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The implications of selective attrition for estimates of intergenerational elasticity of family income

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Abstract

Numerous studies have estimated a high intergenerational correlation in economic status. Such studies do not typically attend to potential biases that may arise due to survey attrition. Using the Panel Study of Income Dynamics – the data source most commonly used in prior studies – we demonstrate that attrition is particularly high for low-income adult children with low-income parents and particularly low for high-income adult children with high-income parents. Because of this pattern of attrition, intergenerational upward mobility has been overstated for low-income families and downward mobility has been understated for high-income families. The bias among low-income families is greater than the bias among high-income families implying that intergenerational elasticity in family income is higher than previous estimates with the Panel Study of Income Dynamics would suggest.

Keywords

intergenerational transmission; attrition; family income

1. Introduction

The intergenerational correlation in economic status in the United States is substantial and persists across all dimensions of economic well-being. Studies have examined earnings (e.g., Solon, 1992), occupation (e.g., Duncan, Feathermen, and Duncan, 1972), income (e.g., Chadwick and Solon, 2002), wealth (e.g., Charles and Hurst, 2003), and consumption (e.g., Waldkirch, Ng, and Cox, 2004). While the exact magnitude differs across domains, estimates of intergenerational elasticities are high — for earnings they typically range between 0.4 and 0.6. Moreover, international comparative estimates indicate that the intergenerational earnings elasticity in the United States is at least as high if not higher than in most other countries for which such data are available (Corak, 2004; Jantti, 2006).

Solon's (1992) seminal work estimating intergenerational earnings elasticities stimulated a series of studies on the topic using the Panel Study of Income Dynamics (PSID) to examine different points in the lifecycle, changes in intergenerational earnings elasticities over time, sons versus daughters, mothers versus fathers, and earnings versus total family income (Chadwick and Solon, 2002; Hertz, 2007; Mayer and Lopoo, 2005; Lee and Solon, 2009 among many others). These subsequent studies conclude that the intergenerational earnings elasticity is no lower than that estimated by Solon (1992), and if anything might be higher. Much of the work on intergenerational transmission of economic status has used the PSID because of its unique sample design. The PSID began with a sample of roughly 18,000 people in 1968 and follows not only the original 1968 sample members, but also individuals who were born to or adopted by the original sample members. Furthermore, as children leave their parents' household, they themselves are followed and information is collected throughout their lives. These design features imply that prospective reports of earnings, income, and numerous other dimensions of economic status are available on multiple generations of individuals within the same family. The PSID is not the only study that has been used to estimate intergenerational correlations in economic status. The National Longitudinal Surveys have also been used to exploit larger sample sizes (Zimmerman, 1992; Levine and Mazumder, 2007) and more recently, Social Security Earnings links with the Survey of Income and Program Participation have allowed for estimation of intergenerational earnings elasticities on a sample that is not intergenerational in its structure (Mazumder, 2005).

While the wave-to-wave response rate in the PSID is among the highest of any national survey in the world, with a rate of 95% – 98% in almost every wave since 1968 (Schoeni, Stafford, McGonagle, and Andreski, 2013), even with very high annual response rates, cumulative attrition over the more than 45-year history of the PSID is substantial. Among the roughly 18,000 individuals participating in the PSID in 1968, as of 2009, 25 percent had died, 25 percent were alive and participating in the study, 12 percent were explicitly dropped from the study in 1997, and the remaining 38 percent had attrited.

In a series of papers, Fitzgerald, Gottschalk, and Moffitt (1998a,b) and more recently Fitzgerald (2011) examine patterns of attrition in the PSID. They find attrition to be associated with observable characteristics, in particular higher attrition for lower income individuals, for men, and for people with more unstable earnings histories. At the same time, they generally conclude that cross-sectional representativeness of means using weighted samples as well as a variety of intergenerational parameter estimates such as intergenerational correlations in earnings, welfare receipt, and education are not significantly biased due to selective attrition (Fitzgerald, Gottschalk, and Moffitt, 1998b).

In this study, we focus on the impact of selective attrition on one key parameter of interest — intergenerational income elasticity. Unlike Fitzgerald, Gottschalk, and Moffitt (1998b), who focus on how one would create weights to account for selective attrition, we closely replicate earlier estimates of intergenerational income elasticity and examine how attrition varies across the distribution of parental income.³ We begin the study by examining whether income predicts subsequent attrition. While prior studies have found that attrition is higher among lower income individuals, we focus our attention on whether the effects of the

income of adult children on attrition vary across the distribution of parental income. As shown below, it is this differential effect that may lead to biased estimates of intergenerational transmission of family income. We then directly estimate intergenerational elasticities in family income separately for individuals who do and do not subsequently attrit from the PSID. Finally, we use intergenerational transition matrices to examine our findings on intergenerational elasticities more closely and to comment on income persistence across the range of parental income. A final section summarizes and discusses the implications of the findings.

2. Data

Our aim is to examine the effect of attrition on intergenerational income elasticity estimates, so we construct our sample to closely resemble that of Solon (1992) and Chadwick and Solon (2002). Our sample consists of individuals who are between 0 and 17 years of age in the 1968 PSID ($N = 8527$). We include in our sample only those individuals in the Survey Research Center (SRC) sample of the PSID — the equal probability weighted sample in 1968 ($N=3456$). In keeping with much of the literature on intergenerational elasticities in the PSID, we exclude individuals from the Survey of Economic Opportunity (SEO) sample — the low-income oversample — from our main analysis (see Solon, 1992 for explanation). In Section 4.4, we show the results of models in which the SEO sample is included.

Individuals in our sample are followed over time. Some of the individuals attrit from the survey and others remain in the survey. Within the group of individuals who attrit from the study there are individuals who attrit before they form their own household (or who attrit in the process of forming their own household) and individuals who attrit after forming their own household. Because we are investigating the intergenerational transmission of family income, we restrict our sample to those individuals for whom we observe family income in adulthood — that is those who eventually form their own household ($N = 2436$).⁴ Individuals who attrit before they form their own household usually do so because they are lost in the process of household formation, because their entire family attrits from the PSID, or, because of a divorce or separation, part of their family attrits from the PSID. These individuals are never observed to live in their own household and so we cannot obtain a measure of family income for these individuals that is distinct from their parent's family income.⁵ We only include individuals who report family income between the age of 25 and 40 ($N = 2291$) and those who do not have missing data on parental income ($N = 2088$).⁶ Of the 2088 individuals in our primary sample, 848 attrit at some point in the study and 1240

³Their estimates of intergenerational earnings elasticities are lower than those estimated by Solon (1992) and others because they control for educational attainment and race among other key covariates and because they use earnings at age 26 for children as their independent variable. If the relationship between lifetime earnings and earnings at 26 differs between attritors and non-attritors, using this early measure of earnings for children may lead to understating the impact of attrition on intergenerational earnings elasticities.

⁴A small number of children ($N = 25$) had not left their parental household by 2007 and are excluded from our analysis.

⁵There is one important exception to this rule. There are individuals who left the survey before 1992 and who were part of a recontact effort in the mid-1990s. Individuals who attrited but who were recontacted in the 1990s are part of our sample of individuals who attrit.

⁶Individuals ($N = 34$) who either leave the parental home after age 40 or who attrit prior to age 40 and are only recontacted after age 40 are excluded from the sample to be consistent with the age range for which we measure child income. To be consistent with the literature on intergenerational income elasticities we include only those individuals for whom we can calculate a five-year average of parental income. Four individuals with negative or zero income in their last year in the sample were also dropped.

never attrit from the study. Individuals who die or who are eliminated from the PSID in the 1997 sample reduction are not counted as attritors.

Means of selected variables separated by attrition are reported in Table 1 panel A. All income measures are expressed in 2007 dollars using the CPI-U. Attritors are more likely to be male, have less education, have lower income, and come from families with lower income than the whole sample. These differences are statistically significant. Attritors also have income measured at a younger age than non-attritors and than the sample overall. Those who never attrit are approximately 1.5 years older than the overall sample. The age difference is statistically significant. We discuss sensitivity analyses that reduce the age difference between samples in Section 3.2.

Many individuals who attrit do so before forming their own households ($N = 1020$), or they form their own household but attrit before age 25 ($N = 111$); therefore, it is important to understand that our results cannot address the effect of overall attrition, rather they only address the effect of attrition among those who remain in the sample until age 25 (or 30) and form their own household. In Section 4.4, we discuss possible effects of overall attrition and we check the sensitivity of our results to the inclusion of sample weights designed to account for attrition over time.

3. Methods

3.1. Main Analysis

We estimate three different types of models. First, we estimate models of individual attrition. The dependent variable is equal to one if the individual attrits from the PSID sample after they have formed their own household. We use linear probability models to estimate the effect of income of parents and children on attrition from the PSID sample.⁷ We focus on whether own family income predicts attrition and whether these effects vary across the distribution of parental income.

Second, we estimate models of intergenerational income elasticities. We follow Chadwick and Solon (2002) and Mayer and Lopoo (2005) closely estimating the following:

$$y_{1i} = \alpha + \rho y_{0i} + \varepsilon_i$$

in which y_{1i} is log family income of the child generation, and y_{0i} is the average of log family income of the 1968 head of household between 1967 and 1971.⁸ Like Chadwick and Solon (2002) we control for the age of both generations using a quadratic in age of the child at the time income is measured and average age of household head between 1967 and 1971. Chadwick and Solon (2002) and Mayer and Lopoo (2005) both use single-year measures of family income for the child generation. Chadwick and Solon (2002) use income in 1992 and Mayer and Lopoo (2005) use income at age 30. Because we replicate these papers closely, we also use a single-year measure of family income for the child but rather than measuring

⁷Probit models yield similar results.

⁸We exclude 204 people based on the restrictions on parent income. If instead we used a three-year average of parental income we would exclude 136 people. Results using this sample are similar.

income at a particular time t or age a , we follow individuals over the full PSID sample and use the last measurement of family income that is available between the age of 25 and 40. This method allows us to maximize the size of our sample by allowing individuals to remain in our sample even if they attrit before a particular year (1992 in the case of Chadwick and Solon (2002), or before age 30 in the case of Mayer and Lopoo (2005)). While maximizing our sample size, we minimize the age difference between the attriting and the non-attriting sample by restricting the age range at which we measure income. Using the last measure of family income also allows us to minimize life-cycle bias by measuring the family income of both parents and children around midlife (Haider and Solon, 2006; Grawe, 2006).

Finally, we estimate a series of family income transition matrices. These matrices are useful because our attrition models suggest that the effect of higher attrition at the bottom end of the parent/child income distribution on intergenerational income elasticity may be at least partially offset by lower attrition at the top end of the parent/child income distribution. We estimate age-adjusted family income transition matrices to correspond with our estimates of intergenerational income elasticity that also adjust for age.⁹ We compare intergenerational income persistence between groups of children by attrition. For all of our results we will follow Fitzgerald, Gottschalk, and Moffitt (1998b) and compare the overall sample to those who never attrit.¹⁰

3.2. Sensitivity Analysis

We explore the sensitivity of the estimates of intergenerational elasticities and transition matrices to a variety of variable definitions, sample restrictions, and to the use of sample weights. The sensitivity analyses are particularly important because they represent both an analysis of the robustness of our results and an analysis of some of the alternative measures of income and sample choices in the literature. Throughout the paper we show the results of our analysis under two different sensitivity analyses — one that uses a multi-year average for income for children and one that uses an age-restricted sample for both the parent and the child generation. These are described in detail below. In Section 4.4 we also show the results of our analysis using sample weights, and including the SEO sample.

3.2.1. Multi-year Income Averages for Children—Our choice of measure of family income for the child generation has the benefit of maximizing sample size while simultaneously limiting age differences between those who attrit and those who do not. However, it has several drawbacks. First, individuals who attrit tend to have more unstable earnings histories (Fitzgerald, Gottschalk, and Moffitt, 1998a). Because earnings are more unstable for attritors, the correlation between a single year of family income and permanent income for attritors may be lower than for non-attritors. Second, the timing of attrition may be associated with periods of high income volatility or with particularly high or low transitory income shocks. Because of these drawbacks, we test the sensitivity of our results

⁹We report transition matrices that are not age-adjusted in Appendix Tables 12a–12c.

¹⁰Fitzgerald, Gottschalk, and Moffitt (1998b) observe that the correct comparison is between the full sample and the non-attriting sample because both the attriting and non-attriting sample are biased by attrition. We follow their example but note that depending on the timing of studies using the PSID to measure intergenerational correlations, the sample in some papers may resemble the non-attriting sample more closely. We account for overlapping samples when calculating standard errors.

to using a multi-year average of family income for children to reduce the transitory income differences between those who attrit and those who never attrit.

If deviations in annual income from permanent income are classical in nature, including a multi-year average of parental income reduces attenuation bias in intergenerational elasticity estimates whereas including a multi-year average of child income will increase the precision of the estimates.¹¹ However, deviations from permanent income may not be classical in nature and using averages in this case will also affect the age of the sample which itself impacts intergenerational correlations (Grawe, 2006; Hertz, 2007). O'Neill et al. (2007) shows that transition matrices overstate mobility in the presence of classical measurement error in both the parent and child generation.

Multi-year averages for the parent generation are used consistently in the literature and we follow suit. Though not used by Solon (1992) or Mayer and Lopoo (2005), multi-year averages for the child generation are also common in the literature (Jantti et al., 2006; Mazumder, 2005; Corak and Heisz, 1999). To explore the sensitivity of the results to using average income of both generations, we measure income of the child y_{1t} as the average of the last three years of family income we observe prior to age 40. We include only those individuals with family income in each of the last three years and thus our sample size is restricted slightly ($N = 1982$). Individuals who are eliminated are those who are observed for fewer than three years prior to attriting or age 40, whichever comes first.

We show means of key variables with the sample in Table 1 panel B. The means are very close to that of the primary sample except that income for children is lower. In addition to smoothing out temporary income fluctuations, using a three-year average income for children reduces average age at which income is measured in the sample.

3.2.2. Age of Parents and Children—Table 1 panel A shows that when using the last observed measure of family income prior to the age of 40, the age difference overall and among those who never attrit is only about one year and age differences between those who attrit and those who never attrit are approximately 4 years. This age difference remains when using a three-year average of income for children. Haider and Solon (2006) show that the relationship between current earnings and transitory earnings varies across the life cycle with the correlation highest between the ages of 30 and 40. Grawe (2006) shows that the age at which income is measured for the parent generation is a particularly important source of downward bias in estimates of intergenerational elasticities. Both as a robustness check on our results and as a way to investigate how attrition may affect estimates of intergenerational elasticities even after controlling for life-cycle effects, we explore using an age-restricted sample ($N = 1450$). For our age-restricted sample, we measure y_{1t} using the average family income of children between the ages of 30 and 35 (inclusive) and measure y_{0i} as in the primary sample, using the 1967 – 1971 average family income of parents, but restrict the age of the parent generation to be between 30 and 50.¹² Means of key variables for this sample

¹¹Mazumder (2005) shows that including longer multi-year averages of parental income (between 20 and 25 years) increases the estimated IGE by about 50 % and that even 5 years of parental data is insufficient to produce unbiased estimates. However, this paper is not an attempt to precisely identify the IGE, rather we focus on the role of attrition in estimates using the PSID.

are shown in Table 1 panel C. Most importantly, for these sensitivity analyses, the average age of those who attrit and those who never attrit is very similar.

Age restrictions on the parent generation should increase our estimated intergenerational correlations even in the absence of changes in the sample (Grawe, 2006; Mazumder, 2005). Table 1 panel C shows that introducing age restrictions for the sample also changes some of the observed characteristics of our sample. The age-restricted sample is more white and has higher average parental income than the primary sample. The differences between those who attrit and those who do not could also change with age restrictions if the type of person who attrits after age 30 differs from the type of person who attrits between age 25 and age 30. Table 1 shows that both the attritors and non-attritors in the age-restricted sample are more likely to be white and from families with higher parental income but of course unobservables between these two groups could still differ.

In what follows, we present the results using the primary sample, along with those using the sample in which child income is averaged over three years and those in which the age of both parents and children are restricted. Importantly, each of these samples is similar to choices that other analysts have made so in addition to showing how our results differ based on measurement and sampling decisions, these samples also show how sensitive results that use averages and results that restrict age are to sample attrition. We explore a variety of other sample restrictions in Section 4.4 including how using the SEO sample and using sample weights affects our results.

4. Results

4.1. Selective attrition

Estimates of the effect of adult child income on subsequent attrition are reported in Table 2. Results for the primary sample are reported in panel A, results using a three-year average of child income are reported in panel B, and results using the age-restricted sample are reported in panel C. The first column reports estimates overall, regardless of parental income status. For the primary sample, the estimate implies that a one log point increase in adult child's income reduces the probability of subsequent attrition by 4.6 percentage points. Adult child income is represented by their most recent income while under the age of 40. For some sample members, this measure was taken as early as 1976 while for others it was taken as late as 2007. Given that the last year of data examined in the study is 2007, the length of time at risk of attrition following the date of the adult child's income measure varies across adult children. On average, the time between the income measurement and 2007 is 9.91 years. Therefore, the elevated rate of 4.6 percentage points associated with the one log point increase in adult child income represents attrition over an average of 10 years.

In the four subsequent columns we report the effect of child income on attrition separately by quartile group of parental income.¹³ Adult child's income has its largest effect on

¹³Because of the move to biennial interviewing after 1997, we do not require all individuals to be observed in every year between the ages of 30 and 35. On average those who attrit have 4.3 years of income contributing to the average and those who do not attrit have 5.2 years of income contributing to the average. We restrict the sample to parents whose age in 1969 — that is the average age during the five-year period — is between 30 and 50.

attrition among adult children who grew up in lower income families. Specifically, a one log point increase in adult child's income reduces attrition by 7.4 percentage points among adult children whose parents were in bottom fourth of the income distribution. This implies that among adult children whose parents were in the bottom fourth, children who end up being more like their parents in terms of income are more likely to attrit. The effect of adult child's income is also negative among children whose parents were in the second and third quartile groups, although it is somewhat smaller at 5.2 and 3.8 percentage points, respectively. Most significantly, among those children whose parents were in the top fourth of the income distribution, the adult child's own income has no statistically significant or substantively meaningful influence on attrition: the point estimate implies a 1.4 percentage point increase in attrition that is not statistically significant. This pattern of significant effects of adult child's income on attrition among children from lower income families but not among higher income families implies that estimates of the intergenerational elasticity of family income may be understated because of attrition. Panels B and C show that the results are not sensitive to either income averaging or age restrictions.

Because we are interested in the effects of attrition across the distribution of parent and child income, we estimate linear probability models of attrition fully interacting child and parent income quartiles. Table 3 reports predicted attrition probabilities by quartile group of adult child income and of parental income evaluated at the mean. Differences in predicted probabilities are evaluated within quartile group of parental income relative to the bottom quartile group of child income. Among adult children whose parents were in the bottom fourth, the largest effect of the adult child's income on attrition is at the bottom of the adult child income distribution. Specifically, children from the bottom fourth of the parental income distribution who themselves are also in the bottom fourth are between 11 and 20 percentage points more likely to attrit than children in higher income groups. In sum, among adult children whose parents were in the bottom income group, those children whose adult outcomes are most like their parents' are most likely to attrit. There are also smaller but statistically significant differences in attrition in the second quartile group of parental income in which children in higher quartile groups are less likely to attrit than children in lower quartile groups. Ignoring for the moment the impact of adult child's income at other levels of parental income, this pattern would imply that the intergenerational elasticity of family income would be higher among those who subsequently attrit than those who do not.

At the top of the parental income distribution the only statistically significant differences in attrition are between children who end up in the bottom of the child income distribution and children who end up in the top of the child income distribution. Children who come from the top half of the parental income distribution who themselves end up in the bottom of the income distribution are between 9 and 14 percentage points more likely to attrit than children who themselves end up in the top of the income distribution. Considering only those adult children whose parents are in the top quartile group, the pattern of attrition by child's income observed in Table 3 implies that adult children least like their parents are more likely to subsequently attrit. This pattern in turn implies that estimates of the

¹³Because there are siblings in our sample, we calculate the quartile groups of parental income based on one observation per parent of average parental income between 1967 and 1971. Quartile groups are calculated using unweighted data.

intergenerational elasticity of family income would be lower among those who subsequently attrit than those who do not.

Panels B and C show some differences from the primary sample. Children with income in the lowest fourth from families with income in the lowest fourth are still the most likely to attrit. However, children with income in the highest fourth and children with income in the lowest fourth who come from families with income in the highest fourth are equally likely to attrit. The differences at the top of the distribution could reflect a higher probability of attrition when a child from a family with income in the highest fourth experiences a negative transitory income shock. Additionally, it may reflect sample selection if children with low permanent income from families in the richest fourth are more likely to attrit at earlier ages. Table 3, panels B and C suggest that in the sample using three-year average income for children and in the age-restricted sample, estimates of intergenerational elasticities should be higher among those who attrit compared with those who never attrit.

4.2. Intergenerational elasticity in family income

Our results suggest that attrition may affect estimates of intergenerational income elasticity — although for the primary sample, the effect of attrition at the bottom of the parental income distribution may counteract the effect of attrition at the top of the parental income distribution. Estimates of the intergenerational elasticity in family income are reported in Table 4. Results for the primary sample are reported in panel A, results using a three-year average of child income are reported in panel B, and results using the age-restricted sample are reported in panel C. The first column reports estimates for the combined sample of adult children who do and do not subsequently attrit. The estimate of 0.479 for the overall sample is between the 0.43 for daughters and 0.53 for sons reported in Chadwick and Solon (2002).¹⁴ Because 46 % of attrition for children occurs before 1991, the Chadwick and Solon (2002) estimate is between that of our attriting group and our never attriting group. Mayer and Lopoo (2005) also examine the intergenerational elasticity of family income for sons and use income data for children between 1979 and 1995. They find an overall estimate of 0.34 — substantially lower than that of Chadwick and Solon (2002) — which compares most closely to our estimate of 0.43 for the never-attriting sons.

Among those adult children who eventually attrit, the elasticity is 0.543. The elasticity is 12 percentage points lower for those who never attrit at 0.421. This difference between the elasticity overall (0.479) and among those who never attrit (0.421) is not statistically significant. The pattern of intergenerational income elasticity is consistent with the differential effects of adult child's income on attrition reported in Table 3. Moreover, it is consistent with Solon's (1992, p. 399) conjecture that attrition would bias his estimates toward zero.

The estimates of the intergenerational elasticity using a three-year average income for children and using the age-restricted sample follow the same pattern as the primary sample

¹⁴Using the 1991 income measure for children as in Chadwick and Solon (2002) we replicate their results very closely. However, our estimates using the last measure of income are slightly different. We estimate intergenerational elasticity of income for sons (daughters) to be 0.43 (0.41) in the never-attriting sample, 0.57 (0.52) in the ever-attriting sample, and 0.51 (0.46) in the sample overall.

—higher intergenerational correlations among those who attrit and lower intergenerational correlations among those who never attrit. The estimates of intergenerational income elasticities are lower for the sample that uses three-year average income for children. This difference is consistent with Table 3 panels B and C, in which the offsetting effects on intergenerational elasticities at the top and bottom of the distribution of parental income were not evident. Consistent with Mazumder (2005) and Grawe (2006), intergenerational elasticities are higher in age-restricted samples. Differences between the estimated intergenerational income elasticity overall and among those who never attrit are statistically significant at the 5 % level for the age-restricted sample.

The relationship between the estimate of intergenerational income elasticity and income mobility by attrition is complicated by the fact that the mean parental and child income is higher for non-attritors than it is overall and higher for non-attritors than for attritors. Table 1 shows that mean income for those who attrit is \$65,618 compared with \$72,470 for those who never attrit and \$69,692 overall. Because of mean differences in income, differences in the coefficient for intergenerational income elasticity between the groups does not fully capture differences in mobility between groups relative to the entire income distribution (Hertz, 2005, 2008). For this reason, we estimate a model of intergenerational income elasticity in which attrition is interacted with parental income. We can then test whether the intergenerational income elasticity differs between groups, whether mean income differs between groups, and whether these differences, separately and jointly, are statistically significant. These results are presented in Table 5. Results for the primary sample are reported in panel A, results using a three-year average of child income are reported in panel B, and results using the age-restricted sample are reported in panel C. Echoing the results in Table 4, children who attrit have a higher income elasticity (only statistically significant in panel C) and have lower average income. For all three samples, these two coefficients are jointly statistically significant at 1 %. The results suggest that children who attrit have more intergenerational persistence in income than children who do not attrit and this persistence occurs at a lower average income level.

4.3. Intergenerational transition matrices in family income

The nonlinearities in the effects of adult child's income on attrition in Table 3 motivate analyses of the nonlinearity of intergenerational income mobility. In Table 6a we report the age-adjusted intergenerational income transition matrices overall, for adult children who eventually attrit, and for adult children who never attrit for the primary sample.¹⁵ Table 6b and 6c contain age-adjusted transition matrices for the sample using three-year average income for children and for the age-restricted sample. Three patterns are apparent. First, persistence at the bottom of the income distribution is larger for the sample overall than for those who never attrit. For the primary sample overall, 40 % of children who are born in the bottom fourth of parental income, remain in the bottom fourth of child income. This

¹⁵Quartile groups of parental and child income are calculated separately for the primary sample, the sample using three-year average income for children, and the age-restricted sample but boundaries between quartiles remain constant across attriting and non-attriting subgroups within each sample. The quartile cutoffs for residualized income for the three samples are similar. They are (−0.388, 0.104, 0.522) for the primary sample (N = 2088), (−0.388, 0.073, 0.431) for the three-year average income (N = 1972), and (−0.388, 0.112, 0.409) for the age-restricted sample (N=1450).

compares with only 35 % of children among those who never attrit. The reason for this difference is that children who attrit are much more likely to come from the bottom of the parental income distribution and themselves be in the bottom of the child income distribution — 45 % of children in the bottom fourth of parental income among those who attrit are in the bottom of the income distribution themselves.

Second, persistence at the top of the income distribution is slightly smaller overall than among those who never attrit. Overall, 28 % of children born in the top of the parental income distribution remain there compared with 30 % of children among those who never attrit.

Finally, the patterns of attrition at the top and bottom of the parental income distribution result in a larger difference in intergenerational income persistence between the bottom and top of the parental income distribution in the sample overall than among those who never attrit. Specifically, the difference between the probability of remaining in your parents' income quartile group if you come from the bottom of the parental income distribution compared to the top is always smaller among those who never attrit than it is in the sample overall. For the primary sample in Table 6a and the sample that uses a three-year average of child income in Table 6b, persistence at the bottom is higher than at the top in the sample overall and for those who do not attrit, but in Table 6c, the age-restricted sample, persistence in intergenerational income quartile group is equal among those who never attrit, while in the sample overall, persistence is greater at the bottom of the income distribution. Overall the age-restricted sample shows higher persistence at the top of the parental income distribution. This higher income persistence is consistent with the higher intergenerational income elasticities in the age-restricted sample shown in Tables 4 and 5.

Table 7 compares the three differences outlined above explicitly. The first row shows the difference between persistence at the bottom of the distribution overall (0.40 in the primary sample) and among those who never attrit (0.35 in the primary sample). For the primary sample the difference is 0.05 (shown in Table 7) and is statistically significant; income persistence at the bottom of the parental income distribution is five percentage points higher in the overall sample than in the non-attriting sample. For all three samples, the difference between persistence at the bottom of the parental income distribution between the sample overall and among those who never attrit is statistically significant. The second row shows the difference between persistence at the top of the parental income distribution in the sample overall (0.28 in the primary sample) and among those who never attrit (0.30 in the primary sample). For the primary sample the difference is -0.02 and is not statistically significant. For all three samples, the difference in income persistence at the top of the parental income distribution between the sample overall and among those who never attrit is always negative. This pattern implies greater persistence at the top of the distribution for those who never attrit but the differences are not statistically significant. Rows three and four show the difference between persistence at the bottom and top of the parental income distribution in the sample overall ($0.40 - 0.28 = 0.12$ in the primary sample) and among those who never attrit ($0.35 - 0.30 = 0.05$ in the primary sample) respectively. For all three samples, the difference between row three and row four is statistically significant at 1 % implying that one would underestimate the difference between intergenerational persistence

at the bottom and top of the income distribution when using only the sample of those who never attrit.¹⁶

4.4. Sample Weights and the SEO Sample

We have included sensitivity analyses that control for the variability of child income and life-cycle effects throughout and shown that our main conclusions are consistent across samples. If anything, the differences in the intergenerational elasticities between the whole and non-attriting groups are larger for the sample that controls for variability in child income and life-cycle effects. In this section, we consider whether using sample weights ameliorates the problem of attrition on intergenerational transmission of income and we explore the differences when the SEO sample is included in the analysis.

Because we use children from a variety of years in the PSID we normalize the yearly cross-sectional weights to have a mean of one and we use the sample weight from the final year in which the child is observed.¹⁷ We report the intergenerational elasticities for all three samples in Table 8 and models that control for differences in mean income of those who attrit in Table 9. We find that using sample weights reduces differences in the intergenerational elasticity of income between the whole sample, attriting sample, and the non-attriting sample. When using sample weights, differences in the estimated intergenerational elasticity overall and among those who never attrit are not statistically significant. We should note however, that most analyses with the PSID do not use sample weights in their estimates unless they specifically use the SEO sample (see Solon, 1992; Hertz, 2007). When we include the SEO sample and sample weights, the differences in estimated intergenerational elasticities overall and among those who never attrit get larger — although not as big as they were without the use of sample weights — and in the case of the age-restricted sample, the difference between the intergenerational elasticity of income overall and among those who never attrit is statistically significant at 5 %.

Table 10 shows the sensitivity of the results on intergenerational persistence from the transition matrices to the use of sample weights. We show the difference in persistence at the bottom of the parental income distribution between the overall sample and those who never attrit, the difference in persistence at the top of the parental income distribution between the overall sample and those who never attrit, and the difference in persistence between the bottom and top of the parental income distribution in the overall sample and for those who never attrit. The substantive differences that we note in Section 4.3 remain even after using sample weights. Differences in intergenerational income persistence at the bottom and the top of the parental income distribution (row 3 minus row 4) between the overall sample and those who never attrit are all significant at 1 % even with sample weights.

¹⁶Because often quartiles are not calculated from age-adjusted income data (see Zimmerman, 1992), in Appendix Tables 12a–12c we report estimates based on unadjusted quartile groups and in Appendix Table 13 we report the differences in persistence. All patterns that we observe for age-adjusted quartile groups are also present without age adjustments. Differences between persistence overall and among those who never attrit at the top of the income distribution are larger and statistically significant using unadjusted income quartile groups.

¹⁷For children who were in the recontact sample, their final weight would be zero because they reenter the sample with zero weight. For these children we use the last positive weight that we observe.

Our analysis has focused on the effect of attrition *after* individuals form their own households and turn age 25. However, in the SRC sample, attrition of this form (N = 848) is much less prevalent than attrition that occurs before children establish their own household or before age 25 (N = 1131). Of the latter group, 80 % attrit with their entire family and 20 % attrit but have family members who remain in the sample. Over 90 % of this group attrits before age 25 so limited inference can be made about their economic status as an adult based on their educational attainment (which is assessed even for adult children who have not formed their own households) because a significant share have not completed their education. Only 30 % of this group has a sibling who eventually becomes a head or wife so little inference can be made about their economic status as an adult using information about their siblings.

In the absence of information about the children who attrit before they form their own households or turn age 25, we use information on total family income in 1968 and education of the 1968 head, to compare children who attrit prior to age 25 (or never form their own household) with children who attrit after 25 and with children who never attrit. Table 11 shows the means of parental income and education in 1968 for each of these three groups. We find that the children who attrit prior to age 25 have 1968 heads who are the least well educated of the three groups — with 0.79 fewer years of schooling than the 1968 head of children who attrit after 25, and 1.59 fewer years of schooling than the 1968 head children who never attrit. Children who attrit prior to age 25 come from families with 8 percent less income in 1968 than families of children who attrit after age 25, and 17 % less income than families of children who never attrit. Differences between the three groups are all statistically significant. These broad measures of socioeconomic status suggest that children who attrit prior to age 25 come from families that resemble the families of children who attrit after 25 more than the families of children who never attrit. In fact, they generally come from families with lower income and less education than their counterparts who attrit later in life. While it is impossible to estimate the impact on estimates of intergenerational elasticities of attrition associated with the pre-25 attritors, a likely conservative assumption is that the pre-25 attritors have intergenerational income elasticities that are as high as the post-25 attritors. If this is the case, then the true intergenerational correlation in the absence of attrition is $0.496 [((1131 + 848)/3219)*0.543 + (1240/3219)*0.421]$ instead of 0.479, or 4% higher. The effect of attrition pre-25 is harder to calculate for the transition matrices because adding 1131 new individuals would change the membership of the income quartile groups but it would likely make the differences between the overall and the never-attributing groups larger.

Conclusions and Discussion

This paper uses the PSID to examine the effect of attrition on a key estimate of intergenerational transmission of economic status — the intergenerational income elasticity. We show that adult children who have higher income are less likely to attrit. The negative effect of child income on attrition is true for children regardless of their parental income status. However, the effects of childhood income are not monotonic throughout the childhood income distribution, and this nonmonotonic relationship is not identical across all levels of parental income. In particular, the lowest income children of the lowest income

parents are the most likely to attrit from the PSID sample. In some specifications, attrition is also lower among high income children with high income parents. The pattern of attrition suggests that the intergenerational income elasticity estimated using PSID data is understated if estimated on the sample of children who never attrit from the sample. We test this hypothesis by estimating the intergeneration income elasticity for child who attrit, children who do not attrit, and for a combined sample.

We find that the difference between the intergenerational income elasticity of the non-attriters and the whole sample is approximately six percentage points. This difference is marginally statistically significant. We then examine the non-monotonicity of this relationship by estimating intergenerational income transition matrices and find that using a sample of non-attriting PSID children significantly underestimates persistence at the bottom of the parental income distribution compared with the combined sample. We show that our results are robust to a variety of variable and sample selections. We further show that sample weights ameliorate some of the effects of attrition for the estimates of intergenerational elasticities, which is important given that most prior studies do not use sample weights. However, the use of weights does not change the conclusions about the effect of attrition on intergenerational transition matrices.

We use our estimates to gauge the bias associated with children attriting from the PSID before becoming adults and forming their own household. We conclude that selective attrition of this type biases standard estimates of the intergenerational correlation in income downward by 4%. Biases in estimates of intergenerational mobility matrices are greater and more complex, implying less mobility at the bottom of the distribution and more mobility at the top of the distribution than is implied by standard estimates that ignore this type of attrition. The results suggest that caution should be exercised when estimating intergenerational correlations within socioeconomic subgroups. However, selective attrition does not change the qualitative conclusions about the extent of intergenerational income immobility, which is substantial.

Fitzgerald, Gottschalk, and Moffitt (1998a, b) and Hertz (2007) use attrition specific inverse probability weights to supplement the weights provided by the PSID. These weights are constructed by using pre-existing variables to predict attrition and are designed to control for attrition prior to establishing a new household and attrition after establishing a new household. Our results only address attrition after establishing a new household, but suggest that some of the bias in estimates of intergenerational elasticities comes from the correlation between child outcomes and parental outcomes in predicting attrition. Our results suggest that weights based only on pre-existing variables may be insufficient to control for the effect of attrition on intergenerational income elasticities and transition matrices. However, new data available in the Roster and Transfer Module in the 2013 PSID could help in constructing weights that control for the correlation between child and parent outcomes in predicting attrition. In this module, individuals complete a roster of adult children and parents — including those who have attrited — that includes socio-economic characteristics. These rosters may be useful in constructing attrition specific inverse probability weights that include characteristics of children (or parents) that would typically only be observed after an individual have attrited.

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Appendix Tables

Table 12a

Intergenerational income transition matrices primary sample no age adjustment, by attrition status

All (N = 2088)	<u>Quartile Group of Child's Income</u>			
	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.41	0.29	0.20	0.10
2 nd	0.27	0.27	0.26	0.20
3 rd	0.22	0.26	0.25	0.27
Top	0.12	0.19	0.29	0.41
Ever attrit (N = 848)				
Quartile Group of Parental Income				
Bottom	0.53	0.25	0.13	0.09
2 nd	0.36	0.29	0.20	0.15
3 rd	0.30	0.26	0.23	0.21
Top	0.19	0.23	0.27	0.31
Never attrit (N = 1240)				
Quartile Group of Parental Income				
Bottom	0.29	0.33	0.26	0.12
2 nd	0.21	0.26	0.30	0.23
3 rd	0.16	0.25	0.27	0.32
Top	0.08	0.16	0.30	0.46

Notes: Quartile groups of parental and child income are calculated using unweighted data.

Appendix Table 12b

Intergenerational income transition matrices three-year average income for children sample no age adjustment, by attrition status

All (N = 1972)	<u>Quartile Group of Child's Income</u>			
	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.42	0.28	0.22	0.08

All (N = 1972)	Quartile Group of Child's Income			
	Bottom	2nd	3rd	Top
2 nd	0.27	0.31	0.24	0.18
3 rd	0.22	0.24	0.26	0.28
Top	0.12	0.18	0.28	0.42
Ever attrit (N = 741)	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.54	0.24	0.17	0.05
2 nd	0.35	0.33	0.21	0.11
3 rd	0.33	0.23	0.22	0.22
Top	0.16	0.25	0.25	0.34
Never attrit (N = 1231)	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.32	0.32	0.25	0.11
2 nd	0.22	0.31	0.25	0.22
3 rd	0.17	0.24	0.28	0.31
Top	0.09	0.14	0.30	0.47

Notes: Quartile groups of parental and child income are calculated using unweighted data.

Appendix Table 12c

Intergenerational income transition matrices age-restricted sample no age adjustment, by attrition status

All (N = 1450)	Quartile Group of Child's Income			
	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.45	0.26	0.20	0.09
2 nd	0.24	0.29	0.28	0.19
3 rd	0.17	0.26	0.27	0.30
Top	0.14	0.19	0.24	0.43
Ever attrit (N = 516)	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.52	0.25	0.15	0.08
2 nd	0.33	0.29	0.24	0.14
3 rd	0.25	0.26	0.24	0.25
Top	0.18	0.18	0.25	0.39
Never attrit (N = 934)	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.39	0.27	0.24	0.10
2 nd	0.20	0.28	0.30	0.22

All (N = 1450)	Quartile Group of Child's Income			
	Bottom	2nd	3rd	Top
3 rd	0.13	0.26	0.29	0.32
Top	0.12	0.20	0.24	0.44

Notes: Quartile groups of parental and child income are calculated using unweighted data.

Appendix Table 13

Intergenerational income persistence no age adjustment, by attrition status

Quartile Group Difference (parent/ child)	Primary Sample	Three-Year Average Income for Children	Age-Restricted Sample
Bottom/Bottom: All – Never attrit	0.12 *** (0.02)	0.10 *** (0.02)	0.06 ** (0.02)
Top/Top: All – Never attrit	–0.05 *** (0.02)	–0.04 *** (0.02)	–0.01 (0.02)
All: Bottom/Bottom – Top/Top	–0.004 (0.036)	0.003 (0.037)	0.02 (0.04)
Never attrit: Bottom/Bottom – Top/Top	–0.17 *** (0.04)	–0.15 *** (0.042)	–0.05 (0.05)

Notes: Quartile groups of parental and child income are calculated using unweighted data. Weighted data produce similar results. Robust standard errors in parentheses.

p<0.01,
**
p<0.05,
*
p<0.1

Table 1**Means of Selected Variables, by Attrition**

Variable Name	All	Ever Attrit	Never Attrit
<i>Panel A. Primary Sample (N = 2088)</i>			
Female	0.51	0.49	0.52
White	0.89	0.83	0.93
Education	13.64	13.23	13.92
Birth Order	2.13	2.15	2.10
Number of Siblings	1.12	1.14	1.10
Marital Status (last observation)	0.72	0.64	0.78
Family Size (last observation)	2.81	2.81	2.82
Age (last observation)	38.08	35.86	39.56
Income (last observation)	87089	74768	95496
Parental Age	41.02	41.57	40.64
Average Parental Income 1967 – 1971	69692	65618	72470
<i>Panel B. Three-year Average Income for Children (N = 1972)</i>			
Female	0.52	0.51	0.52
White	0.89	0.84	0.93
Education	13.67	13.26	13.93
Birth Order	2.12	2.13	2.11
Number of Siblings	1.11	1.11	1.11
Marital Status (last observation)	0.73	0.66	0.77
Family Size (last observation)	2.83	2.85	2.82
Age (last observation)	38.17	35.77	39.61
Average Income (last three observations)	83732	71815	90905
Parental Age	40.98	41.42	40.71
Average Parental Income 1967 – 1971	70263	66334	72627
<i>Panel C. Age-restricted Sample (N = 1450)</i>			
Female	0.51	0.51	0.52
White	0.92	0.87	0.95
Education	13.72	13.32	13.94
Birth Order	2.27	2.31	2.25
Number of Siblings	1.26	1.30	1.24
Marital Status (last observation)	0.74	0.67	0.78
Family Size (last observation)	2.84	2.86	2.83
Age (average of income observations)	32.33	32.21	32.41
Average Income Age 30 – 35	71288	64826	74858
Parental Age	40.15	40.39	40.02
Average Parental Income 1967 – 1971	74751	70069	77338

Table 2

OLS estimates of the effects of child's income on attrition

Explanatory variable	Quartile Group of Parental Income				
	All	Bottom	2nd	3rd	Top
<i>Panel A. Primary Sample (N = 2088)</i>					
Child's income	-0.046*** (0.0103)	-0.074*** (0.019)	-0.052** (0.019)	-0.038*** (0.021)	-0.014 (0.021)
<i>Panel B. Three-year Average Income for Children (N = 1972)</i>					
Child's income	-0.049*** (0.013)	-0.101*** (0.026)	-0.053*** (0.024)	-0.040* (0.024)	-0.003 (0.030)
<i>Panel C. Age-restricted Sample (N = 1450)</i>					
Child's income	-0.055*** (0.017)	-0.073*** (0.026)	-0.082*** (0.039)	-0.058* (0.033)	0.01 (0.041)

Notes: Models include age and age squared at which child's income is measured, average log parental income 1967 – 1971, average age and age squared of parent/head in 1967 – 1971 and a constant. Robust standard errors in parentheses. Stars measure whether coefficients are statistically different from zero.

*** p<0.01,

** p<0.05,

* p<0.1.

The difference between the coefficient on child income for adult children from the bottom and top quartile group of parental income is statistically significant at the 5% level in panel A though the coefficients for the second and third quartile groups are not statistically different from the bottom or top quartile groups. In panel B, the coefficients on income for the bottom and top quartile groups are statistically different at the 5% level but the coefficient on income for quartile group 2 is not statistically different from either the top or the bottom. The coefficient on income for quartile group 3 is different from the bottom quartile group at the 10% level. In panel C the coefficients on income for the bottom and second quartile groups of parental income are statistically different from the top quartile group at the 10% level.

Table 3

Predicted attrition rates from OLS estimates of the effects of child's income on attrition

Explanatory variable	Quartile Group of Parental Income			
	Bottom	2nd	3rd	Top
<i>Panel A. Primary Sample (N = 2088)</i>				
Quartile Group of Child's Income				
Bottom (reference)	0.545 (0.033)	0.445 (0.035)	0.432 (0.036)	0.492 (0.059)
2nd	0.435** (0.038)	0.414 (0.037)	0.385 (0.035)	0.417 (0.039)
3rd	0.340*** (0.042)	0.349** (0.033)	0.361 (0.036)	0.402 (0.036)
Top	0.431* (0.059)	0.337** (0.039)	0.339* (0.035)	0.354** (0.028)
<i>Panel B. Three-year Average Income for Children (N = 1972)</i>				
Quartile Group of Child's Income				
Bottom (reference)	0.478 (0.032)	0.396 (0.034)	0.376 (0.034)	0.417 (0.052)
2nd	0.402* (0.039)	0.405 (0.033)	0.354 (0.035)	0.441 (0.048)
3rd	0.355** (0.042)	0.352 (0.035)	0.319 (0.033)	0.362 (0.035)
Top	0.339** (0.062)	0.281** (0.035)	0.335 (0.035)	0.348 (0.027)
<i>Panel C. Age-restricted Sample (N = 1450)</i>				
Quartile Group of Child's Income				
Bottom (reference)	0.474 (0.039)	0.385 (0.048)	0.392 (0.051)	0.389 (0.056)
2nd	0.451 (0.044)	0.343 (0.040)	0.328 (0.046)	0.316 (0.055)
3rd	0.331** (0.047)	0.287* (0.033)	0.275* (0.034)	0.394 (0.048)
Top	0.320** (0.066)	0.255** (0.044)	0.284* (0.039)	0.357 (0.035)

Notes: Model includes age and age squared at which child's income is measured, average age and age squared of parent/head in 1967 – 1971 without a constant term. Robust standard errors in parentheses. Differences in predicted probabilities are evaluated within parental income quartile group relative to the bottom quartile group of child income.

p<0.01,

**
p<0.05,

*
p<0.1

Table 4

Intergenerational elasticity of family income for all children, by attrition status

Explanatory variable	All	Ever Attrit	Never Attrit
<i>Panel A. Primary Sample (N = 2088)</i>			
Average log family income of 1968 head (1967 – 1971)	0.479 ^{***} (0.051)	0.543 ^{***} (0.088)	0.421 ^{***} (0.041)
<i>Panel B. Three-year Average Income for Children (N = 1972)</i>			
Average log family income of 1968 head (1967 – 1971)	0.439 ^{***} (0.039)	0.485 ^{***} (0.052)	0.403 ^{***} (0.044)
<i>Panel C. Age-restricted Sample (N = 1450)</i>			
Average log family income of 1968 head (1967 – 1971)	0.480 ^{***} (0.053)	0.549 ^{***} (0.068)	0.425 ^{***} (0.054)

Notes: Models include a quadratic in age for parent and child and constant. Models with year fixed effects yield similar results. Robust standard errors in parentheses.

p<0.01,

**
p<0.05,

*
p<0.1

Table 5

Intergenerational elasticity of family income, attrition interaction

Explanatory variable	All
<i>Panel A. Primary Sample (N = 2088)</i>	
Average log family income of 1968 head (1967 – 1971)	0.418*** (0.04)
Ever attrit	–1.60* (0.859)
Average log family income interacted with Ever attrit	0.126 (0.078)
<i>Panel B. Three-year Average Income for Children (N = 1972)</i>	
Average log family income of 1968 head (1967 – 1971)	0.402*** (0.0437)
Ever attrit	–1.03* (0.579)
Average log family income interacted with Ever attrit	0.081 (0.053)
<i>Panel C. Age-restricted Sample (N = 1450)</i>	
Average log family income of 1968 head (1967 – 1971)	0.427*** (0.054)
Ever attrit	–1.41* (0.737)
Average log family income interacted with Ever attrit	0.117* (0.067)

Notes: Model includes a quadratic in age for parent and child and constant. Because differences in the age effects did not differ between groups these were not interacted with attrition. Models with year fixed effects yield similar results. Robust standard errors in parentheses.

p<0.01,

**
p<0.05,

*
p<0.1

Table 6a

Intergenerational income transition matrices primary sample, by attrition status

All (N = 2088)	<u>Quartile Group of Child's Income</u>			
	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.40	0.27	0.17	0.16
2 nd	0.18	0.28	0.30	0.24
3 rd	0.21	0.19	0.27	0.33
Top	0.20	0.26	0.26	0.28
Ever Attrit (N = 848)				
Quartile Group of Parental Income				
Bottom	0.45	0.24	0.13	0.18
2 nd	0.22	0.26	0.26	0.26
3 rd	0.26	0.21	0.23	0.30
Top	0.24	0.29	0.21	0.26
Never Attrit (N = 1240)				
Quartile Group of Parental Income				
Bottom	0.35	0.30	0.22	0.13
2 nd	0.16	0.30	0.32	0.22
3 rd	0.17	0.19	0.30	0.34
Top	0.17	0.23	0.30	0.30

Notes: Quartile groups of parental and child income are calculated using unweighted data.

Table 6b

Intergenerational income transition matrices three-year average income for children sample, by attrition status

All (N = 1972)	<u>Quartile Group of Child's Income</u>			
	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.39	0.28	0.19	0.14
2 nd	0.19	0.30	0.28	0.23
3 rd	0.20	0.21	0.25	0.34
Top	0.19	0.21	0.29	0.31
<hr/>				
Ever Attrit (N = 741)	Bottom	2nd	3rd	Top
<hr/>				
Quartile Group of Parental Income				
Bottom	0.45	0.23	0.16	0.16
2 nd	0.22	0.27	0.30	0.21
3 rd	0.26	0.22	0.21	0.31
Top	0.23	0.21	0.29	0.27
<hr/>				
Never Attrit (N = 1231)	Bottom	2nd	3rd	Top
<hr/>				
Quartile Group of Parental Income				
Bottom	0.34	0.32	0.23	0.11
2 nd	0.18	0.31	0.27	0.24
3 rd	0.17	0.20	0.27	0.36
Top	0.17	0.21	0.28	0.34

Notes: Quartile groups of parental and child income are calculated using unweighted data.

Table 6c

Intergenerational income transition matrices age-restricted sample, by attrition status

All (N = 1450)	<u>Quartile Group of Child's Income</u>			
	Bottom	2nd	3rd	Top
Quartile Group of Parental Income				
Bottom	0.43	0.29	0.19	0.09
2 nd	0.24	0.30	0.27	0.19
3 rd	0.18	0.22	0.30	0.30
Top	0.14	0.19	0.24	0.43
Ever Attrit (N = 516)				
Quartile Group of Parental Income				
Bottom	0.51	0.26	0.14	0.09
2 nd	0.30	0.25	0.24	0.21
3 rd	0.24	0.26	0.29	0.21
Top	0.18	0.18	0.24	0.40
Never Attrit (N = 934)				
Quartile Group of Parental Income				
Bottom	0.36	0.31	0.23	0.10
2 nd	0.22	0.31	0.28	0.19
3 rd	0.16	0.20	0.30	0.34
Top	0.11	0.20	0.25	0.44

Notes: Quartile groups of parental and child income are calculated using unweighted data.

Table 7

Intergenerational income persistence, by attrition status

Quartile Group Difference (parent/child)	Primary Sample	Three-year Average Income for Children	Age-restricted Sample
Bottom/Bottom: All – Never Attrit	0.05*** (0.02)	0.06*** (0.02)	0.07*** (0.02)
Top/Top: All – Never Attrit	–0.02 (0.02)	–0.02 (0.02)	–0.02 (0.02)
All: Bottom/Bottom – Top/Top	0.12*** (0.03)	0.08** (0.04)	0.002 (0.04)
Never Attrit: Bottom/Bottom-Top/Top	0.05 (0.04)	0.002 (0.04)	–0.08* (0.05)

Notes: Quartile groups of parental and child income are calculated using unweighted data. Weighted data produce similar results. Robust standard errors in parentheses.

p<0.01,

**
p<0.05,

*
p<0.1

Table 8

Sensitivity analysis intergenerational elasticity of family income, by attrition status

Sample	N	All	Ever Attrit	Never Attrit
<i>Panel A. Primary Sample</i>				
Weights	2088	0.462*** (0.049)	0.503*** (0.091)	0.431*** (0.044)
SRC + SEO Sample with Weights	4589	0.515*** (0.037)	0.558*** (0.061)	0.480*** (0.036)
<i>Panel B. Three-year Average Income for Children</i>				
Weights	1972	0.429*** (0.043)	0.456*** (0.063)	0.410*** (0.049)
SRC + SEO Sample with Weights	4240	0.484*** (0.033)	0.53*** (0.046)	0.453*** (0.038)
<i>Panel C. Age-restricted Sample</i>				
Weights	1450	0.454*** (0.052)	0.509*** (0.070)	0.415*** (0.057)
SRC + SEO Sample with Weights	3015	0.520*** (0.041)	0.615*** (0.059)	0.464*** (0.043)

Notes: Models include a quadratic in age for parent and child and constant. Robust standard errors in parentheses.

p<0.01,**
p<0.05,*
p<0.1

Table 9

Sensitivity analysis intergenerational elasticity of family income, attrition interaction

Sample	N	Parental Income	Attrition Parental Income Interaction
<i>Panel A. Primary Sample</i>			
Weights	2088	0.421 *** (0.043)	0.094 (0.083)
SRC + SEO Sample with Weights	4589	0.469 *** (0.035)	0.103 * (0.059)
<i>Panel B. Three-year Average Income for Children</i>			
Weights	1972	0.406 *** (0.048)	0.056 (0.063)
SRC + SEO Sample with Weights	4240	0.449 *** (0.038)	0.086 * (0.049)
<i>Panel C. Age-restricted Sample</i>			
Weights	1450	0.417 *** (0.04)	0.09 (0.075)
SRC + SEO Sample with Weights	3015	0.459 *** (0.042)	0.159 ** (0.063)

Notes: Models include a quadratic in age for parent and child and constant. Robust standard errors in parentheses.

p<0.01,**
p<0.05,*
p<0.1

Table 10

Sensitivity of intergenerational income persistence to weighting

Quartile Group Difference (parent/child)	Primary Sample Weighted	Three-year Average Income for Children Weighted	Age-restricted Sample Weighted
Bottom/Bottom: All – Never Attrit	0.05 ^{**} (0.02)	0.05 ^{**} (0.02)	0.08 ^{***} (0.02)
Top/Top: All – Never Attrit	–0.01 (0.02)	–0.02 (0.02)	–0.02 (0.02)
All: Bottom/Bottom – Top/Top	0.13 ^{***} (0.03)	0.11 ^{***} (0.04)	0.007 (0.04)
Never Attrit: Bottom/Bottom-Top/Top	0.07 [*] (0.04)	0.04 (0.04)	–0.09 [*] (0.05)

Notes: Quartile groups of parental and child income are calculated using weighted data. Robust standard errors in parentheses.

p<0.01,**
p<0.05,*
p<0.1

Table 11

1968 Family Characteristics, by attrition status

1968 Characteristic	Attrit Before 25	Attrit After 25	Never Attrit
1968 Family Money (Nominal)	8965 (229)	9762 (204)	10776 (189)
Years of Schooling of 1968 Head	10.86 (0.097)	11.65 (0.113)	12.45 (0.097)
N	1131	848	1240

Notes: All means statistically different from one another at 1% significance level. N for years of schooling is 3182 due to missing information on the schooling of the 1968 head (N = 1099 for Attrit Before 25, N = 845 for Attrit After 25, N = 1238 for Never Attrit).