

Intergenerational Mobility

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Introduction

- Intergenerational mobility: how is economic status transmitted from one generation to the next?
- There's a lot of talk about economic inequality, but is inequality per se bad?
- Milton and Rose Friedman (*Free to Choose*, 1980): free society should strive for equality of opportunity, not equality of outcomes.

- Example: two societies A and B, same degree of income inequality.
 - A, perfect immobility: the distribution of income is exactly the same across generations. Sons born to fathers in the q^{th} percentile are also in the q^{th} percentile as adults.
 - B: perfect mobility: son's position in the earnings distribution is entirely unrelated to father's position.
 - [Society C: perfect negative mobility: fathers in the 90th percentile have sons in the 10th percentile]
- Clearly, very different degrees of equality of opportunity.
- At the same time, there is a strong sense (and some empirical evidence) that inequality is associated with lower intergenerational mobility.
 - High income parents are able to endow their children with better education, more enrichment, more resources, etc.

What do we want to measure?

- At least three different concepts of intergenerational mobility.
 1. *Absolute mobility*: Is generation t 's economic status higher than generation $t-1$?
 2. *Relative mobility* : What is the probability that a child ranks higher on the income scale than his father?
 - Notice that this is a zero-sum game: if someone climbs up the ladder, someone else must fall.
 3. *The extent of mobility*: given how far apart two parents are, how far apart will their children be?
 - Intergenerational correlation or elasticity.

- Slightly different concepts, address different questions, answers not necessarily the same.
- But all three measures do capture some specific aspects of intergenerational mobility.
- Additional question: which measure of economic status?
 - Earnings/income. Lifetime or at a point in time? Which point?
 - Occupational status (“class” preferred by sociologists)
 - Education (good measure of permanent income, but lots of noise)
 - Wealth (but very difficult to get good measures of wealth)
 - Other outcomes: health, attitudes, preferences, etc.

A theory of the distribution of income and intergenerational mobility

- Traditionally, most of the literature in economics has focused on the intergenerational correlation in log earnings, or the intergenerational elasticity (IGE), i.e., the regression:

$$\log y_t = \beta \log y_{t-1} + \varepsilon_t$$

- What economic theory justifies this regression?
- How should one interpret the estimated parameters?
- Here: Solon (1999) adaptation of Becker-Tomes (JPE, 1979)

Model

- Family contains one parent and one child.
- Parent must choose how to allocate lifetime earnings (y_{t-1}) between own consumption (c_{t-1}) and investment in child (I_{t-1}).

- Budget constraint:

$$y_{t-1} = I_{t-1} + C_{t-1}$$

- Technology translating one unit of investment into child's lifetime earnings:

$$y_t = (1 + r)I_{t-1} + E_t$$

- E_t is the combined effect of all other determinants of child earnings (luck, ability, connections, etc.)

- Parents' utility function (Cobb-Douglas)

$$U = (1 - \alpha) \log(C_{t-1}) + \alpha \log y_t$$

$$= (1 - \alpha) \log(y_{t-1} - I_{t-1}) + \alpha \log((1 + r) I_{t-1} + E_t)$$

- First order condition w.r.t. I_{t-1} :

$$I_{t-1} = \alpha y_{t-1} - (1 - \alpha) E_t / (1 + r)$$

- Inserting this into the equation determining child earnings:

$$y_t = \alpha (1 + r) y_{t-1} + \alpha E_t \equiv \beta y_{t-1} + \alpha E_t$$

- Note that the estimated slope in a regression of y_t on y_{t-1} is equal to β only if E_t is orthogonal to y_{t-1} . Typically not.
- Decompose the error term into: $E_t = e_t + u_t$
 - e_t : the child's endowment of earnings capacity, transmitted across generations (inheritable ability, connections, etc.)
 - u_t : labor market "luck", independent of e_t and y_{t-1} .

$$e_t = \lambda e_{t-1} + v_t$$

- Natural to assume:
- What is the intergenerational earnings correlation?
- β plus some term that depends on the covariance between y_{t-1} and e_t .

Empirical studies

- If the earnings technology is $y_t = I_{t-1} \exp(E_t)$ then one gets the log-log relationship estimated in the empirical literature

$$\log y_t = \rho \log y_{t-1} + \varepsilon$$

- Goal of the empirical literature: estimate ρ , the intergenerational elasticity.

Solon (1992)

- Estimates of ρ suffer from error-ridden data and unrepresentative samples, will tend to be biased downwards, overestimate mobility.

- True model:

$$y_{1i} = \rho y_{0i} + \varepsilon_i$$

where y_{0i} and y_{1i} represent long-run economic status for father and son (permanent component of earnings) in family i .

- Problem: difficult to measure y_{0i} and y_{1i} .
 - Often must rely on single-year measure of income as a proxy for permanent income.
 - Data sets used in the early literature highly unrepresentative and homogeneous samples (twins who served in the armed forces, survived and cooperated with surveys)
 - Measures of income based on recollection.

The PSID data

- Panel Study of Income Dynamics (PSID).
 - Nationally representative longitudinal survey
 - About 5,000 families
 - First interviewed in 1968, then all family members followed annually.
 - People who enter the family (spouses, children) also followed.
- Ideally suited for reducing bias from early research.
 - Large representative sample.
 - Fathers and sons observed for a long period of time, possible to get a better measure of long-run earnings.
- Early studies had found intergenerational correlation of 0.2, concluded that society was highly mobile.
- Sociologists, using measures of occupational status, typically estimated higher correlations.
 - Occupational status better measure of permanent income?
 - Occupational status more strongly transmitted across generations, even if income is very different?

- Sample selection:
 - 348 father-son pairs from the main sample (exclude low-income oversample)
 - Children from the 1968 original sample, who reported positive earnings in 1984.
 - Sons born between 1951 and 1959 (young enough so that living with parents is representative, old enough to observe earnings at age ≥ 25).
 - Only oldest son in family (also additional sons for robustness)
 - Both natural and adoptive fathers.

Empirical methodology

- To reduce measurement error bias, average father's earnings over multiple years.
- Alternatively, use father's years of schooling as an instrument for y_{0i} .
 - Not a valid instrument, but probably upward biased, so we can get an upper bound for ρ .

TABLE 2—OLS ESTIMATES OF ρ FROM LOG EARNINGS DATA

Year of father's log earnings	Measure of father's log earnings				
	Single-year measure	Two-year average	Three-year average	Four-year average	Five-year average
1967	0.386 (0.079) [322]	0.425 (0.090) [313]	0.408 (0.087) [309]	0.413 (0.088) [301]	0.413 (0.093) [290]
1968	0.271 (0.074) [326]	0.365 (0.081) [317]	0.369 (0.083) [309]	0.357 (0.088) [298]	
1969	0.326 (0.073) [320]	0.342 (0.078) [312]	0.336 (0.084) [301]		
1970	0.285 (0.073) [318]	0.290 (0.082) [303]			
1971	0.247 (0.073) [307]				

Notes: Standard-error estimates are in parentheses, and sample sizes are in brackets.

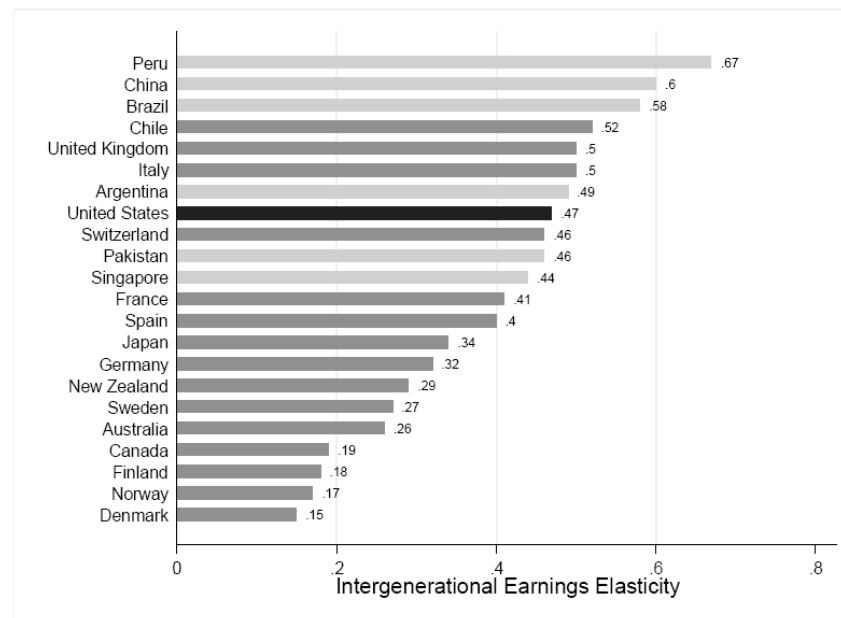
- Estimates based on multiple years of father's earnings tend to be higher, consistent with attenuation bias when using single-year measure.
- Even single-year measure yields higher estimates than previous literature, because sample is more representative.
- Many other studies since Solon for the US, most find IGE between 0.4 and 0.5.

International Comparisons

- Corak, “Inequality from generation to generation: the United States in Comparison” (mimeo, 2011)

Figure 1

Comparable estimates of the intergenerational elasticity between father and son earnings for the United States and twenty one other countries



Note: Lightly shaded bars indicate countries that are not member states of the OECD, generally taken to mean lower income countries.

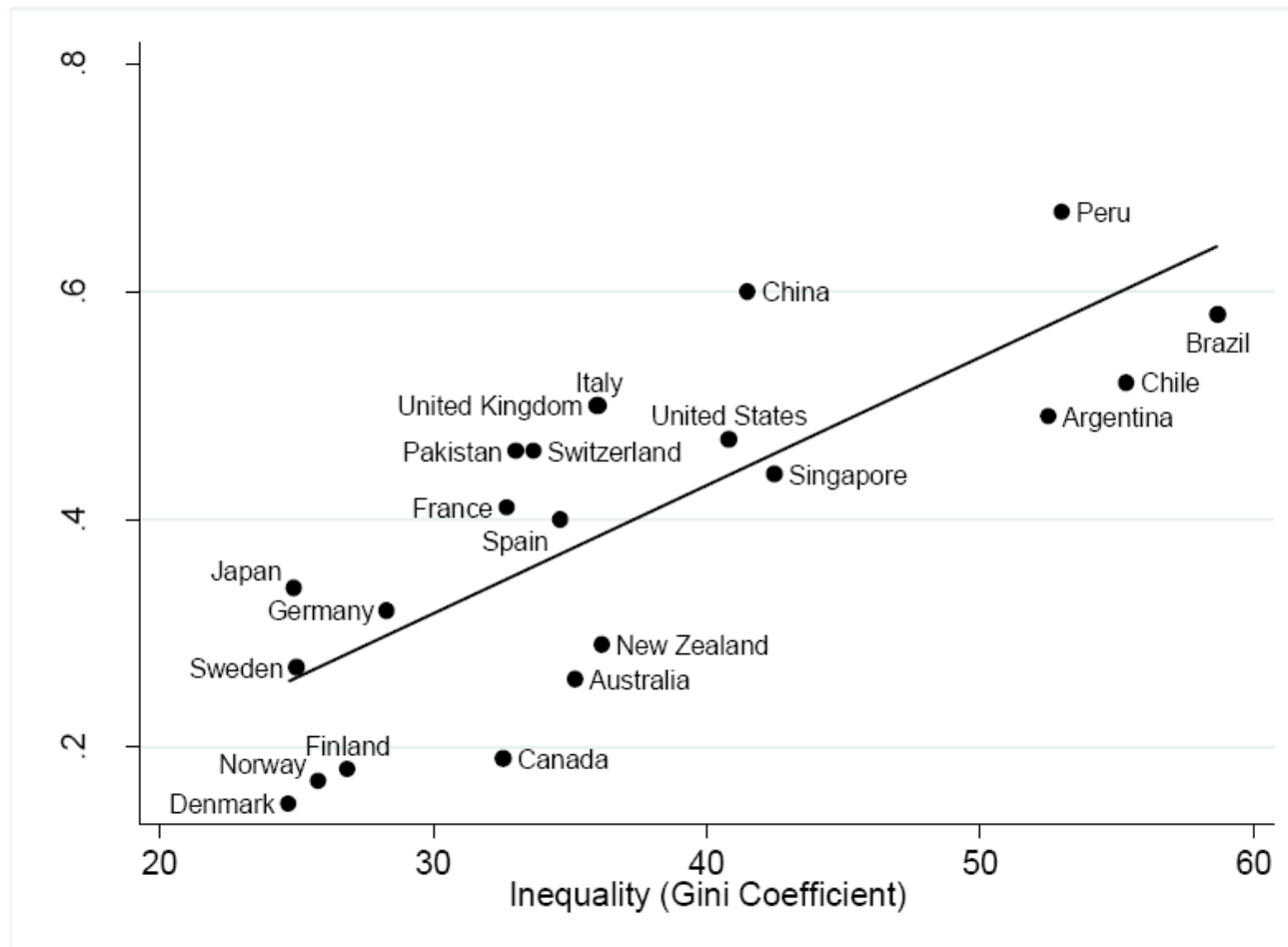
Source: Published estimates collected by the author and using the methods in Corak (2006).

- Compared to other OECD countries, the US does not look much like the Land of Opportunity.

- The “Great Gatsby Curve” (Corak, 2013)

Figure 2

More inequality at a point in time is associated with less generational earnings mobility in twenty two countries with comparable estimates of the intergenerational elasticity between father and son earnings

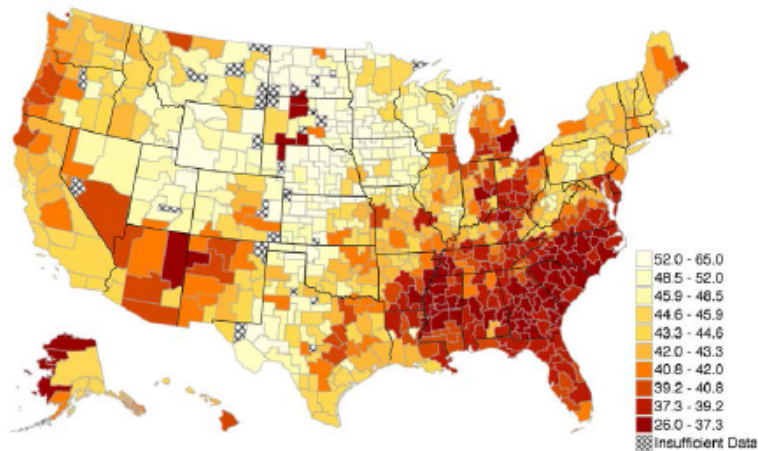


Chetty et al (NBER 2014): “Where is the Land of Opportunity?”

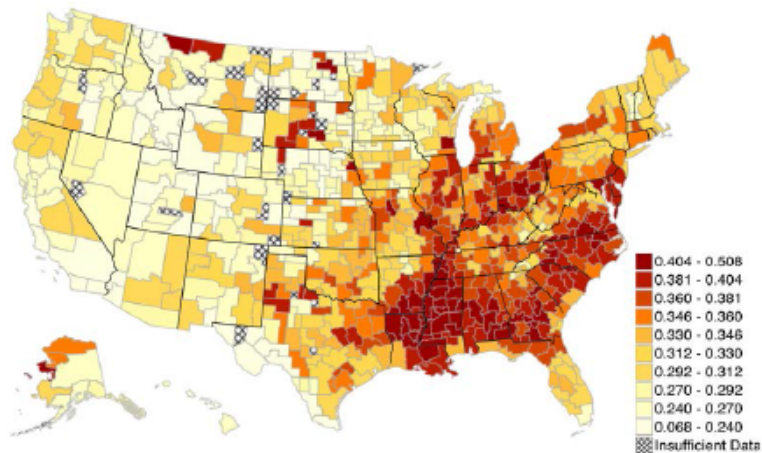
- Data on 40 million children and their parents in the US (Solon’s PSID study: $N < 400$).
- Federal income tax records, 1996-2012, possible to link children to their “parents” (i.e., people who claimed them as child dependents).
- Core sample:
 1. Children born in 1980-1982.
 2. For whom it is possible to identify parents.
 3. Mean parent income in 1996-2000 strictly positive
- Key variables
 1. Parent income: total pre-tax income at family level, averaged over 1996-2000
 2. Child income: average child family income over 2011-2012, when children are in their early 30s.
- Additional variables: College attendance, college quality

FIGURE VI: The Geography of Intergenerational Mobility

A. Absolute Upward Mobility: Mean Child Rank for Parents at 25th Percentile ($\bar{r}_{25}$) by CZ



B. Relative Mobility: Rank-Rank Slopes ($\bar{r}_{100} - \bar{r}_0$)/100 by CZ



Corr. with baseline $\bar{r}_{25} = -0.68$ (unweighted), -0.61 (pop-weighted)

Substantial variation across commuting zones in both relative and absolute mobility.

Factors correlated with high mobility:

- Less residential segregation
- Less income inequality
- Better primary schools
- Greater social capital
- Greater family stability

[https://
www.opportunityatlas.org/](https://www.opportunityatlas.org/)