Intergenerational wealth mobility and the role of inheritance: Evidence from multiple generations

Adrian Adermon[†], Mikael Lindahl[‡] and Daniel Waldenström[♯]

Department of Economics

Uppsala University

February 28, 2015

Abstract

This study estimates intergenerational correlations in mid-life wealth across three generations, and a young fourth generation, and examines how much that can be explained by inheritances. Using new unique Swedish evidence we find parent-child rank correlations of 0.3–0.4 with little additional impact coming from grandparents. Correlations are attenuated when using at a young age, illuminating previous findings in the literature. Bequests and gifts strikingly account for between half and three fourths of the wealth correlation while income and education explain little. We are also the first to compare estimates using wealth in mid-life to estimates using wealth at death.

[†] E-mail: adrian.adermon@nek.uu.se. Web: sites.google.com/site/adrianadermon/

[‡] E-mail: mikael.lindahl@nek.uu.se. Web: sites.google.com/site/cmikaellindahl/home

[♯] E-mail: daniel.waldenstrom@nek.uu.se. Web: www.uueconomics.se/danielw

1. Introduction

This paper studies the persistence of wealth status across multiple generations and how much of this persistence that is driven by direct inheritances from parents to their children. While there is a voluminous empirical literature on intergenerational mobility of incomes (see Solon, 1999, and Black and Devereux, 2011) we know much less about the transmission of wealth from parents to their children and the mechanisms underlying it. This lacuna is unfortunate for a number of reasons. First, wealth may be a better proxy for long-term economic success than earnings or income, as wealth represents cumulative net incomes. Second, as is evident from the literature on life-cycle bias (e.g., Haider and Solon, 2006), it is important to find more permanent measures of economic status than what is captured by yearly income measures. Third, there has in recent years been an increased interest in testing the existence of multigenerational effects, since two-generational estimates might understate the level of true long-term persistence. However, in this literature wealth has received limited attention (for two recent exceptions see Clark and Cummins, 2015, and Boserup, Kopczuk and Kreiner, 2014) despite the fact that there is likely a more prominent role for wealth, either directly or as collateral, to be transferred directly across multiple generations. Fourth, the importance of inherited wealth for economic inequality has recently attracted enormous attention in the academic literature through the work of Piketty (2011, 2014) and Piketty and Zucman (2014, 2015). One crucial and yet largely overlooked aspect, however, is to which extent inheritance also influences the inequality of opportunity in the wealth distribution as measured by the degree of persistence of wealth status across generations.

The present paper has two main purposes. First, we estimate the persistence of wealth inequality across multiple generations. We have access to exceptional wealth data observed at mid-life for individuals in three generations and during childhood/early adulthood for individuals in the fourth generation, which enables us to perform intergenerational wealth mobility estimations across adjacent generations as well as across three and four generations. We build on a growing recent literature that has investigated the importance of multigenerational effects and long-term social mobility using data on income, education, occupation and wealth (e.g., Lindahl et al., 2015; Clark, 2014; Clark and Cummins, 2014; Boserup et al., 2014; Long and Ferrie, 2013, Braun and Stuhler, 2014). A prime finding in this literature is that grandparents have an independent effect on grandchildren and that long-run social mobility is slower than predicted from an estimate using data on parents and children. Recent theoretical contributions by Solon (2014) and Stuhler (2013) discuss reasons for these empirical findings. In order to learn about the extent to which conventional estimates of intergenerational mobility based on data from two consecutive generations can predict long-term intergenerational mobility in wealth, we follow the approach in earlier papers and extend the standard first-order autoregressive (AR(1)) model by also including grandparents', and in some regressions even great grandparents', wealth in the estimations. From these estimates we can then infer how well such a prediction works, for example by simply predicting long-term mobility measures from two-generation data and comparing the predictions with actual mobility measures obtained from comparing cohorts two and three generations apart, respectively. These estimates constitute an improvement over earlier studies of long-term intergenerational mobility in wealth in at least two regards: We are the first to estimate models for three generations measuring wealth of middle aged individual. Moreover, we are the first to present any evidence on the transmission of ancestors' wealth to the wealth of great grandchildren, where we are able to link families across generations through individual identifiers.

Our second contribution is that we are able to quantify the importance of intergenerational transfers in the level of wealth mobility. Bequests and gifts constitute an obvious channel through which wealth persistence arises across generations, but despite this fact there are to our knowledge no previous attempts to show quantitatively exactly how large share of wealth mobility that these transfers account for. We use information about inheritances that was hand-collected from historical inheritance tax records to perform two different estimations: one that uses the timing of wealth measurement and inheritance to construct a wealth measure that is purged of the part that is due to inheritance, and another that controls flexibly for inheritance in the intergenerational wealth estimations. This analysis relates to the recent literature on the role of aggregate inherited wealth in the macroeconomy (Piketty, 2011, 2014; Piketty and Zucman, 2014, 2015; Ohlsson, Roine, and Waldenström, 2014). These studies document how the importance of inheritance has varied considerably over time and now seems to be on the rise again, and coupled with our findings about how inheritance matter for intergenerational wealth persistence generates direct distributional implications of these trends. We also relate our analysis to an older literature studying how inheritances influence the cross-sectional distribution of wealth and income (see, e.g., Davies and Shorrocks, 1978; Davies, 1982; Wolff and Gittleman, 2014).

In addition to our main contributions, we address a number of more specific, mainly methodological, issues. First, we observe individual wealth both when people are alive (in wealth tax returns) and at death (in estate records) and this enables us to present the first systematic comparison of how life-cycle effects in wealth mobility estimates is due to these two sources of wealth data. Previous studies have used only either of these two sources which severely constrains the comparability across findings.[1] Second, we touch on the issue of life-cycle bias in wealth by estimating wealth persistence when individuals in the child generation are around age 30 and compare this to estimates for when they are around age 50. Third, we have in our dataset also access to good measures of lifetime income and educational attainment for the first three generations. This allows us to further decompose the underlying sources of the wealth transmissions across generations.

The rest of the paper is organized as follows. Section 2 presents the concepts and measurement approaches used and Section 3 presents the dataset. In Section 4 we begin by presenting the main results concerning the intergenerational linkages and section 5 and 6 go through the importance of life-cycle variation and specific mechanisms, in particular inheritance, for the observed mobility patterns. Section 6 concludes.

2. Concepts and measurement

2.1 Multigenerational persistence

There are a number of reasons for why multigenerational effects might be present. Becker and Tomes (1979) pointed out that their theoretical model leads us to expect a negative coefficient for the outcome of grandparents in a three-generational regression of children on parents' and grandparents' outcomes due to an endowed luck of parents. Taking stock with this result, Solon (2014) lists several reasons for why we could indeed observe a positive estimate for grandparents in such a three-generational regression. Among these are the direct impact of grandparents through human capital investment, cultural or genetic transmissions, group effects or simply that the outcome variables are measured with errors. Solon (2014), building on Solon's (2004) version of the Becker-Tomes (1979) model, also extends the original model and derives the structural parameters behind the role of grandparents.

[1] Studies of intergenerational wealth mobility that measures wealth of living adults are Mulligan (1997), Charles and Hurst (2003) and Boserup et al. (2014) whereas studies using people's wealth at death are Harbury and Hitchens (1979), Menchik (1979), Kearl and Pope (1986), Wahl (2003), Clark and Cummins, (2015), and Arrondel and Grange (2006).

Stuhler (2012) discusses the implications of how various theoretical models predict long-run social mobility in relation to social mobility between adjacent generations. For example, multigenerational effects are more likely to occur with higher importance of “market luck”, higher importance of multiple factors (“abilities”), and stronger ability transmissions across generations, and with smaller causal effect of parents’ outcomes on the outcomes of the next generation. One conclusion is that deviations from an AR(1) model typically leads to an expectation that we should empirically observe slower long-term social mobility than expected from extrapolating estimates in two-generational regressions.

In order to infer the importance of multigenerational effects, we estimate in this study regression models that are variations of the following equation:

$$(1) \qquad w_{it} = \alpha_0 + \alpha_1 w_{it-1} + \alpha_2 w_{it-2} + \delta' X_{\mathrm{i}} + e_{it},$$

where w_{it} is wealth of child i and w_{it-j} is wealth of the parent ($j = 1$) and grandparent ($j = 2$), and X_i is a vector of controls including a quadratic in birth year for each generation. We use individual wealth for the child generation and family wealth for the parent and grandparent generations. Our wealth measures are scaled in percentile ranks grouped by birth year (see section 3) so that the estimates can be interpreted as rank correlations. Estimates from regressions using variables that have been transformed in other ways are discussed in appendix B. We estimate both the full regression model in (1) as well as simpler models either setting $\alpha_1 = 0$ or $\alpha_2 = 0$. If an estimate of α_2 is statistically significantly different from zero, we cannot reject the AR(1) model of intergenerational transmission.

An alternative approach is to use estimates from models for adjacent generations to predict long-term intergenerational persistence. In other words, estimating $w_{it} = \beta_0 + \beta_{-1} w_{it-1} + u_{it}$ and $w_{it-1} = \varphi_0 + \varphi_{-1} w_{it-2} + u_{it-1}$ we can compare the product of the estimates β_{-1} and φ_{-1} to the estimate β_{-2} from the regression $w_{it} = \beta_0{}' + \beta_{-2} w_{it-2} + v_{it}$. If the product of the estimates β_{-1} and φ_{-1} is smaller than the estimate of β_{-2}, we see this as indication that long-term social mobility is slower than what is predicted from two-generational models.

Clark and Cummins (2014) propose that intergenerational transmission of wealth is evolving as $w_{it} = x_{it} + u_{it}$ and $x_{it} = bx_{it-1} + e_{it}$. This should be interpreted as wealth mismeasuring x, the underlying "social status", and that the true value of wealth evolves as an AR(1) between generations. We call b the long-term intergenerational persistence in social status. From this model follows that if we estimate bivariate models between n generations we get $E[\hat{\beta}_{-n}] = \theta b^n$ where θ is the reliability ratio of w in measuring x. Hence, we get that $E[\hat{\beta}_{-2}] = E[\hat{\beta}_{-1}]b$, which is a formula that can be used to predict an estimate from children and grandparents assuming a value of b or to derive b from the two estimates.[2]

2.2 Mediating variables

When we wish to analyze the impact of inheritance, or bequests (B), on the intergenerational association in wealth we have the situation of B being a mediating variable. A common way is then to proceed by estimating models of the following form:[3]

(2) $$w_{it} = \alpha_0 + \rho_1 w_{it-1} + \delta' \mathrm{X}_\mathrm{i} + \varepsilon_{it},$$

(2') $$w_{it} = \alpha'_0 + \rho_2 w_{it-1} + \gamma B_{it} + \delta' X_\mathrm{i} + v_{it},$$

(2'') $$B_{it} = \alpha''_0 + \rho_3 w_{it-1} + \delta' X_\mathrm{i} + e_{it},$$

Under the strong assumption that $Cov(v_{it}, e_{it}) = 0$, which for example holds if B is randomly distributed conditional on w_{it-1}, we can interpret $\rho_1 - \rho_2$ as the role of inheritance (the mediating effect of inheritance) in the overall association of wealth across generations 1 and 2, captured by ρ_1.

In practice, however, there are two sources of bias in this system of estimated equations: 1) we risk over-controlling for B, which happens if B is (positively) correlated with another mediator Z, and 2) we risk under-controlling for B, by assuming linearity in the impact on the wealth of the individual in generation t.

[2] See Braun and Stuhler (2014) for a recent paper that proposes various theoretical models which are tested on multigenerational data for Germany.

[3] See, for example, Blanden et al. (2007) who analyze a number of channels underlying the intergenerational persistence in income in the U.K.

Since bias 2 can be, at least partially, dealt with by including a flexible function of B in estimation of equation (2'), this is what we do. However, as this requires strong assumptions about the exogeneity of the size of the inheritance, we also propose an alternative approach that uses the timing of wealth measurement and inheritance to constructs a wealth measure that is purged of the part that is due to inheritance. This is done by exploiting the fact that there will be a linear relationship between w_{it} and B at the time of the payout of B (see section 6.1 for details). Under a different, but equally strong assumption, of the timing of death being random (and hence unexpected), this approach generates consistent estimates

Boserup et al. (2014) discuss how to control for different channels (captured in the vector Z) in the estimation of (2) and show that under some assumptions, if wealth is linearly related to Z and if Z is AR(1), one can purge the association between wealth of child and parent generations from these channel by including both Z_{it} and Z_{it-1} (that is, by including controls for the mediating factors for both the parent and child generations) in equation (2). The argument is that in this model, the bivariate wealth mobility estimate will be a function of the association between w and Z in generation t and the strength in the association between Z_{it} and Z_{it-1}. So by controlling for Z in both generations, the bivariate intergenerational estimate remaining is driven by factors uncorrelated with Z_{it} and Z_{it-1}.

3. Data and descriptive statistics

3.1 Data and key variables

The dataset used in this study originates from a survey of all pupils in Malmö (the third largest city in Sweden) conducted when they attended 3rd grade in 1938. The typical child in this "index generation" was born in 1928. Data were also collected for the parents. This included survey information on father's occupation and parental income from tax registers for several years. A lot of effort was spent on collecting information for parents resulting in near-complete coverage (above 95 percent).[4] Note that the study covered both the city of Malmö

[4] The material was originally collected by Siver Hallgren and developed by Torsten Husén. Hallgren (1939) is the first study published using this data set. See also de Wolff and Slijp (1973), Palme and Sandgren (2008) and Lindahl et al. (2015) for further description of the Malmö study data set.

with suburbs and its agricultural surroundings and that this sample was very representative of the population of Swedes during this time.[5]

Information for spouses of the second generation, and for descendants and spouses of subsequent generations, has later been added. This includes information on dates of birth and death, earnings histories and educational attainments drawn from high-quality administrative registers. The result is a dataset consisting of information about up to four generations of the same families, where the great-grandparents were typically born in the late nineteenth century and the great-grandchildren typically finished their education in the early twenty-first century.[6] Because of the excellent quality of the Swedish registers, it has been possible to add information for most of the descendants. For example, if they have moved away from Malmö but stayed in Sweden, they are included in the data set.

For the purpose of this study, we have extended the data set by adding detailed information on personal wealth and inheritances. Our data on personal wealth are collected from official administrative records. For all generations we observe taxable wealth (or for the third and fourth generations wealth-tax related third-party reported wealth) from the income and wealth tax registers, but for the two first generations we also observe wealth at death as reported in estate inventory reports. To our knowledge no one has previously matched individual's wealth both during the lifetime and at death for two interlinked generations.

The definitions of assets, liabilities and net wealth are in principle the same for all generations and across the wealth tax records and the estate inventory reports. Non-financial assets include housing, urban and agricultural land and various kinds of valuables (consumer durables, antiquities, art etc.), financial assets include bank deposits and cash, stocks (listed and non-listed), some insurance savings and miscellaneous private claims, and liabilities include private loans (mainly mortgages) and student loans from the state. Some items are better covered in the estate inventory reports, for assets the net life insurance proceeds and consumer durables and for liabilities funeral expenses, executor's commission, attorney fees and taxes paid

[5] In Lindahl et al., 2015 we show that the distributions in education and earnings are very similar also for descendants of those in the original sample compared to the population of Swedes.
[6] Regarding the issue of mobility, we note that in 1993, 38 percent of the third and fourth generations still lived in Malmö, an additional 31 percent lived elsewhere in the county where Malmö is situated and 8 percent lived in the county of Stockholm, and the rest were quite evenly spread out in the rest of Sweden.

(primarily capital gains taxes).[7] Most assets are reported in tax-assessed values which are generally (but not always) lower than current market values.[8] In some instances people have negative net wealth, a state that primarily reflects the fact that assets are in tax-assessed values whereas debts are always in market values but in some cases also is due to relatively large non-collateralized student loans. In most years, however, reported taxable wealth was censored from below at zero by tax authorities since negative values had little relevance for the tax collection purposes. To make sure that this censoring does not inflict with our findings we run sensitivity checks where we homogenize the wealth variables by censoring all of them from below at zero (see Appendix B).

The first generation's wealth is taxable wealth in 1945 (i.e., measured around the age of 48). The observations were collected manually from the individual income and wealth tax records that are stored in the local county archives in Malmö.[9] Due to the structure of Swedish tax registers we are unable to measure personal wealth in earlier or later years with the same precision and sample coverage and therefore only use a single-year observation. However, as a sensitivity check we compute an alternative wealth measure, "capitalized wealth", which divides tax-reported capital income (interest and dividend income) in 1937 (only men) and 1945 (both men and women) by an assumed real rate of return of three percent and then average across both years. Capitalized wealth differs from taxable wealth by disregarding all the assets that do not yield taxable cash returns, notably most types of real estate and land but also some financial assets, but to the extent that ownership of cash-yielding financial assets and total

[7] A public investigation of private wealth in 1967 found when comparing estate inventory reports with the previous year's wealth tax returns of the deceased persons that personal assets (i.e., durables) and debts were much better covered in the estate inventory reports (SOU 1969, p. 276). See Du Rietz, Henrekson and Waldenström (2014) and Elinder et al. (2014) for detailed descriptions of the Swedish inheritance taxation and the structure of estate inventory reports.

[8] Before World War II tax-assessed values were generally aimed at being equal to market values, but in the postwar era they have mostly been set with a discount: real estate was valued at 75 percent of market value and listed stock values have also been set at lower than market values.

[9] We use tax records (*taxeringslängder*) of 1946 showing incomes and wealth in 1945, kept in Malmö Stadsarkiv. During the period 1911–1946, wealth was taxed jointly with income in the way that one hundreth of taxable wealth was added to taxable income. For reasons of discretion, however, a person's net wealth was not reported directly in the tax records, but it is during 1945 possible to back out the taxable wealth from the reported income and deduction items (before income year 1945 tax register items were structured differently and do unfortunately not allow for this to be done). Specifically, the reported item "taxable amount" (*taxerat belopp*) equals the reported total gross income (*sammanräknad nettoinkomst*) minus "general deductions" (*medgivna allmänna avdrag*) plus a "wealth share" (*förmögenhetsandel*) which was 1/100 of taxable net wealth. We can therefore add general deductions to the taxable amount, subtract total gross income and multiply the sum by 100 and yield the personal taxable wealth (this procedure was also used by Statistics Sweden when analyzing personal wealth for the census of 1945, see Statistics Sweden, 1949, p. 2*).

wealth is positively correlated they can be expected to capture the same structures of inter-generational transmission studied here.

Estate wealth, or terminal wealth, of the first and second generations is observed in the estate inventory reports, which are filed for all individuals with significant wealth holdings.[10] These data were collected manually from county archives all over Sweden where the individuals had deceased until 2001 when the Swedish tax authority took over the responsibility for storing all the country's estate inventory reports.[11] A complicating fact is that estate inventories are always filed individually while we wish to measure the joint parental wealth at death, i.e., summing the wealth of both parents in order to reflect the wealth status of the entire household that presumably mattered for the child's subsequent outcomes. Combining two estates recorded at different points in time is, however, sensitive to the treatment of the time of death and to interspousal transfers from the first deceased parent to the remaining parent. The previous wealth mobility literature using estate wealth data (see Menchik, 1979; Wahl, 2002) has tackled this issue by using a specific measure, the *peak midparent wealth*, which combines the estate wealth of both parents and accounts for the transfers between spouses to avoid double counting: $½ \cdot \left(w_{first\ deceased} + \max\left(w_{second\ deceased}, 0\right)\right)$. We use this concept in our investigations to measure the combined estate wealth of both the father and the mother.

The second generation's wealth during the lifetime is the average taxable wealth observed during the years 1985, 1988 and 1991 (thus measured at ages 57–63). Notable is that wealth in the first two years is censored from below at zero whereas this is not the case for the last year, the reason being different reporting routines at the tax authority after the Swedish tax reform of 1990–1991. We run a number of consistency checks, using wealth in individual years and censoring wealth at zero, and find no deviation in the results due to the changes in reporting routines.[12]

[10] Some of the deceased in our sample do not have estate inventory reports. This is primarily due to the insignificance of their wealth, and this led to that only a so-called estate notification (*dödsboanmälan*) was filed.
[11] Our estate dataset contains over 30 variables showing information about civil status (years of marriage, remarriages), estate wealth composition (value of housing, life insurance savings), *inter vivos* gifts, wills, pre-nuptial arrangements and inheritance waivers, generally for both father and mother.
[12] Included in the wealth measure for 1985 and 1988 is the tax value of real estate, which is 75 percent of market value. Because we also have separate information on real estate tax value, we can scale this up to market value and add the difference to the wealth measure. This reduces the number of zero (censored) observations by around 10 percentage points. This augmented measure is used in sensitivity analyses.

The third generation's wealth is measured as the average between wealth in 1999 and in 2006 (thus measured at ages 43–50). While these wealth data also stem from the wealth tax, they differ from the wealth tax register data used for the first two generations by being partly based on third-party reported financial asset statements of banks and brokerage firms.[13] Non-financial assets are collected from the property tax assessments, which is the same as for the first two generations. Moreover, valuation differs from the previous generations by being based on market prices, which means that tax-assessed property values are multiplied by a sales price ratio (computed by Statistics Sweden using data on actual sales prices and tax assessments for homes sold) and reported in market values. Wealth observations cease in 2007 due to the repeal of the Swedish wealth tax in that year.

The fourth generation's wealth, finally, is measured in 2006 (thus measured around age 21) using the same tax register sources as was used to measure the third generation's wealth. For robustness purposes we also use wealth in 1999 in some analyses. This generation is obviously very young compared to the first three generations when we observe wealth and we therefore analyze its intergenerational outcomes separately from the main analysis.

Inheritances are observed when parents, and for the third generation also grandparents, bequeathed wealth to their children in the second and third generations.[14] The inheritance lots were calculated for each heir and reported by the tax authorities in inheritance tax records (*arvsskattestegar*) which are typically attached to each estate inventory report. It should be noted that these inheritance lots were based on a close scrutiny of the probated wealth, accounting for wills if they existed and taxable *inter vivos* gifts made within ten years of the testator's death.

Finally, we also have access to excellent data on education for all four generation and earnings histories for the first three generations. We derive measures of years of schooling and log lifetime earnings in the same way as in Lindahl et al. (2015). A few differences are that we, to improve comparability with our wealth measures, use family earnings instead of father's earnings, that we use average years of schooling for parents and that we express both these varia-

[13] The data comes from Statistics Sweden's so-called Wealth Register which covers wealth statements for all individuals, i.e., not only households filing tax returns, in Sweden between 1999 and 2007.
[14] We do thus not include inheritances from others than the parents (and grandparents), i.e., siblings, other relatives or non-relatives. But Wolff and Gittleman (2014) shows that about three fourths of inheritances received do actually come from parents or grandparents.

bles in percentile rank, grouped by birth year, for each generation. We also note that i) for the first generation, the education measure is only available for the fathers and is derived from information on occupation, and ii) income in the first generation is for 4 out of 5 years only available as the sum of labor earnings and capital income.[15]

3.2 Descriptive statistics

In our main analyses we strive to use the maximum number of observations, which means that we only require wealth information for the generations actually used in the regressions (but, for example, not on grandchildren if we look at the associations in wealth between children and parents).[16] These are the samples for which we show descriptive statistics in Table 1a and 1b.

[Tables 1a and 1b about here]

Table 1a reports descriptive statistics for our wealth variables for the individuals used in the estimations in this study. We present statistics for tax-register wealth for all four generations, estate wealth for generations one and two, and inheritances for generations two and three, in addition to the other variables used in the estimations. We show means and standard deviations (the first column) as well as various percentiles. All wealth and income measures are presented in thousands of SEK in 2010 prices (1 USD = 6.85 SEK in December 2010).

Looking first at the main wealth measures, we see that mean wealth grew at a moderate rate between the first and second generations (from 150 to 251 thousand SEK), and at a much higher rate between the second and third (from 250 to 870 thousand SEK) which is partly explained by the switch from using tax-assessed values to market values. Because we measure the wealth of the fourth generation at a much younger age (19 on average) than for the earlier generations, they have an average wealth of only 95 thousand SEK. It is also worth noting

[15] Years of schooling is constructed from educational levels available in registers. Our log earnings measure is constructed as from regressing log earnings on a cubic in birth year and year indicators (done separately by generation and gender), taking the residuals which then are averaged over years. Labor income is compiled from Swedish high quality registers for all years that we use. For the first generation we have access to income data as 5 yearly measures spanning 13 years, typically observed between ages 33 and 46. For the second and third generations we can more or less observe lifetime earnings for most of the individuals. See Lindahl et al. (2015) fro details.

[16] We also show results where we restrict all intergenerational regression to have wealth info in all generations, either generations 1-3 or generations 1-4. In this way we can compare the estimates for 2 generations to the estimates from multigenerational regressions using 3-4 generations.

that wealth is more evenly distributed among the later generations compared to the first, where most people have zero wealth, so that the mean is driven by a smaller subset of relatively wealthy individuals. In subsequent generations a majority of individuals have positive wealth. The P90/P50 ratio indicates fairly stable wealth inequality between the second and third generations, with ratios of 5.62 and 5.79, respectively. Inequality is much higher in the younger fourth generation, with a P90/P50 ratio of 19.1.[17]

Estate wealth is higher than tax-register wealth, particularly for the second generation, indicating that the average individual keeps accumulating wealth throughout their life. Unlike taxable wealth, the estate wealth is positive for most of the individuals in the first generation. The P90/P50 ratio is actually somewhat lower in the first generation (at 6.68) than in the second generation (at 8.03). Inheritances are substantial in relation to own wealth, which represents a first indication of that this is likely to be an important channel for intergenerational wealth correlations.

Table 1b presents means and standard deviations for incomes and educational attainment for the first three generations, year of death for the first two generations, and year of birth and gender composition for all four generations. Incomes and educational attainment have been increasing across generation, with more growth between the first and second generation than between the second and third.[18]

In the first generation, almost everyone have died, with an average age at death of 77, while in the second generation, only around a third of individuals have died, with an average age at death of 70. This is mirrored in the smaller estate wealth sample for the second generation, and the smaller inheritance sample for the third generation. Because of this, the second generation estate wealth data and the third generation inheritance data are likely to have some selection problems. For the first generation, because wealth data is missing for many women, only around a third of the sample is female. Subsequent generations are virtually balanced on gender, since we observe wealth for almost everyone in these generations.

[17] Because two of the three years used to calculate wealth for the second generation are censored from below at zero, it is hard to compare the full distributions between generations.
[18] Incomes are measured at age 36 for the first generation, age 41 for the second generation, and age 44 for the third generation, on average.

Our data set is based on the 1,542 individuals in the "index generation", which is the second generation in our multi-generational panel. Of these, 1,491 has at least one parent present in the data. We observe tax wealth for at least one parent for 1,291 individuals in the index generation, and own tax wealth for 1,356 individuals. For 1,147 individuals we observe both own and parental wealth, and this is our main analysis sample for the index generation.

In the third generation (the children of the index generation), there are 2,805 individuals, of which we observe tax wealth for 2,612. For the index generation, we also have 1,393 spouses, of which we observe wealth for 1,281. These observations are included as parental observations in the third generation sample (and as grandparental observations in the fourth generation sample). We observe both own and parental tax wealth for 2,579 individuals, and this is our main analysis sample for the third generation.

In the fourth generation (the grandchildren of the index generation), there are 4,787 individuals, of which we observe tax wealth for 4,664. In addition to the parents who are children of the index generation, we observe an additional 2,459 parents, of which we have wealth information for 2,367. These individuals are included in the parental data in the fourth generation sample. We observe both own and parental wealth for 4,592 individuals, and this is our main analysis sample for the fourth generation. When using additional generations in the regressions for the fourth and third generations, sample sizes fall somewhat more because of missing wealth observations for the added generations – these reduced sample sizes are presented in the regression tables.

Note that in the estimations we always use the sum of the wealth variables of the spouses in the parental generations ("family wealth") and individual wealth for the child generation. For generations further removed, we then take averages across family branches (for example, when analyzing grandparent correlations for the third generation, we first take sums of wealth across spouses, and then average across paternal and maternal grandparent couples). We then rank these wealth measures between 0 and 100 within birth year groups[19]. Hence, the estimates can be interpreted as intergenerational rank correlations. Advantages of using rank in-

[19] Because of our limited sample size, it is not feasible to rank by birth cohort. Instead, we group birth cohorts so that each group has at least around 100 observations. While most such groups cover at most two or three cohorts, some groups in the tails span more cohorts (because of the index generation being born in or around 1928, birth years follow a single-peaked distribution in our data set). To check if this affects results, we have tried dropping these tail groups entirely from the analysis, and results are mostly unchanged. We have also tried increasing group size to contain around 200 observations, and again results are mostly unchanged.

stead of other transformations are that *i)* we can include zero and negative wealth observations, and *ii)* ranks are less sensitive to outliers, which could potentially be a problem with wealth data. As a robustness check we also estimate our main regressions using log wealth and inverse hyperbolic sine transformed wealth (see appendix table B4–B9).

4. Main results

4.1 Intergenerational persistence in wealth across two and three generations

Table 2 presents the estimates from our main intergenerational wealth regressions. Column 1 uses wealth of the child in the second generation and columns 2–4 wealth of the child in the third generation as dependent variables. In Panel A, we use our preferred wealth measures (covering both financial and real estate assets net of debts). Since this measure is only available for one year (hence raising concerns about transitory measurement error bias), in Panel 2 we instead use the average of predicted financial assets for 2 years (8 years apart), calculated from information on capital incomes in those years.

[Table 2 about here]

We note several interesting findings in Panel A. First, there is a fairly strong rank correlation between wealth of adjacent generations, larger than the rank correlation reported in Boserup et al. (2014) for Denmark (but fairly similar to the log wealth elasticity reported in Charles and Hurst (2003) for the U.S.). Second, the wealth rank correlation has increased over time and the difference is statistically significant. Third, although there is a strong link between wealth of the child and grandparent generations (column 3), it does not remain statistically significant when parental wealth is included in the regression (column 4).

In Panel B, these conclusions remain. We see that the correlation between the second and first generation in column 1 is only slightly bigger than the correlation reported din Panel A. And regardless of which measure of wealth that is used for generation 1, we observe a smaller rank correlation compared to the estimate from a regression of wealth for generations 3 and 2 (column 2).

We have also investigated the reliability of the wealth measure that we use for the first generation in a number of other ways, and the general conclusion is that our main results stand up for variations in measurement and specification.[20]

A corollary to the result of the statistically insignificant estimate for grandparents in column 4, is that that we cannot reject an AR(1) model to be a good representation of the transmission of wealth between generations for this sample. However, since the estimate for grandparents is positive (although statistically insignificant) we still proceed to try to infer what is the long-term intergenerational persistence parameter b. For example, this can be done by estimating a 2SLS regression model, of the wealth of children (in the third generation) on the wealth of parents (in the second generation) using the wealth of grandparents (in the first generation) as instrument (see Appendix Table A10). Under the null hypothesis of AR(1) model to be true, this is indeed a valid exclusion restriction.[21] The estimates from such models are 0.49 which is only about 30 percent higher than the estimate from for children and parents reported in column 2. Lindahl et al. (2015) found that similar 2SLS estimates were 50–90 percent higher for educational attainment and lifetime earnings.

To investigate the long-run transmission effects we can also use the estimates from regressions on adjacent generations and compare them to an estimate from a regression using distant generations. To do this we re-run the regression in columns 1–2 using the same sample as in column 4 (results are reported in Appendix Table A1). We find that the estimates are very similar to those reported in Table 2. For the comparable estimates in Panel A, we find that the prediction is 0.108, whereas the estimate for children and grandparents is 0.114. In Panel B, the figures are 0.123 and 0.175 respectively. Hence, long-run persistence in wealth is only predicted to be somewhat lower using the adjacent regression results. What long-run persistence parameter, b, would be required in order to explain the estimates from the regression of child and grandparents wealth? In column 3 of Panel A, the estimate is consistent with a b=0.38, and in column 3 of Panel b with a b=0.47. These figures differ from Boserup et al. (2014) and especially from Clark and Cummins (2014) who both estimate multigenerational

[20] Wealth during midlife for first generation may not be a very good measure (the tax variable contains too many zeros and is only available for one year): The correlation between wealth and other variables such as schooling and earnings is quite high (and similar to that in the second generation). Also, if we use capital derived wealth in 1945 as an instrument for wealth in 1945, we land at similar estimates as those reported in Panel A of Table 2.

[21] If for example the true model is, as discussed in section 2.1, $w_{it} = x_{it} + u_{it}$ and $x_{it} = bx_{it-1} + e_{it}$ for individuals in generation t, we can rewrite this model as $w_{it} = bw_{it-1} + (u_{it} - bu_{it-1} + e_{it})$. Hence, using w_{it-2} as an instrument for w_{it-1} generate unbiased estimate of b if the measurement errors are serially uncorrelated.

wealth regressions. Our results also differ from the findings for years of schooling and life-time earnings studies reported in Lindahl et al. (2015) based on the same data set used in this study (and other studies using occupation etc).

How can we reconcile these differences? One possibility is that these differences are partly due to differences in samples. Boserup et al. (2014) are only able to estimate three generation models using a sample where the child generation is very young (on average 23 years of age). We discuss this possibility further below. As Clark and Cummins (2014) use a peculiar sample of individuals linked across generations through rare surnames it is unclear whether their estimates can be generalized. Below we will also return to the issue about why we observe different results for wealth, in comparison to schooling and earnings reported in Lindahl et al. (2015) using the same data set.

4.2 Nonlinearity in the intergenerational persistence in wealth

We now turn to examining potential nonlinearities in the wealth correlation across the distribution. Figure 1 shows kernel regressions of child wealth rank on ancestors' wealth rank.[22] In each graph, the solid line shows the kernel regression estimate with a 95 percent confidence interval shaded in grey. The dashed line indicates the best linear fit, and the grey lines along the bottom represent a rug plot showing the density of the data. The rank correlation is measured by the slope of the regression line. To put some numbers on these correlations, we have also estimated corresponding spline regressions, where the intergenerational correlation is allowed to vary in each quartile of the ancestor wealth distribution. These are presented in appendix table A4.

[Figure 1 about here]

Panel a presents the association between the second generation and its parents. The relationship is mostly linear, with a small increase in the slope around the top decile group, and a negative slope in the bottom quartile. Notice, however, that the data is very sparse in the lower half of the distribution for the first generation (the same thing is true up in panels c and f,

[22] Boserup et al. (2014) and Chetty et al. (2014) show figures plotting average child rank on the y-axis against parental wealth percentile. That approach corresponds to estimating a local constant kernel regression using a rectangular kernel and a bandwidth of 1. Our approach uses a more efficient local linear kernel regression with an epanechnikov kernel and rule-of-thumb bandwidth. For the large samples used in Boserup et al. (2014) and Chetty et al. (2014), this is unlikely to make a difference, but our smaller sample necessitates performing the analysis in the optimal way.

which also have first generation wealth rank on the x-axis). This is because of the large number of observations with zero wealth in the first generation (see table 1a), resulting in a mass point close to the bottom of the distribution and relatively large confidence intervals in this domain. This calls for some caution in interpreting the patterns in the left part of the figures. This is also borne out in the spline regressions, which appear somewhat unstable when using the first generation for the left-hand variable.

Panels b and d show corresponding wealth rank regressions of third and fourth generation on their parents. Both plots indicate somewhat flatter slopes in the bottom decile group, and a steeper slope in the top decile group (more so for the third generation than for the fourth). The spline regressions confirm this pattern, with monotonically larger correlations for each higher quartile, and a top quartile correlation of 1.077 for the third generation and 0.564 for the fourth generation.

Panels c and e show grandchild-grandparent correlations for the third and fourth generations. Here the overall correlation is smaller, as we saw in our main regressions, but again the slope is flatter or even a negative in the bottom, and a steeper in the top. Again the spline regressions show a similar pattern, with top quartile correlations of 0.526 for the third generation and 0.776 for the fourth generation.

Finally, panel f shows the regression of the fourth generation on their great grandparents. Here, the overall correlation is very flat, with a negative slope in the bottom and a relatively steep slope in the top. The spline regressions are somewhat unstable here, but do show a large positive correlation of 0.440 in the top quartile, with smaller and sometimes statistically insignificant correlations for the other quartiles.

These results suggest that the intergenerational association in wealth is more or less linear in the middle of the distribution, stronger in the top decile and perhaps even negative in the bottom deciles. This latter result could be because some wealthy individuals are able to hide their assets, or have large debts due to investments that have not yet paid off. This general pattern is quite similar to that found in Boserup et al. (2014). Most striking is perhaps the large increase in persistence in the top for the grandchild-grandparent regression in panel f.

To further examine these nonlinearities, we perform a number of additional analyses. First, we estimate a linear probability model which is similar to equation 1, but where the outcome variable is an indicator for being in the top wealth decile, and the explanatory wealth variables are corresponding indicators for parents and grandparents. The coefficient from this regression measures the conditional probability of being in the top wealth decile given that your parents or grandparents were in the top wealth decile. Under perfect mobility, this probability would be 10 percent. Results are presented in appendix table A5. For the second generation, persistence in the top is surprisingly small, with a coefficient of 0.05. For the third generation, the probability (controlling only for parents) is 27 percent, almost three times that under perfect mobility. The grandparents-only probability is 5.8 percent, and controlling for parents there is no additional increased probability of being in the top decile from the grandparents being in the top decile.

Table A6 presents corresponding regressions for the fourth generation. As for the third generation, having parents in the top decile increases the probability of the child being in the top decile by around 30 percent, while having grandparents in the top decile increases the probability with between 13 and 17 percent, implying some multigenerational persistence in the top.

As a final analysis of nonlinearities, we also show transition matrices in appendix table A7. These show the conditional probability of being in a particular wealth quintile given that the individual's ancestors were in a particular wealth quintile. Perfect mobility would imply a probability of 20 percent in every cell. The general pattern for parent-child mobility is one of elevated probabilities along the diagonal, and in particular the probability of being in the top quintile given that your parents were also in the top quintile is 35 percent for the second, 46 percent for the third, and 44 percent for the fourth generation. Disregarding the slight differences across generations, these numbers thus show that children in the richest fifth of all families have been twice as likely to belong to the richest fifth when they grow old. The probability of being in the top quintile if one's parents were in the bottom quintile (the bottom-to-top transition probability) is remarkably high at 18 percent for the second generation, but only 9 percent for the third and 8 percent for the fourth generation. Top-to-bottom transition probabilities are even lower for the second and third generations, at 8 and 5 percent respectively, but higher for the fourth generation at 12 percent. This pattern implies that a very large drop in relative wealth is more unlikely than a very large gain.

For the third generation grandparent-grandchild transition matrices, the patterns are somewhat different, with a bottom-to-top transition probability of 27 percent, which is almost as large as the stay-in-the-top probability of 29 percent, while the probability of staying in the bottom is only 14 percent.

To summarize, the intergenerational wealth rank correlation exhibits nonlinear patterns, with particularly strong persistence in the top of the distribution, and some indications of more mobility in the bottom. This pattern is similar to what has previously been found among rich Americans by Wahl (2002) and in the French population by Arrondel and Grange (2006).

4.3 Wealth persistence across four generations

Finally, we turn to estimating regression models using wealth for individuals from four consecutive generations, i.e., we regress model (1) extended with wealth for an additional generation. Given our data constraints we only observe the wealth of the fourth generation when they are children, adolescents or young adults, making this a sample of individuals who themselves have had no, or very little, time to acquire wealth. Note also that the ages for which we observe wealth depend on the age of parents and grandparents and it should be remembered that this is not a fully representative sample.

Results are shown in Table 3. The organization is similar to columns 2–3 of Table 2, although now the table is extended to involve estimates from data on 4 generations. In Panel A, we show estimates for the full sample. We have also separated the sample into individuals in the child generation that are below and above 18 years of age. The estimates for these samples are shown in Panels B and C, respectively.

[Table 3 about here]

Starting with the results in panel A, we see in column 1 that the wealth rank correlation is high, about 0.38, which is very similar to the rank correlation in wealth between children and parents in generations 3 and 2. This is surprising as the mechanisms underlying these associations should be expected to differ. In columns 2 and 3, we see that there is a fairly strong association between the wealth of those in the child generation and the wealth of ancestor beyond parents. This interpretation is confirmed in column 4 and 5, where we see that the estimate for the wealth of the grandparent is statistically significant, even conditional on the wealth of parent, something that was not seen for generations 1–3 in Table 2.

What do these figures say about long-run persistence in wealth transmission across generations when we use wealth for also for a young fourth generation? As indicated by the positive coefficient estimates for grandparents in columns 4 (and 5) of Panel A, the results are somewhat different than for our three generations where wealth were measured in mid-life. If we estimate a 2SLS regression model, again for three generations, but now using wealth for the young fourth generation as outcome variable (so the wealth of grandparents (in the second generation) is used as instrument for the wealth of parents (in the third generation). We then get a 2SLS estimate equal to 0.65 (see Appendix Table A10) which is 70% higher than the bivariate estimate for parents and children reported in column 1. If we calculate the long-run transmission parameter, *b*, consistent with the estimate reported in column 2 (between grandchildren and grandparents) we get this to be *b*=0.55. However, the figures are not as big as in Clark and Cummins (2014) whose multigenerational estimates were in line with a b above 0.70. Still, given the very young individuals in the fourth generations we believe one should interpret these results with care.

In Panels B and C, we see an interesting pattern emerge. The reason for the high intergenerational association in wealth and for the multigenerational associations appears to be driven by those in the child generation sample that are children or youth. These are clearly individuals that have not been able to accumulate their own wealth and only very few of them have received inheritances. Thus, these high associations should be primarily driven by various kinds of *inter vivos* gifts from parents or other relatives, an observation which lends support to the family of life-cycle models that stresses the importance of accounting for wealth transfers to accurately measure wealth status (see further section 5).

We also analyze the degree of nonlinearities in wealth persistence related to the fourth generation outcomes. The transition matrices in appendix table A7 indicate similar patterns as in the first three generations reported above, with a 44 percent probability of being in the top quintile given that your parents were also in the top quintile. The probability of being in the top quintile if one's parents were in the bottom quintile, the bottom-to-top transition probability, is only 8 percent whereas the equivalent top-to-bottom transition probability is 12 percent, which is somewhat higher than observed in the second and third generations. Looking at grandparent-grandchild transition probabilities, the pattern is relatively similar to the parent-child matrices, with a stay-in-the-top probability of 34 percent, a stay-in-the-bottom probability of 24 percent, and a bottom-to-top probability of 15 percent. Finally, for the great grand-parent-great grandchild matrix for the fourth generation, the pattern is less pronounced throughout, but there is a slightly elevated stay-in-the-top probability of 25 percent.

Altogether, these patterns suggest that wealth mobility patterns do change profoundly when we extend the generational span from three to four levels. Rank correlations are in the same range, with the main effect coming from the parental level. We do find a larger impact of grandparental wealth, and it is also significantly different from zero unlike what was observed for the third generation. Furthermore, the transition probabilities indicate similar, and perhaps even stronger, nonlinearities in the fourth generation as in earlier generations.

5. Life-cycle variations and wealth mobility

When during the life span should wealth be measured in order to achieve the most accurate projection of intergenerational wealth mobility? While this has been a major issue in the intergenerational income mobility literature for some time (see, e.g., Haider and Solon, 2006) it has received considerable less attention among studies of wealth mobility. Theory does not seem to provide a clear-cut answer. In the classical life-cycle model of Modigliani and Brumberg (1954), people accumulate wealth up to their retirement and thereafter decumulate all of it until they die, implying that measuring wealth early or very late in life would not be very informative whereas measuring it around the expected wealth peak around the age of 60–65 would be more adequate. But subsequent research has questioned this hump-shaped age-wealth relationship, both on theoretical grounds (Becker and Tomes (1979) point at dynastic motives to invest in children; Thurow (1976) stresses the old wish to retain the power and influence coming with wealth) and based on evidence showing that wealth decreases only marginally after retirement, if at all (Shorrocks, 1976; Jappelli, 2005). Furthermore, when incorporating inheritances into the definition of lifetime wealth (see, e.g., Meade, 1964), the implication is that wealth should be observed too early in life since most inheritances are received around the ages 40–60 when parents usually pass away. On the other hand, wealth transfers to children or young adults are not quantitatively unimportant (Wolff, 2014) and may be correlated with parental (or grandparental) wealth size as stipulated by, e.g., dynastic bequest models.[23] Altogether, theory provides little explicit guidance as to when wealth should be observed in order to provide a good basis for estimating intergenerational models; while one should avoid using wealth very early in life, before life-cycle saving and inheritance receipts are realized, there is less consensus about the shape of the age-wealth profile from retirement until the point of death.

In this section we make two investigations into the importance of life-cycle variation for intergenerational wealth transmission in two analyses. First, we compare correlations when using wealth observed at middle age (around age 40–55) and using wealth recoded at death. Second, we examine whether the intergenerational linkages depend on the age of the children when measuring their wealth.

5.1 Wealth at middle age vs. at death

Previous empirical studies of wealth mobility fall into two distinct groups based on when during the life span that they observe wealth: one group measures wealth of living adults (Mulligan, 1997; Charles and Hurst, 2003; Halphern et al., 2014) and another group measures people's wealth at death (Harbury and Hitchens, 1979; Menchik, 1979; Kearl and Pope, 1986; Wahl, 2002; Arrondel and Grange, 2006). None of these studies contains evidence on both dates of wealth measurement, The timing of wealth observations in these studies were stipulated by the data at their disposal, but in order to alleviate at least some of the alleged life-cycle patterns most studies include explicit controls for polynomials in age of the deceased and the heirs. It is, however, not obvious that such controls will fully address the influence of age-wealth patterns onto mobility. For example, if the accumulation of wealth is partially dependent on institutional conditions, e.g., the degree of taxation and capital tax progressivity or the extent of welfare service subsidization, the age-wealth relationship may both trend over time and vary across the distribution. By observing wealth both during midlife and at death for a sample of parents and children in the first and second generations, our study is to our knowledge the first to fully account for the life-cycle effects in the intergenerational wealth transmission.

Table 4 shows intergenerational rank correlations for different combinations of wealth during midlife and wealth at death of parents and their children in the first and second generations.

[23] See Kopczuk (2009) for a brief overview of models of bequest motives.

The most interesting results are those in columns 3–6 where we restrict attention to the sample for which we observe wealth in life and at death for all parents and children. The estimate using taxable wealth in both generations is 0.284, which is identical to that in column 1 based on a larger sample (where we only require observation of taxable wealth and estate wealth of the parents). When switching to estate wealth for the parents, the estimate is 0.257 which is not significantly different from 0.284 but from 0.321 which is the equivalent estimate in column 2 using the larger sample. We thus get somewhat conflicting evidence on the impact of sample size, but considering the relatively larger standard errors this effect still ought to be relatively minor. When instead switching to using estate wealth in the child generation in column 5, the estimate shrinks to 0.214 although it is not statistically different from the estimate in column 3. Finally, when using estate wealth in both generations, the intergenerational elasticity falls down to 0.152, the lowest observed estimate and significantly lower than using taxable wealth during life.

[Table 4 about here]

The results in Table 4 seem to suggest that the wealth transmission is lower when measuring wealth at death than during the lifetime. How can we account for this result and what does it imply for the theoretical models at hand? First of all, the finding seems to suggest that wealth at death may be a noisier measure when accounting for wealth mobility than wealth observed during life. To this extent, we offer some tentative support for models relying on the traditional life-cycle hump-shape in the age-wealth relationship. Another possibility is that trends in the Swedish tax system and the extent of publicly subsidized welfare services to the elderly influence the incentives to either sustain or to decumulate wealth after retirement, both of which would set off reshuffling of wealth among the wealth holders and eventually affect our rank-based estimates. For example, inheritance and wealth taxes were historically high in the 1960s through 1980s, i.e., when the estate wealth of the parents in the first generation is measured, but were later slashed in the 1990s and 2000s, i.e., when the wealth of children is measured. At the same time, the need to save for retirement and to keep funds during retirement diminished along with the extension of publicly subsidized elderly care. We cannot fully determine the importance of these institutional factors due to the nature of our dataset, but hope that this will spur further inquiry into the question about the role of life-cycle patterns for wealth mobility.

5.2 Wealth at younger ages vs. middle age

Next we look at how the intergenerational rank correlation in wealth differs depending on the age of children at the time when wealth is measured. Although interesting on its own, an additional motivation for this is to try to understand the results in earlier studies, in particular Boserup at al. (2014) which used young individuals as their third generation in their three-generation regressions. We therefore re-estimate the regressions for the individuals used in Table 2, using wealth measured at a younger age for the third generation: average of the years 1985, 1988 and 1991, when average age is 32 (in Table 2, the average age is about 47). Results are reported in Table 5.

[Table 5 about here]

We note two interesting differences compared to the results in Table 2: the two-generation estimate is significantly smaller and the estimate for grandparent's wealth, in the regression where we condition on parental wealth, is positive and statistically significant. Although these results differ from those reported in Table 2, they are indeed quite similar to the results reported in Boserup et al. (2014). One interpretation is that using wealth for young individuals biases the parental wealth effect downward and the conditional grandparental effect upwards, if we are after the estimates from a regression using "lifetime" wealth. This makes sense if one considers the fact that fewer grandparents have died and thus are more likely to be involved in their grandchildren's life. One interpretation of this result is that is an indication of life-cycle bias in the measurement of wealth persistence.

6. Mechanism analysis: inheritance and human capital

6.1 The role of inheritance

We perform two different exercises to infer the importance of inheritance in explaining the intergenerational association in wealth reported in previous subsections. First, we use an approach that is designed to construct an "inheritance free" measure of wealth for those in the child generation which is then regressed against the wealth of parents. If death is exogenous or unanticipated, we can interpret this as the impact of inheritance on the intergenerational association in wealth.[24]

To efficiently take into account all information on inheritance, we subtract the predicted impact of inheritance on wealth, taking into account the differential impact of inheritances received at different points in time. We do this by estimating the regression model

$$(3) \qquad w_{iy} = a_0 + c_1 A_{iy-t} + \delta(t \cdot A_{iy-t}) + \lambda(t \cdot A_{iy-t}^2) + u_{it},$$

where w_y is wealth of the child measured at the end of year y, and A_{iy-t} is the sum of the child's inheritance received on average at year $y - t$. We also interact inheritance with a quadratic in average time since receiving the inheritances. Because the inheritance terms in this regression provide a prediction of the child wealth that is due to inheritance, the residuals with the constant added back in provide an estimate of wealth net of inheritance, $w_i' = a_0 + u_{it}$, for the individual in the child generation.

In a second step, we then rank this measure of wealth net of inheritance within age groups and regress it on parental wealth rank, as in equation 1. Results are presented in Table 6. In columns 1 and 3 we use the standard measure of child's wealth as the dependent variable for comparison, while in column 2 and 4 we use child's wealth net of inheritance. Panel A shows estimates for the second generation, in which virtually all parents are deceased. The rank correlation using full wealth is 0.246, which is somewhat lower than the 0.283 we get for the full sample (see table 2). When we remove the inheritance channel, the correlation drops to 0.0429 and is no longer statistically significant. Using capital income-based wealth for the parent generation produces similar results, with the correlation falling from 0.284 to 0.0813 when removing inheritances.

[Table 6 about here]

Taken at face value, these results imply that the majority, if not all, of the intergenerational correlation in wealth runs through the inheritance channel. If individuals anticipate the size of their future inheritance, however, they might adjust their savings behavior according to this,

[24] If death, and inheritance, is not unexpected and individuals in the child generation adjust their consumption based on expected inheritance, we will likely underestimate the intergenerational association in wealth.

so that a person expecting a large inheritance saves less than an individual expecting a small or no inheritance. This would bias our estimates of the correlation net of inheritance downwards, leading us to overestimate the relative importance of the inheritance channel.

As a robustness check, we estimate regressions of the form $w_{it} = {\alpha_0}' + \rho_2 w_{it-1} + \sum_{k=1}^{K} \mathrm{A}_{it}^{k} + d'X_{\mathrm{i}} + v_{it}$, where we control for a polynomial of degree K of the inheritance. The idea is to remove the inheritance channel by controlling for it in a flexible manner. Results for the second generation are presented in panel A of appendix Table A8. Controlling for successively higher degrees of the inheritance polynomial reduces the intergenerational wealth correlation, which drops to a statistically insignificant 0.08 when a fourth order polynomial is used.[25] Using the capital income-based wealth measure for the parent generation produces similar results. These results are very close to those in table 6. Like the results in table 6, however, this is also likely to be a lower bound on the net-of-inheritance correlation, because the size of the inheritance is likely to be correlated with other mediating variables. If this is the case, adding inheritance as a control variable will also remove some of the correlation running through these other channels.

In panel B of Table 6, we perform the same type of analysis for the third generation. In the first two columns, we remove only inheritance from parents, while in the last two columns, we remove inheritances from both parents and grandparents.[26] The correlation using full wealth is very close to that in the full sample at 0.38 (see table 2), and drops to around 0.3 when removing the inheritance channel from parents. Including grandparental inheritances, we estimate a larger drop from 0.432 to 0.23. Panels B and C of appendix table A8 present corresponding results using the polynomial regression approach and results are similar for the parental inheritance analysis with an even smaller drop when including grandparental inheritances too.[27] It should be noted that for these individuals, only one parent has died, which means that they have only received a small share of their future total inheritance, since spouses inherit each other (Elinder et al. 2014). Because of this well-known circumstance, it is not

[25] Higher order polynomials do not further reduce the correlation.
[26] The sample in panel C is larger than in panel B because we use all individuals that have received an inheritance from *either* a parent or a grandparent. In the prediction regression (equation 3), we enter parental and grandparental inheritances separately, setting missing inheritances to zero and including dummy variables equal to one if the corresponding inheritance observation was missing.
[27] When controlling for both parental and grandparental inheritances, we enter them as separate polynomials in the regressions, and also include dummy variables indicating that a missing value was set to zero, as in the inheritance prediction regression.

surprising that the inheritance channel accounts for much less of the overall wealth correlation – on the contrary, it is somewhat striking that we are able to remove as much as a fifth of the total correlation by removing the first parental inheritance, and almost half when also including grandparental inheritances.

If inheritances are an important channel for the intergenerational wealth correlation, the correlation should be lower for individuals whose parents are still alive when wealth is measured, and who therefore have not yet received their inheritance, than for individuals whose parents are deceased when wealth is measured, so that the inheritance is included in their wealth. To test this, we regress second generation wealth on parental wealth, an indicator variable equal to one if the parents were deceased at the time child's wealth is measured, and an interaction term between these two variables. In order to have a sharp cutoff, we estimate separate regressions for each of the wealth years 1985, 1988 and 1991. Results are presented in appendix Table A9. The wealth correlations for these single years vary between 0.214 and 0.266. When the "parents deceased" controls are added, all coefficients become statistically insignificant. Nevertheless, the point estimates imply that between 46 and 76 percent of the total intergenerational wealth correlation comes from individuals whose parents were deceased when their wealth was measured, and this analysis thus lends some further support to the results of our other analyses.[28]

While the estimates from our first two analyses are likely to be lower bounds on the intergenerational wealth correlation absent inheritances, we get qualitatively similar results using three different methods that have different problems, indicating that inheritance is an important mediating channel for the intergenerational correlation in wealth. Interestingly, the significant role of inheritance seems to be in line with the findings of Ohlsson et al. (2014) concerning the importance of inherited wealth in the economy as a whole: In the postwar era they find that about half of total private wealth in the economy is inherited, a finding that is similar to that found for France by Piketty and Zucman (2015).

6.2 The role of human capital

[28] It should also be noted that individuals whose parents are deceased could well be different from those whose parents are still alive in other respects (even though we control for quadratic birth year for both generations), so that these results should be interpreted with caution.

Next we turn to exploring the importance of mediators related to human capital and labor market productivity by including measures of education and lifetime earnings in the intergenerational regressions. Note that to control for these channels we include these measures for all generations for which we have wealth included in the regressions (either as dependent variable or as regressor). This means that the intergenerational rank correlation in wealth that remains after including these controls captures everything that is orthogonal to our measures of education and lifetime earnings (see Boserup et al., 2014, for a discussion about this interpretation).

Results are reported din Table 7. We report results in four panels. In Panels A and B we report intergenerational wealth regression for children and parents (generations 1 and 2 in Panel A and generations 2 and 3 in Panel B). In Panel B, the estimates are from regression of individuals in child and grandparental generations and, lastly, in Panel C, we report estimates from multigenerational regression for generations 1, 2 and 3. All regressions include quadratics in birth year for the individuals in all generations included in the regression.

For reference, we start by showing estimates from the intergenerational wealth regressions, without including the mediators, in column 1. In columns 2 and 3 we show estimates from intergenerational income and schooling regressions, respectively. The estimates are similar to the correlations (using variables that have been standardized to have zero mean and standard deviation one) from Lindahl et al. (2015). They are not identical, as samples and variable definitions differ somewhat.[29]

Columns 4–6 report regressions where the human capital variables have been included as controls: the mediators are income (in column 4), schooling (in column 5) and income and schooling (in column 6). The pattern is fairly similar across panels: including the controls only decreases the intergenerational wealth estimate somewhat (by less than one-third in all panels with exception of the regressions for grandchildren and grandparents reported in Panel C). This is similar to what was found in Boserup et al. (2014), although these channels there seemed to matter even less.

[29] Note that the income associations here are lower than in Lindahl et al. (2015) because we now use family income (instead of father's income).

7. Conclusions

We have estimated multigenerational wealth models using a unique data set, partly compiled by us for the purpose of this study. These data enable us to improve on previous studies in several regards. First, we have estimated models for three generations, where wealth is measured in mid-life for all three generations. Second, we have been able to use matched data on inheritances to infer the importance of this specific channel for the intergenerational transmission of wealth. Third, we have compared our estimates using mid-life wealth to estimates using wealth at death for child and parental generations, and wealth measured at younger ages for the child generation, hence addressing life-cycle issues in wealth transmission. Fourth, we have presented tentative evidence on the transmission of ancestors' wealth to the wealth of great grandchildren, at a time when they have not yet entered the labor market. In addition, we also used high quality data on education attainment and lifetime income for three generations to compare our multigenerational wealth estimates to estimates for other outcomes as well as to decompose multigenerational wealth transmission into parts due to education and income, and other factors. We have also investigated the linearity of wealth transmission across three generations.

Our main findings can be summarized as follows. We find positive, but statistically insignificant, estimate of grandparents' wealth in a three-generation regression. This means that we cannot reject the standard AR(1) model for this sample. Using the positive, but statistically insignificant estimate, we predict long-run wealth mobility to be lower than what is predicted by an AR(1) model (by about a fifth), but by a magnitude that suggest higher mobility than for most previous studies using data on education and income (Lindahl et al., 2015), occupation (Long and Ferrie, 2013), and wealth (Clark and Cummins, 2014, and Halphen Boserup et al., 2014). We believe that we can rule out that measurement error in wealth for the first generation drives this result. Instead we argue that these differences are partly due to different mechanisms between wealth and the other outcomes, and partly due to differences between our and other samples used for analyzing wealth. First, we find that inheritances are very important for explaining wealth transmission, and inheritances are mostly given from parents to children. Second, Boserup et al. (2014) are only able to estimate three generation models using a sample where the child generation is very young (on average 23 years of age). We show that for our sample, we get similar results as in their paper if we also use wealth measured when young for the children, whereas the results change if we use data on wealth for individuals near their 50s, which we argue is preferable. The estimations in Clark and Cummins (2014) are more difficult to compare to our, because they cannot link multiple generations except by rare surnames making generalizations difficult.

Second, as mentioned, we find a very important role for inheritances in explaining intergenerational wealth transmission. Our estimates indicate that between half and as much as three fourths of wealth persistence is accounted for by direct transfers from parents (and grandparents). If correct, these results profoundly change our understanding of what drives mobility in the wealth distribution and may even call for a reinterpretation of some of the previous studies in this literature. Even more importantly, however, this finding bears on how we think about the broader role of material inheritance for the equality of opportunity in society as a whole. In fact, the single most important determinant for how people judge inequality depends on the answer to the question: Why are some rich and others poor? For any given level of inequality, the perceived fairness as well as the extent to which interventions to change the distribution are called for, depends on how this situation has come about. In particular, the extent to which economic success is inherited or self-made seems crucial (see, e.g., Mulligan, 1997; Arrow, Bowles and Durlauf, 2000; and Bowles and Gintis, 2002). Taking into account also that the overall importance of wealth and inheritance in Western economies seems to be increasing, our results may imply that the intergenerational persistence in the wealth distribution will grow even stronger in the years to come.

References

Arrondel, L. and C. Grange (2006), "Transmission and inequality of wealth: An empirical study of wealth mobility from 1800 to 1938 in France", *Journal of Economic Inequality* 4: 209–232.

Arrow, K., S. Bowles, and S. Durlauf (1999), *Meritocracy and Economic Inequality*. Princeton, N.J.: Princeton University Press.

Atkinson, A.B. and T. Piketty (Eds.) (2007). *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-speaking countries*. Oxford: Oxford University Press.

Atkinson, A.B. and T. Piketty (Eds.) (2010). *Top Incomes: A Global Perspective*. Oxford: Oxford University Press.

Becker, G. (1974). "A Theory of Social Interactions". *Journal of Political Economy* 82: 1063–1094.

Becker, G. S. and N. Tomes (1979). "An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility." *Journal of Political Economy* 87(6): 1153–1189.

Black, S. and P. Devereux (2010). "Recent Developments in Intergenerational Mobility," in *Handbook of Labor Economics*, vol. 4B, eds. O. Ashenfelter and D. Card, 1487-1541. Amsterdam: Elsevier.

Blanden, J., P. Gregg and L. McMillan (2007). "Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability and Education," *Economic Journal* 117(519): C43–C60.

Boserup, S. H., W. Kopczuk and C. Thustrup Kreiner (2014). "Intergenerational Wealth Mobility: Evidence from Danish Wealth Records of Three Generations." Working Paper, University of Copenhagen.

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

Braun, Sebastian and Jan Stuhler (2014) "The Transmission of Inequality Across Multiple Generations: Testing Recent Theories with Evidence from Germany" Mimeo, November 2014, Universidad Carlos III de Madrid.

Chan, T. W. and V. Boliver (2013). "The Grandparents Effect in Social Mobility: Evidence from British Birth Cohort Studies." *American Sociological Review* 78(4): 662–679.

Charles, K. K. and E. Hurst (2003). "The Correlation of Wealth Across Generations". *Journal of Political Economy* 111(6): 1155–1182.

Chetty, R., N. Hendren, P. Kline and E. Saez (2014). "Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States," *Quarterly Journal of Economics* 129(4): 1553–1623.

Clark, G. (2012). "What is the True Rate of Social Mobility in Sweden? A Surname Analysis, 1700–2012." Mimeo. Davis: University of California, Davis.

Clark, G. (2014). *The Son Also Rises: Surnames and the History of Social Mobility*, Princeton, NJ: Princeton University Press.

Clark, G. and N. Cummins (2014) "Intergenerational Wealth Mobility in England, 1958–2012: Surnames and Social Mobility". Economic Journal 125(582): 61–85.

Elinder, M., O. Erixson, S. Escobar and H. Ohlsson (2014). "Estates, bequests, and inheritances in Sweden – A look into the Belinda databases". Working Paper, Department of Economics, Uppsala University.

Haider, Steven and Gary Solon (2006). "Life-Cycle Variation in the Association between Current and Lifetime Earnings." *American Economic Review* 96(4): 1308–1320.

Hallgren, Siver. (1939). *Intelligens och miljö. En experimentell undersökning av barn i tredje skolåret vid Malmö folkskolor och privata skolor*. Licentiate dissertation. Lund: Lund University.

Harbury, C.D., and D.M.W.N Hitchens (1979). *Inheritance and Wealth Inequality in Britain*, London, Allen and Unwin.

Jaeger, M. M. (2012). “The Extended Family and Children’s Educational Success.” *American Sociological Review* 77(6): 903-922.

Kearl, J. R. and C. L. Pope (1986). “Unobservable Family and Individual Contributions to the Distributions of Income and Wealth”, *Journal of Labor Economics* 3(2): 548–579.

Lindahl, M., M. Palme, S. Sandgren Massih, and A. Sjögren (2015) ” Long-term intergenerational persistence of human capital: an empirical analysis of four generations” *Journal of Human Resources* 50(1): 1–33.

Long, J. and J. Ferrie (2013). “Intergenerational Occupational Mobility in Great Britain and the United States since 1850.” *American Economic Review* 103(4): 1109–1137.

Menchik, P. L. (1979). “Inter-generational Transmission of Inequality: An Empirical Study of Wealth Mobility”. *Economica* 46(184): 349–362.

Mulligan, C. (1997). *Parental Priorities and Economic Inequality*, University of Chicago Press, Chicago.

Ohlsson, H., J. Roine, D. Waldenström (2014). “Inherited wealth over the path of development: Sweden, 1810–2010”, Working Paper, Uppsala University.

Piketty, T. (2011). “On the Long-Run Evolution of Inheritance: France 1820–2050” *Quarterly Journal of Economics* 126(3): 1071–1131.

Piketty, T. (2014), *Capital in the 21st century*, Belknap, Cambridge, MA.

Piketty, T. and G. Zucman (2014), “Capital is Back: Wealth-Income Ratios in Rich Countries, 1700–2010”. *Quarterly Journal of Economics* 129(3): 1255–1310.

Piketty, T., G. Zucman (2015). “Wealth and Inheritance”, forthcoming as chapter in Atkinson, A.B., F. Bourguignon (eds.), *Handbook of Income Distribution. Vol. 2*, Amsterdam, North-Holland.

Solon, G.. (1999). “Intergenerational Mobility in the Labor Market.” in: O. Ashenfelter and D. Card (Eds.), *Handbook of Labor Economics, Vol. 3*. Amsterdam: Elsevier.

Solon, G. (2013). “Theoretical Models of Inequality Transmission across Multiple Generations.” *NBER Working Paper* 18790.

Shorrocks, A. (1976). “The Age-Wealth Relationship: A Cross-Section and Cohort Analysis”. *Review of Economics and Statistics* 57(2): 155–163.

SOU (1969). *Kapitalbeskattningen.* Betänkande av Kapitalskatteberedningen, SOU 1969:54, Norstedt, Stockholm.

Stuhler, J. (2013). “Mobility Across Multiple Generations: The Iterated Regression Fallacy.” IZA Working Paper 7072.

Thurow, L. (1975). *Generating Inequality*. New York: Basic Books.

Wahl, J. B. (2002). "From Riches to Riches: Intergenerational Transfers and the Evidence from Estate Tax Returns". *Social Science Quarterly* 84(2): 278–296.

de Wolff, P. and A. R. D. van Slijpe (1973). "The Relation between Income, Intelligence, Education and Social Background". *European Economic Review* 4(3): 235–264.

Wolff, E. N. and M. Gittleman (2014). "Inheritances and the distribution of wealth or whatever happened to the great inheritance boom?". *Journal of Economic Inequality* 12(4): 439–468.

Table 1a: Summary statistics, wealth variables

	Mean (s.d.)	p10	p25	p50	p75	p90	Obs.
1st generation							
Wealth	148.1	0	0	0	38.06	171.3	1748
	(3486.1)						
Wealth, censored	224.8	0	0	0	38.06	171.3	1748
	(3336.4)						
Wealth, capitalized	41.63	0	0	0	0	26.05	1809
	(540.6)						
Estate wealth	197.9	0	14.89	67.53	187.6	451.3	2168
	(548.8)						
2nd generation							
Wealth	251.0	-3.25	15.8	119.0	341.4	669.5	1356
	(431.2)						
Wealth, censored	262.0	0	18.8	121.0	342.5	670.5	1356
	(407.7)						
Estate wealth	453.4	0	7.48	154.8	627.1	1242.3	412
	(753.6)						
Inheritance	111.9	8.00	20.3	47.2	114.0	270.6	1024
	(203.2)						
3rd generation							
Wealth	870.4	-165.9	-11.97	303.6	857.6	1757.7	4979
	(6947.4)						
Wealth, censored	941.5	0	14.50	331.7	865.7	1764.9	4979
	(6935.8)						
Inheritance	298.5	11.03	26.08	60.12	102.9	260.7	393
	(1176.0)						
4th generation							
Wealth	95.41	-116.5	0	20.34	106.2	388.5	4657
	(445.1)						
Wealth, censored	135.0	0	0	20.34	106.2	388.5	4657
	(410.1)						

Notes: All values are reported in thousands of SEK in 2010 prices. *Wealth, censored* is wealth censored from below at zero. *Wealth, capitalized* is wealth calculated from capital income tax records assuming a three percent real rate of return.

Table 1b: Summary statistics, demographics

	1st generation		2nd generation		3rd generation		4th generation	
	Mean (s.d.)	Obs.	Mean (s.d.)	Obs.	Mean (s.d.)	Obs.	Mean (s.d.)	Obs.
Income	75.56 (138.9)	1286	207.5 (190.2)	1137	255.6 (273.5)	4764		
Years of schooling[a]	7.393 (1.730)	1121	10.0 (2.90)	1350	12.30 (2.607)	4950		
Birth year	1897.4 (7.053)	1748	1927.9 (0.41)	1356	1956.2 (6.529)	4979	1985.5 (8.459)	4657
Year of death	1974.1 (12.96)	1734	1997.8 (6.02)	497				
Share female	0.350 (0.477)	1748	0.47 (0.50)	1356	0.491 (0.500)	4979	0.489 (0.500)	4657

Notes: Income is reported in thousands of SEK in 2010 prices, and is measured in 1933 for the 1st generation, in 1968 for the 2nd generation, and in 2000 for the 3rd generation.
[a]Only fathers' schooling is included for the 1st generation.

Table 2: Wealth regressions

	2nd generation	3rd generation		
	(1)	(2)	(3)	(4)
	Panel A			
Parents	0.283***	0.379***		0.379***
	(0.033)	(0.022)		(0.025)
Grandparents			0.145***	0.034
			(0.031)	(0.028)
R^2	0.070	0.140	0.024	0.152
	Panel B: Capitalized wealth for 1st generation			
Parents	0.317***			0.380***
	(0.040)			(0.025)
Grandparents			0.178***	0.037
			(0.040)	(0.036)
R^2	0.060		0.024	0.152
N	1147	2579	2128	2100

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in column 1, and 3rd generation tax-register wealth in columns 2-4. Explanatory variables are tax-register wealth for parents and grandparents in panel A. In panel B, 1st generation wealth (parents in column 1, grandparents in columns 3-4) is calculated from capital income information. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.

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

Table 3: 4th generation wealth regressions

	(1) 4th gen	(2) 4th gen	(3) 4th gen	(4) 4th gen	(5) 4th gen
Panel A: All					
Parents	0.376***			0.347***	0.351***
	(0.019)			(0.020)	(0.023)
Grandparents		0.206***		0.093***	0.107***
		(0.023)		(0.021)	(0.025)
Great grandparents			0.088**		-0.002
			(0.030)		(0.025)
R^2	0.140	0.041	0.008	0.148	0.155
N	4657	4599	3801	4592	3755
Panel B: Age 18 and younger					
Parents	0.498***			0.457***	0.477***
	(0.028)			(0.030)	(0.033)
Grandparents		0.274***		0.120***	0.145***
		(0.036)		(0.031)	(0.036)
Great grandparents			0.125**		-0.015
			(0.042)		(0.035)
R^2	0.259	0.079	0.018	0.273	0.299
N	2014	1996	1668	1996	1657
Panel C: Older than 18					
Parents	0.277***			0.257***	0.245***
	(0.023)			(0.024)	(0.028)
Grandparents		0.146***		0.065**	0.073*
		(0.025)		(0.025)	(0.029)
Great grandparents			0.049		-0.003
			(0.033)		(0.030)
R^2	0.072	0.019	0.003	0.075	0.070
N	2643	2603	2133	2596	2098

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 4th generation tax-register wealth. Explanatory variables are tax-register wealth for parents, grandparents, and great grandparents. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of all included generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Estate wealth regressions

	Wealth in life				Estate wealth	
			Matched estate wealth sample			
	(1)	(2)	(3)	(4)	(5)	(6)
Parents	0.285***		0.284***		0.214***	
	(0.034)		(0.057)		(0.061)	
Parents, estate		0.321***		0.257***		0.152**
		(0.030)		(0.049)		(0.053)
R^2	0.072	0.106	0.078	0.085	0.045	0.035
N	1093	1093	412	412	412	412

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in columns 1-4, and 2nd generation estate wealth in columns 5-6. Explanatory variables are parental tax-register and estate wealth, respectively. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Wealth regressions at younger ages

	(1) 3rd gen	(2) 3rd gen	(3) 3rd gen
	Panel A		
Parents	0.251***		0.238***
	(0.022)		(0.026)
Grandparents		0.133***	0.062*
		(0.030)	(0.030)
R^2	0.067	0.017	0.069
	Panel B: Capitalized wealth for 1st generation		
Parents			0.246***
			(0.026)
Grandparents		0.132***	0.035
		(0.038)	(0.036)
R^2		0.012	0.067
N	2655	2184	2159

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 3rd generation tax-register wealth measured at a younger age than in Table 2 – see text for details. Explanatory variables are tax-register wealth for parents and grandparents in panel A. In panel B, Grandparents' wealth is calculated from capital income information. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.

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

Table 6: Inheritance regressions. Dep. var: child wealth.

	(1) Full	(2) Excluding inheritance	(3) Full	(4) Excluding inheritance
Panel A: 2nd generation				
Parents' wealth	0.246***	0.0429		
	(0.0386)	(0.0412)		
Parents' wealth, capitalized			0.284***	0.0813
			(0.0444)	(0.0501)
R^2	0.063	0.006	0.060	0.008
N	810	810	810	810
Panel B: 3rd generation				
	Only parental inheritance		Parental and grandparental inheritance	
Parents' wealth	0.380***	0.298***	0.432***	0.230**
	(0.069)	(0.075)	(0.054)	(0.080)
R^2	0.167	0.101	0.206	0.061
N	224	224	374	374

Notes: Standard errors in parentheses are clustered on family. In panel A, dependent variable is 2nd generation tax-register wealth in columns 1 and 4, and 2nd generation tax-register wealth with predicted inheritances subtracted in columns 2 and 4. In panel B, dependent variable is 3rd generation tax-register wealth including and excluding parental inheritances in columns 1 and 2; and including and excluding parental and grandparental inheritances in columns 3 and 4, respectively – see text for details on the inheritance adjustments. Explanatory variables are parental tax-register wealth and capital income-based wealth in panel A, and parental tax-register wealth in panel B. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.

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

Table 7: Mediating variables regressions

	(1) Wealth	(2) Income	(3) Schooling	(4) Wealth	(5) Wealth	(6) Wealth
Panel A: Regressions of 2nd generation on parents						
Parents' wealth	0.274***			0.226***	0.223***	0.210***
	(0.034)			(0.034)	(0.034)	(0.034)
Parents' income		0.183***		0.075*		0.041
		(0.031)		(0.032)		(0.033)
Parents' schooling			0.298***		0.046	0.030
			(0.031)		(0.033)	(0.033)
Own income				0.231***		0.193***
				(0.030)		(0.031)
Own schooling					0.195***	0.121***
					(0.031)	(0.032)
R^2	0.065	0.036	0.100	0.127	0.106	0.140
N	1103	1103	1103	1103	1103	1103
Panel B: Regressions of 3rd generation on parents						
Parents' wealth	0.388***			0.315***	0.322***	0.294***
	(0.022)			(0.023)	(0.024)	(0.024)
Parents' income		0.232***		0.028		0.011
		(0.023)		(0.023)		(0.024)
Parents' schooling			0.390***		-0.001	-0.010
			(0.022)		(0.023)	(0.023)
Own income				0.261***		0.225***
				(0.019)		(0.021)
Own schooling					0.204***	0.126***
					(0.023)	(0.024)
R^2	0.148	0.052	0.157	0.216	0.183	0.227
N	2490	2490	2490	2490	2490	2490
Panel C: Regressions of 3rd generation on grandparents						
Grandparents' wealth	0.143***			0.077**	0.099***	0.069*
	(0.032)			(0.029)	(0.030)	(0.029)
Grandparents' income		0.148***		0.092***		0.069*
		(0.026)		(0.027)		(0.028)
Grandparents' schooling			0.188***		0.024	-0.011
			(0.028)		(0.029)	(0.029)
Own income				0.314***		0.243***
				(0.022)		(0.024)
Own schooling					0.301***	0.200***
					(0.024)	(0.026)
R^2	0.025	0.026	0.038	0.138	0.114	0.170
N	2000	2000	2000	2000	2000	2000
Panel D: Regressions of 3rd generation on parents and grandparents						
Parents' wealth	0.392***			0.313***	0.328***	0.295***
	(0.025)			(0.027)	(0.027)	(0.027)
Grandparents' wealth	0.028			-0.003	0.020	0.002
	(0.029)			(0.028)	(0.028)	(0.028)
Parents' income		0.205***		0.043		0.027
		(0.026)		(0.027)		(0.028)

	(1)	(2)	(3)	(4)	(5)	(6)
Grandparents' income		0.107***		0.053*		0.051
		(0.026)		(0.025)		(0.027)
Parents' schooling			0.370***		-0.000	-0.015
			(0.026)		(0.026)	(0.026)
Grandparents' schooling			0.071**		-0.001	-0.025
			(0.026)		(0.027)	(0.027)
Own income				0.248***		0.211***
				(0.022)		(0.024)
Own schooling					0.211***	0.129***
					(0.025)	(0.027)
R^2	0.163	0.062	0.165	0.230	0.201	0.242
N	1971	1971	1971	1971	1971	1971

Notes: Standard errors in parentheses are clustered on family. Dependent variable is tax-register wealth in columns 1 and 3-6, income in column 2, and schooling in column 3, for the 2nd generation in panel A, and for the 3rd generation in panels B-D. Explanatory variables are tax-register wealth, income, and schooling for parents and grandparents, and own income and schooling. All wealth variables are percentile ranked within birth cohort groups. Income is percentile ranked lifetime income, and schooling is percentile ranked years of completed schooling. All regressions include quadratic controls for birth year of all included generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

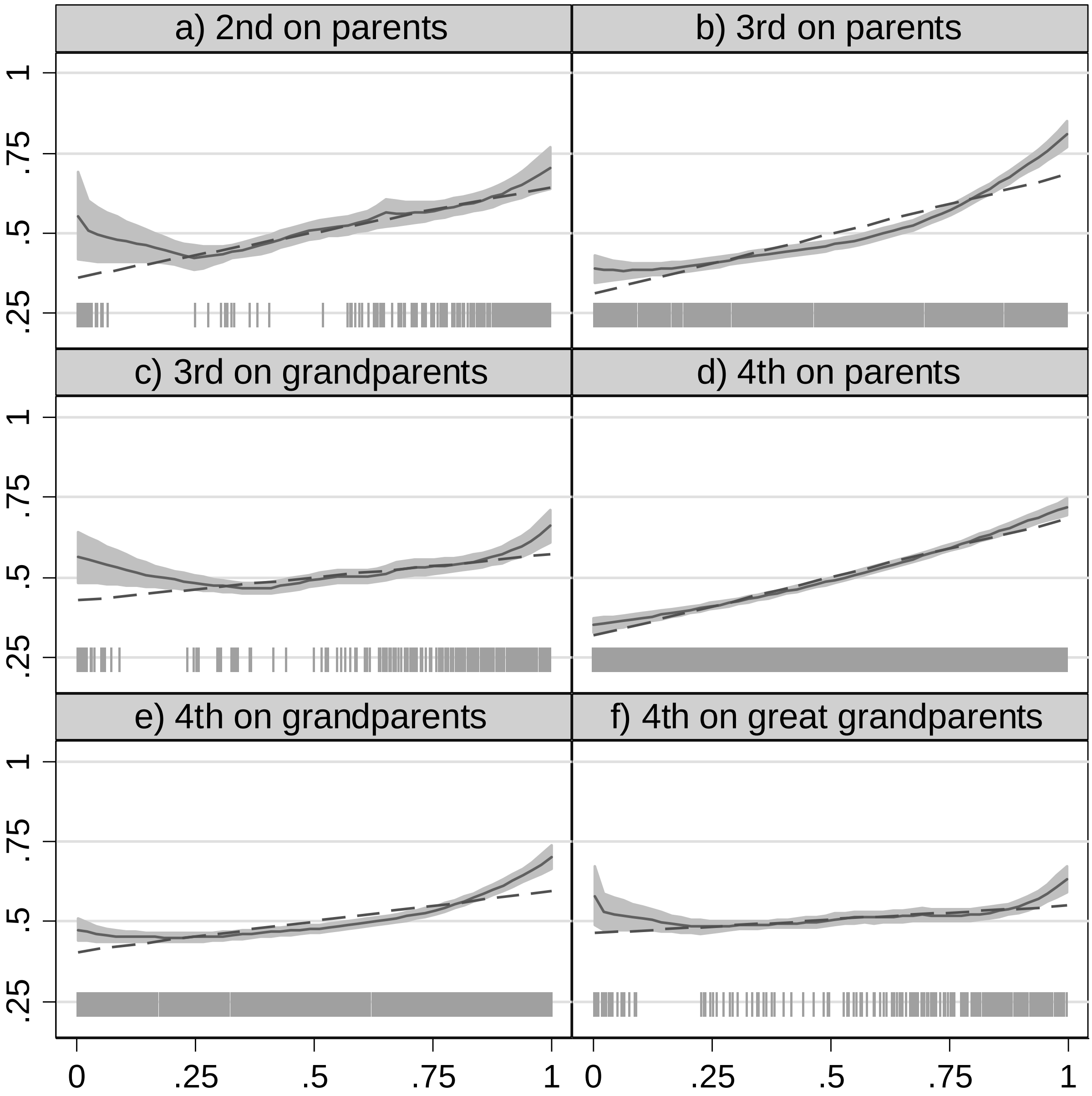

Figure 1: Kernel regressions

Notes: solid lines show results from bivariate local linear kernel regressions using an Epanechnikov kernel and rule-of-thumb bandwidth, with 95 percent confidence intervals shaded in grey. The x axis shows ancestors' wealth percentile rank, and the y axis shows descendants' wealth percentile rank. Dashed lines show best linear fits, and the vertical lines along the bottom show the distribution of observations across.

Appendix - Not intended for print publication

Appendix A: Additional results

Table A1: Wealth regressions, three-generation panel

	2nd generation	3rd generation		
	(1)	(2)	(3)	(4)
	Panel A			
Parents	0.278***	0.387***		0.382***
	(0.037)	(0.026)		(0.027)
Grandparents			0.114***	0.036
			(0.033)	(0.031)
R^2	0.067	0.138	0.015	0.143
	Panel B: Capitalized wealth for 1st generation			
Parents	0.318***			0.377***
	(0.045)			(0.027)
Grandparents			0.175***	0.070
			(0.040)	(0.038)
R^2	0.059		0.020	0.144
N	920	1939	1939	1939

Notes: The sample is restricted to only include families where we have wealth observations on all three generations. In column 1, only individuals who have children with observed wealth in the 3rd generation are included, and in columns 2-4, only individuals who have a parent in the index generation with observed wealth, as well as grandparents with observed wealth, are included. Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in column 1, and 3rd generation tax-register wealth in columns 2-4. Explanatory variables are tax-register wealth for parents and grandparents in panel A. In panel B, 1st generation wealth (parents in column 1, grandparents in columns 3-4) is calculated from capital income information. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: Wealth regressions, four-generation panel

	2nd generation	3rd generation		
	(1)	(2)	(3)	(4)
Parents	0.273***	0.367***		0.357***
	(0.039)	(0.029)		(0.029)
Grandparents			0.130***	0.052
			(0.035)	(0.033)
R^2	0.066	0.129	0.023	0.137
N	843	1587	1587	1587

Notes: The sample is restricted to only include families where we have wealth observations on all four generations. In column 1, only individuals who have children with observed wealth in the 3rd generation and grandchildren with observed wealth in the 4th generation are included, and in columns 2-4, only individuals who have a parent in the index generation with observed wealth, as well as grandparents and children with observed wealth are included. Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in column 1, and 3rd generation tax-register wealth in columns 2-4. Explanatory variables are tax-register wealth for parents and grandparents. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: 4th generation wealth regressions, four-generation panel

	(1)	(2)	(3)	(4)	(5)
	4th gen	4th gen	4th gen	4th gen	4th gen
Parents	0.365***			0.327***	0.330***
	(0.025)			(0.026)	(0.026)

	(1)	(2)	(3)	(4)	(5)
Grandparents		0.231^{***}		0.128^{***}	0.127^{***}
		(0.029)		(0.027)	(0.028)
Great grandparents			0.067^{*}		-0.000
			(0.031)		(0.028)
R^2	0.133	0.051	0.004	0.147	0.148
N	3456	3456	3456	3456	3456

Notes: The sample is restricted to only include families where we have wealth observations on all four generations. To be included, an individual needs to have a grandparent with observed wealth in the index generation, as well as parents and great grandparents with observed wealth. Standard errors in parentheses are clustered on family. Dependent variable is 4th generation tax-register wealth. Explanatory variables are tax-register wealth for parents, grandparents and great grandparents. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: Spline regressions

	2nd generation	3rd generation		4th generation		
	(1)	(2)	(3)	(4)	(5)	(6)
Quartile	Parents	Parents	Grandparents	Parents	Grandparents	Great grandparents
1st	-0.534^{*}	0.110	-0.472^{*}	0.216^{*}	-0.067	-0.300
	(0.244)	(0.139)	(0.207)	(0.094)	(0.135)	(0.171)
2nd	0.770^{***}	0.235^{*}	0.229	0.266^{**}	0.173	0.256^{*}
	(0.227)	(0.107)	(0.174)	(0.082)	(0.100)	(0.129)
3rd	-0.161	0.331^{**}	-0.036	0.476^{***}	0.108	-0.174
	(0.216)	(0.100)	(0.175)	(0.085)	(0.096)	(0.147)
4th	0.611^{**}	1.077^{***}	0.526^{**}	0.564^{***}	0.776^{***}	0.440^{*}
	(0.188)	(0.120)	(0.185)	(0.132)	(0.149)	(0.195)
R^2	0.082	0.163	0.033	0.145	0.055	0.012
N	1147	2579	2128	4657	4599	3801

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in column 1, 3rd generation tax-register wealth in columns 2-3, and 4th generation tax-register wealth in columns 4-6. Explanatory variables are spline segments for each quartile of tax-register wealth for parents in columns 1, 2, and 4; grandparents in columns 3 and 5; and great grandparents in column 6. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: Nonlinear wealth regressions

	2nd generation in top decile	3rd generation in top decile		
	(1)	(2)	(3)	(4)
Parents in top decile	0.052*	0.268***		0.276***
	(0.026)	(0.036)		(0.038)
Grandparents in top decile			0.058**	0.024
			(0.022)	(0.020)
R^2	0.024	0.061	0.009	0.071
N	1490	2751	2600	2600

Notes: Standard errors in parentheses are clustered on family. Dependent variable is and indicator variable equal to one if the 2nd generation individual is in the top decile of the tax-register distribution, and zero otherwise in column 1, and the corresponding indicator variable for the 3rd generation in columns 2-4. Explanatory variables are top decile indicator variables for parents and grandparents. All regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6: 4th generation nonlinear wealth regressions

	(1)	(2)	(3)	(4)	(5)
	Dep. var: 4th gen in top decile				
Parents in top decile	0.292***	0.291***	0.315***		
	(0.034)	(0.032)	(0.034)		
Grandparents in top decile	0.125***	0.117***		0.174***	
	(0.033)	(0.031)		(0.036)	
Great grandparents in top decile	-0.010				0.021
	(0.016)				(0.017)
R^2	0.101	0.100	0.088	0.029	0.002
N	4536	4782	4787	4782	4536

Notes: Standard errors in parentheses are clustered on family. Dependent variable is and indicator variable equal to one if the4th generation individual is in the top decile of the tax-register distribution, and zero otherwise. Explanatory variables are corresponding top decile indicator variables for parents, grandparents, and great grandparents. All regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7a: Transition matrix, 1st to 2nd generation

	Wealth quintile, 2nd gen					
Wealth quintile, parents	1	2	3	4	5	Total
1	21.21	15.15	21.21	24.24	18.18	100.00
2	26.35	22.16	20.24	18.15	13.09	100.00
3	19.13	15.65	29.57	17.39	18.26	100.00
4	13.16	16.84	21.58	24.74	23.68	100.00
5	8.47	17.37	16.53	22.46	35.17	100.00

Notes: The cell in row *i* and column *j* gives the conditional percentage probability of an individual in the 2nd generation being in the *j*th wealth quintile given that their parents were in the *i*th wealth quintile.

Table A7b: Transition matrix, 2nd to 3rd generation

	Wealth quintile, 3rd gen					
Wealth quintile, parents	1	2	3	4	5	Total
1	28.54	29.72	20.08	12.20	9.45	100.00
2	25.54	26.52	23.58	14.15	10.22	100.00

3	23.67	18.37	21.02	23.30	13.64	100.00
4	15.86	17.41	21.66	26.11	18.96	100.00
5	5.42	13.54	11.99	22.82	46.23	100.00

Notes: The cell in row *i* and column *j* gives the conditional percentage probability of an individual in the 3rd generation being in the *j*th wealth quintile given that their parents were in the *i*th wealth quintile.

Table A7c: Transition matrix, 1st to 3rd generation

	Wealth quintile, 3rd gen					
Wealth quintile, grandparents	1	2	3	4	5	Total
1	13.56	18.64	18.64	22.03	27.12	100.00
2	20.24	23.00	22.21	17.28	17.28	100.00
3	21.25	27.19	19.06	20.94	11.56	100.00
4	15.91	18.51	21.75	22.73	21.10	100.00
5	18.69	14.02	14.25	24.53	28.50	100.00

Notes: The cell in row *i* and column *j* gives the conditional percentage probability of an individual in the 3rd generation being in the *j*th wealth quintile given that their grandparents were in the *i*th wealth quintile.

Table A7d: Transition matrix, 3rd to 4th generation

	Wealth quintile, 4th gen					
Wealth quintile, parents	1	2	3	4	5	Total
1	31.20	29.89	20.11	10.76	8.04	100.00
2	25.70	23.77	24.20	16.17	10.17	100.00
3	20.11	19.35	25.08	20.54	14.92	100.00
4	14.16	14.48	18.96	29.29	23.11	100.00
5	12.25	9.16	12.25	22.79	43.56	100.00

Notes: The cell in row *i* and column *j* gives the conditional percentage probability of an individual in the 4th generation being in the *j*th wealth quintile given that their parents were in the *i*th wealth quintile.

Table A7e: Transition matrix, 2nd to 4th generation

Wealth quintile, grandparents	Wealth quintile, 4th gen 1	2	3	4	5	Total
1	24.35	23.49	19.83	17.24	15.09	100.00
2	24.50	21.85	20.42	17.88	15.34	100.00
3	20.52	20.41	23.34	19.44	16.29	100.00
4	20.59	17.12	21.24	21.67	19.39	100.00
5	12.92	13.14	15.64	24.00	34.31	100.00

Notes: The cell in row *i* and column *j* gives the conditional percentage probability of an individual in the 4th generation being in the *j*th wealth quintile given that their grandparents were in the *i*th wealth quintile.

Table A7f: Transition matrix, 1st to 4th generation

Wealth quintile, great grandparents	Wealth quintile, 4th gen 1	2	3	4	5	Total
1	19.42	17.48	20.39	17.48	25.24	100.00
2	21.32	19.90	20.01	19.19	19.57	100.00
3	19.19	24.35	18.06	19.68	18.71	100.00
4	19.40	16.60	22.20	19.80	22.00	100.00
5	18.01	17.34	17.61	22.04	25.00	100.00

Notes: The cell in row *i* and column *j* gives the conditional percentage probability of an individual in the 4th generation being in the *j*th wealth quintile given that their great grandparents were in the *i*th wealth quintile.

Table A8: Controlling for inheritance polynomial.

	(1)	(2)	(3)	(4)	(5)
Polynomial degree	None	1st	2nd	3rd	4th
Panel A: 2nd generation					
Parents' wealth	0.248***	0.140***	0.101*	0.0837*	0.0800
	(0.0379)	(0.0406)	(0.0417)	(0.0414)	(0.0417)
R^2	0.061	0.110	0.122	0.127	0.128
Parents' wealth,	0.276***	0.150**	0.103*	0.0869	0.0839
capitalized	(0.0439)	(0.0464)	(0.0484)	(0.0480)	(0.0482)
R^2	0.055	0.108	0.121	0.126	0.128
N	861	861	861	861	861
Panel B: 3rd generation, only parental inheritance					
Parents' wealth	0.380***	0.363***	0.327***	0.311***	0.312***
	(0.069)	(0.070)	(0.076)	(0.079)	(0.079)
R^2	0.167	0.177	0.186	0.191	0.200
N	224	224	224	224	224
Panel C: 3rd generation, parental and grandparental inheritance					
Parents' wealth	0.432***	0.400***	0.374***	0.377***	0.379***
	(0.054)	(0.061)	(0.066)	(0.072)	(0.072)
R^2	0.206	0.223	0.228	0.232	0.239
N	374	374	374	374	374

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in panel A, and 3rd generation tax-register wealth in panels B and C. Explanatory variables are tax-register and capital income based wealth for parents. In columns 2-5, successively higher-order polynomials in inheritances are included as controls. In panels A and B, only parental inheritances are included, while in panel C parental and grandparental inheritances are included. Panel C includes all individuals with observations on *either* parental or grandparental inheritance. When one inheritance variable is missing, it is set to zero, and the regressions also include indicator variables for each inheritance being missing. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A9: Inheritance regression, interaction

	1985 wealth		1988 wealth		1991 wealth	
	(1)	(2)	(3)	(4)	(5)	(6)
Parents' wealth	0.214***	0.072	0.253***	0.144	0.266***	0.0667
	(0.033)	(0.083)	(0.034)	(0.106)	(0.034)	(0.159)
Parents deceased		-0.057		0.029		-0.094
		(0.060)		(0.076)		(0.110)
Interaction		0.168		0.123		0.208
		(0.090)		(0.111)		(0.162)
Main + interaction		0.241***		0.267***		0.274***
		(0.036)		(0.035)		(0.035)
R^2	0.052	0.056	0.065	0.070	0.072	0.073
N	1146	1146	1122	1122	1075	1075

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth measured in 1985 in columns 1,2 in 1988 in columns 3-4, and in 1991 in columns 5-6. Explanatory variables are tax-register wealth for parents; an indicator variable equal to one if the parents' year of death is at or before the wealth year for the children, and an interaction term between these two variables. "Main + interaction" is the sum of the main and interaction coefficients. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A10: IV regressions

	(1) 3rd gen	(2) 4th gen
Parents	0.490***	0.648***
	(0.094)	(0.067)
R^2	0.131	0.066
N	2100	4592

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 3rd generation tax-register wealth in column 1, and 4th generation estate wealth in column 2. Explanatory variable is parental tax-register wealth, instrumented with grandparental tax-register wealth (first-stage F=138 for column 1, F=445 for column 2) . All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.

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

Appendix B: Sensitivity analyses

Table B1: Wealth regressions, wealth variables censored at zero

	2nd generation	3rd generation		
	(1)	(2)	(3)	(4)
	Panel A			
Parents	0.305***	0.402***		0.400***
	(0.033)	(0.021)		(0.024)
Grandparents			0.176***	0.044
			(0.032)	(0.029)
R^2	0.078	0.158	0.033	0.173
	Panel B: Capitalized wealth for 1st generation			
Parents	0.321***			0.405***
	(0.039)			(0.024)
Grandparents			0.184***	0.029
			(0.040)	(0.036)
R^2	0.062		0.027	0.172
N	1147	2579	2128	2100

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in column 1, and 3rd generation tax-register wealth in columns 2-4. Explanatory variables are tax-register wealth for parents and grandparents in panel A. In panel B, 1st generation wealth (parents in column 1, grandparents in columns 3-4) is calculated from capital income information. All wealth variables are censored from below at zero and percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.

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

Table B2: 4th generation wealth regressions, wealth variables censored at zero

	(1) 4th gen	(2) 4th gen	(3) 4th gen	(4) 4th gen	(5) 4th gen
Panel A: All					
Parents	0.409***			0.380***	0.387***
	(0.018)			(0.019)	(0.022)
Grandparents		0.221***		0.085***	0.092***
		(0.022)		(0.020)	(0.024)
Great grandparents			0.103***		0.003
			(0.031)		(0.025)
R^2	0.176	0.050	0.010	0.183	0.187
N	4657	4599	3801	4592	3755
Panel B: Age 18 and younger					
Parents	0.513***			0.469***	0.491***
	(0.027)			(0.029)	(0.032)
Grandparents		0.294***		0.116***	0.138***
		(0.034)		(0.031)	(0.036)
Great grandparents			0.135**		-0.011
			(0.044)		(0.037)
R^2	0.269	0.088	0.019	0.281	0.309
N	2014	1996	1668	1996	1657
Panel C: Older than 18					
Parents	0.326***			0.307***	0.298***
	(0.021)			(0.022)	(0.026)
Grandparents		0.160***		0.056*	0.051
		(0.024)		(0.023)	(0.028)
Great grandparents			0.068*		0.008
			(0.033)		(0.029)
R^2	0.113	0.026	0.005	0.116	0.105
N	2643	2603	2133	2596	2098

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 4th generation tax-register wealth. Explanatory variables are tax-register wealth for parents, grandparents, and great grandparents. All wealth variables are censored from below at zero and percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of all included generations.

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

Table B3: Mediating variables regressions, wealth variables censored at zero

	(1) Wealth	(2) Income	(3) Schooling	(4) Wealth	(5) Wealth	(6) Wealth
Panel A: Regressions of 2nd generation on parents						
Parents' wealth	0.296***			0.240***	0.238***	0.221***
	(0.034)			(0.035)	(0.034)	(0.034)
Parents' income		0.183***		0.076*		0.038
		(0.031)		(0.032)		(0.033)
Parents' schooling			0.298***		0.049	0.034
			(0.031)		(0.033)	(0.033)
Own income				0.238***		0.196***
				(0.029)		(0.030)
Own schooling					0.207***	0.133***
					(0.031)	(0.032)
R^2	0.074	0.036	0.100	0.139	0.120	0.155
N	1103	1103	1103	1103	1103	1103
Panel B: Regressions of 3rd generation on parents						
Parents' wealth	0.408***			0.337***	0.334***	0.310***
	(0.021)			(0.022)	(0.023)	(0.023)
Parents' income		0.232***		0.005		-0.012
		(0.023)		(0.023)		(0.023)
Parents' schooling			0.390***		-0.014	-0.018
			(0.022)		(0.023)	(0.023)
Own income				0.288***		0.247***
				(0.019)		(0.020)
Own schooling					0.231***	0.147***
					(0.022)	(0.023)
R^2	0.164	0.052	0.157	0.244	0.207	0.259
N	2490	2490	2490	2490	2490	2490
Panel C: Regressions of 3rd generation on grandparents						
Grandparents' wealth	0.173***			0.096**	0.122***	0.086**
	(0.032)			(0.030)	(0.030)	(0.029)
Grandparents' income		0.148***		0.081**		0.056*
		(0.026)		(0.027)		(0.028)
Grandparents' schooling			0.188***		0.013	-0.017
			(0.028)		(0.028)	(0.028)
Own income				0.337***		0.259***
				(0.022)		(0.024)
Own schooling					0.328***	0.223***
					(0.023)	(0.025)
R^2	0.034	0.026	0.038	0.160	0.138	0.199
N	2000	2000	2000	2000	2000	2000
Panel D: Regressions of 3rd generation on parents and grandparents						
Parents' wealth	0.402***			0.330***	0.330***	0.307***
	(0.025)			(0.027)	(0.026)	(0.027)
Grandparents' wealth	0.038			0.002	0.033	0.009
	(0.030)			(0.029)	(0.029)	(0.029)
Parents' income		0.205***		0.015		-0.002

		(0.026)		(0.027)		(0.028)
Grandparents' income		0.107***		0.048		0.047
		(0.026)		(0.025)		(0.026)
Parents' schooling			0.370***		-0.010	-0.016
			(0.026)		(0.026)	(0.026)
Grandparents' schooling			0.071**		-0.009	-0.031
			(0.026)		(0.026)	(0.026)
Own income				0.274***		0.232***
				(0.022)		(0.023)
Own schooling					0.234***	0.149***
					(0.025)	(0.026)
R^2	0.179	0.062	0.165	0.256	0.224	0.272
N	1971	1971	1971	1971	1971	1971

Notes: Standard errors in parentheses are clustered on family. Dependent variable is tax-register wealth in columns 1 and 3-6, income in column 2, and schooling in column 3, for the 2nd generation in panel A, and for the 3rd generation in panels B-D. Explanatory variables are tax-register wealth, income, and schooling for parents and grandparents, and own income and schooling. All wealth variables are censored from below at zero and percentile ranked within birth cohort groups. Income is percentile ranked lifetime income, and schooling is percentile ranked years of completed schooling. All regressions include quadratic controls for birth year of all included generations.

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

Table B4: Wealth regressions, log

	2nd generation	3rd generation		
	(1)	(2)	(3)	(4)
	Panel A			
Parents	0.181***	0.319***		0.310***
	(0.047)	(0.030)		(0.055)
Grandparents			0.306***	0.179***
			(0.064)	(0.047)
R^2	0.070	0.105	0.109	0.154
N	407	1609	607	562
	Panel B: Capitalized wealth for 1st generation			
Parents	0.203***			0.327***
	(0.052)			(0.065)
Grandparents			0.193**	0.099*
			(0.068)	(0.048)
R^2	0.078		0.075	0.139
N	242		359	338

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in column 1, and 3rd generation tax-register wealth in columns 2-4. Explanatory variables are tax-register wealth for parents and grandparents in panel A. In panel B, 1st generation wealth (parents in column 1, grand-parents in columns 3-4) is calculated from capital income information. All wealth variables are log transformed, and all regressions include quadratic controls for birth year of both generations.

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

Table B5: 4th generation wealth regressions, log

	(1) 4th gen	(2) 4th gen	(3) 4th gen	(4) 4th gen	(5) 4th gen
Panel A: All					
Parents	0.449***			0.426***	0.461***
	(0.037)			(0.043)	(0.072)
Grandparents		0.199***		0.066*	0.211**
		(0.034)		(0.030)	(0.076)
Great grandparents			0.165**		-0.021
			(0.055)		(0.048)
R^2	0.256	0.176	0.122	0.248	0.229
N	2561	2583	987	2234	828
Panel B: Age 18 and younger					
Parents	0.473***			0.442***	0.492***
	(0.048)			(0.051)	(0.091)
Grandparents		0.246***		0.074	0.151
		(0.049)		(0.043)	(0.105)
Great grandparents			0.172*		-0.011
			(0.070)		(0.056)
R^2	0.183	0.064	0.054	0.179	0.208
N	1393	1438	604	1240	501
Panel C: Older than 18					
Parents	0.404***			0.390***	0.409***
	(0.055)			(0.071)	(0.104)
Grandparents		0.161***		0.067	0.299**
		(0.038)		(0.038)	(0.092)
Great grandparents			0.131*		-0.050
			(0.064)		(0.078)
R^2	0.212	0.152	0.123	0.212	0.210
N	1168	1145	383	994	327

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 4th generation tax-register wealth. Explanatory variables are tax-register wealth for parents, grandparents, and great grandparents. All wealth variables are log transformed, and all regressions include quadratic controls for birth year of all included generations.

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

Table B6: Mediating variables regressions, log

	(1) Wealth	(2) Income	(3) Schooling	(4) Wealth	(5) Wealth	(6) Wealth
Panel A: Regressions of 2nd generation on parents						
Parents' wealth	0.215***			0.221***	0.202***	0.216***
	(0.054)			(0.061)	(0.060)	(0.062)
Parents' income		0.168**		-0.045		-0.032
		(0.058)		(0.093)		(0.106)
Parents' schooling			0.385***		-0.042	-0.050
			(0.098)		(0.041)	(0.044)
Own income				0.193		0.176
				(0.119)		(0.127)
Own schooling					0.061	0.049
					(0.040)	(0.042)
R^2	0.151	0.087	0.184	0.168	0.171	0.184
N	146	146	146	146	146	146
Panel B: Regressions of 3rd generation on parents						
Parents' wealth	0.341***			0.303***	0.290***	0.281***
	(0.058)			(0.061)	(0.059)	(0.060)
Parents' income		0.143***		0.087		0.052
		(0.040)		(0.051)		(0.055)
Parents' schooling			0.369***		0.032	0.024
			(0.035)		(0.018)	(0.020)
Own income				0.134**		0.111*
				(0.043)		(0.043)
Own schooling					0.044*	0.028
					(0.020)	(0.020)
R^2	0.113	0.022	0.194	0.133	0.129	0.139
N	638	638	638	638	638	638
Panel C: Regressions of 3rd generation on grandparents						
Grandparents' wealth	0.244***			0.176**	0.236***	0.194**
	(0.060)			(0.062)	(0.060)	(0.061)
Grandparents' income		0.087		0.150		0.145
		(0.052)		(0.080)		(0.096)
Grandparents' schooling			0.237***		-0.020	-0.052
			(0.070)		(0.038)	(0.044)
Own income				0.167		0.102
				(0.096)		(0.097)
Own schooling					0.122***	0.101**
					(0.029)	(0.032)
R^2	0.112	0.018	0.090	0.146	0.167	0.183
N	241	241	241	241	241	241
Panel D: Regressions of 3rd generation on parents and grandparents						
Parents' wealth	0.262***			0.187*	0.128	0.114
	(0.076)			(0.082)	(0.080)	(0.082)
Grandparents' wealth	0.124*			0.078	0.140*	0.114
	(0.060)			(0.057)	(0.060)	(0.060)
Parents' income		0.226*		0.030		-0.021

		(0.100)		(0.124)		(0.126)
Grandparents' income		0.039		0.182		0.142
		(0.061)		(0.100)		(0.117)
Parents' schooling			0.405***		0.084	0.067
			(0.075)		(0.043)	(0.047)
Grandparents' schooling			0.019		-0.021	-0.044
			(0.078)		(0.038)	(0.043)
Own income				0.113		0.051
				(0.113)		(0.108)
Own schooling					0.098**	0.091**
					(0.033)	(0.033)
R^2	0.146	0.095	0.304	0.185	0.223	0.235
N	176	176	176	176	176	176

Notes: Standard errors in parentheses are clustered on family. Dependent variable is tax-register wealth in columns 1 and 3-6, income in column 2, and schooling in column 3, for the 2nd generation in panel A, and for the 3rd generation in panels B-D. Explanatory variables are tax-register wealth, income, and schooling for parents and grandparents, and own income and schooling. All wealth variables are log transformed. Income is log transformed lifetime income, and schooling is years of completed schooling. All regressions include quadratic controls for birth year of all included generations.

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

Table B7: Wealth regressions, IHS

	2nd generation	3rd generation		
	(1)	(2)	(3)	(4)
	Panel A			
Parents	0.187***	0.266***		0.261***
	(0.034)	(0.031)		(0.036)
Grandparents			0.095*	0.048
			(0.043)	(0.041)
R^2	0.030	0.045	0.014	0.050
	Panel B: Capitalized wealth for 1st generation			
Parents	0.268***			0.259***
	(0.041)			(0.036)
Grandparents			0.167**	0.082
			(0.062)	(0.061)
R^2	0.030		0.015	0.050
N	1147	2579	2128	2100

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in column 1, and 3rd generation tax-register wealth in columns 2-4. Explanatory variables are tax-register wealth for parents and grandparents in panel A. In panel B, 1st generation wealth (parents in column 1, grandparents in columns 3-4) is calculated from capital income information. All wealth variables are inverse hyperbolic sine transformed, and all regressions include quadratic controls for birth year of both generations.

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

Table B8: 4th generation wealth regressions, IHS

	(1) 4th gen	(2) 4th gen	(3) 4th gen	(4) 4th gen	(5) 4th gen
Panel A: All					
Parents	0.190***			0.182***	0.186***
	(0.015)			(0.015)	(0.017)
Grandparents		0.100***		0.062**	0.060*
		(0.023)		(0.022)	(0.025)
Great grandparents			0.056*		0.020
			(0.028)		(0.025)
R^2	0.164	0.124	0.119	0.164	0.166
N	4657	4599	3801	4592	3755
Panel B: Age 18 and younger					
Parents	0.156***			0.151***	0.159***
	(0.015)			(0.015)	(0.017)
Grandparents		0.079***		0.050*	0.050*
		(0.024)		(0.020)	(0.021)
Great grandparents			0.051*		0.021
			(0.023)		(0.021)
R^2	0.141	0.029	0.023	0.150	0.172
N	2014	1996	1668	1996	1657
Panel C: Older than 18					
Parents	0.218***			0.208***	0.210***
	(0.021)			(0.022)	(0.025)
Grandparents		0.119***		0.072*	0.073
		(0.032)		(0.032)	(0.037)
Great grandparents			0.064		0.021
			(0.047)		(0.043)
R^2	0.080	0.045	0.040	0.084	0.086
N	2643	2603	2133	2596	2098

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 4th generation tax-register wealth. Explanatory variables are tax-register wealth for parents, grandparents, and great grandparents. All wealth variables are inverse hyperbolic sine transformed, and all regressions include quadratic controls for birth year of all included generations.

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

Table B9: Mediating variables regressions, IHS

	(1) Wealth	(2) Income	(3) Schooling	(4) Wealth	(5) Wealth	(6) Wealth
Panel A: Regressions of 2nd generation on parents						
Parents' wealth	0.188***			0.158***	0.166***	0.152***
	(0.035)			(0.036)	(0.035)	(0.036)
Parents' income		0.223***		1.412*		1.355
		(0.041)		(0.641)		(0.724)
Parents' schooling			0.573***		0.059	-0.093
			(0.053)		(0.153)	(0.162)
Own income				1.399***		1.183**
				(0.409)		(0.426)
Own schooling					0.260**	0.141
					(0.090)	(0.095)
R^2	0.029	0.058	0.174	0.047	0.038	0.049
N	1103	1103	1103	1103	1103	1103
Panel B: Regressions of 3rd generation on parents						
Parents' wealth	0.278***			0.190***	0.215***	0.175***
	(0.031)			(0.029)	(0.030)	(0.028)
Parents' income		0.257***		2.523***		1.930***
		(0.025)		(0.492)		(0.543)
Parents' schooling			0.412***		0.280**	0.090
			(0.021)		(0.101)	(0.102)
Own income				5.298***		4.685***
				(0.426)		(0.463)
Own schooling					0.839***	0.420***
					(0.099)	(0.104)
R^2	0.048	0.058	0.207	0.141	0.093	0.148
N	2490	2490	2490	2490	2490	2490
Panel C: Regressions of 3rd generation on grandparents						
Grandparents' wealth	0.101*			0.045	0.057	0.038
	(0.044)			(0.040)	(0.042)	(0.040)
Grandparents' income		0.197***		1.295		1.072
		(0.033)		(0.669)		(0.820)
Grandparents' schooling			0.308***		0.072	-0.165
			(0.039)		(0.177)	(0.219)
Own income				6.118***		5.210***
				(0.503)		(0.548)
Own schooling					1.052***	0.603***
					(0.107)	(0.114)
R^2	0.015	0.029	0.077	0.112	0.068	0.126
N	2000	2000	2000	2000	2000	2000
Panel D: Regressions of 3rd generation on parents and grandparents						
Parents' wealth	0.272***			0.178***	0.220***	0.169***
	(0.036)			(0.034)	(0.035)	(0.033)
Grandparents' wealth	0.052			0.006	0.007	0.002
	(0.043)			(0.041)	(0.042)	(0.041)
Parents' income		0.229***		3.365***		2.859***

		(0.029)		(0.592)		(0.644)
Grandparents' income		0.131***		0.228		0.251
		(0.033)		(0.657)		(0.800)
Parents' schooling			0.392***		0.323*	0.082
			(0.028)		(0.132)	(0.130)
Grandparents' schooling			0.065		-0.099	-0.203
			(0.038)		(0.191)	(0.214)
Own income				5.274***		4.710***
				(0.495)		(0.530)
Own schooling					0.863***	0.408***
					(0.113)	(0.116)
R^2	0.055	0.066	0.200	0.154	0.100	0.161
N	1971	1971	1971	1971	1971	1971

Notes: Standard errors in parentheses are clustered on family. Dependent variable is tax-register wealth in columns 1 and 3-6, income in column 2, and schooling in column 3, for the 2nd generation in panel A, and for the 3rd generation in panels B-D. Explanatory variables are tax-register wealth, income, and schooling for parents and grandparents, and own income and schooling. All wealth variables are inverse hyperbolic sine transformed. Income is inverse hyperbolic sine transformed lifetime income, and schooling is years of completed schooling. All regressions include quadratic controls for birth year of all included generations.

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

Table B10: Wealth regressions, with corrected real estate value for 2nd generation (1985 and 1988)

	2nd generation	3rd generation	
	(1)	(2)	(3)
	Panel A		
Parents	0.265***	0.385***	0.386***
	(0.033)	(0.021)	(0.024)
Grandparents			0.034
			(0.029)
R^2	0.065	0.143	0.156
	Panel B: Capitalized wealth for 1st generation		
Parents	0.291***		0.387***
	(0.040)		(0.024)
Grandparents			0.034
			(0.037)
R2	0.055	0.000	0.155
N	1147	2579	2100

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth in column 1, and 3rd generation tax-register wealth in columns 2-4. Explanatory variables are tax-register wealth for parents and grandparents in panel A. In panel B, 1st generation wealth (parents in column 1, grandparents in columns 3-4) is calculated from capital income information. 2nd generation wealth (dependent variables in column 1, and parental variables in columns 2-3) is based on 1985 and 1988 tax-register information, and has been corrected by adjusting real estate values up to market price. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B11: Wealth regressions, using single years for 2nd generation

	1985		1988		1991	
	(1)	(2)	(3)	(4)	(5)	(6)
	2nd gen	2nd gen	2nd gen	2nd gen	2nd gen	2nd gen
Parents	0.219***		0.258***		0.271***	
	(0.033)		(0.034)		(0.034)	
Parents, capitalized		0.261***		0.299***		0.315***
		(0.041)		(0.040)		(0.041)
R2	0.048	0.046	0.059	0.054	0.067	0.062
Obs.	1147	1147	1123	1123	1076	1076

Notes: Standard errors in parentheses are clustered on family. Dependent variable is 2nd generation tax-register wealth from 1985 in columns 1-2, from 1988 in columns 3-4, and from 1991 in columns 5-6. Explanatory variables are tax-register wealth and capital income based wealth for parents. All wealth variables are percentile ranked within birth cohort groups, and all regressions include quadratic controls for birth year of both generations.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$