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Equality of Opportunity: Definitions, Trends, and Interventions

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The 'Horatio Alger' ideal of upward mobility has a strong grip on the American imagination. But recent years have seen growing concern about the distance between the rhetoric of opportunity and the reality of intergenerational mobility trends and patterns.

The related issues of equal opportunity, intergenerational mobility, and inequality have all risen up the agenda, for both scholars and policy-makers. A growing literature suggests that the United States has fairly low rates of relative income mobility, by comparison to other countries, but also wide variation within the country. Education, race, and family structure impact significantly on mobility patterns, at both an individual and community level. President Obama has described the lack of upward mobility, along with income inequality, as 'the defining challenge of our time.' Rep. Paul Ryan believes that 'the engines of upward mobility have stalled.'

But political debates about equality of opportunity and social and economic mobility often provide as much heat as light. Vitally important questions of definition and motivation are often left unanswered. How far can 'equality of opportunity' be read across from patterns of intergenerational mobility, which measure only outcomes? Is the main concern with absolute mobility (how people fare compared to their parents) – or with relative mobility (how people fare with regard to their peers)? Is the right metric for mobility earnings, income, education, or wellbeing, or some other yardstick? Is the primary concern with upward mobility from the bottom or with mobility across the spectrum? And so on.

In this paper, we discuss the normative and definitional questions that guide the selection of measures intended to capture 'equality of opportunity'; argue for one measure in particular, namely relative intergenerational income mobility (RIIM); briefly summarize the state of knowledge on mobility in the United States; describe a new micro-simulation model designed to examine RIIM – the Social Genome Model (SGM); and report results from the model on the impact of repeated policy interventions across different life stages on rates of relative mobility.

The three steps being taken in mobility research can be described as the what, the why, and the how. First, it is important to understand *what* patterns and trends in mobility are. Second, try to understand *why* they exist - in other words, to uncover and describe the 'transmission mechanisms' between the outcomes of one generation and the next. Third, consider *how* to weaken those mechanisms – or put differently, how to break the cycles of advantage and disadvantage.

Moving the needle on relative intergenerational mobility is neither quick nor easy. But it is possible. Since mobility rates are an indicator of the degree of equal opportunity, it is also necessary.

I. Concepts and Definitions

Amartya Sen, the Nobel Prize-winning economist, famously argued that since everyone favors equality of one sort or another, the key question is: Equality of what?[1] Sen was primarily concerned with distinguishing between competing philosophical approaches to equality represented by utilitarianism, welfarism, and Rawlsian liberalism. But the imperative to be clear about the normative basis for studies of equality applies more broadly, and it certainly applies to questions of mobility and opportunity.

What do we mean by 'equality of opportunity'? Assuming we can approximate opportunity in some way, do we really want 'equality' of it, or just 'more equality than we have right now'? And how will we determine what is an acceptable level?

A series of decisions have to be made before we can even start to construct measures. Four are particularly important (our answers are summarized here too):

A. Opportunities or outcomes? (*Outcomes*)

B. Intergenerational or Intra-generational? (*Intergenerational*)

C. Absolute or Relative Mobility (*Relative*)

D. Mobility of What? (*Income*)

A. Opportunities or Outcomes?

First, are we interested in opportunities or outcomes? It hardly needs saying that the two are not the same. An opportunity—say, for a college education—may be equally available to Fred and Bob. If Fred chooses to take up the opportunity and Bob chooses not to, their life outcomes - say, in earnings - may differ too. Fred may experience upward mobility, while Bob does not. Differences in intergenerational mobility open up. But it would be hard to claim that there was any inequality of opportunity.

As the philosopher Adam Swift argues, the use of outcomes as proxies for opportunities – the standard approach taken in mobility research – has attendant problems: "From a normative perspective it is chances as opportunities, not chances as statistical probabilities, that matter. What we care about is not whether people from different origins have the same statistical chance of ending up in particular destinations but whether they have the same *opportunity* to do so." (Emphasis added.)[2]

Understanding how far inequalities of outcome reflect inequalities of opportunity or merely inequalities of preferences is, of course, a difficult task. For one thing, we would need a robust way to measure whether an opportunity was within an individual's opportunity set. More difficult still, we need a way to determine whether an individual's preference—say to go to college or not—was in itself a reflection of their background, rather than a genuine, individually-fashioned preference.

The real question is whether inequalities of outcome serve as good-enough proxies for inequalities of opportunity, without presuming that they are identical. Further research might help to establish whether outcome differences are explained, in part at least, by differences in preferences. The formation of these preferences could then be investigated to see how far they are adaptations to background, or reflective choices.

But we need not wait. In our view, in most cases the distribution of outcomes offers a good-enough proxy for the distribution of opportunities. Empirical evidence seems to support this view. It seems unlikely, for example, that the large gaps in college completion rates by socioeconomic background are primarily the result of large gaps in preferences. The aspiration to complete college is shared across the economic spectrum.[3] Small-scale interventions, including simply the provision of more information about college entry, can have quite marked effects on application rates.[4]

There are a number of reasons why 'perfect' mobility rates – with no statistical association between background and outcomes – would signal an imperfect world, not least because of the importance of the rights of parents to raise their children as they see fit, by and large, but also because individual preferences will vary. There are therefore limits to the overall

mobility enterprise. But it is safe to say that current mobility patterns reflect real differences in opportunities – which ought therefore to be tackled.

B. Intergenerational or Intra-generational?

Individuals will move up and down the income ladder during their own lifetime, especially during the prime working age years. Typically, incomes will rise during the course of labor market activity, and taper down during retirement. There may also be positive and negative income shocks along the way, especially from unemployment. The movement of an individual along the income distribution during their own lifetime is defined as *intra*-generational mobility. For this kind of measure, the incomes or other outcomes of the previous generation are not important – though of course they are likely to determine both the starting point and shape of an individual's journey. By contrast, *inter*generational mobility compares the outcome of an individual with the outcome of their parents, in terms of rank position, in terms of income, or on another measure.

Since almost all people are intra-generationally mobile, to varying degrees, studies of *inter*generational mobility typically compare outcomes at a particular point in time for both generations – for example, around the age of forty. The selection of a particular age may influence the results, of course, since the lifetime curves for different groups may vary, especially in terms of earnings or income. Some recent work in the U.K. by Paul Gregg suggests much lower rates of intergenerational mobility in terms of lifetime incomes, compared to estimates of mobility based on 'point-in-time' incomes.[5]

Both intra-generational and intergenerational mobility are important, of course. Opportunities for an individual to progress during their own lifetime matter, regardless of background. The two kinds of mobility are also empirically related: the extent to which parental

outcomes influence the adult outcomes of their children will depend in part on the ability of the next generation to move up during their own lifetimes. Where they end up on the ladder is a function of how far they climb, not just where they start.

Our principal focus is on intergenerational mobility, incorporating intra-generational mobility as an important component. Our normative concern is with the extent to which parental outcomes predict children's outcomes, or more broadly, the extent to which inequalities are replicated across generations. From a policy perspective, it will be important to keep in mind both the difference and the relationship between intergenerational and intra-generational mobility.

C. Absolute or Relative Mobility?

A related and important distinction, one that is often lost in public debate, is between relative and absolute mobility. Relative mobility is, as Scott Winship puts it, "a measure of how the ranking of adults against their peers is (or is not) tied to the ranking of their parents against their peers. That is to say, ignoring dollar amounts, did adults who rank high or low in the income distribution also have parents who ranked high or low?"

By contrast, absolute mobility rates are all about dollar amounts. In Winship's terms, "absolute mobility ignores rankings and simply considers whether adults tend to have higher, size-adjusted incomes than their parents did at the same age, after taking into account increases in the cost of living."[6]

Most people are upwardly mobile in the absolute sense: 84 percent of U.S. adults, according to the latest estimates.[7] Those raised in families towards the bottom of the income distribution are the most likely to overtake their parents' income status, as figure 1 shows.

Of course both kinds of mobility matter, though for somewhat different reasons. One version of the American Dream is of growing prosperity for all (or at least the overwhelming majority), and this is captured well by absolute mobility rates. The two key drivers here are the rates of economic growth, and the distribution of that growth. Policy will therefore attempt to maximize real income growth for as wide a swath of the population as possible. A certain conception of fairness is captured here: citizens should share in the proceeds of economic growth. Whether people occupy a different rung on the income ladder than their parents is, from this perspective, a second-order question. Relative mobility captures a wholly different idea of fairness, closer to the ideal of meritocracy.

In theory at least, it is possible to have a society with very high relative mobility but very low absolute mobility, or vice versa. In practice, societies will display a different mix of the two. Postwar America, for example, was an engine of absolute mobility, fuelled by strong economic growth.[8] But relative mobility rates remained flat, as we discuss below.

Relative and absolute mobility may also buttress each other. Higher rates of absolute mobility may lower the stakes for relative mobility, making it easier to widen the 'bottlenecks' in the opportunity structure.[9] Higher rates of relative mobility may mean a more competitive labor market, resulting in higher rates of growth and therefore higher rates of absolute mobility.[10]

Policy-makers will likely balance the need to promote both kinds of mobility, and some scholars are exploring innovative ways to combine aspects of both kinds of mobility into a single measure.[11] But it is important to clear which kind of mobility a particular policy is attempting to improve, not least so that the efficacy of the policy can be judged against the appropriate benchmark.

Our own work is animated by a normative focus on relative intergenerational mobility. Relative mobility tracks more closely the ideal of '*equality* of opportunity' – as opposed to the expansion of opportunity over time. Even if everyone is richer than their parents, we would be a deeply unfair society if everyone was also stuck on exactly the same point on the income ladder. We want growth and more prosperity, but we also want fluidity and more fairness.

D. Mobility of What?

But which outcomes? There is a kaleidoscopic array of possibilities. Here are a few: income, wages, education, well-being, and occupational status. Each can be defended on strong normative grounds. So what is the currency of equal opportunity? Are we interested in equalizing the opportunities to be happy, to be well-off, to be well schooled, or to enjoy job status?

Achievements on different potential dimensions of wellbeing cannot be collapsed into one measure. The truth is that all of them matter, and it is instructive to examine mobility patterns in each, and indeed on other dimensions.[12] An important item on the mobility research agenda is deepening our understanding of the interactions between mobility on these different dimensions. We also need to keep in mind a range of successful outcomes. For instance, a person from an affluent background might receive a great education and choose a career that is stimulating to them, high in status, but low in earnings: they become the curator of a small arts museum, perhaps. In income terms, they may be downwardly mobile - but on all the other dimensions they may have risen up the ladder.

It is important to bear this diversity in mind; but at the same time we need to select some concrete dimensions in order to focus our research efforts. And while achievements on the

various dimensions do not go together lock-step, they do cluster together quite strongly. In most cases, education, wages, income, status, and wellbeing will point in the same direction.[13]

We follow most researchers in the field by focusing on income as an outcome, and in particular on household income. Income is a powerful predictor of other outcomes, in terms of health, employment, housing, family formation, and so on. It is also what Fishkin describes as an 'instrumental good': in other words, one that can be fairly easily converted into other goods, including opportunity-enhancing ones such as education.[14] More straightforwardly, income is also easier to measure on a comparable basis than many other goods.

To be clear: our focus on income derives not from a belief that only money matters, but from the evidence that income is strongly correlated with other goods; that it provides a robust, comparable metric; and that it does, after all, matter quite a lot - especially to those who have least of it.

All empirical treatments of 'equality of opportunity' or mobility rest on strong assumptions about what matters, and how to measure what matters. Different approaches have strengths and weaknesses. The key is to be clear about the underpinnings of your analyses. We believe that i) what matters most is intergenerational opportunity; ii) the distribution of certain outcomes can act as a good-enough proxy for the distribution of opportunities; and iii) that income provides a defensible, robust outcome for these purposes.

II. Relative Intergenerational Income Mobility: The Evidence

Relative intergenerational income mobility (RIIM) is our primary interest. What does the extant research literature tell us about trends and patterns, especially in the U.S., on this front?

Taken as a whole, the U.S. has fairly low rates of RIIM, particularly in terms of upward mobility from the bottom, compared to other nations. Rates appear to have been flat for at least the last few decades.[15] However, there is significant geographical variation within the U.S. in mobility patterns – as least as much, it seems, as between the US and other nations.[16] These geographical variations are visible both between fairly large areas, such as Commuting Zones, but also at a smaller, neighborhood level.

There are sharp differences in mobility patterns by race, with black Americans in particular having a much worse mobility pattern than white Americans.[17] There are also marked gaps in mobility patterns at different levels of education, as well as for different family structures experienced during childhood. We provide a brief overview here, since other papers in this collection provide a detailed picture of these patterns.[18] There are modest differences in mobility patterns for women and men, which we do not address here but are examined by a number of scholars.[19]

A. The Canadian Dream? International Variations

There is a long-standing literature on international comparisons of mobility, with long-standing problems of data collection and comparability. Comparing cross-generation trends across countries is inevitably difficult. However, the broad picture that emerges from these comparisons is fairly clear and consistent: within economically-developed countries, mobility rates are highest in Scandinavia and lowest in the U.S, U.K., and Italy - with Australia, Western Europe, and Canada lying somewhere in between. Figure 2, from a forthcoming chapter by Jo Blanden, provides a list of the most recent, reliable income elasticity coefficients for a range of nations.[20]

Given the huge differences on a whole range of factors between nations – not least population size and diversity – these comparisons are of fairly limited value. It is more instructive to look at close neighbors, so scholars including Miles Corak have conducted a number of studies comparing the U.S. to Canada. Overall, Canadian rates of mobility appear to be higher. One analysis compares intergenerational earnings persistence by earnings decile in the U.S. and Canada, and finds greater persistence in the U.S., especially at the top and bottom of the distribution (see figures 3 and 4).[21]

B. Current Overall Picture on Mobility

A standard technique for assessing intergenerational mobility is sorting children and their parents into their respective income distributions and plotting the results. This procedure generates a social mobility transition matrix. Such matrices can then be conditioned to capture differences by individual characteristics, for example, race, gender, education, etc. If a society has 'perfect' mobility, then—regardless of conditioning—children whose parents are in the lowest quintile of the parent income distribution are as likely to end up in the lowest quintile of the child income distribution as they are to end up in any other quintile. An alternative approach is rank direction mobility (RDM), which tracks an individual's position on the whole income rank compared to their parents' rank – developed in particular by Bhashkar Mazumder.[22]

In addition, different sources of data can be used, including longitudinal surveys such as the PSID or the NLSY, Social Security data, or tax records. Again, each has their strengths and weaknesses.[23]

The U.S. suffers from a high degree of intergenerational income "stickiness," especially at the top and the bottom of the income distribution. Using the dataset constructed from the NLSY for the Social Genome Model, figure 5 shows that children born to families at the bottom

of the income distribution (i.e., whose parents' income falls in the bottom quintile) have a 36 percent probability of remaining stuck there in adulthood—far more than the 'ideal' 20 percent. Likewise, children on the opposite end of the spectrum have a 30 percent chance of remaining in the highest income quintile. There is more than a two-fold difference in the odds of a child born in the top quintile remaining in the top income quintiles (the 'comfortable middle class'), compared to one born in the bottom quintile (56% versus 23%). Other studies using different datasets find similar results; most of those using PSID find lower rates of mobility.[24]

For those born in the middle quintile, the odds of being upwardly or downwardly mobile are broadly equal: that is, their chances of ending up in each of the five income quintiles by adulthood are approximately the same, from 17 percent for the lowest quintile to 19 percent for the highest.

C. Time Trends

In a comprehensive series of recent studies, making innovative use of administrative records of income, Chetty et al. probe both geographical variations in mobility (see below) and long-term trends. Their conclusion is that RIIM rates are flat.[25]

Chetty estimates a rank-rank specification, with each child ranked within their birth cohort according to his or her mean family income at age 29-30, and each set of parents ranked according to their mean family income around the year of their child's birth. Regressing child rank on parent rank shows "no trend" across birth cohorts (i.e., 1971-74, 1975-58, or 1979-82) (see figure 6). The authors also use college attendance and college quality as alternative outcome measures of mobility and come to a qualitatively similar conclusion: "Intergenerational mobility is stable (or improving slightly)."

These findings echo the results of earlier research on time trends. Hertz (2007) examined cohorts of children born between 1952 and 1975 and observed as adults between 1977 and 2000 included in the Panel Study of Income Dynamics (PSID). Using several distinct methodologies to correct for respondent attrition, he found "no clear long-run linear trends in the IGE of family income or family income per person." Lee and Solon (2009) used the same underlying dataset and come to a similar conclusion. While data limitations prevented them from ruling out a modest trend, their analysis of IGEs for sons and daughters—they analyze the two separately—suggests "intergenerational income mobility in the United States has not changed dramatically over the last two decades." Figure 7 shows the IGEs for sons and daughters who reached adulthood (age 25) between 1977 and 2000.[26]

D. Race Gaps

Among the most striking descriptive findings in the RIIM literature are the stark divisions by race, especially for black Americans, as shown in figure 8 and figure 9. Whereas white children have, for all intents and purposes, the same experience as that of the full population—stickiness in the tails and a relatively evenly distributed middle class, black children face pervasive downward pressure towards the bottom of the income distribution, regardless of parent income.

Half the black children born into the bottom quintile remain there in adulthood, compared to just one in four whites. Only 3 percent join the top income quintile, implying that a real-life "rags to riches" story is unlikely for black children.

Moreover, unlike white children and the population as a whole, black children with middle-class roots are more likely to fall than to rise. Of black children born to parents in the middle income quintile, only 14 percent move upward in the distribution, 37 percent remain

middle class, and 69 percent move downward. The equivalent breakdown in the white distribution is 44 percent, 23 percent, and 34 percent, respectively.

These trends echo findings from other researchers, using both the NLSY and PSID datasets. (One difference is that the PSID data suggests lower rates of upward mobility for whites – and this in itself is worthy of more investigation.) Work by Mazumder, as well as by Greg Acs, paints a similar picture in terms of race gaps in mobility.[27]

Studies which attempt to explain gaps in black and white mobility typically find that cognitive test scores in adolescence can explain a large proportion of both upward and downward mobility. Other, lesser factors behind the race gap in mobility include family structure (with regard to upward mobility) and higher education. Following a covariate analysis of rank direction mobility using both NLSY and administrative datasets, Mazumder concludes: "It is apparent that the cumulative effects of a variety of influences that affect cognitive ability by adolescence play a critical role in accounting for racial differences in upward and downward mobility."[28]

Given the literature showing that differences in skills open up early in life, and, if anything, then widen through the K-12 years, the implications of the findings on race and mobility are that more attention should be paid to closing gaps in skill development during childhood and adolescence.[29]

E. Skill and Education Gaps

Gaps in skills help to explain mobility patterns for the whole population, as well as between racial groups. While there is an ongoing debate over the relative contribution of cognitive and 'non-cognitive' skills (variously labelled grit, persistence, prudence, conscientiousness, and so on), there is general agreement that both sets of skills matter, that the

two sets are strongly inter-related, and that both are malleable – with non-cognitive skills more malleable later, and certainly well into adolescence.[30]

Most studies incorporating a measure of cognitive ability find strong predictive effects for upward and downward mobility. Even controlling for parental background and personality attributes, measured cognitive ability emerges with a strong independent effect on outcomes.[31] There is also evidence that cognitive abilities are partly inherited; though there is little agreement among researchers how big that part is. Some behavioural geneticists, comparing correlations in IQ between adopted and non-adopted siblings and identical and non-identical twins (who have varying similarities in genes and in family environment) have suggested that genes account for up to 60% of the variation in IQ (Sacerdote, 2008). But Björklund, Jäntti, and Solon (2005) use a large Swedish sample to explore correlations in earnings across a large number of sibling types, including adoptees, and find a weaker role for genetics in explaining earnings, determining around 20% of the variance in earnings. As Jo Blanden concludes: "This literature indicates that genes play an important role in generating intergenerational transmissions. But they also show that they are not the whole story."[32]

Gaps in skills are likely to overlap strongly, though not perfectly, with gaps in educational achievement. Indeed, much of the effect of education on mobility rates may be mediated through cognitive ability, and vice versa. Higher levels of education are clearly associated with significantly higher rates of upward mobility.

Children who go on to achieve a college degree, irrespective of their parents' income, are more likely to make it to the top income quintile. A comparison of figure 10 and figure 11 shows that, among bottom-income children, those with a college degree are twenty times more likely than their high school dropout counterparts to make it to the top (20 percent versus 1 percent).

Even top-income children receive a boost by receiving a college degree—37 percent of them stay at the top, far more than their high school dropout and graduate peers. A college degree not only improves the economic situation of the poor but also preserves the economic situation of the affluent.

At the other end of the spectrum, failing to receive a high school diploma damages upward mobility rates. Bottom-income children without a diploma have a 54% probability of remaining on the bottom rung as adults. Rates of downward mobility from the middle three quintiles are also very high for those without a diploma (42%, 37%, and 48% respectively). Only those born in the top quintile appear to enjoy some immunity from the effects of not completing high school, with almost as many remaining on the top rung (14%) as falling to the bottom (16%).

F. Family Structure

Family structure - and by implication family stability - are important descriptive factors for mobility patterns. We examine here three categories of children: those with mothers who were unmarried throughout their childhood ('never-married'); with mothers who were married for some of their childhood ('discontinuously married'); and those whose mothers were married throughout their childhood ('continuously married'). As shown in figure 12, bottom-income children with never-married mothers face roughly equal odds of remaining in the bottom as rising to any other quintile. Only 5 percent make it to the top of the income distribution, compared to 10 percent overall.

Children of continuously-married mothers at the bottom of the distribution have more scope to be upwardly mobile, as shown in figure 13. Just 17 percent of those with continuously married mothers, compared to 32 percent with discontinuously married mothers stay at the

bottom - as shown in figure 14. This pattern of greater upward mobility repeats for children in each parent income quintile. Being raised by continuously married parents has a particularly strong correlation with upward mobility for black children.[33]

Being raised by continuously married parents, then, appears to provide a strong defense against falling behind and a strong foundation for moving ahead. Of course these are simply descriptive data. What lies behind the better mobility patterns of children raised by married parents? The two biggest factors appear to be higher income, even within income quintiles, and more engaged parenting. To that extent, the marriage is a signal of other factors rather than a key factor in and of itself.[34]

G. Disunited States: Geographical Variation Within the U.S.

Mobility patterns vary strongly by race, education level, skills, and family structure. But there is another source of heterogeneity, too: variability in mobility at the subnational level.

Specifically, Chetty et al. find that commuting zones (CZs) within the US exhibit "substantial variation in both relative and absolute mobility."[35] Figure 15 illustrates this point graphically. Several regional patterns are readily apparent—whereas the Great Plains has the most upward mobility and the Southeast has the least, the West Coast and Northeast fall somewhere in between.

Most of the U.S. population lives in a metropolitan area, so it is noteworthy that there are also wide variations in mobility across cities. For example, Chetty et al. estimate that "the probability that a child from the lowest quintile of parental income rises to the top quintile is 10.8% in Salt Lake City, compared with 4.4% in Charlotte."

While wary of making any causal claims, the authors do attempt to identify correlates of intergenerational mobility by geography. Five stand out: racial and economic segregation, school

quality, income inequality, social capital, and family structure. Pooling all CZs, OLS regressions of absolute upward mobility on all five factors suggest that together they explain 76% of the variation in upward mobility. In each case, family structure—using a proxy of the fraction of children with single mothers—is "the strongest and most robust predictor."

There is also strong evidence for geographical effects on a smaller scale. Sharkey (2013) finds large differences in the economic status of neighborhoods for black and white families. For example, 84 percent of black children born from 1955 through 1970 were raised in "high disadvantage" neighborhoods, compared to just 5 percent of whites. Only 2 percent of blacks were raised in "low disadvantage" neighborhoods, compared to 45 percent of whites. Sharkey estimates that between one-quarter and one-third of the black-white gap in downward mobility from the top three income quintiles can be explained by differences in neighborhood poverty rates.[36] It is not clear what the causal pathways are, though Sharkey's analysis suggests that rates of labor market activity are an important factor, above and beyond the economic effects.

In summary, U.S. RIIM rates are fairly low by international standards, flat over time, and vary significantly between different places and different groups. Indeed, given the diversity of mobility patterns, it may be more helpful to think in terms of different *social mobilities* rather than a singular rate of social mobility.

III. Trouble Ahead? Possible Mobility Futures

The evidence on mobility trends over time suggests a degree of stability. RIIM rates appear to have been essentially unchanged during periods of strong and poor economic growth, and periods of declining and rising income inequality. In some senses, of course, the trend is of

secondary interest: the primary question is whether the rates of mobility are congruent with an equal-opportunity notion of fairness.

But since improving rates of intergenerational mobility is by definition a long-term endeavor, it is important to be alert to contemporary signals of a potential improvement or worsening in mobility rates in the decades ahead. In particular, it is worth looking at inequalities in income, educational attainment, family structure and parenting, and by neighborhood. Most of these are covered in other papers in this collection, so our treatment here is brief.

A. Income

Income inequality has been rising in recent decades. The extent of the rise is strongly determined by the selection of income measure (in particular the difference between pre-tax and -transfer income and post-tax and -transfer income). But the rise is real, especially in terms of the gap between the top of the distribution and the majority of the population. Income inequality in recent decades has been a 'top-majority' phenomenon, rather than a 'bottom-majority' one.

This may be one reason why increased income inequality appears not to have impacted on mobility, or at any rate, not yet.[37] It simply isn't affecting the bulk of the population directly. It is also possible that income inequality has been pulling downwards on mobility rates, but that other forces – such as declining teen pregnancy rates, or rising high school graduation rates – have been pulling in the opposite direction.

There is certainly a strong intuitive claim in the idea of a 'Great Gatsby curve' relationship[38] between inequality and immobility, not least, because as Sawhill has argued elsewhere, "when the rungs of the ladder are far apart, it becomes more difficult to climb the ladder…Inequality in one generation may mean less opportunity for the next generation to get ahead and thus still more inequality in the future."[39]

Proof of a link between income inequality and immobility is not needed for the combination of the two to raise concerns. There is a moral justification for a society with high inequality offset by high mobility, grounded in liberal ideas of freedom and fairness, and a moral justification for a society with low mobility, softened by low inequality, based on left-of-center egalitarian ideals. But there is little moral justification for a society with a large gap between rich and poor, *and* little movement between the two. These are, of course, strongly normative claims – and should be treated as such.

B. Educational Attainment

There is some evidence for growing gaps in levels of educational attainment by parental income background, in the early years, though K-12, and into higher education.[40] Most of these are covered by other contributors to this collection; suffice for us to say that to the extent that educational attainment predicts adult outcomes, rising gaps by background could, *prima facie*, result in lower rates of intergenerational mobility. From the perspective of relative mobility, gaps in attainment are more important than the overall levels. If higher education rates rise, but rise disproportionately among the affluent, the effects on RIIM are likely to be negative. There is good evidence, for example, that differences in higher educational attainment by income background have had a strong, negative influence on intergenerational mobility in the UK in recent years, as many more young people have gone to college.[41]

C. Families and Parenting

Quite significant gaps have opened up in rates of marriage, intentional childbearing, and family stability by social and economic background. These gaps are the principal subject of Sawhill's latest book, *Generation Unbound: Drifting into Sex and Parenthood without Marriage*,

in which she writes that "family formation is a new fault line in the American class structure."[42] Again, it is too early to say whether these trends will have an impact on intergenerational mobility. But given the relationship between family structure and outcomes, there is certainly cause for great concern.[43]

There are also large gaps in terms of parental engagement and parenting skills along income, race and educational axes. Work by James Heckman and colleagues shows that parents provide vital 'scaffolding' around the skill development of their children.[44] Research by Ross Thompson, Ariel Kalil and others shows how supportive, nurturing parenting styles can blunt the impact of poverty and underpin the development of positive skills and outlook.[45] Our own research suggests that narrowing parenting gaps would have a positive impact on certain outcomes, including high school graduation rates.[46] (We are not aware, however, of research on trends over time in these parenting gaps, which would be a useful addition to the inequality literature.)

D. Geographical Inequalities

American neighborhoods have become somewhat less segregated along race lines in recent decades, though from high levels. In the meantime, rates of segregation by economic status have risen.[47] Patrick Sharkey provides suggestive evidence that cities with higher rates of economic segregation have lower rates of intergenerational mobility. As he concludes: "The degree to which the poor live apart from the rich is a more robust predictor of economic mobility than the overall amount of inequality within a metropolitan area. In other words, what matters is not just the size of the gap between the poorest and richest residents of a metro area, but how the richest and poorest are sorted across different communities".[48]

There are of course, many other dimensions of inequality that may have an impact on intergenerational mobility, in addition to the ones we have addressed briefly here. These include wage progression, gender roles, workplace training, non-cognitive skill development, social and community norms and culture, school and teacher quality, and so on. The key point is that policy-makers need to be on high alert for gaps on those dimensions that seem most strongly connected to mobility trends.

Since these factors are associated with rates of social mobility, growing gaps may presage somewhat lower mobility rates in the future, if nothing is done. Perhaps not – but if we are committed to improving social mobility, the precautionary principle might be usefully applied.

Scholarly efforts to discover and describe the 'transmission mechanisms' by which inequalities transfer from one generation to the next should help to identify the most dangerous gaps, and so point the way to the most fruitful areas for policy intervention. It is for these purposes that the Social Genome Model (SGM) has been developed. In the next section, we describe the model and then we put it to work, estimating the effects of a range of interventions on patterns of intergenerational mobility.

IV. Why Isn't There More Mobility? A Look Inside the Black Box Using the Social Genome Model (SGM)

Much of the literature on intergenerational mobility has relied on a simple mobility matrix or a summary statistic such as the IGE. The most common measure of mobility is the relationship between the income of a parent and the income of the child as an adult. This

research literature leaves unanswered a number of important questions that work on the SGM is beginning to address.

1. Is income a sufficient measure of a child's early background and later "success"?
2. Can we fill in the black box and show the pathways to adult success?
3. What might be done to improve social mobility and how do we measure the effectiveness of alternative programs and policies aimed at this goal?

The SGM – originally developed at Brookings and now a partnership between Brookings, the Urban Institute, and Child Trends – is a first attempt to answer such questions. It was developed to serve a number of purposes: first, to fill in the black box in a way that is consistent with current conceptualizations of the process of child development and human capital formation; second, to produce a better tool for assessing the likely effects of various interventions that might improve social mobility; and third, to identify gaps in the research literature that are critical to fill if we want to answer these questions about mobility.

A. The Conceptual Framework

The SGM is a life cycle model and as such contains five life stages (after circumstances at birth) with a corresponding set of success measures at the end of each life stage, as illustrated in figure 16**.** The success measures were chosen after a review of the literature on child development and human capital, including a review of any empirical evidence that each measure was predictive of later success, the availability of data on the measure, and the advice of experts in the field.[49]

Some very useful microsimulation models are based primarily on fitting or calibrating the data to match one's outcomes of interest. There need be no strong theoretical basis for what

variables to include in the equations; instead a premium is placed on which variables best predict these outcomes.

Work on the SGM has necessarily included some of this kind of empirical searching for strong predictors of later outcomes, but this kind of rank empiricism was rejected in favor of motivating the model by a long literature on child development and human capital formation. Although this is not the place to review this literature in any detail, a few key points are worth making.

First, you need to pick your parents well. Not only do they determine a child's genetic endowment but also his early home environment. Parents' relative rank in the income distribution is only one way to look at family background. There is an extensive literature in sociology that has used a multiple measure of 'class' or of various advantages and disadvantages at birth. In the SGM we sometimes use such a multidimensional measure, looking at a child's family income, maternal education, marital status, and weight at birth. At other times, we use conventional measures of family income.

Similar issues surround the measurement of adult success. Thus far, we have focused primarily on family income at age 40 and especially at the proportion of children who become "middle class by middle age." But there are deep normative questions about what defines "success," with some scholars preferring a measure of capacities (health and education, for example) over a measure of income.[50] There are also issues about whether to focus on the individual or the family and whether or how to adjust for family size. Currently, we compare an individual's family income at age 40 to 300% of the poverty threshold for a family of four—roughly $68,000; "success" means having a family income above that threshold.

The child's birth weight is included as a proxy for prenatal environment which recent literature suggests can be critical to future development.[51] Maternal education plays a strong role in the model and gets at some mixture of genetic endowment and home environment. In addition, the model includes direct measures of the quality of parenting using the HOME scale.

Second, although the process of human development begins in the home and is greatly influenced by the quality of parenting, the process continues in the school years.[52] We measure both cognitive and non-cognitive skill acquisition at the end of middle childhood (ages 10-11) and at the end of adolescence (ages 18-19). New work is underway to specify a more detailed structural model between ages 10 and 19.[53] We also look at both achievement (e.g., test scores, GPA) and attainment (e.g., graduation from high school or college). But other measures of skill acquisition could be added and factor analysis could be used to hunt for important latent variables.[54] New work by Reeves and others on character or non-cognitive skills suggests that self-control (prudence) and persistence (grit) also matter for later success.[55] Currently, the model includes some rough but very incomplete measures related to these attributes, such as involvement in crime, having a baby as a teenager, or being suspended from school.

Third, although our intent is to measure human capital broadly to include health, attitudes, and habits, at the core of the model is the relationship between education and earnings in the tradition of Becker, Mincer, and later contributors to the human capital literature. Lessons from that literature include the following: a) the rate of return on education is in the neighborhood of 6 to 10 percent; b) most of the results from OLS regressions (finding rates of return of around 6 percent) reflect a causal effect, not ability bias; the ability bias in such estimates is small and likely compensated for by a bias in the opposite direction due to measurement error;[56] c) rates of return have increased for recent cohorts compared to earlier

ones, probably because of a lag in the response of supply to demand;[57] d) marginal returns may differ from average returns and depend on who is being targeted by an intervention;[58] e) the "rate of return to education" is heterogeneous across skill sets, and depends on labor market demand;[59] f) rates of return vary by subgroup, with blacks experiencing higher returns than whites, natives experiencing higher returns than immigrants, and youth experiencing higher returns than the elderly.[60]

Fourth, as Heckman has famously stated, success begets success. The process of human capital formation is cumulative and rates of return vary with the level of prior skill development. Also, cognitive and non-cognitive skills may be complementary. The children in the Perry Preschool Project, for example, did better in high school because the non-cognitive skills they acquired early on helped them focus and stay out of trouble. Heckman calls this capacity building "self-productivity." It's one reason why Cunha and Heckman find that later-stage interventions designed to remediate early-stage deficiencies are more costly than earlier ones.[61] As detailed below, the SGM strongly demonstrates this principle.

On the other hand, the full benefits of early-stage interventions will not materialize without some investment during later stages. Currie and Thomas, for example, show that participants in the Head Start program lose some of their performance advantage over nonparticipants after returning to their disadvantaged home environments.[62] The Chicago Longitudinal Study, which tracked children in a preschool program, also found that adolescent and adult-stage benefits were greater for children that received extended interventions through sixth grade: later investment helped the children capitalize on earlier investment.[63] As noted in more detail below, one advantage of the SGM is that it can capture the effects of sustained intervention throughout childhood and adolescence.

Fifth, while individual earnings are a function of human capital accumulation, broadly defined, they do not depend only on human capital. There may be imperfections in the labor market (e.g. discrimination or high rates of unemployment induced by a recession) that also determine how much someone can earn. In addition, there are many unobserved characteristics that affect earnings. For these kinds of reasons, the ability of even well-specified earnings equations to explain a lot of the variance in individual earnings is limited. We have done some work to specify a labor market module that could eventually be linked to the SGM. In this module, there is an earnings function and several identities (relating, for example, income to earned and non-earned sources, and to the earnings and employment experience of different family members). There are, in addition, a series of equations that relate employment and earnings to the state of the labor market.

Finally, we need to distinguish the process that determines individual earnings from the one that determines family income. The latter depends on family formation decisions. The current SGM model lacks a family formation module, although a separate model, called FamilyScape, that is now a partnership between Brookings and Child Trends, attempts to model this process, including the formation of a dyad, whether a couple has sex, whether they use birth control, become pregnant, have an abortion, marry or divorce, and whether a birth occurs – and to what kind of parents. By linking the two, or by using the Urban Institute's Dynasim model, it might become possible to create a two-generation model.

B. Structure of the Model

With the above conceptual framework in mind, the model is structured as a series of regression equations in which outcomes in each life stage are treated as dependent on outcomes in all prior life stages, plus some more contemporaneous variables. More specifically:

$$Outcome = \beta_0 + \beta_1 CAB + \beta_2 Previous\ Stage\ Outcomes + \varepsilon \qquad \text{Equation 1}$$

where $\beta_1$and β_2 are vectors of coefficients, *CAB* is the set of Circumstances at Birth variables, *Previous Stage Outcomes* is the set of outcomes from temporally prior stages (see figure 16), and ε is the error term containing unobserved characteristics.[64] Figure 17 lists the variables used to measure outcomes at each life stage and some of the other variables used in the model.

C. Data

The SGM is constructed using two data sets from the Bureau of Labor Statistics' National Longitudinal Surveys. Our primary data set is the 'Children of the NLSY79' (CNLSY). It represents children born mainly in the 1980s and 90s, and is the source of our data for the birth, early and middle childhood, and adolescent stages. No respondent in the CNLSY is yet old enough to track through adulthood, so we impute their adult values with help from a second dataset: the 'National Longitudinal Survey of Youth 1979' (NLSY79). [65]

The result is a longitudinal dataset in which synthetic individuals, part actual CNLSY data and part imputed data, pass through five life stages from birth to adulthood. This includes 5,783 children from the CNLSY, born between 1971 and 2009.[66,67]

V. Social Genome Model as a Policy Tool

A. Advantages of the model

The SGM has a number of advantages as a policy tool for studying social mobility. First, it provides an explicit framework for considering pathways to the middle class. As noted earlier,

the model divides the life cycle into five stages and defines outcomes in each stage which are predictive of later outcomes and eventual economic success. This framework allows us to assess not only whether children are likely to be successful as adults but also whether they are likely to be successful middle schoolers, adolescents, or young adults. Allowing for these intermediate outcomes and the transitions between them, as the SGM does, is critical to understanding downward and upward mobility; we can test whether and how gaps in success persist or cumulate over time.

Second, although the model relies on certain metrics of success, it allows for flexibility in how success is defined. We currently use a family income of at least 300 percent of poverty by age 40, but other measures could be used. In addition, a user interested in a specific question, such as the proportion of African-American children who are reading at grade level by age 10, or the number of poor children who graduate from college, or the number of adolescent boys who have ever been involved with the juvenile justice system, will be able to use the model to answer these and numerous similar questions.

Third, the SGM can take the results of rigorous evaluations of social programs (typically RCTs) and estimate their impacts on longer-term outcomes. This allows for the evaluation of policy experiments without the significant delay and expense of a real-world evaluation. For example, if we know how a preschool program affects school readiness at age five, we can use the SGM to estimate its effects on later outcomes such as high school graduation rates or adult earnings without having to wait 30 years and having to spend millions of dollars on a real world evaluation of the program.

Fourth, the SGM enables decision makers to compare the relative effectiveness of different interventions using a standardized metric, such as discounted lifetime income, and then

compare those results to the costs of the program. For instance, we have shown that a multi-stage intervention targeted at children living in families with incomes below 200 percent of the poverty line would more than pay for itself given the positive impact on lifetime income. The use of such cost-benefit analyses may lead to more informed decisions on where to invest the marginal dollar of public or philanthropic funds.

Fifth, the SGM can be used to look at the cumulative impacts of intervening not just once but multiple times and in multiple domains over a child's life. By design, many evaluations are limited to quantifying the effect of a single, isolated intervention. But disadvantaged children may need more than a one-time boost whose effects may fade over time. Perhaps they need a parenting program in infancy, a preschool experience as a toddler, a reading program in elementary school, and so forth. [68] The SGM can be, and—as will be discussed below—has already been, used to evaluate such multiple intervention efforts.

Sixth, the SGM allows for examinations of the distributional implications of different policies. For many years, researchers have documented persistent gaps in success between men and women, whites and African Americans, and children of high-income parents and low-income parents. Because the SGM is based on a detailed representation of the demographic and economic characteristics of the U.S. population, it will allow us not only to measure and monitor these gaps at baseline but also after a targeted intervention. For example, we can simulate the effect of a middle childhood education initiative on the black-white gap in success at adulthood.

Finally, the SGM can be used to set research priorities. Where the model's parameters or data are weak (see below for more discussion of these flaws), it is usually because insufficient resources have been devoted to collecting the right data or estimating the most important parameters. Currently, in characterizing the birth circumstances of children, we rely on data on

the mother only, e.g., her education attainment, age at child's birth, etc. Ideally, we would include analogous data on the father, but the NLSY does not contain good data on such questions. This is just one example of a research gap that may be worth filling.

B. Our use of the model

We have illustrated the use of the model as a policy tool in several previous papers. Some of this work has been descriptive and documents how pathways to success vary systematically for different groups of children. Of particular concern, we document a significant and persistent gap between children born into disadvantaged and advantaged circumstances.[69]

As shown in figure 18, among children born of normal birth weight to married mothers who were not poor and had at least a high school education at the time of their child's birth, 72 percent can be expected to be ready to start kindergarten, compared to only 59 percent otherwise. This gap never narrows—even by the end of adolescence, children who are less advantaged at birth are 29 percentage points less likely to succeed as adults.[70] At age 40, there is a 22 percentage point gap in the likelihood of being middle class between "advantaged-at-birth" and "disadvantaged-at-birth" children.

The model also confirms that success begets further success. Not only do children born advantaged retain a large advantage at the end of early childhood, but the pattern persists in subsequent stages. In middle childhood, adolescence, and adulthood, those who succeeded in the previous stage are much more likely than those who did not to succeed again. For example, we find that 82 percent of children in our sample who are well prepared to start school are able to master basic skills by age 11, compared with just 45 percent of children who were ill prepared (see figure 19). Acquiring these basic academic and social skills by age 11 further increases a

child's chances of completing high school with good grades and risk-free behavior by a similar magnitude—which, in turn, further increases the chances that a young person acquires a college degree or the associated income. Success by age 29 doubles the chances of being middle class by middle age.

Nevertheless, falling off the success track is not (necessarily) a death knell. Early failures need not be determinative; children can get back on track. A child who is not school ready has a similar chance of being middle class as another child who is school ready as long as he or she can get on track by age ten and stay on track. Moreover, a child from a disadvantaged background who does meet our metrics of success in each life stage has almost the same probability of being middle class by middle age as a child who started off more advantaged. The problem is that there are relatively few such children. These findings point to the importance of early interventions by government or parents that keep children on the right track.

Beyond these descriptive analyses, we have used the SGM to do two types of simulations. One type involves analyzing the effects of changing a particular set of parameters or variables to explore certain "what if" questions. For example, what if disadvantaged children were as school ready as their more advantaged peers? The second type of simulation involves looking at the effects of a program intervention or set of interventions.

In one particular simulation, we use the model to show how much of the adult income gap between low- and high-income children can be closed with well-evaluated programs in every life stage.[71,72] As noted in figure 20, we model the effects of five interventions by adjusting outcome variables from early childhood to adolescence. Although each program has been evaluated independently, their cumulative impact has not. Our rationale for pursuing such a simulation is that if we want to see larger and longer lasting effects on adult outcomes, we may

have to combine early childhood initiatives with interventions in elementary school, adolescence, and beyond.

The results of intervening early and often are impressive. As shown in figure 21, the baseline 20 percentage point gap in the share of low-income and high-income children reaching middle class by middle age shrinks to 6 percentage points after the multi-stage intervention. When we measure the impact of the same set of interventions, targeted on low-income children, but look at how they affect racial gaps in success rates later in life, the results are less dramatic but still encouraging.[73] White-black gaps in success narrow in every stage of the lifecycle, although large disparities still persist, especially in adolescence and adulthood (see figure 22).

Successful implementation of these interventions would also substantially increase rates of upward mobility among low-income children. We find that, under the baseline scenario, less than one in ten children born into the bottom income quintile climb into the top quintile by age 40 (see figure 23). After the multi-stage intervention, however, nearly one in five does. Furthermore, the proportion of low-income children stuck in the bottom quintile drops from 34 to 23 percent.

These interventions pass muster under a simple cost-benefit test. Figure 24 shows the marginal lifetime income effect of each program as well as its cost per child. We estimate the total cost per child for all of these programs is just over $20,000. The discounted lifetime income of the average participant in these programs would increase by more than $200,000. Looked at from a society-wide perspective, this much additional income would likely produce sufficient additional revenues to offset the costs of the programs.

These results suggest the SGM's utility to evaluators and policymakers. That said, the model has certain limitations.

C. Limitations of the Model

The model's limitations reflect both the availability of data and the state of research in the field.

On the data front, there is no longitudinal data set that follows children from birth to age 40 and includes a rich set of variables about their outcomes at each life stage. This has required a lot of imputation or simulation of outcomes, added to measurement error, and likely biased our coefficients downwards.

The model also lacks a module devoted explicitly to family formation and child bearing. Although marriage and childbearing are at work behind the scenes of our regressions, an improved model would make these factors explicit.

With respect to the accuracy of the parameters, the biggest concern is whether or not the regression coefficients can be considered causal estimates of the effects of different variables on the outcomes being measured. Due to the dense correlations among our variables, especially across stages, we stop short of interpreting individual coefficients and focus on the effects of the interventions on later outcomes. Some of our advisers have suggested taking the best causal estimates from the external literature and importing them into the model. While we believe it is a good idea to benchmark the most important coefficients against this literature, we do not import outside coefficient estimates into the model; the external coefficients vary with sample composition, time frame, methodology, and model specification. Our approach, we hope, allows for more consistency within the model.

We have investigated the reasonableness of the model by looking in particular at whether the returns to education assumed by the model are similar to those in the best external literature; they are. However, when we try to benchmark the model against some of the RCT evidence

from long-term follow ups (e.g. Perry Preschool), the model tends to underestimate the effects of such policies, according to an outside analysis provided by Lynn Karoly, a senior economist at RAND. This is likely due to an insufficiently specified model of child development—and the limited variables available in the NLSY datasets. But it could also reflect the fact that the Perry Preschool Program was given to a particularly disadvantaged group that has no counterpart in today's environment, in which mothers are more educated and many children receive some form of out-of-home care.

D. Conclusions on the SGM

The SGM is a very promising way to learn more about why a child's circumstances at birth affect his or her eventual success in life, including adult incomes. It can also be used to estimate the effects of a variety of interventions designed to help less advantaged children climb the ladder. And finally, it demonstrates how far we are from having a complete understanding of the process.

Nonetheless, we find it encouraging that a set of well-evaluated programs appear, according to the model, to make it possible to close most of the gap in the lifetime incomes between children born into lower and higher income families.

VI. Conclusion

The issue of intergenerational mobility is likely to be on the public agenda for the foreseeable future, especially against a background of weak growth rates in the economy and in median earnings and rising income inequality at the top of the distribution. In recent years, scholars have made considerable progress in describing the patterns of mobility in the United

States. Now the main challenges are to understand the transmission mechanisms between the status of one generation and to develop and promote a policy agenda for promoting greater mobility.

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[1] Sen, Amartya. 1979. "Equality of What?" The Tanner Lecture on Human Values. Stanford: Stanford University.
[2] Swift, Adam. 2004. "Would Perfect mobility be Perfect?" *European Sociological Review* 20(1): 1-11.
[3] Reeves, Richard. 2014. "Vague Hopes, Active Aspirations and Equality." Washington and Chicago: Brookings Institution and University of Chicago.
[4] Hoxby, Caroline M., and Sarah Turner. 2013. "Informing Students about Their College Options: A Proposal for Broadening the Expanding College Opportunities Project." Discussion Paper. Washington: The Hamilton Project, Brookings Institution.
[5] Gregg, Paul, Lindsey Macmillan, and Claudia Vittori. 2014. "Moving Towards Estimation Lifetime Intergenerational Economic Mobility in the UK." Working paper 14/332. Bristol, United Kingdom: University of Bristol.
[6] Economic Policies for the 21st Century. 2014. *Income Inequality in America: Fact and Fiction*. New York: Manhattan Institute.
[7] Economic Mobility Project. 2012. *Pursuing the American Dream: Economic Mobility Across Generations*. Washington: The Pew Charitable Trusts.
[8] ibid.
[9] Fishkin, Joseph R. 2014. *Bottlenecks: A New Theory of Equal Opportunity*. Oxford: Oxford University Press.
[10] The Sutton Trust. 2010. *The Mobility Manifesto*. London: The Sutton Trust.
[11] Genicot, Garance, and Debraj Ray. 2012. "Measuring Upward Mobility." New York: Russell Sage.
[12] Graham, Carol, and Nikolova, Milena. 2013. "Happy Peasants and Frustrated Achievers? Agency, Capabilities, and Subjective Well-Being." Human Capital and Economic Opportunity Global Working Group, Working Paper No. 2013-013.

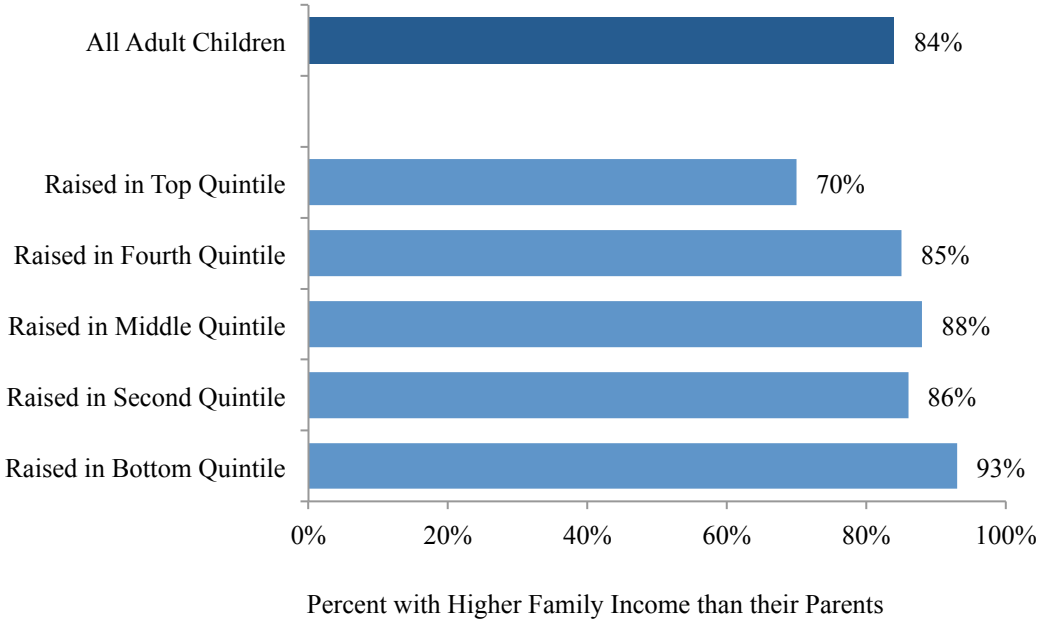
[13] Haskins, Ron, and Isabel Sawhill. 2009. *Creating an Opportunity Society*. Washington: Brookings Institution.
[14] Fishkin, *Bottlenecks*.
[15] Chetty, Raj, et al. 2014. "Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility." *American Economic Review* 104(5): 141-147.
[16] Chetty, Raj, et al. 2014. "Where is the Land of Opportunity: The Geography of Intergenerational Mobility in the United States." *Quarterly Journal of Economics* (forthcoming).
[17] Mazumder, Bhashkar, 2012. "Black–white differences in intergenerational economic mobility in the United States." *Economic Perspectives*, Federal Reserve Bank of Chicago; Mazumder, Bhashkar. 2014. *Upward Intergenerational Mobility in the United States*, Washington: The Pew Charitable Trusts.
[18] See papers in this collection by Timothy Smeeding, Katherine Magnuson, Patrick Sharkey, and Eric S. Rosengren.
[19] Isaacs, Julia B. 2008. "Economic Mobility of Men and Women." In *Getting Ahead or Losing Ground: Economic Mobility in America*, edited by Julia B. Isaacs, Isabel Sawhill, and Ron Haskins. Washington: Brookings Institution and The Pew Charitable Trusts.
[20] Blanden, Jo. 2014. "Concepts, Measures and Mechanisms: An Overview of Empirical Evidence on Intergenerational Social Mobility in the U.S. and UK." Unpublished paper. University of Surrey.
[21] Corak, Miles. 2009. "Chasing the Same Dream, Climbing Different Ladders: Economic Mobility in the United States and Canada." Washington: The Pew Charitable Trusts.
[22] Bhattacharya, Depobam, and Bhashkar Mazumder. 2011. "A Nonparametric Analysis of Black-White Differences in Intergenerational Income Mobility in the United States." *Quantitative Economics* 2(3): 335-379.
[23] Winship, Scott, and Stephanie Owen. 2013. "Guide to the Brookings Social Genome Model." Washington: Brookings Institution.
[24] Isaacs, Julia B., Isabel Sawhill, and Ron Haskins. 2008. *Getting Ahead or Losing Ground: Economic Mobility in America.* Washington: Brookings Institution and The Pew Charitable Trusts.

[25] Chetty, Raj, et al., "Is the United States Still a Land of Opportunity?"
[26] The results for daughters show some decrease in mobility early in the 1980s, in contrast to the findings discussed above, but this result may be anomalous.
[27] Acs, Gregory. 2011. "Downward Mobility from the Middle Class: Waking Up from the American Dream." Washington: The Pew Charitable Trusts; Mazumder, Bhashkar. 2014. "Black-White Differences in Intergenerational Economic Mobility in the United States." Chicago: Federal Reserve Bank of Chicago.
[28] Mazumder, "Black-White Differences."
[29] Heckman, James J., and Tim Kautz. 2012. "Hard Evidence on Soft Skills." *Labour Economics* 19(4): 451-64; see papers in this collection by Greg J. Duncan and Richard J. Murnane; Duncan, Greg J. et al. 2012. "Child Skills and Behaviors in Intergenerational Inequality." In *From Parents to Children: The Intergenerational Transmission of Advantage*, edited by John Ermisch, Markus Jantti, and Timothy M. Smeeding. New York: Russell Sage.
[30] Heckman and Kautz; Heckman, James J., John Eric Humphries, and Tim Kautz, eds. *The Myth of Achievement Tests: The GED and the Role of Character in American Life*. Chicago: University of Chicago Press; Tough, Paul. 2013. *How Children Succeed: Grit, Curiosity, and the Hidden Power of Character*. New York: Mariner; Duckworth, Angela, and James J. Gross. 2014. "Self-Control and Grit: Related but Separable Determinants of Success." *Current Directions in Psychological Science* (forthcoming); Seligman, Martin. 2011. *Flourish: A Visionary New Understanding of Happiness and Well-Being*. New York: Free Press.
[31] Damian, Rodica, et al. Forthcoming. "Can Personality Traits and Intelligence Compensate for Background Disadvantage? Predicting Status Attainment in Adulthood." *Journal of Personality and Social Psychology* (in press); Reeves, Richard V. and Kimberly Howard. 2013. "The Glass Floor: Education, Downward Mobility, and Opportunity Hoarding." Washington: Brookings Institution.
[32] Blanden, Jo. "Concepts, Measures and Mechanisms: An Overview of Empirical Evidence on Intergenerational Social Mobility in the U.S. and UK."
[33] Mazumder, Bhashkar. 2012. "Upward Intergenerational Economic Mobility in the United States." Washington: The Pew Charitable Trusts.
[34] Reeves, Richard V., and Kimberly Howard. "The Marriage Effect: Money or Parenting?" Last modified September 4, 2014. Accessed October 10, 2014. http://www.brookings.edu/blogs/social-mobility-memos/posts/2014/09/04-marriage-social-mobility-parenting-income-reeves; Sawhill, Isabel. 2014. *Generation Unbound: Drifting into Sex and Parenthood without Marriage*. Washington: Brookings Institution.
[35] Chetty, Raj, et al., "Where is the Land of Opportunity."
[36] Sharkey, Patrick. 2009. "Neighborhoods and the Black-White Mobility Gap." Washington: The Pew Charitable Trusts.
[37] Chetty, Raj, et al., "Is the United States Still a Land of Opportunity?"
[38] Center for American Progress. "The Rise and Consequences of Inequality." Accessed October 10, 2014. http://www.americanprogress.org/events/2012/01/12/17181/the-rise-and-consequences-of-inequality/.
[39] Froomkin, Dan. 2010. "Social Immobility: Climbing the Economic Ladder is Harder in the U.S. Than in Most European Countries." *The Huffington Post*.
[40] See paper in this collection by Katherine Magnuson, Greg J. Duncan and Richard J. Murnane; Reardon, Sean. 2011. "The Widening Academic Achievement Gap Between the Rich and the Poor: New Evidence and Possible Explanations." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg Duncan and Richard Murnane. New York: Russell Sage; Dynarski, Susan. 2011. "Inequality in Postsecondary Education." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg Duncan and Richard Murnane. New York: Russell Sage.
[41] Blanden, Jo, Paul Gregg, and Lindsey Macmillan. 2007. "Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability Education. *The Economic Journal* 117(519): C43-C60.
[42] Sawhill, *Generation Unbound*.
[43] Cooper, Carey E., et al. 2011. "Partnership Instability, School Readiness, and Gender Disparities." *Sociology of Education* 84(3): 246-259; McLanahan, Sara. 2011. "Family Instability and Complexity after a Nonmarital Birth: Outcomes for Children in Fragile Families." In *Social Class and Changing Families in an Unequal America*, edited by Marcia J. Carlson and Paula England. Stanford: Stanford University Press.
[44] Cunha, Flavio, and James J. Heckman. 2008. "Formulating, Identifying, and Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Journal of Human Resources* 43(4): 738-782; Cunha, Flavio, James J. Heckman, and Susanne M. Schennach. 2010. "Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Econometrica* 78(3): 883-931.

[45] Kalil, Ariel. 2014. "Addressing the Parenting Divide to Promote Early Childhood Development for Disadvantaged Children." Washington: The Hamilton Project, Brookings Institution; Thompson, Ross A. 2014. "Stress and Child Development." *Future of Children* 24(1): 41-59.
[46] Reeves, Richard V., and Kimberly Howard. 2013. "The Parenting Gap." Washington: Brookings Institution.
[47] The Pew Charitable Trusts. "Financial Security and Mobility." Accessed October 10, 2014. http://www.pewtrusts.org/en/projects/financial-security-and-mobility.
[48] Sharkey, Patrick. "Rich Neighborhood, Poor Neighborhood: How Segregation Threatens Social Mobility." Last modified December 5, 2013. Accessed October 10, 2014. http://www.brookings.edu/blogs/social-mobility-memos/posts/2013/12/04-how-segregation-threatens-mobility.
[49] Some measures strongly suggested by theory or by other experts were simply not available or were not well measured enough to include in the model. Examples include paternal education and child health outcomes which were poorly measured in our data set.
[50] Sen, Amartya. 1992. *Inequality Reexamined*. New York: Russell Sage Foundation.
[51] Glover, Vivette. 2011. "Annual Research Review: Prenatal Stress and the Origins of Psychopathology: An Evolutionary Perspective." *Journal of Child Psychology and Psychiatry* 52(4): 356-67.
[52] Garcia, Jorge, and James Heckman. 2014. "Ability, Character, and Social Mobility." Unpublished paper.
[53] Child Trends is developing the model, breaking the adolescent stage into multiple, more detailed stages and adding variables that capture additional information on peer relationships and educational progress.
[54] Heckman, James, Rodrigo Pinto, and Peter Savelyev. 2013. "Understanding the Mechanisms Through Which an Influential Early Childhood Program Boosted Adult Outcomes." *American Economic Review* 103(6): 2052-2086.
[55] Reeves, Richard. 2014. "The New Politics of Character." *National Affairs* 20(3): 111-125.
[56] Card, David. 2001. "Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems." *Econometrica* 69(5): 1127-160.
[57] Goldin, Claudia, and Lawrence Katz. 2008. *The Race between Education and Technology*. Cambridge, MA: Belknap of Harvard UP.
[58] Carneiro, Pedro, James Heckman, and Edward Vytlacil. 2011. "Estimating Marginal Returns to Education." *American Economic Review*, 101(6): 2754-81.
[59] Sawhill, Isabel and Stephanie Owen. 2013. "Should Everyone Go to College?" Washington, D.C.: The Brookings Institution.
[60] Henderson, Daniel, Solomon Polachek, and Le Wang. 2011. "Heterogeneity in Schooling Rates of Return." *Economics of Education Review* 30(6): 1202-214.
[61] Cunha, Flavio, and James Heckman. 2009. "Investing in our Young People." *Rivista Internazionale di Scienze Sociali* 117(3): 387-418.
[62] Currie, Janet and Duncan Thomas. 1995. "Does Head Start Make a Difference?" *American Economic Review* 85(3): 341-364.
[63] Reynolds, A. J., J. A. Temple, S.-R. Ou, I. A. Arteaga, and B. A. B. White. 2011. "School-Based Early Childhood Education and Age-28 Well-Being: Effects by Timing, Dosage, and Subgroups." *Science* 333(6040): 360-64.
[64] Because of the need to impute data for the two adult stages of the model, the actual specification for these two stages is different than in the case of the childhood stages. See the Social Genome Model Guide for a detailed description.
[65] The NLSY79 followed Americans from the generation just before the CNLSY sample. To impute the adult-stage outcomes for the CNLSY respondents, we follow a two-step process. First, we use regression analysis of the NLSY79 to estimate the relationships between birth and adolescent values, and adult outcomes. Then we apply the regression coefficients, which summarize those relationships, to the birth and adolescent values in the CNLSY sample. This plug-in approach gives us predicted adult outcomes for each CNLSY respondent. Note that this assumes that the CNLSY respondents will follow a similar life-trajectory to the older, NLSY79 respondents. As a result, our model does not incorporate possible cohort effects. Both the CNLSY and the NLSY79 also suffer from missingness because of attrition, non-response, and data entry error. We use imputation to fill in these gaps; see the Social Genome Model Guide for details.
[66] Because the CNLSY children were born to mothers who were living in the U.S. in 1978, we exclude children who immigrated after 1978, or were born to mothers who immigrated after 1978. Our data and model, then, are best viewed as applying to the entire set of children born to women living in the U.S.

[67] Child Trends, in conjunction with Brookings, retooled the model to use data from the National Longitudinal Survey of Youth, 1997. See Child Trends publication #2014-27, "What if you earned a diploma and delayed parenthood?"
[68] Reeves, Richard, Isabel Sawhill, and Kimberly Howard. 2013. "The Parenting Gap." *Democracy* 30(4): 40-45.
[69] Sawhill, Isabel, Scott Winship, and Kerry Searle Grannis. 2012. "Pathways to the Middle Class: Balancing Personal and Public Responsibilities." Washington, D.C.: The Brookings Institution.
[70] Here, we define success in adulthood as being middle class (income of at least 300% of poverty line) by middle age (age 40).
[71] We define low-income as family income below 200% of the poverty line. High-income is defined as the complement—at least 200% of the poverty line.
[72] Sawhill, Isabel and Quentin Karpilow. 2014. "How Much Could We Improve Children's Life Chances by Intervening Early and Often?" Washington, D.C.: The Brookings Institution.
[73] Again, success here is defined as reaching the middle class by middle age.

Figure 1: Share of American children whose family income exceeds their parents' family income



Source: Economic Mobility Project. 2012. *Pursuing the American Dream: Economic Mobility Across Generations*. Washington: The Pew Charitable Trusts.

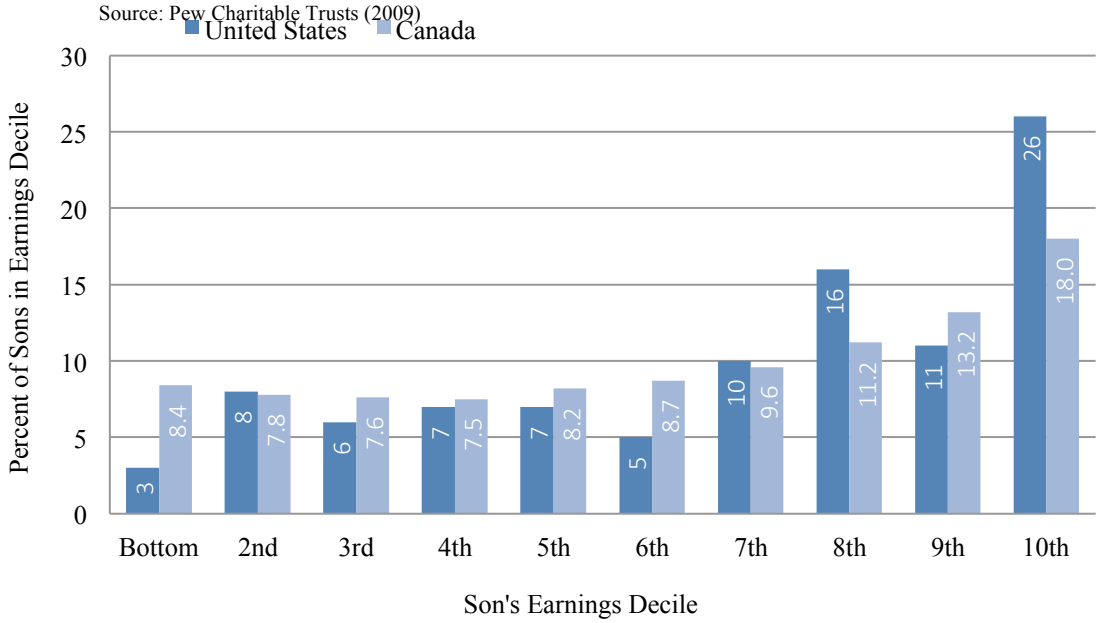
Figure 2: Preferred estimates of income mobility

Country	Source	Elasticity
Brazil	Dunn (2007) (scaled)	0.52 (0.011)
US	Chetty et al (2014)	0.341 (0.0004)
UK	Dearden, Machin and Reed (1997) (scaled) and averaged with Nicoletti and Ermisch (2007)	0.37 (0.05)
Italy	Piraino (2007) (scaled)	0.33 (0.026)
France	Lefranc and Trannoy (2005) (scaled)	0.32 (0.045)
Spain	Cervini-Plá (2009)	0.29 (0.03)
Norway	Nilsen et al (forthcoming)	0.25 (0.006)
Australia	Leigh (2007a) revised as in Björklund and Jäntti (2008)	0.25 (.080)
New Zealand	Gibbons (2010)	0.25 (0.09)
Germany	Vogel (2008)	0.24 (.053)
Sweden	Björklund and Chadwick (2003)	0.24 (0.011)
Canada	Corak and Heisz (1999)	0.23 (0.01)
Finland	Pekkarinen et al. (2006) Österbacka (2001) Averaged as in Björklund and Jäntti (2008)	0.20 (.020)
Denmark	Hussein et al (2008)	0.14 (0.004)
Japan	Ueda (2009)	0.31 (0.043)
South Africa	Piraino	0.48 (0.045)

Source: Blanden, Jo. 2014. "Concepts, Measures and Mechanisms: An Overview of Empirical Evidence on Intergenerational Social Mobility in the U.S. and UK." Unpublished paper. University of Surrey.

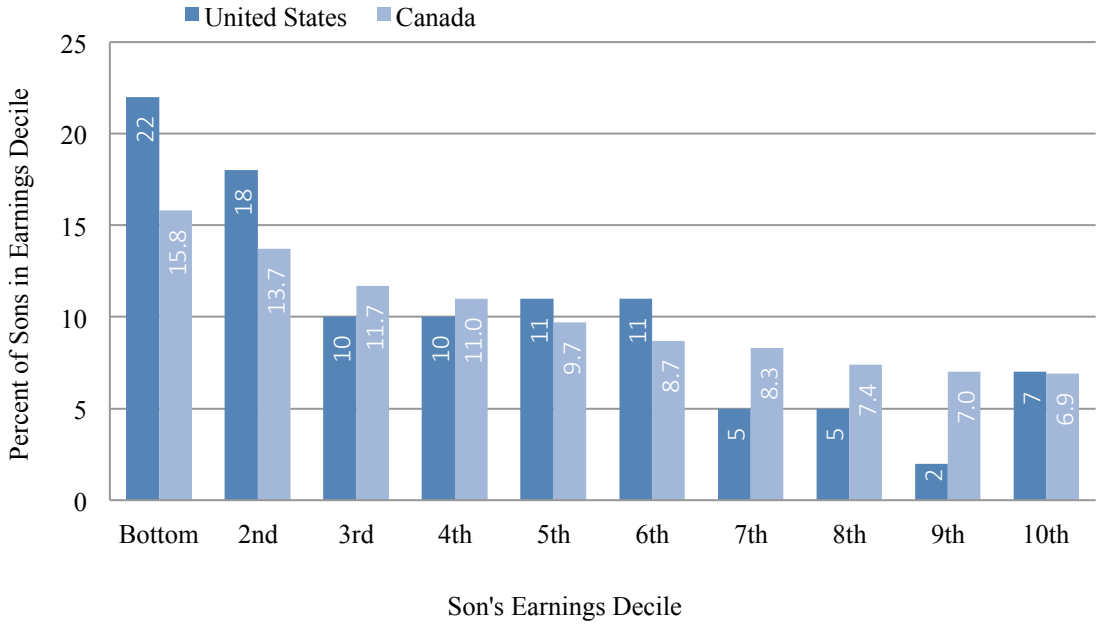
Note: Estimates based on Instrumental Variables regressions are scaled down by 0.75 to allow a legitimate comparison to be made with those based on OLS and time averaging. This reflects the difference in these estimates found for the US in Solon (1992) and Björklund and Jäntti (1997). Nicoletti and Ermisch (2007) assert that their results are less subject to IV bias than others put forward in the literature and offer as evidence the fact that they lay between the OLS and IV estimates in Dearden, Machin and Reed. As a consequence we do not scale these estimates, although we appreciate that this is controversial.

Figure 3: Earnings decile of sons born to top-decile fathers



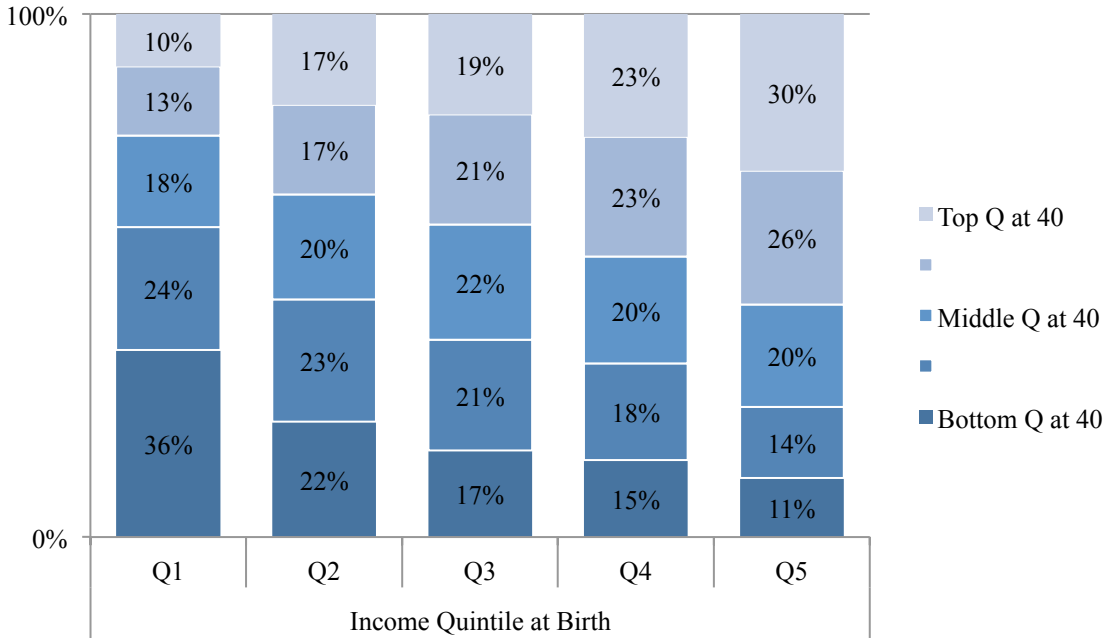
Source: Corak, Miles. 2009. "Chasing the Same Dream, Climbing Different Ladders: Economic Mobility in the United States and Canada." Washington: The Pew Charitable Trusts.

Figure 4: Earnings decile of sons born to bottom-decile fathers



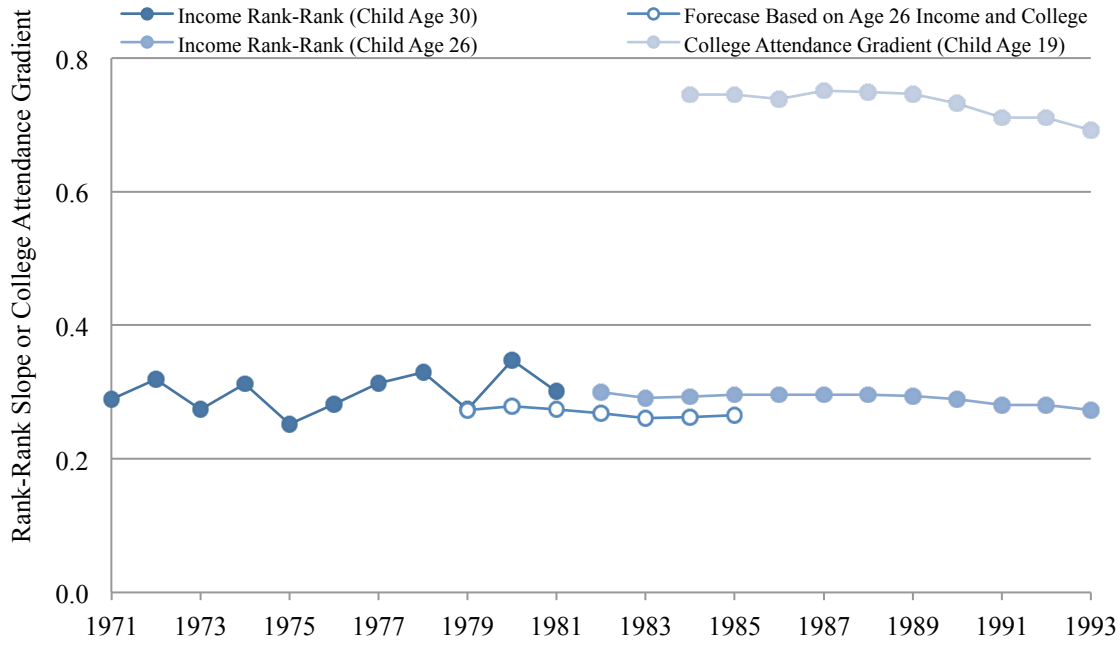
Source: Corak, Miles. 2009. "Chasing the Same Dream, Climbing Different Ladders: Economic Mobility in the United States and Canada." Washington: The Pew Charitable Trusts.

Figure 5: Social mobility matrix, US overall



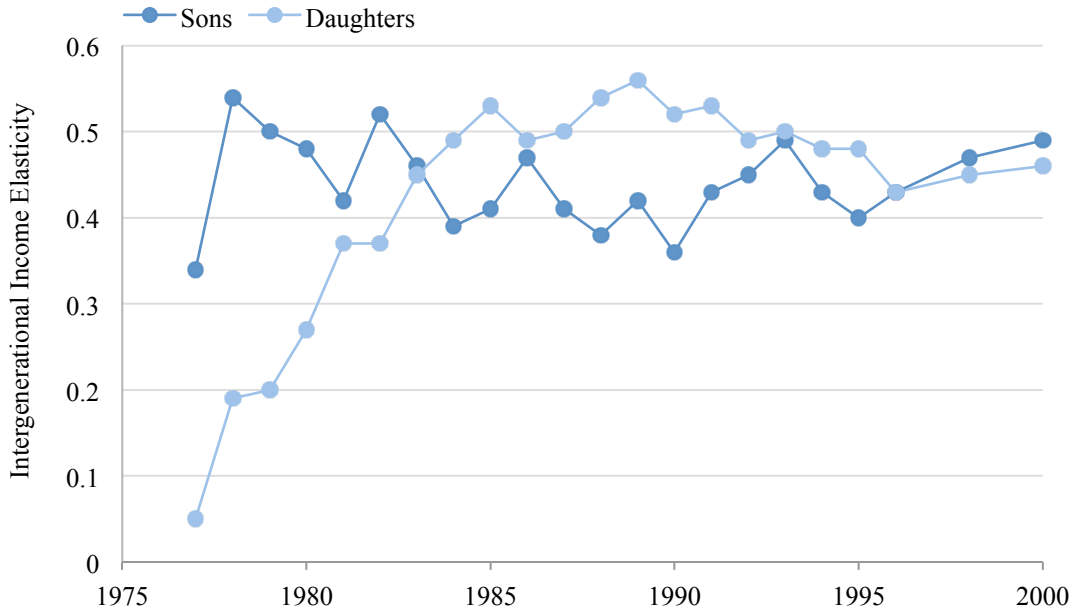
Source: Author's calculations.

Figure 6: Intergenerational mobility estimates for the 1971-1993 birth cohorts



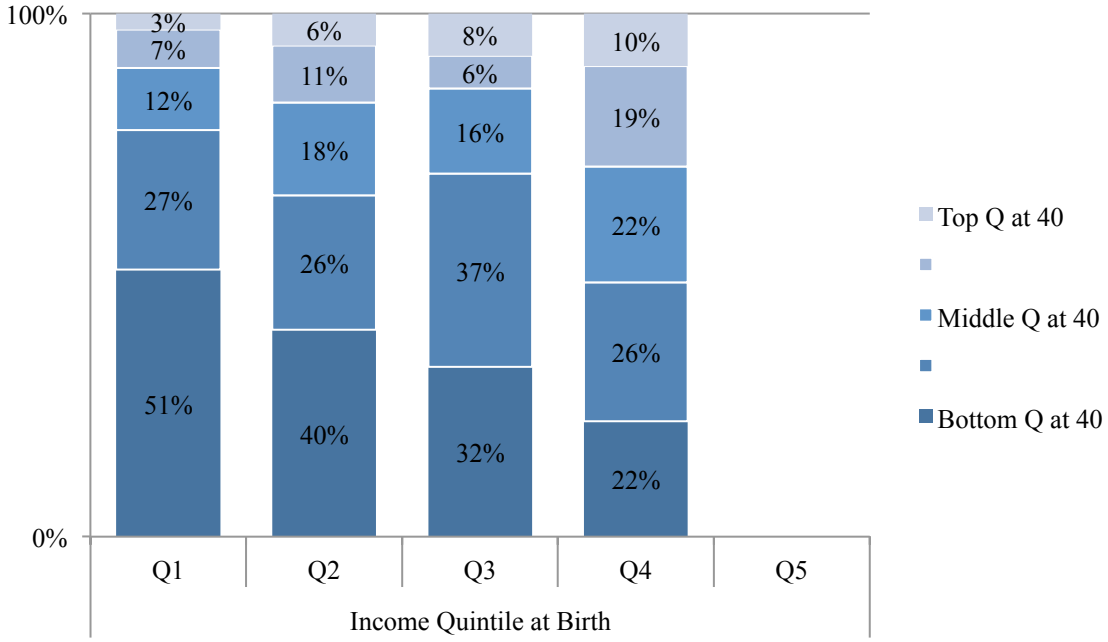
Source: Chetty, Raj, et al. 2014. "Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility." *American Economic Review* 104(5): 141-147.

Figure 7: Intergenerational income elasticities (IGEs) for sons and daughters



Source: Lee, Chul-In and Gary Solon. 2009. "Trends in Intergenerational Income Mobility." *The Review of Economics and Statistics* 91(4): 766-772.

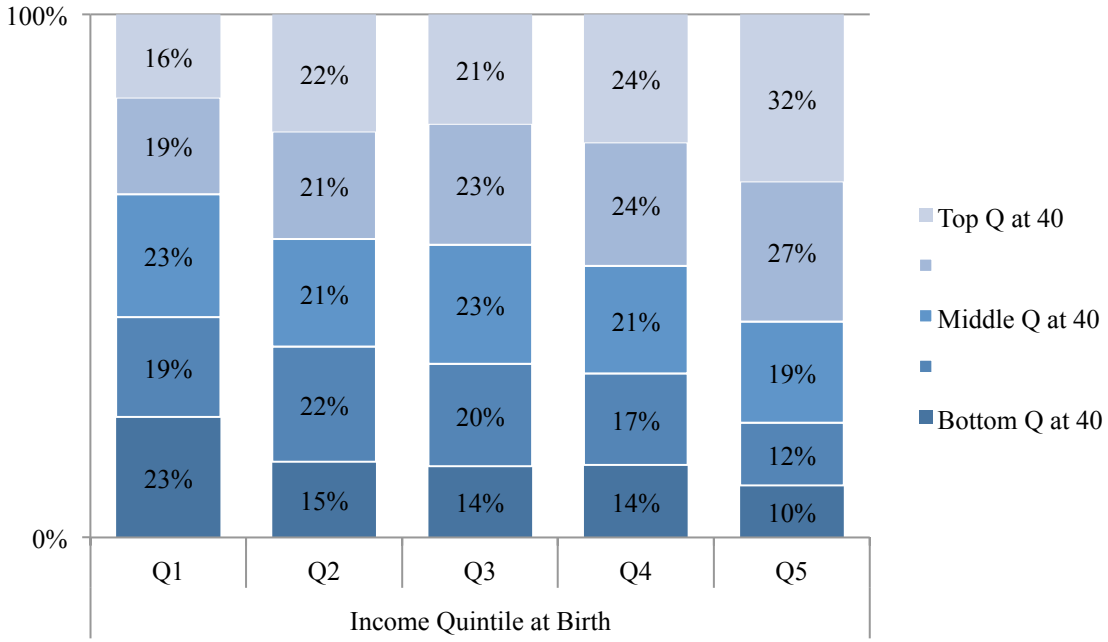
Figure 8: Social mobility matrix, black Americans



Note: The sample size is too small to calculate a matrix for those born in the top income quintile.

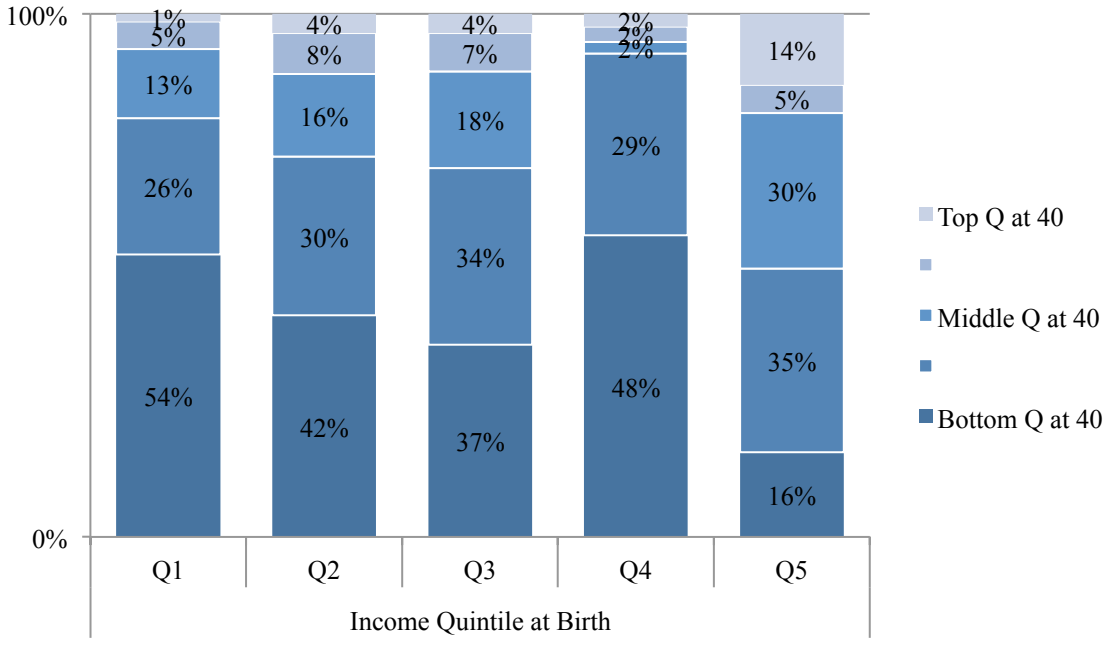
Source: Author's calculations.

Figure 9: Social mobility matrix, white Americans



Source: Author's calculations.

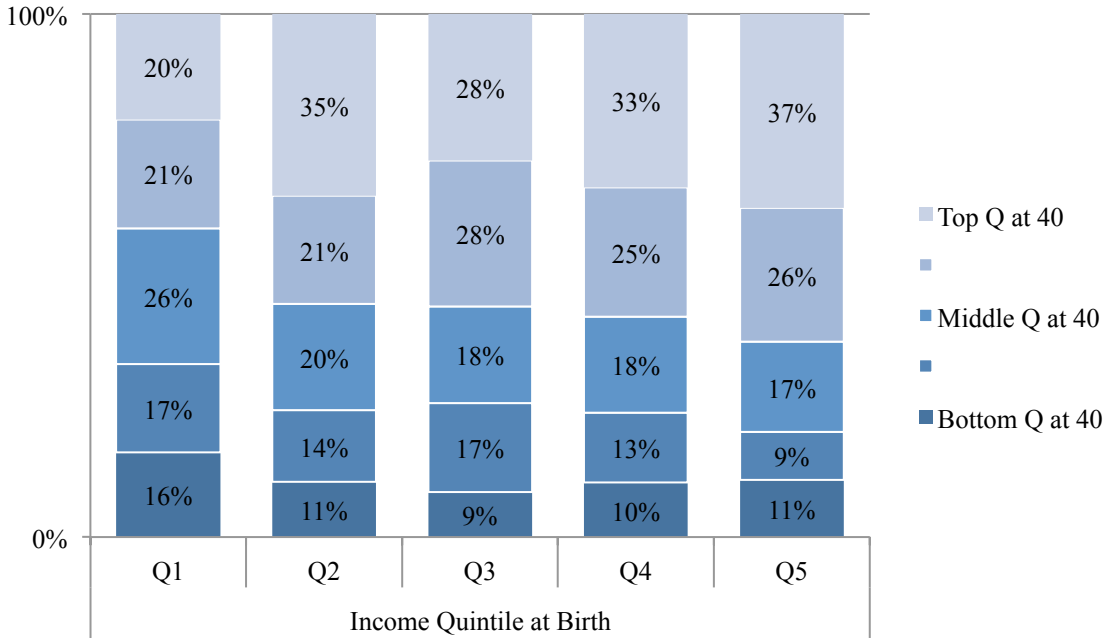
Figure 10: Social mobility matrix, less than high school education



Source: Author's calculations.

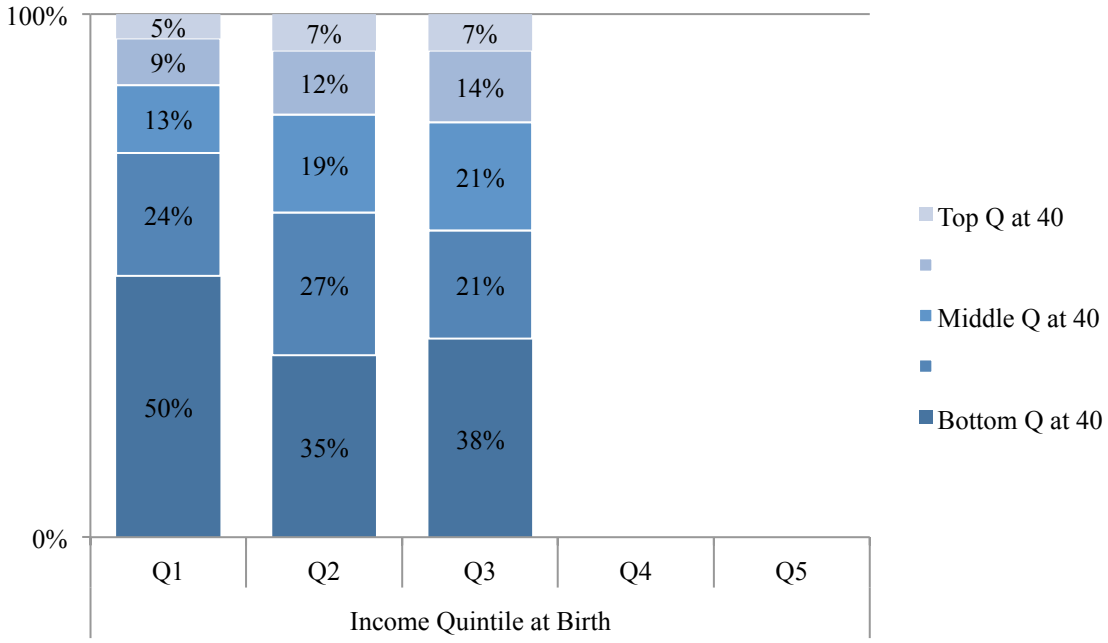
Note: The sample size for the top income quintile at 40 is small.

Figure 11: Social mobility matrix, college graduate



Source: Author's calculations.

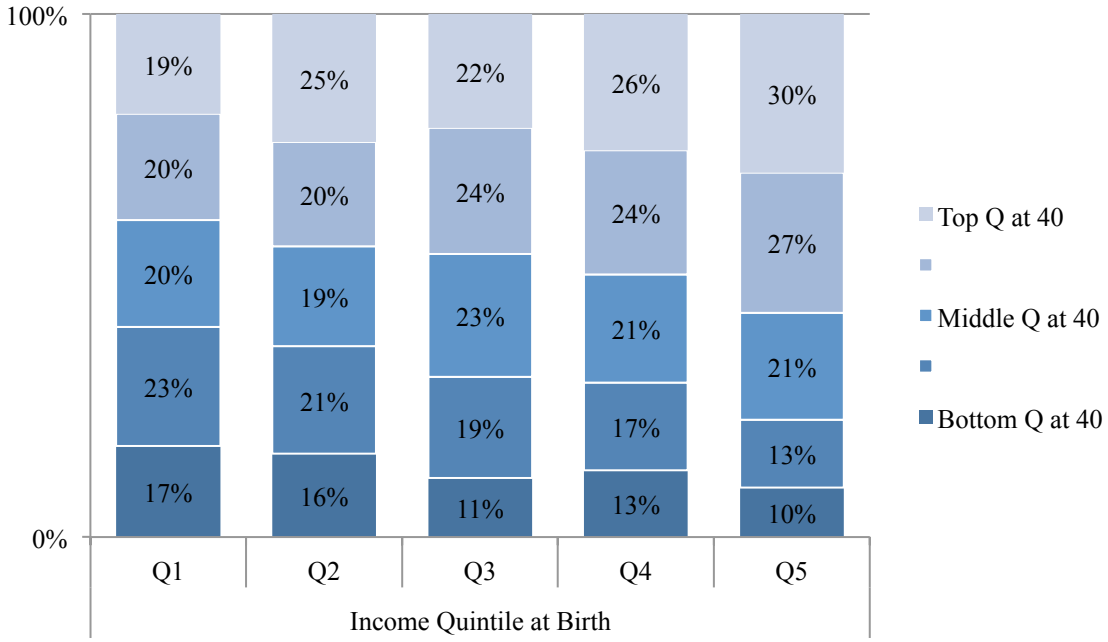
Figure 12: Social mobility matrix, children of never-married mothers



Source: Author's calculations.

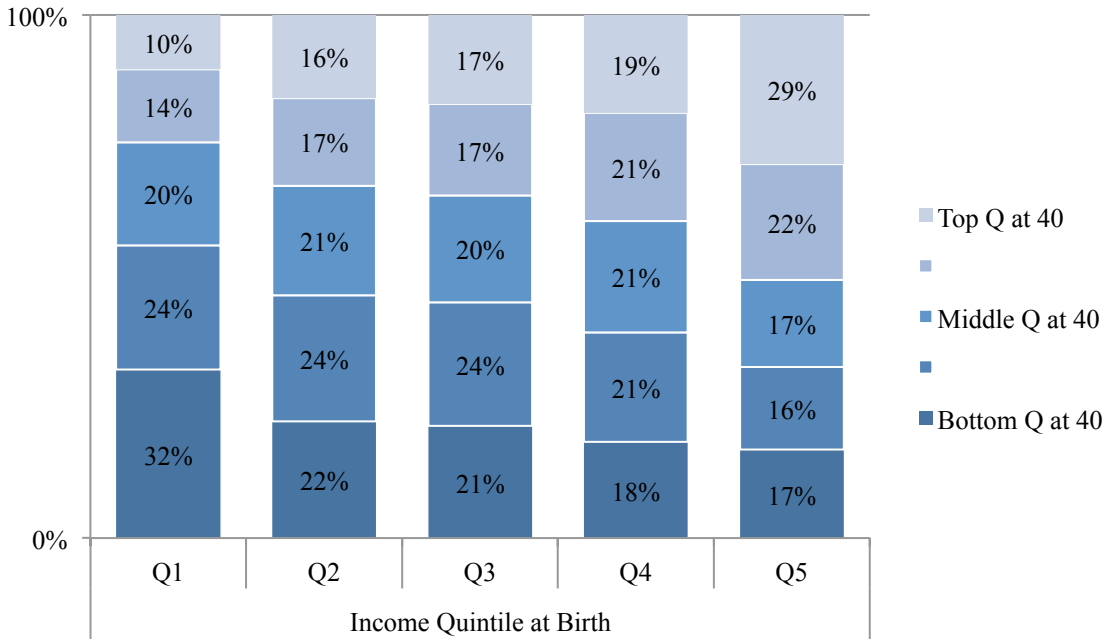
Note: The sample size is too small to calculate a matrix for those born in the top two income quintiles.

Figure 13: Social mobility matrix, children of continuously-married mothers



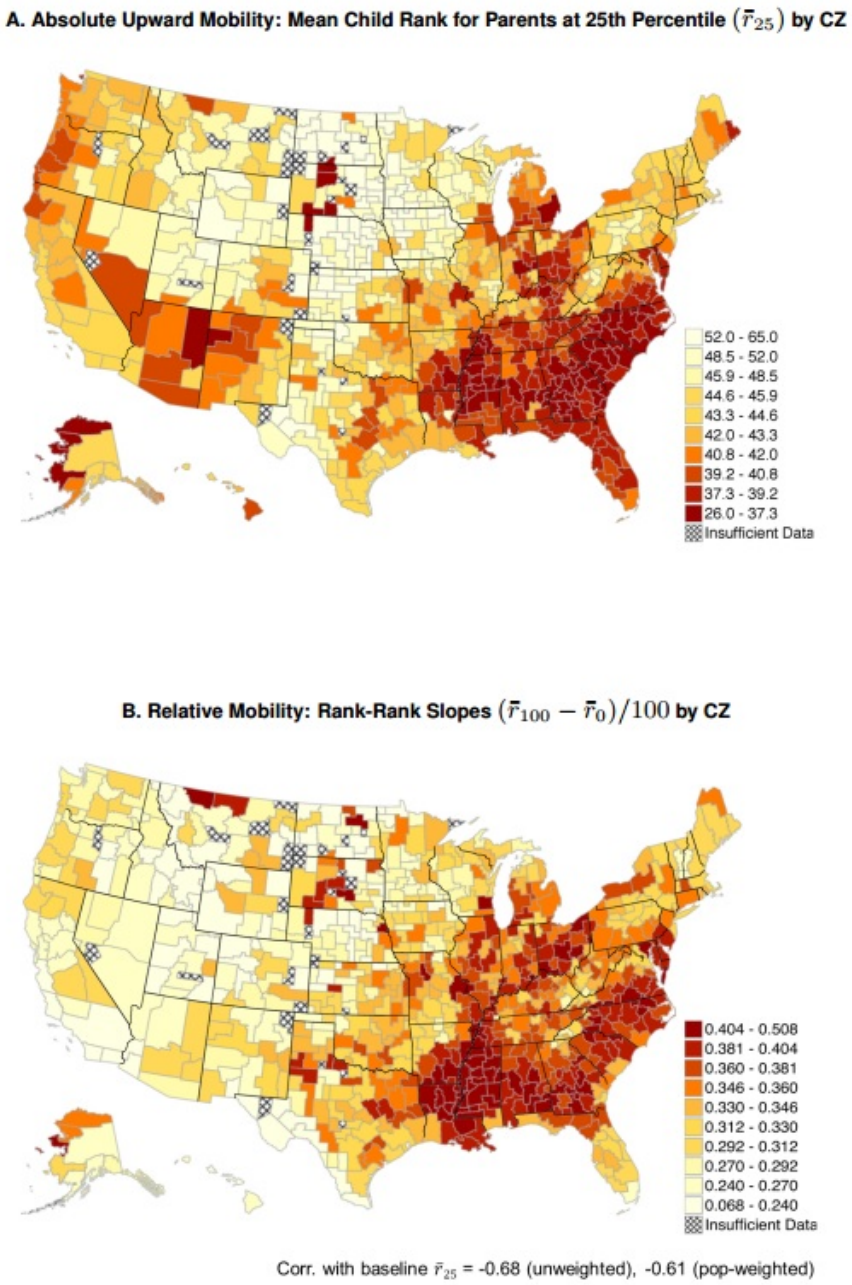
Source: Author's calculations.

Figure 14: Social mobility matrix, children of discontinuously-married mothers



Source: Author's calculations.

Figure 15: Heat maps of absolute upward mobility and relative mobility



Source: Chetty, Raj, et al. 2014. "Where is the Land of Opportunity: The Geography of Intergenerational Mobility in the United States." *Quarterly Journal of Economics* (forthcoming).

Figure 16: The stages of the Social Genome Model

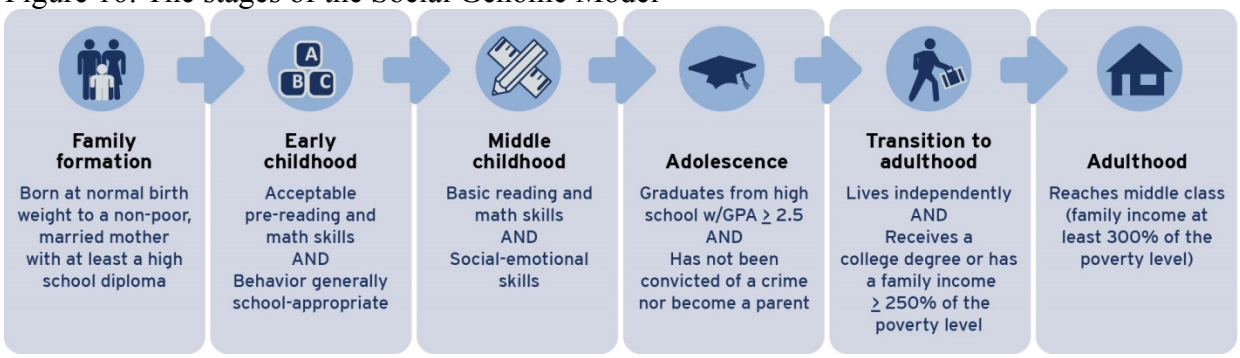


Figure 17: Life stages and corresponding outcomes

Stage	Variable	Description
Circumstances at Birth	Gender	A dichotomous variable indicating the sex of the individual. Males are the omitted category.
	Race	Dichotomous variables indicating whether the child is black, Hispanic, or other. The omitted category consists of white children.
	Maternal Educational Attainment	Dichotomous variables are included to indicate whether the individual's mother graduated from high school, attended some college, or obtained a Bachelor's degree or more advanced degree. The omitted category is mothers who did not finish high school.
	Maternal Age at the Time of the Child's Birth	A continuous variable measuring the age of the mother (in years) at the time of the child's birth.
	Maternal Age at First Birth	A continuous variable measuring the age of the mother (in years) at the time of her first child's birth.
	Marital Status of the Child's Parents at the Time of Birth	A dichotomous variable indicating whether the child's mother was married when he/she was born. The omitted category includes those children whose mothers were not married, even if cohabitating, at the time of their birth.
	Family Income at Birth	This continuous variable is the log-transformed measure of the family's income as a percent of the federal poverty line in the year that the child was born.
	Low Birth Weight	A dichotomous variable indicating whether a child weighed 5.5 pounds or less when they were born. The omitted category consists of children who weighed more than 5.5 pounds at the time of their birth.
	Mother's AFQT Score	The age-normed percentile score of the child's mother on the Armed Forces Qualifying Test, a general achievement test taken when the mothers were between 16 and 23.
	Parenting: Cognitive Stimulation	Standardized score on the HOME Inventory Cognitive Stimulation scale, measured when the child is 0-2.
	Parenting: Emotional Support	Standardized score on the HOME Inventory Emotional Support scale, measured when the child is 0-2.
	Early Verbal Ability	The age-standardized score of the child on the Peabody Picture Vocabulary Test (PPVT), measured when the child is 3 or 4.

Figure 17: Life stages and corresponding outcomes (continued)

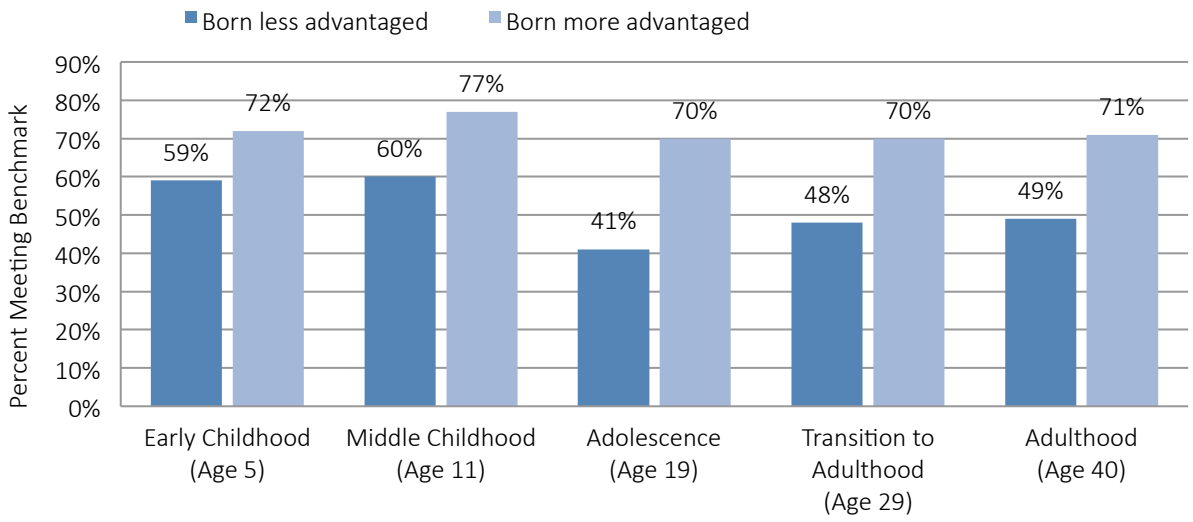
Stage	Variable	Description
Early Childhood (Age 5)	Math	Age-standardized scores from the math section of the Peabody Individual Achievement Test (PIAT)
	Reading	Age-standardized scores from the reading recognition section of the Peabody Individual Achievement Test (PIAT)
	Antisocial Behavior	Age-standardized antisocial behavior subscale from the Behavior Problems Index (BPI). Scores are reverse coded so that higher is better.
	Hyperactivity	Age-standardized hyperactivity subscale from the Behavior Problems Index (BPI). Scores are reverse coded so that higher is better.
Middle Childhood (Age 11)	Math	Age-standardized scores from the math section of the Peabody Individual Achievement Test (PIAT)
	Reading	Age-standardized scores from the reading recognition section of the Peabody Individual Achievement Test (PIAT)
	Antisocial Behavior	Age-standardized antisocial behavior subscale from the Behavior Problems Index (BPI). Scores are reverse coded so that higher is better.
	Hyperactivity	Age-standardized hyperactivity subscale from the Behavior Problems Index (BPI). Scores are reverse coded so that higher is better.
Adolescence (Age 19)	High School Graduation Status	A dichotomous variable indicating whether the individual received a high school diploma by age 19. GED earners are not counted as high school graduates.
	Grade Point Average (GPA)	A continuous variable of average grade in the last year of high school. Ranges from 0 to 4.
	Criminal Conviction	A dichotomous variable indicating whether the individual was convicted of any charges other than minor traffic violations by age 19.
	Teen Parent	A dichotomous variable indicating whether the individual reported having a child by age 19.
	Lives Independently from parents*	A dichotomous variable indicating whether the individual was living independently from his or her parents at age 19.
	Math*	Age-standardized score on a test measuring mathematical ability: math section of the Peabody Individual Achievement Test (PIAT) at age 13 or 14 in the CNLSY and arithmetic reasoning section of the Armed Services Vocational Aptitude Battery (ASVAB), taken between ages 15 and 23, in the NLSY79.
	Reading*	Age-standardized score on a test measuring verbal ability: reading recognition section of the Peabody Individual Achievement Test (PIAT) at age 13 or 14 in the CNLSY and word knowledge section in the Armed Services Vocational Aptitude Battery (ASVAB), taken between ages 15 and 23, in the NLSY79.
	Family Income*	This continuous variable is the log-transformed measure of the family's income during early adolescence (ideally measured at age 13, 14, 15, or 16).

Figure 17: Life stages and corresponding outcomes (continued)

Stage	Variable	Description
Adolescence (Age 19) (Continued)	Marijuana Use*	This dichotomous variable indicates whether the individual reports having ever used marijuana (CNLSY) or having used marijuana in the past year (NLSY79).
	Other Drug Use*	This dichotomous variable indicates whether the individual reports having ever used drugs other than marijuana or amphetamines (CNLSY) or having used drugs other than marijuana in the past year (NLSY79).
	Early Sex*	This dichotomous variable indicates whether the individual reports having had sexual intercourse before age 15.
	Suspension*	This dichotomous variable indicates whether the individual was ever suspended from school.
	Fighting*	This dichotomous variable indicates whether the individual reported getting in a fight at school or work in the past year.
	Hitting*	This dichotomous variable indicates whether the individual reported hitting or seriously threatening to hit someone in the past year.
	Damaging Property*	This dichotomous variable indicates whether the individual reported intentionally damaging the property of others in the past year.
	Self-Esteem Index*	Age-standardized IRT score on the Rosenberg Self-Esteem Scale.
	Religious Service Attendance*	This variable measures frequency of religious service attendance on a scale of 0 (none) to 5 (more than once a week).
	Gender Role Attitudes*	This continuous variable is the mean of the individual's answers to five questions about how they view women.
	Participation in School Clubs*	Dichotomous variable indicating whether the individual participated in clubs in high school such as band, choir, or sports.
Transition to Adulthood (Age 29)	Family income*	This continuous variable is the log-transformed measure of the family's income during the year the individual was 29 years old.
	Family income to needs	This continuous variable is the log-transformed measure of the family's income as a percent of the federal poverty during the year the individual was 29 years old.
	College Completion	Dichotomous variable indicating whether the individual obtained a 4-year degree or higher.
	Lives independently from parents	A dichotomous variable indicating whether the individual was living independently from his or her parents at age 29.
Adulthood (Age 40)	Family income*	This continuous variable is the log-transformed measure of the family's income during the year the individual was 40 years old.
	Family income to needs	This continuous variable is the log-transformed measure of the family's income as a percent of the federal poverty during the year the individual was 40 years old.

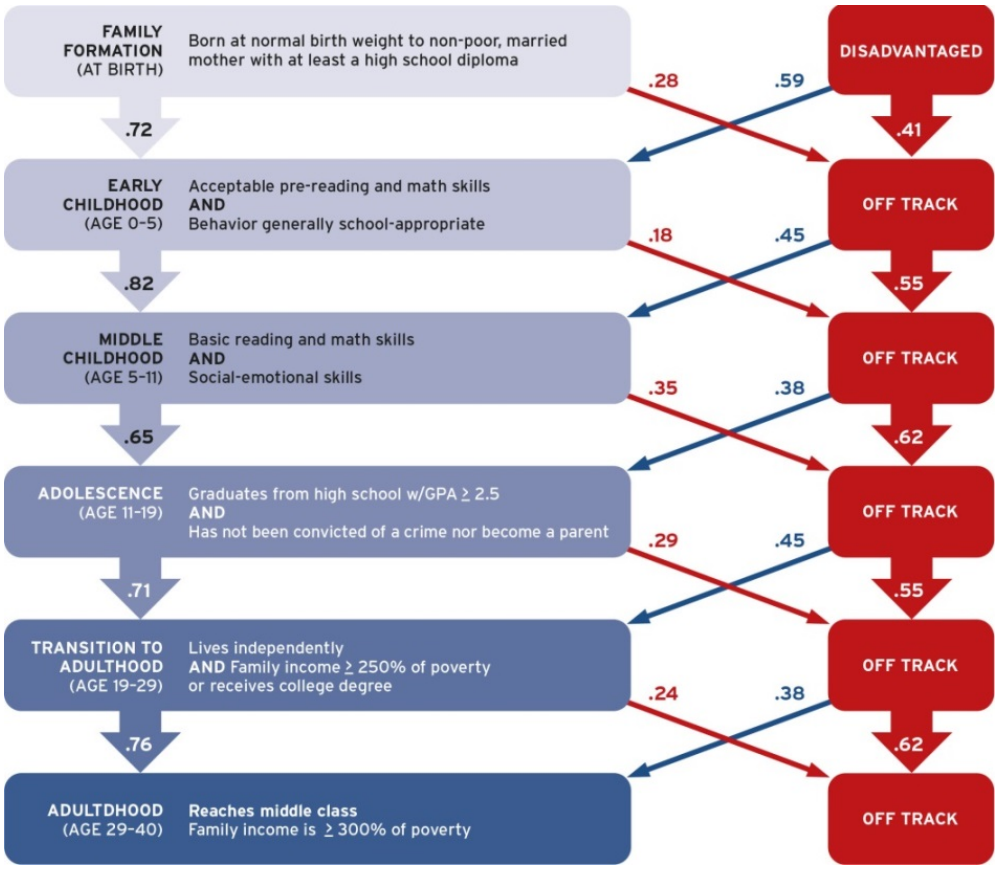
Note: * denotes variables used for imputation or improved prediction of adult outcomes, but not a success measures.

Figure 18: Percent succeeding at each life stage, by circumstances at birth



Source: Author's calculations.

Figure 19: Probability of being on track or falling off track, conditional on previous experience

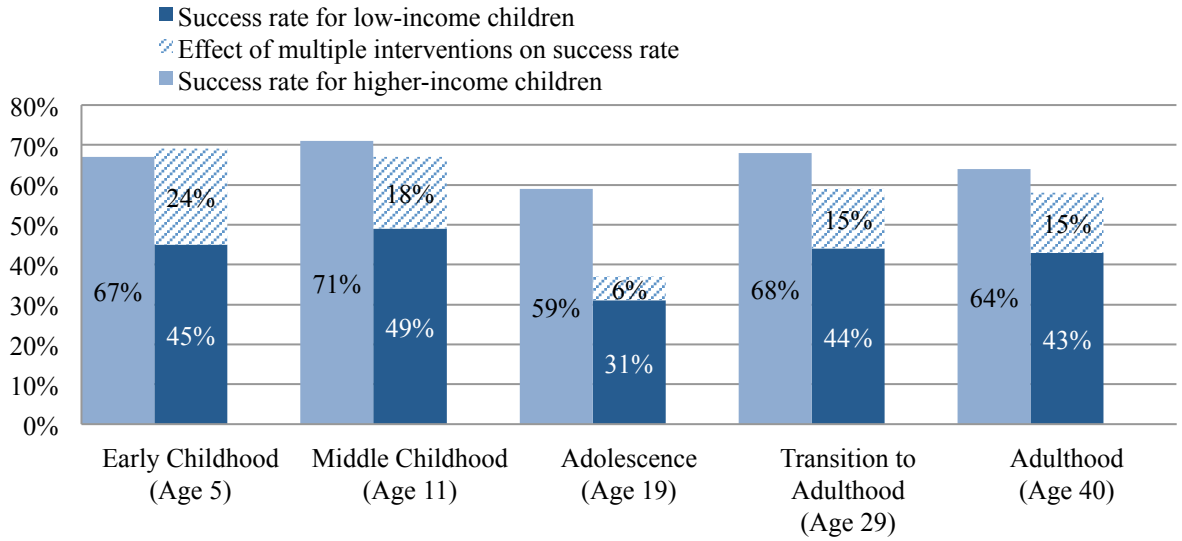


Source: Author's calculations.

Figure 20: Summary of post-birth interventions

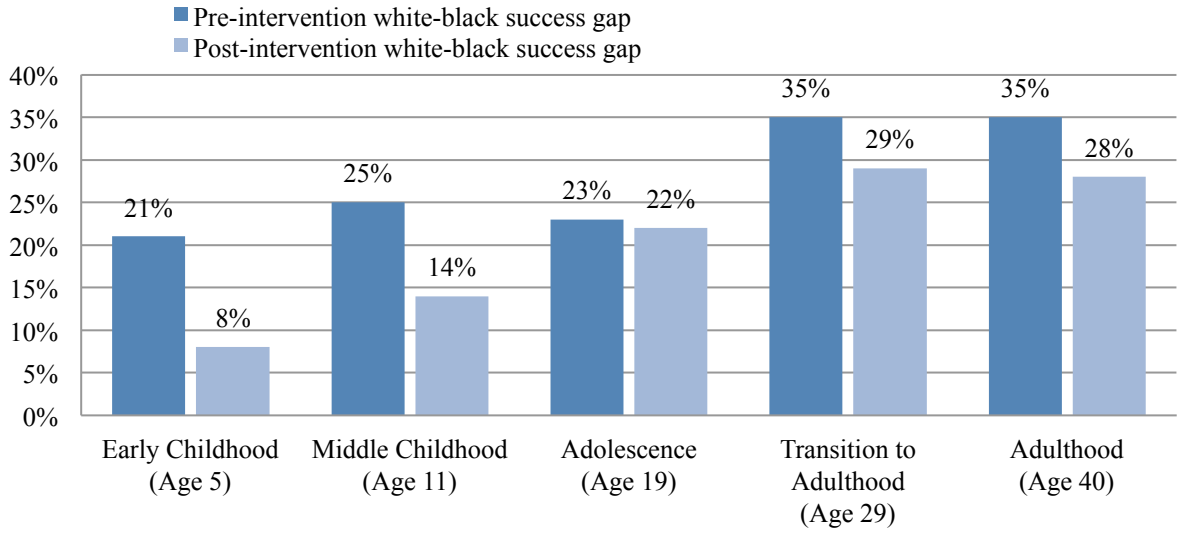
Life Stage	Intervention Model	Description	Adjusted Variable	Effect Size
Early Childhood	Home Instruction for Parents of Preschool Youngsters (HIPPY)	Biweekly home visits and group meetings to instruct and equip parents to be effective teachers for their children	Reading	0.75 SD
			Hyperactivity	-0.68 SD
	Preschool	High-quality center-based preschool programs that provide educational services to children directly	Reading	0.45 SD
			Math	0.45 SD
			Antisocial Behavior	-0.20 SD
Middle Childhood	Social Emotional Learning (SEL)	A broad range of interventions that focus on improving behavioral, emotional, and relationship competencies	Reading	0.36 SD
			Math	0.27 SD
	Success for All (SFA)	A school-wide reform program with a strong emphasis on early detection and prevention of reading problems	Antisocial Behavior	-0.22 SD
Adolescence	Talent Development (TD)	A comprehensive high school reform initiative aimed at reducing student dropout rates	Reading	0.32 SD
			Math	0.65 SD

Figure 21: Percent succeeding at each life stage, by income at birth



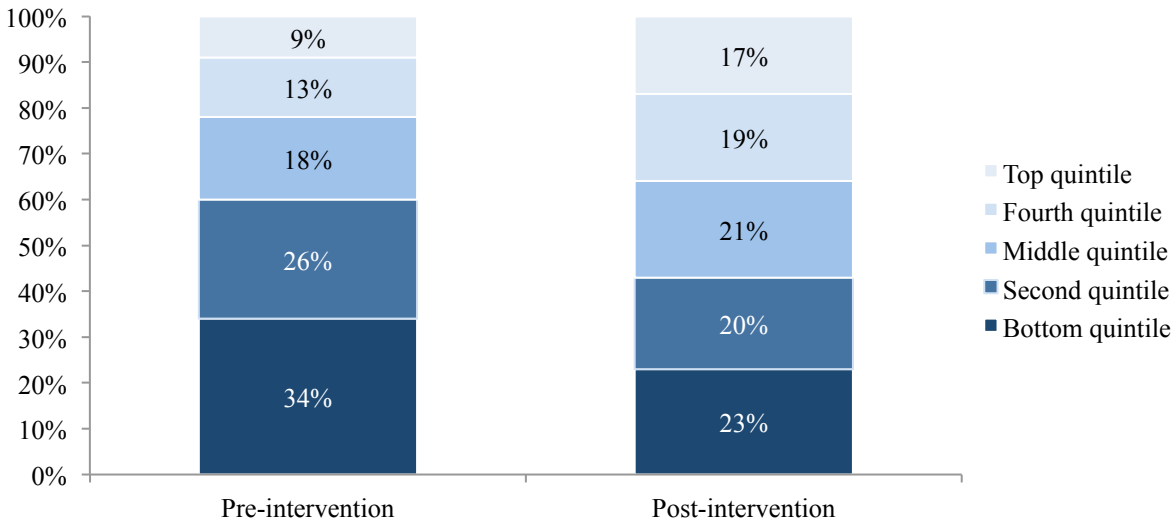
Source: Author's calculations.

Figure 22: Percentage point gap in white-black success rate



Source: Author's calculations.

Figure 23: Pre- and post-intervention mobility matrix for children born low-income



Source: Author's calculations.

Figure 24: Costs and Estimated Benefits of Simulated Interventions

	Marginal lifetime income effect	Cost per child
HIPPY (Ages 3-5)	$43,371	$3,500
Preschool (Ages 3-5)	$45,651	$8,100
SFA and SEL (Ages 6-11)	$47,594	$8,100
Talent Development (Ages 14-18)	$68,574	$1,400
Total	$205,190	$21,100

Source: Author's calculations.