

Inequality and Mobility

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Public Economics

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Logistics

- Tomorrow's lecture with Emmanuel Saez is **3-5pm**.
- Assignment for tomorrow. Read and prepare discussion (2-3pm) of one of these papers:
- "Compensate the Losers? Economic Policy and Partisan Realignment in the US" (Kuziemko, Longuet Marx and Naidu)
- "Measuring Unfair Inequality: Reconciling Equality of Opportunity and Freedom from Poverty" (Hufe, Kanbur and Peichl)
- "Diversifying Society's Leaders? The Determinants and Causal Effects of Admission to Highly Selective Private Colleges" (Chetty, Deming and Friedman)
- "Eclipse of Rent-Sharing: The Effect of Managers' Business Education on Wages and the Labor Share in the US and Denmark" (Acemogly, Xi He and le Maire)

Distributional issues

Focus until 1980: **efficiency**

Low levels of inequality

Cold-war context: do market economies allocate resources more efficiently than planned?

Distributional questions rely on judgment about equity

“Of the tendencies that are harmful to sound economics, the most seductive, and in my opinion the most poisonous, is to focus on questions of distribution.” (Robert E. Lucas, 2004)

Today: **Equity** is at the center-stage.

Why care about inequality and public finance?

Practically important:

Rising tensions b/w polarized groups

Contentious debate about **whether** and **how** to reduce inequality?

Academically relevant:

Inequality studied across fields with different methods.

Methodologically interesting:

Data-driven revolution during past 15 years enables new questions to be raised.

Compelling identification requires large datasets.

Largely available in the Nordic countries.

Key questions

- What is the **extent** of inequality?
- What are the **causes** of inequality?
- What are the **consequences** of inequality?
 - o Does / Should the government reduce inequality through taxes, transfers and other redistributive policies?
 - o “income distribution may be considered the normative economic issue ‘par excellence’” (Atkinson and Bourguignon, HB, 2000)

Essential preliminaries

1. Inequality of what?

- Income, consumption or wealth?
- Non-monetary sources of income; e.g. subsistence agriculture and home-production.

2. Time period

- Historic / **real-time** data: "Real-Time Inequality." (Blanchet, Saez and Zucman, 2022)

3. Unit of observation

- **Data sources:**

i. Survey data

ii. Administrative data

iii. Combinations

Measurement

Inequality of, say, income, is measured through indexes that are functions of the CDF (cumulative distribution function): $F(z) =$ share of units with income below z .

Quantile function: Define the percentile p 's income z_p such that a share p has income below z_p : $F(z_p) = p$, or $z_p = F^{-1}(p)$.

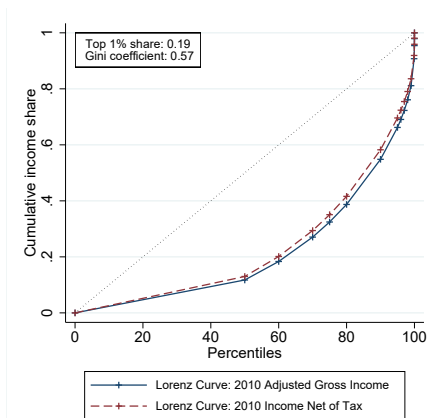
E.g. $z_{0.90} =$ NOK 705,000 in the Norwegian after-tax income distribution in 2023 (source: Statistics Norway).

Inequality indexes are *relative* (e.g. Gini) or *absolute* (e.g. variance of the distribution or poverty index)

Lorenz Curve

- **Lorenz** curve $L(p)$ at percentile p is the share of total income earned by individuals below percentile p .

$$0 \leq L(p) \leq p.$$



Common inequality concepts

1. **Gini** coefficient measures the area between perfect equality and Lorenz curve.

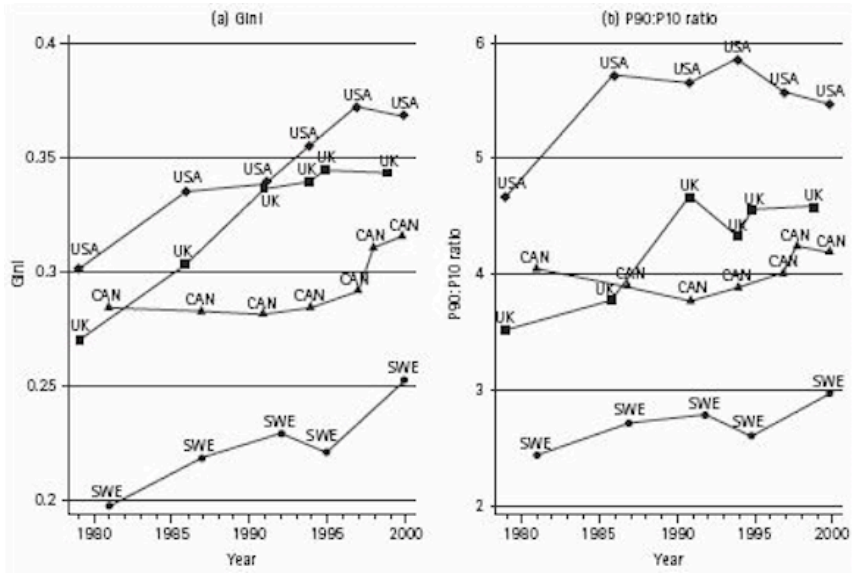
Gini=0: perfect equality. Gini=1: complete inequality (top earner earns everything).

2. **Income quantile shares** measure the share of total income going to given quantile $[p_1, p_2]$ from percentile p_1 to p_2 . Examples: top 1% income share is around 20% \Leftrightarrow Top 1% incomes are 20 times larger than the average.
3. **Percentile ratios** (Kuznets ratios) are z_{p_2}/z_{p_1} .
4. **Poverty rate** is the fraction of population below z^* .

- Less used: Theil index; Atkinson index.

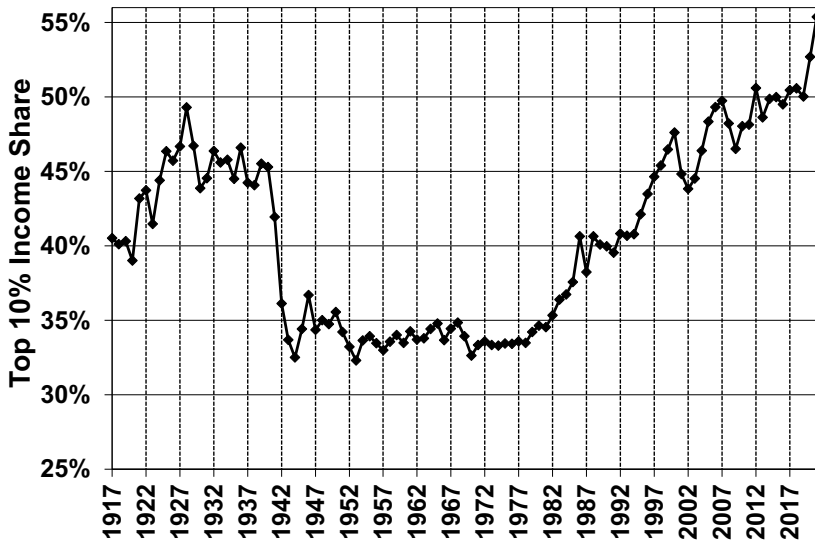
Derived from Social Welfare Function with concave utility.

Concavity \uparrow ; Inequality aversion \uparrow ; Indexes \uparrow



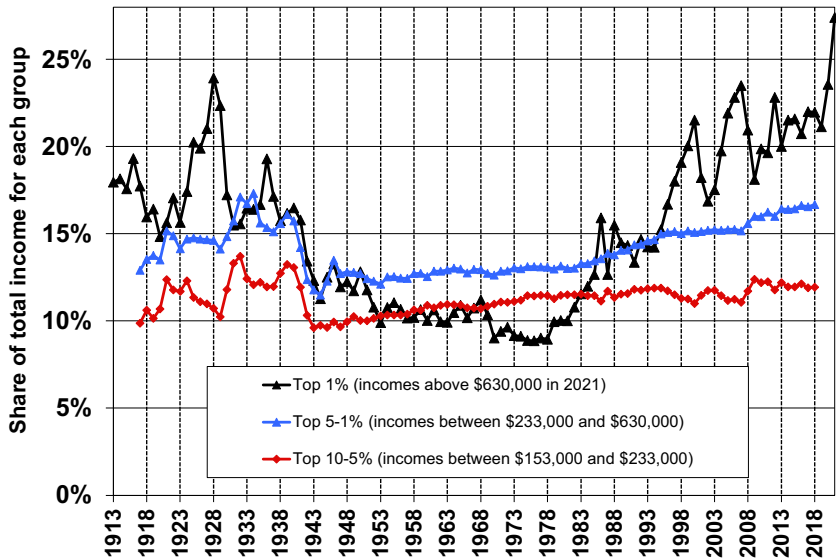
Source: Jenkins and Kerm (2012)

Top 10% Pre-tax Income Share in the US



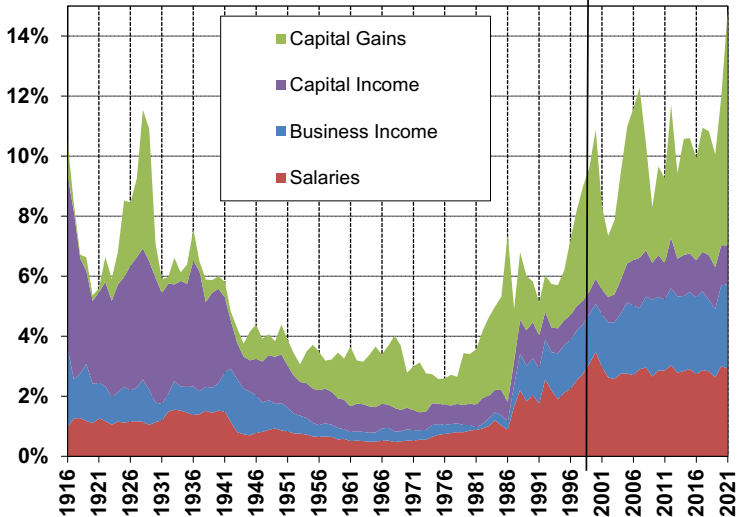
Source: Piketty and Saez, 2003 updated to 2021. Series based on pre-tax cash market income including realized capital gains and excluding government transfers.

Decomposing Top 10% into 3 Groups, 1913-2021

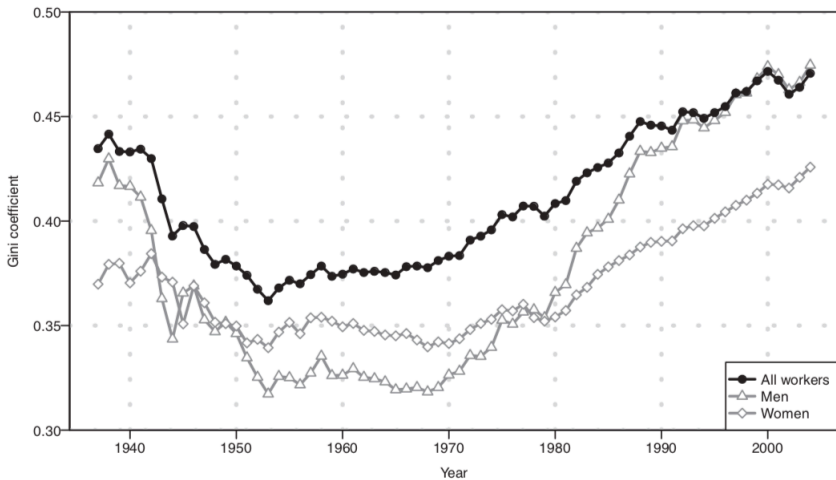


Source: Piketty and Saez, 2003 updated to 2018. Series based on pre-tax cash market income including realized capital gains and excluding government transfers.

US Top 0.1% Pre-Tax Income Share and Composition



Source: Piketty and Saez, 2003 updated. Series based on pre-tax cash market income including or excluding realized capital gains, and always excluding government transfers.



Source: Kopczuk, Saez and Song, 2010, QJE.

Piketty, Saez and Zucman (2018)

Gap between **macro-measurements** of growth and **micro-measurements** of inequality.

- All inequality measures to date are based on fiscal income, i.e. on **tax returns**.

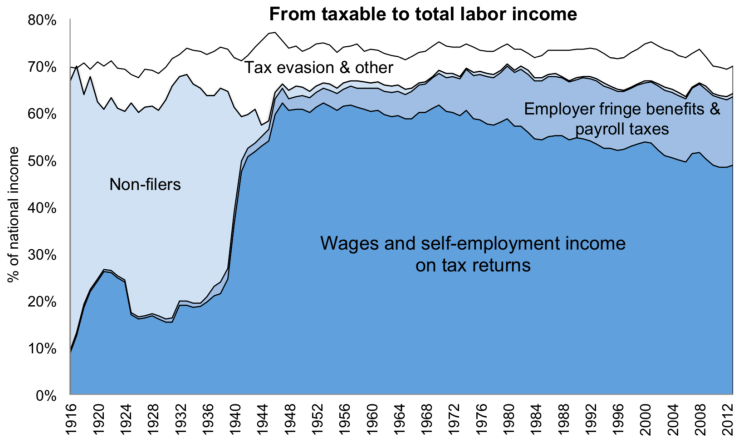
How much of total economic growth accrued to the bottom 50% or the top 10%?

How does government revenue/spending affect the distribution of growth?

Innovation:

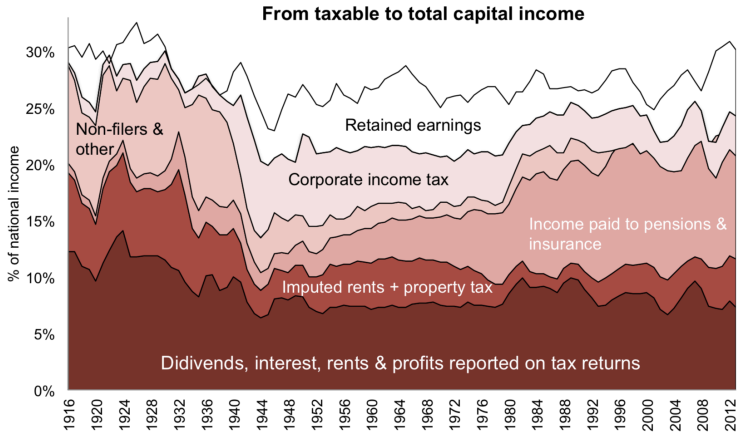
- Bridge the gap by distributing national income to the citizens.
- Use tax returns, surveys and assumptions to allocate these income.

How much labor income is missing?



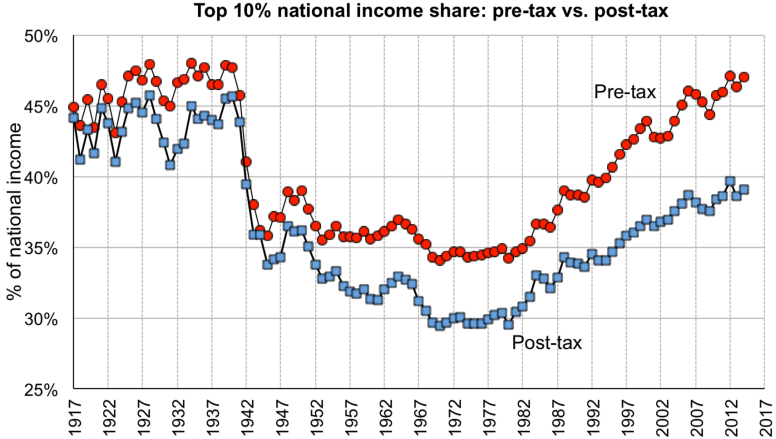
Source: Piketty, Saez and Zucman (2018).

How much capital income is missing?



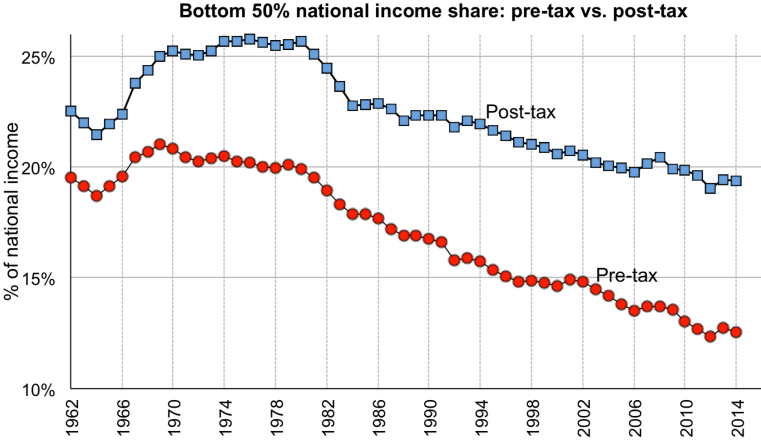
Source: Piketty, Saez and Zucman (2018).

New series confirm tax-data picture



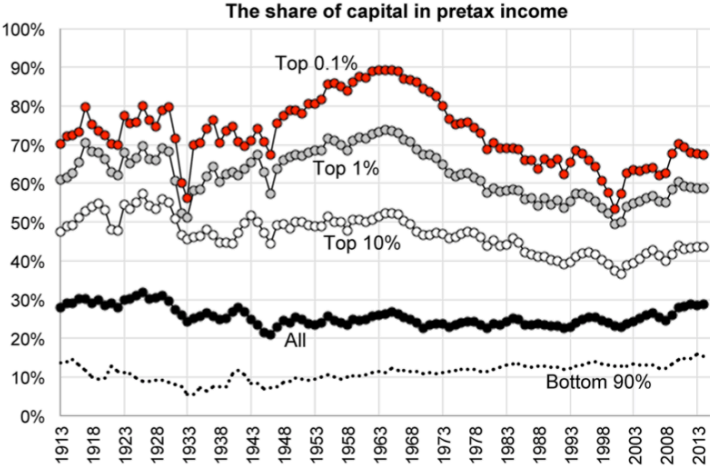
Source: Piketty, Saez and Zucman (2018).

Collapse of the bottom 50 %

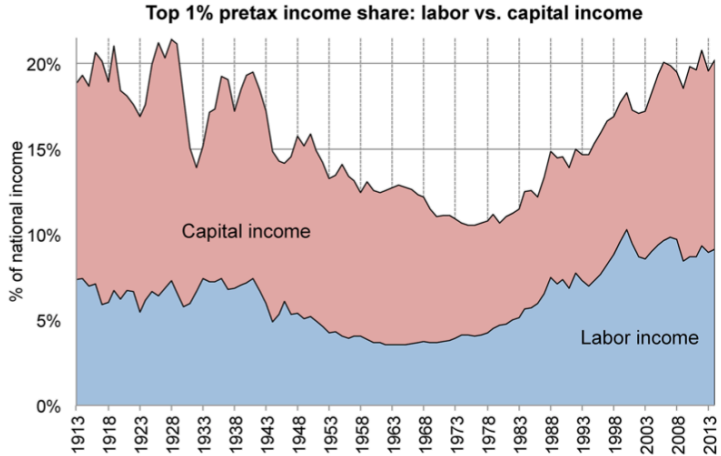


Source: Piketty, Saez and Zucman (2018).

Capital Share



Source: Piketty, Saez and Zucman (2018).



Source: Piketty, Saez and Zucman (2018).



The
**GREAT
LEVELER**

VIOLENCE *and the*
HISTORY *of* INEQUALITY
from the STONE AGE to
the TWENTY-FIRST CENTURY

WALTER SCHEIDEL

How can we affect the trends?

- Walter Scheidel, *"The great Leveler"*:
"Only specific types of violence have consistently forced down inequality."

1. Large wars
2. Revolution
3. State collapse
4. Natural disasters

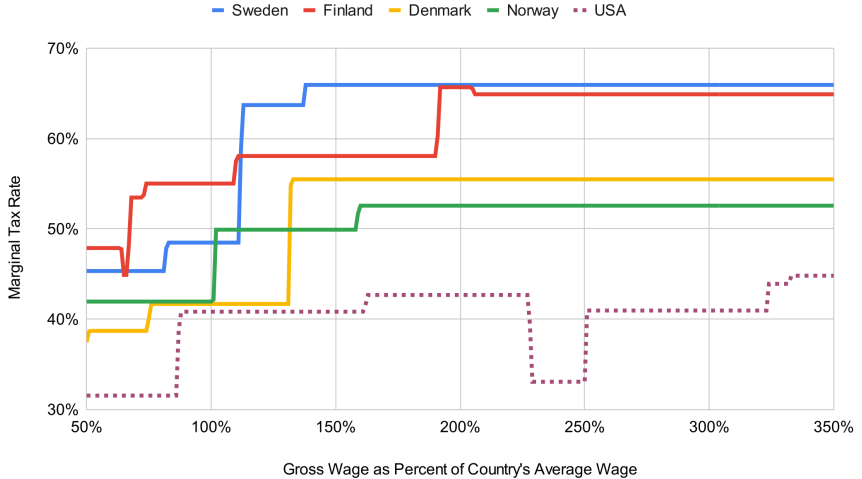
Government the fifth leveler?

- After WW2, 2 groups emerged:
 - **Communists:** Eastern Europe, Russia, China and Cuba.
 - **Capitalists:** US, UK.
- Also a third group:
 - **Social Democracies:** Scandinavia, France.
Kept inequality in check.
- i. Expansion of the public sector during 20th century.
- ii. Post-tax inequality much lower than pre-tax (cf. Aaberge et al, 2010).
- iii. External shocks (which Scheidel describes) triggered policy reforms.
- iv. Policy changes have long-lasting influences.
 - JMC from Stanford: Zach Freitas-Groff: "Persistence in Policy: Evidence from Close Votes"

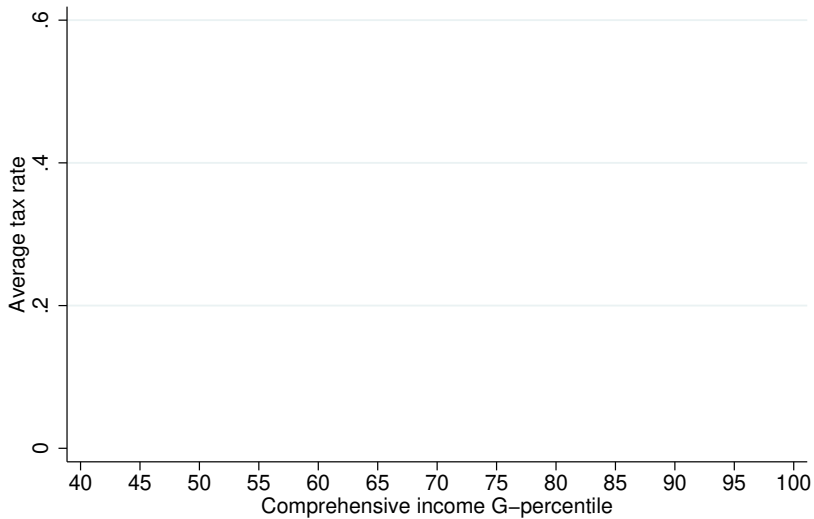
Research Frontier

- How can we tax the very rich?
- Welfare states levy **progressive income taxes**.
⇒ Expect average tax rate to rise with income.
- **Comprehensive income** = taxable income + Retained earnings
- Document how **taxes paid** vary with comprehensive income.
- Data on comprehensive income **hard** to come by.
Limited by tax records.
- Different research teams are making progress on this issue.

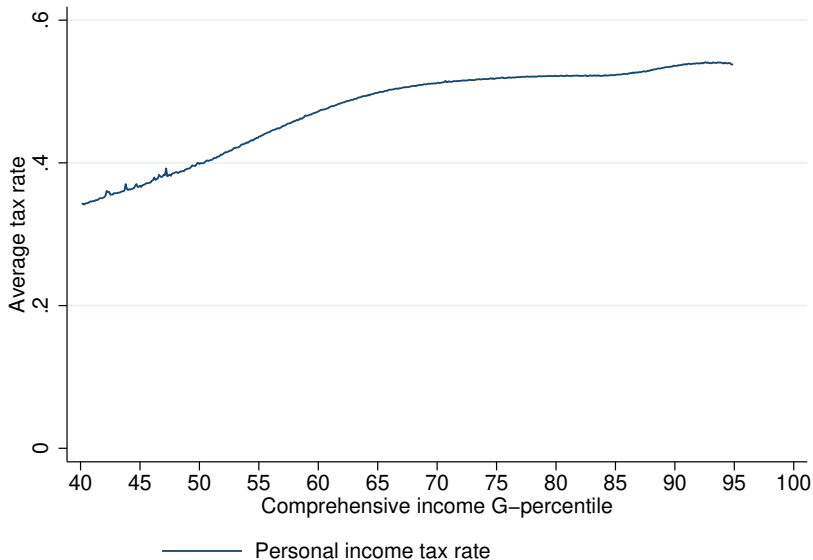
All-In Marginal Labor Tax Rate by Percent of Country's Average Wage (2020)



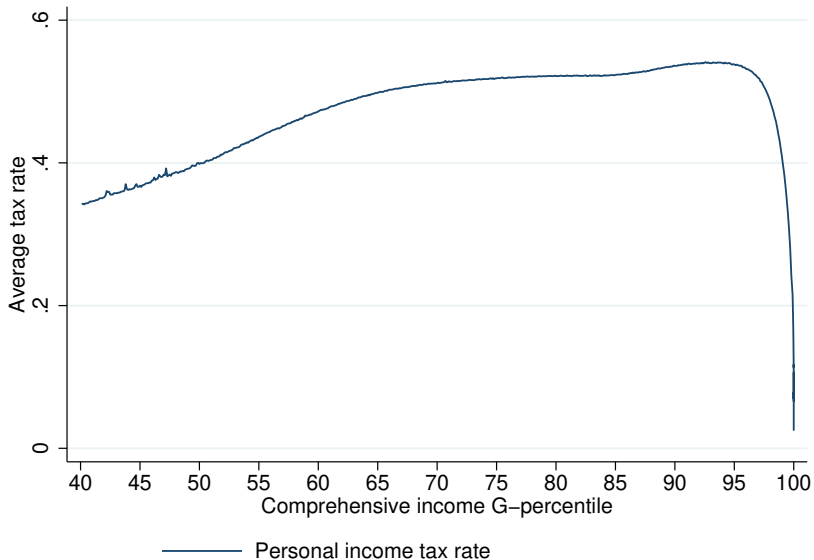
Taxes in Sweden



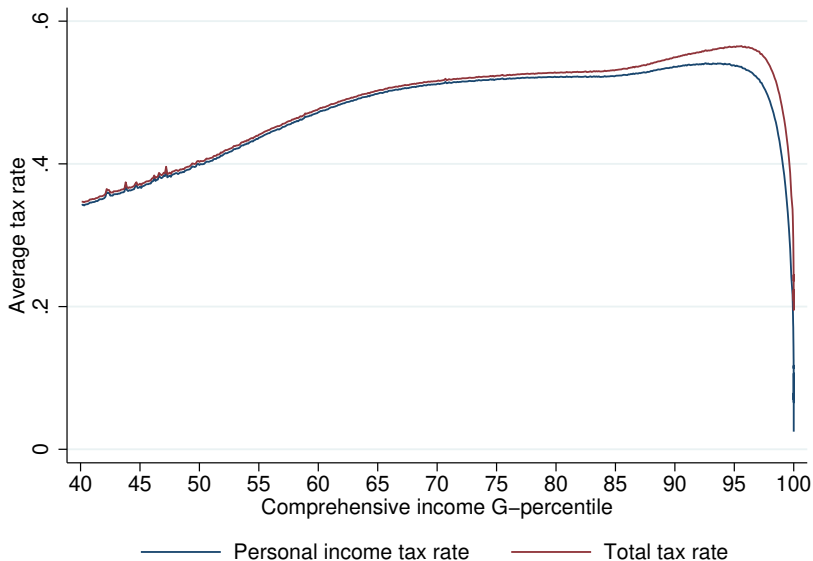
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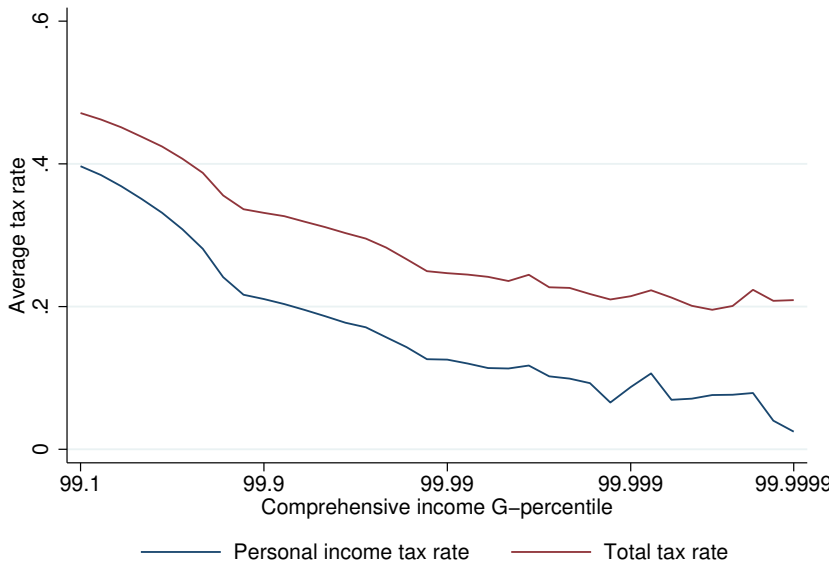
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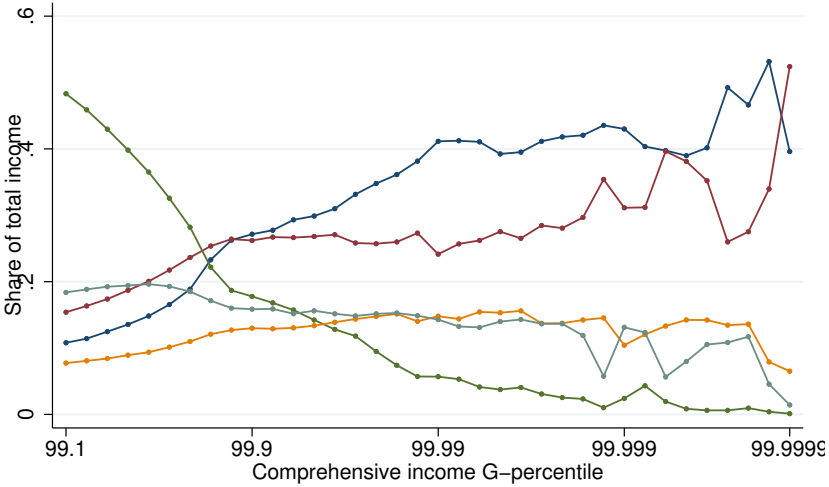
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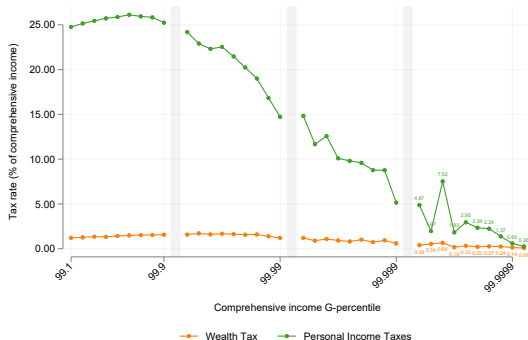
Taxes in Sweden



- Retained (unlisted)
- Retained (listed)
- Labor earnings
- Dividends and interest
- Capital gains

Taxes in France

Personal taxes along the comprehensive income distribution



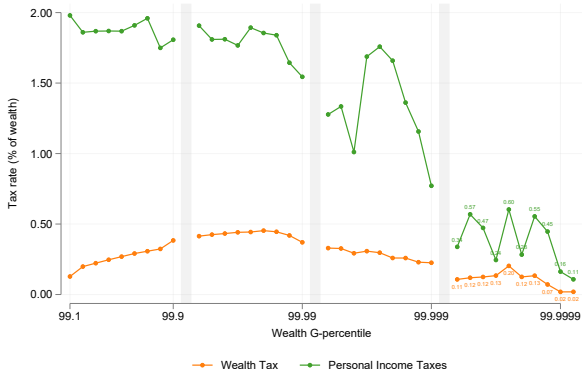
- The wealth tax fails to correct the decrease in personal income taxes

14

Source: Bach, Bozio, Guillouzouic, Malgouyres (2023)

Taxes in France

Personal taxes along the wealth distribution



- Similar along the wealth distribution

Source: Bach, Bozio, Guillouzouic, Malgouyres (2023)

Inequality in the history of economic thought

- **Simon Kuznets (1953)**

1. First one to present empirical estimates of inequality using national accounts and tax records.
2. Proposed a two-sector model (agriculture and industry) to explain the industrial development.

Early industrialization: farmers piling up in urban hubs \Rightarrow **Inequality**
 \uparrow .

Over time, with high growth, democratization \Rightarrow
Inequality \downarrow .

Kuznets Curve: Inverted U, with inequality on y-axis and gdp/capita on x-axis.

Wealth Inequality

- **Motivation:** Wealth more important marker of consumption opportunities than income.

What is wealth?

Assets:

- **Real estate:**
Owner-occupied housing; condos; land; vacation homes.
- **Financial assets:**
Listed and unlisted stocks; funds; options; bonds; money (Pension wealth)
- **Other assets:**
Cash; jewelry; cars; art.
Human capital?

Liabilities:

- Mortgages; credit card debt; options; other loans.

Measuring wealth inequality

- Even with a consensus view of the definition, measurement problematic
1. **Capitalization Method:** Infer wealth from capital income flows (e.g. Saez, Zucman, QJE 2016).
 2. **Surveys**
 3. **Estate Tax Data:** Wealth typically assessed once **at death**. ⇒ Infer wealth among living.
 4. **Administrative sources:** Accurate, but has problems too.

Measuring wealth inequality

1. Capitalization technique

Idea:

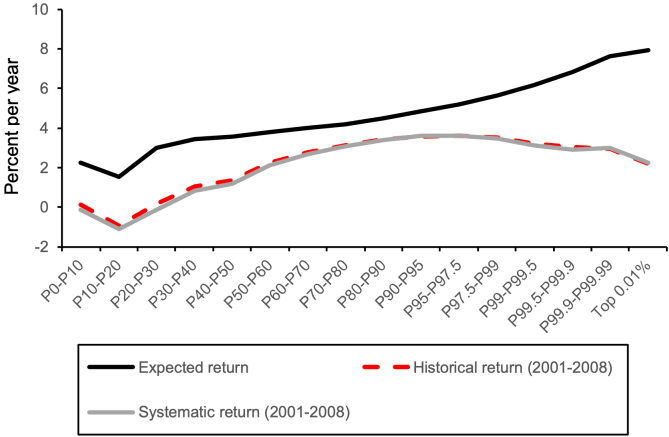
$$k_c = r_c W_c$$

where k is capital income in asset class c and r is rate of return.

- Capital income, k_c , taxed → tax returns contain capital income **by components**.
- Sum up to component-level; **aggregate return** to households.
- Household balance sheet data from National Accounts
→ **aggregate value** by component.
- Multiply capital income, k , component by $1/r_c$, where r_c is aggregate rate of return.

Heterogenous return across wealth

A. Return on Gross Wealth



Source: Bach, Calvet, Sodini (AER, 2020)

Issues

- **Key assumption:** Uniform return within asset class.
 - Recent research suggests that this is **not** fulfilled.
 - Rate of return **rising** in wealth.
 - E.g. Access to investment options depend on wealth.
- **Caveat:** Not all assets deliver capital income.
 - **Owner-occupied housing**
 - Capitalize property taxes. **Misses exempt housing, e.g. condos.**
 - Capitalize mortgages from mortgage interest paid.
 - **Pension wealth**
 - Impute pension wealth based on pension distributions and wages.
 - Not very important for top shares (since a small share of their wealth are pension wealth).

Properties of capitalization factor

Fixed-income components account for **most** of the increase in top 0.1 %'s share.

- **Fixed-income assets:** Bonds, deposits

Share of fixed-income in overall capital income **actually falls** over time.

Underlying capitalization factor for taxable interest income ↑ from 24 (in 2000; $r = 0.042$) to 97 (in 2012; and $r = 0.0104$).

Two consistent stories:

1. Massive rebalancing of portfolios towards fixed-income components.
2. Small measurement errors in returns → huge errors on capitalization factors **when interest rates are low**.

Example:

- **Underestimate** return by 1 ppt → cap. factor of 50 (instead of 97).
- **Overestimate** return by 1 ppt → cap. factor of 2500 (instead of 97).
- Interest payment of 100 SEK ⇒ [5000, 250000]; **wide range**.

Similar misestimations much less problematic when r is high.

(Capitalized) wealth and labor income inequality



Source: Piketty, Saez and Zucman (2016).

3. Estate tax data

Estates with value > threshold file estate tax return (1 % of deceased in the US; threshold is \$12.9 million USD).

Observe **wealth of the deceased**.

Only in top groups.

Decedents = sample of living population with **mortality rate: m_j** .

Strategy:

- Estimate m for observable differences (age and gender).
- Wealth of those alive is $w_{e,c} \times \frac{1}{m_c}$
where $w_{e,c}$ is the wealth of the deceased in group c .

Issues:

- m_c are growing **differently** over time for **different** groups.
- Wealth of deceased different from observationally similar living ind.
- Tax data \leftrightarrow Avoidance/evasion issues.
- Tax base \neq National accounts definition.

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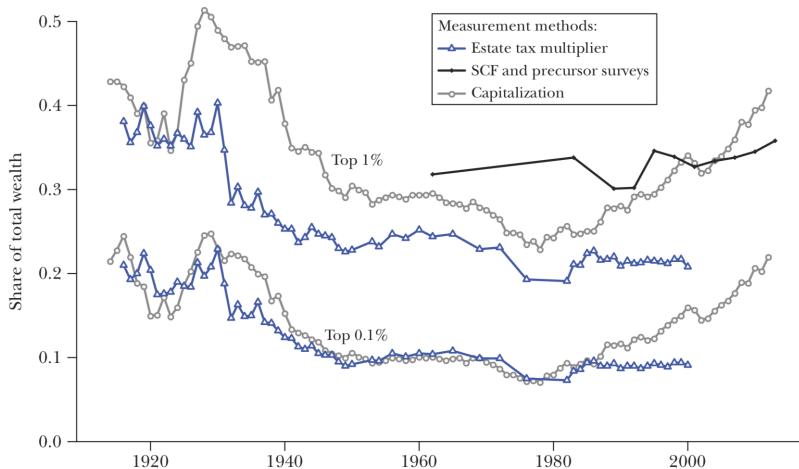
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Figure 1

Top 0.1% and Top 1% Wealth Shares



Source: Kopczuk (2015).

4. Wealth records

Wealth taxed in developed countries

→ wealth information

Similar issues as in 3 (tax base and reporting responses)

Self-reporting versus third-party reported assets.

Key facts

- Wealth is more unequally distributed than labor income.
- Wealth concentration seems to be particularly high in times of low growth (e.g. 18th and 19th century).
- Wealth inequality \uparrow in recent decades but magnitudes differ across countries.

What are the origins of wealth inequality?

1. Differences in self-made wealth?

- If yes, due to differences in:

b. labor earnings?

c. saving rates?

d. portfolio choice?

2. Differences in inherited wealth?

- Due to e.g. differences in self-made wealth in previous generations?

- Why relevant?

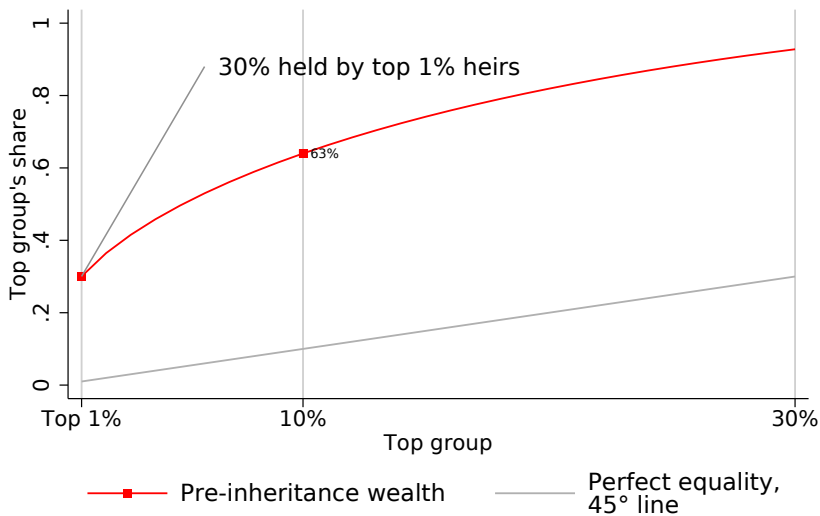
i. Matters for policy: use labor income or inheritance taxes to reduce wealth inequality?

ii. Attitudes towards inheritance taxes depend on the **source of inequality**.

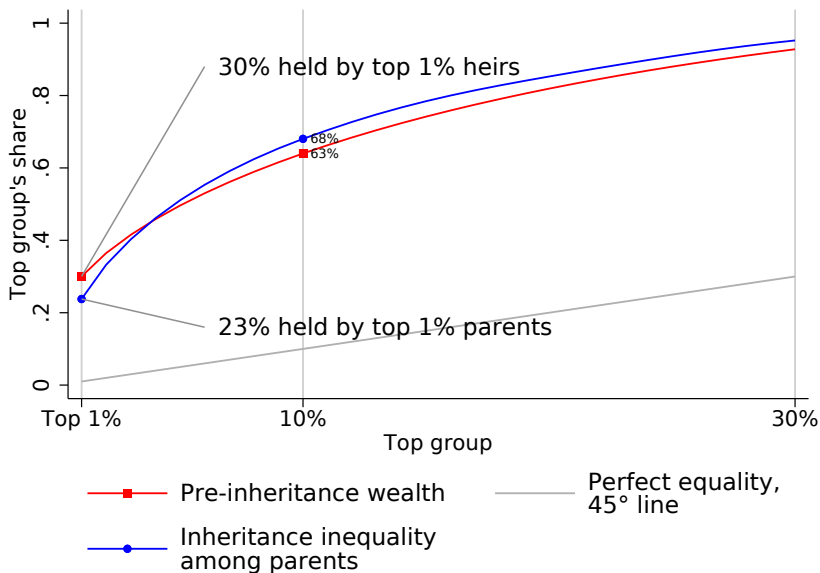
What are the origins of wealth inequality?

- Nekoei and Seim (2023, ReStud):
- How do inheritances shape wealth inequality?
- Both in the **short** and **long** run
- Start by short run.

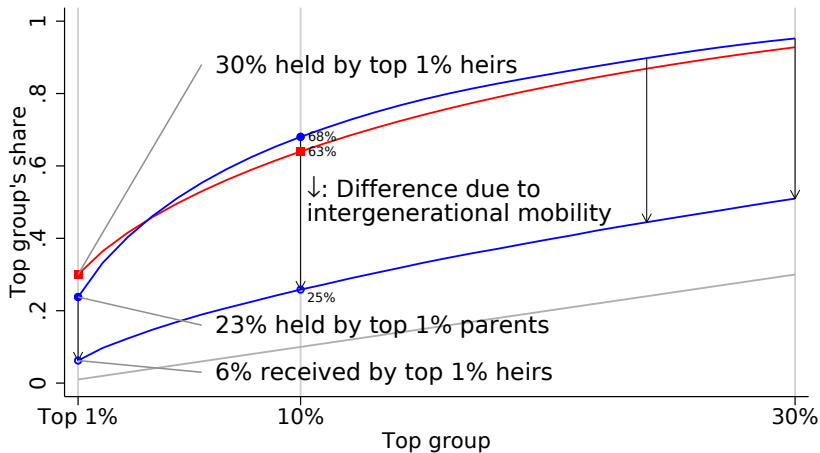
Top Groups' Shares



Top Groups' Shares

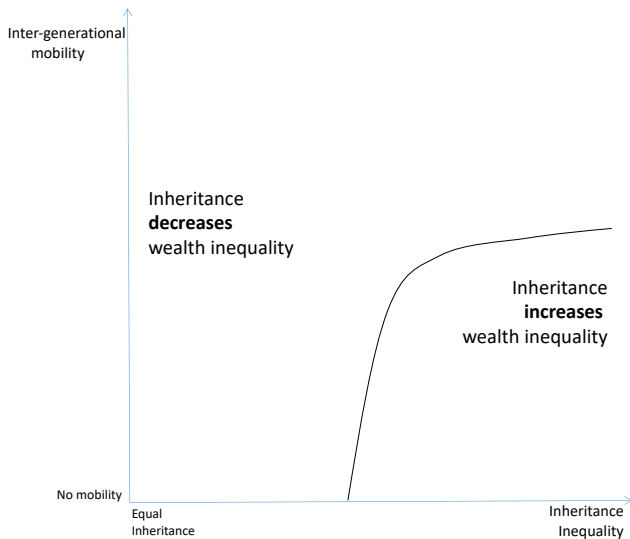


Top Groups' Shares

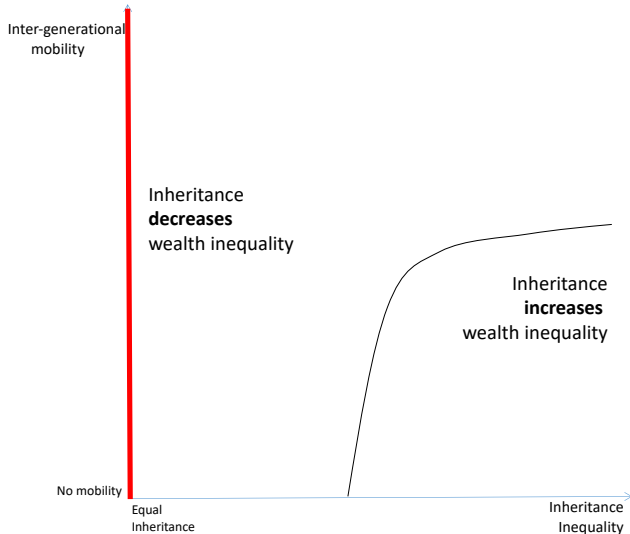


- Pre-inheritance wealth
- Inheritance inequality among parents
- Perfect equality, 45° line
- Inheritance inequality among heirs

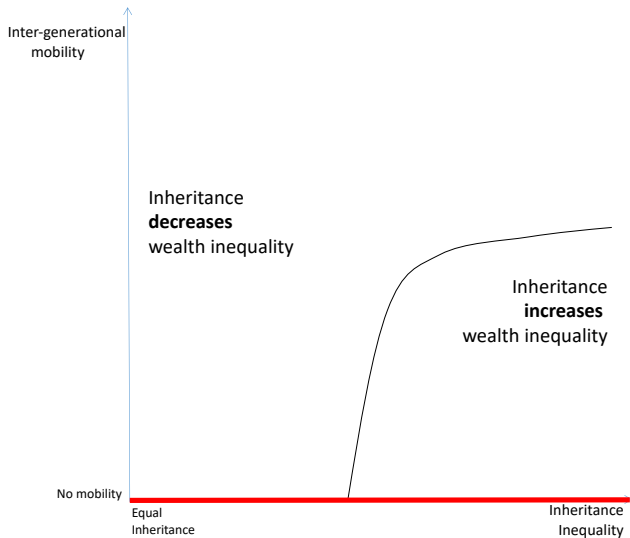
Theoretical Framework



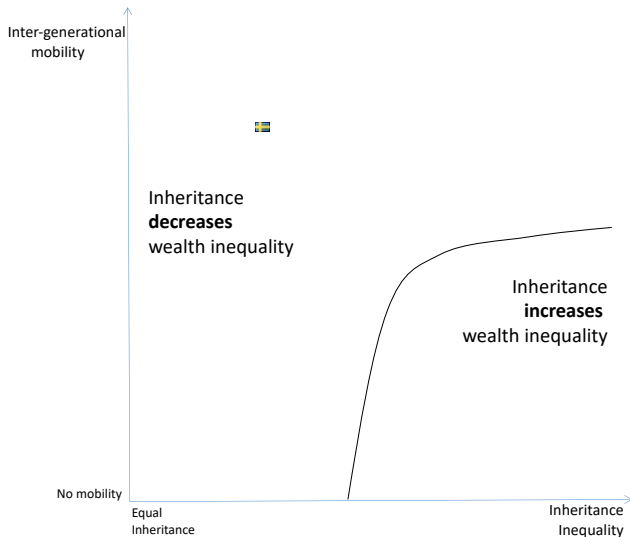
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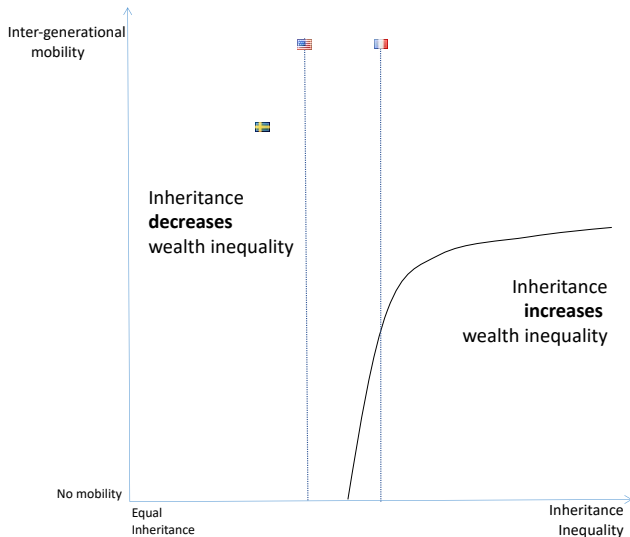
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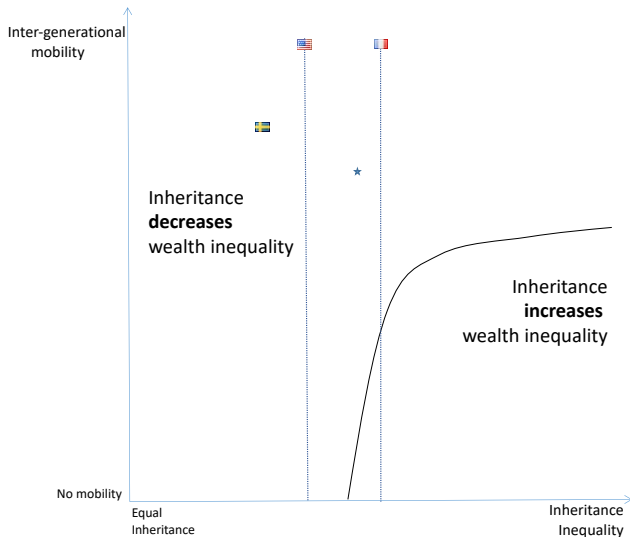
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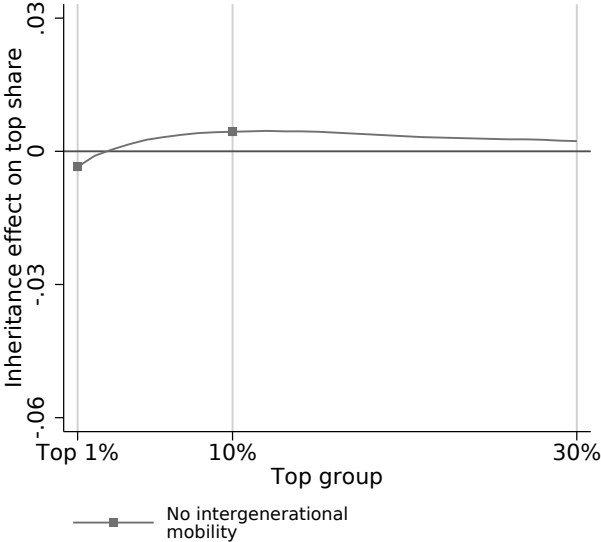
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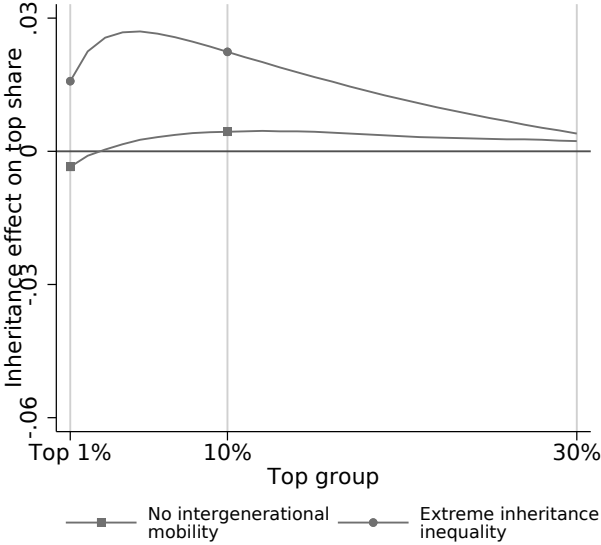
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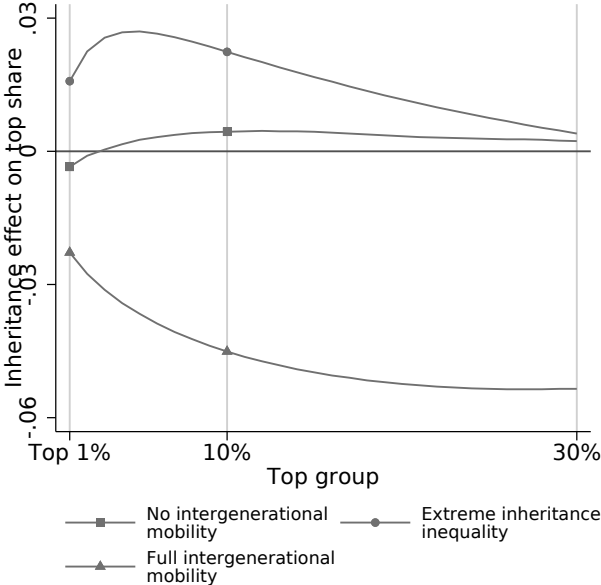
Effect of Inheritances on Wealth Shares



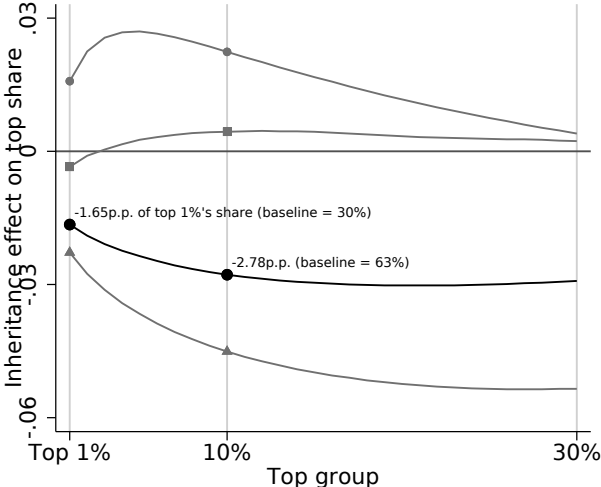
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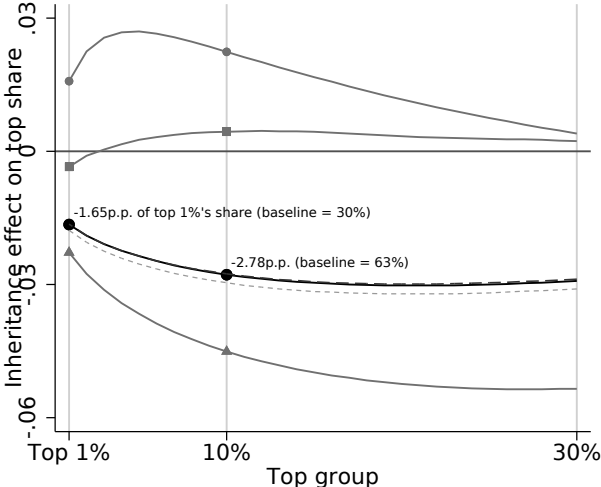


Effect of Inheritances on Wealth Shares



- No intergenerational mobility
- Extreme inheritance inequality
- Full intergenerational mobility
- Actual inheritance

Effect of Inheritances on Wealth Shares



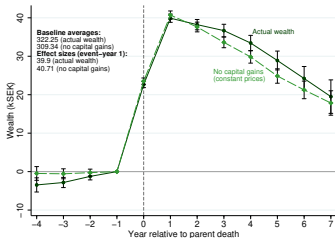
Inheritance role in shaping **long-run** wealth inequality

- Long-run inequality determined by
 - short-run effect
 - behavioral responses
 - growth rate of inherited wealthacross the wealth distribution.
- Do wealthier heirs
 - receive more inheritance?
 - spend their inheritance at different pace?
 - invest their inheritance better?

Heterogenous Depletion Rates

Heirs & Parents: Bottom 95%

Heirs: Bottom 95%; Parents: Top 5%

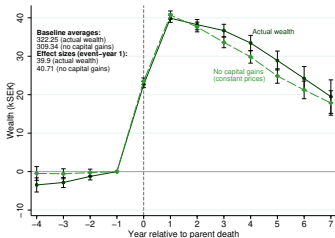


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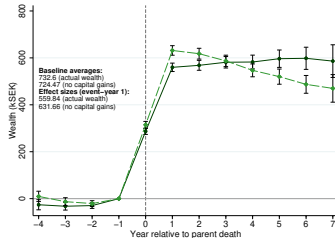
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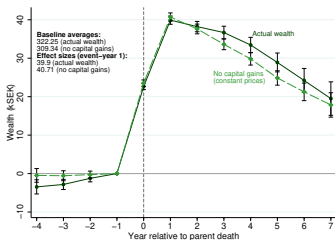


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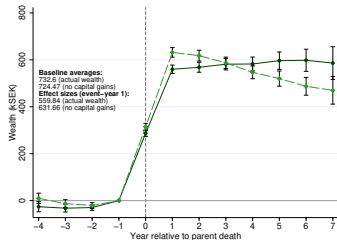
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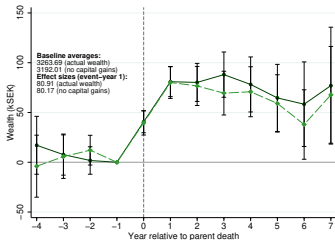
Heirs & Parents: Bottom 95%



Heirs: Bottom 95%; Parents: Top 5%



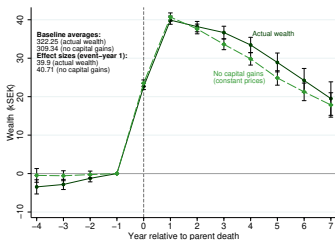
Heirs: Top 5%; Parents: Bottom 95%



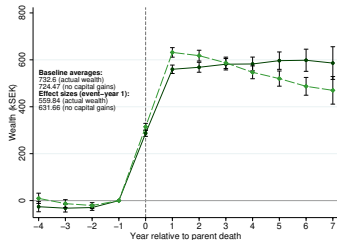
Heirs & Parents: Top 5%

Heterogenous Depletion Rates

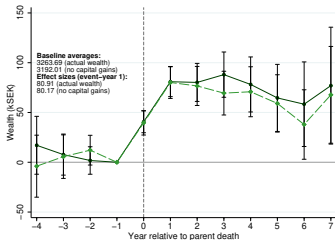
Heirs & Parents: Bottom 95%



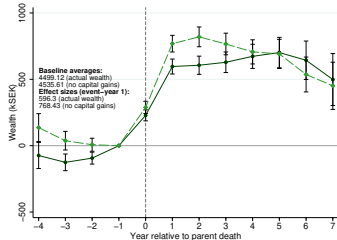
Heirs: Bottom 95%; Parents: Top 5%



Heirs: Top 5%; Parents: Bottom 95%



Heirs & Parents: Top 5%

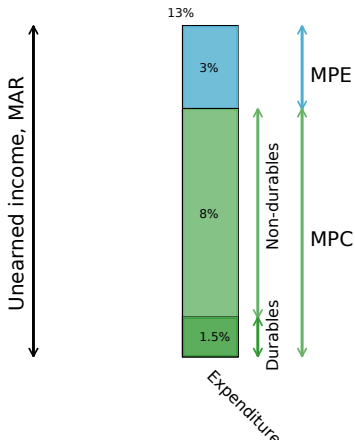


Heterogenous Responses and Returns to Inheritances

Heirs : B 95%
Parents : B 95%

Heirs: B 95%
Parents: Top 5%

Heirs: Top 5%
Parents: Top 5%

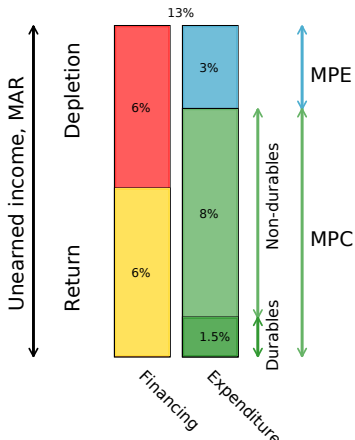


Heterogenous Responses and Returns to Inheritances

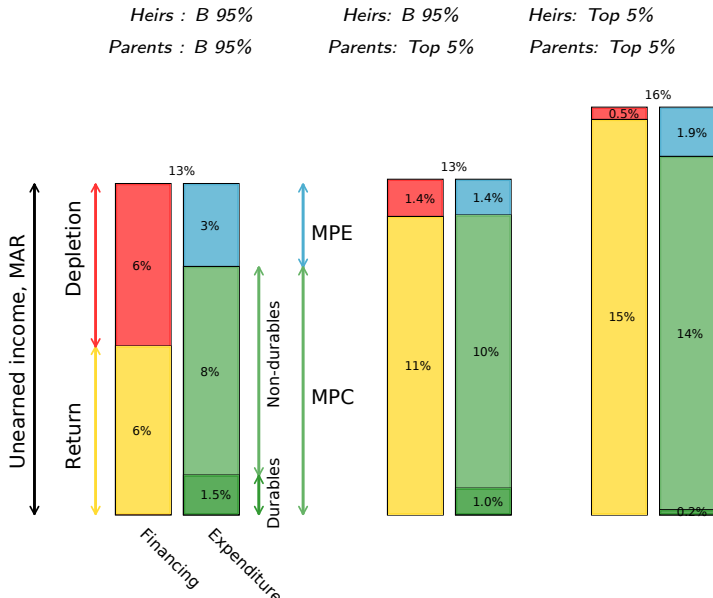
Heirs : B 95%
Parents : B 95%

Heirs: B 95%
Parents: Top 5%

Heirs: Top 5%
Parents: Top 5%

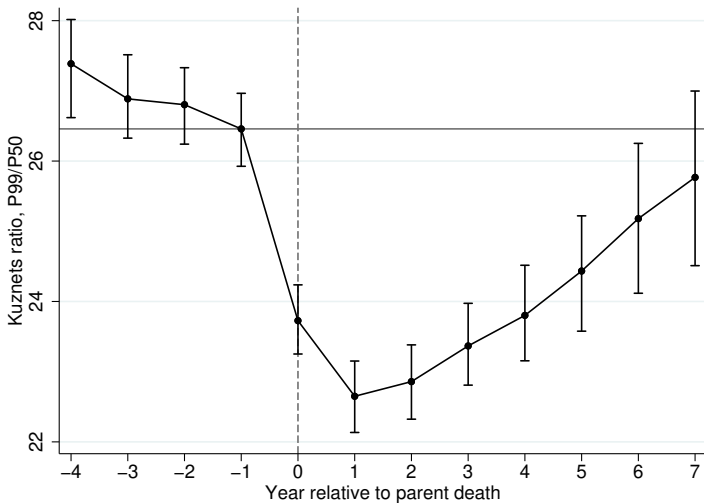


Heterogenous Responses and Returns to Inheritances

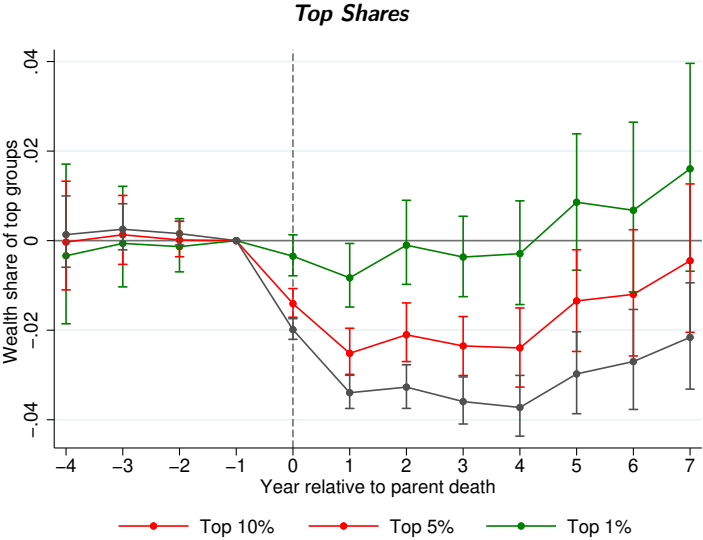


Long-run Effect of Inheritances on Wealth Inequality

Kuznets (Percentile) Ratios



Long-run Effect of Inheritances on Wealth Inequality



Alstadsaeter et al (2017)

Data on top income shares rely on administrative tax data on personal income.

Q: **How to treat business income?**

Tax incentives may influence

1. how they are reported,
2. measured top income shares.

Two ways to tax business income:

1. As **pass-through**.
⇒ *Accrual*-based measurement.
2. First: **firm profits**, then: **dividends/capital gains**.
⇒ *Realization*-based measurement.

In Norway, observe shareholders \Rightarrow distribute **non-reported** corporate income to individuals.

Setting:

Tax on all (both individual and corporate) income: 28 %.
Progressive surtax on individual wage income.

Prior to 2006, **dividends tax exempt**.

Shareholder income tax, **announced** in 2004 and **introduced** in 2006, taxes both dividends and capital gains.

- **Goal:** Haig-Simons income = Consumption + change in consumption opportunities.

Allocate **direct** and **indirect** ownership using the shareholder register:

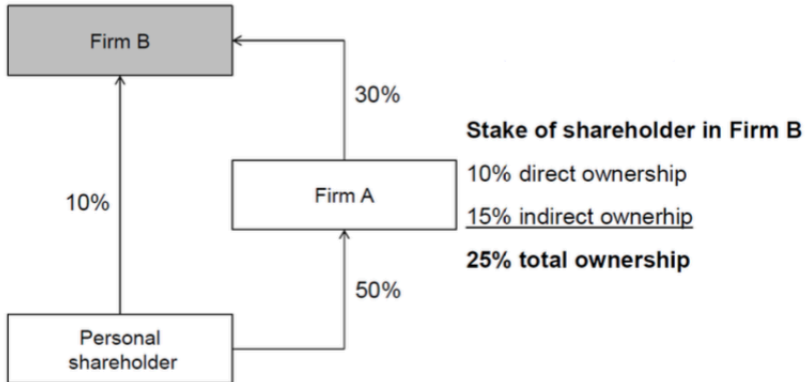
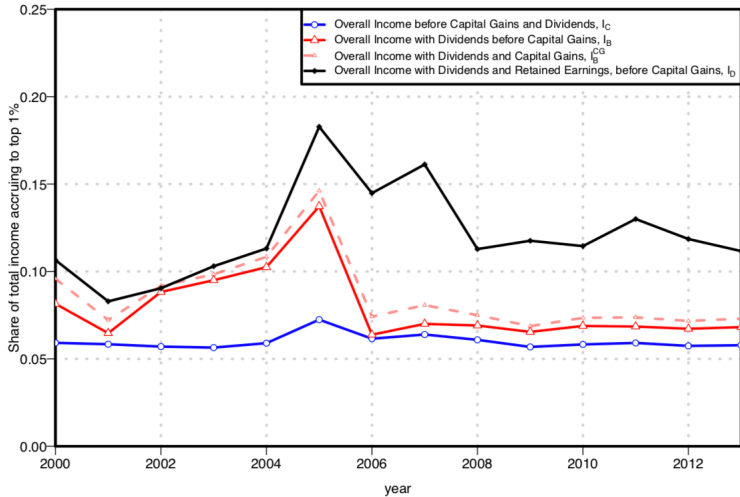


Figure 1: Top 1% in Norway using different approach to measuring income



Source: Alstadsaeter et al. (2017).

Mobility

Concepts:

- **Intra-generational** mobility
- **Inter-generational** mobility
- **Causal effects** on mobility
- With mobility, I typically mean **earnings mobility**.

Goal Nr 1: Mobility Within Generations

(i) **Intragenerational** variability in earnings \Rightarrow

- Life-time inequality **lower** than annual earnings inequality.
- If individuals are **not** cash-constrained, life-time inequality better measure of welfare inequality.
- If individuals are cash-constrained, variability **reduces** welfare.
- **Key Q:** Is the increase in inequality over time offset by increased earnings mobility?
 - Plausible, as bonuses and performance pay may have increased annual variability.
 - Would imply that rise in inequality is not that concerning.

Goal Nr 2: Mobility Over Generations

(ii) **Intergenerational** variability in earnings \Rightarrow

- Perceived as positive (Roemer and Trannoy, 2016).
- Since Rawls, social justice accomplished by equalizing **opportunities**, not **outcomes** (see e.g. Hurley, 2003).

R.H. Tawney (1931): Equality of opportunity *"obtains in so far as, and only in so far as, each member of a community, whatever his birth, or occupation, or social position, possesses in fact, and not merely in form, equal chances of using to the full his natural endowments of physique, of character, and of intelligence."*

- Goal: "Leveling the playing field"; "Starting-gate equality".
- Tension: Inequality of opportunity is usually measured as **inequality of outcomes**.

Mobility Concepts

- **What is mobility?**

“... the mobility literature does not provide a unified discourse of analysis. This might be because the very notion of income mobility is not well-defined; different studies concentrate on different aspects of this multi-faceted concept. At any rate, it seems safe to say that a considerable degree of confusion confronts a newcomer to the field” (Fields and Ok, 1999, p. 557).

- How to convert a bivariate income distribution $Y = (Y_1, Y_2)$ with joint density $f(y_1, y_2)$ to a **measure of mobility**?

Examples:

- Consider the following transformations:

i. $x \equiv (1, 3) \rightarrow (1, 3)$

ii. $x \equiv (1, 3) \rightarrow (3, 1)$

iii. $x \equiv (1, 3) \rightarrow (2, 2)$

- Which of these distributional transformations exhibit more mobility?

- Process i. seems to have **low** mobility:

1. Incomes are the same.
2. **And** final outcome completely dependent on initial outcome.

- What about ii. and iii.?

1. Individuals move more in ii. than iii.
2. Final outcome **not** dependent on initial outcome in iii.

- **Origin independence** maybe more relevant for **intergenerational** mobility?

Relative versus Absolute Mobility

- Consider the following transformations:

i. $x \equiv (1, 3) \rightarrow (1, 3)$

ii. $x \equiv (1, 3) \rightarrow (2, 6)$

- Which of these distributional transformations exhibit more mobility?

- If you believe ii. has more mobility than i., you are **not** a relativist.

1. Mobility measure f is relative if $f(\lambda x, \lambda y) = f(x, y)$.

- Some propose **axiomatic approach** to arrive at measures (see e.g. Fields and Ok, 1999)

- Others take pragmatic approach.

Intergenerational mobility

Inequality in itself not necessarily viewed as *bad*. The **causes** of inequality is what matters.

Key determinant of preferences for redistribution: **perception of the sources of economic success** (Fong, 2001).

⇒ How level is the intergenerational playing field?

Becker and Tomes (1979) ran:

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

where y_t denotes log-earnings of generation t ,

β : Intergenerational **elasticity**,

$1 - \beta$: Intergenerational **mobility**.

- $\hat{\beta} = 0.15 \Rightarrow \hat{\beta}^2 = 0.02$, or:

“Almost all the earnings advantages and disadvantages of ancestors are wiped out in three generations.” Gary Becker and Nigel Tomes (1986).

Why so low estimate?

1. Classical measurement error \Rightarrow attenuation bias.

Measure y_{t-1} using parent income at age a , $y_{t-1,a}$.

Assume **decomposition** of $y_{t-1,a}$:

$$y_{t-1,a} = \underbrace{y_{t-1}}_{\text{Permanent income}} + \underbrace{\nu_a}_{\text{Transitory income}}$$

Then:

$$p \lim \hat{\beta} = \frac{\text{var}(y_0)}{\text{var}(y_0) + \text{var}(\nu)} \beta.$$

Averaging $y_{t-1,a}$ over T years:

$$p \lim \hat{\beta} = \frac{\text{var}(y_0)}{\text{var}(y_0) + \text{var}(\nu)/T} \beta.$$

Mazumder (2005) allows for ν to follow an AR(1) process.

Using 1984 SIPP data matched to SSAs earnings records (SER), he finds that the IGE **increases** from **0.25** when $T = 2$ to **0.45** when $T = 7$ and to **0.61** when $T = 16$.

Why so low estimate?

2. Age of parents and sons.

Suppose earnings of parents and sons at age a are:

$$y_{t-1,a} = \mu_a y_{t-1} + \nu$$

$$y_{t,a} = \lambda_a y_t + u.$$

Assume that the error terms are uncorrelated with each other and with life-time earnings:

$$\begin{aligned} p \lim \hat{\beta} &= \lambda_a \frac{\mu_a \text{var}(y_{t-1})}{\underbrace{\mu_a^2 \text{var}(y_{t-1}) + \text{var}(\nu)}_{\equiv \theta_a}} \beta \\ &= \lambda_a \theta_a \beta \end{aligned}$$

Haider and Solon (2006): λ_a around 0.2 in early ages (20s), highest around ages 30-40. Similar pattern of θ_a estimates.

They never reach 1 suggesting important attenuation biases.

Chetty, Hendren, Kline and Saez (2014)

Is the United States a **Land of Opportunity**?

I.e., is a person's chance of success independent of family background?

Cannot measure **chances/opportunities**, therefore use outcomes.

Problematic as children of wealthy parents may choose not to work.
⇒ Reduces persistence in earnings (despite underlying opportunities remain persistent)

Start from the bivariate distribution of parent and children's income.

Relative mobility: How much better are children of rich parents doing relative to those of poor? Example: Rank-rank slope.

- Relative mobility \uparrow may be driven by **worse** outcomes for children of rich parents.

Absolute mobility: What is the average outcome of children growing up to poor parents?

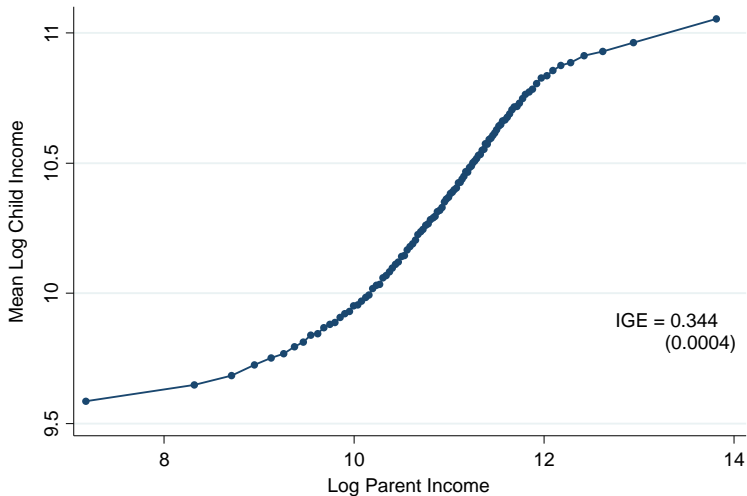
Absolute mobility \uparrow unambiguously increase welfare, measured by Pareto-principle.

1. What is the mean rank of children whose parents are at the 25th percentile?
2. What is the probability of a child from the bottom quintile to reach the top quintile?
3. What is the probability of a child has income above the poverty line, conditional on having a parent in the 25th percentile?
4. What is the likelihood that a child earns more than her parents?

Data and Sample

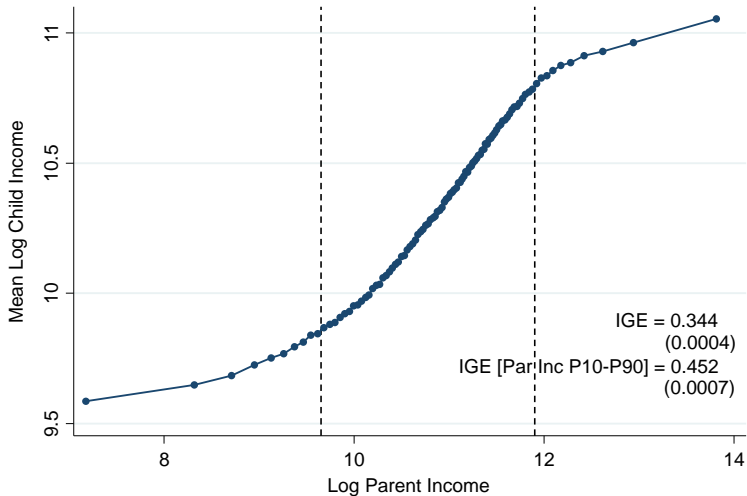
- Baseline population: Children born 1980-1982 (income is measured in 2011-2012).
- Parents are identified as claiming the child as dependent.
- Income concept: Labor income + Capital income + UI + Social security + DI
- Average over a few years, aggregated to household-level.
- IRS data observed from 1996.
 - Parents' income measured in 1996-2000.
- Issues:
 - Not all children are claimed.
 - Early childhood circumstances relevant (c.f. James Heckman) – data limits them to look at parents' income when child is young.
 - Illegal income not observed.

Mean Log Child Income vs. Log Parent Income (Excluding 0's)



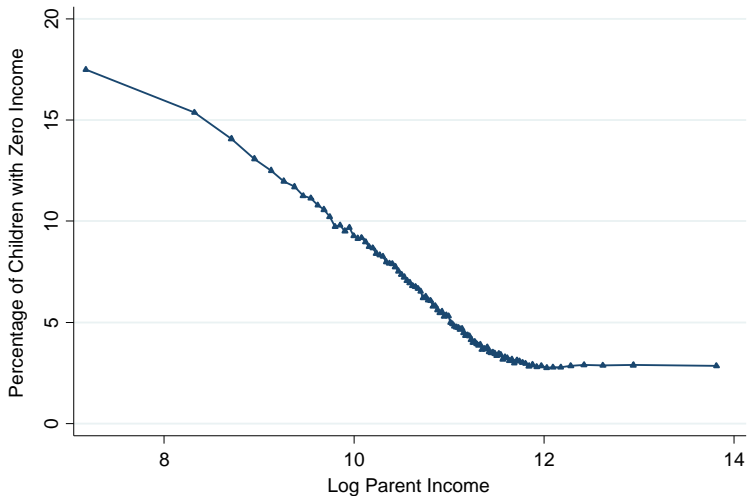
Source: Chetty, Hendren, Kline and Saez (2014)

Mean Log Child Income vs. Log Parent Income (Excluding 0's)



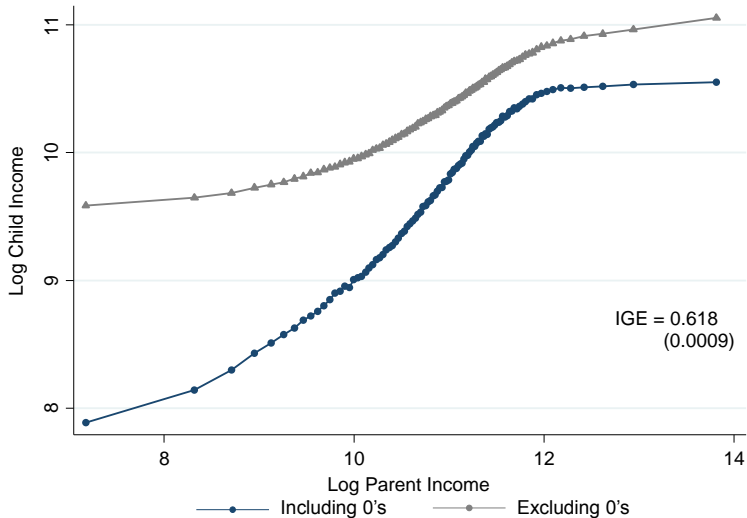
Source: Chetty, Hendren, Kline and Saez (2014)

Fraction of Children with Zero Income vs. Log Parent Income



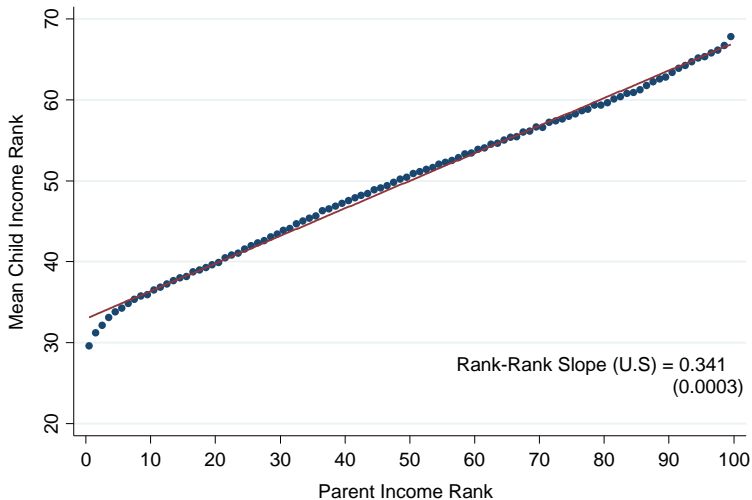
Source: Chetty, Hendren, Kline and Saez (2014)

Mean Log Child Income vs. Log Parent Income
Income of Non-Working Children Coded as \$1

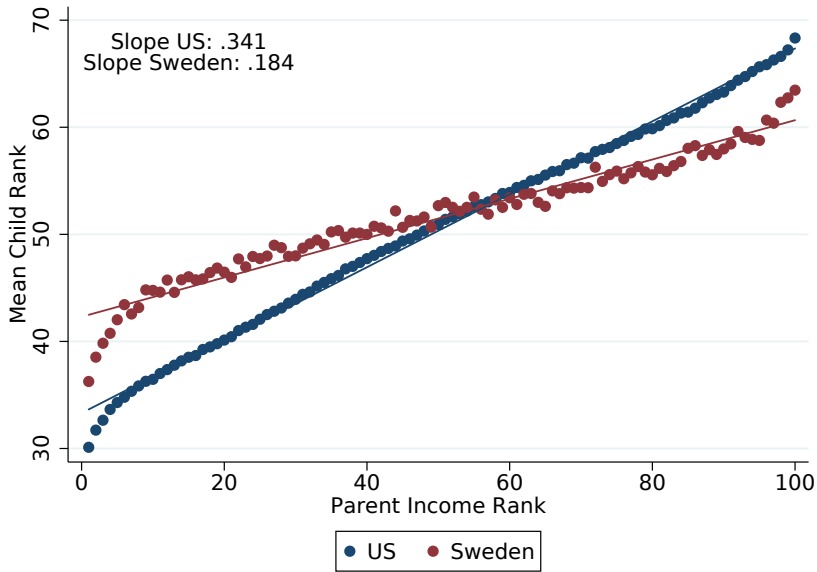


Source: Chetty, Hendren, Kline and Saez (2014)

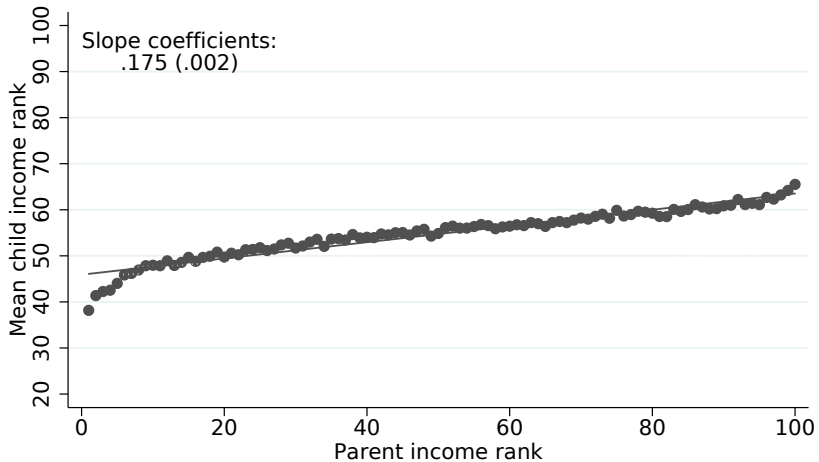
Mean Child Percentile Rank vs. Parent Percentile Rank



Source: Chetty, Hendren, Kline and Saez (2014)

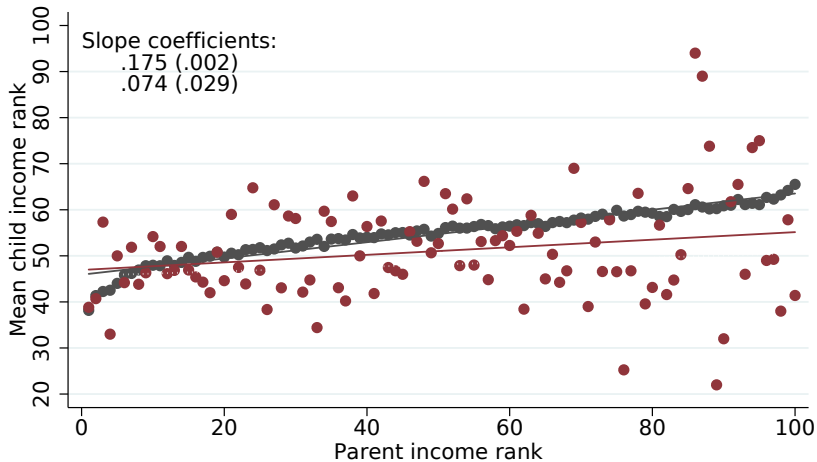


Source: Own calculations and Chetty, Hendren, Kline and Saez (2014).



- Children living with their biological parent
- Adopted child, biological parent
- Adopted child, adoptive parent

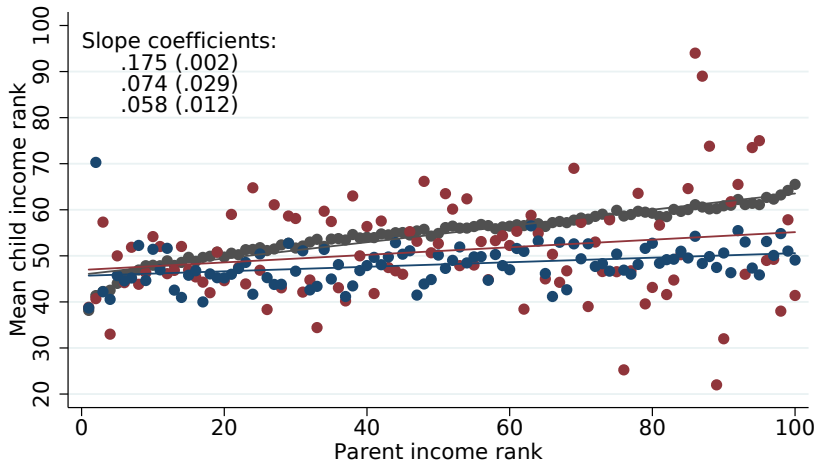
Source: Own calculations.



Slope coefficients:
.175 (.002)
.074 (.029)

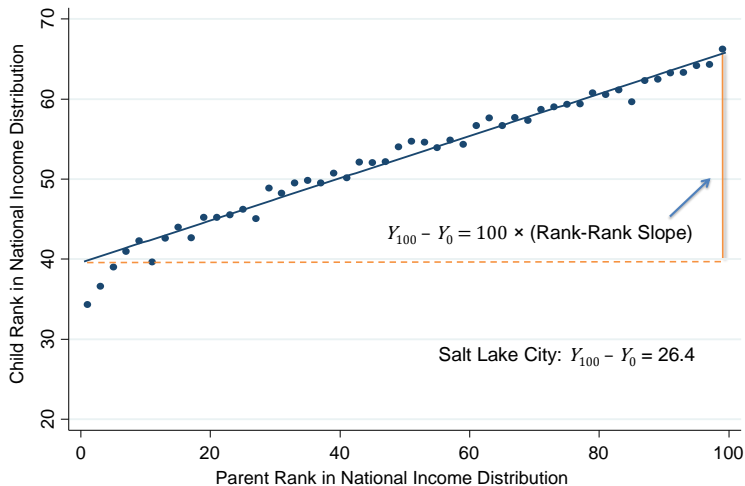
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Source: Own calculations.



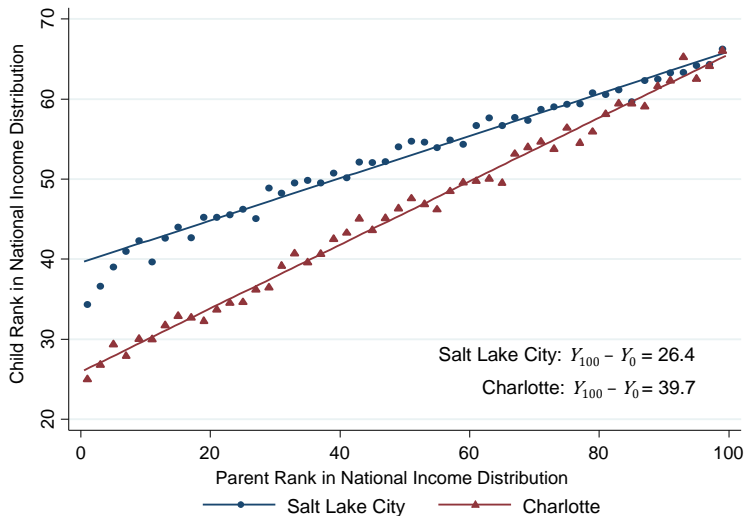
Source: Own calculations.

Intergenerational Mobility in Salt Lake City



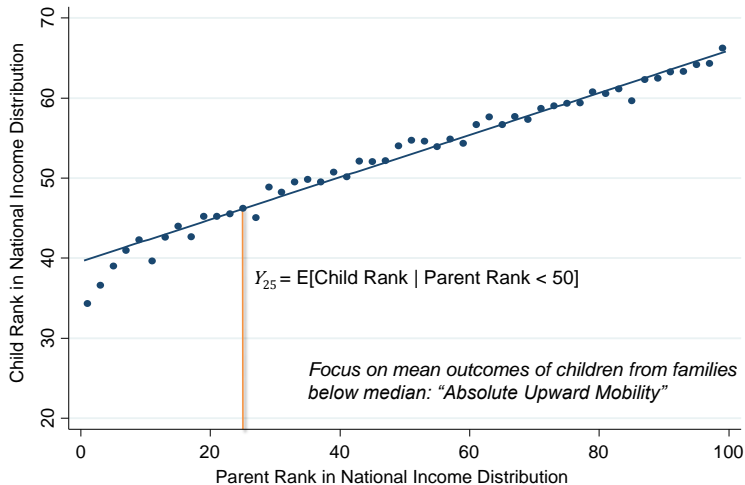
Source: Chetty, Hendren, Kline and Saez (2014)

Intergenerational Mobility in Salt Lake City vs. Charlotte



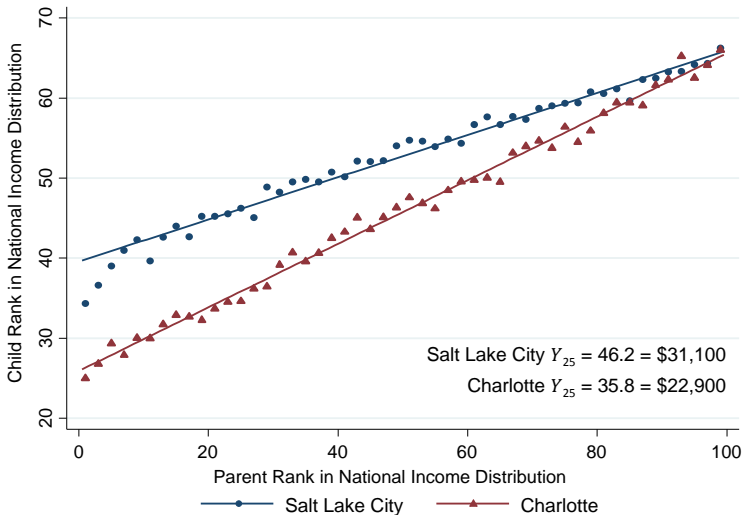
Source: Chetty, Hendren, Kline and Saez (2014)

Intergenerational Mobility in Salt Lake City



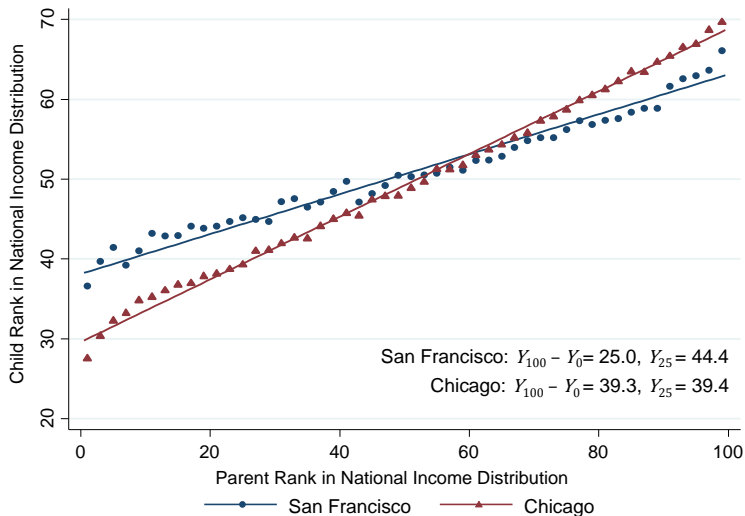
Source: Chetty, Hendren, Kline and Saez (2014)

Intergenerational Mobility in Salt Lake City vs. Charlotte



Source: Chetty, Hendren, Kline and Saez (2014)

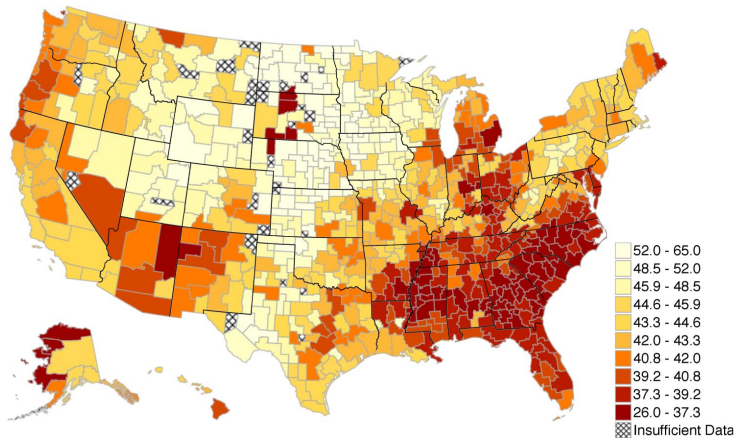
Intergenerational Mobility in San Francisco vs. Chicago



Source: Chetty, Hendren, Kline and Saez (2014)

The Geography of Upward Mobility in the United States

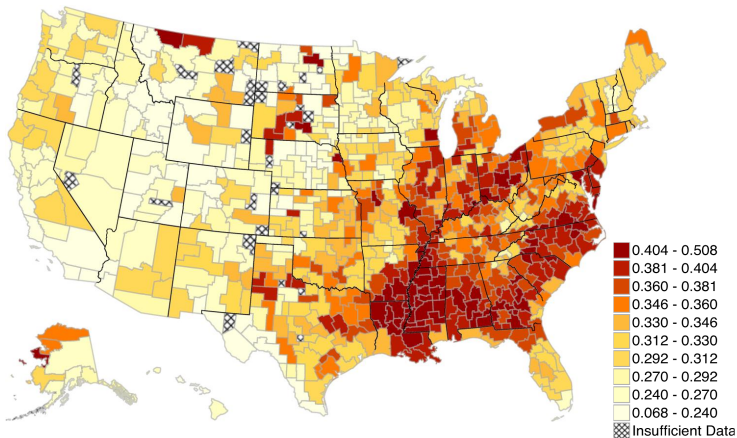
Mean Child Percentile Rank for Parents at 25th Percentile (Y_{25})



Note: Lighter Color = More Absolute Upward Mobility

Source: Chetty, Hendren, Kline and Saez (2014)

Relative Mobility Across Areas in the U.S.
Rank-Rank Slopes ($Y_{100} - Y_0$) by Commuting Zone



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

Source: Chetty, Hendren, Kline and Saez (2014)

Absolute Mobility

Chetty, Grusky, Hell, Hendren, Manduca and Narang, 2017, *Science*:

- **American Dream:** Acquiring higher standard of living than parents.

Hard to study its evolution without large panel datasets with intergenerational links.

- **Solution:**

- (i) Obtain income distributions of children and parents from CPS and Census.
- (ii) Get the joint rank-rank distribution of parents and childrens.
How? Two strategies:
 - (i) Assume joint distribution of parent and child ranks (copula) is stable.
 - (ii) Bound absolute mobility estimates under alternative copulas.

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- (ii) Bound absolute mobility estimates under alternative copulas.

Approach

- **Goal:** Estimate A across cohorts c .

$$A_c = \frac{1}{N_C} \sum_i \mathbf{I}\{y_{ic}^k > y_{ic}^p\}$$

Inputs:

Children's marginal income distribution, $Q_c^k(r^k)$.

Parents' marginal income distribution, $Q_c^p(r^p)$.

Copula: $C_c(r^k, r^p)$.

Then absolute mobility is:

$$A_c = \int \mathbf{I}\{Q_c^k(r^k) > Q_c^p(r^p)\} C_c(r^k, r^p) dr^k dr^p$$

- Assume $C_c(r^k, r^p) = C(r^k, r^p)$ **constant**.

Approach

- **Goal:** Estimate A across cohorts c .

$$A_c = \frac{1}{N_C} \sum_i \mathbb{I}\{y_{ic}^k > y_{ic}^p\}$$

Inputs:

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Parents' marginal income distribution, $Q_c^p(r^p)$.

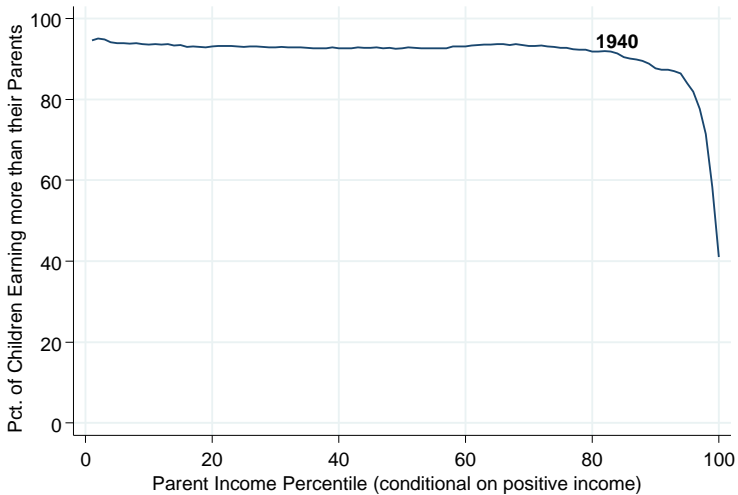
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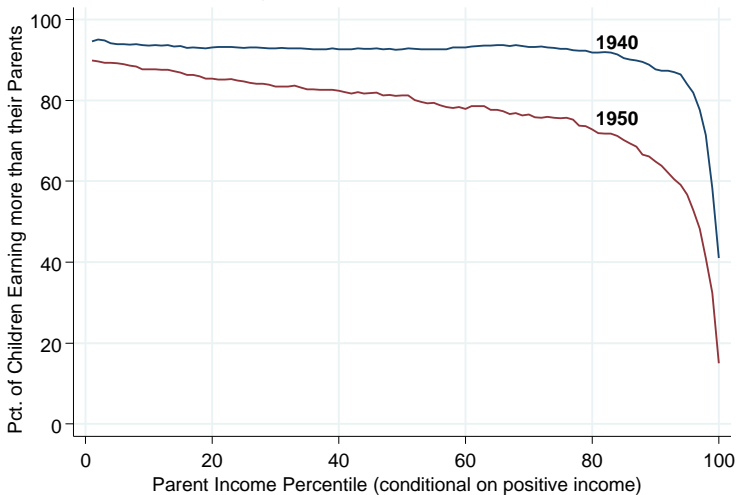
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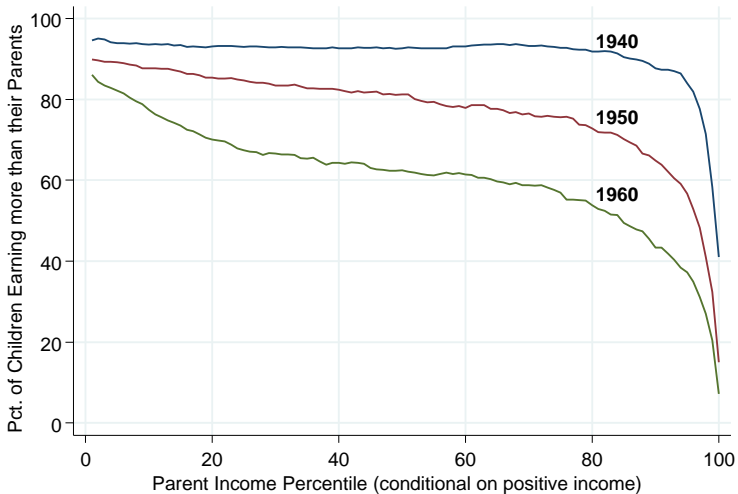
Percent of Children Earning More than their Parents
By Parent Income Percentile



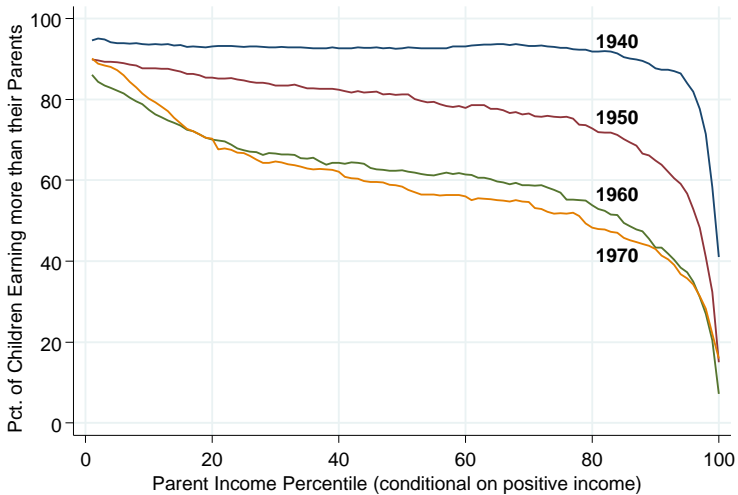
Percent of Children Earning More than their Parents
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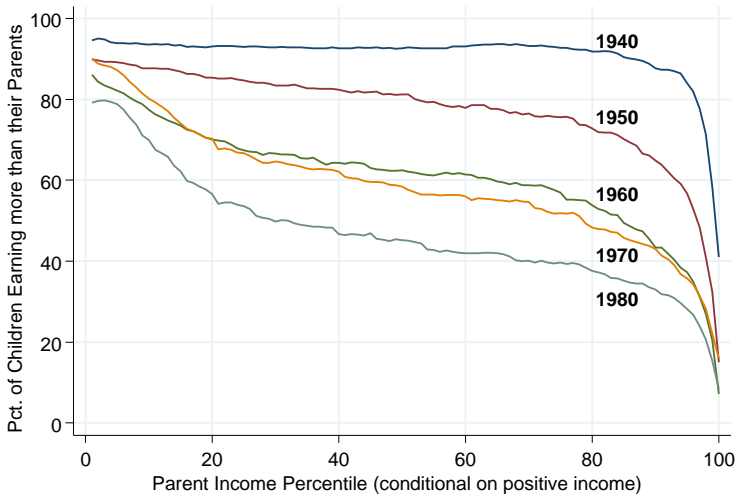
Percent of Children Earning More than their Parents
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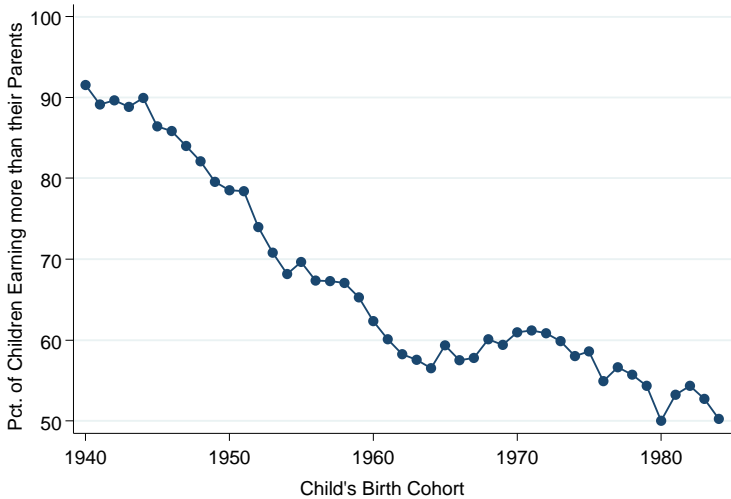
Percent of Children Earning More than their Parents
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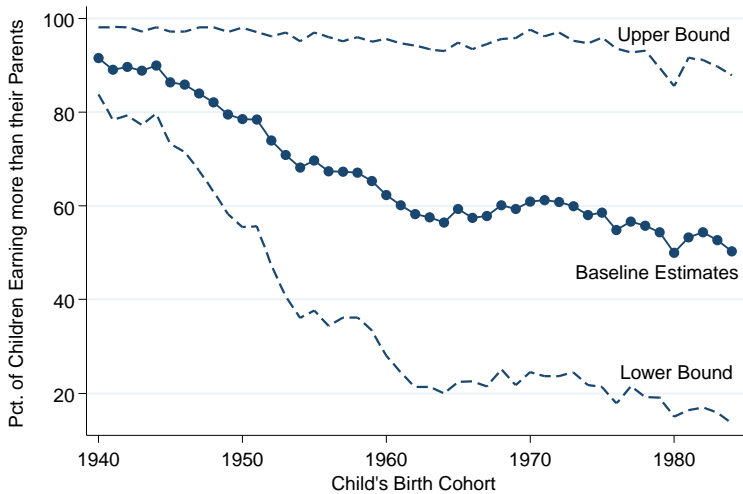
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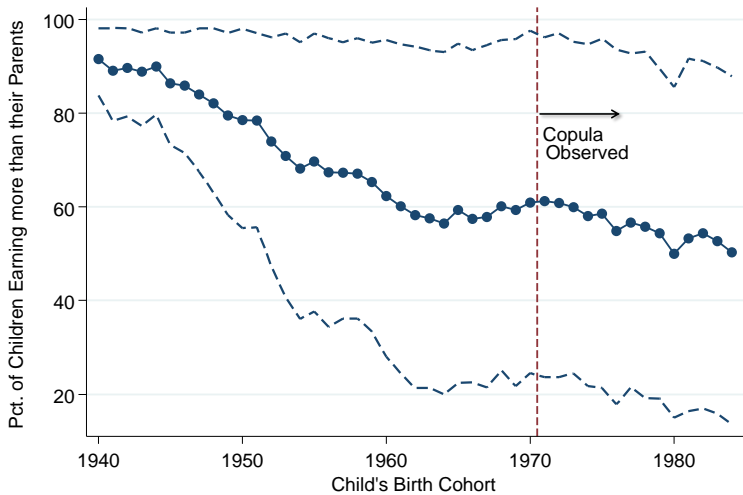
Mean Rates of Absolute Mobility by Cohort



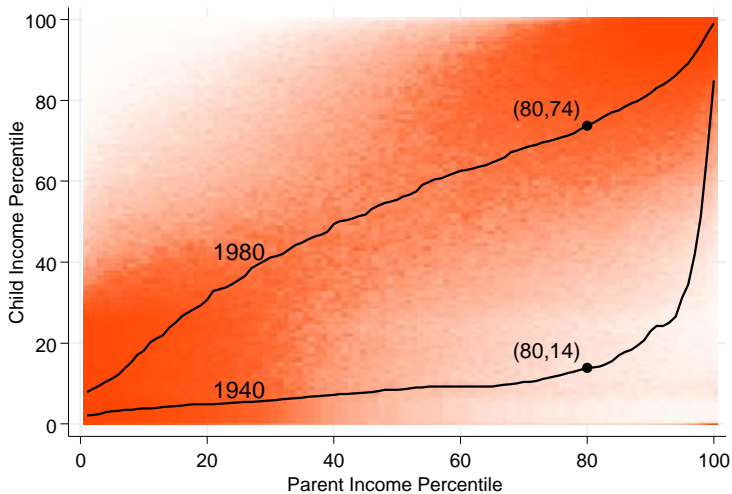
Bounds on Absolute Mobility Across All Copulas



Bounds on Absolute Mobility Across All Copulas



Child Rank Required to Earn More Than Parents with Copula for 1980 Cohort

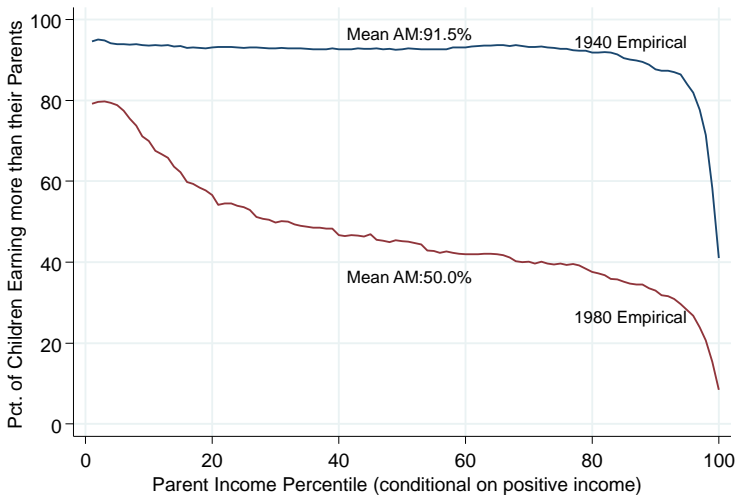


Note: Darker colors represent higher density in copula

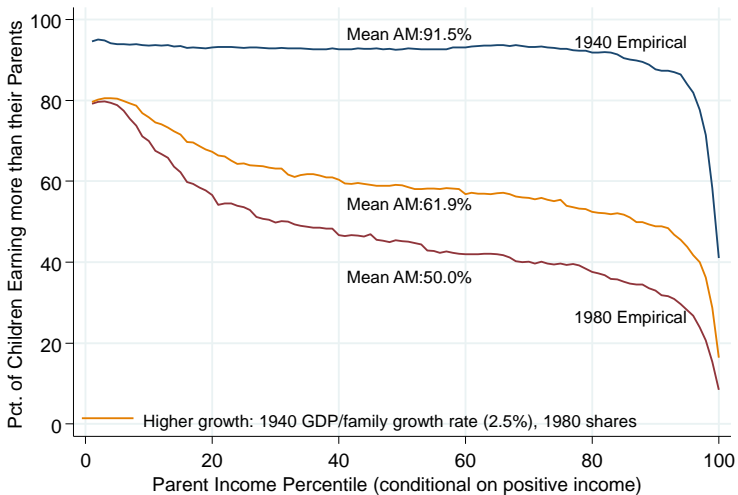
Counterfactual Scenarios

- 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

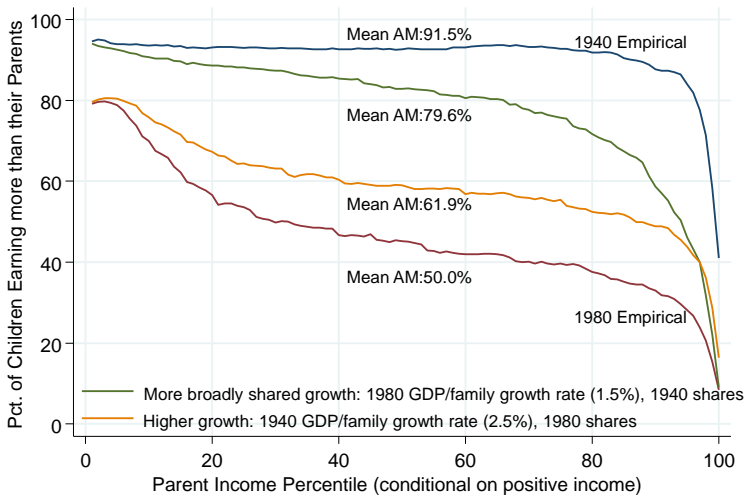
Counterfactual Rates of Absolute Mobility by Parent Income Percentile



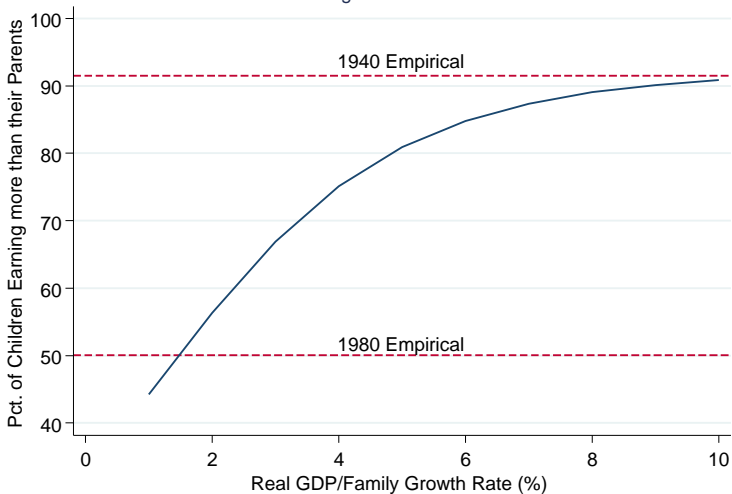
Counterfactual Rates of Absolute Mobility by Parent Income Percentile



Counterfactual Rates of Absolute Mobility by Parent Income Percentile



Absolute Mobility Under Counterfactual Growth Rates Growth Distributed According to GDP Shares for 1980 Cohort

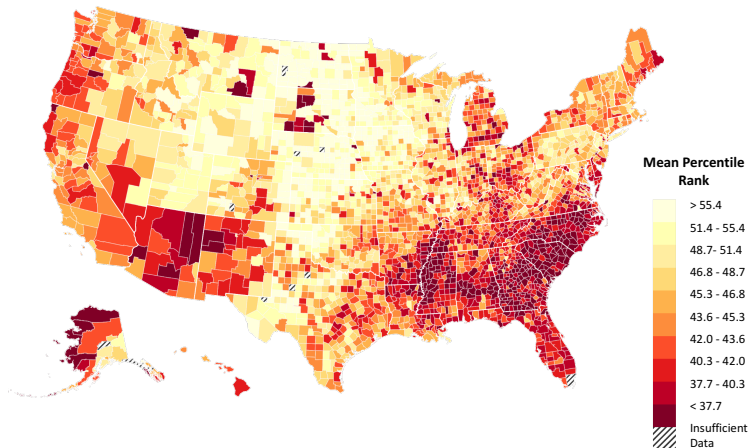


Chetty and Hendren (2018, QJE)

- How much of the variation is **causal** versus **selection**?
- Starting point:
 - (i) Substantial variation in outcomes across geographic areas.
 - (ii) Experimental evidence suggest no significant effects of moving to better areas on economic outcomes (e.g. Katz, Kling and Liebman, 2001).
- Do children who move to areas with more mobility do better?
- Replicate mobility maps for permanent residents of CZs.
 - = **parents** who stay in one and the same CZ during 1996-2012.

The Geography of Intergenerational Mobility in the United States

Predicted Income Rank at Age 30 for Children with Parents at 25th Percentile



What is the Average Causal Impact of Growing Up in place with Better Outcomes?

Source: Chetty and Hendren (2018).

- **Exposure effect:** Take everyone who moves.
- What is the effect of moving to a better neighborhood at age m instead of age $m + 1$?
- Model:

$$y_i = \alpha_m + \beta_m \bar{y}_{pds} + \varepsilon_i$$

where

y_i are adult earnings of individual i

\bar{y}_{pds} is percentile p outcomes of permanent residents at destination d CZ of cohort s .

- β_m measures the effect on adult earnings of spending year m and onwards in an area where permanent residents have one percentile better outcomes.
- Note that we do **not** impose functional form assumptions about the exposure effect.

$$\text{Exposure, } \gamma_m = \beta_m - \beta_{m+1}.$$

- If outcome y_i is measured at age T , $\beta_m = 0$ for $m > T$.
 - Moves occurring after outcome is measured have **no** causal effect on income.

How can we estimate β ?

1. **Randomization:** Assign children to new neighborhoods at age m .
2. **Observational analysis:** Selection effects.

$$\hat{\beta}_m = \beta_m + \delta_m$$

where δ_m captures that parents who move to good areas have better outcomes to begin with.

⇒ **Assume that selection is constant:**

$$\delta_m = \delta$$

Identify β_m 's off of parents who move at different ages.

Assume that the *timing* of the move is exogenous.

First assessment:

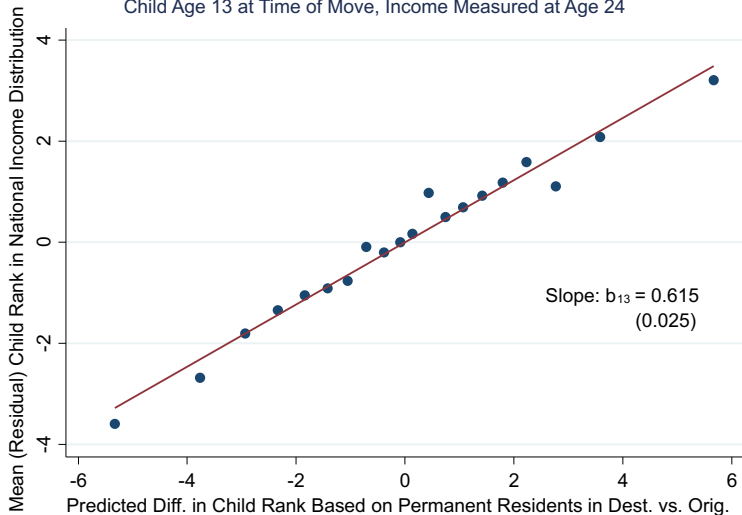
$$y_i = \alpha_{qos} + b_m \Delta_{odps} + \varepsilon_{1i}$$

where y_i is child's income rank at age 24; α_{qos} is a FE for origin CZ $o \times$ parental decile $q \times$ birth cohort s ,

and $\Delta_{odps} = \bar{y}_{pds} - \bar{y}_{pos}$ is the difference in predicted income rank in the destination versus origin for the relevant parental rank p and birth cohort s .

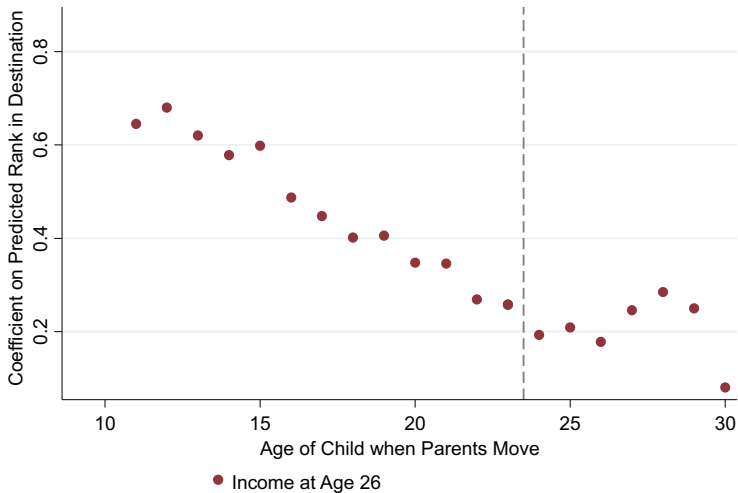
First, **nonparametric** evidence of (residualized) child rank (y_i) against (residualized) difference in mobility Δ_{odps} .

Movers' Outcomes vs. Predicted Outcomes Based on Residents in Destination
Child Age 13 at Time of Move, Income Measured at Age 24



Source: Chetty and Hendren (2018).

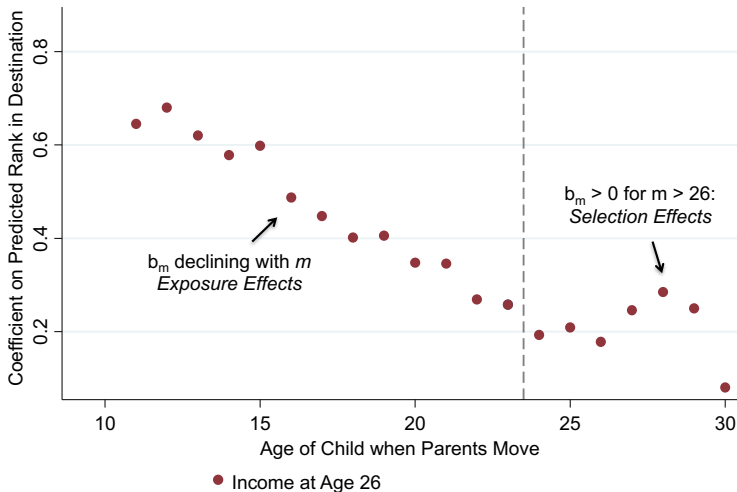
Movers' Outcomes vs. Predicted Outcomes Based on Residents in Destination By Child's Age at Move, Income Measured at Age 26



Source: Chetty and Hendren (2018).

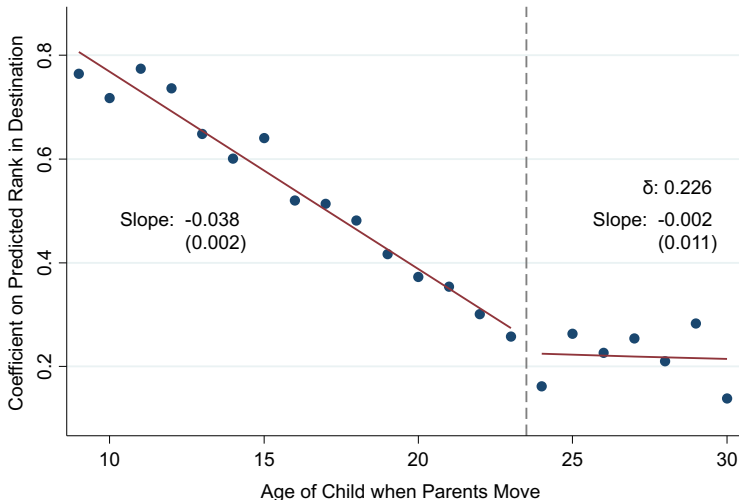
Movers' Outcomes vs. Predicted Outcomes Based on Residents in Destination

By Child's Age at Move, Income Measured at Age 26



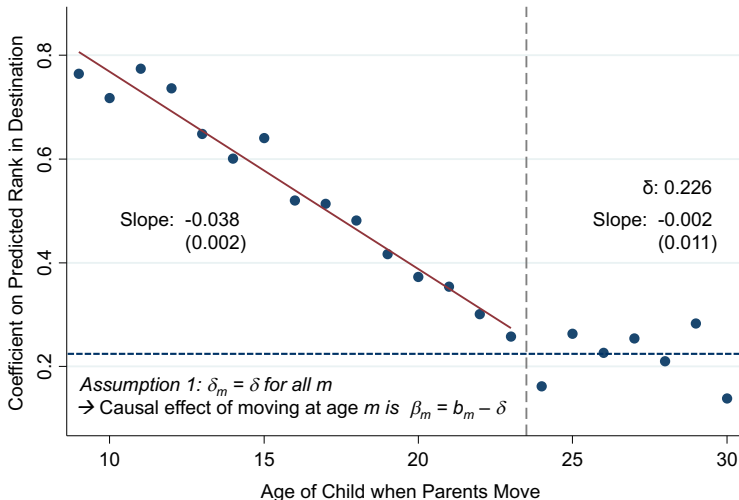
Source: Chetty and Hendren (2018).

Movers' Outcomes vs. Predicted Outcomes Based on Residents in Destination
By Child's Age at Move, Income Measured at Age = 24



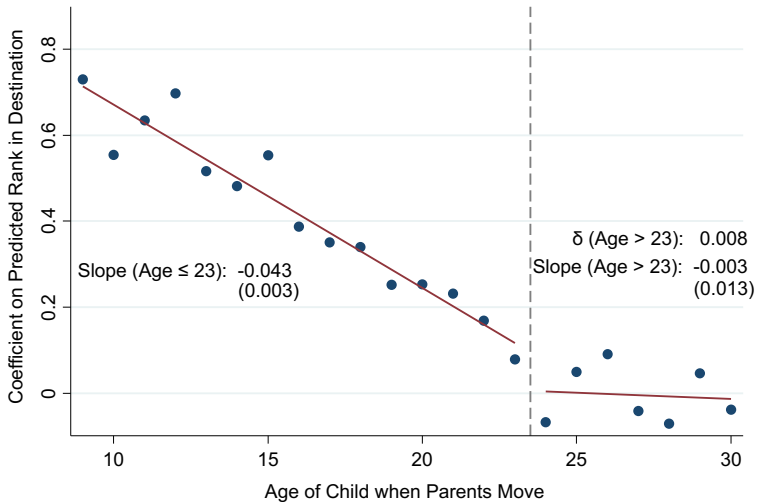
Source: Chetty and Hendren (2018).

Movers' Outcomes vs. Predicted Outcomes Based on Residents in Destination
By Child's Age at Move, Income Measured at Age = 24



Source: Chetty and Hendren (2018).

Family Fixed Effects: Sibling Comparisons



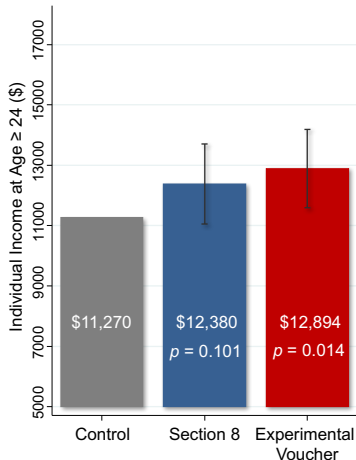
Source: Chetty and Hendren (2018).

Comparison with Moving to Opportunity (MTO)

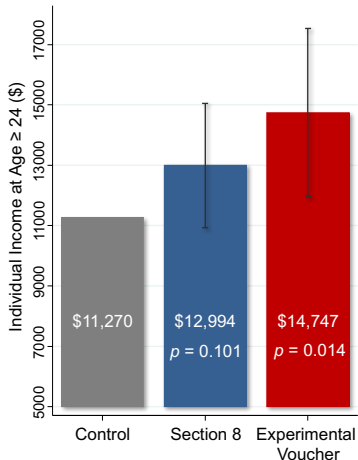
- 4,600 families randomly assigned to one of three groups in the mid-1990s:
 1. Experimental: Housing vouchers.
 - Restricted to moves to low-poverty tracts (poverty rate < 10%)
 2. Section 8 voucher: conventional housing vouchers.
 - No restrictions.
 3. Control: Public housing in high-poverty areas.
- Take-up of around 48% (for treatment arm 1).
- **Prior work:**
 - Large impact of moving to better area on mental health, subjective well-being.
 - Small impact on short-run earnings.
- Chetty, Hendren, Katz (AER, 2016): [Long-run effects](#).
- **Strong first stage:** Experiment induced moves to low-poverty areas.

Impacts of MTO on Children Below Age 13 at Random Assignment

(a) Individual Earnings (ITT)

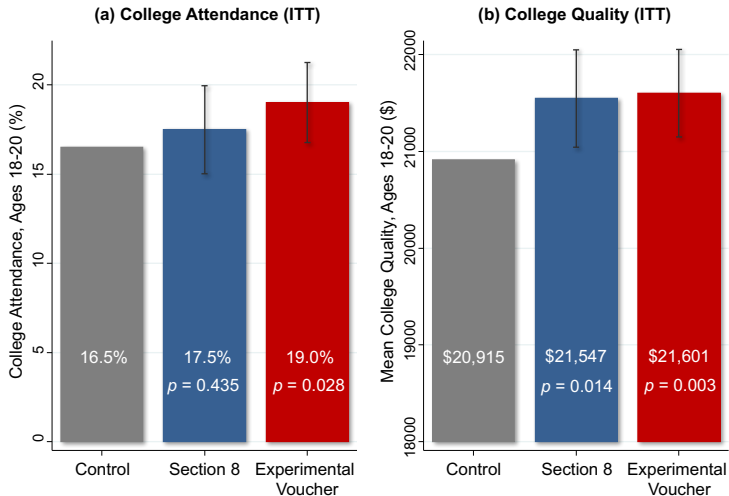


(b) Individual Earnings (TOT)



Source: Chetty, Hendren and Katz (2016).

Impacts of MTO on Children Below Age 13 at Random Assignment

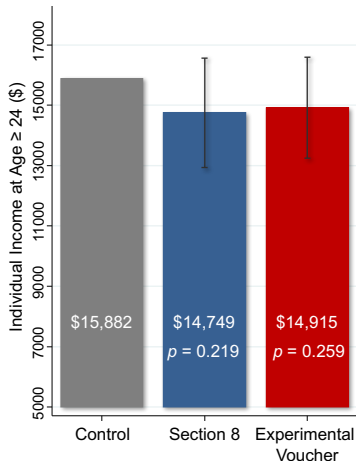


Source: Chetty, Hendren and Katz (2016).

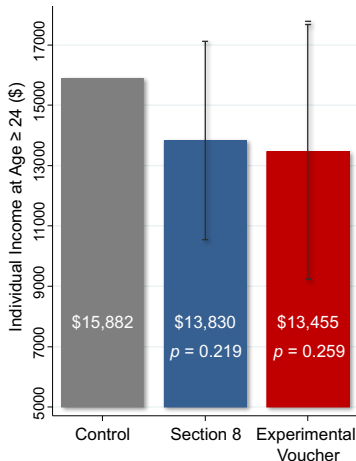
Very Different Outcomes for moves > 13 years of age

Impacts of MTO on Children Age 13-18 at Random Assignment

(a) Individual Earnings (ITT)



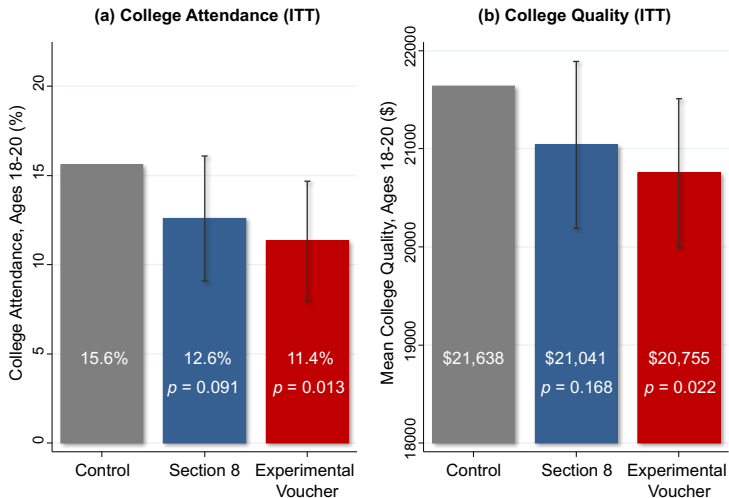
(b) Individual Earnings (TOT)



Source: Chetty, Hendren and Katz (2016).

Very Different Outcomes for moves > 13 years of age

Impacts of MTO on Children Age 13-18 at Random Assignment



Source: Chetty, Hendren and Katz (2016).

Key differences

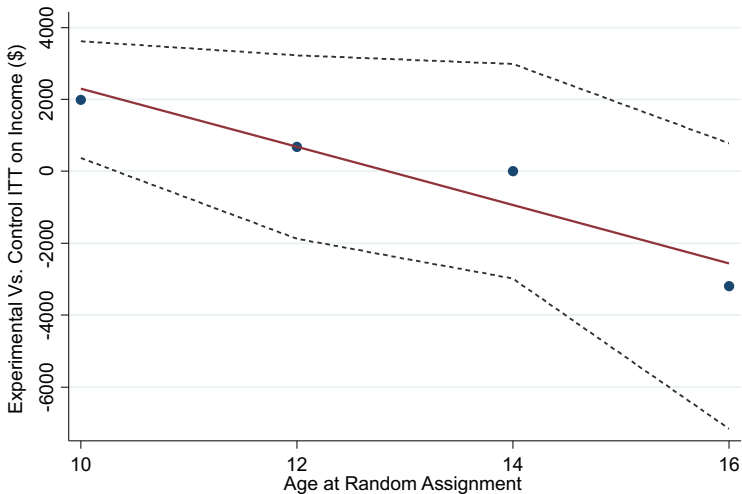
1. **Different populations:**

- MTO: moves created from vouchers.
- Quasi-experiment: moves that happen without interventions.
- Previous studies **on the MTO** were concerned with adult-movers.

2. **Different comparisons:**

- MTO: compare movers to non-movers (include disruption effect)
- Quasi-experiment: compare movers to better vs. worse areas *conditional* on moving.

Impacts of Experimental Voucher by Age of Random Assignment Household Income, Age ≥ 24 (\$)



Source: Chetty, Hendren and Katz (2016).

Open Questions

1. **Neighborhoods are like a black box.**

- What is in the locations that drive improved outcomes?
- **Reduced-form effect of** schools; peers; infrastructure; social capital.
- Hard to know how to improve areas without knowing more.

2. **Moving-experiments is a zero-sum game.**

- Cannot move everyone to the best neighborhoods.
- Invest in the place instead?

3. **Measure **opportunities / choice sets** rather than outcomes.**

- Hard, but important.