The Fading American Dream
Trends in Absolute Income Mobility Since 1940

Raj Chetty, Stanford Economics
David Grusky, Stanford Sociology
Maximilian Hell, Stanford Sociology
Nathan Hendren, Harvard Economics
Robert Manduca, Harvard Sociology
Jimmy Narang, UC-Berkeley Economics

February 2017
Central feature of American Dream: aspiration that children have a higher standard of living than their parents [Samuel 2012]

- When asked to assess economic progress, children often compare their earnings to their parents [Goldthorpe 1987, Hoschschild 2016]

- Obama (2014): “People’s frustrations are partly rooted “in the fear that their kids won’t be better off than they were”

→ Longstanding interest in measuring absolute mobility: fraction of children who have a higher standard of living than their parents
How many people are better off than their parents? Depends on how you cut the data.

Dimitrios Halikias and Richard V. Reeves • Wednesday, August 10, 2016
Key problem for estimating absolute mobility: lack of large panel datasets linking parents and children.
We develop a method of estimating absolute mobility for the 1940-84 birth cohorts that can be implemented using existing data.

We estimate mobility by decomposing joint distribution of income into two components:

1. Marginal income distributions for parents and children, estimated using CPS and Census cross-sections.
2. Joint distribution of parent and child ranks (copula).
   - For recent cohorts, obtain copula from tax records, building on prior work showing stable relative mobility [Chetty et al. 2014].
   - For early cohorts, derive bounds to show that estimates of absolute mobility are insensitive to copula.
1. Data and methods

2. Baseline estimates under copula stability

3. Bounds under alternative copulas

4. Sensitivity to specification choices

5. Policy counterfactuals
Data and Methods
Baseline income measure: pre-tax family income at age 30, deflated using CPI-U-RS

Estimate absolute mobility by combining three sets of inputs for each birth cohort \( c \):

1. Children’s marginal income distributions \( Q_c^k(r^k) \)
2. Parents’ marginal income distributions \( Q_c^p(r^p) \)
3. Copula: joint distribution of parent and child ranks \( C_c(r^k, r^p) \)

Calculate absolute mobility for birth cohort \( c \) as:

\[
A_c = \int 1\{Q_c^k(r^k) \geq Q_c^p(r^p)\} C_c(r^k, r^p) \, dr^k \, dr^p
\]
Children’s Income Distributions

- Estimate income distributions at age 30 for children in each birth cohort from 1940-84 using CPS data from 1970-2014
  - Sample: all non-institutionalized individuals born in the U.S.
  - Income defined as sum of spouses’ personal pre-tax incomes
Parents’ Income Distributions

- Constructing parents’ income distributions by child’s birth cohort is more complicated because of lack of panel data

- Overcome this problem by pooling data from multiple Census cross-sections
Example: income distribution of parents of children in 1970 birth cohort

Combine data from three Censuses (1% IPUMS):

1. In 1970 Census, select parents aged 25-35 with children born in that year


3. In 1960 Census, select all individuals aged 25-35

   Give this group weight equal to the fraction of individuals who have 1 year old children after age 35 in 1970 Census

Assumption: income distribution of those who have kids after age 35 is representative of income distribution of general population
For children born in 1980s, estimate copula using population tax data [Chetty, Hendren, Kline, Saez, Turner 2015]

Income definition in tax records: pre-tax family income (AGI+SSDI)
  - For non-filers, use W-2 wage earnings + SSDI + UI income
  - If no 1040 and no W-2, code income as 0

Incomes of children born in 1980s measured at age ~30 in 2012

Incomes of parents measured in 1996-2000 between ages 30-60

Copula (distribution of ranks) is stable after age 30 [Chetty et al. 2014]
Copula: Joint Distribution of Ranks

- Estimate copula non-parametrically as a 100 x 100 percentile transition matrix for 1980-82 birth cohorts

  - Rank children based on their incomes relative to other children in same birth cohort
  
  - Rank parents of these children based on their incomes relative to other parents

  - Compute joint probabilities of each rank pair
Chetty et al. (2014) show that copula is very stable back to 1971 birth cohort using Statistics of Income 0.1% sample

- Constant *relative* mobility (in percentile ranks, not absolute dollars)

Baseline: assume copula stability for *all* cohorts going back to 1940

- Then derive bounds for absolute mobility with alternative copulas
Baseline Estimates
Baseline Estimates of Absolute Mobility

- Consider children in 1940 birth cohort

- Estimate absolute mobility in four steps:
  1. Estimate parent income distribution using Census data
  2. Obtain distribution of child ranks for each parent rank using copula from tax data for 1980 cohort
  3. Map children’s ranks to incomes at age 30 using 1970 CPS
  4. Calculate fraction of children with incomes exceeding parents by parent income percentile
Percent of Children Earning More than their Parents
By Parent Income Percentile

Pct. of Children Earning more than their Parents

Parent Income Percentile (conditional on positive income)
Percent of Children Earning More than their Parents

By Parent Income Percentile

Pct. of Children Earning more than their Parents

Parent Income Percentile (conditional on positive income)
Percent of Children Earning More than their Parents
By Parent Income Percentile

Parent Income Percentile (conditional on positive income) vs. Pct. of Children Earning more than their Parents
Mean Rates of Absolute Mobility by Cohort

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Bounds with Alternative Copulas
Baseline estimates rely on assumption that copula remains stable back to 1940 cohort.

Now relax this assumption and derive bounds on absolute mobility under alternative copulas by birth cohort.

- Consider all copulas under which children’s ranks increase with parent ranks (first-order stochastic dominance).
- Rules out negative intergenerational persistence.

High-dimensional (10,000-variable) maximization problem, but objective function and constraints are all linear.

- Can be solved efficiently using linear programming.
Bounds on Absolute Mobility Across All Copulas

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Baseline Estimates

Upper Bound

Lower Bound
Bounds on Absolute Mobility Across All Copulas

Pct. of Children Earning more than their Parents

Child's Birth Cohort


Copula Observed
Household Income Distributions of Parents and Children at Age 30
For Children in 1940 Birth Cohort
Household Income Distributions of Parents and Children at Age 30

For Children in 1940 Birth Cohort

80th percentile of parents distribution

14th percentile of children's distribution

Income (Measured in Real 2014$)
Household Income Distributions of Parents and Children at Age 30
For Children in 1980 Birth Cohort

Density

Income (Measured in Real 2014$)

80th percentile of parents distribution

74th percentile of children's distribution

Parents

Children

0 50k 80k 100k 150k

Density
Child Rank Required to Earn More Than Parents

- 1940
- 1980

(80, 14)
(80, 74)
Child Rank Required to Earn More Than Parents with Copula for 1980 Cohort

Note: Darker colors represent higher density in copula
Sensitivity Analysis
Sensitivity Analysis

- Assess sensitivity of results to key specification choices

1. Using alternative price deflators
   - CPI-U-RS fails to account adequately for quality improvements and new products [Boskin et al. 1996, Broda and Weinstein 2009]
   - Follow prior work by subtracting 0.8% from inflation rate implied by CPI-U-RS [Meyer and Sullivan 2009, Broda and Weinstein 2010]
Trends in Absolute Mobility: Alternative Price Deflators

Pct. of Children Earning more than their Parents

- Baseline: CPI-U-RS
- CPI-U-RS minus 0.8%

Child's Birth Cohort

Trends in Absolute Mobility: Alternative Price Deflators

Baseline: CPI-U-RS
CPI-U-RS minus 0.8%
CPI-U-RS minus 2%

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Trends in Absolute Mobility: Alternative Price Deflators

Baseline: CPI-U-RS
GDP Deflator
PCEPI
CPI-U

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Sensitivity Analysis

- Assess sensitivity of results to key specification choices

  1. Using alternative price deflators
  2. Using post-tax and transfer incomes

    - Conceptually, not clear whether earnings or consumption is the relevant metric for absolute mobility
    - Assess whether distinction matters empirically
    - Calculate tax rates using NBER TAXSIM since 1960 and using raw federal MTR’s prior to 1960
    - Estimate cash and in-kind transfers (SNAP, WIC, housing assistance) since 1967 using CPS data from Fox et al. (2014)
Trends in Absolute Mobility: Including Taxes and Transfers

Baseline: Pre-Tax Income

Pct. of Children Earning more than their Parents

Child's Birth Cohort

- 1940
- 1950
- 1960
- 1970
- 1980
Trends in Absolute Mobility: Including Taxes and Transfers

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Baseline: Pre-Tax Income
Including Taxes
Trends in Absolute Mobility: Including Taxes and Transfers

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Baseline: Pre-Tax Income
Including Taxes
Including Taxes and Transfers
Sensitivity Analysis

- Assess sensitivity of results to key specification choices
  
  1. Using alternative price deflators
  
  2. Using post-tax and transfer incomes
  
  3. Measuring incomes at age 40 instead of 30

  - Children today may take longer to reach peak earnings than those in earlier cohorts
Trends in Absolute Mobility: Income Measured at Age 40

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Baseline: Children Age 30, Parents 25-35
Children Age 40, Parents 35-45
Sensitivity Analysis

- Assess sensitivity of results to key specification choices

1. Using alternative price deflators
2. Using post-tax and transfer incomes
3. Measuring incomes at age 40 instead of 30
4. Using individual income instead of family income

  - Fraction of individuals married at age 30 has fallen over time → family income may be lower for recent cohorts
Trends in Absolute Mobility: Individual Income, Sons vs. Fathers

Pct. of Children Earning more than their Parents

Baseline
Son vs. Father Individual Income

Child's Birth Cohort


Pct. of Children Earning more than their Parents

40 50 60 70 80 90 100
Assess sensitivity of results to key specification choices

1. Using alternative price deflators
2. Using post-tax and transfer incomes
3. Measuring incomes at age 40 instead of 30
4. Using individual income instead of family income
5. Adjusting for changes in household size

- Households have grown smaller over time → consumption per person may not have fallen as much
Trends in Absolute Mobility: Adjusting for Family Size

Pct. of Children Earning more than their Parents

- Baseline: No Adjustment
- Divide by Family Size
- Divide by $\sqrt{\text{Family Size}}$
Sensitivity Analysis

- Assess sensitivity of results to key specification choices
  1. Using alternative price deflators
  2. Using post-tax and transfer incomes
  3. Measuring incomes at age 40 instead of 30
  4. Using individual income instead of family income
  5. Adjusting for changes in household size
  6. Accounting for fringe benefits and income under-reporting
    - Divergence between income reported in CPS and total compensation has grown in recent years
Effects of Uniform Increase in Children’s Income on Absolute Mobility for 1980 Cohort

Pct. of Children Earning more than their Parents

Magnitude of Income Increase for Children in 2010 ($)
Result that absolute mobility has declined sharply since 1940 is robust to key specification choices

1. Using alternative price deflators
2. Using post-tax and transfer incomes
3. Measuring incomes at age 40 instead of 30
4. Using individual income instead of family income
5. Adjusting for changes in household size
6. Accounting for fringe benefits and income under-reporting
Counterfactuals
What policies can restore absolute mobility to historical levels?

Two key macroeconomic changes since 1940: lower GDP growth rates and less equal distribution of growth [e.g., Goldin and Katz 2009]

Consider two counterfactual scenarios for children born in 1980:

1. **Higher growth**: GDP growth since birth matching experience of 1940 cohort, with GDP distributed across income percentiles as in 2010

2. **More broadly shared growth**: Same GDP growth rate, but distribute GDP across income percentiles as in 1940 cohort
Counterfactual Rates of Absolute Mobility by Parent Income Percentile

Pct. of Children Earning more than their Parents

Mean AM: 91.5%

Mean AM: 50.0%

1940 Empirical

1980 Empirical
Counterfactual Rates of Absolute Mobility by Parent Income Percentile

- **Mean AM: 91.5%**
- **Mean AM: 61.9%**
- **Mean AM: 50.0%**

1940 Empirical

1980 Empirical

Pct. of Children Earning more than their Parents

Higher growth: 1940 GDP/family growth rate (2.5%), 1980 shares
Counterfactual Rates of Absolute Mobility by Parent Income Percentile

More broadly shared growth: 1980 GDP/family growth rate (1.5%), 1940 shares

Higher growth: 1940 GDP/family growth rate (2.5%), 1980 shares
Absolute Mobility Under Counterfactual Growth Rates
Growth Distributed According to GDP Shares for 1980 Cohort

Pct. of Children Earning more than their Parents

Real GDP/Family Growth Rate (%)
1. Rates of absolute mobility have fallen from ~90% for 1940 birth cohort to ~50% for children entering labor market today

2. Absolute mobility has fallen primarily because of growing inequality in distribution of economic growth

- Inequality and absolute mobility are tightly linked

  → Those who are interested in reviving absolute mobility must be interested in more broadly shared economic growth
Appendix Slides
Trends in Absolute Mobility: Alternative Income Thresholds

Baseline
20% Less
20% More

Pct. of Children Earning 20% More/Less than Parents

Child's Birth Cohort

Trends in Absolute Mobility: Selected States by Decade

- Massachusetts
- New York
- Ohio
- Michigan

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Parent Income Percentile (conditional on positive income) vs. Child Income Percentile

Child Rank Required to Earn More than Parents

Upper Bound Copula for 1980 Birth Cohort
Child Rank Required to Earn More than Parents

Lower Bound Copula for 1980 Birth Cohort

Child Income Percentile vs. Parent Income Percentile (conditional on positive income).
Median Ratio of Child’s Income to Parents’ Income by Birth Cohort

Median Kid Income / Parent Income
Trends in Absolute Mobility: Wage vs Family Income

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Baseline
Wage Income Only
Family Income
Trends in Absolute Mobility: Including Immigrants

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Baseline
Including Immigrants
Trends in Absolute Mobility: Robustness to Parent Age

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Baseline
Child Income at 30
Parents Matched at 25-35
Trends in Absolute Mobility: CPS vs Census

- Baseline
- CPS Only
- Census Only

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Trends in Absolute Mobility by Gender

- Baseline
- Son vs. Parents' Family Income
- Daughter vs. Parents' Family Income
- Son vs. Father Individual Income
- Daughter vs. Father Individual Income

Pct. of Children Earning more than their Parents

Child's Birth Cohort

Median Individual Income Among Working Individuals Ages 25-34 by Year

Our Sample - Males
CPS Historical Income Tables - Males
Our Sample - Females
CPS Historical Income Tables - Females
Counterfactual Rates of Absolute Mobility by Parent Income Percentile

Income Measured at Age 40

Pct. of Children Earning more than their Parents

Parent Income Percentile (conditional on positive income)

Mean AM: 85.8%

Mean AM: 73.6%

Mean AM: 67.5%

Mean AM: 55.8%

1940 Empirical

1970 Empirical

1970 GDP/family growth rate (1.5%), 1940 income shares

1940 GDP/family growth rate (2.5%), 1970 income shares
Counterfactual Rates of Absolute Mobility by Parent Income Percentile
Age 30, GDP Growth Shares

Pct. of Children Earning more than their Parents

Parent Income Percentile (conditional on positive income)

1940 Empirical
Mean AM: 91.5%

Mean AM: 79.7%

Mean AM: 50.0%

Mean AM: 46.5%

1980 Empirical

1980 GDP/family growth rate (1.5%), 1940 income growth shares

1940 GDP/family growth rate (2.5%), 1980 income growth shares
Counterfactual Rates of Absolute Mobility by Parent Income Percentile
Age 40, GDP Growth Shares

Mean AM: 85.8%
Mean AM: 74.4%
Mean AM: 57.1%
Mean AM: 55.8%

Pct. of Children Earning more than their Parents

Parent Income Percentile (conditional on positive income)
Probability of Reaching Top Quintile by Birth Cohort

Probability Child in Top Fifth of Income Distribution

- Q1
- Q3
- Q5

Child's Birth Cohort

Parent Quintile

- Q1
- Q3
- Q5

Return