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Intergenerational trends in educational and income mobility in the United States of America since the 1960s

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► Intergenerational trends in educational and income mobility in the United States of America since the 1960s

Authors / Ekkehard Ernst, François Langot, Rossana Merola, Jhon Jair Gonzales Pulgarin





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Abstract

Concerns about widening inequality have increased attention on the topic of equality of opportunities and intergenerational mobility. We use data from the National Longitudinal Survey of Youth to analyse how educational and income mobility has evolved in the United States of America.

We show that since the 1980s the probability of moving from the bottom to the top of the education and income distribution (upward mobility) has increased. On the other hand, for children whose parents graduated from college, downward educational and income mobility has decreased. High parental income enables parents to insure against intergenerational income falling, generating a correlation between parents' and children's income.

We conclude that American society, by increasing the number of university places, has created opportunities for students from low-income families to achieve higher educational attainments, which have pushed them out of the immobility trap. However, society has also developed an elite, which is wealthy and well educated. For those born to this elite, their family's status has a strong impact on their welfare and that of future generations.

Keywords: inequality, education, social mobility.

JEL classification: I24, J24, J31, J62.

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► Introduction

Social cohesion in the United States of America (the US) has long been based on the idea that all economic opportunities are accessible to everyone (this is the iconic “rags-to-riches American dream”). From this perspective, social mobility is a prerequisite for sustaining “American-style” society, which is the guarantee that everyone can access any remuneration based on their merits (Alesina et al. 2018).¹ The credibility of this American-style society is, therefore, based on there being effective “prospects of upward mobility” (Benabou and Ok 2001).²

In this paper, we measure whether, over time, access to all opportunities offered by the American economy has become more open and, hence, enhanced social mobility. We contribute to the literature by analysing the role of educational mobility in the economic mobility process.³ So far, the evidence is scarce, as we discuss in section 2.

We believe that this is a relevant topic to analyse, since social mobility – in terms of income and education – tends to correlate negatively with inequality and poverty. Common wisdom says that countries with higher income inequality tend to have lower intergenerational income mobility, which is supported by findings by Chetty et al. (2014b). The relationship between social mobility and inequality has even been given its own name – the “Great Gatsby Curve” (for example, Corak 2013; Blanden 2013). Educational mobility also plays a key role. Using the Global Database of Intergenerational Mobility, Narayan et al. (2018) find that countries that have higher educational mobility are characterized by higher growth, and lower inequality and poverty.

We analyse intergenerational education and income mobility in the US, for children born between 1957 and 1964 and between 1980 and 1984, using the 1979 and 1997 versions of the National Longitudinal Survey of Youth (NLSY).⁴ Chetty et al. (2017) argue that it is essential to have data available that establishes a link between parents and children, to fully understand the evolution of social mobility. The NLSY provides valuable information on the links between parents and children, which therefore allows us to understand intergenerational social mobility.

For children whose parents have had a tertiary education, we show the probability of attaining a bachelor's degree has remained stable for cohorts born between 1957 and 1964, and has significantly increased for those born between 1980 and 1984. This suggests that making universities more accessible in the 1960s had an impact on upward educational mobility in the US.⁵ Across the period we examine, the probability that a child – whose parents have had a tertiary education – will attain a bachelor's degree has an inverted U shape. This shows there was a break in the social reproduction of the elite (Bourdieu 1984). For example, having at least one parent with a bachelor's degree accounts for 70 per cent of the probability that a child born between 1957 and 1964 will graduate, but the parents' contribution declines to less than 60 per cent for children born between 1980 and 1984. In other words, cohorts who have a parent with a bachelor's degree have had 3.5 times more chances to attain a bachelor's degree than those whose parents

¹ “America has always been a land of opportunity, a land where, if you work hard, you can get ahead” (Clinton 1995). When Americans were asked to explain the meaning of “the American dream” for the 2009 Economic Mobility Project, they typically said it is: “Being able to succeed regardless of the economic circumstances in which you were born.” With this in mind, lower-income individuals do not ask for large redistributive policies, because they expect that they, or their children, will climb the income ladder (Corak 2013).

² Upward income mobility is defined as the strictly positive probability of ending up in the top 25 per cent of earnings, even when parents have an income in the bottom half of the income distribution (Chetty et al. 2014a).

³ The literature distinguishes between absolute and relative mobility. Absolute mobility measures whether society's education, income and general living standards have increased; this is often measured by the percentage of people who have a higher income than their parents. Relative mobility refers to the likelihood that children will move from their parents' rank in the social hierarchy. In this paper, we focus on relative mobility.

⁴ Intergenerational social mobility refers to children's ability to attain a higher social status than their parents (OECD 2018).

⁵ These findings are consistent with, and extend, the results of Hilger (2015). Hilger estimates that educational mobility strongly increased between the 1930s and the 1970s, and slightly declines after the 1980s.

have not had a tertiary education, if they were born between 1957 and 1964, but only 2.25 times more chances if they were born between 1980 and 1984.

Intergenerational educational mobility is the sum of downward mobility and upward mobility. In the US, intergenerational educational mobility has risen since the 1960s, and our results point out that upward education mobility is the stronger force at work. However, low-educated parents have also been able to invest more in their children's education, which has led to an increase in their children attaining a higher education, because the number of higher education places has risen. This rise in places is a necessary condition: after the children of higher-educated parents have been registered at universities, the increased number of university places leaves more opportunities for the rest.

Since education tends to be a strong predictor of lifetime earnings, the increase in educational mobility could also induce an increase in income mobility in the US. We test this in the second part of the paper, by analysing how income mobility has evolved. We compute intergenerational income elasticity (IGE), which is the elasticity of a child's income with respect to their parents' income.⁶ We show that IGE is continuously decreasing, suggesting that income mobility of cohorts born between 1957 and 1984 has been increasing. These results are consistent with those for educational mobility, for which upward mobility has also been increasing significantly.

However, changes to IGE, as a measure of income mobility, can be affected by changes to intergenerational inequality. In our sample, income inequality among youth has declined over the period we examine, while income inequality among parents has risen. This has led to a significant decline in the relative income inequality between youths and parents. Therefore, even if the correlation between children's and parents' incomes remains stable over the period, IGE mechanically declines, driven by the reduction in the relative income inequality between youths and parents. The declining IGE supports the idea that income mobility in the US is rising. However, this rise is misleading as it is only driven by the increase in income inequalities among parents.

To isolate income mobility from changes in income inequality, we use an alternative measure of income mobility: the rank–rank correlation. This measures the association between parents ranking in the income distribution and their children's ranking in the income distribution when they are adults.⁷ Chetty et al. (2014a) show that rank–rank correlations and IGE estimates are closely related; the rank–rank correlation can be viewed as the IGE estimate, but without the effect of shifting relative inequalities. The rank–rank correlation decreases only slightly over time, which points to a modest increase in income mobility. Our results are similar to those of Chetty et al. (2014a), showing that, overall, the rank–rank intergenerational correlation has not changed. IGE decreased only for cohorts between 1971 and 1993, because of increasing income inequality.

We subsequently test whether parental education has an impact on children's income. We find that parents' income has a greater impact on children's income when parents are highly educated. This result is consistent with the view that highly educated parents invest more in their children and send them to better quality schools, leading to their children having higher cognitive skills and completing more years of schooling, which ultimately affects the children's earnings (Blanden et al. 2007; Keane and Wolpin 2001; Daruich and Kozlowski 2020). However, we also find that the income of parents with no college degree has a very small impact on the income ranking of their children, and that income differences among parents with no college degree do not explain the income positions of their children.

⁶ Intergenerational mobility can be measured in relative or absolute terms. According to Chetty et al. (2014a), IGE is an indicator of relative mobility. IGE is obtained by running a regression of the logarithm of the child's income on the logarithm of the parents' income (log–log estimate).

⁷ The measure of intergenerational income mobility, in relative terms, is based on the correlation between the ranking of children's and parents' incomes. This is obtained by performing a regression of the percentile rank of a child in the income distribution of children and the percentile rank of their parents in the income distribution of parents. The slope of this regression reflects the association between the income distribution of children and their parents.

Our results highlight that, even in a society where people – in principle – can move upwards, the perpetuation of privileges creates "stickiness" at the top of the distribution. This is because wealthy students are more likely to have access to the most prestigious colleges.⁸ Chetty et al. (2020) argue that most students at Ivy League colleges come from families in the top 1.0 per cent of the income distribution, while only 3.8 per cent of the students come from the bottom quintile of the income distribution. Sandel describes this as: "American higher education is like an elevator in a building that most people enter on the top floor" (Sandel 2021).

Finally, we use matrices of mobility to analyse upward mobility – the combination of educational and income mobility. While we show that upward mobility has risen, we also observe that downward mobility has declined over the same period, which points to the perpetuation of elites. We conclude that, by the end of the 1980s, the American system has successfully improved educational opportunities for children from low-income families, by increasing the number of university seats. However, society has also developed an elite, which is wealthy and well educated. For those born to this elite, their family's status has a strong impact on their welfare and that of future generations.

⁸ The New York Times has published comprehensive information on the correlation between parental income and the university that their children attend (Aisch et al. 2017).

► 1 Related literature

Analysing intergenerational mobility is crucial to understanding economic inequalities, as intergenerational mobility is an indicator of the extent to which children can succeed regardless of their family background.

People who believe that opportunities are unequally distributed, and high income can buy better education, are less keen to accept current income disparities. Perception of equal opportunities is crucial for social stability and cohesion (OECD 2022).

One strand of the literature analyses the impact of educational mobility on economic mobility. So far, there is scarce empirical evidence on this subject, but the literature does point out that the impact varies between regions. In Latin America, education has a strong impact on economic mobility (Torche 2014). In contrast, Assad and Saleh (2018) and Binzel and Carvalho (2017) show that educational mobility in Jordan and Egypt respectively has not increased income mobility, which suggests that the educational pathway plays a limited role in economic mobility.

Becker et al. (2018) develop a theoretical model that predicts that, under certain circumstances, there are strong complementarities between parents' and children's education.⁹ This implies that societies develop a highly educated elite, whose members have high mobility but not "across the endogenously determined class boundaries" (Becker et al. 2018, p. 9). Therefore, a family's initial status has a strong impact on the welfare of its future generations. These theoretical predictions are consistent with observed data in OECD countries. Throughout OECD countries, high parental educational attainment has a positive influence on the likelihood that their children will complete tertiary education or an advanced research programme (OECD 2017).¹⁰

Another strand of the literature analyses how intergenerational mobility has evolved. Narayan et al. (2018) provide an overview of intergenerational mobility around the world and compare income and educational mobility in developing and developed countries. Focusing on the US, Autor (2014) stresses the importance of measuring whether mobility for children born before and after the historic rise of US inequality has appreciably changed. Related to this, Davis and Mazumder (2017) document a sharp decline in income mobility for cohorts born around 1960, compared with those born in the 1940s. The reason for this trend is that most of those born around 1960 entered the labour market after the large increase in inequality, which started in the early 1980s; those born in the 1940s entered the labour market before this inflection point.

However, Chetty et al. (2014a) reach different conclusions. They find that mobility has not changed since the 1970s. A lacking trend for intergenerational mobility contrasts with the increasing income inequality observed in recent decades, since inequality and mobility are negatively correlated (this is the Great Gatsby Curve we discussed in the Introduction). One explanation for this

⁹ If there is high elasticity between parents' and children's human capital and between children's earnings and their parent's investments in human capital, the relationship between parents' and children's human capital will be convex, leading to high returns on human capital investments. The complementarities of parents' and children's human capital imply that parents have a strong influence on the human capital of their children.

¹⁰ In OECD countries, on average, children whose parents have a tertiary degree are 55 per cent likely to obtain a tertiary degree themselves ("immobility at the top"), whereas this likelihood is 20 per cent for children whose parents do not have a tertiary degree ("upward mobility"). Using comparable data, immobility at the top and upward mobility are, respectively, 55 per cent and 25 per cent in the US; 62 per cent and 17 per cent in France; 60 per cent and 33 per cent in Norway; and 65 per cent and 25 per cent in the UK. This represents a 30 percentage point (pp) gap in the US and a 45 pp gap in France. In the US, 19 per cent of people aged 30 to 44 years old whose parents have not had a tertiary education (2012, 2015) have completed tertiary type A or an advanced research programme. The equivalent proportions are 16 per cent in France, 33 per cent in Norway and 25 per cent in the UK. In contrast, in the US, 56 per cent of people aged 30 to 44 years old (2012 or 2015) with at least one parent who has a tertiary education degree have completed tertiary type A or an advanced research programme. The equivalent proportions are 62 per cent in France, 61 per cent in Norway and 64 per cent in the UK (OECD 2017). This represents a 37 percentage point (pp) gap in the US and a 46 pp gap in France.

is that the increase in inequality has been driven by the extreme upper tail, and there is little correlation between mobility and inequality in the extreme upper tail, while the correlation between inequality and mobility is driven primarily by "middle-class" inequality (Piketty and Saez 2003; Chetty et al. 2014b).

In the same vein as Chetty et al. (2014a), Lee and Solon (2009) argue that intergenerational mobility has not changed. They say that estimates are imprecise due to an inefficient use of data. Chetty et al. (2017) argue that a lack of data to establish a link between parents and their children prevents researchers from fully understanding how income mobility has evolved in the US.

Ayasse et al. (2016) provide an analysis of the American dream in different US states. They define the "American dream" as the probability that youths will end up in the national fifth quintile of the income distribution, given that their parents were in the national first quintile of the income distribution.

The probabilities range from 0.0408 for South Carolina to 0.19 for North Dakota. After three generations, the probabilities range from 0.123 for Georgia to 0.344 for North Dakota.

The Pew Charitable Trusts (2012) finds that younger generations of Americans have higher earnings than their parents had at the same age, although there is some persistence in income position. For example, 43 per cent of adults whose parents' income was in the bottom quintile of the income distribution remained in the bottom quintile, while 40 per cent of adults whose parents' income was in the top quintile of the income distribution remained in the top quintile. Despite this persistence, this research also shows that educational attainments push people out of the immobility trap. For example, 47 per cent of adults whose parents' income was in the bottom quintile of the income distribution remain in the bottom quintile if they do not have a college degree, but only 10 per cent remain in the bottom quintile if they attain a college degree. Meanwhile, an adult whose parents' income was in the top quintile is more likely to remain in the top quintile if they have a bachelor's degree than if they do not (51 per cent compared with 25 per cent).¹¹

¹¹ Stockhausen (2018) computed absolute and relative income mobility for youth in West Germany and the US who were born between 1955 and 1975. He finds that the share of youth who earn more than their parents (absolute mobility) amounts to 67 per cent in West Germany and 60 per cent in the US. In terms of relative income mobility, 66 per cent of West German youth and 50 per cent of American youth whose parents were in the lowest quartile manage to end up in the highest quartile. West Germany exhibits a lower estimated IGE than the US (0.299 and 0.483 respectively), suggesting higher income mobility in West Germany. Combining the two measures (absolute and relative income mobility) Stockhausen (2018) shows that 56 per cent of West German youth and 52 per cent of American youth who have higher income than their parents have ended up in one higher income quartile at least.

► 2 Data description

Before discussing data on educational attainments and income trends, in this section we give a short overview of the historical context for education attainments and the evolution of global trends in the US.

Educational mobility in the US is a result of the educational system, which has undergone a big transformation. Over the last century, American universities have increased seats and the proportion of youths who go to college has dramatically increased.

American universities were initially conceived to preserve the values of Protestantism. They were marked by religious idealism, and this influenced the type of students who colleges accepted. For example, the 300 students who attended Harvard during the administration of Dunster and Chauncy, between 1642 and 1672, were mainly English exiles or their sons; sons of ministers and magistrates; sons of the gentry; and sons of college-educated fathers (Geiger 2016). This situation remained unchanged during the late nineteenth and early twentieth centuries. During the 1950s, the American university system was influenced by the ideas of James Bryant Conant who, citing Thomas Jefferson, referred to social mobility as an essential feature of a classless society in the US. Conant (1940) pointed out that the education system has a role in providing people with opportunities to develop their skills and improve their chances for social mobility.

The spread of Conant's ideas, together with demographic growth and public reforms, may explain why the percentage of adults aged 25 to 29 years old with at least a bachelor's degree increased: in 1940, 5 per cent had a bachelor's degree or higher, while in 1976, 24 per cent had a bachelor's degree or higher. By 2015, this percentage had risen to 36 per cent (see [Census website](#)).

Overview of the National Longitudinal Survey of Youth

The primary purpose of the NLSY is to collect data on young people's experiences of the labour force, attachment to the labour market and investment in education and training. The NLSY shows how different socioeconomic variables have evolved for people who were 14 to 22 years old in the first round of the 1979 version (NLSY79) or 12 to 17 years old in the first round of the 1997 version (NLSY97).¹²

In 1979, the NLSY79 surveyed 12,686 young men and women who were born between 1957 and 1964. This sample was interviewed annually from 1979 to 1994, and biennially thereafter. Data are now available from round 1 in 1979 through to round 28 in 2018. The initial cohort of NLSY97 was 8,984 young men and women who were divided into two subsamples:

A cross-sectional sample of 6,748 respondents who were born between 1980 and 1984. The subsample was designed to represent people living in the US during the initial survey round.

1. A cross-sectional sample of 6,748 respondents who were born between 1980 and 1984. The subsample was designed to represent people living in the US during the initial survey round.

¹² See Appendix A for more details on how the NLSY cohorts are distributed.

2. A supplemental sample of 2,236 respondents who were born between 1980 and 1984. The subsample was designed to overrepresent Hispanic, Latino and Black people living in the US during the initial survey round.

The NLSY97 cohort has so far been surveyed 19 times; it is now interviewed biennially. Data are now available from round 1 in 1997/98 through to round 19 in 2019/2020, and from a COVID-19 supplement in 2021, which asked respondents how the COVID pandemic was affecting their health and employment.¹³ Our study characterizes individuals by their educational attainment and income 30 years after they were born, and by the educational attainment and income of their parents during the corresponding rounds of the NLSY97.¹⁴

Educational attainment

In our study, we define a “skilled individual” as an NLSY respondent who has more than 15 years of schooling or more than 3 years of college education (this is the number of years needed to attain a bachelor’s degree). If a respondent has less schooling, we define them as “unskilled”.

If a respondent’s mother, father or both parents have the number of years of schooling that was needed to attain a bachelor’s degree in 1979 or 1997, we define them as skilled.¹⁵ For each NLSY79 respondent, we compare their educational attainment at age 30 with the educational attainment of their parents. For this information, we use data recorded in 1979, because parents were more than 30 years old in that year and, therefore, had already made education investment decisions.

We consider similar procedures for youth in the NLSY97. In this case, we compare the educational attainment of respondent at age 30 with that achieved by their parents before 1997.

Educational attainment of youths

We observe youth 30 years after their birth. If they have enough years of schooling to attain a bachelor’s degree, we define them as “skilled children”. Otherwise, we define them as “unskilled children”. For example, to calculate whether youth born in 1957 are skilled or unskilled, we use information from the variable R24454 labelled HGREV87. This asks youth this question from the 1979 survey: “What is the highest grade completed as of May of the survey year 1987?” Cohorts born in other years were asked a similar question.¹⁶ The answers to this question range from 0 to 20 years of schooling or 8 or more years of college education. We deem the respondent is skilled if he/she has more than 15 years of schooling or more than 3 years of college education.

For years 2010, 2011, 2013 and 2015, we use the variable `cv_hgv_ever_edt_year` to compute the level of education that NLSY97 respondents have attained. We use a similar methodology to compute the educational attainment of NLSY79 respondents.

¹³ While it could be possible to analyse the upward mobility in education by race and gender, the data may be insufficient for statistical precision. Even if it was possible to carry analyse the NLSY97 data by race and gender, it would be impossible to analyse the NLSY79, because multiple steps would be needed to compute family income.

¹⁴ In our study, we check that parents are at least 30 years old, as parents are unlikely to make investments in their education before then. See Appendix A for the age distribution of youths and parents. The purpose of stating the age requirement for parents at 30 is to emphasize that individuals may have fewer incentives to invest in their education beyond this age.

¹⁵ We are unable to say if the father or the mother obtained in fact the diploma. To facilitate the presentation, we will say subsequently that those having a number of years of study permitting to have at least a bachelor are graduates at least with a bachelor’s degree.

¹⁶ Using the NLSY79, we compute the education completed by youth respondents in 1987, 1994 and 1996 for those born in 1957, 1964 and 1965 respectively. Similarly, the NLSY97 allows us to compute the education completed by youth respondents in 2010, 2013 and 2015 for those born in 1980, 1983 and 1987, respectively. Because of data availability, we cannot compute the education of youth respondents in 1995, 2012 or 2014, and use 1996, 2013 and 2015 respectively instead.

Educational attainment of parents

We define the father or the mother of the respondent as a “skilled parent” if they have more than 15 years of schooling or more than 3 years of college education.

We use the variables `hgc_father_1979` and `hgc_mother_1979` to compute indicators of education for the mother and father of each NLSY79 respondents. These variables provide information on the number of years of education a parent has attained.

Similarly, we use the variables `cv_hgc_bio_dad_1997` and `cv_hgc_bio_mom_1997` to obtain information about the level of education that the mother and father of each NLSY97 respondent has attained.

In NLSY79 and NLSY97 these variables range from zero years of schooling through to eight years of college education.

Income

Youths' income (NLSY79 and NLSY97)

For each of the birth cohorts, we use the pre-tax income from wages and salaries to define the income of youths when they are 30 years old (variable `R35590`, questions 13 to 15).

For the years 1987 to 1994, we use the variable `Trunc_Revised_year` to obtain the total pre-tax income from salary, wages, commissions or tips in the past calendar year.

For years 2010, 2011, 2013 and 2015 for NLSY97, we use the variable `T75456` labelled `YINC_1700_year` to obtain the total pre-tax income from salary, wages, commissions or tips.

In the case of the NLSY79, the available data is truncated at the top of the income distribution. Data administrators have employed various truncation methods during different periods. Specifically, between 1979 and 1984, incomes exceeding \$75,000 have been truncated to \$75,001; from 1985 to 1988, values above \$100,000 have been truncated to \$100,001. Subsequently, different algorithms were implemented. For the NLSY97, top-coding of income variables is applied to 2% of the reported values, and these values are replaced by the mean of the high values. We use the International Monetary Fund (IMF) Consumer Price Index (CPI) to deflate all income variables.¹⁷

Parents' income (NLSY79)

Variable `tnfi_trunc_1979` is the total pre-tax family income in the past calendar year. We use this variable as a proxy for parents' income in 1979. This variable provides information about the different sources of income of household members who are related to the respondent by blood or marriage. We use data only for youths living with their parents at the time of the survey.

We extract the possible income that youths are contributing to the family income variable, leaving what is mainly parents' income. We use the variable `R0173700` labelled `hhi-2` (version of household record from screener) to identify any youth respondents who are married or have children and delete them from the sample.

¹⁷ For the CPI for the US, refer to IMF data (<https://data.imf.org/?sk=4FFB52B2-3653-409A-B471-D47B46D904B5&sId=1485878855236>).

Out of 12,686 NLSY79 respondents, we identify 8,838 youth respondents living with their parents. To distinguish the parents' and youth's incomes, parents answer questionnaire A and youths answer a shorter, more limited questionnaire.¹⁸ The household income is based on the information provided by parents.

We extract the youths' income from the net family income variable using two types of variables:

1. The variable R01554 labelled S21Q02A, which is the total salary and wage income of each youth in the past calendar year. This variable excludes youths who are 18 years old or older, have a child, are enrolled in college, are married, are living outside the parents' home or have served in the military services in the past calendar year.
2. The variable R01691 labelled INCOME-24 for the other youths, who do not meet any of the previous criteria.

Parents' income (NLSY97)

For the NLSY97, we have precise information about parents' income, so we can directly compare it with children's income.¹⁹ We use the variable R1204500 labelled `cv_income_gross_yr_1997`, which is a proxy indicator of family income in 1997.²⁰ This variable provides information on the gross household income in the past calendar year.

Representativeness of data

To generate our sample, we apply several restrictions to the NLSY data. To check if our sample is representative of the American population, we compare our observations with summary statistics computed using the Current Population Survey (CPS).

Table 1 shows that the education and race of youths are homogenized in the CPS and the NLSY, but the proportion of female youths is lower in the NLSY79 than in the CPS. The proportion of educated youths is similar in the NLSY79 and the CPS, but quite different in the NLSY97. The proportion of educated people increases more steeply in the NLSY97 than in the CPS. Finally, the earnings distribution of youths in the NLSY is similar to the CPS. We conclude that our sample is representative of youths aged 30 years in the US.

¹⁸ If the youth is 18 years old or older, has a child, is enrolled in college, is married or is living outside the parents' home, they answer a more complex questionnaire about their income. For more information, see Table 1 on the NLSY79 website (<https://www.nlsinfo.org/content/cohorts/NLSY79>).

¹⁹ This information is not available for 2001.

²⁰ This variable is computed by combining several components. For more information, see National Longitudinal Surveys (<https://www.nlsinfo.org/>).

► **Table 1. Characteristics and earnings of youth: a comparison of CPS and NLSY data**

Variable		CPS 1987–1994	NLSY79 1987–1994	CPS 2010–2013	NLSY97 2010–2013
Male (%)		53.38	61.20	52.60	54.43
Female (%)		46.62	38.80	47.40	45.57
Non-Black (%)		91.05	89.16	89.07	88.51
Black (%)		8.95	10.84	10.93	11.49
Low educated (%)		74.41	76.29	63.95	51.26
High educated (%)		25.59	23.71	36.05	48.74
Income (US \$)	Average	35 165.48	37 123.56	39 432.70	38 009.00
	P25	18 423.78	21 109.88	19 387.95	20 000.00
	P50	31 400.87	34 226.88	32 011.00	32 761.15
	P75	47 127.06	48 936.55	49 906.80	50 000.00
Number of observations		17,257	1,726	8,648	1,517

Note: The NLSY data are weighted. P25, P50 and P75 are respectively the 25th percentile, the 50th percentile or median and the 75th percentile.

Table 2 compares parents' income distributions in our sample (this data is extracted from the NLSY79 and the NLSY97) with CPS data. Our data from the NLSY97 is comparable with the CPS (this shows our data are representative of the US population) but our data from the NLSY79 is not. These differences are no surprise, as Jo (2006) has already shown that the NLSY97 and CPS do not represent the same population.²¹

²¹ In particular, the NLSY oversamples Hispanic and Black people. This overbalance is not sufficiently corrected by the weight matrix to assert that Hispanic and Black individuals are relatively poor within the sample.

► Table 2. Parents' income (in US \$): a comparison of CPS and NLSY data

Year	Source	Average	SD	P25	P50	P75	Observations
1987	CPS	42 709	31 428	20 310	36 355	57 687	19 113
	NLSY79	66 504	43 304	30 045	55 584	94 643	189
1988	CPS	40 647	29 463	19 580	34 750	54 574	23 037
	NLSY79	62 439	38 279	33 808	58 212	82 027	225
1989	CPS	39 972	28 189	19 185	34 788	54 474	23 141
	NLSY79	63 358	37 503	35 972	55 877	81 538	225
1990	CPS	41 114	30 647	19 432	35 042	55 372	21 405
	NLSY79	64 860	36 943	40 447	61 010	79 087	252
1991	CPS	42 294	31 399	19 992	35 906	56 256	21 839
	NLSY79	68 901	38 504	39 407	64 584	96 110	233
1992	CPS	42 715	31 621	20 973	36 313	56 884	22 236
	NLSY79	58 124	33 579	33 269	52 476	74 620	208
1993	CPS	43 660	31 599	20 831	37 887	59 193	23 137
	NLSY79	70 403	43 014	40 543	66 643	95 276	206
1994	CPS	44 825	32 504	21 501	39 288	60 080	23 497
	NLSY79	69 131	43 036	37 798	59 682	90 517	188
2010	CPS	48 882	53 391	21 735	38 036	59 082	25 716
	NLSY79	47 049	47 095	16 301	33 961	63 847	408
2011	CPS	50 173	53 477	22 733	39 518	60 546	25 528
	NLSY79	51 542	51 339	21 403	40 130	64 209	345
2012	CPS	51 296	54 025	23 562	39 337	62 474	26 046
	NLSY79	47 402	35 710	24 052	41 889	65 452	390
2013	CPS	50 137	46 102	22 851	39 255	62 333	26 441
	NLSY79	48 688	42 813	23 806	37 988	63 314	374

► 3 Educational mobility

Stylized facts

One way to measure the evolution of educational mobility between different cohorts is to construct mobility matrices between parents without a bachelor's degree and children with a bachelor's degree. These 2×2 matrices are used to measure how the probability of attaining a bachelor's degree, given the family's educational background, has evolved.²²

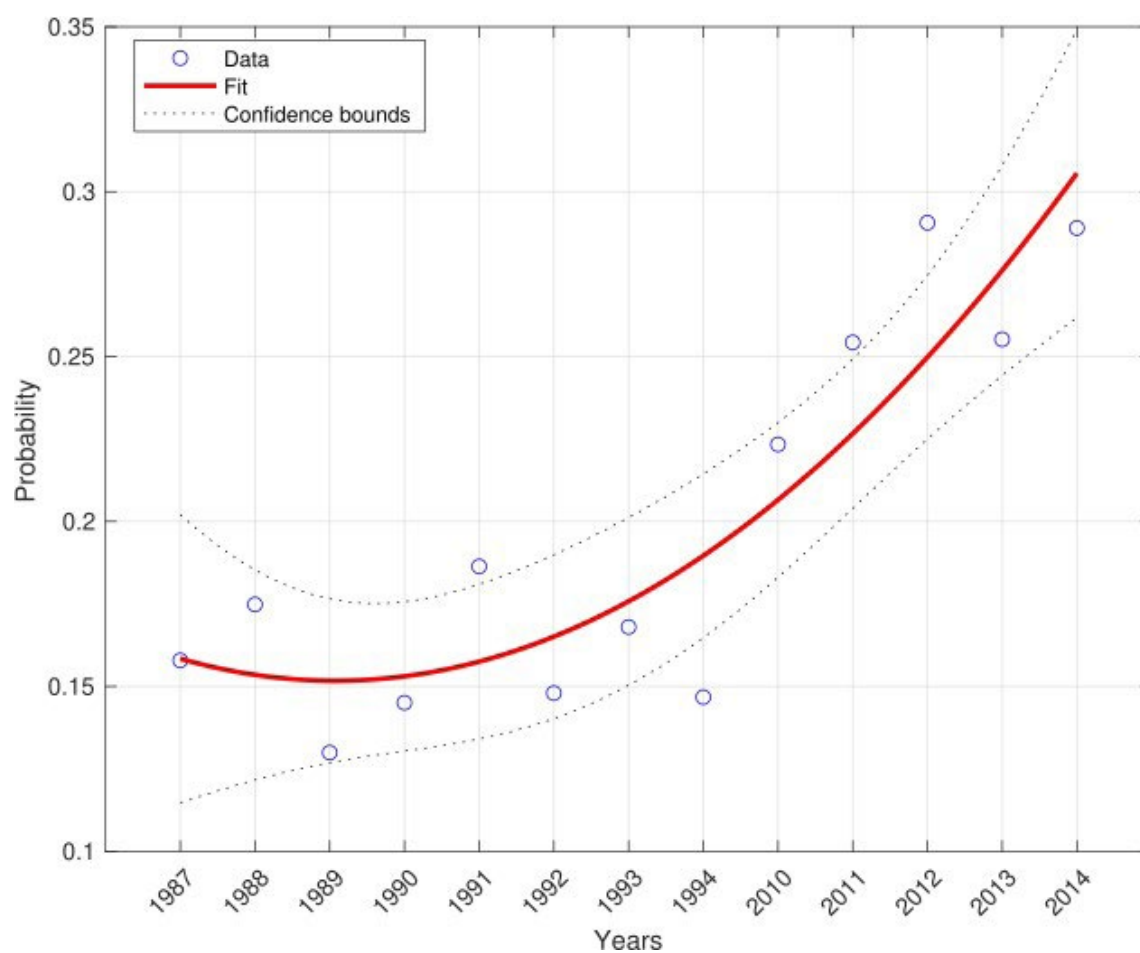
Panel (a) in Figure 1 shows how the probability of a child attaining a bachelor's degree if their parents do not have a bachelor's degree has evolved (upward educational mobility). In 25 years, the probability has more than doubled, so we conclude that upward mobility has clearly increased since the end of the 1980s.

Panel (b) in Figure 1 shows the probability of a child not attaining a bachelor's degree despite their parents having a bachelor's degree (downward educational mobility). In 25 years, the probability has more than halved, so we conclude that downward mobility has greatly diminished.

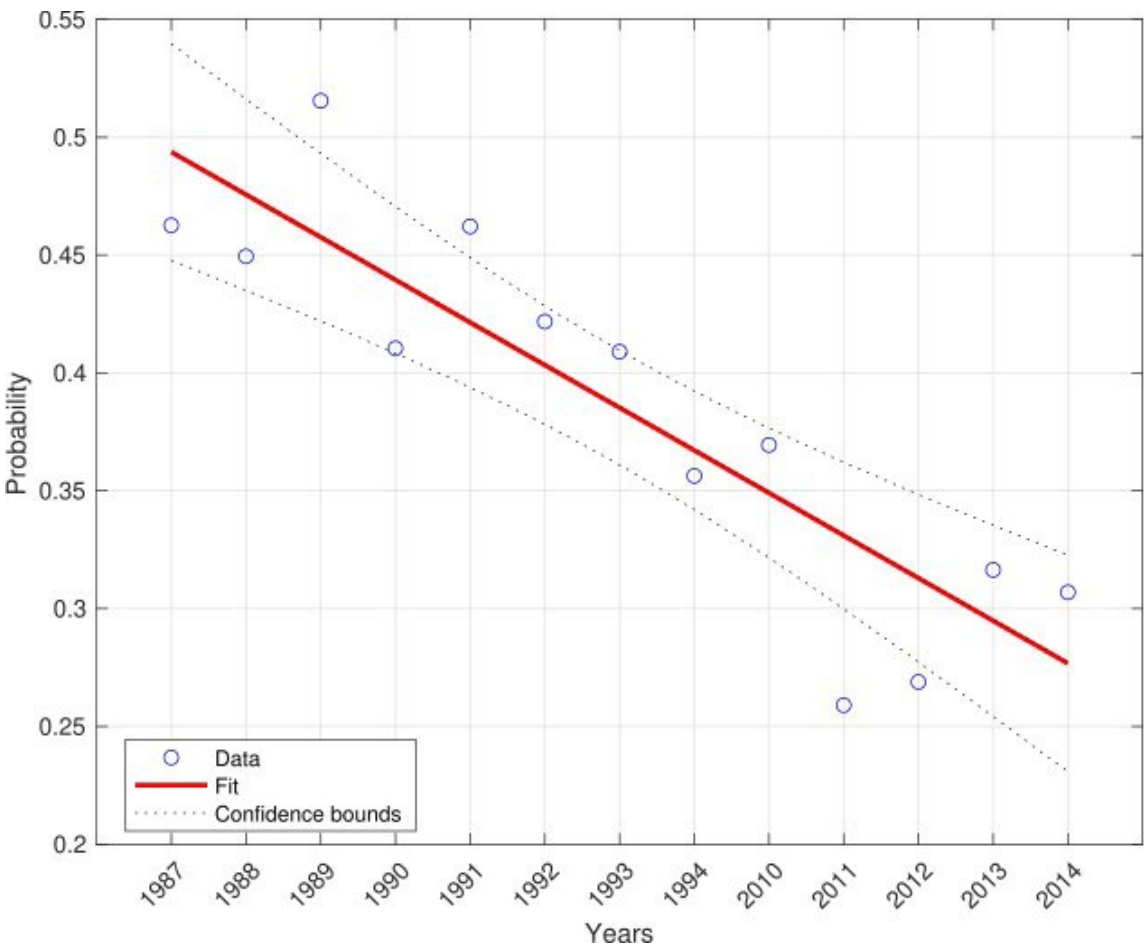
Finally, panel (c) in Figure 1 shows that total educational mobility (this is the share of upward and downward mobility in all intergenerational transitions) in the US has increased since the late 1980s. This underlines the strong force of upward mobility, which dominates the reduction in downward mobility.

²² The matrix of educational mobility is $\begin{bmatrix} N_{uu} & N_{us} \\ N_{su} & N_{ss} \end{bmatrix}$, where u denotes "unskilled" and s denotes "skilled". Therefore, for example, the probability that a child whose parents do not have a bachelor degree can obtain a bachelor degree themselves is for a child with parents without a bachelor's degree is $N_{us}/(N_{uu} + N_{us})$.

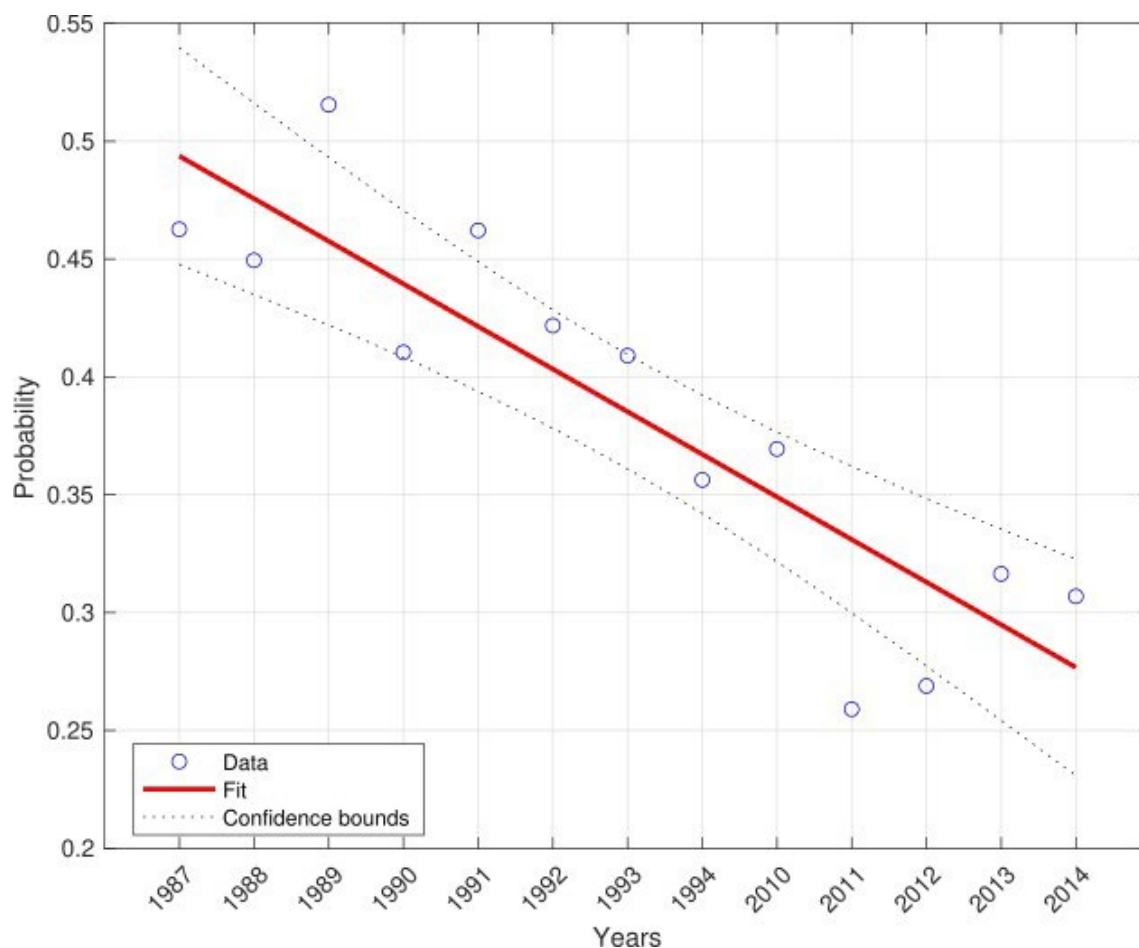
► Figure 1. Mobility in educational attainment between 1987 and 2014

Panel a: Upward educational mobility

Panel b: Downward educational mobility



Panel c: Total educational mobility



Note: (1) Children are observed 30 years after their birth date, so observations are between 1987 and 2014. (2) In panels (a) and (c), the estimated equation is $Pr_t = a + b_t + c_t^2 + \varepsilon_t$; in panel (b) it is $Pr_t = a + b_t + \varepsilon_t$. (3) The Ordinary Least Squares (OLS) estimated coefficients are $\{0.1642^{***}; -0.009; 0.0015^{**}\}$ in panel (a), $\{0.51^{***}; -0.018^{***}\}$ in panel (b), and $\{0.24^{***}; -0.0103; 0.0011^{**}\}$ in panel (c). (4) * $p < 10\%$, ** $p < 5\%$ and *** $p < 1\%$ levels.

Econometric approach

We aim to distinguish the effect that two factors may have on the observed increase in upward educational mobility:

1. Universities opening up to the entire population, which has made it more likely that youths will attain a bachelor's degree or a higher degree.
2. A favourable family context since children in higher socioeconomic backgrounds are more exposed to regular educational activities at home (Clarke and Thévenon 2022)

To achieve this aim, we estimate the following regression:

$$Y_{i,j,k} = \alpha_{j,k} + \beta_{j,k} X_{i,k} + \varepsilon_{i,j,k} \quad \text{Equation 1}$$

where:

$Y_{i,j,k}$	is a binary variable for each NLSY version $k \in \{NLSY\ 79, NLSY\ 97\}$. The value is 1 if the youth respondent i is skilled (they have at least a bachelor's degree) and they were born in cohort j
$X_{i,k}$	is a binary variable. The value is 1 if the mother or father of the respondent i has a bachelor's degree in one of the NLSY versions k
$\varepsilon_{i,j,k}$	are the residuals
$\alpha_{j,k}$	is the probability that a youth born in year j will become skilled when he/she has unskilled parents
$\beta_{j,k}$	is the impact that having skilled parents has on the probability that a youth born in cohort j will become skilled.

► Table 3. Education transition for different birth cohorts (NLSY79)

Birth year (<i>j</i>)	β_{jk}	α_{jk}	Observations	Adjusted R^2
1957	0.379*** (0.0467)	0.158*** (0.0158)	986	0.136
1958	0.376*** (0.0437)	0.175*** (0.0166)	1 030	0.133
1959	0.355*** (0.0451)	0.130*** (0.0144)	1 061	0.129
1960	0.445*** (0.0421)	0.145*** (0.0147)	1 144	0.186
1961	0.351*** (0.0423)	0.186*** (0.0164)	1 041	0.114
1962	0.430*** (0.0404)	0.148*** (0.0143)	1 084	0.175
1963	0.423*** (0.0448)	0.168*** (0.0158)	1 000	0.154
1964	0.497*** (0.0433)	0.147*** (0.0162)	837	0.231

Note: (1) $k = \text{NLSY79}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 presents OLS estimates for Equation 1 for different birth cohorts, using the NLSY79.²³ For example, the probability that a child born in 1958 to unskilled parents will become skilled is 17.5 per cent ($\alpha_{1958, \text{NLSY79}}$). Having skilled parents has a marginal impact that causes the probability to rise by 37.6 pp ($\beta_{1958, \text{NLSY79}}$). Therefore, the probability that a youth born in 1958 will be highly educated, regardless of their parents' educational attainment, is $\alpha_{1958, \text{NLSY79}} + \beta_{1958, \text{NLSY79}} \times P_{s,p} = 26.88\%$, where $P_{s,p} = 24.963\%$ is the proportion of skilled individuals in the population of parents.²⁴

²³ For the estimates, we use analytical weights that correspond to the year when youths are 30 years old. For example, 1987 for those born in 1957.

²⁴ For more details of how the proportion of skilled individuals in the population of parents has evolved, see Appendix A.

► Table 4. Education transition for different birth cohorts (NLSY97)

Birth year (<i>j</i>)	β_{fk}	α_{fk}	Observations	Adjusted R^2
1980	0.407*** (0.0394)	0.223*** (0.0190)	838	0.155
1981	0.487*** (0.0337)	0.254*** (0.0182)	961	0.209
1982	0.441*** (0.0348)	0.291*** (0.0193)	968	0.169
1983	0.428*** (0.0343)	0.255*** (0.0180)	989	0.167
1984	0.404*** (0.0357)	0.289*** (0.0188)	983	0.142

Note: (1) $k = \text{NLSY97}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

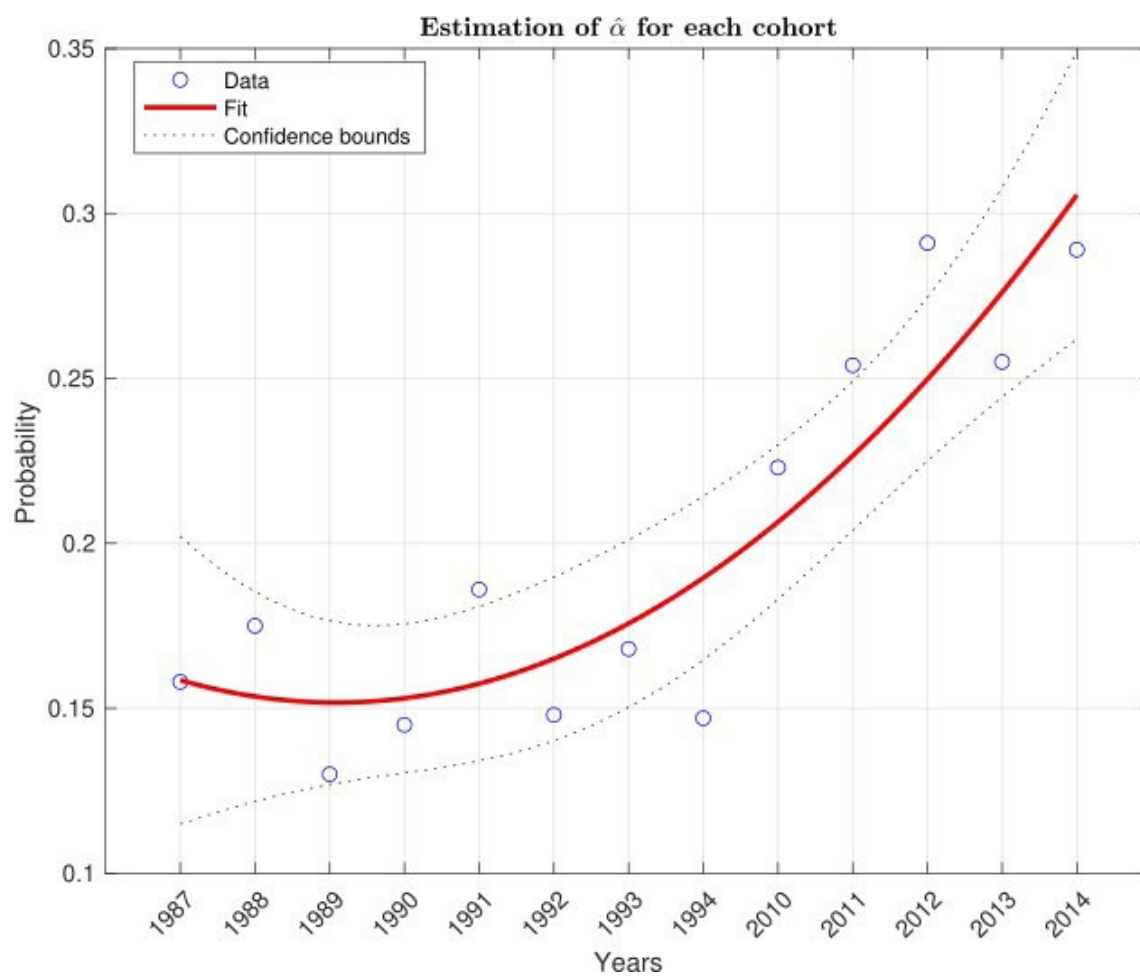
Table 4 presents OLS estimates for Equation 1 using the NLSY97. The results show that the coefficients $\alpha_{j,k}$ are higher than those obtained for the NLSY79. On average, we observe an increase in educational mobility, mostly driven by universities opening up to all.

Table 4 shows that the probability of a youth achieving a higher degree than their parents has significantly increased, from 15.7 per cent in the NLSY79 to 26.2 per cent in the NLSY97. The marginal effect of the family context has remained unchanged – the differences between zero and the NLSY79 average estimate (0.41) and the NLSY97 average estimate (0.43) are not statistically different.

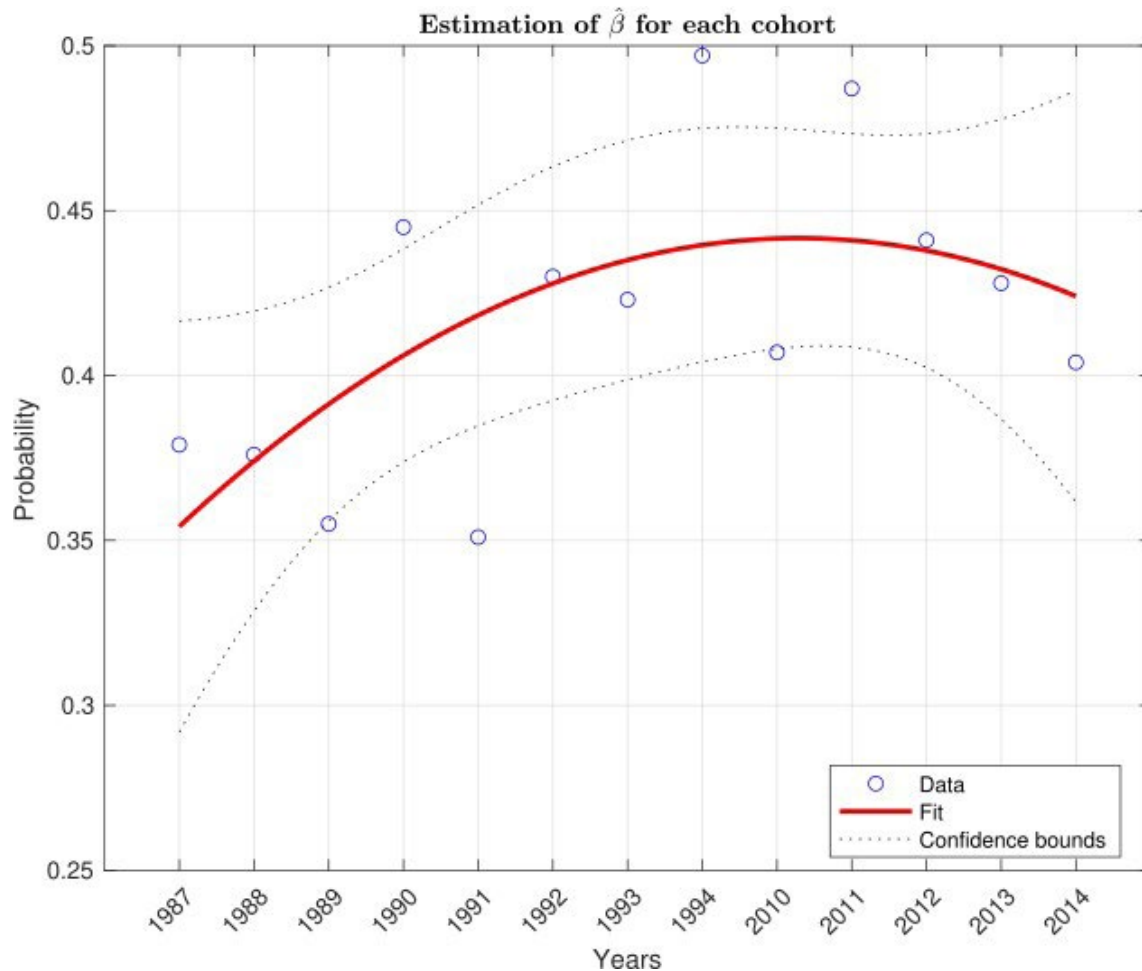
Information in Table 3 and Table 4 allows us to track how the educational transition between youths and their parents has evolved.

► Figure 2. Mobility in educational attainment between 1987 and 2014

Panel a: Estimation of α (the probability that a youth will become skilled, having unskilled parents)



Panel b: Estimation of β (the impact that having skilled parents has on the probability that a youth will become skilled)



Note: (1) Children are observed 30 years after their birth date, so observations are between 1987 and 2014. (2) In panels (a) and (b), the estimated equation is $\theta_t = a + b_t + c_t^2 + \varepsilon_t$ for $\theta \in \{a, \beta\}$. (3) The estimated coefficients are $\{0.166^{***}, -0.009, 0.0015^{**}\}$ in panel (a) and $\{0.331^{***}, 0.0236^{**}, -0.0012\}$ in panel (b). (4) * $p < 10\%$, ** $p < 5\%$ and *** $p < 1\%$ levels.

Figure 2 panel (a) shows how much the probability that a child born to unskilled parents will attain a bachelor's degree has increased. Rather than being a continual change, this increase results from a significant change in educational opportunities that began in the late 1980s.

The average age to attain a bachelor's degree is 22 years, and the schooling duration to attain this degree is four years. This means that, when we observe a child at 30 years old, they were enrolled in their bachelor's degree 11 years earlier (between 1977 and 1986 for the NLSY79 cohorts and between 1990 and 1994 for the NLSY97 cohorts). Therefore, upward educational mobility in the US has largely increased since the late 1980s.

Figure 2 panel (b) shows that the marginal impact that having skilled parents has on the probability of obtaining at least a bachelor's degree has evolved with an inverted U shape. For youth born in 1958, the parents–children correlation is 0.36. It reaches its maximum (0.56) for those born in 1965 and then declines to 0.40 (close to the initial correlation) for those born in 1984. The

situation between 1987 and 1996 contrasts with the situation after 2010. For the first subsample (1987 to 1996), parents having higher education had an increasing impact on the probability that their children would attain at least a bachelor's degree. For the second subsample (2010 onwards), this impact declined.

Figure 2 panel (a) suggests that, after intergenerational educational mobility significantly declined, having broader access to American universities has significantly improved educational mobility for children from low-income families, as their educational attainments that increased since the late 1980s. This turning point coincides with the end of Ronald Reagan's presidential term, so it is likely that the increase in educational mobility results from changes in the US educational system driven by the *report A Nation at Risk: The Imperative for Educational Reform* (The National Commission on Excellence in Education 1983). Figure 2 panel (b) shows that, for children with highly educated parents, after 2010 downward mobility marginally increased or stagnated.

Robustness check

Previous research (Carneiro et al. 2013) has found that the mother's education level plays a central role in the educational attainment of her children. This points to a need to analyse the educational transition between mothers and children. Therefore, we re-estimate Equation 1 using the variable X_{ik} for both versions of the survey $k \in \{NLSY79, NLSY97\}$ (see Table 5 and Table 6). X_{ik} now takes the value of 1 if the mother of the respondent i has at least a bachelor's degree.

The estimation results show that coefficients α and β are identical to those obtained when we assume that either the mother or the father or both have a bachelor's degree. We conclude that changes in educational mobility between generations are robust to alternative measures of parents' education.

► Table 5. Education transition, youths and mothers, for different birth cohorts (NLSY79)

Birth year (j)	β_{fk}	α_{fk}	Observations	Adjusted R^2
1957	0.434*** (0.0634)	0.193*** (0.0157)	1 093	0.096
1958	0.327*** (0.0617)	0.218*** (0.0164)	1 125	0.055
1959	0.397*** (0.0638)	0.158*** (0.0142)	1 186	0.079
1960	0.472*** (0.0554)	0.177*** (0.0143)	1 296	0.124
1961	0.321*** (0.0602)	0.220*** (0.0155)	1 171	0.049
1962	0.453*** (0.0539)	0.182*** (0.0138)	1 238	0.107
1963	0.469*** (0.0594)	0.197*** (0.0152)	1 132	0.107
1964	0.532*** (0.0585)	0.200*** (0.0162)	951	0.131

Note: (1) $k = \text{NLSY79}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

► Table 6. Education transition, youths and mothers, for different birth cohorts (NLSY97)

Birth year (<i>j</i>)	β_{fk}	α_{fk}	Observations	Adjusted R^2
1980	0.402*** (0.0452)	0.265*** (0.0194)	814	0.119
1981	0.438*** (0.0386)	0.311*** (0.0185)	942	0.134
1982	0.417*** (0.0379)	0.337*** (0.0194)	944	0.127
1983	0.481*** (0.0362)	0.282*** (0.0178)	967	0.174
1984	0.393*** (0.0397)	0.330*** (0.0189)	961	0.109

Note: (1) $k = \text{NLSY97}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

► 4 Income mobility

Log-log correlations

To track the evolution of income mobility in the US between 1987 and 2015, we follow Solon (1999). We regress the log income from salaries and wages $Y_{i,j,k}$ of each youth i , reported 30 years after their birth cohort j , on the log income of their parents $X_{i,j,k}$ reported when the youth is 18 years old. We run this regression for both versions k of the NLSY, in other words for $k \in \{NLSY79, NLSY97\}$. IGE is the most widely used measure of intergenerational economic mobility. It captures the statistical connection between parents' income and the income of their children in later life: $\frac{d \log(Y_{i,j,k})}{d \log(X_{i,j,k})}$. To estimate IGE, we estimate the regression shown in Equation 2 (Chetty et al. 2014a).

$$\log(Y_{i,j,k}) = \omega_{j,k} + \kappa_{j,k} \log(X_{i,j,k}) + e_{i,j,k} \quad \text{Equation 2}$$

where:

- $\kappa_{j,k}$ is IGE. It gives a measure of relative mobility by estimating the income gaps (in log) between children born to high-income families and those born to low-income families
- $\omega_{j,k}$ is a constant. It may be interpreted as "minimum income", as it is the income (in log) of children whose parents have \$1 income.

► Table 7. IGE for different birth cohorts (NLSY79)

Birth year (j)	$\kappa_{j,k}$	$\omega_{j,k}$	Observations	Adjusted R^2
1957	0.263*	7.286***	189	0.034
	(0.101)	(1.110)		
1958	0.235	7.667***	225	0.021
	(0.130)	(1.417)		
1959	0.404**	5.882***	225	0.067
	(0.126)	(1.412)		
1960	0.171*	8.431***	252	0.017
	(0.0824)	(0.896)		
1961	0.233***	7.675***	233	0.017
	(0.0623)	(0.670)		
1962	0.170*	8.492***	208	0.013
	(0.0713)	(0.759)		
1963	0.211	7.959***	206	0.026
	(0.125)	(1.377)		
1964	0.158	8.459***	188	0.013
	(0.0859)	(0.929)		

Note: (1) $k = NLSY79$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

► Table 8. IGE for different birth cohorts (NLSY97)

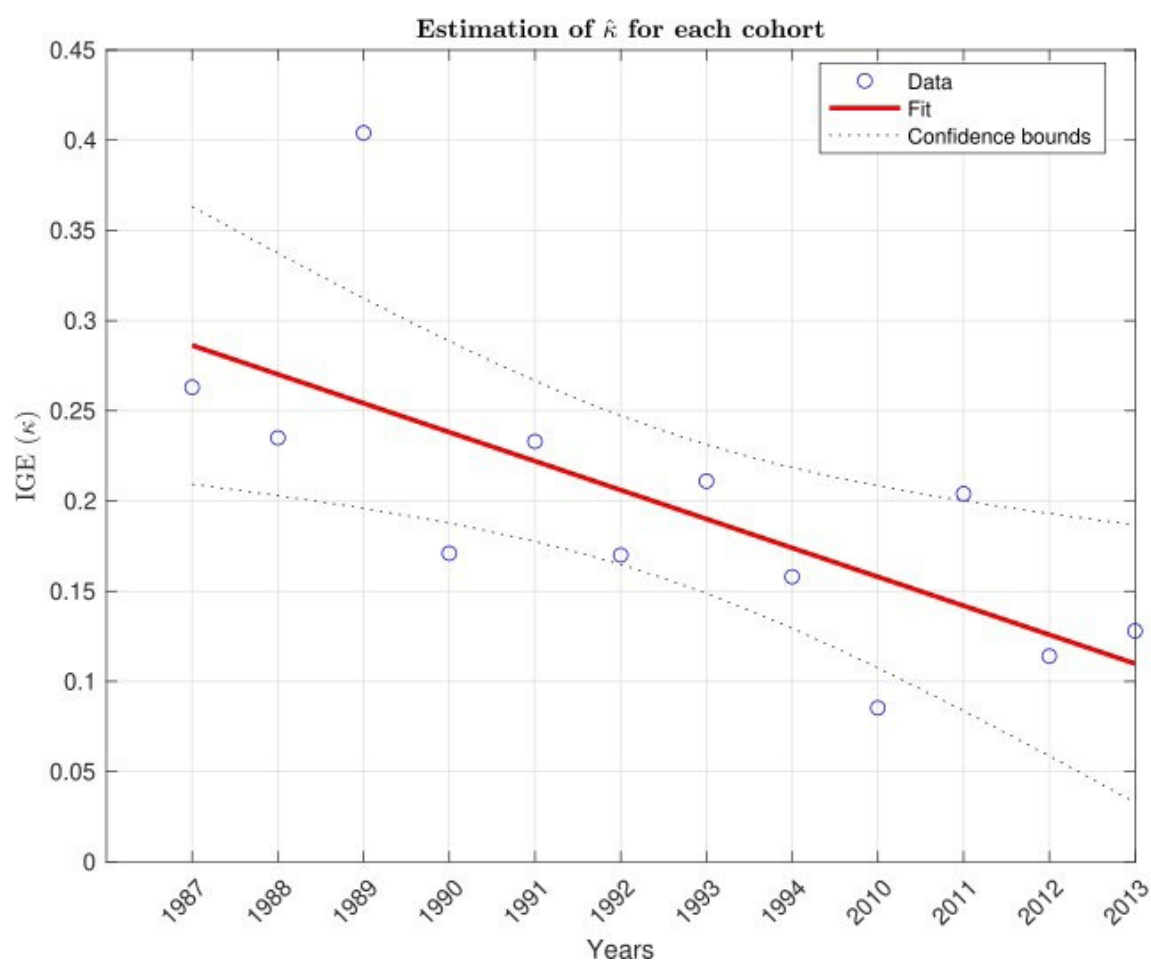
Birth Year (j)	κ_{jk}	ω_{jk}	Observations	Adjusted R ²
1980	0.085*	9.408***	408	0.012
	(0.0379)	(0.385)		
1981	0.204***	8.089***	345	0.036
	(0.0541)	(0.569)		
1982	0.114**	9.104***	390	0.012
	(0.0422)	(0.441)		
1983	0.128**	8.822***	374	0.014
	(0.0458)	(0.469)		

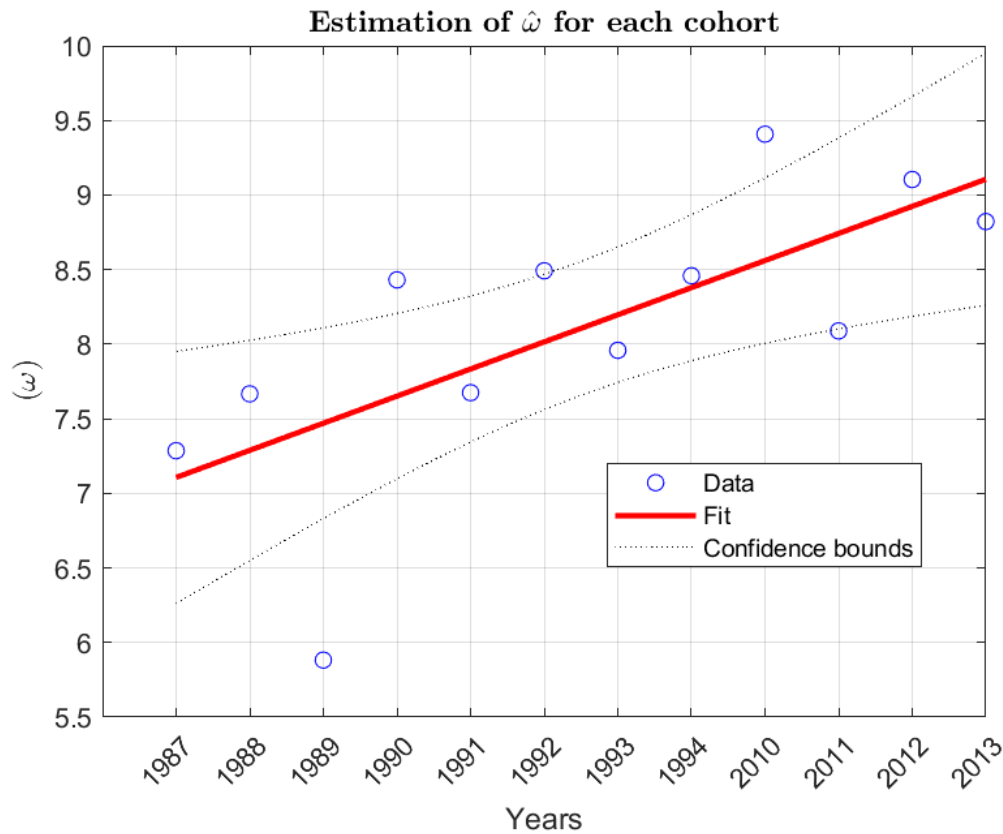
Note: (1) $k = \text{NLSY97}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7 shows that IGE values range from 0.158 to 0.404, for children born between 1957 and 1964. The average estimated IGE value is 0.23. This means that, for NLSY79 respondents, a 10 per cent increase in parents' income is associated with an average 2.3 per cent rise in children's income.

Table 8 shows that IGE values are lower for youths born between 1980 and 1983 than for those born between 1957 and 1964. The values range from 0.085 and 0.204; the average estimated IGE value is 0.13. This means that, for NLSY97 respondents, a 10 per cent increase in parents' income is associated with an average 1.3 per cent rise in children's income.

► Figure 3. Intergenerational elasticity

Panel a: Estimation of IGE (κ)

Panel b: Estimation of minimum expected income ϖ 

Note: (1) Children's income is observed 30 years after their birth date, so observations are between 1987 and 2013. (2) In panels (a) and (b), the estimated equation is $\theta_t = a + b_t + \varepsilon_t$ for $\theta \in \{\kappa, \omega\}$. (3) The estimated coefficients are $\{0.3022^{***}, -0.016^{**}\}$ in panel (a) and $\{6.92^{***}, 0.1817^{**}\}$ in panel (b). (4) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

The evolution of IGE across the cohorts gives us information about income mobility trends (see Figure 3). We observe that IGE is continuously decreasing, as the estimated slope of the IGE trend is negative. This means that the income mobility of cohorts born between 1957 and 1984 has been increasing. These results are consistent with the results on educational mobility, which also point to a significant increase in upward mobility.

As Chetty et al. (2014a) point out, IGE depends on two components: an indicator of income mobility ρ and an indicator of the relative income inequalities between youths and parents (see Equation 3).

$$IGE = \rho \frac{\sigma_{\log(Y)}}{\sigma_{\log(X)}} \text{ with } \rho = \text{corr}(\log(X), \log(Y)) \quad \text{Equation 3}$$

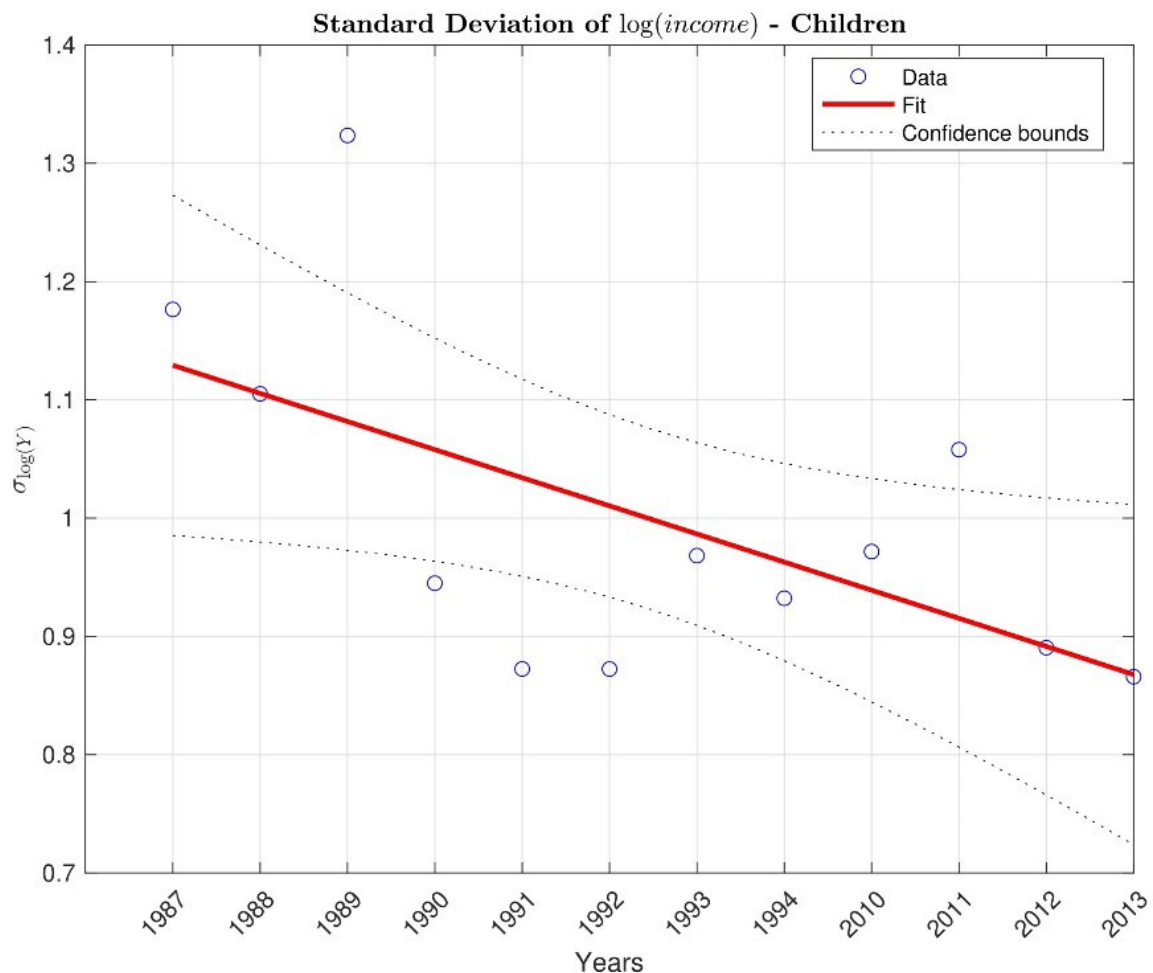
Equation 3 shows that, if income inequality among children $\sigma_{\log(Y)}$ decreases relative to income inequality among parents $\sigma_{\log(X)}$, IGE declines if all other things are equal. Therefore, IGE can be affected by changes to the relative size of intergenerational inequality. Figure 4 panel (a) shows that income inequality among youths has declined over the period, while panel (b) shows that income inequality among parents has risen over the same period. This has led to a significant decline in relative income inequality, which is illustrated in panel (c). Therefore, even if the correlation

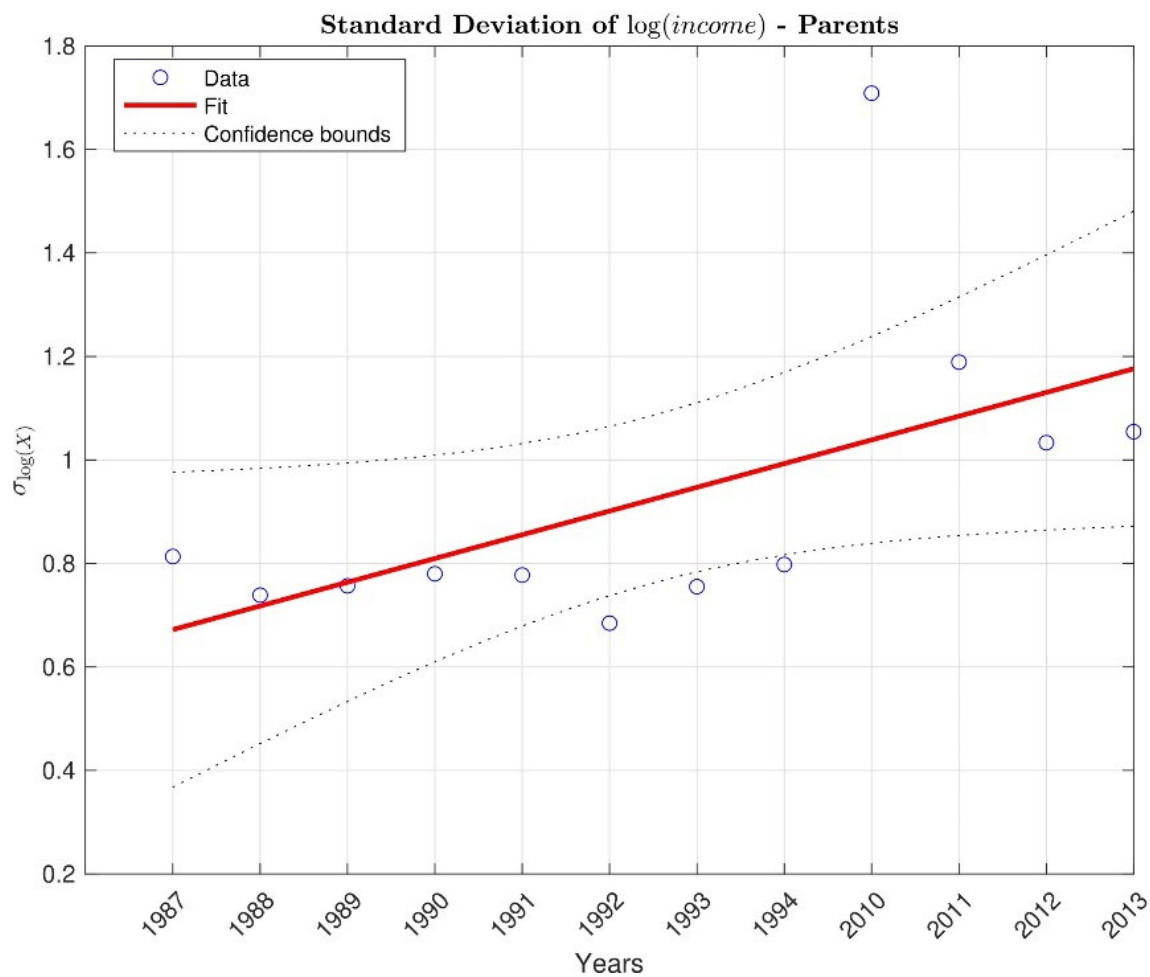
between children's and parents' income p remains stable over the period, IGE mechanically declines due to a reduction in relative inequalities $\frac{\sigma_{\log(Y)}}{\sigma_{\log(X)}}$.

This highlights that the rise in income inequality, largely documented in the US, has a direct impact on IGE, which is a measure of intergenerational mobility. In particular, when IGE in the US is decreasing, it may suggest that income mobility is rising; however, this result is driven only by widening income disparities among parents. This generates greater income mobility, even if children and parents occupy the same position in the income distribution of their respective peers. Another limitation of using IGE to measure intergenerational mobility is that IGE is sensitive to extreme values in the distribution, especially at the bottom of the distribution where the log function magnifies the shape (Chetty et al. 2014a). Therefore, in subsection 5.2 we compute the rank-rank correlation, to isolate income mobility from relative changes in income inequality between parents and children.

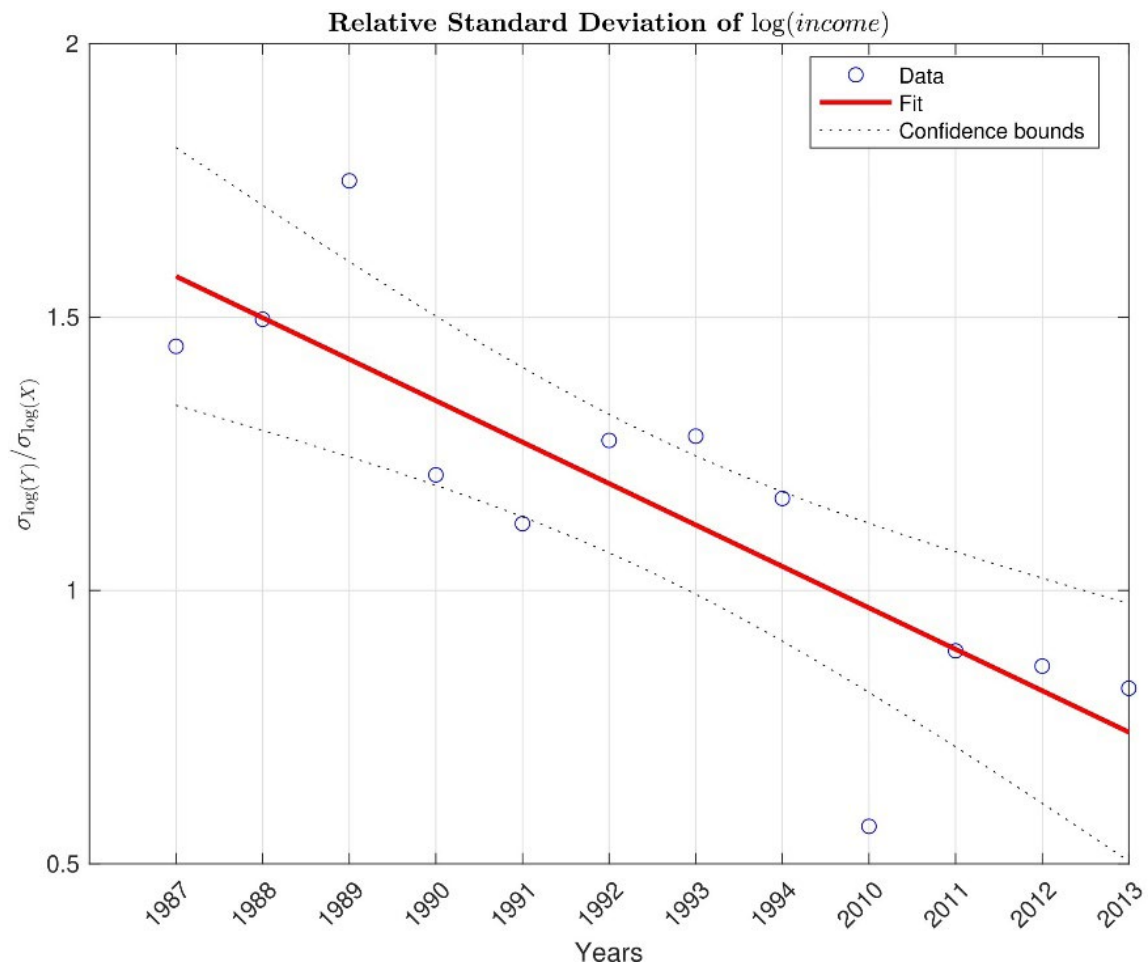
► **Figure 4. Income inequalities between 1987 and 2014**

Panel a: Income inequality among youths



Panel b: Income inequality among parents

Panel c: Relative income inequality between youths and parents



Note: (1) Children are observed 30 years after their birth date, so observations are between 1987 and 2014. (2) In all panels the estimated equation is $\theta_t = a + b_t + \varepsilon_t$ for $\theta \in \{\kappa, \omega\}$ (3) The estimated coefficients are $\{1.152^{***}; -0.0237^{**}\}$ in panel (a), $\{0.6261^{***}; 0.045^{**}\}$ in panel (b) and $\{1.6501^{***}; -0.0757^{***}\}$ in panel (c). (4) ** $p < 10\%$, * $p < 5\%$ and *** $p < 1\%$.

Rank-rank correlations

Estimating the rank-rank correlation between parents' and youths' incomes is an alternative procedure to analyse intergenerational income mobility (see Equation 4).

$$P_{i,j,k}^c = \tilde{\omega}_{j,k} + \tilde{\kappa}_{j,k} P_{i,j,k}^p + \varepsilon_{i,j,k} \quad \text{Equation 4}$$

where:

$P_{i,j,k}^c$ is the income percentile of a youth i born in j and registered in survey k

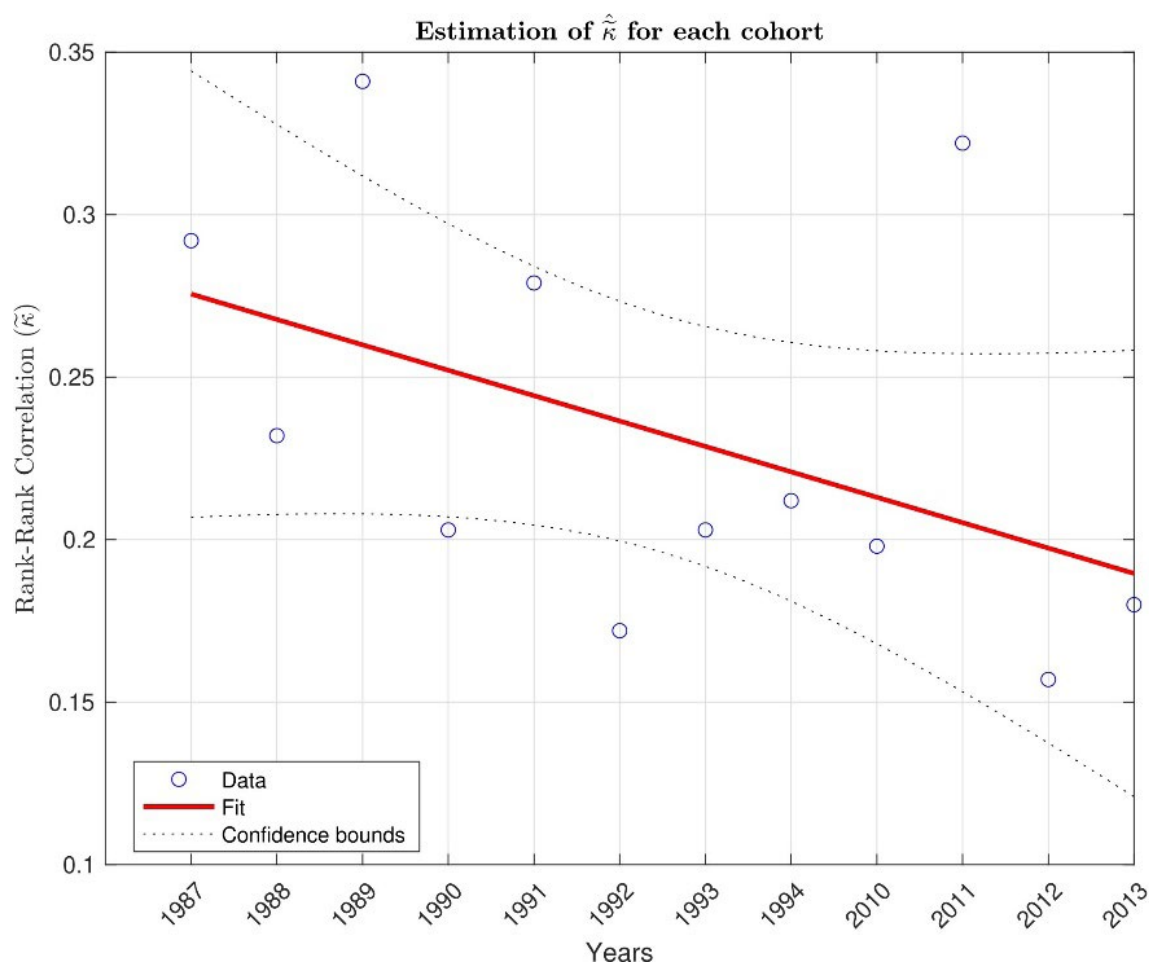
$P_{i,j,k}^p$ is the income percentile of the youth's parents.

In this case, $\tilde{\kappa}$ is the slope coefficient once we regress youth income percentiles on parents' income percentiles for each birth cohort in both versions k of the NLSY. Therefore, for each youth i, k $\tilde{\kappa}$ measures the impact (correlation) that their parents' income position – relative to other parents of the same cohort – has on their income position – relative to other youth in the same cohort when they are 30 years old. A strong correlation between the income position of parents and youths suggests low income mobility, as the income position of youth at age 30 years is greatly influenced by the income of their parents some years earlier.

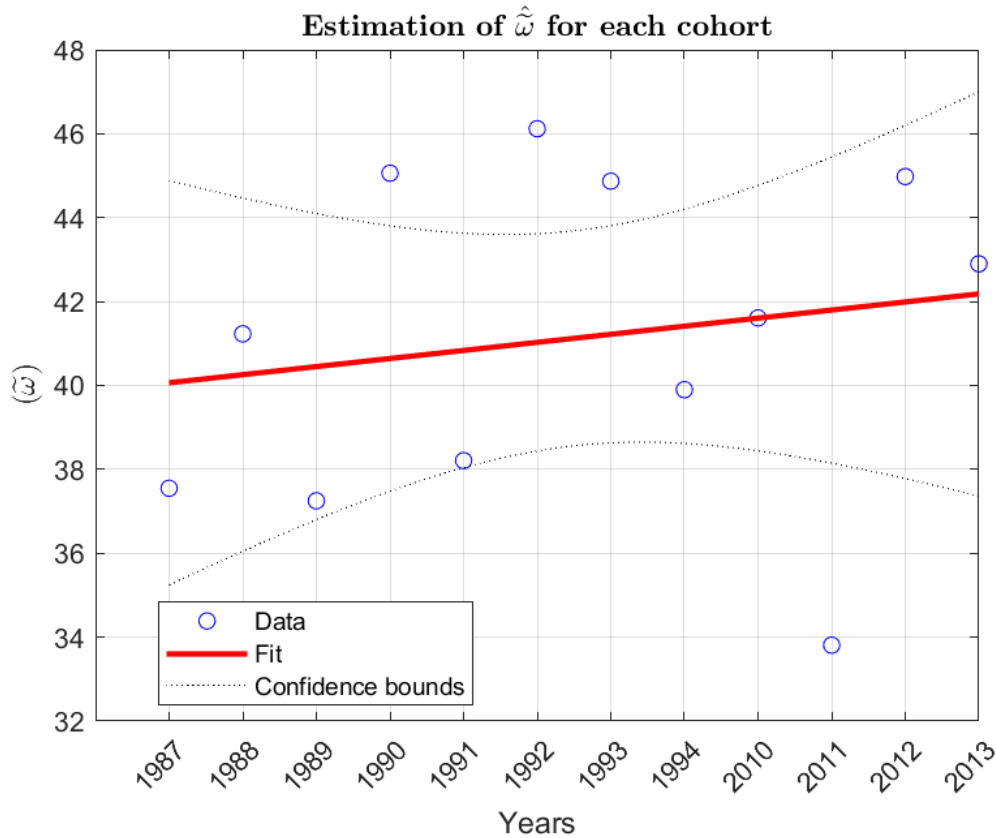
Figure 5 shows that the rank–rank correlation decreases slightly over time; the negative slope is significant at 10 per cent. This suggests that the effect of parents' income position on the income position of their children has declined slightly.

► **Figure 5. Rank correlation**

Panel a: Marginal impact of parents' incomes



Panel b: Minimum income percentile



Note: (1) Children's income is observed 30 years after their birth date, so observations are between 1987 and 2013. (2) In both panels the estimated equation is $\theta t = a + bt + \varepsilon t$ for $\theta \in \{\bar{\kappa}, \hat{\omega}\}$. (3) The estimated coefficients are $\{0.2833^{***}; -0.0078+\}$ in panel (a) and $\{39.872^{***}; 0.192\}$ in panel (b). (4) + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$.

Table 9 and Table 10 report OLS estimates of the rank–rank correlation. Children whose parents are at the bottom of the income distribution have income in the 40th percentile ($\hat{\omega}$ in Figure 5 panel (b)), and this rank remains stable over time.

Figure 5 panel (a) shows that, on average for all NLSY79 cohorts, a 1 pp increase in parents' rank is associated with a 0.24 pp increase in children's mean rank, while on average for all NLSY97 cohorts, a 1 pp increase in parents' rank is associated with a 0.21 pp increase in children's rank. Given that the rank–rank correlation is a good approximation of the ρ coefficient of IGE,²⁵ we can deduce that the largest part of the shift in income mobility, which IGE captures, is determined by changes to income inequality, while a small part of the shift is explained by changes to the link between parents' and children's income ranks.

²⁵ The coefficient of the rank–rank correlation is approximately proportional to ρ . If we denote ρ_P the rank–rank correlation, with PX (PY) the percentile rank in the income distribution X (Y), then $\rho_P \approx \gamma \rho$, with γ a constant. Therefore, IGE combines the rank–rank correlation with the ratio of standard deviations of income across generations.

► Table 9. Rank–rank correlations for different birth cohorts (NLSY79)

Birth year (j)	$\tilde{k}_{j,k}$	$\tilde{\omega}_{j,k}$	Observations	Adjusted R^2
1957	0.292*** (0.0812)	37.55*** (5.081)	189	0.075
1958	0.232** (0.0835)	41.23*** (5.115)	225	0.044
1959	0.341*** (0.0755)	37.25*** (5.284)	225	0.101
1960	0.203* (0.0802)	45.06*** (4.984)	252	0.029
1961	0.279*** (0.0729)	38.21*** (4.657)	233	0.066
1962	0.172* (0.0787)	46.12*** (4.777)	208	0.022
1963	0.172* (0.0961)	44.87*** (5.765)	206	0.030
1964	0.212* (0.0823)	39.90*** (4.954)	188	0.036

Note: (1) $k = \text{NLSY79}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

► Table 10. Rank–rank correlations for different birth cohorts (NLSY97)

Birth Year (j)	$\tilde{k}_{j,k}$	$\tilde{\omega}_{j,k}$	Observations	Adjusted R^2
1980	0.198*** (0.0522)	41.61*** (3.195)	408	0.039
1981	0.322*** (0.0554)	33.81*** (3.528)	345	0.102
1982	0.157** (0.0538)	44.98*** (3.342)	390	0.022
1983	0.180*** (0.0536)	42.90*** (3.104)	374	0.028

Note: (1) $k = \text{NLSY97}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

► 5 The impact of parents' education on children's income

Section 4 shows that all children now have a better chance of attaining a university degree, regardless of their parents' education level. We now test whether parents' education has an impact on children's income. To test this idea, we estimate the model shown in Equation 5:

$$Q_{i,j,k}^c = \tilde{\omega}_{j,k} + \tilde{k}_{j,k}^{ls} Q_{i,k}^{p,ls} + \tilde{k}_{j,k}^{hs} Q_{i,k}^{p,hs} + \varepsilon_{i,j,k} \quad \text{Equation 5}$$

where:

$Q_{i,j,k}^c$ is the income quartile of a youth i born in j and registered in survey k

$Q_{i,k}^p$ is the income quartile of the youth's parents in survey k

$Q_{i,k}^{p,hs}$ is the income quartile of highly educated parents

$Q_{i,k}^{p,ls}$ is the income quartile of low-educated parents

Equation 5 allows us to distinguish the impact that parents' income rank has on children's income rank, conditionally on the parents' educational attainment ($\tilde{k}_{j,k}^{ls}$ and $\tilde{k}_{j,k}^{hs}$).

We restrict our analysis to mobility across quartiles, because there are too few observations to robustly estimate based on percentiles.

► **Table 11. Impact of parents' educational attainment on the rank-rank correlations for different birth cohorts (NLSY79)**

Birth year (<i>j</i>)	$\bar{k}_{j,k}^{ls}$	$\bar{k}_{j,k}^{hs}$	$\tilde{\omega}_{j,k}$	Observations	Adjusted R^2
1957	0.200* (0.0841)	0.316** (0.104)	2.019*** (0.232)	189	0.052
1958	0.118 (0.0771)	0.272* (0.118)	2.237*** (0.226)	225	0.033
1959	0.270*** (0.0777)	0.383*** (0.0895)	1.978*** (0.233)	225	0.073
1960	0.052 (0.0753)	0.177 (0.0934)	2.530*** (0.213)	252	0.011
1961	0.151 (0.0784)	0.364** (0.0803)*	2.082*** (0.217)	233	0.080
1962	0.075 (0.0798)	0.239* (0.0950)	2.356*** (0.221)	208	0.033
1963	0.008 (0.0822)	0.285** (0.105)	2.556*** (0.230)	206	0.081
1964	0.111 (0.0811)	0.189 (0.103)	2.158*** (0.223)	188	0.012

Note: (1) k = NLSY79. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

► **Table 12. Impact of parents' educational attainment on the rank-rank correlations for different birth cohorts (NLSY97)**

Birth year (<i>j</i>)	$\tilde{k}_{j,k}^{ls}$	$\tilde{k}_{j,k}^{hs}$	$\tilde{\omega}_{j,k}$	Observations	Adjusted R^2
1980	0.176** (0.0553)	0.236*** (0.0621)	2.076*** (0.151)	408	0.040
1981	0.203*** (0.0593)	0.364*** (0.0548)	1.816*** (0.154)	345	0.105
1982	0.025 (0.0529)	0.154* (0.0619)	2.438*** (0.148)	390	0.024
1983	0.035 (0.0557)	0.214*** (0.0645)	2.324*** (0.145)	374	0.050

Note: (1) $k = \text{NLSY97}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Tables 11 and Table 12 report OLS estimates for Equation (4). Results reported in Tables 11 and in Table 12 show that the impact of parents' incomes on children's incomes is lower when parents do not have college degrees than when they are college graduates. Over all cohorts, the average value measuring the effect of the impact of parents' income on children's income is $\tilde{k}_{j,k}^{ls} = 0.118$ if parents are unskilled, whereas it is $\tilde{k}_{j,k}^{hs} = 0.266$ if parents are skilled. This difference is statistically significant at 5% level. The impact of the income rank of parents without a university degree is very low on the income rank of their children, which indicates that a low parental income is not relevant in explaining the income positions of children.

Our results suggest that the American system is giving more opportunities than in the past, for children from low-income families whose parents have not graduated from college. Meanwhile, children whose parents have college degrees and high income are protected against intergenerational income fall. Therefore, there is a correlation between the income of parents and their children.

Our results are consistent with the view that the more money a family has, the more likely their children will have access to the most prestigious colleges and the best earning outcomes. As Chetty et al. (2020) point out, Ivy League colleges predominantly enrol students from high-income families ("reproduction of elites").

Our results also align with those of Becker et al. (2018) and The Pew Charitable Trusts (2012). On the one hand, American society has developed a highly educated elite, whose members have high mobility but not, as Becker et al. (2018, p. 9) describe: "across the endogenously determined class boundaries". Therefore, for those born into this elite, their family position has a strong impact on the social rank of them and their future generations. On the other hand, making universities open to all, by increasing the number of places, has created new opportunities for children from low-income families to attain a higher education, which pushes them out of the immobility trap. As The Pew Charitable Trusts (2012) states, adults whose parents are in the bottom quintile of the income distribution are much more likely to remain at the bottom themselves if they do not attain a college degree, while those who do attain a college degree are more likely to move out of the bottom quintile.

► 6 The reality of the American dream

Another way to measure the proportion of Americans who can realize the American dream is to compute the transition matrices that describe intergenerational mobility. As we are interested in a combination of educational mobility and earnings mobility, we combine information on children's educational attainment – conditionally on their parents' educational attainment – with information on earning mobility. In this way, we compute the earnings quartiles for parents and children with and without a bachelor's degree (see Table 13 for the NLSY79 cohorts and Table 14 for the NLSY97 cohorts).²⁶

This information tells us the probability that the income of child who is a college graduate, and the income of a child who is not a college graduate, will be in one of the four quartiles, conditional on their parents' income rank and education (see Equation 6).

$$p_{ij,i'j'} = \Pr(\text{child: degree} = D_i \text{ \& earning} = Q_j \mid \text{parent: degree} = D_{i'} \text{ \& earning} = Q_{j'}) \text{ Equation 6}$$

where:

- D_i is a categorical variable that captures the educational level of child i
- $D_{i'}$ is a categorical variable that captures the educational level of parent i'
- Q_j is a categorical variable that captures the income rank of child j
- $Q_{j'}$ is a categorical variable that captures the income rank of parent j'

More precisely:

$D_x \in \{\text{college degree, no college degree}\}$ for $x = i, i'$ and $Q_y \in \{Q1, ..., Q4\}$ for $y = j, j'$.

► Table 13. Intergenerational mobility (NLSY79)

		Children – no bachelor's degree				Children – bachelor's degree or higher			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Parents – no bachelor's degree	Q1	0.3273	0.2485	0.1667	0.1545	0.0606	0.0152	0.0182	0.0091
	Q2	0.2312	0.2601	0.2139	0.1705	0.0260	0.0376	0.0405	0.0202
	Q3	0.1667	0.2258	0.2151	0.2366	0.0430	0.0323	0.0457	0.0349
	Q4	0.1447	0.1500	0.2184	0.2684	0.0526	0.0684	0.0553	0.0421
Parents – bachelor's degree or higher	Q1	0.1429	0.1169	0.1818	0.1818	0.0779	0.0649	0.0779	0.1558
	Q2	0.0541	0.0541	0.1622	0.2973	0.0946	0.1757	0.0811	0.0811
	Q3	0.0658	0.1316	0.1053	0.1842	0.1184	0.1974	0.0921	0.1053
	Q4	0.0563	0.0423	0.1549	0.2113	0.0704	0.0845	0.1972	0.1831

²⁶ To have robust information for each survey, we present the results after we have aggregated all transitions for each survey. Therefore, results related to the NLSY79 aggregate all transitions of children born between 1957 and 1964, and those related to the NLSY97 aggregate all transitions of children born between 1980 and 1984.

► **Table 14. Intergenerational mobility (NLSY97)**

		Children – no bachelor's degree				Children – bachelor's degree or higher			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Parents – no bachelor's degree	Q1	0.2759	0.2414	0.1552	0.1149	0.0661	0.0603	0.0546	0.0316
	Q2	0.2076	0.1725	0.2018	0.1784	0.0673	0.0673	0.0614	0.0439
	Q3	0.1623	0.2068	0.1545	0.1597	0.0890	0.0995	0.0812	0.0471
	Q4	0.1342	0.1178	0.1589	0.2137	0.0877	0.0986	0.0795	0.1096
Parents – bachelor's degree or higher	Q1	0.0764	0.1083	0.0828	0.0955	0.2484	0.1210	0.1146	0.1529
	Q2	0.0671	0.0470	0.0872	0.1275	0.1812	0.1678	0.1477	0.1745
	Q3	0.0347	0.0556	0.0903	0.1181	0.1736	0.1597	0.1667	0.2014
	Q4	0.0461	0.0329	0.0329	0.0921	0.1776	0.1316	0.2303	0.2566

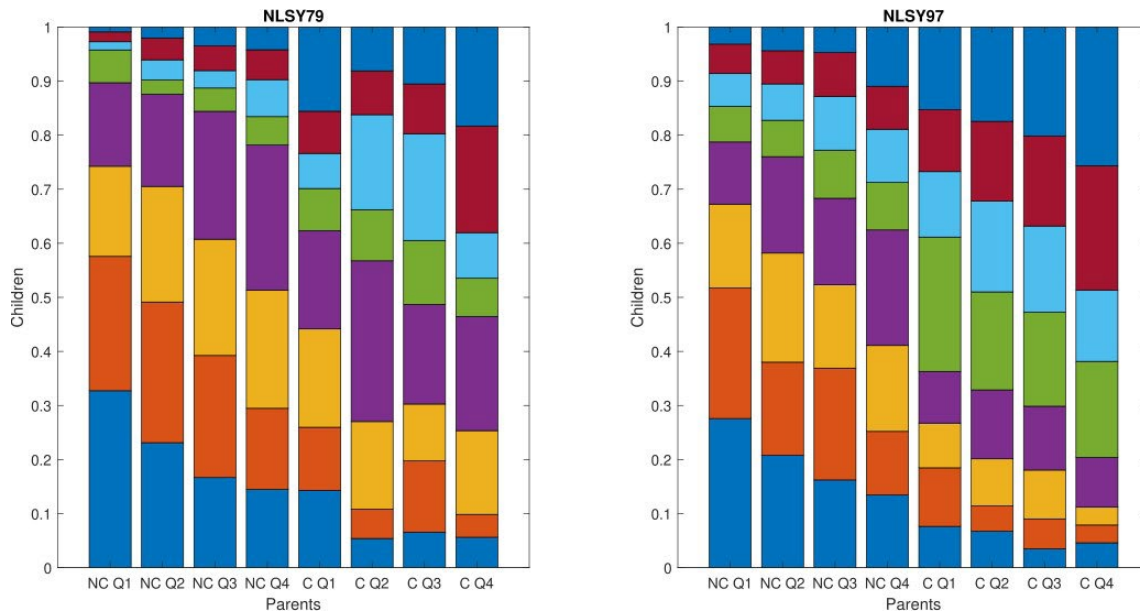
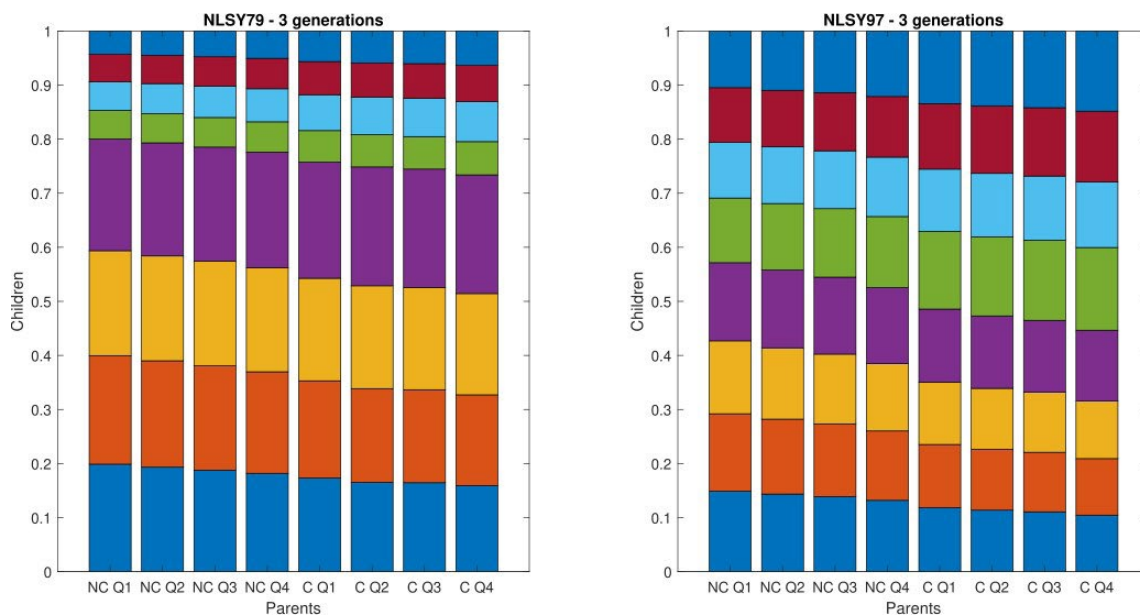
It is particularly interesting to focus on the probability that a child can move from the bottom to the top of the distribution. This means, in other words, the probability that a child – whose parents do not have a college degree and are in the first income quartile – could attain a college degree and earnings in the top income quartile. This probability is 0.91 per cent for the NLSY79 (see Table 13) and 3.16 per cent for the NLSY97 (see Table 14). As the probability has increased more than threefold, it clearly shows that upward mobility has risen over time.

We observe that downward mobility has also declined. The probability that a child – whose parents have a college degree and are in the top income quartile for parents with a degree – does not attain a college degree and has earnings in the first quartile – is 5.63 per cent for the NLSY79 (see Table 13) and 4.61 per cent for the NLSY97 (see Table 14).

Figure 6 panel (a) compares the mobility between parents and children for NLSY79 and NLSY97 cohorts. It shows that cohorts born after 1980 (NLSY97) – after universities became open to all students – have greater upward mobility. For NLSY97 cohorts, panel (a) also suggests that a college degree does not always translate into higher earnings, as the green bars show a large proportion of youths with a college degree are at the bottom of the wage distribution of skilled young workers.

► **Figure 6. Intergenerational mobility – education and earnings**

Panel a: Mobility parents-children (1 generation) -NLSY79

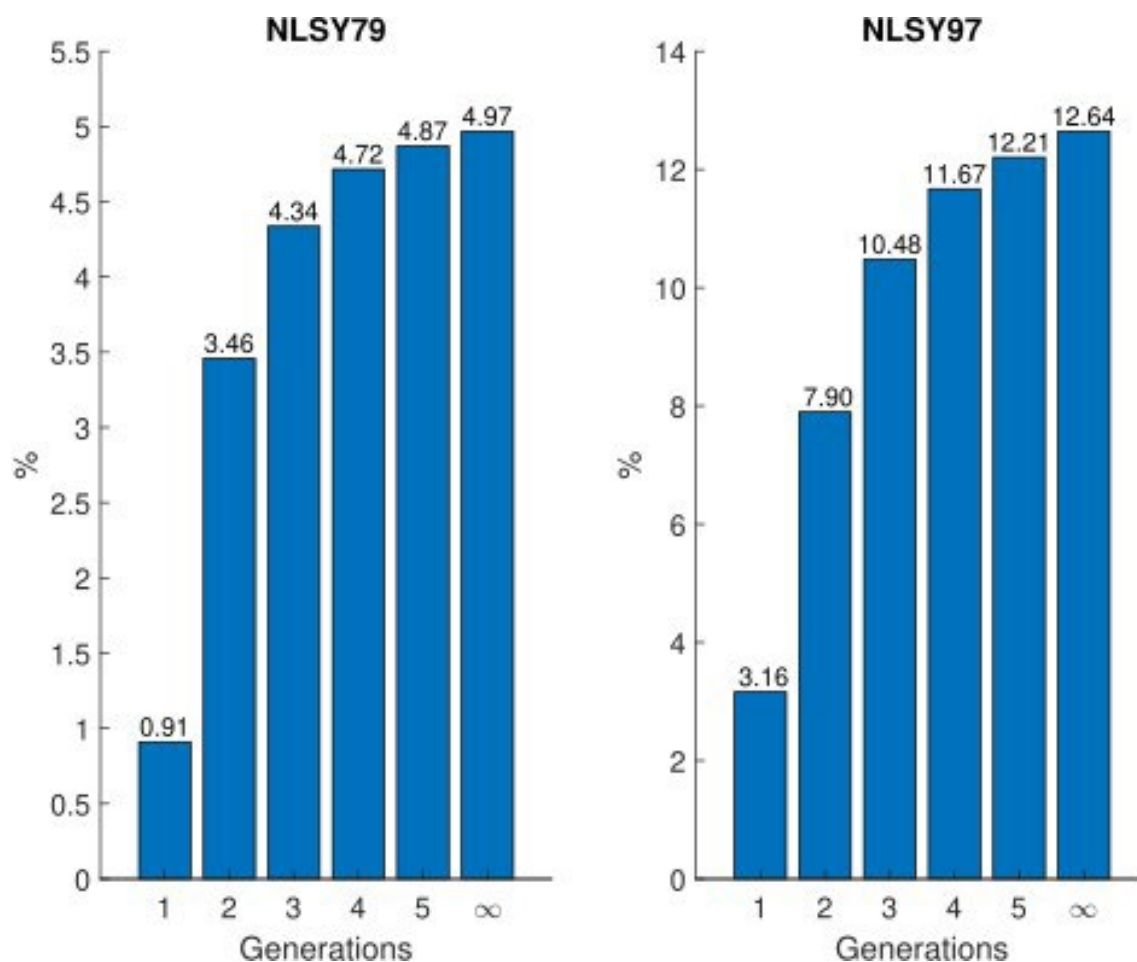
► **Panel b: Mobility parents-children (3 generations) -NLSY79**

Note: (1) Blue = no college degree (NC) and income in the first quartile (Q). (2) Orange = no college degree and income in the second quartile. (3) Yellow = no college degree and income in the third quartile. (4) Purple = no college degree and income in the fourth quartile. (5) Green = college degree (C) and income in the first quartile. (6) Sky blue = college degree and income in the second quartile. (7) Burgundy = college degree and income in the third quartile. (8) Dark blue = college degree and income in the fourth quartile.

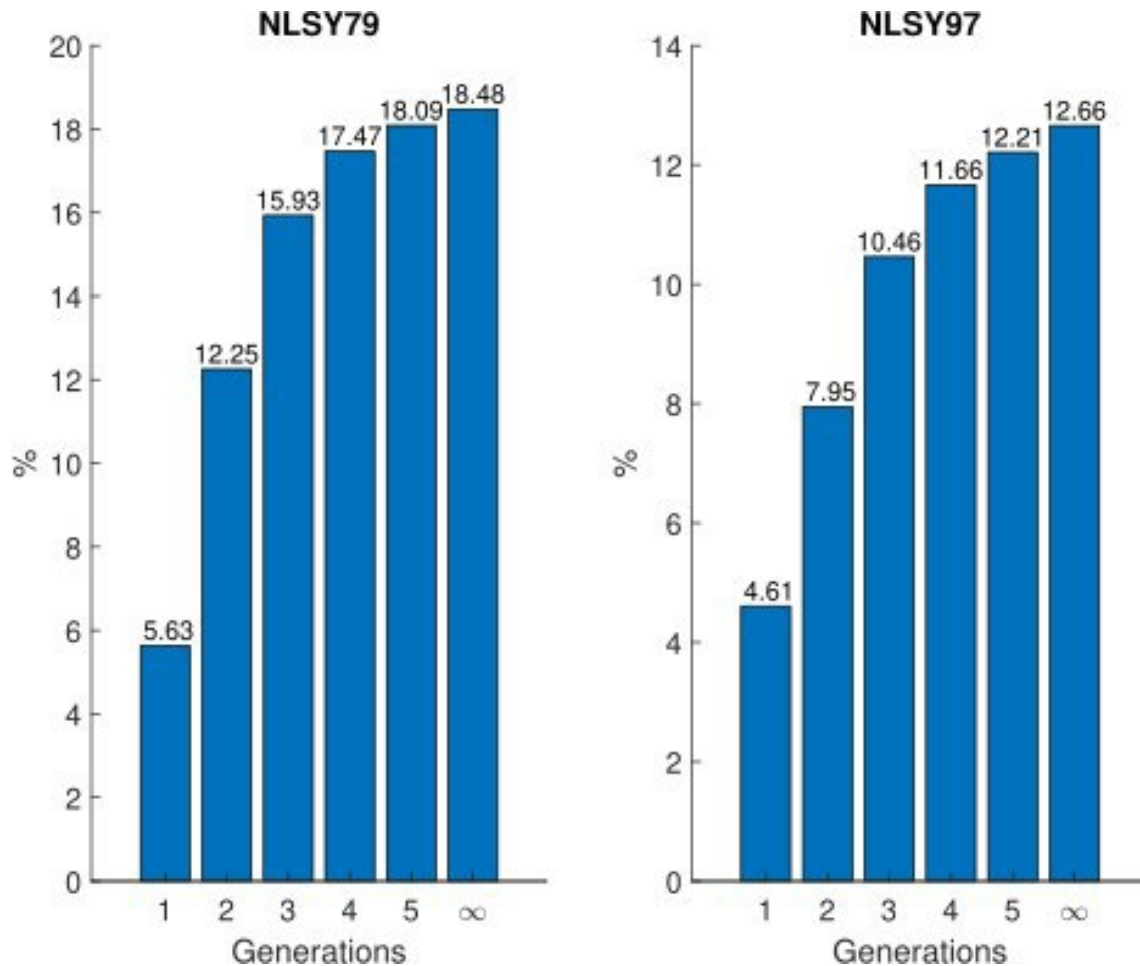
Matrices allow us to analyse an important aspect of mobility, which is the pace at which it occurs. Social fluidity can be apprehended by iterating these matrices for several generations, until the situation of the initial set of parents no longer influences the position in society of subsequent generations of children. Comparing Figure 6 panels (a) and (b) provides an indication of the pace at which an individual may escape from their initial family group.

► **Figure 7. Mobility from bottom to top and from top to bottom**

Panel a: Upward mobility



Panel b: Downward mobility



Note: (1) Upward mobility is the probability that a child will attain a college degree and earnings in the highest quartile, if their parents do not have a college degree and their earnings are in the first quartile. (2) Downward mobility is the probability that a child will not attain a college degree and have earnings in the lowest quartile, if their parents have college degrees and earnings in the highest quartile.

Figure 7 focuses on "extreme mobility", which is:

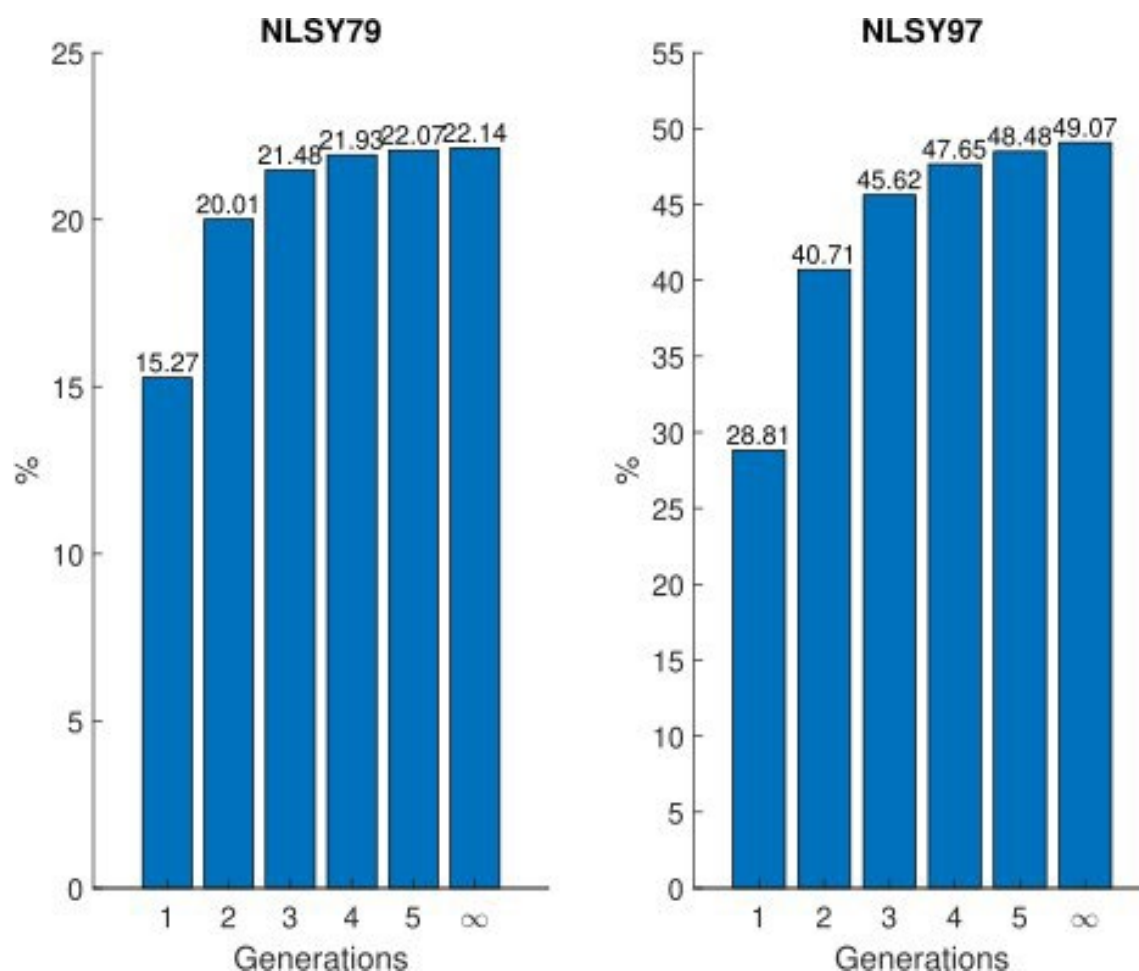
the probability that a parent with no college degree and at the bottom of the income distribution, will have a descendant (such as a child, grandchild or great-grandchild) who attains a college degree and earnings that place them at the top of the income distribution (upward mobility), or

the probability that a parent with a college degree and at the top of the income distribution, will have a descendant who does not attain a college degree and has earnings that place them at the bottom of the income distribution (downward mobility).

From Figure 7 we observe that NLSY97 cohorts, who were born after 1980, have higher upward mobility than NLSY79 cohorts, who were born between 1957 and 1964. Panel (a) shows that upward mobility more quickly converges towards its long-run value for NLSY97 cohorts than NLSY79 cohorts. This implies that, for NLSY97 cohorts, fewer generations are needed before youths escape from the poor education and income situation of the initial parents.

Figure 8 confirms this result. It shows the probability that a child will attain a college degree if their parents do not have college degrees rose significantly between the two surveys. Therefore, dependence on the initial conditions is more rapidly forgotten for NLSY97 cohorts and their descendants than for NLSY79 cohorts and their descendants.

► Figure 8. Educational mobility



Note: Educational mobility is the probability that a child will attain a college degree if their parents do not have college degrees. In contrast, Figure 7 panel (b) shows that downward mobility decreased between NLSY79 and NLSY97. NLSY97 cohorts experience lower downward mobility, and downward mobility converges more slowly towards its long-run value for them than for NLSY79 cohorts. This finding is consistent with the effect of broadening access to university after the 1980s, which has given a greater proportion of youth access to higher education and, therefore, caused upward mobility to rise.

► Conclusions

We use data from the NLSY to analyse intergenerational mobility in the US using alternative methodologies. First, we find that educational mobility has increased since the end of the 1980s, when American universities were opened up to all students. However, increased educational mobility has not translated into greater income mobility.

Second, our analysis suggests that parents' income has a greater impact on children's income when parents are highly educated. Low parental education is not relevant in explaining children's education.

Finally, using mobility matrices, we show that the probability of moving from the bottom to the top of the income distribution has increased from 0.91 per cent in the NLSY79 to 3.16 per cent in the NLSY97. Our analysis further confirms that upward mobility has risen over time, while downward mobility has decreased.

We find that the American system has had two effects. The first effect creates more opportunities for youths from low-income families whose parents have not graduated from college, and pushing them out of the immobility trap. This reduces the correlation between parents' and children's income. The second effect is insuring the children of highly educated and wealthy parents against intergenerational income fall. This perpetrates privileges and reinforces the social reproduction of elites. Our analysis shows that the first effect is stronger than the second effect.

From a policy perspective, our results suggest that, in the US, making universities open to all is a successful strategy for improving educational opportunities for youths whose parents do not have higher education. Naturally, the success of this type of educational reform depends on country-specific socioeconomic conditions, such as how meritocratic the labour market is.²⁷

We also acknowledge that policies to foster social mobility should be applied as a bundle. Some studies highlight how other policy tools (such as public childcare programs, tax credit schemes and education subsidies) may especially benefit children from low-income families. One example from the US that illustrates this is the Moving to Opportunity program, which gives poor families vouchers to help them move to better neighbourhoods.²⁸ Neighbourhood characteristics (such as income segregation, concentrated poverty, inequality, racial segregation, quality of schools and crime rate) are important determinants of social mobility. Therefore, reducing the concentration of poverty and socioeconomic segregation of neighbourhoods can benefit mobility. Moving to Opportunity has highlighted that having a better neighbourhood and local environment has a beneficial effect on a child's long-term outcomes, including their adult incomes. Chetty and Hendren (2018) show that, on average, boys and girls from low-income families, and who grew up in a disadvantaged neighbourhood, earn about 35 per cent and 25 per cent less, respectively, than children who are otherwise similar but benefited from the Moving to Opportunity program and moved to a better areas when they were 10 years old.

Other policies can negatively affect upward mobility: Blundell et al. (2016) and Albertini et al. (2020) show that in-work benefits and the Earned Income Tax credit (EITC) may affect people's educational choices and labour-market trajectories over their lifetime. In particular, by making low-skilled jobs more attractive, the EITC reduces the return on education, thereby discouraging some youths from pursuing further studies after high school (Albertini et al. 2020). Some studies warn that universal subsidy schemes have only limited redistributive effects. To promote mobility,

²⁷ In developing countries, income mobility is low compared with educational mobility. This gap between relatively high educational mobility and low income mobility is mostly due to a lack of jobs.

²⁸ The Moving to Opportunity programme is a major randomized housing-mobility experiment sponsored by the Department of Housing and Urban Development. For more information, see www2.nber.org/mtopublic.

public spending on education needs to be properly targeted and generate better quality of, and access to, education for disadvantaged groups (Narayan et al. 2018).

Chetty et al. (2020) point out that Ivy League colleges predominantly enroll students from high-income families and, therefore, limit intergenerational mobility. To increase intergenerational mobility, Chetty et al. (2020) suggest that these colleges' application and admission processes should give a sliding-scale preference to low- and middle-income students, similar to the preference implicitly given to legacy students at elite private colleges.

Fostering employment opportunities and fighting discrimination may also have a beneficial effect on intergenerational mobility. To equalize labour-market opportunities, governments should make it easier for disadvantaged people to access the labour market and do more to protect workers against racial discrimination.²⁹

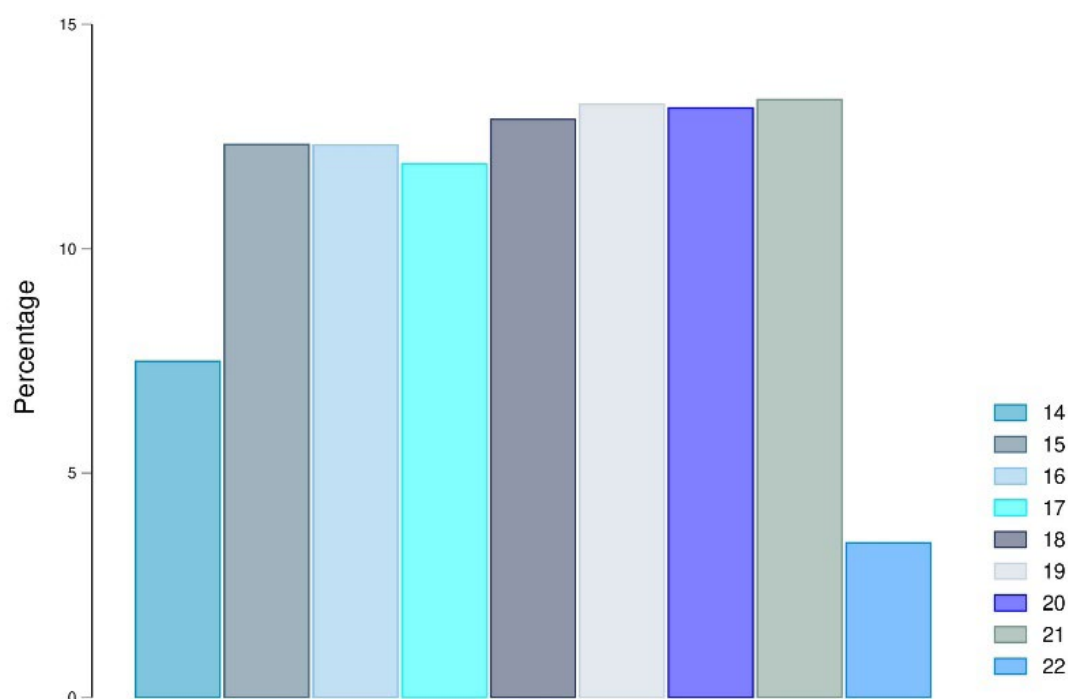
²⁹ For more on different policy tools to improve social mobility, refer to Nybom (2018). For more on labour-market inclusion, refer to ElGanainy et al. (2021).

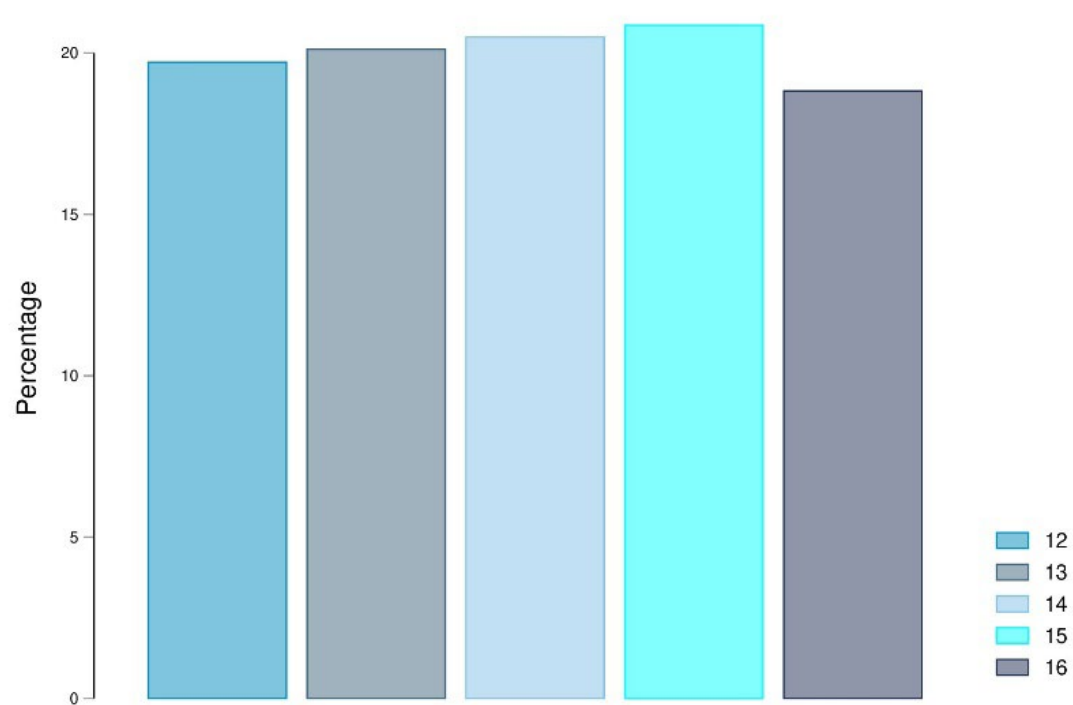
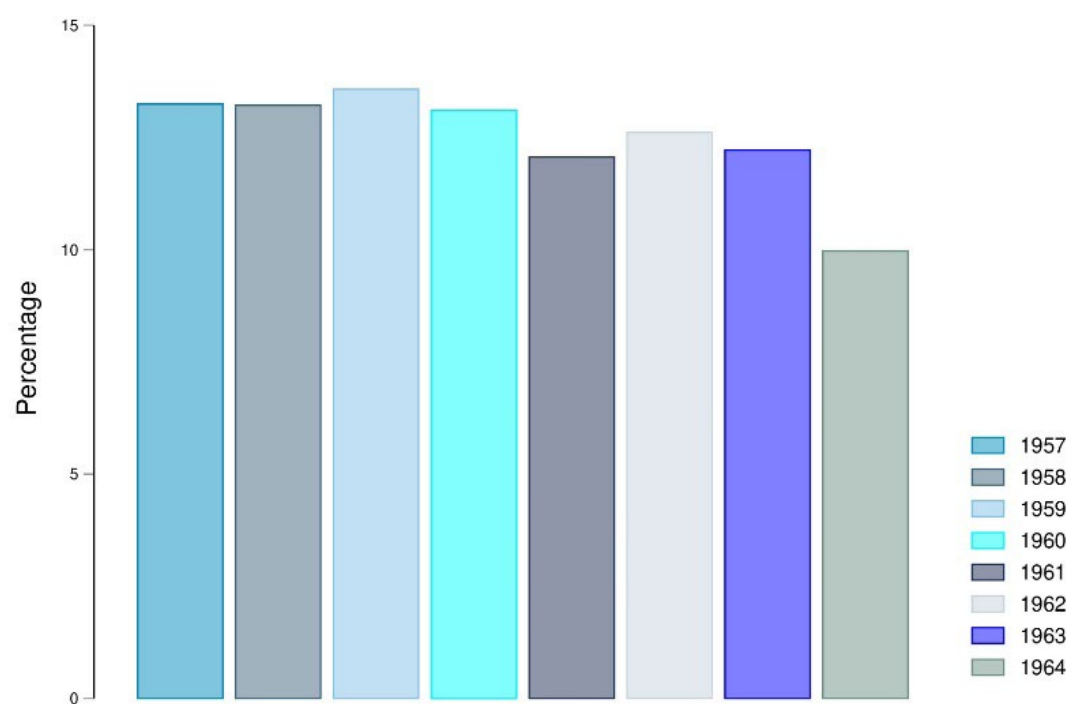
Appendix A: Age distribution of youth and parents

The age distribution of youths is shown in Figure 9 and the age distribution of parents is shown in Figure 10. In both figures, panels (a) and (b) present the age distributions. In Figure 9, panels (c) and (d) present the birth cohorts of the youth respondents for the NLSY79 and the NLSY97 respectively. The bins (this is the information used to compute educational mobility) in the graphs are slightly different. The figures show us that the ages of youths in the cohorts are equally distributed.

► **Figure 9. Age and birth distribution of youth cohorts**

Panel a: Age in 1979



Panel b: Age in 1997*Panel c: Birth cohort in 1979*

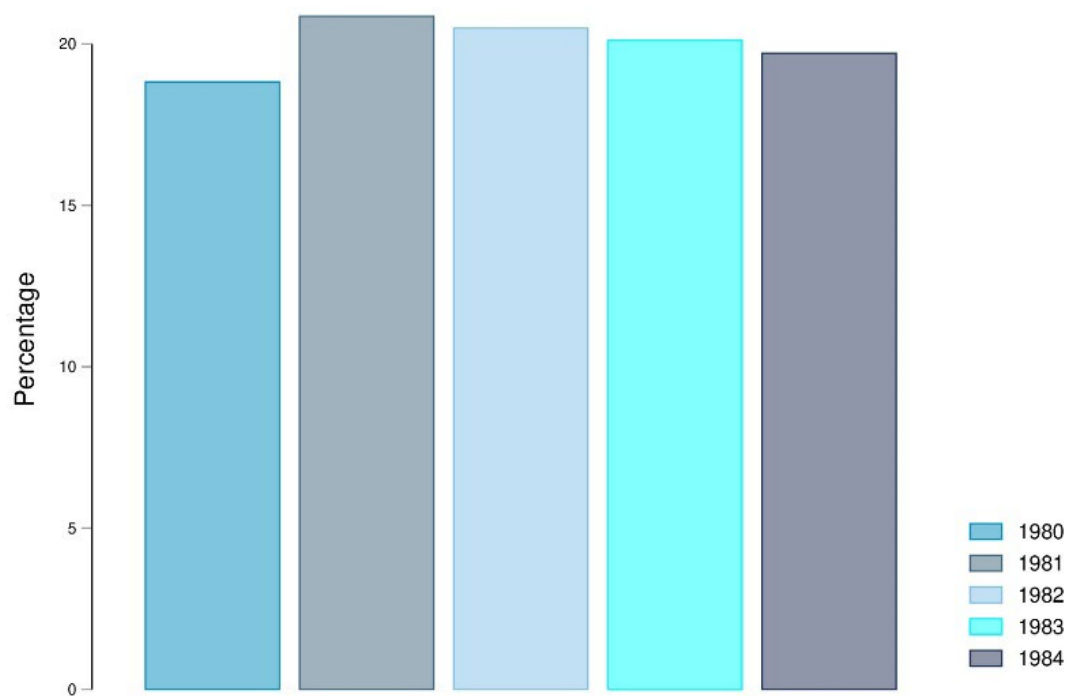
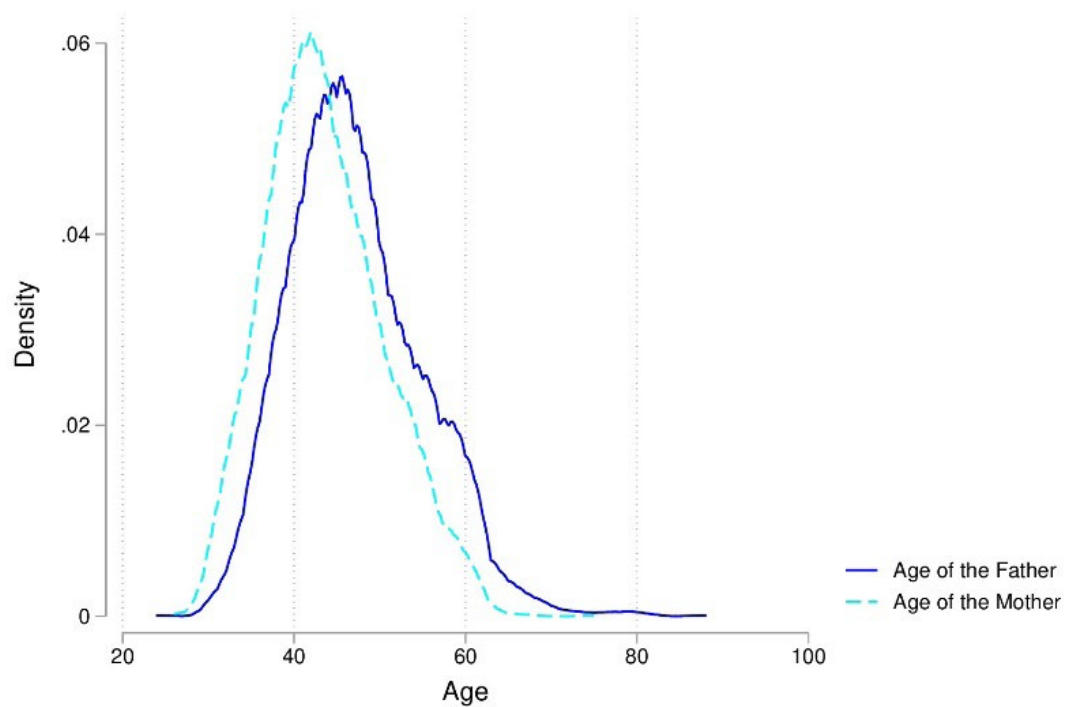
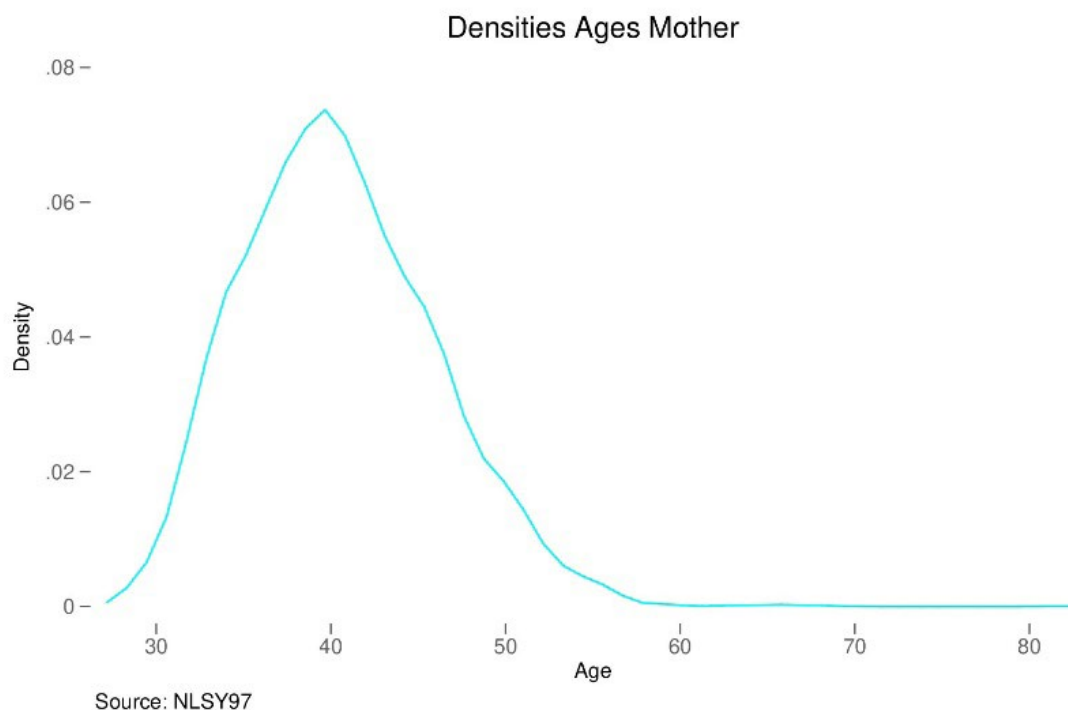
Panel d: Birth cohort in 1997

Figure 10 panels (a) and (b) present the Kernel age densities of parents of NLSY79 and NLSY97 youth respondents respectively.

► Figure 10. Age distribution of parents of youth respondents

Panel a: Age of parents in 1979

Panel b: Age of mother in 1997

Note: (1) The information in panel (a) is computed from ages reported in 1987. (2) Age distribution information for fathers of NLSY97 youth respondents is unavailable. (3) Age distribution for mothers of NLSY97 youth respondents is calculated using information reported in 1997 about the mothers' age when the youth respondents were born.

► **Table 15. Percentage of parents who are skilled individuals**

Birth year (<i>j</i>)	Parents who are skilled (%)
NLSY79	
1957	21.425
1958	24.963
1959	22.600
1960	21.340
1961	22.105
1962	24.950
1963	22.761
1964	23.924
1965	27.170
NLSY97	
1980	34.983
1981	40.436
1982	42.791
1983	39.239
1984	41.176

Appendix B: Educational mobility (NLSY79)

We use the same sample for both educational and income mobility.

► **Table 16. Education transition for different birth cohorts**

Birth year (<i>j</i>)	β_{jk}	α_{jk}	Observations	Adjusted R^2
1957	0.250** (0.0800)	0.136*** (0.0241)	363	0.064
1958	0.291*** (0.0836)	0.172*** (0.0261)	377	0.069
1959	0.165* (0.0718)	0.092*** (0.0200)	403	0.034
1960	0.391*** (0.0725)	0.118*** (0.0210)	460	0.149
1961	0.339*** (0.0738)	0.141*** (0.0253)	377	0.116
1962	0.315*** (0.0766)	0.103*** (0.0221)	341	0.115
1963	0.443*** (0.0800)	0.133*** (0.0233)	406	0.170
1964	0.257*** (0.0755)	0.163*** (0.0274)	342	0.062

*Note: (1) $k = \text{NLSY79}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

► Table 17. Education transition for mothers of youth respondents from different birth cohorts

Birth year (j)	β_{jk}	α_{jk}	Observations	Adjusted R^2
1957	0.352** (0.123)	0.156*** (0.0245)	362	0.063
1958	0.229 (0.130)	0.207*** (0.0265)	377	0.019
1959	0.190 (0.122)	0.109*** (0.0206)	402	0.016
1960	0.326** (0.115)	0.167*** (0.0229)	460	0.044
1961	0.184 (0.0991)	0.193*** (0.0272)	376	0.018
1962	0.461*** (0.105)	0.123*** (0.0225)	340	0.135
1963	0.479*** (0.128)	0.172*** (0.0246)	404	0.095
1964	0.437*** (0.115)	0.186*** (0.0267)	339	0.078

Note: (1) $k = \text{NLSY79}$. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix C: Probit models of intergenerational educational mobility

We estimate complementary models to support our results on intergenerational educational mobility. Linear probability models can yield probabilities outside the range between 0 and 1, which may be corrected using a probit or logit configuration. We perform the probit estimation defined in Equation 7.

$$P(Y_{i,j,k} | X_{i,j,k}) = \Phi(\psi_{j,k} + \tau_{j,k}X_{i,j,k}) \quad \text{Equation 7}$$

where:

$Y_{i,j,k}$	is a binary variable for each NLSY version $k \in \{NLSY\ 79, NLSY\ 97\}$. The value is 1 if the youth respondent i is skilled (they have at least a bachelor's degree) 30 years after their birth cohort j
$X_{i,k}$	is a binary variable. The value is 1 if the mother or father of the respondent i has a bachelor's degree in one of the NLSY versions k
Φ	is the normal distribution.

The predicted probability that a youth will attain a bachelor's degree if their parents have at least a bachelor's degree is calculated using Equation 8.

$$P(Y_{i,j,k} | X_{i,j,k} = 1) = \Phi(\hat{\psi}_{j,k} + \hat{\tau}_{j,k}X_{i,j,k}) \quad \text{Equation 8}$$

The results reported in Table 18 and Table 19 confirm our previous results, which point to an increasing trend of educational mobility. The estimates are significant but, when the parents of a youth respondent do not have a bachelor's degree, we observe it has a negative effect on the probability that the youth respondent will attain a bachelor's degree, as the constants through the different specifications have negative signs. Figure 11 panel (a) shows the educational mobility trend, which is positive and statistically significant. Figure 11 panel (b) shows the increasing probability that youths will attain a bachelor's degree if their parents have a bachelor's degree.

► **Table 18. Probit estimates of education transition for different birth cohorts (NLSY79)**

Birth cohorts	Highly skilled parents		Constant	Observations	Pseudo R^2
1957–1987	1.123*** (0.106)	-0.872*** (0.0511)		986	0.1006
1958–1988	1.041*** (0.0983)	-0.919*** (0.0517)		1,030	0.0965
1959–1989	1.051*** (0.107)	-1.153*** (0.0544)		1,061	0.0951
1960–1990	1.326*** (0.107)	-1.197*** (0.0530)		1,144	0.1436
1961–1991	1.017*** (0.105)	-1.011*** (0.0520)		1,041	0.0862
1962–1992	1.231*** (0.104)	-1.117*** (0.0532)		1,084	0.1290
1963–1993	1.192*** (0.112)	-1.076*** (0.0538)		1,000	0.1122
1964–1994	1.465*** (0.119)	-1.142*** (0.0615)		837	0.1803

*Note: (1) k = NLSY79. (2) Robust standard errors are in parentheses. (3) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. (4) No sample weights have been used.*

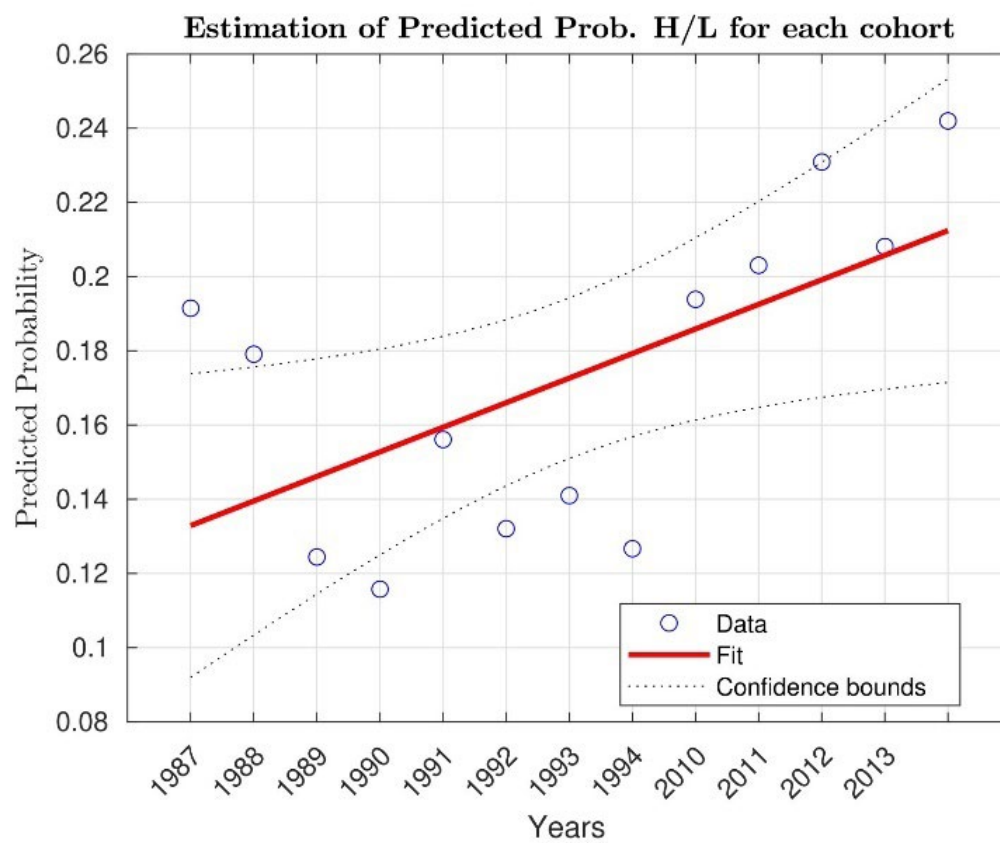
► **Table 19. Probit estimates of education transition for different birth cohorts (NLSY97)**

Birth cohorts	Highly skilled parents		Constant	Observations	Pseudo R^2
1980–2010	1.077*** (0.0867)	-0.864*** (0.0460)		1,276	0.1038
1981–2011	1.235*** (0.0819)	-0.831*** (0.0427)		1,454	0.1319
1982–2012(13)	1.152*** (0.0843)	-0.736*** (0.0431)		1,354	0.1132
1983–2013	1.137*** (0.0813)	-0.813*** (0.0446)		1,363	0.1191
1984–2014	1.059*** (0.0841)	-0.700*** (0.0428)		1,343	0.0956

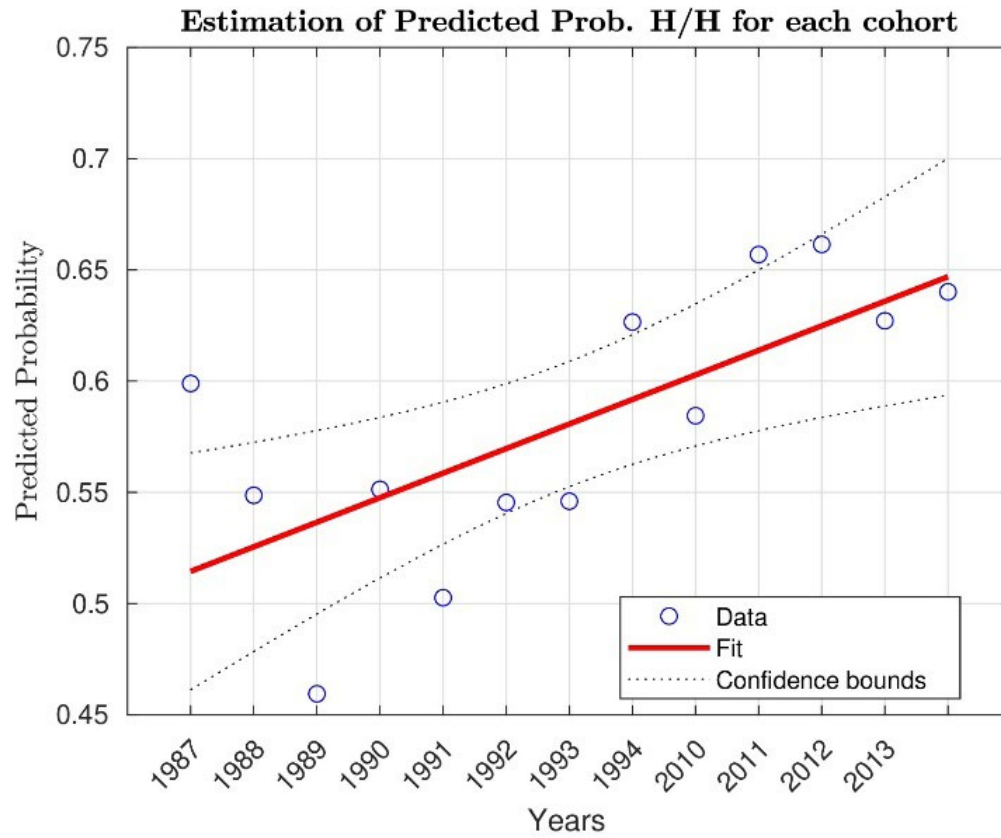
*Note: (1) We observe youths' education levels in 2013 and 2015 instead of 2012 and 2014. (2) k = NLSY97. (3) Robust standard errors are in parentheses. (4) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. (5) No sample weights have been used.*

► **Figure 11. Predicted probability of being high-skilled**

Panel a: Predicted probability of being high skills having low-skilled parents



Panel b: Predicted probability of being high skills having high-skilled parents

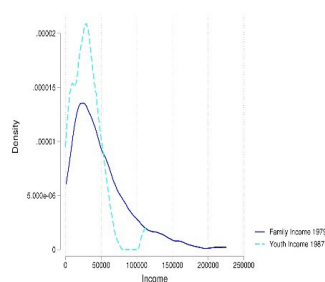


Note: (1) Graphs present predicted probabilities generated by the probit estimation. (2) The estimated equations are $\theta_t = a + b_t + \varepsilon_t$ for $\theta \in \{\psi, \tau\}$. (3) The estimated coefficient for panel (a) is $\{0.12627^{***}; 0.0066269^{**}\}$ and for panel (b) is $\{0.50345^{***}; 0.011037^{**}\}$. (4) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

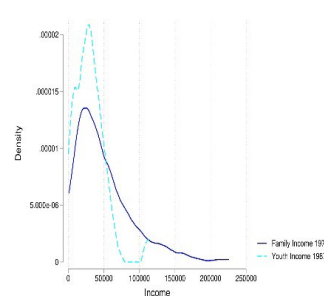
Appendix D: Income distribution of youths

► **Figure 12. Income distribution of youths born between 1957 and 1983**

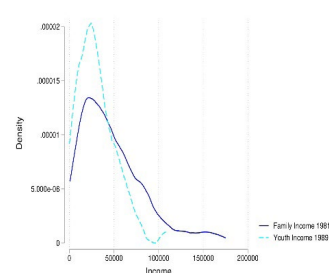
Youths born in 1957



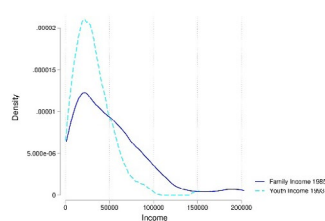
Youths born in 1958



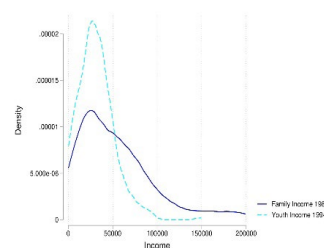
Youths born in 1959



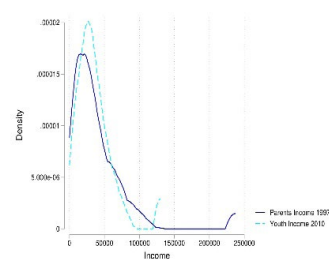
Youths born in 1963



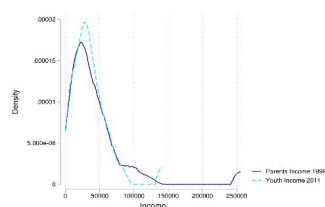
Youths born in 1964



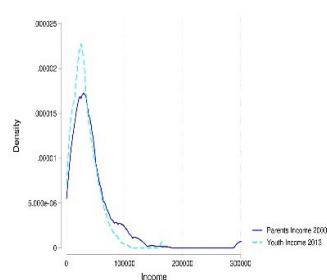
Youths born in 1980



Youths born in 1981



Youths born in 1983



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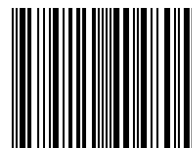
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