Is the United States Still a Land of Opportunity?
Recent Trends in Intergenerational Mobility

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The opinions expressed in this paper are those of the authors alone and do not necessarily reflect the views of the Internal Revenue Service or the U.S. Treasury Department. This work is a component of a larger project examining the effects of eliminating tax expenditures on the budget deficit and economic activity. Certain results reported here are taken from the SOI Working Paper “The Economic Impacts of Tax Expenditures: Evidence from Spatial Variation across the U.S.,” approved under IRS contract TIRNO-12-P-00374.
Growing public perception that intergenerational mobility has declined in the United States

Vast literature has investigated whether this is true empirically [e.g., Aaronson and Mazumder 2008, Lee and Solon 2009, Auten, Gee, and Turner 2013]

Results debated partly due to limitations in data [Black and Devereux 2011]
We analyze trends in mobility for 1971-1993 birth cohorts using administrative data on more than 50 million children and their parents.

Two main empirical results:

1. Relationship between parent and child percentile ranks (i.e. the copula) is extremely stable.
   - Chance of moving from bottom to top fifth of income distribution no lower for children entering labor market today than in the 1970s.

2. Inequality increased in this sample, consistent with prior work.
   - Consequences of the “birth lottery” – the parents to whom a child is born – are larger today than in the past.
Data

- We use de-identified data from federal income tax returns
  - Includes non-filers via information forms (e.g. W-2’s)
Linking Children to Parents

- Parent(s) defined as first person(s) who claim child as a dependent
- Can reliably link children to parents up to age 16, after which some children leave the house
- We link approximately 90% of children to parents overall
Two Samples

1. Population tax records starting in 1996
   - Data on children and parents for the 1980-1993 birth cohorts
   - 40 million children, age 20-31 in 2011

2. Statistics of Income 0.1% Stratified Random Samples 1987-1997
   - Data on children and parents for the 1971-1982 birth cohorts
**Income Definitions**

- **Parent Income**: mean pre-tax household income (AGI+SSDI)
- **Child Income**: mean pre-tax household income ages 26 or 29-30
- For non-filers, use W-2 wage earnings + SSDI + UI income
  - If no 1040 and no W-2, code income as 0
- These **household** level definitions capture total resources in the household
  - Results robust to using individual-level income measures
Measuring Intergenerational Mobility
Measuring Mobility

- Previous literature has measured mobility using various statistics
  - Log-log intergenerational elasticity
  - Rank-rank correlations
  - Transition matrices

- Each of these could potentially exhibit different time trends

- Begin by formalizing how we measure mobility
We decompose joint distribution of parent and child income into two components

1. Joint distribution of parent and child percentile ranks (i.e., copula of distribution)

2. Marginal distributions of parent and child income

Marginal distributions determine inequality within generations

Copula is the key determinant of mobility across generations

- Rank-rank and transition matrix depend purely on copula
- Log-log IGE combines copula and marginal distributions
We study all three measures, but use a *rank-rank* specification as our primary measure.

- 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 in this sample.

In our companion paper on geography of mobility, we show that rank-rank has statistical advantages over other measures.
Mean Child Percentile Rank vs. Parent Percentile Rank

Rank-Rank Slope (U.S) = 0.341 (0.0003)
Literature has emphasized two sources of potential bias in estimates of intergenerational elasticities:

1. Lifecycle bias: measuring earnings too early or too late
2. Attenuation bias: measuring transitory rather than permanent income
Lifecycle Bias: Intergenerational Income Correlation
by Age at Which Child’s Income is Measured
Lifecycle Bias: Intergenerational Income Correlation by Age at Which Child’s Income is Measured

Rank-Rank Slope

Age at which Child’s Income is Measured

- Population
- SOI 0.1% Random Sample
Attenuation Bias: Rank-Rank Slopes by Number of Years Used to Measure Parent Income

Years Used to Compute Mean Parent Income

Rank
Rank Slope

Years Used to Measure Parent Income

0
0.1
0.2
0.3
0.4
Time Trends
Child Income Rank vs. Parent Income Rank by Birth Cohort

Mean Child Income Rank vs. Parent Income Rank

71-74 Slope = 0.299 (0.009)
Child Income Rank vs. Parent Income Rank by Birth Cohort

Mean Child Income Rank vs. Parent Income Rank

71-74 Slope = 0.299 (0.009)
75-78 Slope = 0.291 (0.007)
Child Income Rank vs. Parent Income Rank by Birth Cohort

Mean Child Income Rank

Parent Income Rank

71-74 Slope = 0.299 (0.009)
75-78 Slope = 0.291 (0.007)
79-82 Slope = 0.313 (0.008)
Intergenerational Mobility Estimates for the 1971-1993 Birth Cohorts

Rank-Rank Slope

Income Rank-Rank
(Child Age 30)
Intergenerational Mobility Estimates for the 1971-1993 Birth Cohorts

![Graph showing rank-rank slope over time for different birth cohorts.](image-url)

- **Income Rank-Rank** (Child Age 30; SOI Sample)
- **Income Rank-Rank** (Child Age 26; Pop. Sample)
For younger cohorts, it is too early to measure earnings

But we can measure college attendance, which is a strong predictor of earnings

Moreover, college-income gradient is highly correlated with income rank-rank slope across areas of the U.S. [Chetty et al. 2014]

Define college attendance as attending when age 19

Results similar if attendance measured at later ages
College Attendance Rates vs. Parent Income Rank by Cohort

Percent in College at 19

Parent Income Rank

84-87 Slope = 0.745 (0.008)
College Attendance Rates vs. Parent Income Rank by Cohort

Percent in College at 19

Parent Income Rank

84-87 Slope = 0.745 (0.008)

88-90 Slope = 0.742 (0.010)
College Attendance Rates vs. Parent Income Rank by Cohort

Percent in College at 19

Parent Income Rank

1984-87 Slope = 0.745 (0.008)

88-90 Slope = 0.742 (0.010)

91-93 Slope = 0.705 (0.013)
Intergenerational Mobility Estimates for the 1971-1993 Birth Cohorts

Income Rank-Rank
(Child Age 30; SOI Sample)

Income Rank-Rank
(Child Age 26; Pop. Sample)

College-Income Gradient
(Child Age 19; Pop. Sample)
Intergenerational Mobility Estimates for the 1971-1993 Birth Cohorts

Income Rank-Rank (Child Age 30; SOI Sample)

Income Rank-Rank (Child Age 26; Pop. Sample)

Forecast Based on Age 26 Income and College Attendance

College-Income Gradient (Child Age 19; Pop. Sample)
Can obtain a richer prediction of earnings by using information on which college student attended

Define “college quality” as mean earnings at age 31 of children born in 1979-80 based on the college they attended at age 20
College Quality Rank vs. Parent Income Rank by Cohort

84-87 Coll. Qual Gradient (P75-P25) = 0.191
88-90 Coll. Qual Gradient (P75-P25) = 0.192
91-93 Coll. Qual Gradient (P75-P25) = 0.181
Mobility also stable using other statistics

Ex: fraction of children who reach the top quintile
Probability of Reaching Top Quintile by Birth Cohort

Probability Child in Top Fifth of Income Distribution

Child's Birth Cohort

Probability of Reaching Top Quintile by Birth Cohort

Parent Quintile

- Q1
- Q3
- Q5
Substantial heterogeneity in mobility across areas
[Chetty, Hendren, Kline, Saez 2014]

Do these differences persist over time?
Intergenerational Mobility Estimates by Parent’s Census Division

College Attendance

Age 26 Income Rank

Rank-Rank Slope

Child's Birth Cohort

Pacific

Mountain

New England

East South Central
Rank-based mobility is not declining in the U.S. as a whole

Combined with evidence from Lee and Solon (2009), mobility appears to be roughly stable over past half century

But mobility is (and has consistently been) low in the U.S. relative to most other developed countries (Corak 2013)

Increased inequality → consequences of the “birth lottery” larger

Low mobility matters more today than in the past
Results may be surprising given negative correlation between mobility and inequality in cross-section [Corak 2013]

Based on “Great Gatsby Curve,” one would predict that mobility should have fallen by 20% [Krueger 2012]

One explanation: much of the increase in inequality is driven by extreme upper tail (top 1%)

But top 1% income shares are not strongly correlated with mobility across countries or across areas within the U.S. [Chetty et al. 2014]

Predicted increase in rank-rank slope based on bottom 99% Gini coefficient (“middle class inequality”) is only 0.3 to 0.32
Key open question: why do some parts of the U.S. have persistently low rates of intergenerational mobility?

Mobility statistics by birth cohort by commuting zone available on project website (www.equality-of-opportunity.org)
Download Data on Social Mobility
www.equality-of-opportunity.org/data

### The Geography of Intergenerational Mobility

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### Time Trends in Intergenerational Mobility

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Slope of College Attendance Gradient by Age of Child when Parent Income is Measured
Attenuation Bias: Rank-Rank Slopes by Number of Years Used to Measure Child Income
Robustness of College Attendance Gradient by Age at which College Attendance isMeasured

Slope of Coll. Attendance by Par. Income Gradient

Child's Birth Cohort

Before Age 19
Before Age 20
Before Age 22
Before Age 25