The Fading American Dream: Trends in Absolute Income Mobility in the U.S.

by Raj Chetty, David Grusky, Maximilian Hell, Nathaniel Hendren, Robert Manduca, and Jimmy Narang

[PRELIMINARY AND INCOMPLETE: September 6, 2016]

One of the central tenets of the "American Dream" is that children should have a higher standard of living than their parents (Samuel 2012). Despite the widespread support for this notion of absolute upward income mobility, there is little data on rates of absolute upward mobility in the United States. What fraction of children grow up to earn more than their parents? How have rates of absolute upward mobility changed over time?

Evidence on absolute upward mobility is scarce because of a lack of historical panel data linking children to their parents. We develop a new method of estimating rates of upward mobility for the 1940-1984 birth cohorts that can be implemented using existing datasets.

Our approach combines two sets of inputs: *marginal income distributions* for parents and children and the joint distribution of parent and child ranks, termed the distribution's *copula*. We estimate marginal income distributions for parents and children from 1940-2014 using cross-sectional data drawn from the Census and Current Population Surveys. In our baseline analysis, we measure income in pre-tax dollars at the household level at age 30, adjusting for inflation using the CPI-U-RS. We also evaluate the sensitivity of our results to a variety of alternative income measures and inflation adjustments.

We obtain information on the copula in two steps. For recent birth cohorts, we directly estimate the copula using information from de-identified federal income tax returns that provide a panel covering the U.S. population. For earlier birth cohorts, such panel data are not available. Here, we develop bounds on rates of absolute mobility that are robust across all possible copulas. Fortunately, we show that the rate of absolute mobility for these birth cohorts turns out to be insensitive to the copula. In contrast, these bounds are not informative for more recent cohorts where linked data is available

The reason that absolute mobility is insensitive to the copula is that virtually all children born in the 1940-1950 birth cohorts earn more than their parents – regardless of their rank in the income distribution – because income grew very rapidly throughout the distribution between 1940 and 1980. In contrast, the copula plays a much bigger role in determining rates of mobility for more recent cohorts because growth rates, particularly in the middle of the distribution, have fallen sharply. Fortunately, the copula can be directly estimated using panel data available for recent cohorts. In short, the key piece of missing data that has hampered direct measurement of absolute mobility – the lack of historical

panel data linking parents and children – turns out to be inessential for characterizing trends in mobility in practice.

Using this methodology, we find that rates of absolute upward income mobility in the United States have fallen sharply and steadily since 1940.

Figure 1a plots the fraction of children earning more than their parents for children of different parental income backgrounds for decadal birth cohorts. To do so, we use our baseline assumption that the copula of parent and child income ranks is stable over time. Across all birth cohorts, the vast majority of children raised at the very bottom of the income distribution earn more than their parents. In earlier cohorts, this was also true of children in the rest of the income distribution as well: at the 50th percentile of the parental income distribution, children born in 1940 had a 90% chance of earning more than their parents, while children born just forty years later had exactly half that chance (i.e., 45%). This drop is even more pronounced at the top of the parental income distribution: 85% of children born in 1940 with parents at the 90th percentile of the income distribution grew up to earn more than their parents; in contrast to 35% for children born in 1980.

Aggregating across parental backgrounds, these differences translate into a dramatic decline in the average rate of absolute mobility in the U.S. This is shown in Figure 1b for all cohorts between 1940-1984. We estimate that roughly 90% of children born in 1940 grew up to earn more than their parents. This falls to 50% for children born in 1980. Whereas in past decades most children in the US could expect to grow up to earn more than their parents, today these odds are roughly equivalent to a coin flip.

The baseline results in Figure 1b rely on the assumption that the copula does not change across the 45 birth cohorts in our data. While Chetty et al. (2014) provide suggestive evidence that the copula is stable over the 1971-1986 birth cohorts, there is no guarantee one can extrapolate this stability back to the 1940 cohort.

We therefore assess how the patterns in Figure 1b would differ under alternative copula assumptions. To do so, we use linear programming to estimate the maximum and minimum fraction of children that earn more than their parents by searching over the set of all possible copulas. We restrict attention to the subset of copulas children from more affluent backgrounds are more likely have higher incomes in the sense of first-order stochastic dominance.

Figure 2a presents the maximum and minimum rates of absolute upward income mobility for each cohort searching over all possible copulas, and provides a comparison to our baseline results assuming the copula for the 1980-82 cohorts is stable. For recent cohorts, these bounds are quite wide. For the 1984 cohort, there exists copulas in which only 18% of children in the 1984 cohort earn more than their parents; there also exists copulas in

which 85% of children earn more than their parents. In this sense, the marginal income distributions of parents and children provide very little guidance on rates of absolute income mobility in recent cohorts.

In contrast, the bounds are much tighter in earlier cohorts. For children born in 1940, there does not exist a copula in which less than 80% of children grew up to earn more than their parents. Similarly, for children born in 1950, at least 58% of children earn more than their parents – again a larger number than the 50% observed for the 1984 cohort today.

These patterns illustrate that it is not a general result that one can always provide guidance on rates of absolute mobility without data linking parents to children: for recent cohorts, knowledge of the copula is required; and fortunately it is available. For older cohorts, the marginal income distributions are such that one can provide relatively tight bounds and conclude that there has been a dramatic fall in rates of absolute upward income mobility.

To illustrate why this is the case, Figure 2b presents the marginal income distributions of parents and children. A child born in 1940 whose parents are at the 80th percentile of the income distribution must reach only the 15th percentile of the children's income distribution in order earn more than their parents. Figure 2c generalizes this statistic by plotting the income percentile a child needs to achieve in her own cohort distribution in order to earn more than her parents. This is a function purely of the marginal income distributions. The fraction of children earning more than their parents is then given by the area above this line, where we weight this area according to the joint distribution of parent and child income ranks (i.e. the copula). In early cohorts, all feasible copulas suggest most children are earning more than their parents.

In addition to being insensitive to assumptions about the copula, the result that absolute upward mobility has declined markedly is robust to a wide range of other specification choices that are explored in Figure 3: (a) using alternative price deflators, (b) Adjusting for family size, and (c) measuring children's incomes at age 40 (for the 1950-74 birth cohorts) instead of age 30.

The decline in absolute mobility is even starker when comparing only sons to their fathers. As shown in Figure 3d, we estimate a decline from above 90% in the 1940 cohort to below 45% in the 1984 cohort. Moreover, we find that the fraction of females earning more than their fathers has remained relatively stagnant over the last 40 years, despite the strong rise in female labor force participation and relative earnings.

Why have rates of upward income mobility fallen so sharply? We answer this question by simulating absolute mobility for the most recent birth cohort we study (those born in 1984) under counterfactual assumptions about the marginal income distribution for children and the copula. Changing the copula – e.g., higher rates of relative (or exchange)

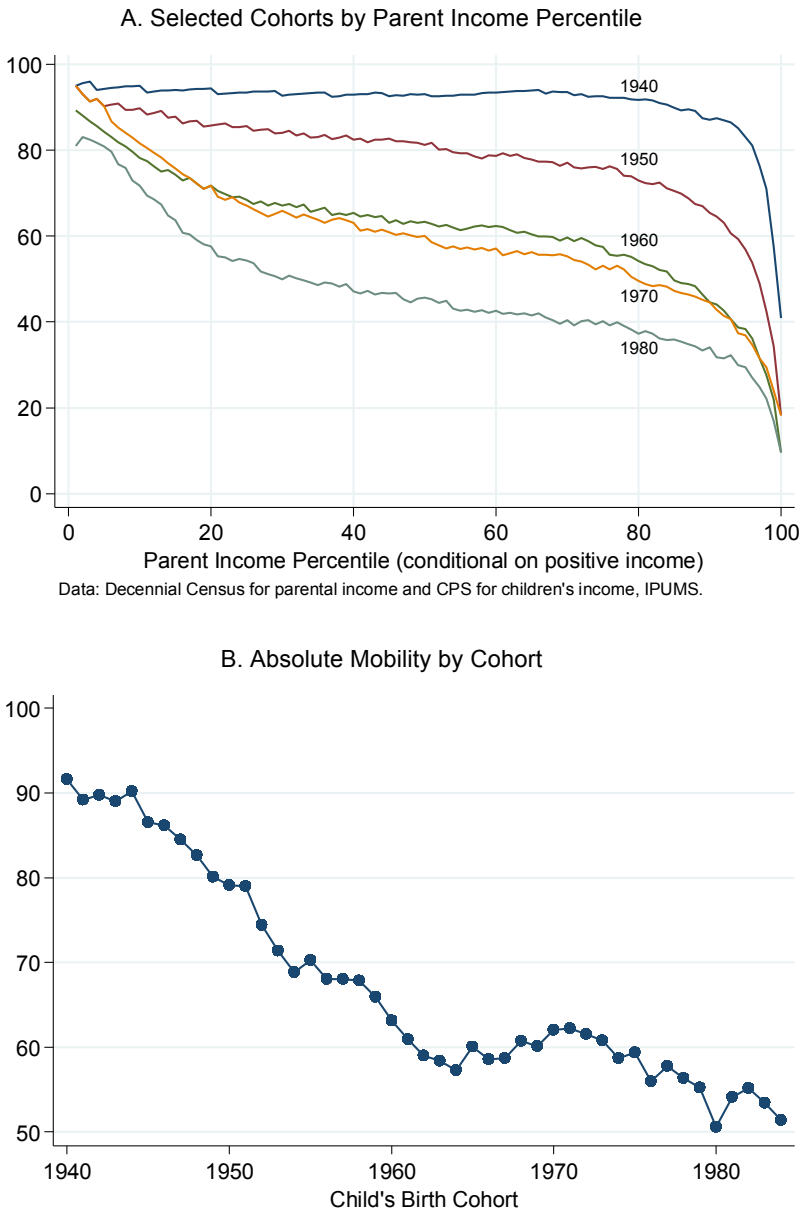
mobility – has modest effects on rates of absolute upward mobility. Changing the marginal income distribution for children, in contrast, has substantial effects. If children in the 1984 birth cohort had experienced income growth relative to their parents comparable to the growth rates observed for the 1950 birth cohort throughout the distribution, 90% of them would have earned more than their parents. But higher growth itself is not a sufficient condition for greater absolute mobility; the distribution of that growth is critical. Increasing the mean growth rate to match that observed for the 1950 birth cohort, but sharing that growth in the same proportions observed from 1984-2014 – a period in which high-income individuals received much larger shares of the growth – would have increased absolute mobility by much less. Our results imply that a more equitable distribution of growth is necessary to stem the sharp decline in rates of absolute upward mobility.

References

Chetty, Raj, Nathaniel Hendren, Patrick Kline, Emmanuel Saez, Nicholas Turner. "Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility." *American Economic Review* 104.5 (2014): 141-47.

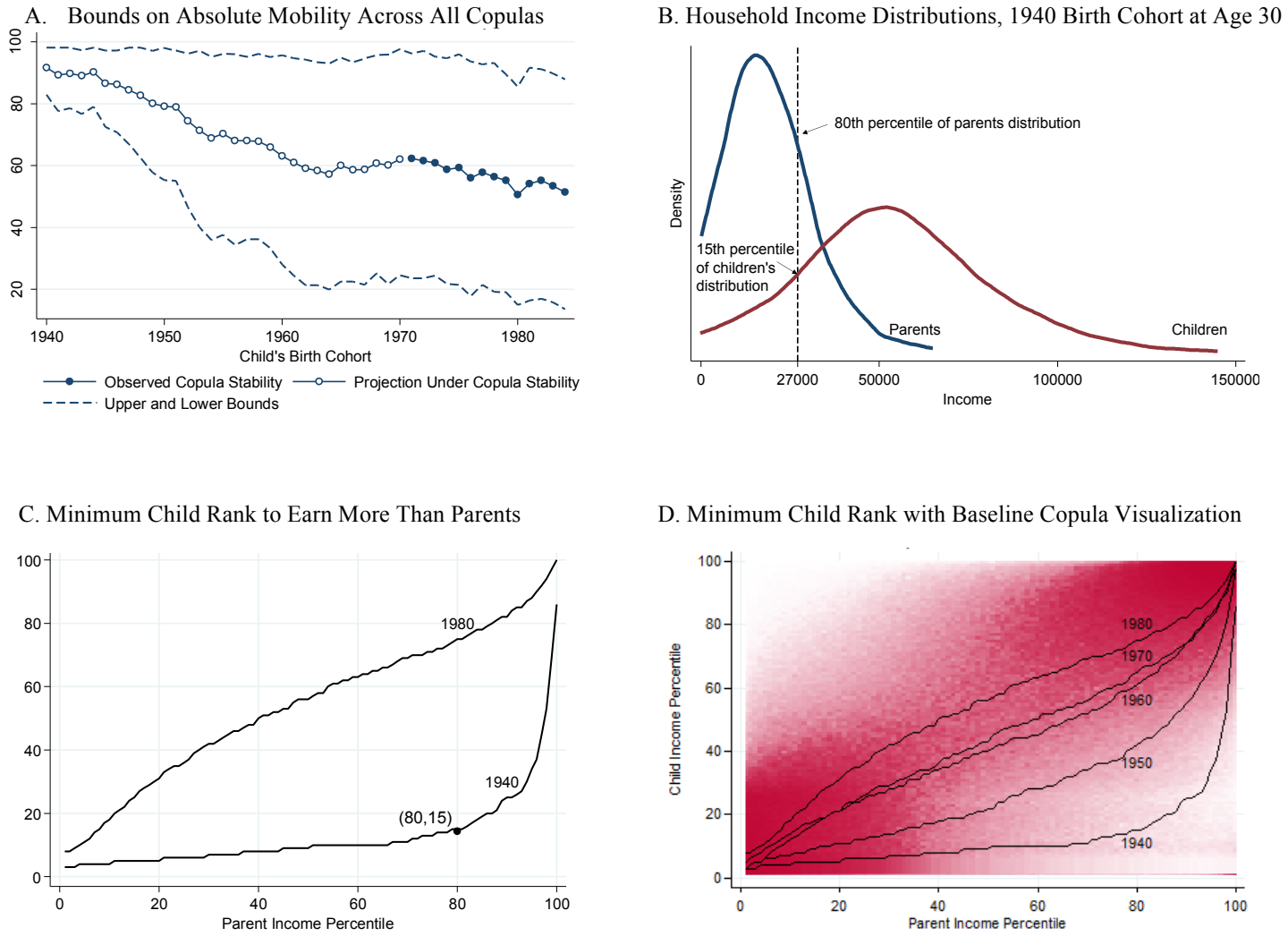
Samuel, Lawrence R. *The American Dream: A Cultural History.* Syracuse Univ. Press

Figure 1. Percent of Children Earning More Than Their Parents



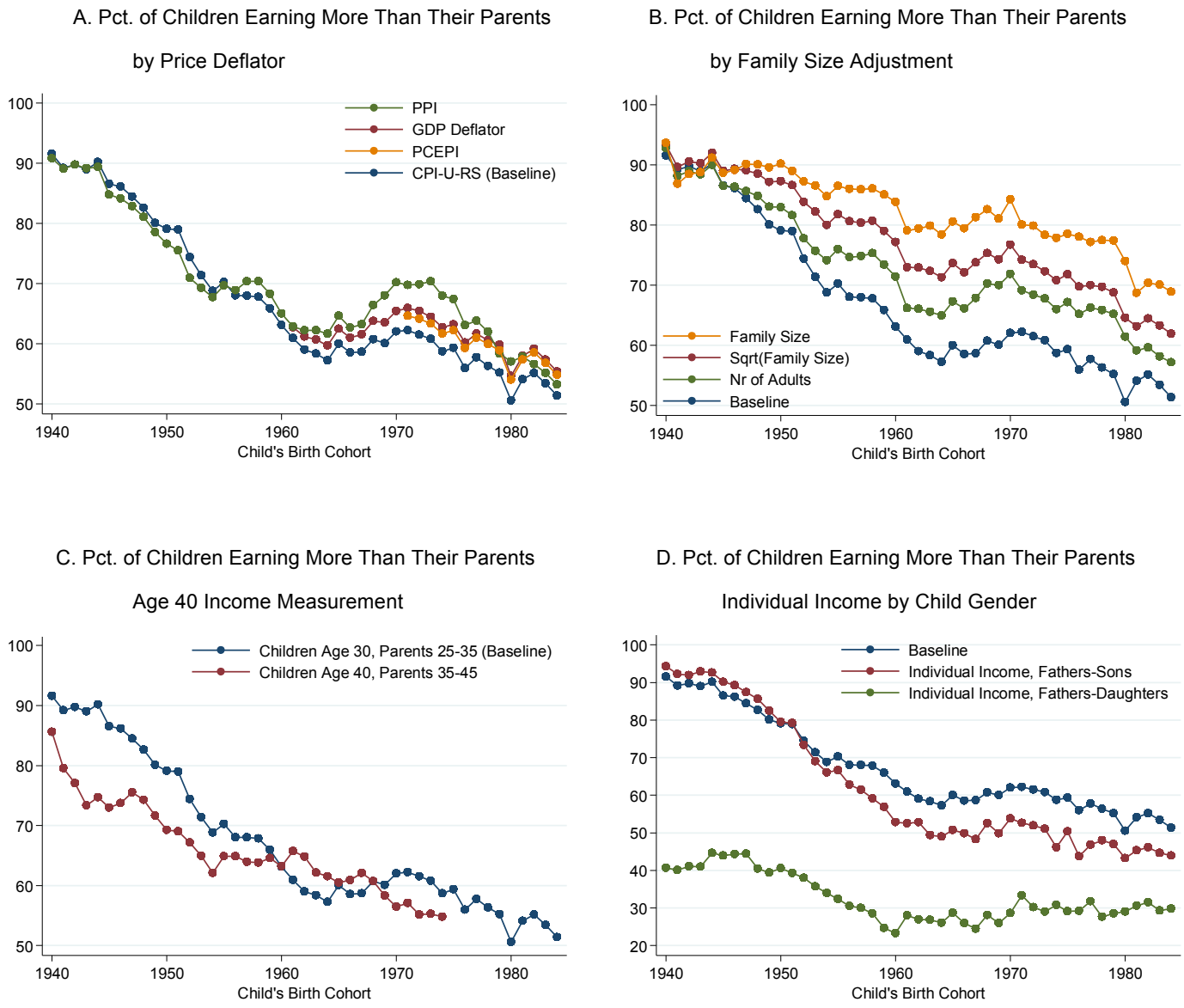
Notes: This figure plots the fraction of children earning more than their parents ("absolute mobility") by parent income percentile for selected child birth cohorts (Panel A) and by child birth cohort (Panel B). Child income is measured at age 30 in the CPS-ASEC as the sum of individual and spousal income, dropping individuals that report negative income and immigrants. Parent income is measured as the sum of individual and spousal income of the highest earning parent between the ages of 25-35 in the Census, dropping zeroes. Parent income percentiles are constructed as the percentile rank in the national distribution of parent incomes within each child cohort. Child and parent incomes are deflated to 2014 dollars using the CPI-U-RS. Absolute mobility is calculated by combining the marginal income distributions of parents and children, combined with the estimated copula for the 1980-1982 cohorts in population tax data (Chetty et al. 2014a). See Figure 2 notes for further information on the construction of the copula.

Figure 2. Sensitivity of Results to the Copula



Notes: These figures illustrate the sensitivity of results to changes in the copula. Panel A plots bounds on absolute mobility for each cohort over all possible copulas satisfying first-order stochastic dominance (FOSD). The bounding copulas are estimated separately by cohort. The solid circles in Panel A present our baseline results over the years for which (Chetty et al. 2014b) document copula stability (1971-1984). The hollow circles present the estimates under the assumption of copula stability for earlier cohorts. To provide intuition for why absolute mobility must be high for earlier cohorts, Panel B plots the marginal income distributions of parents and children for the 1940 birth cohort using our baseline income definitions and restricting to positive parent incomes such that the PDFs for both parents and children integrate to one minus the percentage of parent incomes less than or equal to zero. Panel B cuts above the 99th percentile of children's income for scaling. The vertical dashed line marks the 80th percentile of the parent income distribution, which also corresponds to the 15th percentile of the children's income distribution, suggesting children with parents at the 80th percentile must reach the 15th percentile of their cohort's income distribution to obtain a higher income. Panel C plots the income percentile that a child must reach in their cohort to earn more than their parents for the 1940 and 1980 cohorts. The circle (80,15) reflects the example in Panel B. Panel D adds interim decadal cohorts to Panel C and overlays a heat map of the baseline copula. Each cell (x,y) of the 100x100 copula gives the probability of a child being in income percentile y conditional on having parents in income percentile x.

Figure 3. Robustness to Income Deflator, Household Structure, Age, and Household Income



Notes: This figure presents absolute mobility by child birth cohort for a range of alternative specifications. Panel A presents estimates that use alternative price deflators to compare incomes across years, Panel B across family size adjustments, Panel C across age of income measurement, and Panel D across child gender. See notes for Figure 1 for further information on baseline sampling restrictions. Panel A presents results from specifications that use alternative income deflators to compare incomes across years. Panel B presents absolute mobility using different adjustments for family size. Absolute mobility for each family size adjustment was calculated by dividing income by the given measure of family size for both parents and children in both the child and parent marginal distributions as well as in the construction of the copula. Number of adults is defined as the child's marital status plus 1. Family size is defined as the number of dependents ever claimed by a person plus the number of adults. Panel C presents absolute mobility when child income is measured at age 40 and parent income is measured between ages 35-45. Note that the last year of income data is 2014, so children can only be measured at age 40 until 1974. Panel D presents absolute mobility for father-son and father-daughter pairs using individual income, which is defined analogously to the baseline income definition but does not include spousal income. The copula was recalculated restricting to father-son and father-daughter pairs, respectively, for each of these specifications, using the analogous individual income definition in (Chetty et al. 2014a).