, Pakistan, Nepal, India, Argentina and Mexico (McKenzie 2005).

This method is computationally easier and avoids many of the problems of recall bias and measurement errors that characterize income and consumption measures. However, care needs to be taken to ensure that sufficient indicators are used to prevent "clumping" (small numbers of distinct clusters) and "truncation" (respondents spread over a narrow range) and thereby allow inequality among households to be measured. Critics of PCA argue that the method of choosing the number of components and the variables to include is not well defined, and the common use of discrete data is problematic with this technique.

Another issue is related with the cross-country nature of the data. In most of the literature the index from PCA is constructed at the country level, while here data are from 13 different countries. In this case, McKenzie (2005) suggests the use of pooled data in order to "provide that the same weighting method can be used for each country, and that principal components can put weights on variables which explain variation across countries as well as households within countries". However, as shown in Table 2, these countries often shows very different distributions for each indicator. As a consequence, by applying PCA directly, respondents from Mediterranean countries would end in the lower tail of the index distribution while those from Scandinavia in the upper tail. For this reason, we first center the four indicators at the country level (subtracting off the country mean), and then we extract the first principal component. Robustness checks about this index are provided in Appendix B.2. In particular, we consider alternative indexes constructed at country or regional levels and the robustness of the principal component method used to extract the index.

Table 3 reports the results from a principal component analysis. The eigenvectors (principal components) are normalized to have unit length; thus the sum of the squares of the loadings is 1.

[2] It is used for the analysis of inequalities within demographic and health surveys (DHS).

It is worth noting that the first principal component explains about half of the total variance: an overwhelming result compared with the literature, which usually shows percentages below 30%. It means that the variables are highly correlated and the first component contains most of the relevant information. Moreover, the first principal component is the only one that shows signs of the factor loadings that are consistent with an SES index (positive for the first three proxies and negative for the fourth).

Figure 1 shows the distribution of the SES index by country. The index does not show any clumping or truncation—problems that often arise in the literature. Although centered, the index shows a very different distribution across countries. In particular, Mediterranean countries and Poland show very high inequality in the distribution of the SES index, while it is more equally distributed in the Scandinavian countries. This result is consistent with the available historical data on wealth distribution of these countries as reported in Appendix A, and therefore the constructed SES index should also provide a good measure of wealth inequality.

2.2 Adult outcomes and other controls

In order to evaluate the long-lasting effects of family background, three different dimensions of the old-age status are explored: health, economic, and cognitive status. The respondent's economic status is proxied with the log of household total net per-capita income, constructed from income-related variables collected in different modules of the second wave of SHARE. The amounts are expressed in Euros using purchasing power–adjusted exchange rates. Further information about data collection and imputation can be found in Börsch-Supan and Jürges (2005).

In SHARE, cognitive status is measured by using simple tests of orientation in time, memory, verbal fluency, and numeracy. The tests are comparable with similar tests implemented in the HRS and ELSA, and follow a protocol aimed at minimizing the potential influences of the interviewer and the interview process. The test of orientation in time shows very little variability across respondents and therefore it is not used in this paper.

The test of memory consists of verbal registration and recall of a list of 10 words (butter, arm, letter, queen, ticket, grass, corner, stone, book, stick). The speed at which these words are displayed to the interviewer and then read out to the respondent is automatically controlled by the Computer Assisted Personal Interview (CAPI) system. The respondent hears the complete list only once and the test is carried out two times, immediately after the encoding phase (immediate recall) and at the end of the cognitive function module (delayed recall). The total scores of both tests correspond to the number of words that the respondent recalls. A general measure of memory is constructed by summing up the individual scores in the two tests. The resulting memory variable ranges between 0 and 20.

The test of verbal fluency consists of counting how many distinct elements from the animal kingdom the respondent can name within one minute. This variable ranges between 0 and 60.

The test of numeracy consists of a few questions[3] involving simple arithmetical calculations based on real-life situations. Respondents who correctly answer the first question are asked a more difficult one, while those who make a mistake are asked an easier one. The last question is about compound interest, testing basic financial literacy. The resulting total score ranges from 0 to 4.

As common in the neuro-psychological literature, a single index for cognitive ability is extracted in order to reduce the dimensionality of the old-age cognitive ability status. As before, it is contructed by using PCA. Table 4 reports the eigenvector associated with the first eigenvalue. It is worth noting that 62% of the total variance is explained by the first principal component used to proxy for cognitive status.

As is usual in empirical research, self-rated health status (SRHS) is used as a measure of the health status. Respondents are asked to rate their general health according to five possible categories (*excellent*, *very good*, *good*, *fair*, *poor*). In order to facilitate the interpretation of the results the variable is recoded as a dummy variable equal to 1 for those that report at least good health. The SRHS question is asked in each wave of SHARE, but for comparison with the economic and cognitive status, only the second wave question is used[4].

Other important variables are used in order to explore the different channels through which family background may affect old-age socio-economic status. Table 5 reports summary statistics for these variables. *Age left* is an educational variable that records the age at which the respondent left full-time education. *Child math* and *Child language* are self-assessed measures of the relative position in math and language at school with respect to the other children when the respondent was aged 10. The categories are five: 1 *much better*, 2 *better*, 3 *about the same*, 4 *worse* or 5 *much worse* than the average. *Child health* asks the respondent to rate his or her health from birth up until, and including, age 15 according to the same five categories of the SRHS. A set of dummies is included to control for

[3]It consists of 4 different questions with a simple branching.

[4]The fact that the question about SRHS in childhood is asked in a different wave with respect to the adult SRHS question can decrease the probability of a coloring effect, namely the fact that "*individuals whose adult health has taken a serious turn for the worse may now better remember a childhood health problem or see their childhood health as worse than it really was*" (Smith 2009b, page 20).

the area of residence during the childhood: *big city* (reference category), *suburb*, *large town*, *small town* and *rural*. We include also 167 dummies that control for the regional area of the childhood residence, but they are excluded from the table. Each dummy refers to the Nomenclature of Units for Territorial Statistics (NUTS) code level 2, a geocode standard for referencing the subdivisions of countries for statistical purposes.

Finally, there are controls for adult health and working histories. Health includes a dummy variable equal to 1 if the individual ever had a physical injury which results in a disability and a variable that controls for the number of periods of ill health during his or her adulthood that lasted for more than a year. Adult working history includes dummies for the occupational level of the individual's main job, past or actual, divided in three skill levels as for the father's occupation (*high*, *medium* and *low*) and a fourth dummy equal to 1 if the individual had never done any paid work (*Never worked*).

For a descriptive analysis of the long-term effects of family SES, Figure 2 shows the differences in old-age income, health, cognition and childhood school performance between those in the first and last quintiles of the distribution of the childhood SES index. Differences are evaluated using the median value in each of the two quintiles of the SES index. Income and old-age cognition are expressed in percentage differences, while health and school performance are expressed as simple differences because they range between 0 and 5. As expected, in each country respondents from the bottom of the childhood SES distribution perform worse than respondents at the top. More interesting is the large variability across countries. In the case of income, for instance, differences range from 20% for Belgium to 98% for Spain. Large differences are seen also in old-age cognition, with differences of up to 70% in Italy and Spain. More generally, excluding health where the differences across countries are not so definite, Italy and Spain (and partially France) are the countries that report the largest gradient in each old-age outcome. These differences, however, might be due to a possible composition effect, in particular in terms of age, that we try to disentangle in the empirical section of this paper.

Finally, a large cross-country variability is present also in childhood school performance, approximated with the relative performance in math at school. This important result reveals that these differences between individuals born in poor and better-off families, although self-reported, widen starting with the first years of age with Mediterranean countries (Greece, Italy and Spain) showing the largest gradient.

3 Empirical strategy

The descriptive evidence in the previous section has shown a strong association between family background and old-age outcomes.

At the same time,we saw a large variability across countries in the lasting effects of childhood SES. Since the aim of this paper is to understand the reasons for such large cross-country variability, the empirical strategy presented in this section intends to shed light on the mechanisms behind the long-term effects of childhood circumstances, in particular, the channels through which family background affects old-age economic, health and cognitive outcomes.

To this end, the simple empirical framework proposed by Case, Fertig and Paxson (2005) could be a useful starting point for the analysis of such a mechanism. They consider several alternative models of how childhood circumstances and health affect the dynamic relationship between health and economic status. As in their model, we start from the consideration that childhood circumstances may have both direct and indirect effects on old-age outcomes. Based on four stages of life, Figure 3 shows all the possible pathways from childhood circumstances to old-age outcomes. To illustrate this idea, let Y_O be any of the outcomes in old age—economic, health or cognitive—for an individual from country k and cohort c. It is expressed as a linear function of childhood SES (CS), initial endowment (IE), schooling (S) and adult economic, cognitive and health outcomes (Y_{AE}, Y_{AC} and Y_{AH}):

$$Y_O = \beta_0 + \beta_1 \mathrm{CS} + \beta_2 \mathrm{IE} + \beta_3 \mathrm{S} + \beta_4 Y_{\mathrm{AE}} + \beta_5 Y_{\mathrm{AC}} + \beta_6 Y_{\mathrm{AH}} + \varepsilon_O, \tag{2}$$

where subscripts for country and cohort are omitted.

Since childhood circumstances may also affect schooling and adult outcomes, as in Figure 3, the coefficient β_1 can be seen as the direct effect of childhood SES on old-age outcomes. Empirically, this model is estimated by pooling observations over countries and cohorts and controlling for a quadratic function of age, sex, and country-fixed effects. Since neighborhood and regional characteristics may also matter (see Solon 1999) the specification also includes fixed effects for region (NUTS level 2) and area of residence (e.g. city or rural) during childhood.

The empirical strategy of this paper is twofold. First, we estimate equation (2), gradually accounting for all the possible pathways from childhood SES to old-age status as suggested in Figure 3. It means that we start conditioning only on childhood SES and the other baseline controls (age, sex, country fixed effects), and gradually we include the other controls. Second, we account for cross-country heterogeneity in childhood SES effects by interacting the childhood SES coefficient with the country dummies. An alternative strategy would be to make separate estimates by country to allow for the maximum level of country heterogeneity. However, the number of individuals in each country sample might not be sufficiently large to test differences in the coefficients across country. In any case, as discussed in Appendix B.2, the results from separated estimates by country or region (aggregating more countries) are very similar to those presented in the estimation results section.

Endogeneity concerns may arise because parameter estimates of (2) will be unbiased only under mean independence between the error terms and our control for childhood SES (CS). It is clear that without valid controls for the initial endowment (IE) this condition does not hold because genetic characteristics and personal traits passed by parents to their offspring may affect both childhood SES and adult outcomes. To give credibility to a causal interpretation, controls for childhood health and school performances at age 10 are included in the model to proxy for initial endowment. The use of childhood school performance indicators is justified by the central role played by cognitive and non-cognitive abilities in determining such performances (Heckman 2007). In the same way, childhood health should control for the initial health condition. Nevertheless, such proxies of initial endowment show two main limitations. First, they are self-reported and therefore potentially affected by recall bias, as already discussed in Section 2. Second, childhood health and school performance should be determined not only by the initial endowment passed from parents to children but by the childhood SES as well. Hence, as in an imperfect proxy case (see Wooldridge 2001), ordinary least squares (OLS) estimates of the childhood SES coefficient may be biased downward — if part of the effect of childhood SES is through childhood health and school performance — or upward — if our proxies only partially capture the initial endowment effect.

However, most of the endogeneity concerns should be overcome when the cross-country heterogeneity in the lasting effects of childhood SES is analyzed. Assuming that the "genetic rules" that determine the inheritance of ability and personal traits are the same across countries, cross-country differences in the effect of childhood SES should be due only to environmental factors (and to the interaction between those and genetic factors) such as different institutional settings and policy. Although this assumption is untestable, it should be a reasonable assumption for a homogeneous population in terms of race like the European one before the 1960[5]. Given that assumption, the main idea of the paper is to identify those factors that explain most of the observed cross-country heterogeneity.

[5]See Bowles and Gintis (2002) for a survey paper that analyzes the importance of race in the mechanism of intergenerational transmission of economic status.

3.1 Other identification issues

This section discusses two identification issues that may arise in the estimation strategy previously presented: panel attrition and selective mortality. Attrition may be a relevant identification issue because estimates in Section 4 rely on retrospective information collected in the third wave of the survey and information on old-age economic, health and cognitive status collected in the second wave. Panel attrition in SHARE is nonnegligible, as about one third of the original sample is lost between the first and the second waves of the survey and about one fourth is lost between the second and third. The representativeness of the second wave sample was ensured with the refreshment sample: a new sample drawn to compensate for the loss of observations due to sample attrition. However, because of the attrition between waves 2 and 3, retrospective information is not available for all wave 2 respondents. Given the relevant attrition rate between waves 2 and 3, we cannot exclude the possibility that this selectivity effect is driven by observables and unobservable factors. Thus, ignoring attrition may lead to invalid inferences. For this reason estimations are implemented by using the calibrated longitudinal weights provided by the public release of SHARE. These weights are meant to make the distribution of the sample by gender, age class and geographical area (NUT-1 level) in each country the same as the distribution of the target population (50+ in 2006 and alive in 2008). However, the effectiveness of the reweighting procedure relies crucially on the assumption that the missing data mechanism underlying unit nonresponse is missing at random (MAR), namely that after the weighting procedure there is no relation between the probability of unit nonresponse and other variables excluded from the conditioning set. In Appendix B.1 this assumption is relaxed by considering an alternative approach that accounts for selection on unobservables. It will be shown that the results of interest do not change substantially with respect to the use of calibrated weights provided by SHARE.

The second identification issue concerns a possible selective mortality effect that may affect the cohorts and countries of interest differently. Differences in mortality, accumulated over time between birth and the age at which a cohort is observed, may induce biased estimates of the cross-country differences in the lasting effect of childhood SES. The problem may not be so important for the younger cohorts, but it may be very relevant for the older ones, especially those that survived the Second World War. Appendix B.2 attempts to control for the effects of selective mortality by including a polynomial function of the cumulated mortality rates in the estimation. The results show that cross-country differences in the lasting effect of childhood SES are not significantly affected by selective mortality.

4 Estimation results

This section begins by estimating equation (2) to evaluate the lasting effects of childhood circumstances on old-age economic, health and cognitive outcomes, gradually accounting for all possible pathways of these effects as suggested in Figure 3. As argued in Section 2.2, the logarithm of per capita household income is used as a proxy for the economic status, SRHS as a proxy for health, and the first principal component from simple tests of memory, verbal fluency and numeracy for the cognitive status. In Table 6 each set of rows shows the results obtained from an OLS estimation of the childhood SES index for each old-age dimension. Controls include also a quadratic function in age, a female dummy, a full set of country dummies (the baseline model) and an increasing number of controls. Standard errors are robust to heteroskedasticity. Only coefficients for childhood SES, health and school performances at the age of 10 are reported. Starting from the first column of the economic status, the coefficient for childhood SES is, as expected, positive and strongly significant. It shows that one standard deviation increase of the childhood SES corresponds to about 14% increase of the old-age household income. The results for health and cognitive status are similar, where one standard deviation increase of the childhood SES significantly increases the probability of reporting good health by about 4% and the cognitive status index of about 0.23 standard deviations. The addition of controls for childhood health and school performances in math and language in the second column only slightly decreases the coefficient for childhood SES by roughly 10%. As expected, child school performances always have a positive and significant effect on old-age outcomes, while childhood health seems to be an important and significant predictor only of the old-age health status. Including controls for region and area of residence during childhood has a non-negligible effect on our estimates, increasing both the the adjusted R^2 and slightly decreasing the coefficient of the child SES index. However, the inclusion of a quadratic control in years of schooling seems to be most important — it significantly decreases the childhood SES coefficient by roughly 30% in the case of old-age economic status and by about 40% for health and cognition.

Two main considerations arise from these first results. First, the socio-economic gradient in old-age outcomes among individuals grown up in different socio-economic backgrounds is strong and significant also after controlling for proxies of the initial endowment such as childhood health and school performance. Second, the first three components analyzed so far—childhood school performances, region of residence and educational attainment— explain roughly half of the gradient in old-age outcomes. It is worth noting that education explains the largest part of this gradient. If childhood health and school performances at age 10 are good proxies for respondent's initial endowment, that implies that the gradient in adult outcomes cannot be explained only by differences in initial endowment (heritability). Hence, a reasonable explanation might be the Becker and Tomes hypothesis of an imperfect capital market, in which poor parents cannot borrow to finance their children's human capital accumulation. Although the direct cost of education may be negligible for primary and secondary education, the cost for constrained children may be particularly large in terms of foregone income (Perotti 1996).

Finally, the last column of Table 6 controls for respondents' health and working histories as proxies for adult outcomes as in equation (2). In each model, the inclusion of these variables clearly decreases but does not eliminate the effects of childhood SES and of initial endowment. More generally, the gradual inclusion of controls for all the possible and observed pathways can explain roughly two-thirds of the observed childhood SES gradient in old-age outcomes. Nevertheless, there is a residual effect that cannot be explained by the large set of controls included in the full model. One possible explanation—consistent with the child development literature (see Currie 2009)—is that childhood circumstances directly affect old-age outcomes. However, it is also possible that our large set of controls is not able to control for all the possible pathways from childhood SES to old-age outcomes.

4.1 Cross-country heterogeneity

The estimates reported so far do not control for heterogeneity across countries, except for the inclusion of a full set of country dummies. For this reason, Tables 7a, 7b and 7c report the same estimates but allow for heterogeneity in the effect of childhood SES. Each table shows only the coefficient of childhood SES for the reference country (Italy) and those of the interaction terms between this variable and the country dummies. This second set of coefficients can be interpreted as the country difference with respect to Italy in the effect of childhood SES on old-age outcomes. A positive (negative) difference would imply a larger (smaller) impact of childhood SES on old-age economic, health or cognitive status in that country.

Tables 7a shows a large cross-country heterogeneity in the childhood SES effect on old-age economic status. In particular, the effect is stronger in Italy and Spain. The first column shows that in Italy one standard deviation increase in childhood SES increases the old-age per capita household income by about 22%, 8% more than the average effect estimated in Table 6. Except for Spain, all other countries report significantly smaller effects—around 10%—less than half the effect estimated for Italy and Spain. Only small decreases in the size of the coefficients are observed when proxies for childhood endowment are included in the regression. Similar considerations arise after the inclusion of control for the region of residence.

As for Table 6, instead, the inclusion of educational controls makes a large difference. Almost all differences with respect to Italy decrease and are no longer significant at the conventional level. The only exceptions are Belgium and the Czech Republic, which still have negative and significant interactions. Similar cross-country differences in the lasting effects of childhood circumstances are estimated for health and cognitive status, with Spain and Italy showing the largest gradient. In the case of health, however, after controlling for education some of the differences across European countries remain significant.

These results indicate that most of the cross-country heterogeneity in the long-term effects of childhood circumstances arises via schooling. This may imply a relationship between cross-country differences in educational policy and the observed differences in the lasting effect of childhood SES. To this end, Table 8 shows the years of compulsory schooling for the cohorts of interest. Consistent with the literature on intergenerational earnings transmission (Solon 2002), countries like Italy and Spain—characterized by poor public provision of education—are also those with the highest estimated gap in old-age outcomes between respondents from different family backgrounds.

Figure 4 shows the role played by educational policy in the mechanism of intergenerational transmission of human capital even better. It shows the relation between the estimated effect of childhood SES on income and the average years of schooling at the country level in 1960 (Barro and Lee 2010). The straight line is the regression line fitted to the data. Except for Greece, the figure reveals a clear negative relation between the estimated effect of childhood SES on income and average years of schooling by country.

To further confirm that relationship, Table 9 shows OLS estimates of the effect of childhood SES on the age at which the individual left full-time education. As expected, childhood SES has a strong effect on an individual's schooling choice after controlling for childhood health and school performance at age 10. At the same time the high variability across countries is confirmed. In particular, one standard deviation increase in childhood SES implies about two more years of schooling for the Italian sample, but this gradient significantly decreases in the other European states. As before, Italy and Spain but also Greece show the larger gradients while the other countries show a gradient of about 1 year or even less for each standard deviation increase in the childhood SES index.

The estimated coefficients from the last table are then used to verify whether there is a strong link between the estimated intergenerational persistence of human capital and inequality as predicted in Solon (2004) and confirmed in the empirical evidence of Jäntti et al. (2006) and Corak (2006). Unfortunately there are only few historical data on income distribution, thus Figure 4 shows the relation between the estimated effect of childhood SES on years of schooling and the Gini index for these countries during the '80s. The inequality index refers to the '80s, when the respondents were adults. Therefore such a strong (ex-post) link may be explained by Corak's argument that educational policies—which are able to increase the educational attainment of the whole population—increase the supply of skilled workers and so indirectly reduce the return to education (i.e. inequality).

Although it is not the main target of this work, it remains to be explained why in some countries crucial educational reforms aimed at increasing the level of human capital of the economy were implemented only later. As mentioned in Section 1.1, Galor et al. (2009) suggest historical cross-country differences as a consequence of different distributions of landownership. Our data seem to support such a theoretical prediction. Mediterranean countries, which implemented such important reforms later than the other European countries, were characterized at that time by larger inequality, lower income per capita and a larger agricultural sector as evident by the larger number of respondents' breadwinners employed in the agricultural sector[6].

Finally, it may be interesting to analyze cross-country differences in school performances at age 10, used here as proxies for the initial cognitive and non-cognitive endowments. As already discussed in Section 3, childhood school performances at age 10 may be influenced by childhood SES as well and not only be the result of different initial endowments. For this reason, Table 10 shows OLS estimates of childhood SES on school performances at age 10 in math and language, controlling for heterogeneity across countries. As for schooling, Italy and Spain show the highest coefficients on childhood SES (negative because lower values correspond to higher school performance). This result is consistent with Esping-Andersen (2008) and D'Addio (2007), who show the highest level of intergenerational persistence in education in Italy and Spain using PISA data on cognitive abilities at the age of 15 and the number of books at home as a proxy for parental background. This result indicates that in these countries the gap between children from different family backgrounds starts to widen beginning with the first years of age.

[6] In Mediterranean countries the average number of respondents' breadwinners employed in the agricultural sector or in elementary occupations was around 60% versus an average of 35% in the other countries.

A final remark: Greece shows a large gradient in childhood school performances and years of schooling (as Spain and Italy), but a smaller gradient in old-age outcomes. This apparently puzzling result, however, is in line with OECD (2010) estimates of intergenerational wage persistence and school performance in Greece.

5 Concluding remarks

This paper has investigated the long-lasting effects of socio-economic background on old-age economic, cognitive and health status and the heterogeneity of these effects across 13 European countries using data from SHARE. The results reveal large differences in old-age outcomes across individuals grown up with different socio-economic backgrounds, and large cross-country heterogeneity. Such cross-cross heterogeneity in the long-lasting effects of childhood SES demonstrates how different institutional and cultural environments have an effect on determining the degree of intergenerational mobility in a society. Consistent with the literature on intergenerational earnings transmission (Becker and Tomes 1986; Solon 2002, 2004), Spain and Italy—characterized by poor public provision of education—are the countries that show the highest level of intergenerational persistence.

At the same time, the cross-country heterogeneity in these results is consistent with the other important theoretical prediction of a strong relationship between inequality and intergenerational persistence. Such a relationship may be explained ex-ante by the fact that in presence of large inequalities only individuals from better-off families are able to take advantage of the higher return to education and ex-post by the fact that limitations in the supply of educated workers (as a consequence of low intergenerational mobility) imply a higher return to education.

Some caveats, however, must be noted. The increase in public provision of education may not be sufficient to reset the gap between individuals from different socio-economic backgrounds, since it starts to widen from the early childhood as shown by the large estimated gradient in childhood school performances at age 10. Such a gap, however, cannot be explained only by genetic differences in the initial endowment passed from parents to children. The large cross-country heterogeneity seems to indicate that there are cultural and institutional factors that affect such differences at early stages of life. Identification of the causes of these cross-country differences at early stages are relevant from a policy prospective. In fact, after the expansion of universal education in the last 50 years, public policies designed to increase the intergenerational mobility in a society should be directed to the early stages of life.

References

Angrist J. and Krueger A. (1991) "Does Compulsory School Attendance Affect Schooling and Earnings?" *The Quarterly Journal of Economics*, 106(4): 979–1014.

Barro R. and Lee W. (2010) "A New Data Set of Educational Attainment in the World, 1950–2010". NBER Working Paper 15902 (accompanying data are available at www.barrolee.com).

Becker G. and Tomes N. (1986) "Human Capital and the Rise and Fall of Families". *Journal of Labor Economics*, 4(3): 1–39.

Berney L. and Blane D. (1998) "Collecting retrospective data: Accuracy of recall after 50 years judged against historical records". *Social Science & Medicine*, 45(10): 1519–1525.

Börsch-Supan A. and Jürges H. (2005) *The Survey of Health, Aging, and Retirement in Europe. Methodology*, Mannheim Research Institute for the Economics of Aging (MEA).

Bowles S. and Gintis H. (2002) "The inheritance of inequality". *Journal of Economic Perspectives*, 16(3): 3–30.

Case A., Fertig A. and Paxson C. (2005) "The Lasting Impact of Childhood Health and Circumstance". *Journal of Health Economics*, 24: 365–389.

Case A., Paxson C. and Islam M. (2009) "Making Sense of the Labor Market Height Premium: Evidence from the British Household Panel Survey". *Economic Letters,* 102: 174–176.

Corak M. (2006) "Do Poor Children Become Poor Adults? Lessons from a Cross Country Comparison of Generational Earnings Mobility". IZA DP No. 1993.

Cunha F. and Heckman J. (2008) "Formulating, Identifying and Estimating the Technology of Cognitive and Non-cognitive Skill Formation". *Journal of Human Resources*, 43(4): 127–169.

Currie J. (2009) "Healthy, wealthy, and wise: Socioeconomic status, poor health in childhood, and human capital development." *Journal of Economic Literature*, 47: 87–122.

D'Addio A. (2007) "Intergenerational Transmission of Disadvantage: Mobility or Immobility Across Generations?" OECD Social, Employment and Migration Working Papers 52, OECD Publishing.

Erikson R. and Goldthorpe J. (2002) "Intergenerational Inequality: A Sociological Perspective". *Journal of Economic Perspectives*, 16(3): 31–44.

Esping-Andersen G. (2008) "Childhood investments and skill formation". *International Tax Public Finance*, 15: 19–44.

Filmer D. and Pritchett L. (2001) "Estimating wealth effects without expenditure data or tears: An application to educational enrollments in states of India". *Demography*, 38(1): 115–132.

Galor O. (2011) "Inequality, human capital formation and the process of development" . Working Papers 2011-7, Brown University, Department of Economics. Prepared for the *Handbook of the Economics of Education.*

Galor O., Moav O. and Vollrath D. (2009) "Inequality in Landownership, the Emergence of Human-Capital Promoting Institutions, and the Great Divergence". *Review of Economic Studies*, 76: 143–179.

Garrouste C. and Paccagnella O. (2010) Data Quality: Three Examples of Consistency Across SHARE and SHARELIFE. In Schröder M. "Retrospective Data Collection in the Survey of Health, Ageing and Retirement in Europe". *SHARELIFE Methodology.* Mannheim Research Institute for the Economics of Aging (MEA).

Gluckman P. and Hanson M. (2005) *The fetal matrix: Evolution, development, and disease.* New York: Cambridge University Press.

Grossman M. (1972) "On the concept of health capital and the demand for health." *Journal of Political Economy*, 80(2): 223–255.

Haas S. (2007) "The Long-Term Effects of Poor Childhood Health: An Assessment and Application of Retrospective Reports". *Demography*, 44(1): 113–135.

Heckman J. (2007) "The economics, technology, and neuroscience of human capability formation". *National Academic Science*, 104(33): 13250–13255.

Human Mortality Database (2011). University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany). Available at www.mortality.org or www.humanmortality.de.

Jäntti et al. (2006) "American exceptionalism in a new light: A comparison of intergenerational earnings mobility in the nordic countries, the United Kingdom and the United States". *IZA Discussion Papers* 1938, Institute for the Study of Labor (IZA).

Krall et al. (1988) "Recall of childhood illnesses". *Journal of Clinical Epidemiology*, 41(11): 1059–1064.

Maddison A. (2010), Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD. Data available at http://www.ggdc.net/maddison/.

Maoz Y. and Moav O. (1999) "Intergenerational mobility and the process of development". *Economic Journal*, 109: 677–697.

McKenzie D. (2005) "Measuring inequality with asset indicators". *J Population Economics*, 18: 229–260.

Nicoletti C. and Peracchi F. (2005) "Survey response and survey characteristics: Microlevel evidence from the European Community Household Panel". *Journal of the Royal Statistical Society*, Series A, 168(4): 763–781.

OECD (2010) "Economic Policy Reforms 2010: Going for Growth". *OECD Publishing*. doi: 10.1787/growth-2010-en.

Perotti R. (1996) "Growth, income distribution, and democracy: what data say". *Journal of Economic Growth*, 1(2): 149–187.

Schröder M. (2010) "Retrospective Data Collection in the Survey of Health, Ageing and Retirement in Europe". *SHARELIFE Methodology.* Mannheim Research Institute for the Economics of Aging (MEA).

Smith J. (2009a) "Reconstructing childhood health histories". *Demography*, 46(2): 387–403.

Smith J. (2009b) "The Impact of Childhood Health on Adult Labor Market Outcomes". *Review of Economics and Statistics*, 91(3): 478–48.

Solon G. (1999) "Intergenerational mobility in the labor market". In O. Ashenfelter and D. Card, *Handbook of Labor Economics*, 1 edn, Vol. 3, North-Holland, Amsterdam.

Solon G. (2002). "Cross-Country Differences in Intergenerational Earnings Mobility". *Journal of Economic Perspectives*, 16(3): 59–66.

Solon G. (2004) "A Model of Intergenerational Mobility Variation over Time and Place". In Miles Corak (ed.), *Generational Income Mobility in North America and Europe*, pp. 38–47, Cambridge: Cambridge University Press, 2004.

Vella F. (1998) "Estimating Models with Sample Selection Bias: A Survey". *Journal of Human Resources*, 33(1): 27–169.

Wooldridge J. (2001) *Econometric Analysis of Cross Section and Panel Data*, MIT Press.

Table 1: Sample by country

Country	Males	Females
Austria	257	366
Germany	705	760
Sweden	570	705
Netherlands	744	879
Spain	537	624
Italy	948	1072
France	748	918
Denmark	807	903
Greece	940	1070
Switzerland	455	567
Belgium	987	1136
Czech Rep.	667	902
Poland	649	847
Total	9014	10749

Table 2: Childhood background proxies by country and average gdp per capita 1920–1960 in thousand 1990 international Geary-Khamis dollars.

Country	Rooms p.c.	N. facilities	One bookcase	Low skill occ.	GDP
Austria	0.69 (0.45)	1.49 (1.56)	0.15 (0.35)	0.83 (0.38)	3.68
Belgium	0.99 (0.48)	1.80 (1.70)	0.27 (0.45)	0.76 (0.43)	5.06
Czech Rep.	0.56 (0.27)	2.30 (1.56)	0.34 (0.47)	0.78 (0.41)	3.12
Denmark	0.91 (0.41)	3.00 (1.93)	0.45 (0.50)	0.79 (0.41)	5.80
France	0.82 (0.44)	2.13 (1.78)	0.25 (0.44)	0.73 (0.44)	4.55
Germany	0.78 (0.40)	2.12 (1.57)	0.29 (0.45)	0.75 (0.43)	4.47
Greece	0.54 (0.23)	1.32 (1.40)	0.11 (0.31)	0.88 (0.32)	2.17
Italy	0.56 (0.36)	1.43 (1.57)	0.09 (0.29)	0.86 (0.35)	3.42
Netherlands	0.80 (0.36)	2.37 (1.13)	0.33 (0.47)	0.74 (0.44)	5.44
Poland	0.38 (0.25)	0.62 (1.29)	0.14 (0.35)	0.91 (0.29)	2.33
Spain	0.62 (0.41)	1.25 (1.45)	0.14 (0.34)	0.88 (0.32)	2.41
Sweden	0.77 (0.41)	3.19 (2.00)	0.37 (0.48)	0.75 (0.43)	5.42
Switzerland	0.88 (0.39)	3.14 (1.66)	0.41 (0.49)	0.74 (0.44)	7.44

Table 3: Principal component analysis (PCA) for childhood SES index

	Components			
Variable	1st	2nd	3rd	4th
Rooms p.c.	0.399	0.870	−0.288	−0.013
Books	0.565	−0.186	0.185	0.782
N. facilities	0.535	−0.040	0.643	−0.547
Occupation level	−0.486	0.454	0.685	0.297
Explained variance	0.504	0.206	0.160	0.125

Table 4: PCA for adult cognitive status

	Components		
Variable	1st	2nd	3rd
Memory	0.557	−0.267	−0.757
Fluency	0.596	−0.504	0.637
Numeracy	0.583	0.821	0.145
Explained variance	0.627	0.206	0.167

Table 5: Descriptive statistics

Variable	Mean	SD	N
ln(income)	9.11	(1.423)	19763
SRHS	0.62	(0.47)	19734
Cognition	−0.04	(1.31)	19438
Child SES	0.06	(1.42)	19763
Child math	2.75	(0.89)	19763
Child language	2.72	(0.87)	19763
Child health	2.08	(1.03)	19763
Age	63.69	(9.08)	19763
Female	0.54	(0.49)	19763
Big city	0.15	(0.36)	19763
Suburb	0.07	(0.25)	19763
Large town	0.14	(0.35)	19763
Small town	0.18	(0.38)	19763
Rural	0.46	(0.46)	19763
N ill periods	0.29	(0.81)	19763
Injury	0.12	(0.33)	19763
Occ. skill: high	0.10	(0.32)	19763
Occ. skill: low	0.40	(0.49)	19763
Never worked	0.08	(0.26)	19763

Table 6: OLS estimates of childhood SES on Health, Cognitive and Economic status at old age

			Economic status		
Child SES	0.141 ***	0.122 ***	0.106 ***	0.077 ***	0.059 ***
Child math		−0.075 ***	−0.071 ***	−0.054 **	−0.044 *
Child language		−0.080 ***	−0.079 ***	−0.062 **	−0.047 *
Child health		−0.017	−0.024	−0.023	−0.022
N	19763	19763	19763	19763	19763
R^2	0.138	0.144	0.164	0.168	0.174
			Health status		
Child SES	0.042 ***	0.036 ***	0.032 ***	0.018 ***	0.015 ***
Child math		−0.020 ***	−0.019 ***	−0.010	−0.007
Child language		−0.022 ***	−0.022 ***	−0.014 **	−0.012 *
Child health		−0.050 ***	−0.051 ***	−0.050 ***	−0.040 ***
N	19734	19734	19734	19734	19734
R^2	0.096	0.112	0.126	0.136	0.178
			Cognitive status		
Child SES	0.235 ***	0.191 ***	0.166 ***	0.100 ***	0.082 ***
Child math		−0.232 ***	−0.229 ***	−0.189 ***	−0.178 ***
Child language		−0.152 ***	−0.153 ***	−0.116 ***	−0.098 ***
Child health		−0.011	−0.021 *	−0.017	−0.011
N	19438	19438	19438	19438	19438
R^2	0.364	0.407	0.429	0.454	0.467
Controls:					
Country FE, age and sex	X	X	X	X	X
Regional and area FE			X	X	X
Education				X	X
Occupation and health history					X

Economic status is assessed using the logarithm of per capita income; health status using self-assessed health; cognitive status using an index from memory, verbal fluency and numeracy tests. All regressions include a quadratic function in age, a female dummy, a full set of country dummies. Standard errors are robust to heteroskedasticity. Significance levels: (*) p-values between 10 and 5 percent; (**) p-values between 5 and 1 percent; (***) p-values less than 1 percent.

Table 7a: OLS estimates of childhood SES on economic status, country differences

	Economic status				
IT	0.222***	0.196***	0.168***	0.115***	0.099***
AT	−0.121***	−0.113***	−0.086**	−0.054	−0.066
BE	−0.168***	−0.159***	−0.128***	−0.096**	−0.103***
CH	−0.117***	−0.100**	−0.087**	−0.046	−0.048
CZ	−0.126***	−0.130***	−0.132***	−0.085**	−0.097**
DE	−0.119**	−0.107**	−0.103**	−0.069	−0.069
DK	−0.114***	−0.102***	−0.082**	−0.045	−0.043
ES	0.028	0.033	0.082	0.099	0.088
FR	−0.093**	−0.084**	−0.068*	−0.041	−0.041
GR	−0.131**	−0.137**	−0.090	−0.072	−0.058
NL	−0.080**	−0.067*	−0.049	−0.023	−0.029
PO	−0.086	−0.078	−0.086	−0.055	−0.058
SW	−0.126***	−0.112***	−0.098***	−0.067*	−0.056
R^2	0.140	0.145	0.166	0.170	0.175
Controls:					
Country FE, age and sex	X	X	X	X	X
Ch. health and school performance		X	X	X	X
Regional and area FE			X	X	X
Education				X	X
Occupation and health history					X

Same regressions as in Table 6 but adding interaction terms between childhood SES index and country dummies. The first row reports the coefficient of the childhood SES index for the reference country (Italy). The other rows report for each country the coefficient for the country interaction, namely the difference with respect to Italy in the childhood SES coefficient. Standard errors are robust to heteroskedasticity. Significance levels: (*) p-values between 10 and 5 percent; (**) p-values between 5 and 1 percent; (***) p-values less than 1 percent.

Table 7b: OLS estimates of childhood SES on health status, country differences

	Health status				
IT	0.071***	0.065***	0.066***	0.039***	0.038***
AT	0.001	−0.001	−0.000	0.016	0.010
BE	−0.052***	−0.052***	−0.048***	−0.032***	−0.034***
CH	−0.058***	−0.058***	−0.054***	−0.033***	−0.035***
CZ	−0.030**	−0.032**	−0.035**	−0.012	−0.020
DE	−0.041***	−0.040***	−0.050***	−0.033**	−0.037***
DK	−0.040***	−0.039***	−0.039***	−0.020*	−0.023**
ES	−0.013	−0.017	−0.028*	−0.020	−0.025
FR	−0.024**	−0.024**	−0.026**	−0.012	−0.012
GR	−0.064***	−0.065***	−0.061***	−0.052***	−0.054***
NL	−0.056***	−0.055***	−0.055***	−0.042***	−0.040***
PO	−0.034**	−0.030**	−0.033**	−0.017	−0.022
SW	−0.047***	−0.048***	−0.053***	−0.037***	−0.040***
R^2	0.098	0.114	0.128	0.137	0.179
Controls:					
Country FE, age and sex	X	X	X	X	X
Ch. health and school performance		X	X	X	X
Regional and area FE			X	X	X
Education				X	X
Occupation and health history					X

Table 7c: OLS estimates of childhood SES on cognitive status, country differences

	Cognitive status				
IT	0.338***	0.276***	0.243***	0.119***	0.103***
AT	−0.008	0.013	−0.004	0.070	0.054
BE	−0.141***	−0.119***	−0.095***	−0.021	−0.028
CH	−0.189***	−0.144***	−0.130***	−0.036	−0.036
CZ	−0.123***	−0.134***	−0.125***	−0.018	−0.031
DE	−0.148***	−0.121***	−0.120***	−0.045	−0.048
DK	−0.155***	−0.127***	−0.105***	−0.020	−0.019
ES	−0.067	−0.054	−0.040	−0.002	−0.015
FR	−0.068*	−0.047	−0.034	0.028	0.032
GR	−0.175***	−0.196***	−0.183***	−0.141***	−0.125***
NL	−0.184***	−0.152***	−0.134***	−0.076**	−0.077**
PO	−0.156***	−0.142***	−0.119***	−0.047	−0.053
SW	−0.177***	−0.142***	−0.127***	−0.058	−0.044
R^2	0.367	0.410	0.431	0.456	0.468
Controls:					
Country FE, age and sex	X	X	X	X	X
Ch. health and school performance		X	X	X	X
Regional and area FE			X	X	X
Education				X	X
Occupation and health history					X

Table 8: Years of compulsory schooling for the cohorts of interest

Country	Years
Austria	8–9
Belgium	8
Czech Rep.	8–9
Denmark	4–7
France	8*
Italy	5*
Germany	8–9
Greece	6
Netherlands	7
Poland	7–8
Spain	6
Sweden	8–9
Switzerland	8

*In Italy and France, increases in years of schooling involve only the younger cohorts in the sample; therefore they were not reported.

Source: Eurydice.

Table 9: OLS estimates of childhood SES on years of schooling

	Years of schooling		
IT	1.995 ***	1.809 ***	1.762 ***
AT	−1.112 ***	−1.052 ***	−1.024 ***
BE	−0.994 ***	−0.927 ***	−0.941 ***
CH	−1.260 ***	−1.128 ***	−1.172 ***
CZ	−1.389 ***	−1.417 ***	−1.405 ***
DE	−0.932 ***	−0.850 ***	−0.808 ***
DK	−1.116 ***	−1.028 ***	−1.039 ***
ES	−0.530 ***	−0.495 ***	−0.574 ***
FR	−0.760 ***	−0.700 ***	−0.741 ***
GR	−0.538 ***	−0.590 ***	−0.644 ***
SW	−0.918 ***	−0.811 ***	−0.767 ***
NL	−0.796 ***	−0.702 ***	−0.689 ***
PO	−1.022 ***	−0.974 ***	−1.001 ***
R^2	0.364	0.393	0.408
N	19763	19763	19763
Controls:			
Country FE, age and sex	X	X	X
Ch. health and school performance		X	X
Regional and area FE			X

The first row reports the coefficient of the childhood SES index for the reference country (Italy). The other rows report for each country the coefficient for the country interaction. Standard errors are robust to heteroskedasticity. Significance levels: (*) p-values between 10 and 5 percent; (**) p-values between 5 and 1 percent; (***) p-values less than 1 percent.

Table 10: OLS estimates of childhood SES on school performance at 10

	Math	Language
IT	−0.168***	−0.227***
AT	0.088**	0.104***
BE	0.085***	0.086***
CH	0.169***	0.138***
CZ	0.009	0.015
DE	0.092***	0.126***
DK	0.103***	0.123***
ES	−0.101***	0.080***
FR	0.068**	0.091***
GR	−0.095***	0.011
NL	0.111***	0.137***
PO	0.037	0.091***
SW	0.130***	0.133***
R^2	0.10	0.10
N	19763	19763
Controls:		
Country FE, age and sex	X	X

The first row reports the coefficient of the childhood SES index for the reference country (Italy). The other rows report for each country the coefficient for the country interaction. Standard errors are robust to heteroskedasticity. Significance levels: (*) p-values between 10 and 5 percent; (**) p-values between 5 and 1 percent; (***) p-values less than 1 percent.

Figure 1: Histogram of the distribution of childhood SES index across country

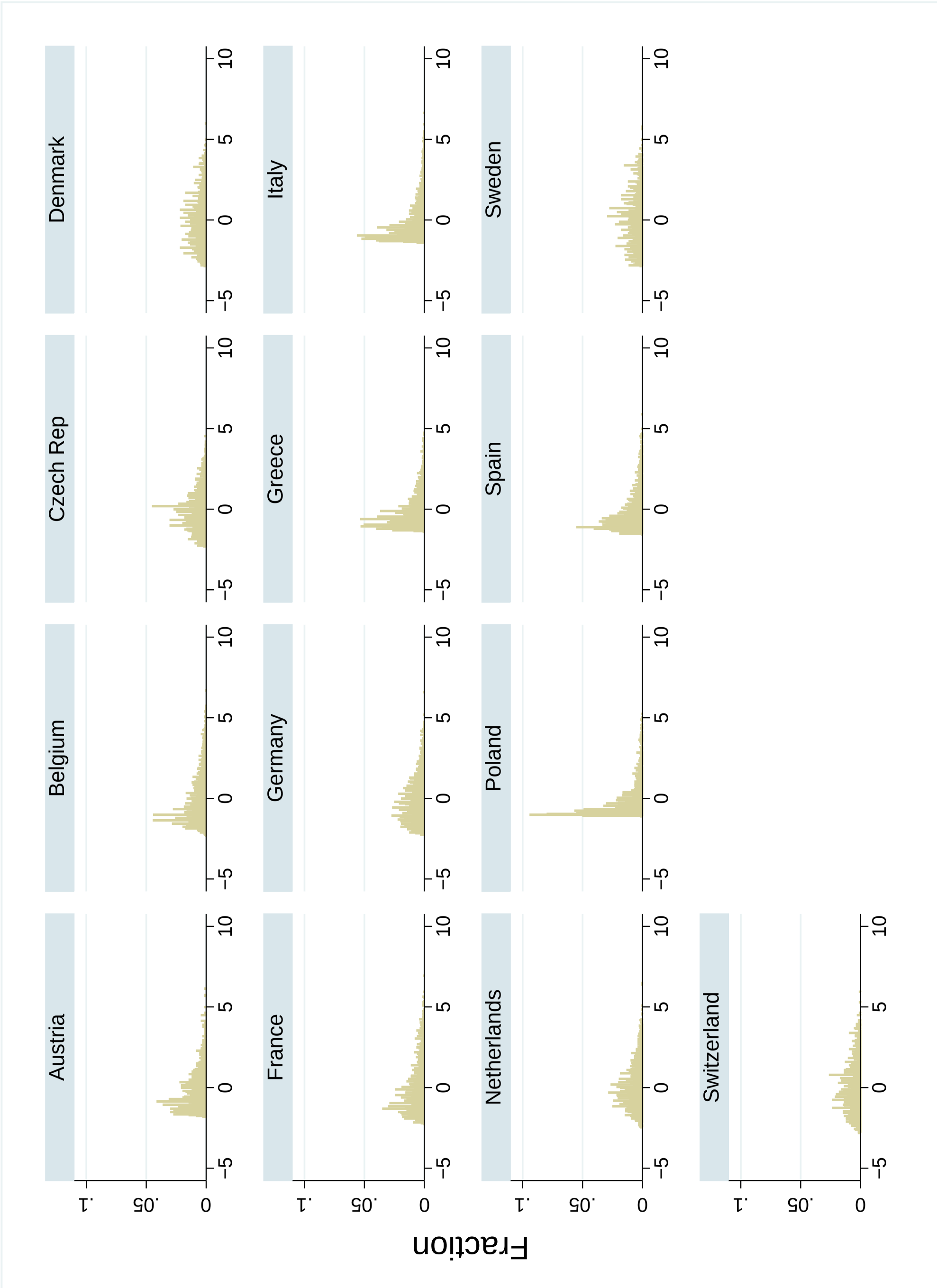


Figure 2: Differences in old age income, health, cognition and childhood school performance between those in the first and last quintile of the distribution of childhood SES index (considering the median value in each quintile)

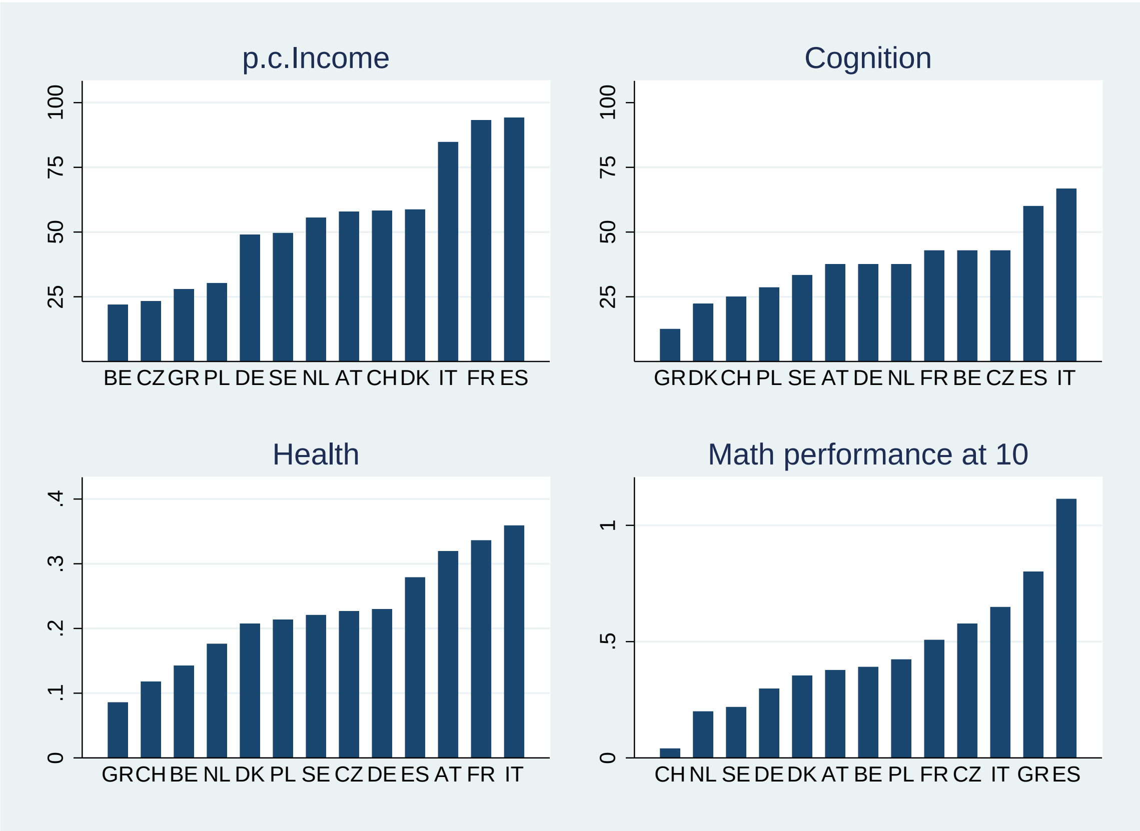


Figure 3: Childhood circumstances and old age relationship: possible pathways

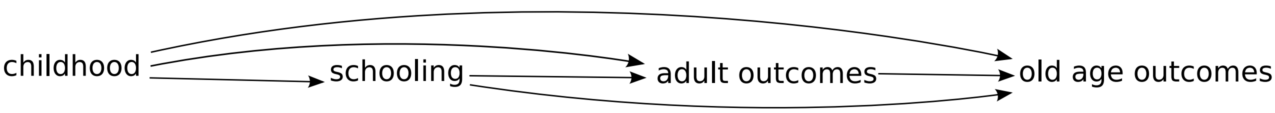


Figure 4: Estimated effect of childhood SES on income and average years of education in 1960

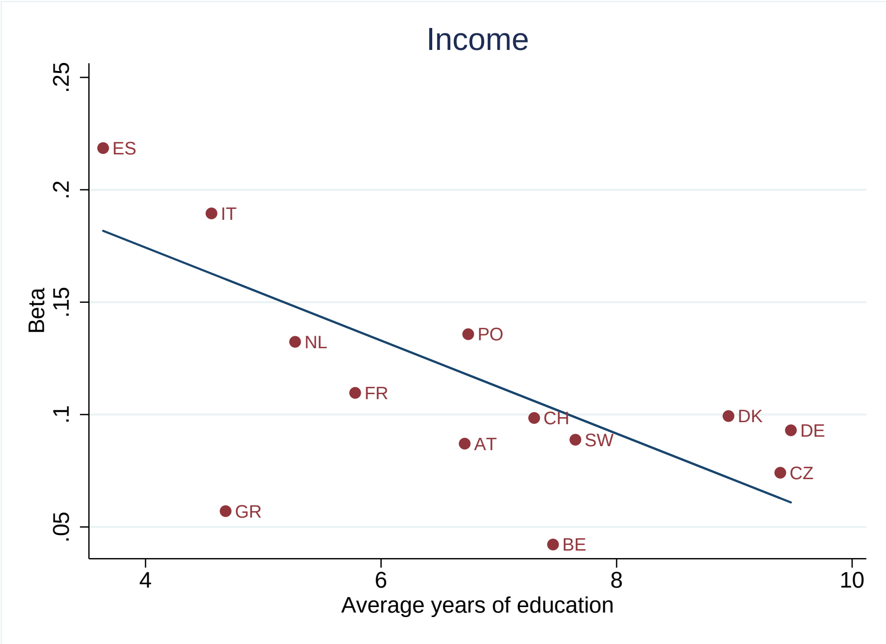
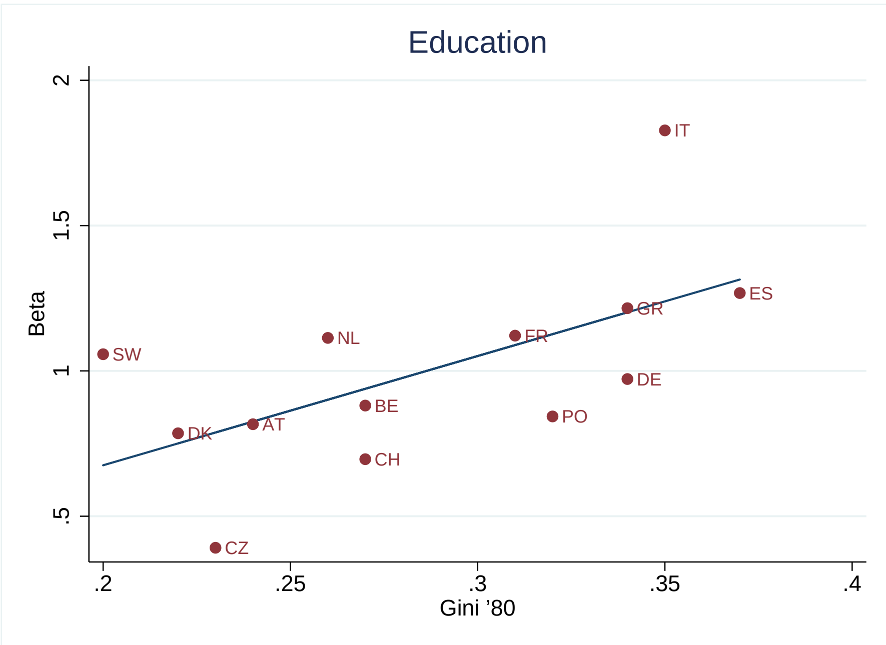


Figure 5: Estimated effect of childhood SES on educational attainment and Gini coefficient



A Quality of self-reported childhood information and of the SES index

Appendix A explores the quality of some of the self-reported childhood measures used in the paper. We start reporting the strong relationship between the SHARELIFE variables that ask the respondent to remember the number of books at home and historical data on educational attainment. Table A.1 shows for each country the comparison between average year of schooling of the population aged 25 and over in 1960 and the proportion of respondents reporting at least one bookcase of books in their childhood accommodation. Information on school attainment is from the last release of the Barro-Lee dataset on educational attainment (2010). The very high correlation between the two variables, namely .69, indicates that the SHARELIFE variable should be a good proxy for the educational level and for the cultural background of the respondents' household.

The next step is to evaluate the quality of the childhood SES index and its ability to proxy for childhood SES. As shown in Figure 1, Mediterranean countries and Poland show very high inequality in the distribution of the SES index, while it is more equally distributed in the Scandinavian ones. As further check on the consistency of this index with external data, Table A.2 shows a comparison between the Gini coefficient based on the SES index and the Gini reported by OECD for these countries during the 80s. Although the two Gini coefficients refer to different time periods, their correlation is still very high: .72.

A final test of external consistency of this indicator is made using historical data of GDP per capita from the Maddison database. In particular, for each cohort in each country, we construct a variable that reports the average GDP growth during the ages 0–10. This variable is regressed on the wealth index controlling for sex, a quadratic polynomial in year of birth, and a full set of country dummies. The results (not reported here to conserve space) show that increases in GDP per capita significantly predict increases in the childhood SES index.

Table A.1: Comparison between average year of schooling in 1960 (of the population aged 25 and over) and the proportion of respondents reporting at least one bookcase of books in their childhood accommodation

Country	Years of schooling	One bookcase
Austria	6.71	.15
Belgium	7.46	.27
Czech Rep.	9.39	.34
Denmark	8.95	.45
France	5.78	.25
Germany	9.48	.29
Greece	4.64	.11
Italy	4.56	.09
Netherlands	5.27	.33
Poland	6.74	.14
Spain	3.64	.14
Sweden	7.65	.37
Switzerland	7.30	.41
Correlation		.69

Table A.2: Comparison between Gini index based on childhood SES indicator and that reported by OECD for these countries during the '80s

Country	Sample Gini	Gini '80s
Austria	.42	.24
Belgium	.37	.27
Czech Rep.	.31	.23
Denmark	.32	.22
France	.39	.31
Germany	.34	.34
Greece	.43	.34
Italy	.48	.35
Poland *	.56	.32
Netherlands	.30	.26
Sweden	.33	.20
Spain	.45	.37
Switzerland *	.31	.27
Correlation		.72

*1980 data not available and substituted with 1990 data.
Source: OECD.stat

B Robustness Checks

B.1 Attrition

Panel attrition may be not missing at random (NMAR). To control for selection due to NMAR attrition, we adopt a simple semi-parametric two-step procedure as in Vella (1998) that should be robust to departures from the assumption of Gaussian error.

We start describing the canonical sample-selection model:

$$\begin{cases} Y = X\beta + \epsilon & Y \text{ observed} \quad \text{if } D = 1 \\ D^* = Z\gamma + v & \\ D = 1\{D^* > 0\}. & \end{cases}$$

The semi-nonparametric selection literature makes no parametric distributional assumption on ϵ and v (aside from the usual independence assumption from X and Z) and can be used as a basis for estimation under relaxed assumptions:

$$\begin{aligned} E(Y|X, D = 1) &= X\beta + E(\epsilon|X, D = 1) \\ &= X\beta + h(Z\gamma) \end{aligned}$$

where h is an unknown function. The first step of the procedure involves estimating the probability of continued panel participation in order to obtain the index $(Z\gamma)$. The second step corrects for selection due to NMAR attrition inserting a third-order expansion of the index-generated using the estimates from the first step—as additional regressors. The order is chosen on the basis of the t-statistics on the additional terms.

Usually, strong identification of these parameters requires exclusion restrictions, namely forcing some of the variables that enter the model for panel attrition out of the model for the conditional mean of the outcome of interest. In order to be valid, these exclusion should affect only the probability of panel attrition. Following Nicoletti and Peracchi (2005), it is possible to argue that a valid set consists of the characteristics of the data collection process in the second wave, since they are important predictors of panel attrition but are unlikely to have any causal effect on the outcome of interest. The variables considered are the interview date and the inclusion in the second wave refreshment sample.

The first step is estimated parametrically by logit inserting (as regressor along with the exclusion restrictions) a quadratic function in age, a female and country dummies. The second step includes (among regressors) the function $h(Z\gamma)$ approximated by a cubic polynomial in the index $(Z\gamma)$. For reason of space, the first stage—which shows that the exclusion restrictions have the expected sign and are strongly significant—is not reported. Table B.1 compares the estimated effect of childhood

SES on old-age status using calibrated weights (CW) and using the semi nonparametric sample selection model (SEL) previously described. Although the correction terms are significant in the case of economic and cognitive status, there are no big differences in the estimated effects of interest.

B.2 Other robustness checks

In this section we present the other robustness checks implemented in this paper. We start by analyzing whether selective mortality is a relevant concern that may alter our estimates. Differences in mortality, cumulated over time between birth and the age at which a cohort is observed, may induce biased estimates of the cross-country differences in the lasting effect of childhood SES. As already mentioned, it may be very relevant for the older ones that survived the WWII. In order to control for mortality, we use data from the Human Mortality Database (HMD) that provides detailed mortality information for eight countries (IT, BE, CH, DK, ES, FR, NL, SW) by sex. Using an approach similar to those implemented to control for attrition, we include among regressors a correction term, namely a function of the cumulated mortality rates, approximated by a cubic polynomial function. The results for the eight countries where data are available are shown in Table B.2. As before, even when the correction terms (CMR, CMR^2, CMR^3) are statistically significant—as in the case of cognitive abilities—the estimated effects of childhood SES are very similar.

Another important robustness check concerns the presence of nonlinearities in the effect of childhood SES on old age outcome. Even when the effect is linear in the pooled sample, we may still have nonlinearity in the effect of interest at country or regional level. In order to verify for the presence of nonlinearities, we estimate a model similar to that in Tables 7a, 7b and 7c but with two main differences. First, instead of our index for childhood SES we insert four dummies for different quintiles of the distribution of that index with the third quintile used as reference category. Second, we aggregate countries according to their geographical location, becuase estimating a model with interaction terms between the four quintile dummies and each country involves too many parameters to be estimated. We divide the SHARE countries into 4 regions: Mediterranean (Italy and Spain), Central (France, Belgium, Switzerland, Germany and Netherlands), Scandinavian (Denmark and Sweden) and Eastern European (Poland and Czech Republic). As shown in Section 4 countries in the same region share in most cases the same level of intergenerational mobility. For this reason, we exclude Greece from the Mediterranean group because the estimates reported before have shown that this country seems to not share the same level of intergenerational mobility of Italy and Spain. Tables B.3, B.4 and B.5 show the results for each old age outcome. Each table shows only the coefficients on the quintile dummies for the reference region (Mediterranean) and those on the interaction terms between these dummies and the regional dummies. The results show the presence of nonlinearities mainly in the case of economic and health outcomes. Tables B.3 and B.4, in fact, show that in each region differences across individual from different quintiles of the childhood SES index arise only in the first and in the last quintile. The effect, instead, seems to be almost linear in the case of cognitive abilities. Cross-region differences, instead, arise in particular in the last quintile. Hence, the before presented cross-country differences in intergenerational persistence of human capital between Italy and Spain and the other Europeans seem to be mainly the result of cross-country differences in the last quintile of the distribution. However, since the childhood index is centered at country level, this result can be interpreted as the consequence of the right-skewed distribution of the index in Italy and Spain with a lot of children that grew up in poor families.

Other robustness checks have been implemented, but the results are not reported to conserve space. One key assumption of the results presented in Tables 7a, 7b and 7c, is that except for the cross-country heterogeneity in the constant term and in the childhood SES coefficient we can treat the pooled data as one population. To verify the validity of this assumption, we start checking whether the estimated cross-country differences in the long-lasting effects of childhood SES change substantially if we implement separated estimates for cohorts born before and after the WWII. We choose this threshold because it is particularly relevant for both mortality and historical reasons. In this case we observe some changes in the estimated coefficients of interest, but the country ranking reported so far remain unchanged. Secondly, as already mentioned in Section 3 we implement separated estimates by country to allow for the maximum level of heterogeneity at country level. As before, however, the results are very similar to those presented in Section 4.

Finally, we verify the robustness of our index by excluding one of the four variables used to extract the SES index at a time and re-extracting the principal components. The result from this procedure, however, does not show large differences with respect to that reported in Section 4 and the country ranking in terms of the level of intergenerational mobility remains substantially unaffected.

Table B.1: Comparison of estimates of childhood SES effects on old-age status using calibrated weights (CW) and using a semi nonparametric sample selection model (SEL).

	Economic		Health		Cognitive	
	CW	SEL	CW	SEL	CW	SEL
IT	0.226 ***	0.225 ***	0.068 ***	0.068 ***	0.339 ***	0.341 ***
AT	−0.117 ***	−0.115 ***	−0.003	−0.003	−0.022	−0.019
BE	−0.167 ***	−0.167 ***	−0.051 ***	−0.051 ***	−0.148 ***	−0.148 ***
CH	−0.119 ***	−0.120 ***	−0.056 ***	−0.056 ***	−0.190 ***	−0.190 ***
CZ	−0.130 ***	−0.129 ***	−0.027 *	−0.026 *	−0.121 ***	−0.122 ***
DE	−0.105 **	−0.106 **	−0.037 ***	−0.037 ***	−0.137 ***	−0.139 ***
DK	−0.120 ***	−0.120 ***	−0.036 ***	−0.036 ***	−0.157 ***	−0.159 ***
ES	0.031	0.031	−0.008	−0.009	−0.066	−0.063
FR	−0.098 ***	−0.098 ***	−0.023 *	−0.022 *	−0.073 *	−0.075 **
GR	−0.109 *	−0.108 *	−0.058 ***	−0.056 ***	−0.178 ***	−0.182 ***
NL	−0.079 **	−0.080 **	−0.052 ***	−0.052 ***	−0.187 ***	−0.189 ***
PO	−0.082	−0.081	−0.034 **	−0.033 **	−0.158 ***	−0.160 ***
SW	−0.135 ***	−0.135 ***	−0.043 ***	−0.043 ***	−0.179 ***	−0.182 ***
$(Z\gamma)$		−0.512 **		−0.014		−0.797 **
$(Z\gamma)^2$		0.419		−0.004		0.914 ***
$(Z\gamma)^3$		−0.118		−0.009		−0.278 **
R^2	0.133	0.133	0.098	0.098	0.369	0.370
Controls:						
Country FE, age and sex	X	X	X	X	X	X

The first row reports the coefficient of the childhood SES index for the reference country. The other rows report for each country the coefficient for the country interaction. Standard errors are robust to heteroskedasticity. Significance levels: (*) p-values between 10 and 5 percent; (**) p-values between 5 and 1 percent; (***) p-values less than 1 percent.

Table B.2: Comparison of estimates of childhood SES effects on old-age status not controlling for mortality (NE) and including a function of cumulated mortality rates (ME).

	Economic		Health		Cognitive	
	NE	ME	NE	ME	NE	ME
IT	0.224 ***	0.226 ***	0.071 ***	0.071 ***	0.338 ***	0.339 ***
BE	−0.167 ***	−0.169 ***	−0.052 ***	−0.052 ***	−0.141 ***	−0.142 ***
CH	−0.117 ***	−0.121 ***	−0.058 ***	−0.059 ***	−0.189 ***	−0.193 ***
DK	−0.114 ***	−0.109 ***	−0.041 ***	−0.041 ***	−0.155 ***	−0.159 ***
ES	0.028	0.028	−0.013	−0.013	−0.067	−0.065
FR	−0.093 **	−0.097 **	−0.024 **	−0.024 **	−0.068 *	−0.066 *
NL	−0.080 **	−0.079 **	−0.056 ***	−0.058 ***	−0.184 ***	−0.192 ***
SW	−0.125 ***	−0.125 ***	−0.048 ***	−0.049 ***	−0.177 ***	−0.186 ***
CMR		0.015		−0.002		0.088 *
CMR^2		−0.000		−0.000		−0.002 *
CMR^3		0.000		0.000		0.000 **
N	12600	12600	12573	12573	12357	12357
R^2	0.109	0.109	0.099	0.099	0.379	0.379
Controls:						
Country FE, age and sex	X	X	X	X	X	X

The first row reports the coefficient of the childhood SES index for the reference country . The other rows report for each country the coefficient on the country interaction. Standard errors are robust to heteroskedasticity. Significance levels: (*) p-values between 10 and 5 percent; (**) p-values between 5 and 1 percent; (***) p-values less than 1 percent.

Table B.3: OLS estimates of childhood SES quintiles on economic status at old age

	Economic status				
Mediterranean_q1	-0.275 *	-0.255	-0.161	-0.115	-0.112
Scandinavian	0.089	0.093	0.043	0.037	0.041
Central	-0.019	-0.017	-0.066	-0.077	-0.049
Eastern	-0.201	-0.196	-0.236	-0.249	-0.239
Mediterranean_q2	0.052	0.056	0.080	0.102	0.113
Scandinavian	-0.048	-0.049	-0.052	-0.071	-0.083
Central	-0.242 *	-0.231 *	-0.254 *	-0.265 *	-0.248 *
Eastern	-0.389 ***	-0.378 **	-0.379 ***	-0.373 **	-0.374 ***
Mediterranean_q4	-0.034	-0.059	-0.079	-0.121	-0.133
Scandinavian	0.233	0.242	0.256	0.264	0.262
Central	0.142	0.148	0.140	0.168	0.166
Eastern	-0.052	-0.049	-0.080	-0.041	-0.050
Mediterranean_q5	0.598 ***	0.527 ***	0.521 ***	0.388 ***	0.333 **
Scandinavian	-0.333 **	-0.303 **	-0.324 **	-0.256 *	-0.240
Central	-0.398 ***	-0.372 ***	-0.397 ***	-0.331 **	-0.318 **
Eastern	-0.562 ***	-0.545 ***	-0.598 ***	-0.500 ***	-0.501 ***
R^2	0.144	0.150	0.172	0.176	0.182
Controls:					
Country FE, age and sex	X	X	X	X	X
Ch. health and school performance		X	X	X	X
Regional and area FE			X	X	X
Education				X	X
Occupation and health history					X

Same regressions as in Table 6 but adding childhood SES quintile dummies and the interaction terms between these dummies and regional dummies. For each set of rows, the first one reports the coefficient of the childhood SES quintile for the reference region (Mediterranean). The other rows report for each region the coefficient for the region interaction, namely the difference in the childhood SES quintile coefficient with respect to Mediterranean countries. Standard errors are robust to heteroskedasticity. Significance levels: (*) p-values between 10 and 5 percent; (**) p-values between 5 and 1 percent; (***) p-values less than 1 percent.

Table B.4: OLS estimates of childhood SES quintiles on health status at old age

	Health status				
Mediterranean_q1	-0.100 ***	-0.096 ***	-0.087 **	-0.065 *	-0.043
Scandinavian	0.021	0.035	0.032	0.031	0.029
Central	-0.020	-0.017	-0.012	-0.017	-0.030
Eastern	0.024	0.021	0.004	-0.002	-0.020
Mediterranean_q2	-0.026	-0.026	-0.027	-0.016	-0.002
Scandinavian	-0.031	-0.021	-0.020	-0.028	-0.038
Central	-0.009	-0.008	-0.002	-0.006	-0.023
Eastern	-0.012	-0.014	-0.002	0.001	-0.012
Mediterranean_q4	0.025	0.015	0.020	-0.002	0.002
Scandinavian	-0.008	-0.003	-0.010	-0.005	-0.003
Central	0.003	0.004	-0.004	0.010	-0.002
Eastern	-0.036	-0.037	-0.048	-0.028	-0.037
Mediterranean_q5	0.153 ***	0.131 ***	0.129 ***	0.063 **	0.065 **
Scandinavian	-0.109 ***	-0.099 **	-0.100 **	-0.067 *	-0.070 *
Central	-0.096 **	-0.091 **	-0.090 **	-0.058	-0.069 *
Eastern	-0.102 **	-0.092 **	-0.095 **	-0.046	-0.065
R^2	0.095	0.112	0.126	0.135	0.177
Controls:					
Country FE, age and sex	X	X	X	X	X
Ch. health and school performance		X	X	X	X
Regional and area FE			X	X	X
Education				X	X
Occupation and health history					X

Table B.5: OLS estimates of childhood SES quintiles on cognitive status at old age

	Cognitive status				
Mediterranean_q1	-0.472 ***	-0.425 ***	-0.341 ***	-0.236 ***	-0.223 ***
Scandinavian	0.125	0.134	0.117	0.110	0.118
Central	-0.051	-0.052	-0.053	-0.079	-0.052
Eastern	0.190 **	0.214 **	0.161 *	0.134	0.136
Mediterranean_q2	-0.127 *	-0.113 *	-0.099	-0.053	-0.034
Scandinavian	0.087	0.082	0.086	0.052	0.036
Central	-0.028	-0.004	-0.004	-0.026	-0.020
Eastern	-0.100	-0.068	-0.062	-0.041	-0.045
Mediterranean_q4	0.257 ***	0.200 ***	0.179 ***	0.079	0.067
Scandinavian	-0.112	-0.088	-0.092	-0.073	-0.068
Central	-0.053	-0.038	-0.046	0.017	0.011
Eastern	-0.139	-0.123	-0.131	-0.040	-0.052
Mediterranean_q5	0.720 ***	0.561 ***	0.515 ***	0.211 ***	0.155 **
Scandinavian	-0.239 **	-0.169 *	-0.133	0.014	0.043
Central	-0.211 **	-0.156 *	-0.153 *	-0.017	-0.001
Eastern	-0.332 ***	-0.295 ***	-0.274 ***	-0.052	-0.058
R^2	0.368	0.412	0.433	0.459	0.471
Controls:					
Country FE, age and sex	X	X	X	X	X
Ch. health and school performance		X	X	X	X
Regional and area FE			X	X	X
Education				X	X
Occupation and health history					X