Increasing Inequality in Parent Incomes and Children's Completed Schooling: Correlation or Causation?

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Abstract (150 words)

This paper tracks changes in income inequality and educational attainment between children born into low- and high-income households in the U.S. between 1954 and 1985. Using data from the Panel Study of Income Dynamics, we find that the schooling gap between high and low income children grew by half a year. We next attempt to account for the increase in the schooling gap by changing gaps in family income and other demographic factors (increasing single parenthood and parent education, falling family sizes). Depending on the time period chosen, increases in the income gap between high and low income children account for between 24% and 82% of the increasing schooling gap. Surprisingly, other demographic factors accounted for relatively little of the gap, particularly over the full time period of our analysis.

Abstract (full)

It is well known that income inequality increased dramatically in the United States beginning in the 1970s. Reardon (2011) documents a correspondingly large increase – of close to .50 standard deviations – in the test score gap between children in low and high income families over the same period. This paper shifts the focus from achievement to attainment, as measured by years of completed schooling, and tracks changes in income inequality and educational attainment between children born into low- and high-income households in the U.S. between 1954 and 1985. Using data from the Panel Study of Income Dynamics and concentrating on the cohorts whose adolescent family income were measured between the early 1980s and late 1990s, we find that the schooling gap between high and low income children grew by half a year (about one-quarter standard deviation). We next attempt to account for the increase in the schooling gap by changing gaps in family income and other demographic factors (increasing single parenthood and parent education, falling family sizes). We also estimate changes in the relative importance of income and these other demographic factors for children's completed schooling.

Depending on the time period chosen and the specification of the completed schooling regression equation, we find that increases in the income gap between high and low income children account for between 24% and 82% of the increasing schooling gap, with income changes defined over the longest (31-year) time period the PSID offers accounting for the largest share of increases in the schooling gap. None of our divisions of the 31-year time period produced significant changes in the estimated associations between income (or log income) and completed schooling. Increasing gaps in the two-parent family structures of high and low income families accounted for relatively little of schooling gap because our estimates of the (regression adjusted) associations between family structure and schooling were small. In the case of parent education and family size, trends tended to favor low-income children and thus were unable to account for the increasing schooling gap.

Increasing Inequality in Parent Incomes and Children's Completed Schooling: Correlation or Causation?

Economic growth for much of the 20th century supported America's promise of being a land of opportunity for both parents and children. In the thirty years between 1947 and 1977, a period in which gross national product (GDP) per capita doubled, the family incomes of those in the lowest income bracket nearly doubled as well.[1] In contrast, as documented in countless studies, the last 30 years have been marked by increasing income inequality, with stagnant incomes for families at the bottom of the distribution and sharp increases for those at the top of it.

Reardon (2011) explores the implications of the increasing income inequality for test score gaps between high and low income students. As described below, he finds that these gaps grew sharply, but also several reasons to doubt that the increasing gaps in income and test scores are causally linked. This paper shifts the focus from achievement to attainment, as measured by years of completed schooling, and tracks changes in income inequality and educational attainment between children born into low- and high-income households in the U.S. between 1954 and 1985. A key advantage of our efforts over Reardon's is that our data come from a single source – the Panel Study of Income Dynamics – which provides a consistent, high-quality measure of income, enables us to link family income in adolescence to schooling completed in a decade later and supplies measures of important family demographic conditions (parent schooling, family size and structure) . As with Reardon (20110) we find that attainment gaps have grown, although not by as much as achievement gaps.

Our primary goal is to account for the increase in the schooling gap by changing gaps in family income and other demographic factors (increasing single parenthood and parent education, falling family sizes). We also estimate changes in the relative importance of income and these other demographic factors for children's completed schooling.

BACKGROUND

How rising inequality influences children's skills and attainment

Assessing how increased income inequality influences skill acquisition and educational attainment of children born into different circumstances is complicated. Duncan and Murnane (2011) present a conceptual model of how increasing family income inequality may affect access to high-quality child care, schools, and other settings that help build children's skills and educational attainments. Changes in these social contexts may in turn affect children's skill acquisition and educational attainments directly and indirectly through influences on how schools operate. For example, growing income inequality increases the gap in the resources rich and poor families can invest in their children. Growing disparities in parental investments may also indirectly widen skill gaps by contributing to residential segregation as the wealthy purchase housing in neighborhoods where less affluent families cannot afford to live. Indeed, residential segregation by income has increased in recent decades (Reardon and Bischoff, 2010). This can reduce interactions between rich and poor in schools, in child-care centers, in libraries, and in grocery stores. Without the financial and human resources and political clout of the wealthy, institutions in poorer neighborhoods, perhaps most importantly schools, may decline in quality, with detrimental effects on the education and life chances of children born into poor families.

Similarly, low family income also makes it more difficult for parents to afford high-quality child care, which prepares children for kindergarten. It can also lead to difficult-to-teach classrooms filled with low-achieving, inattentive classmates. Crime in low-income neighborhoods may provide tempting alternatives to working hard at school and at the same time make it more difficult for neighborhood schools to recruit high-quality teachers.

Empirical evidence on how the relationship between family income and children's participation in these settings has changed over time is limited (though the chapters in Duncan and Murnane present a sobering portrait of gaps in the skills and learning environments between low- and high-income children). Consequently, we know relatively little about how rising income inequality is connected to the life chances of low- and high-income children.

What is known suggests that the rich have become richer in terms of the resources they have to spend on promoting their children's development. For instance, Kornrich and Furstenberg (2010) show that spending on child-enrichment goods and services jumped for families in the top quintiles but much less so for those in bottom income quintiles, as reflected in four large consumer expenditure surveys conducted between the early 1970s and 2005-2006. In 1972-1973, high-income families spent about $2,700 more per year on child enrichment than did low-income families. By 2005-2006, this gap had nearly tripled, to $7,500. Belley and Lochner (2007) compare the two cohorts of the NLSY (79 and 97) to show that family income has become a substantially more important determinant of college attendance and college quality (but not high school completion) in recent years, particularly for those youth with the lowest skills. This, they argue, is consistent with the hypothesis that more youth are borrowing constrained today (given, e.g., rising tuition costs and falling Pell Grant offerings) than they were in the early 1980s.

In a related vein, Ramey and Ramey (2010) use time diary data to illustrate rising levels of time spent by parents on childcare in the U.S., especially for college-educated parents but in particular from the mid-1990's (i.e., considerably later in the period of rising income inequality)[2] College-educated mothers increased their childcare time by over nine hours per week, whereas less-educated mothers increased their childcare time by less than half that amount. The authors attribute part of this phenomenon to an increase in the perceived return to attending a good college. Not only do parents with higher levels of education spend more time with their children overall (Guryan, Hurst, & Kearney, 2008; Ramey and Ramey, 2010) but they also spend more time in developmentally-relevant activities (Kalil, Ryan, & Corey, 2012). Similar socioeconomic differences in time spent in educationally enriching activities have been documented for children (Phillips, 2011).

Changes over time in parental time and capital investments are potentially plausible candidates for explaining divergence in children's actual attainments. Researchers also agree that schools and neighborhoods have become more economically segregated over time, and this too may account for dispersion in attainment between children from low- and high-income families.

The rising number of children growing up in single-parent households is also a possible explanatory factor shaping the correlation between income inequality and children's outcomes. For example, the proportion of children under the age of eighteen living in single-mother families rose from 10.9 percent in 1970 to 20.9 percent in 1985 to 22.4 percent in 2000 (Child Trends, 2011). This period corresponds to a sharp increase in the number of children born to an unmarried mother. The increase in single mother headed households has been greatest for those with the fewest economic advantages. In 1960, about 14% of mothers in the bottom quartile of the education distribution versus 4.5% of mother in the top quartile were single. By 2000, the percentages were approximately 43% and 7%, respectively. Thus, over four decades, the disparity in single motherhood by socio-economic background grew from 10 percentage points to 36 percentage points (McLanahan, 2004).

At the same time, demographic trends in the US have changed in ways that may have partially offset the adverse impacts of rising income inequality. In particular, women have increasingly delayed childbearing, families have gotten smaller, and women's education levels have risen (Cherlin, 2005). For example, over the past four decades, teenagers have accounted for a decreasing share of women giving birth for the first time (36 percent in 1970 compared to 21 percent in 2007), whereas in contrast the average age at which women first gave birth in 2007 was 25, compared to 21 in 1970 (White House Council on Women and Girls, 2011). Delays in marriage and childbearing over the past several decades are associated with a reduction of about one child per mother by the end of the childbearing years (White House Council on Women and Girls, 2011). The drop in fertility rates has been especially apparent among non-Hispanic black women, who saw their rate decrease from 91 births per 1,000 women aged 15 to 44 in 1980 to 67 births per 1,000 women aged 15 to 44 in 2005. Fertility rates among non-Hispanic white women decreased from 62 to 58 (Child Trends Databank, 2006).

Families with large numbers of children have become less common, with a drop in the proportion of families containing four or more children from seventeen percent in 1970 to six percent in 2000, for example (Lofquist et al., 2012). Delayed marriage and childbirth have also been associated with increased educational attainment among women over the past forty years. Undergraduate enrollment grew rapidly in the 1970's, especially for women; correspondingly, the share of women age 25–34 with at least a college degree has more than tripled since 1968, from about 11 percent to about 35 percent (White House Council on Women and Girls, 2011). A higher share of women than men completed high school and earned a bachelor's degree in 2009 compared to 1971.

How has children's educational performance changed over time?

As the incomes of affluent and poor American families have diverged over the past three decades, so too has the educational performance of the children in these families. Reardon (2011) documents startling growth in the income-based gap on the test scores of children born since the 1950s. Among children born around 1950, test scores of low-income children lagged behind those of their better-off peers by a little over half a standard deviation, or about 50 points on an SAT-type test. Fifty years later, this gap was twice as large. Interestingly, the income-based gap grew despite the fact that racial gaps in test scores diminished during the same period (Jencks & Phillips 1998).[3]

Reardon explores the possible causal role rising income inequality may have played in generating the income-based test-score gap. He fails to find evidence that the growing income-achievement gap results from a growing achievement gap between children with highly and less-educated parents. But he also finds evidence that casts doubt on strong linkages between inequality and test scores. When he separates gaps at the high and low ends of the income distribution, he does not find that growing income gaps at the low end of the income distribution coincide with growing test scores between low and middle-income children. Nor do trends in high-end income and test score gaps coincide. Moreover, he finds evidence that the gap has grown at least in part from the growing importance of income for children's achievement.

Using data from the 1979 and 1997 National Longitudinal Surveys of Youth, Bailey and Dynarski (2011) show that graduation rates for children born into high-income families jumped twenty-one percentage points (from 33 to 54 percent) between the early 1960s and the early 1980s. The corresponding increase for children born into low-income families was only four percentage points (from 5 to 9 percent). A little less than half of the gap between rich and poor in college graduation rates can be explained by differences in college enrollment rates, with the rest explained by differences in students' persistence in completing their degrees.

The goal of the present paper is to relate these secular changes in income inequality to changes in years of completed schooling over the same period. In doing so, we add to the evidence produced by Reardon and by Bailey and Dynarski with a deeper investigation of the potential causal association between these two phenomena.

METHOD

Data

We use data spanning cohorts born between 1954 and 1985 from the Panel Study of Income Dynamics (PSID). The PSID has followed a nationally representative sample of families and their children from 1968 through 2009. Our analysis sample consists of 6,087 respondents who were observed in the PSID between ages 14 and 16 (the period over which we measure parental income and demographic variables) and had non-missing data on completed schooling around age 24. We adjust for differential non-response by using the PSID's attrition-adjusted weights in all of our analyses.

Completed education

We center our analysis on a continuous measure representing years of completed schooling reported at age 24 (between 1978 and 2009). This measure has a value between one and 17, where one through 16 represents the highest grade or year of school completed. The PSID assigns a value of 17 for those who report at least some post-graduate work. Because the PSID switched to a biannual survey starting in 1997, for the even years 1998-2008 the year immediately previous or immediately following the year the respondent was 24 was used. Further, education values for heads and wives are not asked annually as they are for other family members, so in some cases the most recent data available is also used.

Childhood income

We created a measure of average annual household income across the three calendar years when the child was 14-16 years old. We used the PSID's high-quality edited measure of annual total family income (pre-tax), which includes taxable income and cash transfers to all household members. Three-year average family incomes were inflated to 2010 levels using the U.S. consumer price index. Finally, income was truncated at the 1st and 99th percentiles to avoid undue influence from a handful of children with very large family incomes.

Control variables and regression procedures

We first look at simple trends in income and attainment inequality. But we also find it useful to calculate trends in these measures after adjusting for concurrent changes in key demographic correlates of income – family size, parent education and family structure – plus other demographic controls. We do not pretend to believe that these adjustments will isolate the causal impact of income in our comparisons of the completed schooling of poor and rich children, but they are useful for provide a rough estimate of association after controlling for trends in these demographic measures.

The specific set of controls used in the regressions are: fraction of years between ages 14 and 16 that the child household contained only one parent; highest completed schooling of the household head when the child was 14 years old; number of siblings (born to the child's mother); child sex (female=1) and race/ethnicity (Black and Hispanic). We run OLS regressions using STATA 11.0 SE, and all analyses were weighted using the provided attrition-adjusted weight. We test both linear and log regression specifications for associations between parental income and children's completed schooling.

RESULTS

Simple trends

We first sought to compare PSID information on income and schooling with Census data and data taken from the two youth cohorts in the National Longitudinal Studies of Youth. Figure 1 shows 10th, 50th and 90th percentiles of the distribution of child-based family income between 1968 and 1999 taken from the Current Population Survey.[4] Both sets of time series are child-based, although the CPS data are implicitly weighted by children of all ages, whereas PSID children were all age 14 at the time of the income measurement. Another difference is that we average trios of consecutive years in the PSID to remove some of its transitory sampling error, and we center each of the 3-year averages on the middle years. In all cases, the income figures are inflated to 2010 dollars using the CPI.

[Figure 1 about here]

Note first in Figure 1 that a child-based calculation of income trends in the Current Population Survey (and PSID) shows that the income gaps between the top and bottom of the income distribution were already increasing in the early 1970s, well before the point nearly 10 years later that marks the beginning of most accounts of the inequality increase. This has implications for how we think about using PSID cohorts to examine periods of increasing income inequality.

Turning to the comparative time series, Figure 1 show that incomes at all three points in the income distributions are higher in the PSID than CPS, which results in part from the older age of the PSID sample (all are age 14) relative to the CPS sample (children of all ages) and the fact that the PSID has always accounted for more aggregate income than the CPS (Fitzgerald et al., 1998). Our interest is in how well the two sets of time series track one another, particularly at the low and high ends of the income distribution. That appears to be the case, with the correlation between the two 90th percentile series at .78 and the 10th percentile correlation at .89. At .60, the correlation between the two time series of median income is somewhat lower.

Bailey and Dynarski (2011) present time series information on the relationship between childhood income and college completion. They use data from the NLSY79 and NLS97 to compare children in the top and bottom quartiles of the income distribution. They select children who began in these two studies between the ages of 14 and 19 and use parent family income measured in the first study year. They then measure of completed schooling as of age 25. As described above, our PSID analysis tracks average income between ages 14 and 16 and completed schooling at age 24. In both cases we measure college graduation rates.

Data from the two studies are shown in Figure 2. As might be expected from the fact that our use of 3-year average income quartiles likely includes fewer youth with transitory residence in the top and bottom income quintiles, PSID college graduation rates are higher in the top quartile and lower in the bottom quartile than in the two NLS datasets. The striking increase in graduation rates for top-quartile youth tracks closely in the two data sources. For bottom quartile youth, the PSID's rates are flat while the NLS's increase somewhat. We have no ready explanation for this difference.[5]

[Figure 2 about here]

Appendix Table 1 provides considerable details on trends in children's schooling, parent income and the other demographic variables used in our PSID-based analysis. Results are presented separately for all 31 birth cohorts taken together; for cohorts split according the whether they turned 14 in the first (1968-1981) or second (1982-1999) half of the period; and for three sets of cohorts defined by whether they turned 14 in the first (1968-73), middle (1980-85) or last (1994-99) six years of the period. All of these groups are used in our trend analyses.

Turning first to children's completed schooling, we see differential patterns of increases over time. Our primary interest is in differential trends for children in the top and bottom quintiles of the income distribution, which are also shown in Figure 3 for all PSID cohorts and in Figure 4 for cohorts grouped according to whether they turned 14 in the first, middle and last six year divisions of the sample. As might be suspected from Figure 2, schooling gaps between the top and bottom quintiles are quite large.

The year-by-year tracking of gaps in Figure 3 shows considerable variation. A fifth-order polynominal fit to the data shows relatively little change in the first half of the period, an increasing gap across the 1980s, and then little net change after that. Figure 4 smoothes out the yearly fluctuations using six-year averages. It shows that top-quintile children who turned 14 in the first six years of the period enjoyed a 2.32 year advantage in completed schooling over corresponding children in the bottom quintile. This advantage increased by nearly half (.43) a year by the end of the period. All of this increase occurred in the second half of the period – roughly the time covered in the Bailey and Dynarski (2011) study.

[Figures 3 and 4 about here]

Both absolute and relative income gaps grew as well (Figures 5-7). A fifth-order polynomial fit to the yearly times series of gaps shows a, increase in the first part of the period, followed by a flat period and then ending with an increase. When groups into six year periods (Figure 6), the average incomes of children in the top and bottom quintiles was $114,000 in the first six years of the period; this had grown to $157,000 by the last six years. About one-third of this increase occurred between the beginning and middle of our 31-year period. In the case of log income, a little more than half of the increase had occurred between the beginning and middle of the period. Juxtaposing the schooling and income trends in the first half of our accounting period presents one problem for an income-based explanation of changes in the schooling gap between high- and low-income children. Figure 6 shows that schooling gaps closed slightly, while at the same time income gaps were increasing.[6]

[Figures 5-7 about here]

Other large demographic changes were taking place as well, some of which favored high-income children and others favored low-income children. Best known are the increases in single-parent family structures, which were particularly sharp among low income children. In the first six years of the period, rates of single-parenthood for low-income youth averaged about 50% between ages 14 and 16. This increased to nearly 75% by the end of the period. The contrasting figures for high-income youth (3% and 6%) are much lower, and their increase was not statistically significant. As a result, the single-parenthood gap favoring higher-income children increased sharply over the period (Figure 8).

[Figure 8 about here]

Trends in parent education and family size are more mixed. Comparing the beginning and end of our 31-year period, the gap in both measured narrowed. For example, parental schooling levels for higher income children increased from 13.3 to 15.1 years. Parent schooling levels for low-income children were much lower (7.9 and 10.7 years) but increased more rapidly. And while family sizes are larger for low- relative to high income families, the gap narrowed between the beginning and end of the period. A glance at Figures 9 and 10 shows that the parent schooling gap trends are not monotonic, and that the entire gap closing in family size occurred in the first half of the period. It is obvious that an accounting of trends in high- and low-income children's schooling gaps will likely depend upon the calendar years chosen for the trend analysis.

[Figure 9 and 10 about here]

Regression results

The ability of changes in parent income and schooling and of family structure and size to account for increases in schooling disparities between high- and low-income children also depends on the importance of these demographic factors in determining children's schooling. We do not pretend that our demographic regressions can pinpoint the causal impacts of these factors. But it is instructive to perform this kind of accounting and then speculate on the sensitivity of our estimates to possible biases in our estimates of importance. Our schooling regressions are straightforward, using children's years of completed schooling as the dependent variable and, as independent variables, income, family structure and size (all averaged across ages 14-16), plus parent schooling, race, and Hispanic status and child gender and parity. We adjust standard errors to account for within-family clustering of siblings.

Regression results are summarize in Table 1 and detailed in Appendix Table 2. The first column presents regression results when all 31 cohorts are pooled together. Two version of this regression are shown, one with parental family income entered linearly and the other using the natural logarithm of family income. Coefficients on the remaining variables are taken from the log income regression. Table 1 presents both raw-score and standardized coefficients.

[Table 1 here]

Consistent with abundant past literature, parental income and education are the most powerful predictors of children's schooling. In log form, each log unit increase in income is associated with a .71 year increase in children's schooling, while each additional year of parent schooling is associated with a .21 year schooling increase for their children. The standardized coefficients on these two measures are in the .2-.3 range. A big surprise is seeing that, after adjusting for other variables, single-parent family structure does not have a statistically significant association with child schooling.[7] More expectedly, additional siblings are associated with less schooling.

Part of the story we are investigating involves possible changes in the importance of our demographic measures, in particular family income, in explaining children's completed schooling. The second and third columns of Table 1 show results from regressions fit separately for children born in the first and second halves of the 31-year period. Most surprising is that there is no statistically significant increase in the explanatory power of family income; in fact, point estimates show a small decline. This appears to be at odds with Reardon's (2011) and Belly and Lochner's (2007) conclusions.

We explored these surprising results in a number of ways. First, we estimated a piecewise linear relationships between income (and log income) and children's completed schooling fit to the first and second half of the period, which allows for separate linear segments for each income quintile. There was some indication (p values between .05 and .10) of an increase in the importance of the lowest income quintile, but nothing close to a statistically significant change elsewhere in the income distribution.

We also estimated models in which year the child turned age 14 was interacted with log income. A linear time trend did have a significant interaction (coefficient [and standard error] = .0105 [.0034]; main effect of log income = .541 [.076]) when time-based interactions with other demographic variables were not controlled for. A fully interacted model produces a negative although insignificant coefficient on the time by log income interaction variable: -.0069 [.0046].[8] Thus what appeared to be an increasing coefficient on income could be more than accounted for by controlling for other demographic measures. Interactions with the time trend express as a quadratic or cubic function did not come close to explaining incremental variation in completed schooling (p=.93 and p=..48, respectively).

The explanatory power of the other demographic measures changes much more markedly. The association between single-parent family structure of children schooling changes from slightly positive to strongly negative – living with a single-parent as opposed to two parents between ages 14-16 is associated with about one-quarter of year less schooling in the second half of the period. The importance of parent schooling increases as well, with the standardized coefficient increasing from .29 to .35. Associations between family size and completed schooling fall to nearly zero.

Still more detail on coefficient changes is shown in the last three columns of Table 1. Tracking changes from the early, middle and final years of the PSID, it shows no discernible trend in the income coefficients, family structure becoming important only for the latter cohorts, family size mattering only for the early cohorts, and the bulk of the increasing importance of parent schooling occurring in the early years of the observation period.

Accounting for change

Our original intention was to perform a Oaxaca-type decomposition on links between income and schooling – how much of the divergence in schooling outcomes for high- and low-income children could be attributed to increases in the *amount* of income separating the two groups versus increases in the *importance* of income for completed schooling? It is clear from Table 1 that, at least according to the estimates coming from our simple demographic regressions fit to data from the PSID, parent income hasn't become more predictive of children's completed schooling over the past 31 years. In contrast, the explanatory power of other demographic variables (parent education and single-parent family structure) has increased markedly.

As a result, we confine our accounting exercise to the first half of the Oaxaca approach. We choose two accounting periods – the first and last six years of the 31-year span provides the longest period over which changes could have taken place in our data, and the middle and last six years, which very roughly coincides with the period over which family income inequality has increased the most.

Earliest and most recent cohorts. The left panels of Table 2 and Figure 11 show the accounting for the first and last six years. Over that time, the schooling gap between children in the top and bottom quintiles of the family income distribution increased by .43 years. The gap in average family income increased by $42,500. When valued by the .080 coefficient from the "All cohorts" regression in Table 1, the increasing income gap accounts for .34 years of the schooling gap, which is about 80% of the raw .43-year gap. The log form of the regression applied to differences in log incomes of the top and bottom quintile children yields a similar estimate – 82% of the gap accounted for.

[Figure 11 here]

Changes in the high/low income gaps in the other demographic variables mattered much less. Although single-parent families became much more prevalent among low than high-income families, its penalty for completed schooling for children was very small, leading family structure changes to account for almost none of the increasing schooling gap. Since parent education increased more rapidly for low- than high-income children, the considerable explanatory power of parent education for children's completed schooling leads us to expect it to narrow rather than widen completed schooling gaps. So too with family size, which fell more rapidly for low- than high-income families and were also a force for narrowing rather than widening the schooling gaps.

Although not shown in the tables and figures, we also performed an accounting based on an even division of the cohorts according to the year in which they turned 14. Also using the coefficients from a regression fit across the 31 cohorts, we obtain an accounting that is somewhat more balanced but still shows that income matters the most. Instead of the 79% and 82% accounting power of linear and log income, this split produces corresponding fractions of 44% and 62%. For family structure, parent education and number of siblings, the 4%, -53% and -19% figures become 3%, -38% and -17%.

Changes since the early 1980s. Our final accounting of changes is based on the period most associated with increasing income inequality, using the middle (age 14 in 1980-85) and final (age 14 in 1994-99) six-year cohorts. This is a time over which children's schooling gaps increased markedly (by .55 years; Figure 5), as did gaps favoring high-income children in parent income, family structure and parent schooling. We use regression coefficients fit to data drawn from children turning 14 in the second half of our 31-year accounting period to value these gaps.

The accounting picture for this period, shown in the right-hand panel of Figure 11, is quite different. Increasing income gaps are not nearly as dominant as before, accounting for between one-quarter and one-third of the increases in the schooling gap.

DISCUSSION

We have used the 30+ year time series in the Panel Study of Income Dynamics to examine the evolution of income-based disparities in children's completed schooling in the United States. In line with the Bailey and Dynarski (2011) analysis of college graduation rates and Reardon's (2011) analysis of test scores, we find that gaps in the completed schooling of children in the top and bottom quintiles of the family income distribution increased by about half a year across the entire period, with virtually all of the increase occurring in the second half of the period. Our goal is to account for these increased schooling gaps changes with changes in the quantities and coefficients of income, parent education, family structure and size.

As might be expected from the CPS comparisons, gaps in both the absolute and relative incomes of 14-16 year old children in the top and bottom quintiles of the family income distribution grew sharply over the entire period; the gap in absolute income increased by $42,000 – more than 50%. But other big-ticket demographic changes were taking place at the same time. Rates of single-parent family structure increased much more for low- than higher-income children. Parent schooling increased substantially for both groups, more so for low-income children in the first half of the period but more so for high-income children in the second half. Sibship size fell for both groups as well, again more for low- than high-income children in the first half of the period and by similar amounts in the second half. Each of these demographic factors is correlated with child achievement, but since our purpose is to account for changes in the income-based disparities in children's completed schooling, it is apparent that these disparate trends would complicate our task.

Also complicating our task is the time series pattern of gaps in schooling completed by high and low-income children. Reardon's (2011) examination of test scores shows a steady increase in top/bottom test score gaps; the Bailey and Dynarski look at increasing gaps in completed schooling only span the second half of our accounting period. Here PSID data show little in the way of a trend in the gap prior to the late 1970s, despite the increase in income. The absence of an increasing schooling gap in the first half of the period complicates any attempt to link trends in schooling disparities to trends in income disparities.

Attempts to account for increasing schooling gaps with changing gaps in demographic measures requires some sort of measure of the relative importance of the demographic measures in explaining children's schooling. Our regressions provided several surprises. First, in contrast to the findings in Belley and Lochner (2007), there was no evidence that the predictive importance of family income had grown over time, though the latter study did not look at years of education as we did (instead, they looked at college attendance). Second, single-parent family structure was not associated with less schooling until the second half of our accounting period.

Our accounting exercise showed considerable sensitive of the results to the accounting period. Using the longest available accounting period, with individuals who were adolescents around 1970 to adolescents in the late 1990s, increases in income inequality accounted for almost all of the increasing schooling gaps between high and low income children. Looking only at second half of the period – from the early 1980s to the late 1990s shows a much balanced accounting, with increasing disparities in income, family structure and parent education dividing up the credit for increases in children's attainment more or less equally.

Our conclusions at this point are tentative. First, and most certain, our study adds to the evidence of growing gaps in important school-related outcomes of high- and low-income children over the past three decades. Second, it is clear that a number of important demographic changes were taking place over the period during which income inequality rose, some of which favored high income families but some favoring low-income families. This makes it impossible to say whether simple correlations between trends in schooling and income gaps over- or understate causal influences.

Third, we found no evidence that the importance of family income for children's completed schooling has increased over the past several decades. On the other hand, the importance of an indicator of the quality (parent education level) of parenting and one of our indicators of the quantity (single-parent family structure) of parenting increased sharply over the period. Perhaps whatever gains in the technology of parenting have occurred over the period are best captured by parenting activities.

Fourth, our most comprehensive look (for children born between 1954 and 1985) shows that increases in the income gaps between low- and high-income children can account for most (around 80%) of the increases in their schooling gaps. However, this is not a terribly robust result. Shortening the accounting period by half drops the accounting fraction by more than half. A definitive accounting of the importance of income inequality is not yet in hand.

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Table 1: Coefficients, standard errors and standardized coefficients from regressions of children's completed schooling on family income and demographic measures

	All cohorts	First half/ second half			First, middle and last six years		
	Age 14 in 1968-1999	Age 14 in 1968-1981	Age 14 in 1982-1999		Age 14 in 1968-1973	Age 14 in 1980-1985	Age 14 in 1994-1999
Parent income (average, age 14-16, in 2010$)							
Regression 1: Linear form	.080*** (.005) [β=.214]	.083*** (.008) [β= .205]	.074*** (.007) [β=.215]	*p* = .426	.077*** (.012) [β=.185]	.055*** (.013) [β=.148]	.070*** (.010) [β=.221]
Regression 2: Natural log form	.708*** (.044) [β= .242]	.761*** (.071) [β=.227]	.671*** (.057) [β=.255]	*p* = .326	.782*** (.110) [β=.223]	.661*** (.106) [β=.230]	.660*** (.082) [β=.259]
Other demographic measures (coefficients from regression #2)							
Single parent family (% of years, age 14-16	-.077 (.069) [β=-.015]	.141 (.108) [β=.024]	-.249** (.087) [β=-.054]	*p* < .01	.213 (.165) [β=.035]	.150 (.177) [β=.029]	-.609*** (.126) [β=-.133]
Number of siblings	-.110*** (.012) [β=-.116]	-.138*** (.015) [β=-.167]	-.004 (.023) [β=-.003]	*p* < .001	-.156*** (.022) [β=-.194]	-.009 (.032) [β=-.009]	-.049 (.042) [β=-.029]
Head's years of education	.208*** (.009) [β=.319]	.171*** (.011) [β=.286]	.257*** (.014) [β=.345]	p<.001	.150*** (.016) [β=.270]	.258*** (.024) [β=.358]	.254*** (.020) [β=.354]

Other controls	incl.	incl.	incl.	incl.	incl.	incl.
Number of observations	6,087	3,017	3,070	1,342	955	1,312

Regressions are weighted using the PSID attrition-adjusted weight.

Table 2: Accounting for increases in the schooling gap between the top and bottom income quintiles with mean changes in income and demographic measures

	Last minus first six years in period (total increase in schooling gap is .43 years)			Last minus middle six years in period (total increase in schooling gap is .55 years)		
	2nd – 1st period change in gap	Amount of schooling gap accounted for	Percent of gap accounted for	2nd – 1st period change in gap	Amount of schooling gap accounted for	Percent of gap accounted for
Completed schooling	0.43			0.55		
Parent income in $10K						
Linear	4.25	0.34	79.1%	2.60	0.19	35.0%
Natural log	0.50	0.35	82.3%	0.20	0.13	24.4%
Single parent family	-0.21	0.02	3.8%	-0.12	0.03	45.3%
Number of siblings	0.75	-0.08	-19.2%	0.02	0.00	0.0%
Mother's years of education	-1.09	-0.23	-52.7%	0.67	0.17	31.3%

Note: "Last minus first six years" gap changes are weighted by the "all cohorts" regression results shown in the first column of Table 2. "Last minus middle six years" gap changes are weighted by the "Age 14 in 1982-1999" regression results shown in the third column of Table 2.

Appendix Table 1: Means and standard deviations for variables used in the analysis, by year turned age 14

	All cohorts		First /second half of period				First /middle/last six years of period			
			Age 14 in 1968-1981	Age 14 in 1982-1999	p level of difference		Age 14 in 1968-1973	Age 14 in 1980-1985	Age 14 in 1994-1999	p level of difference
Years of completed schooling										
All	13.20 (2.03)		12.92 (2.03)	13.45 (1.99)	$p < .001$		12.79 (1.96)	13.07 (2.03)	13.70 (2.02)	$p < .001$
Bottom quintile	11.88 (1.65)		11.67 (1.64)	12.00 (1.65)	$p < .001$		11.44 (1.92)	11.74 (1.75)	12.21 (1.66)	$p < .001$
2nd quintile	12.41 (1.79)		11.83 (1.74)	12.74 (1.73)	$p < .001$		11.61 (1.69)	12.50 (2.02)	12.65 (1.66)	$p < .001$
3rd quintile	12.92 (1.84)		12.64 (1.81)	13.19 (1.84)	$p < .001$		12.55 (1.88)	12.80 (1.81)	13.43 (1.85)	$p < .001$
4th quintile	13.37 (1.88)		12.91 (1.78)	13.85 (1.86)	$p < .001$		12.65 (1.61)	13.40 (2.87)	14.25 (1.87)	$p < .001$
Top quintile	14.21 (1.99)		13.87 (2.09)	14.58 (1.81)	$p < .001$		13.76 (1.92)	13.94 (1.95)	14.96 (1.70)	$p < .001$
Top minus bottom quintile	2.33 (.08)		2.20 (.13)	2.58 (.11)	$p < .05$		2.32 (.20)	2.20 (.21)	2.75 (.13)	
Parent income (average, age 14-16, in 2010$)										
All	8.71 (5.45)		8.86 (5.03)	8.58 (5.78)	$p < .05$		8.65 (4.76)	8.24 (5.49)	9.05 (6.43)	$p < .01$
Bottom quintile	2.00 (.70)		2.23 (.58)	1.87 (.73)	$p < .001$		2.34 (.52)	1.97 (.68)	1.93 (.73)	$p < .001$
2nd quintile	4.11 (.69)		4.09 (.61)	4.12 (.74)	$p = .491$		3.95 (.54)	3.96 (.70)	3.97 (.66)	$p = .973$
3rd quintile	6.28 (.83)		6.11 (.79)	6.43 (.84)	$p < .001$		5.91 (.74)	5.89 (.74)	6.47 (.88)	$p < .001$
4th quintile	8.92 (1.19)		8.59 (1.14)	9.27 (1.15)	$p < .001$		8.19 (.99)	8.44 (1.07)	9.57 (1.20)	$p < .001$
Top quintile	15.32		14.48	16.22	$p < .001$		13.79	15.08	17.64	$p < .001$

	(4.77)		(4.42)	(4.96)			(4.45)	(5.11)	(5.17)	
Top minus bottom quintile	13.32 (.12)		12.25 (.18)	14.35 (.16)	$p < .001$		11.46 (.29)	13.11 (.31)	15.71 (.25)	
Parent income (average, age 14-16, in natural log)										
All	1.96 (.69)		2.02 (.61)	1.90 (.76)	$p < .001$		2.01 (.56)	1.89 (.71)	1.93 (.79)	$p < .001$
Bottom quintile	.62 (.41)		.76 (.30)	.54 (.44)	$p < .001$		.82 (.25)	.61 (.40)	.57 (.43)	$p < .001$
2nd quintile	1.40 (.17)		1.40 (.15)	1.40 (.19)	$p = .894$		1.37 (.14)	1.36 (.18)	1.36 (.17)	$p = .948$
3rd quintile	1.83 (.13)		1.80 (.13)	1.85 (.13)	$p < .001$		1.77 (.13)	1.77 (.12)	1.86 (.14)	$p < .001$
4th quintile	2.18 (.13)		2.14 (.13)	2.22 (.12)	$p < .001$		2.10 (.12)	2.13 (.13)	2.25 (.13)	$p < .001$
Top quintile	2.69 (.28)		2.63 (.27)	2.74 (.28)	$p < .001$		2.58 (.27)	2.67 (.30)	2.83 (.28)	$p < .001$
Top minus bottom quintile	2.07 (.01)		1.87 (.01)	2.20 (.01)	$p < .001$		1.76 (.02)	2.06 (.03)	2.26 (.02)	
Single parent family (% of years, age 14-16)	22.35 (39.80)		15.91 (34.95)	28.00 (42.82)	$p < .001$		13.33 (32.46)	21.43 (38.95)	31.26 (44.34)	$p < .001$
Bottom quintile	68.59 (44.27)		59.08 (47.77)	74.06 (41.17)	$p < .001$		50.80 (48.27)	60.04 (47.66)	74.64 (40.57)	$p < .001$
2nd quintile	44.09 (47.16)		38.06 (46.69)	47.55 (47.11)	$p = .157$		32.62 (45.95)	40.91 (46.35)	52.86 (47.28)	$p < .05$
3rd quintile	21.23 (39.06)		16.29 (35.51)	25.84 (41.62)	$p < .01$		14.01 (33.05)	23.97 (41.27)	33.96 (44.83)	$p < .01$
4th quintile	8.85 (25.47)		6.56 (21.45)	11.24 (28.91)	$p = .084$		6.56 (21.92)	6.19 (19.43)	13.26 (31.38)	$p < .05$
Top quintile	4.11 (17.64)		2.69 (14.12)	5.62 (20.66)	$p < .05$		3.54 (17.00)	3.03 (13.54)	5.93 (22.20)	$p = .240$
Top minus bottom	-64.49		-56.39	-68.44	$p < .001$		-47.26	-57.01	-68.71	

quintile	(1.50)		(2.08)	(2.15)			(3.23)	(3.68)	(3.31)	
Number of siblings	2.73 (2.12)		3.51 (2.46)	2.04 (1.46)	$p < .001$		3.76 (2.45)	2.55 (2.05)	1.92 (1.19)	$p < .001$
Bottom quintile	3.21 (2.45)		4.50 (3.05)	2.47 (1.61)	$p < .001$		4.85 (2.79)	3.22 (2.44)	2.42 (1.39)	$p < .001$
2nd quintile	3.05 (2.47)		4.46 (2.91)	2.24 (1.72)	$p < .001$		5.12 (3.00)	2.74 (2.35)	2.18 (1.28)	$p < .001$
3rd quintile	2.74 (2.16)		3.50 (2.48)	2.03 (1.51)	$p < .001$		3.86 (2.57)	2.62 (2.05)	1.78 (1.15)	$p < .001$
4th quintile	2.50 (1.67)		3.09 (1.84)	1.89 (1.21)	$p < .001$		3.34 (1.90)	2.12 (1.38)	1.81 (1.20)	$p < .001$
Top quintile	2.53 (1.03)		3.22 (2.34)	1.80 (1.27)	$p < .001$		3.34 (2.27)	2.42 (2.02)	1.65 (.87)	$p < .001$
Top minus bottom quintile	-.68 (.09)		-1.28 (.17)	-.68 (.07)	$p < .001$		-1.52 (.26)	-.79 (.22)	-.77 (.10)	
Head’s years of education	12.34 (3.10)		11.65 (3.39)	12.95 (2.68)	$p < .001$		11.28 (3.53)	12.40 (2.81)	13.09 (2.82)	$p < .001$
Bottom quintile	10.02 (2.93)		8.86 (3.19)	10.69 (2.53)	$p < .001$		7.86 (3.55)	10.37 (2.53)	10.72 (2.84)	$p < .001$
2nd quintile	11.03 (3.05)		9.57 (3.37)	11.86 (2.49)	$p < .001$		9.11 (3.51)	11.22 (3.05)	11.63 (2.55)	$p < .001$
3rd quintile	11.63 (2.89)		10.58 (3.00)	12.61 (2.39)	$p < .001$		9.97 (3.10)	11.80 (2.39)	12.74 (2.38)	$p < .001$
4th quintile	12.67 (2.75)		11.98 (2.99)	13.40 (2.25)	$p < .001$		11.61 (3.00)	12.83 (2.52)	13.66 (2.27)	$p < .001$
Top quintile	14.17 (2.43)		13.62 (2.66)	14.77 (2.01)	$p < .001$		13.35 (2.77)	14.10 (2.15)	15.12 (1.93)	$p < .001$
Top minus bottom quintile	4.15 (.12)		4.76 (.20)	4.07 (.14)	$p < .05$		5.49 (.34)	3.73 (.27)	4.40 (.21)	
Child first born?	33.40 (---)		26.30 (---)	39.62 (---)	$p < .001$		25.41 (---)	35.05 (---)	38.60 (---)	$p < .001$
Child male?	49.43 (---)		49.36 (---)	49.49 (---)	$p = .686$		49.24 (---)	50.42 (---)	47.40 (---)	$p = .329$
Black?	13.89 (---)		11.66 (---)	15.85 (---)	$p = .038$		10.49 (---)	13.40 (---)	18.37 (---)	$p < .001$
Hispanic?	3.41		3.61	3.23	$p = .008$		2.74	2.95	4.46	$p = .033$

	(---)		(---)	(---)			(---)	(---)	(---)	
Number of observations	6,141		3,017	3.124			1,342	955	1.356	

Note: Income quintiles are defined by family income averaged over ages 14-16 for each birth cohort.

Appendix Table 2: Coefficients and standard errors from regressions of children's completed schooling on family income and demographic measures

	All cohorts	First /second half of period			First/last six years in period			Middle/last six years in period		
		Age 14 in 1968-1981	Age 14 in 1982-1999	Difference	Age 14 in 1968-1973	Age 14 in 1994-1999	Difference	Age 14 in 1980-1985	Age 14 in 1994-1999	Difference
Parent income (average, age 14-16, in 2010$)										
Regression 1: Quintile form										
Lowest	(ref)	(ref)	(ref)		(ref)	(ref)		(ref)	(ref)	
Second	.311*** (.089)	.095 (.142)	.394*** (.112)	*p* =.099	.107 (.222)	.064 (.161)	*p* = .875	.640** (.215)	.064 (.161)	*p* < .05
Third	.669*** (.091)	.690*** (.139)	.616*** (.121)	*p* =.689	.844*** (.211)	.505** (.173)	*p* = .215	.902*** (.220)	.505** (.173)	*p* = .149
Fourth	.841*** (.094)	.667*** (.143)	1.031*** (.127)	*p* =.057	.635** (.216)	1.020*** (.184)	*p* = .385	1.243*** (.232)	1.020*** (.184)	*p* = .445
Highest	1.377*** (.099)	1.380*** (.149)	1.389*** (.134)	*p* =.964	1.510*** (.225)	1.302*** (.197)	*p* = .488	1.496*** (.240)	1.302*** (.197)	*p* = .528
Regression 2: Linear form	.080*** (.005)	.083*** (.008)	.074*** (.007)	*p* = .426	.077*** (.012)	.070*** (.010)	*p* = .644	.055*** (.013)	.070*** (.010)	*p* = .339
Regression 3: Natural log form	.708*** (.044)	.761*** (.071)	.671*** (.057)	*p* = .326	.782*** (.110)	.660*** (.082)	*p* = .372	.661*** (.106)	.660*** (.082)	*p* = .989
Other demographic measures (coefficients from regression #1)										
Single parent family (% of years, age 14-16	-.137* (.069)	.102 (.109)	-.288** (.088)	*p* < .01	.196 (.163)	-.614*** (.126)	*p* < .001	.204 (.180)	-.614*** (.126)	*p* < .001
Number of siblings	-.112*** (.012)	-.140*** (.015)	-.006 (.023)	*p* < .001	-.152*** (.022)	-.050 (.042)	*p* < .05	-.004 (.033)	-.050 (.042)	*p* = .394
Head's years of education	.212*** (.009)	.170*** (.011)	.262*** (.014)	*p* < .001	.147*** (.016)	.254*** (.020)	*p* < .001	.261*** (.024)	.254*** (.020)	*p* = .818
Child first born?	.054	-.013	.141*	*p* = .136	-.055	.292**	*p* < .05	.161	.292**	*p* = .415

	(.051)	(.079)	(.066)		(.116)	(.097)		(.133)	(.097)	
Child male?	-.255*** (.044)	-.138* (.064)	-.379*** (.061)	*p* < .05	-.188* (.093)	-.578*** (.090)	*p* < .01	-.201 (.115)	-.578*** (.090)	*p* < .01
Black?	.171* (.071)	.351** (.112)	.019 (.091)	*p* < .001	.343* (.172)	-.187 (.127)	*p* < .05	.428* (.192)	-.187 (.127)	*p* < .01
Hispanic?	.116 (.126)	-.352* (.175)	.630*** (.180)	*p* < .001	-.196 (.295)	1.252*** (.243)	*p* < .001	-.300 (.340)	1.252*** (.243)	*p* < .001
R^2 (from regression #1)	.27	.25	.29		.25	.37		.25	.37	
Number of observations	6,087	3,017	3,070		1,342	1,312		955	1,312	

Regressions are weighted using the PSID attrition-adjusted weight

Appendix Table 3: Coefficients, standard errors and standardized coefficients from bivariate regressions of children's completed schooling on family income and demographic measures

	All cohorts	First half/ second half	
	Age 14 in 1968-1999	Age 14 in 1968-1981	Age 14 in 1982-1999
Parent income (average, age 14-16, in 2010$)			
Linear form	.146*** (.004) [β=.393]	.144*** (.007) [β= .360]	.149*** (.006) [β=.432]
Natural log	1.164*** (.034) [β= .398]	1.240*** (.057) [β=.371]	1.183*** (.042) [β=.449]
Other demographic measures			
Single parent family (% of years, age 14-16	-.820*** (.064) [β=-.161]	-.643*** (.105) [β=-.111]	-1.120** (.082) [β=-.241]
Number of siblings	-.228*** (.012) [β=-.239]	-.224*** (.014) [β=-.271]	-.174*** (.024) [β=-.128]
Head's years of education	.301*** (.007) [β=.461]	.256*** (.010) [β=.428]	.352*** (.012) [β=.474]
Number of observations	6,087	3,017	3,070

Each coefficient comes from a bivariate regression of children's completed schooling on the given measure. Regressions are weighted using the PSID attrition-adjusted weight.

Figure 1: CPS (all ages) and PSID (age 14) income distributions for children

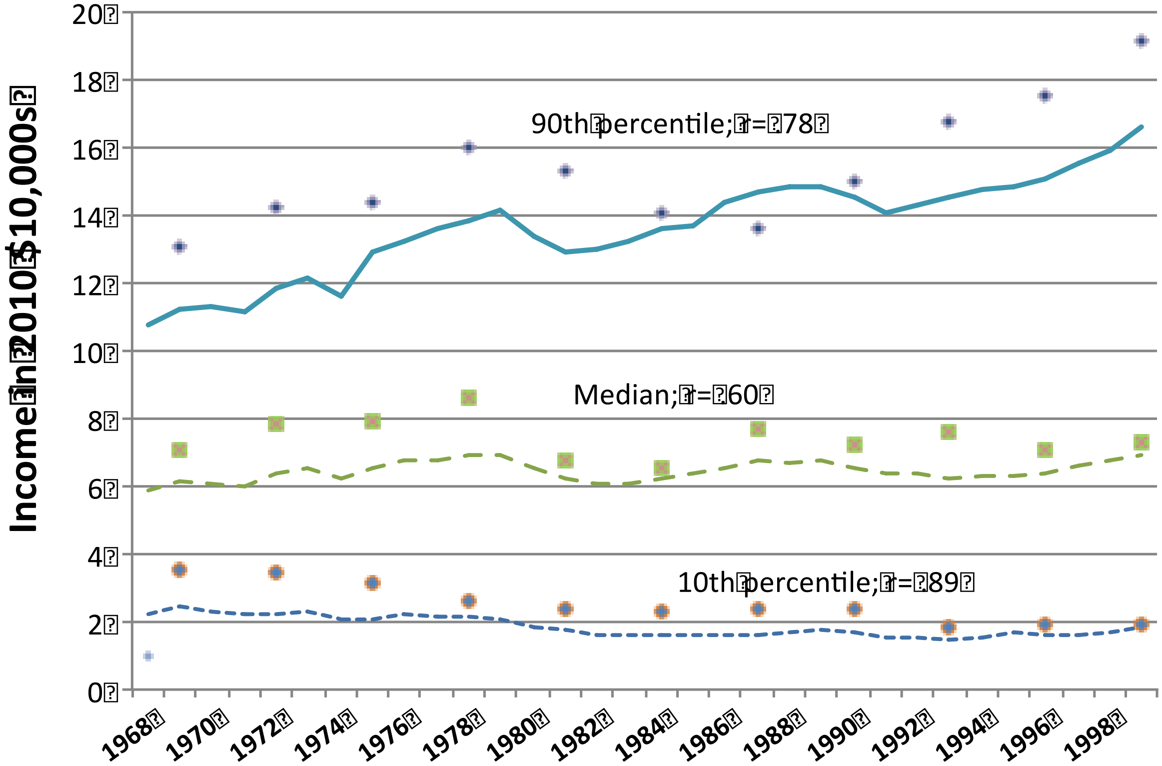
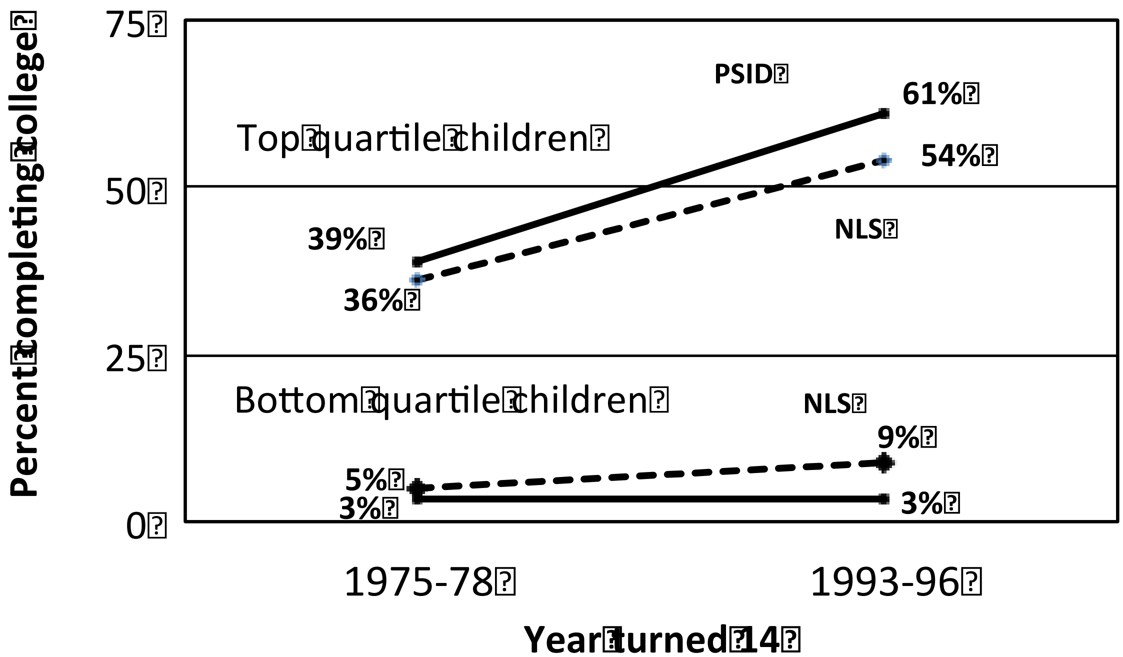


Figure 2: College graduation rates for high and low income children in NLS and PSID



Bailey and Dynarski (2011) for NLSY; authors' calculations for the PSID

Figure 3: Top minus Bottom Quintile Differences in Cohort-specific Children's Years of Completed Schooling

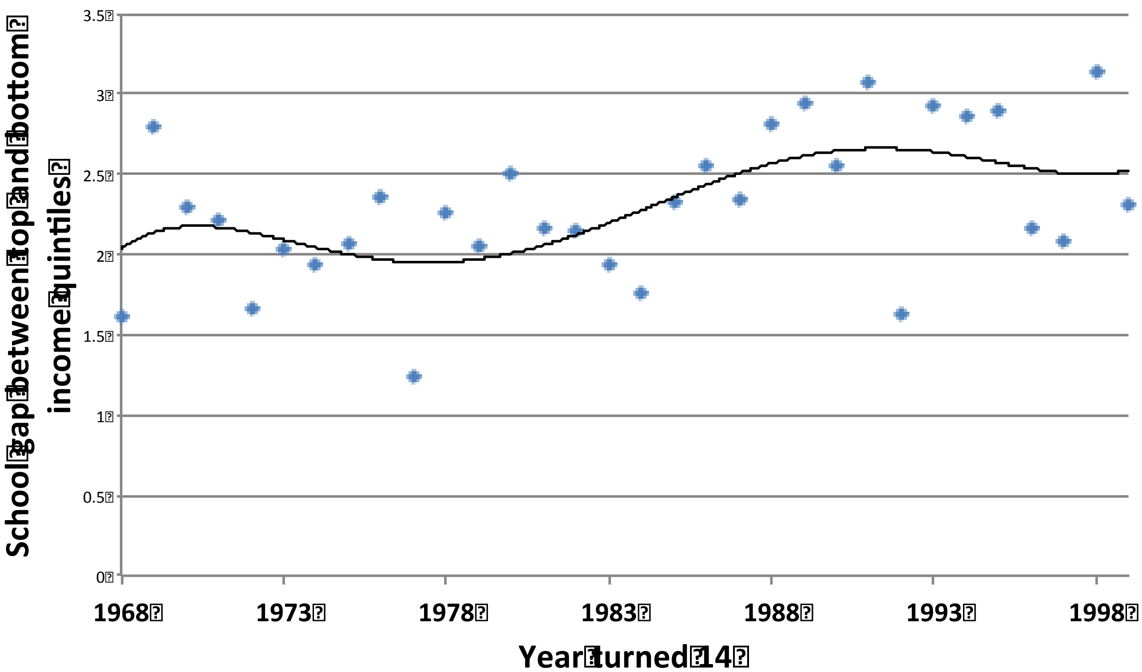
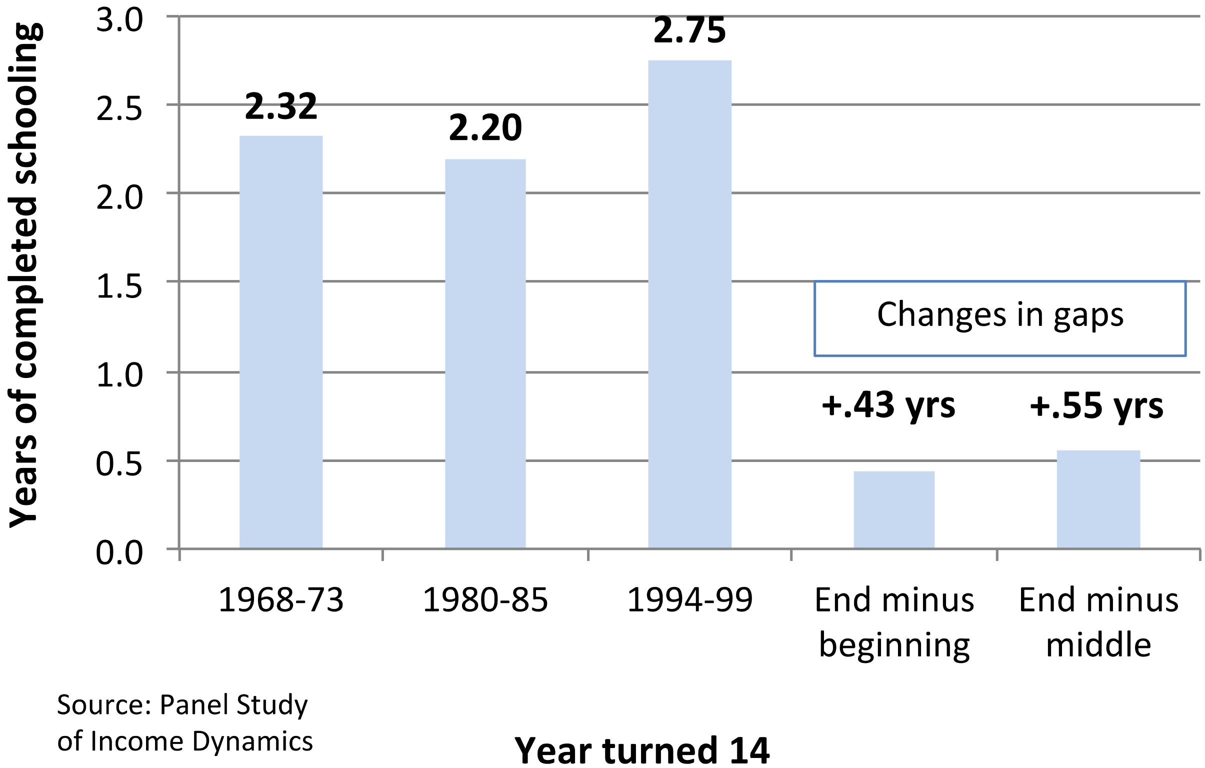


Figure 4: Top minus Bottom Quintile Differences in Children's Years of Completed Schooling



Source: Panel Study of Income Dynamics

Figure 5: Top minus Bottom Quintile Differences in Cohort-specific Family Income

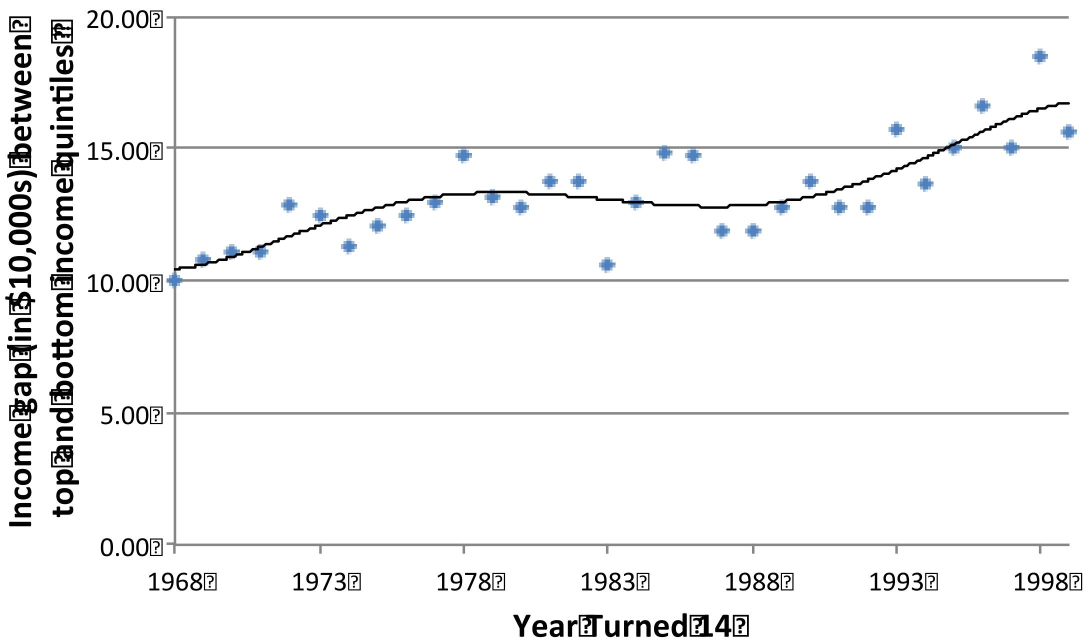
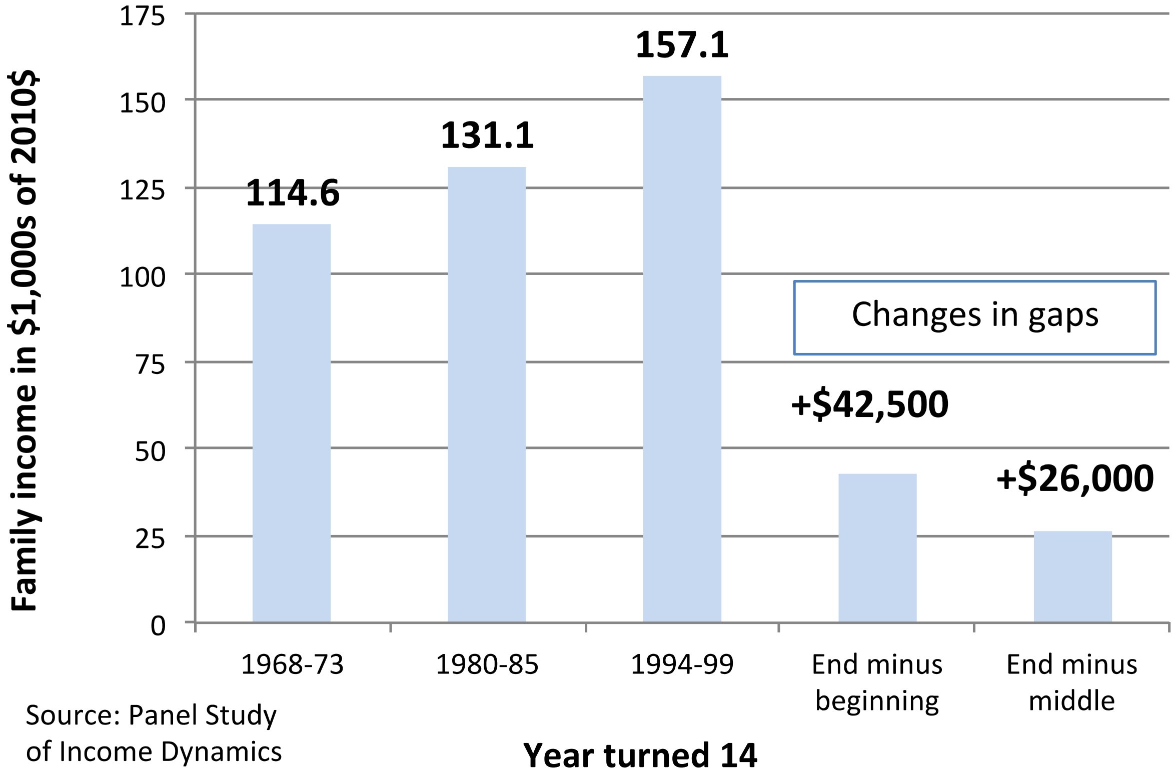
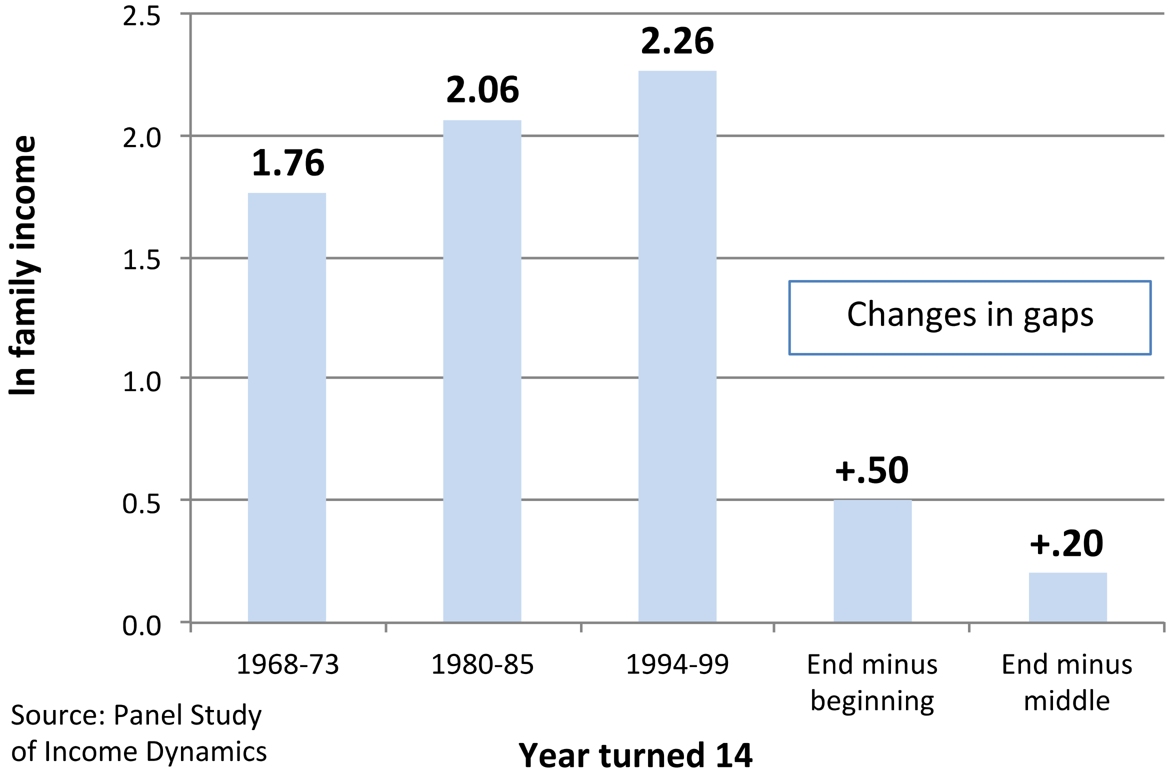


Figure 6: Top minus Bottom Quintile Differences in Family Income



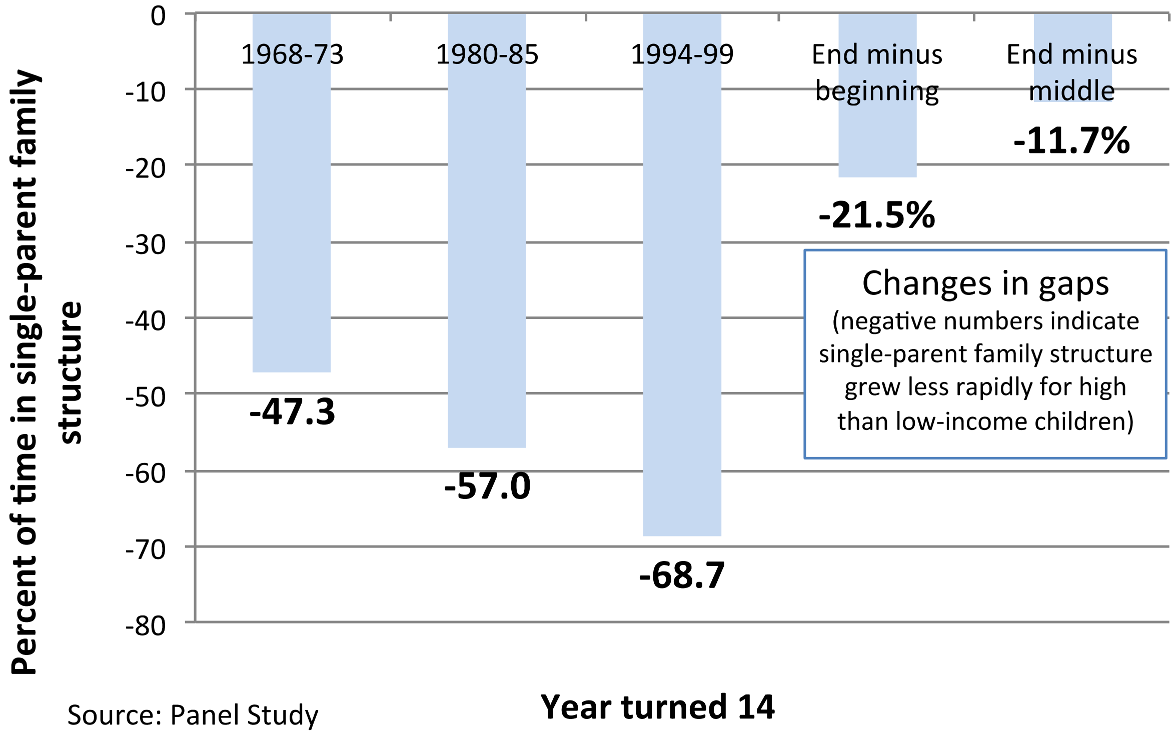
Source: Panel Study of Income Dynamics

Figure 7: Top minus Bottom Quintile Differences in ln Family Income



Source: Panel Study of Income Dynamics

Figure 8: Top minus Bottom Quintile Differences in Single Parent Family Structure



Source: Panel Study of Income Dynamics

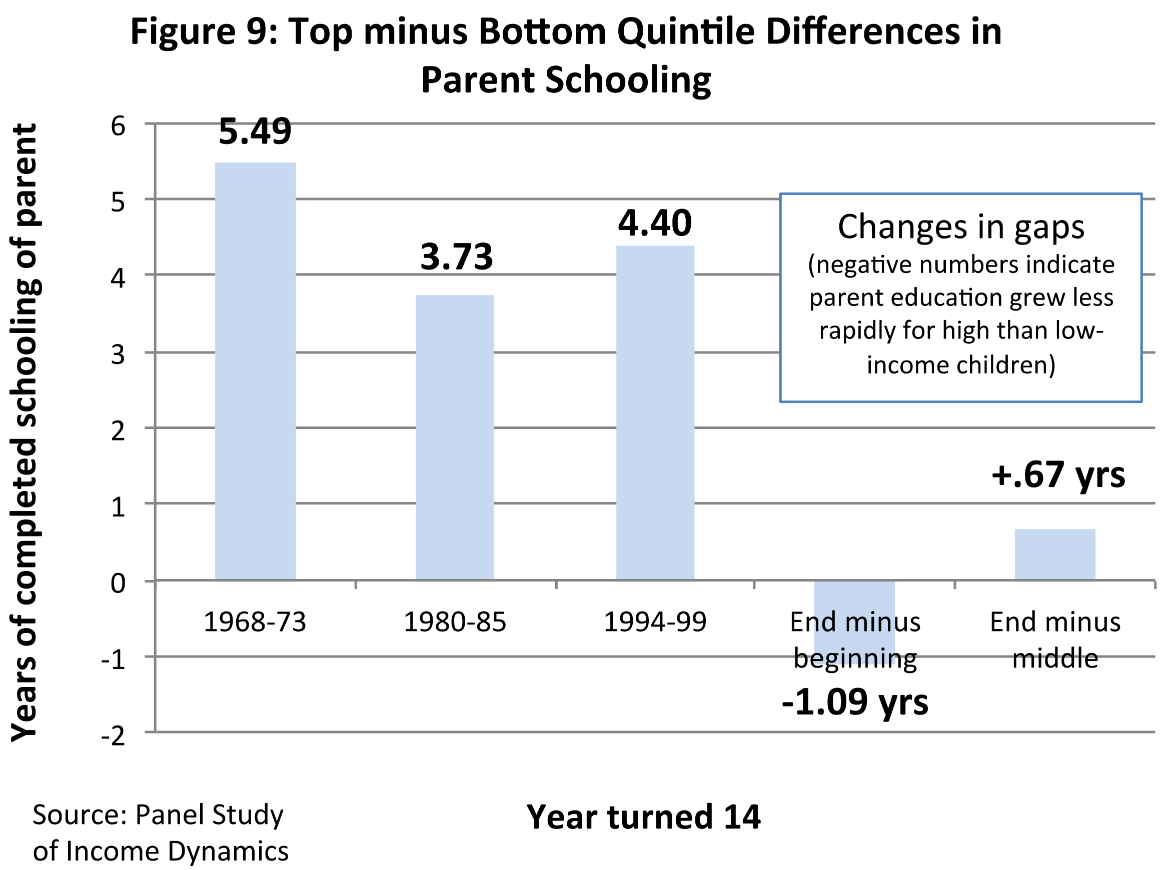


Figure 9: Top minus Bottom Quintile Differences in Parent Schooling
Years of completed schooling of parent
6
5
4
3
2
1
0
-1
-2
5.49
3.73
4.40
+.67 yrs
-1.09 yrs
Changes in gaps
(negative numbers indicate parent education grew less rapidly for high than low-income children)
1968-73
1980-85
1994-99
End minus beginning
End minus middle
Year turned 14
Source: Panel Study of Income Dynamics

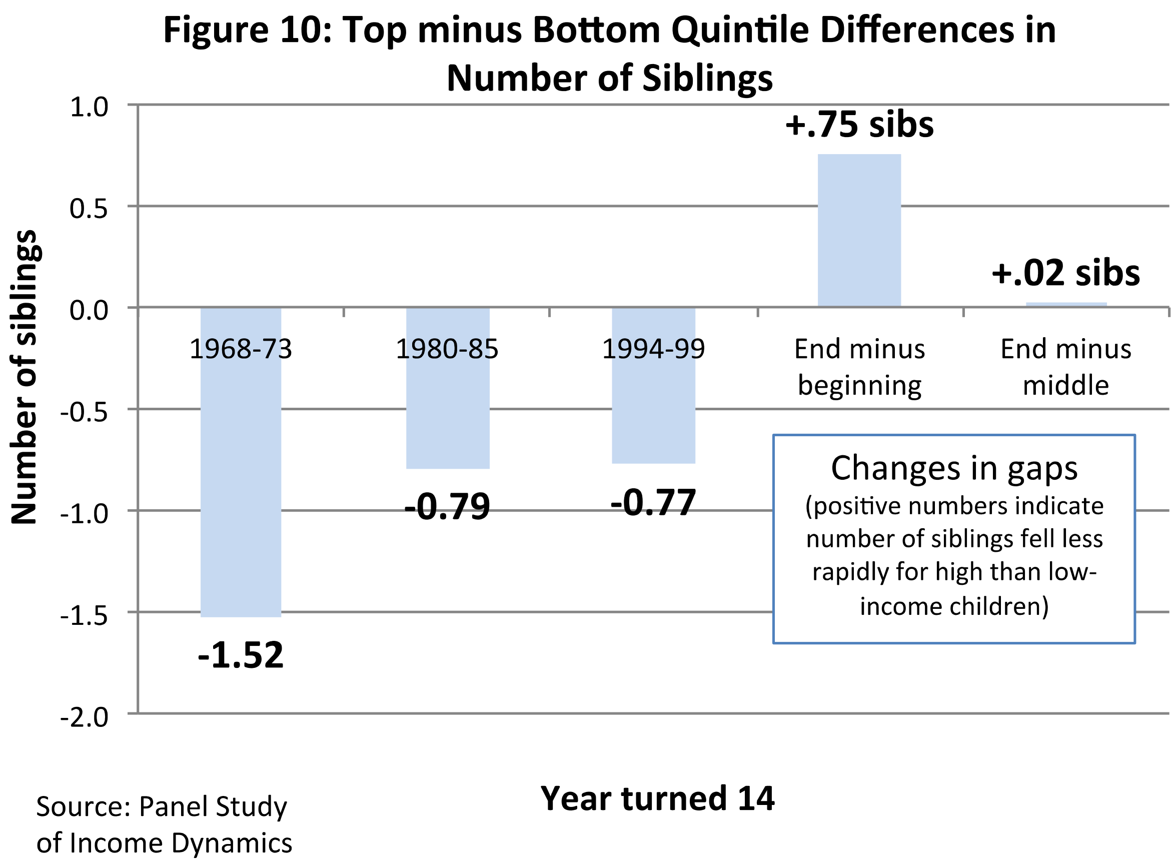
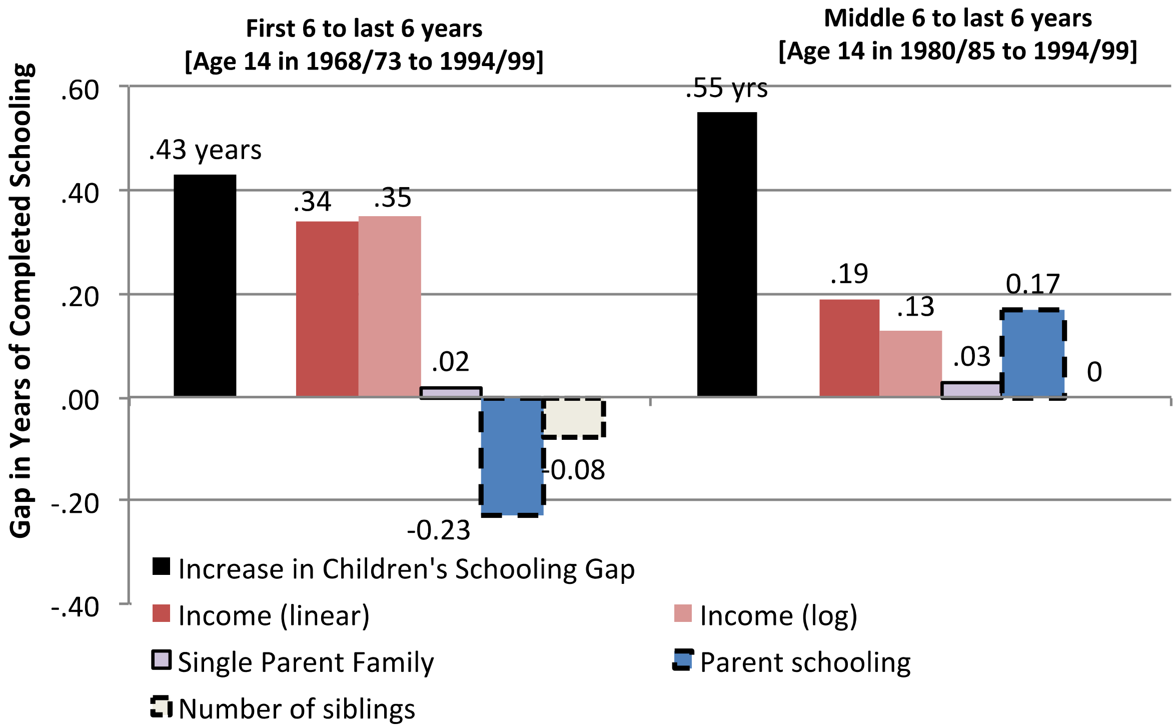


Figure 10: Top minus Bottom Quintile Differences in Number of Siblings
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
Number of siblings
+.75 sibs
+.02 sibs
1968-73
1980-85
1994-99
End minus beginning
End minus middle
-1.52
-0.79
-0.77
Changes in gaps
(positive numbers indicate number of siblings fell less rapidly for high than low-income children)
Year turned 14
Source: Panel Study of Income Dynamics

Figure 11: Accounting for Increases in the Schooling Gap for Children in the Top and Bottom Quintiles



ENDNOTES

[1] These data are reported in Duncan and Murnane (2011) and are from the U.S. Census Bureau, which started tracking annual family income in 1947.

[2] Bianchi et al. (2003), however, using different time use data, show that the rise in childcare time that started in about 1985 did not apply differentially to mothers (or fathers) with and without college degrees. Indeed, these authors conclude that from 1965-2000 there was no evidence that parental time investments were becoming more differentiated by educational attainment.

[3] Reardon compiles information from all available U.S. national surveys that compiled information on both test scores and child income. The numbers on the graph show the ages at which the achievement test was given.

[4] Sean Reardon kindly supplied us with the CPS data.

[5] Apart from marriage between immigrants and nonimmigrants (and the 1997 addition of an immigrant cohort), the PSID has no mechanism for adding immigrants to its sample. Since both the NLSY79 and the NLS97 drew fresh dwelling-based samples of youth, their samples should include immigrants in the population at the time the samples were drawn. Given the generally lower college-graduation rates for immigrants, this ought to lead the NLS-based samples to show less of an increase in graduation rates than the PSID. On the other hand, the intergenerational trust built up by the PSID with its repeated contacts since 1968 might lead to higher response rates among highly disadvantaged youth, which would lead the PSID to show less of an increase in college graduation rates. Another possible source of difference is the age at which completed schooling is measured – 25 in the NLS and 24 in the PSID. Given the considerable schooling undertaken by low-income women in their 20s, the younger age may reduce completed schooling in the PSID relative to the NLS.

[6] It is tricky to think about timing issues. For one thing, our age 14-16 accounting period over which family income is measured was chosen for practical rather than conceptual reasons; it enabled us to gain as many PSID birth cohorts as possible for which both family income and children's completed schooling were measured at sensible ages. If income before or after the age 14-16 window matters the most for children's schooling, then our age 14-16 window may be providing an erroneous reading of the degree to which income inequality that may be causing disparities in completed schooling.

[7] As shown in Appendix Table 3, the bivariate coefficient on single-parent family structure, -.820, is much larger, statistically significant and has the expected negative sign.

[8] In contrast, time interactions with single parent (negative sign), parent education (positive sign) and sibship size (positive sign) were all statistically significant at $p<.001$.