

Lecture 1: Introduction to Graduate Public Economics

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Our Goals for this class

- 1 Learn skills and methods (theory and empirical).
- 2 Create a culture of key papers and read widely.
- 3 Get you inspired and ready for your own research.

Class Logistics

- Meet once per week, 2.5-3 hours. Longer break halfway through.
- 3 problem sets.
- One referee report.
- One final exam.
- I post office hours 1-2 weeks in advance – sign up whether class or research related.
- Reading group.
- What I expect from you.

PUBLIC ECONOMICS DEFINITION

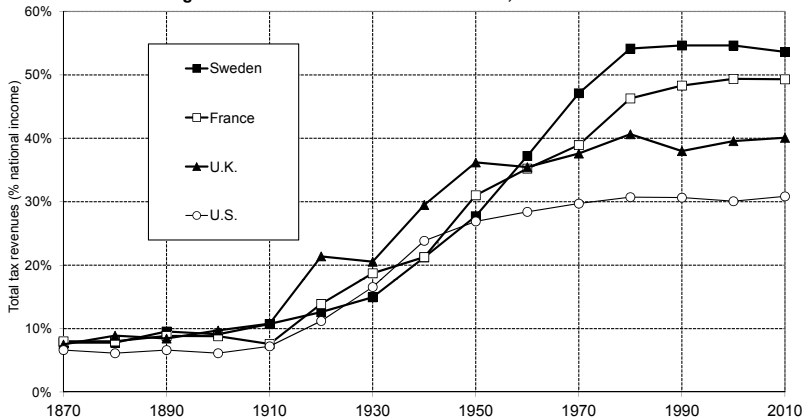
Acknowledgment: many slides are based on Emmanuel Saez' grad econ course at Berkeley.

Public economics = Study of the role of the government in the economy

Government is instrumental in most aspects of economic life:

- 1) Government in charge of huge regulatory structure
- 2) Taxes: governments in advanced economies collect 30-50% of National Income in taxes
- 3) Expenditures: tax revenue funds traditional **public goods** (infrastructure, public order and safety, defense), and **welfare state** (education, retirement benefits, health care, income support)
- 4) Macro-economic stabilization through central bank (interest rate, inflation control), fiscal stimulus, bailout policies

Figure 13.1. Tax revenues in rich countries, 1870-2010



Total tax revenues were less than 10% of national income in rich countries until 1900-1910; they represent between 30% and 55% of national income in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c.

Two General Rules for Government Intervention

- 1) Failure of 1st Welfare Theorem: Government intervention can help if there are market or individual failures. Markets first, government second. Why?
- 2) Fallacy of the 2nd Welfare Theorem: Distortionary Government intervention is required to reduce economic inequality

Role 1: 1st Welfare Theorem Failure

1st Welfare Theorem: If (1) no externalities, (2) perfect competition, (3) perfect information, (4) agents are rational, then private market equilibrium is Pareto efficient

Government intervention may be desirable if:

- 1) Externalities require government interventions (Pigouvian taxes/subsidies, public good provision)
- 2) Imperfect competition requires regulation (typically studied in Industrial Organization)
- 3) Imperfect or Asymmetric Information (e.g., adverse selection may call for mandatory insurance)
- 4) Agents are not rational (= **individual failures** analyzed in behavioral economics, field in huge expansion): e.g., myopic or hyperbolic agents may not save enough for retirement

1. Externalities

Markets may be incomplete (e.g., smoking, pollution).

Achieving the Coasian efficient solution requires a coordinating institution, such as a government.

Public goods (infrastructure, defense, education).

Important question: what public goods to provide, how to correct for externalities.

2. Imperfect competition

Role for government regulation when markets are not competitive.

We will see some of this when we study R&D policies and innovation.

Typically we leave this to IO, but we shouldn't!

3. Imperfect and asymmetric information

Adverse Selection in health insurance (reason for mandated coverage).

Capital markets and credit constraints (subsidies for education).

Intergenerational issues (future generations may not be valued appropriately in today's market).

4. Individual Failures

Behavioral issues, own-agency problems.

If agents do not optimize, may be best to intervene. E.g.: mandated retirement savings.

Paternalism?

Currently very active area of research, theoretically and empirically.

Individual Failures vs. Paternalism

In many situations, individuals may not or do not seem to act in their best interests [e.g., many individuals are not able to save for retirement]

Two Polar Views on such situations:

1) **Individual Failures [Behavioral Economics View]** Individual Failures exist: Self-control problems, Cognitive Limitations

2) **Paternalism [Libertarian Chicago View]** Individual failures do not exist and govt wants to impose on individuals its own preferences against individuals' will

Key way to distinguish those 2 views: Under Paternalism, individuals should be opposed to govt programs such as Social Security. If individuals understand they have failures, they will tend to support govt programs such as Social Security.

Role 2: 2nd Welfare Theorem Fallacy

Even with no market failures, free market might generate substantial inequality. Inequality is an issue because of people care about their relative situation.

2nd Welfare Theorem: Any Pareto Efficient outcome can be reached by (1) Suitable redistribution of initial endowments [individualized **lump-sum** taxes based on indiv. characteristics and not behavior], (2) Then letting markets work freely

⇒ No conflict between efficiency and equity [1st best taxation]

Redistribution of initial endowments is not feasible (information pb) ⇒ govt needs to use **distortionary** taxes and transfers ⇒ Trade-off between efficiency and equity [2nd best taxation]

This class will focus on both roles, but first on 2).

Illustration of 2nd Welfare Theorem Fallacy

Suppose economy is populated 50% with disabled people unable to work (hence they earn \$0) and 50% with able people who can work and earn \$100

Free market outcome: disabled have \$0, able have \$100

2nd welfare theorem: govt is able to tell apart the disabled from the able [even if the able do not work]

⇒ can tax the able by \$50 [regardless of whether they work or not] to give \$50 to each disabled person ⇒ the able keep working [otherwise they'd have zero income and still have to pay \$50]

Real world: govt can't tell apart disabled from non working able

⇒ \$50 tax on workers + \$50 transfer on non workers destroys all incentives to work ⇒ govt can no longer do full redistribution ⇒ Trade-off between equity and size of the pie

Normative vs. Positive Public Economics

Normative Public Economics: Analysis of How Things Should be (e.g., should the government intervene in health insurance market? how high should taxes be?, etc.)

Positive Public Economics: Analysis of How Things Really Are (e.g., Does govt provided health care crowd out private health care insurance? Do higher taxes reduce labor supply?)

Positive Public Economics is a required 1st step before we can complete Normative Public Economics

Positive analysis is primarily empirical and Normative analysis is primarily theoretical

Positive Public Economics overlaps with Labor Economics

Political Economy is a positive analysis of govt outcomes [public choice is political economy from a libertarian view]

Plan for ec2450a Lectures (I)

- (1) Optimal income taxation: Facts about inequality, theory.
- (2) Optimal transfers: Optimal design, participation responses.
- (3) Empirical evidence on responses to taxation: labor supply responses, migration, taxable income responses.
- (4) Social preferences for redistribution: Theory and empirical studies.
- (5) Tax avoidance, evasion, and enforcement

Plan for ec2450a Lectures (II)

- (6) Capital income taxation: canonical models, bequest and inheritance taxation, a simpler theory, empirical evidence.
- (7) Education and human capital
- (8) New Dynamic Public Finance: methods and standard results, applications, life cycle taxation, recent topics.

Plan for ec2450a Lectures (III)

- (9) Policies for R&D and innovation: Theory of incentives and empirical evidence.
- (10) Corporate taxation: Theory and evidence on taxation, corporate financial policy, and business investment
- (11) Social Security and Retirement: theory of social security, evidence on behavioral responses to policies, tax-favored retirement accounts: IRAs, 401(k)s.

My research

I do mostly public, but mixed with labor, macro, and (some) political economy.

Both theory and empirical work.

Classical optimal tax theory (e.g.: labor market frictions, rent-seeking, capital taxation)

Dynamic new Public Finance and Mechanism Design (e.g.: human capital, R&D incentives).

Social preference theory.

Empirical experimental work on preferences for redistribution.

Empirical effects of taxes (e.g: migration, innovation, capital income).

Innovation policy.

Income Inequality: Labor vs. Capital Income

Individuals derive market income (before tax) from **labor** and **capital**:
 $z = wl + rk$ where w is wage, l is labor supply, k is wealth, r is rate of return on wealth

- 1) **Labor income inequality** is due to differences in working abilities (education, talent, physical ability, etc.), work effort (hours of work, effort on the job, etc.), and luck (labor effort might succeed or not)
- 2) **Capital income inequality** is due to differences in wealth k (due to past saving behavior and inheritances received), and in rates of return r (varies dramatically overtime and across assets)

Macro-aggregates: Labor vs. Capital Income

Labor income $wl \simeq 75\%$ of national income z

Capital income $rk \simeq 25\%$ of national income z (has increased in recent decades)

Wealth stock $k \simeq 400 - 500\%$ of national income z (is increasing)

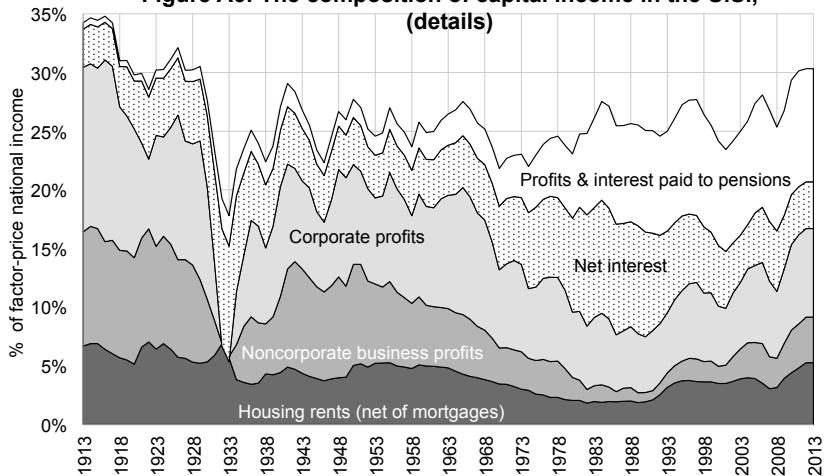
Rate of return on capital $r \simeq 5\%$

$\alpha = \beta \cdot r$ where $\alpha = rk/z$ share of capital income and $\beta = k/z$ wealth to income ratio

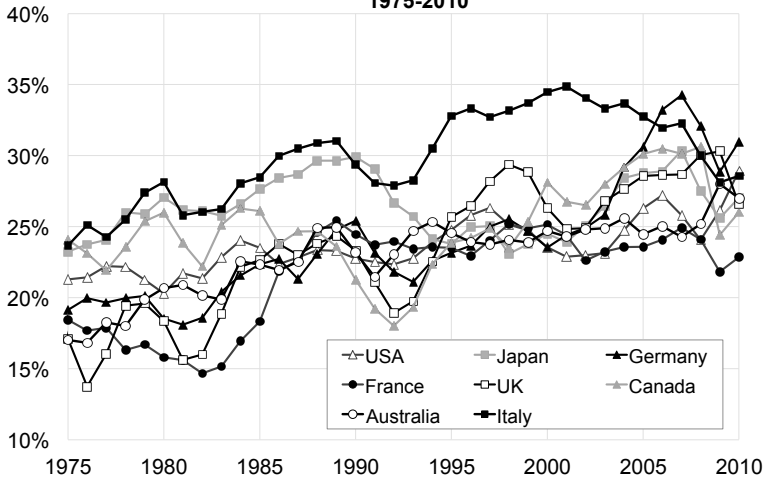
In GDP, gross capital share is higher (35%) because it includes depreciation of capital ($\simeq 10\%$ of GDP)

National Income = GDP - depreciation of capital + net foreign income

**Figure A6: The composition of capital income in the U.S.,
(details)**

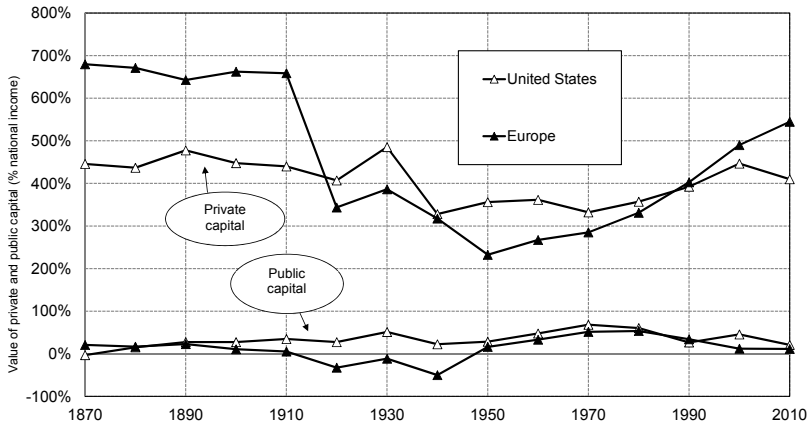


**Figure 12: Capital shares in factor-price national income
1975-2010**



Source: Piketty and Zucman (2014)

Figure 5.1. Private and public capital: Europe and America, 1870-2010



The fluctuations of national capital in the long run correspond mostly to the fluctuations of private capital (both in Europe and in the U.S.). Sources and series: see piketty.pse.ens.fr/capital21c.

Income Inequality: Labor vs. Capital Income

Capital Income (or wealth) is more concentrated than Labor Income. In the US:

Top 1% wealth holders have 40% of total wealth (Saez-Zucman 2014).
Bottom 50% wealth holders hold almost no wealth.

Top 1% incomes have 20% of total income (Piketty-Saez)

Top 1% labor income earners have about 15% of total labor income

Income Inequality Measurement

Inequality can be measured by indexes such as Gini, log-variance, quantile income shares which are functions of the income distribution $F(z)$

Gini = 2 * area between 45 degree line and Lorenz curve

Lorenz curve $L(p)$ at percentile p is fraction of total income earned by individuals below percentile p

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

Gini=0 means perfect equality

Gini=1 means complete inequality (top person has all the income)

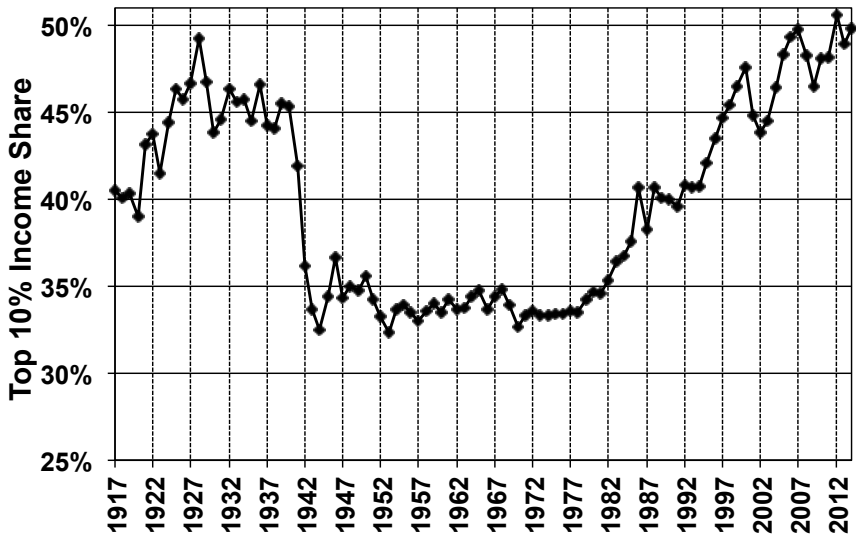
Key Empirical Facts on Income/Wealth Inequality Evolution

- 1) In the US, labor income inequality has increased substantially since 1970: due to skilled biased technological progress vs. institutions (min wage and Unions) [Autor-Katz'99]
- 2) US top income shares dropped dramatically from 1929 to 1950 and increased dramatically since 1980 [Piketty and Saez]
- 3) Top US incomes used to be primarily capital income. Now, top incomes are divided 50/50 between labor and capital income (explosion of top labor incomes with stock-options, etc.)
- 4) Fall in top income shares from 1900-1950 happened in most OECD countries. Surge in top income shares has happened primarily in English speaking countries, not as much in Continental Europe and Japan [Atkinson, Piketty, Saez JEL'11]

Figure 1: Gini coefficient

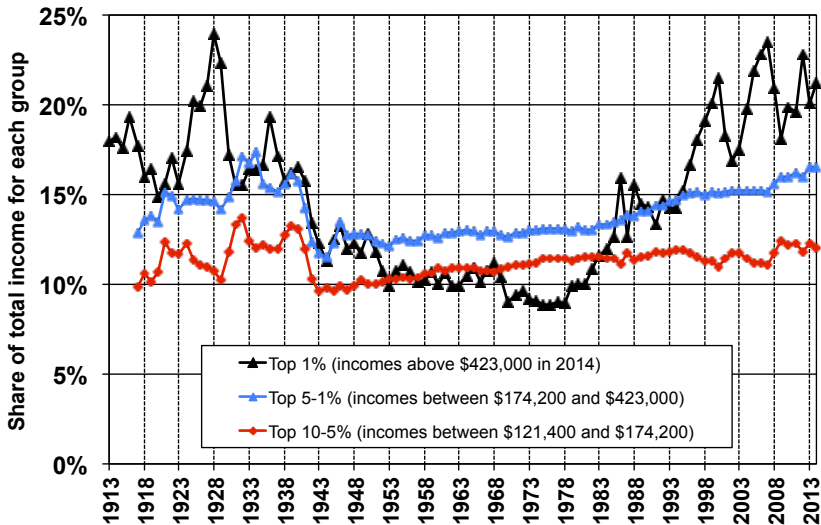


Top 10% Pre-tax Income Share in the US, 1917-2014



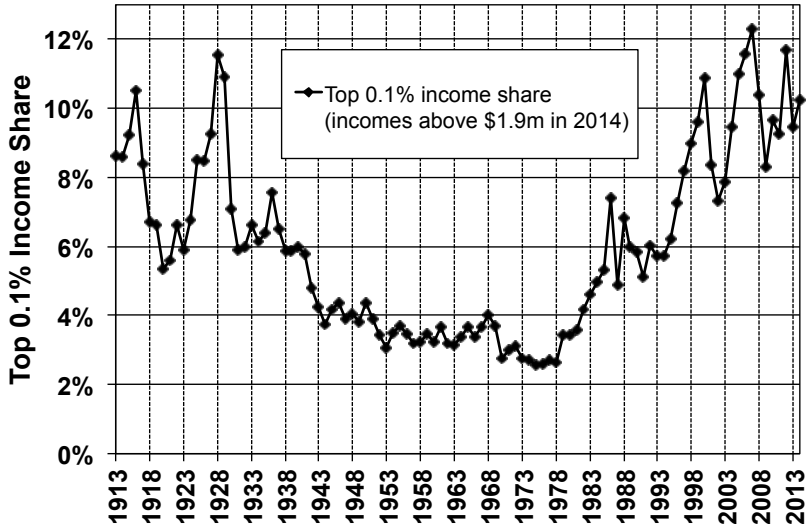
Source: Piketty and Saez, 2003 updated to 2014. Series based on pre-tax cash market income including realized capital gains and excluding government transfers.

Decomposing Top 10% into 3 Groups, 1913-2014



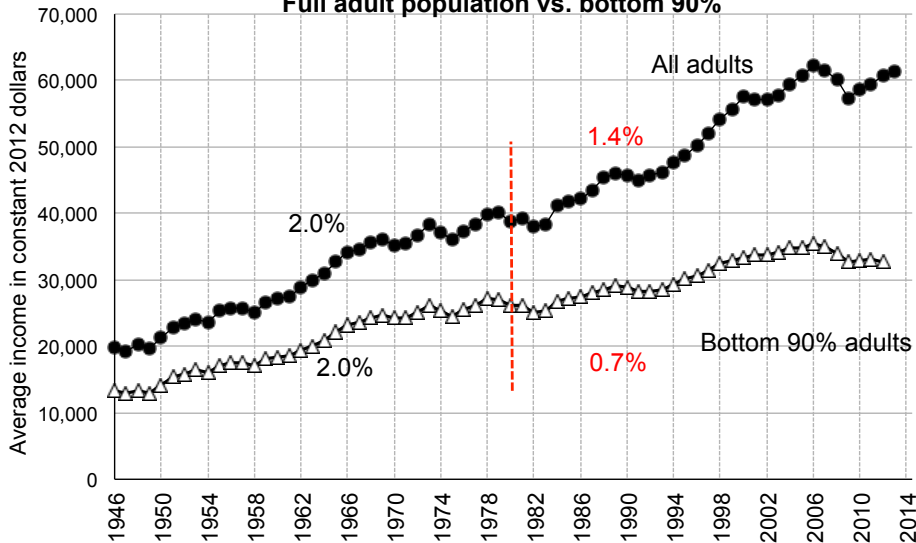
Source: Piketty and Saez, 2003 updated to 2014. Series based on pre-tax cash market income including realized capital gains and excluding government transfers.

Top 0.1% US Pre-Tax Income Share, 1913-2014



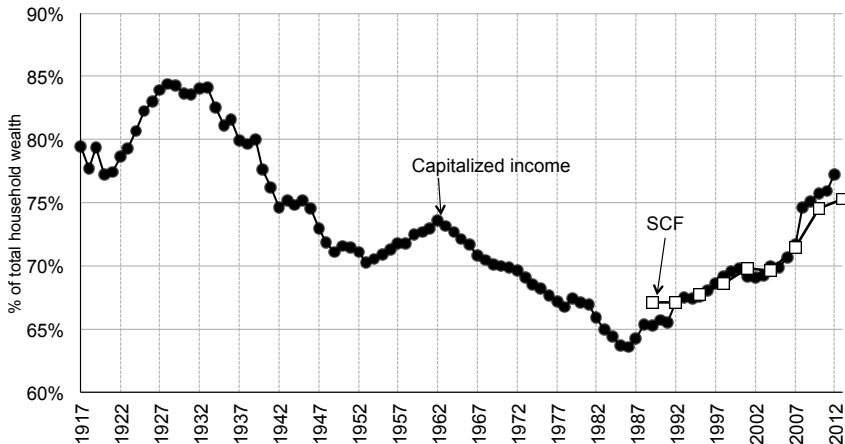
Source: Piketty and Saez, 2003 updated to 2014. Series based on pre-tax cash market income including or excluding realized capital gains, and always excluding government transfers.

Real average national income: Full adult population vs. bottom 90%



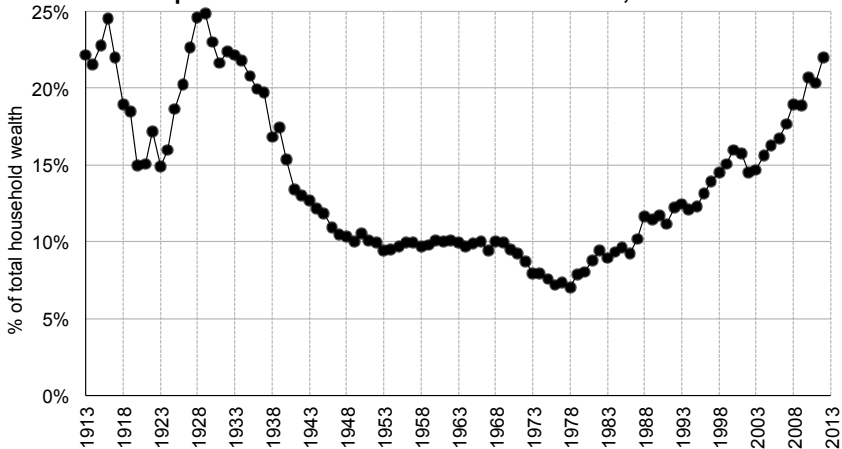
Real values are obtained by using the national income deflator and expressed in 2012 dollars. Source: Appendix Tables XX.

Top 10% wealth share in the United States, 1917-2012



The figure depicts the share of total household wealth owned by the top 10%, obtained by capitalizing income tax returns versus in the Survey of Consumer Finances. The unit of analysis is the family. Source: Appendix Tables B1 and C4.

Top 0.1% wealth share in the United States, 1913-2012



This figure depicts the share of total household wealth held by the 0.1% richest families, as estimated by capitalizing income tax returns. In 2012, the top 0.1% includes about 160,000 families with net wealth above \$20.6 million. Source: Appendix Table B1.

Key Empirical Facts on Income/Capital Inequality Cross-Sectionally

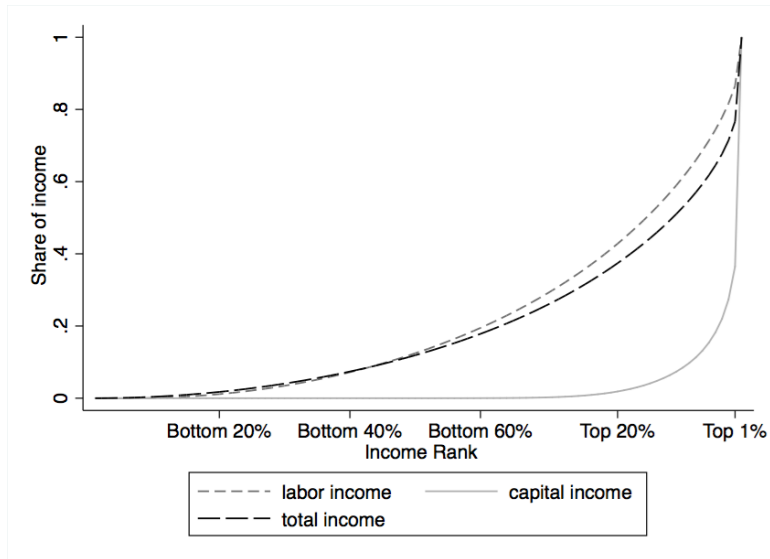
Based on IRS tax returns data from Saez and Zucman (2015) for 2007.

Fact 1: Capital income is more unequally distributed than labor income.

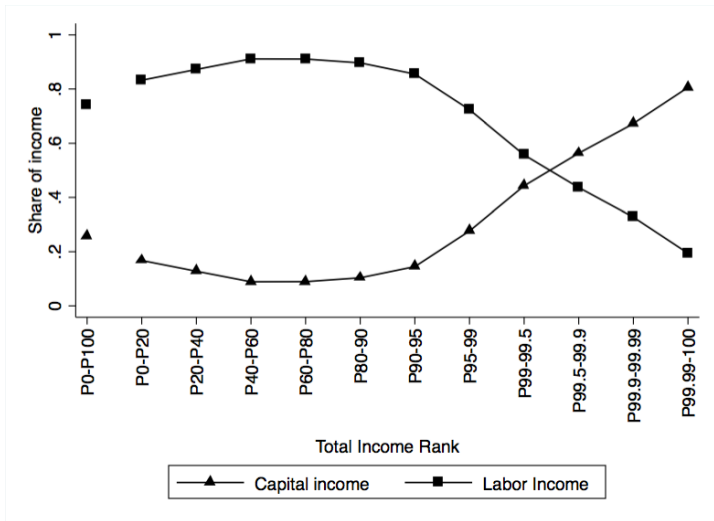
Fact 2: At the top, total income is mostly capital income.

Fact 3: Two-dimensional heterogeneity: even conditional on labor income, a lot of inequality in capital income.

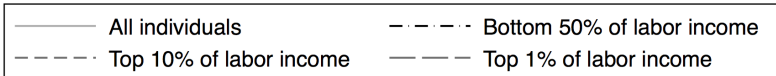
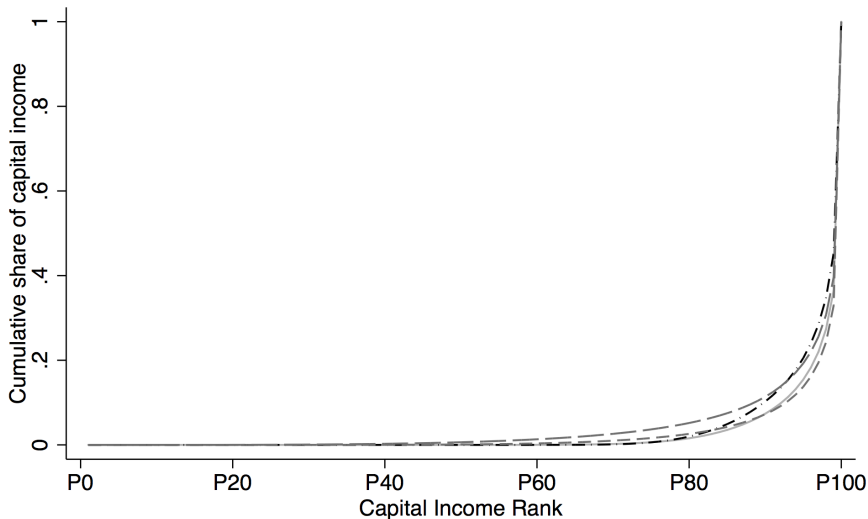
Labor, Capital, and Total Income Distributions (Fact 1)



Labor, Capital, and Total Income Distributions (Fact 2)



Capital Income Conditional on Labor Income (Fact 3)



Measuring Intergenerational Income Mobility

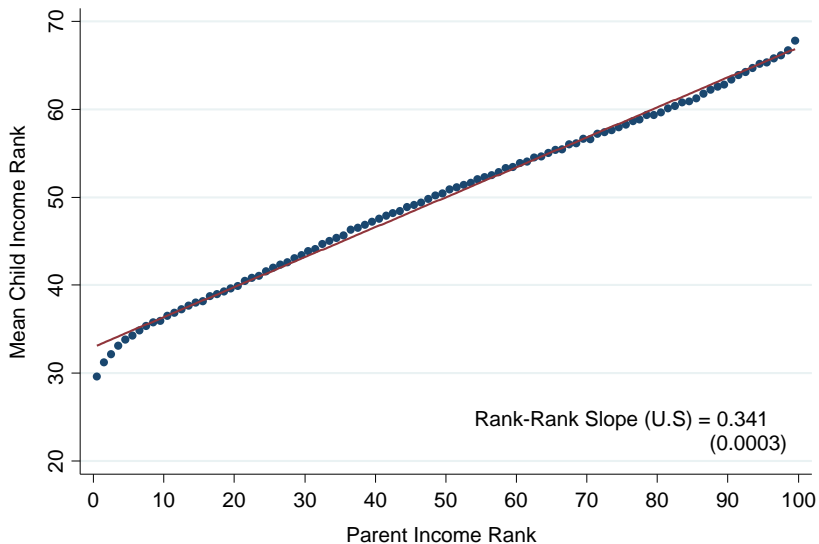
Strong consensus that children's success should not depend too much on parental income [Equality of Opportunity]

Studies linking adult children to their parents can measure link between children and parents income

Simple measure: average income rank of children by income rank of parents [Chetty et al. 2014]

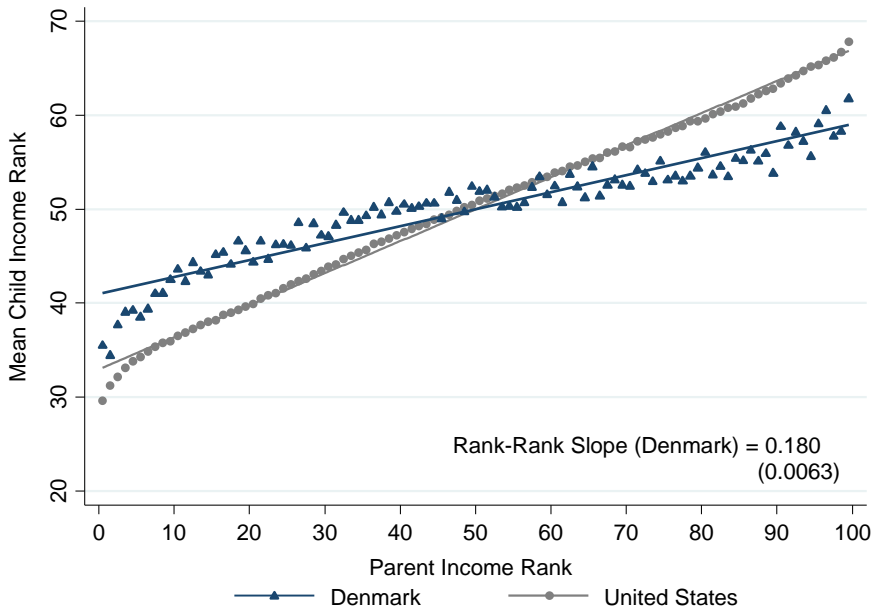
- 1) US has less mobility than European countries (especially Scandinavian countries such as Denmark)
- 2) Substantial heterogeneity in mobility across cities in the US
- 3) Places with low race/income segregation, low income inequality, good K-12 schools, high social capital, high family stability tend to have high mobility [these are correlations and do not imply causality]

A. Mean Child Income Rank vs. Parent Income Rank in the U.S.



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

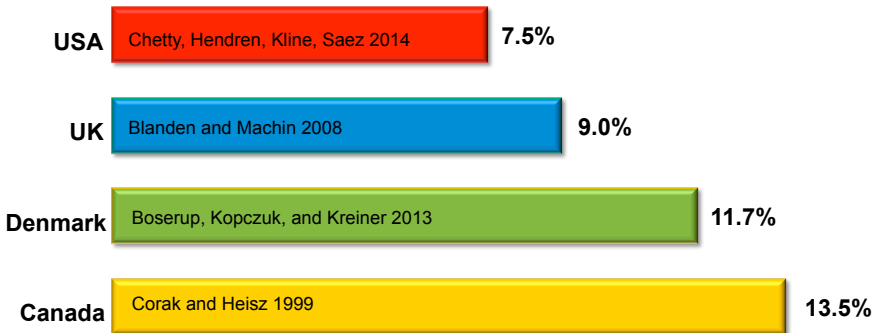
B. United States vs. Denmark



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

The American Dream?

- Probability that a child born to parents in the bottom fifth of the income distribution reaches the top fifth:



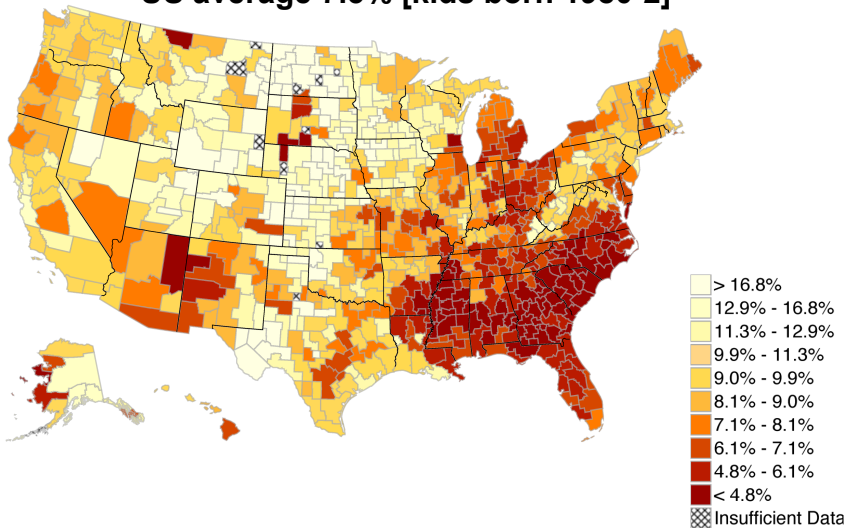
→ Chances of achieving the “American Dream” are almost two times higher in Canada than in the U.S.

Source: Chetty et al. (2014)

The Geography of Upward Mobility in the United States

Probability of Reaching the Top Fifth Starting from the Bottom Fifth

US average 7.5% [kids born 1980-2]



Note: Lighter Color = More Upward Mobility

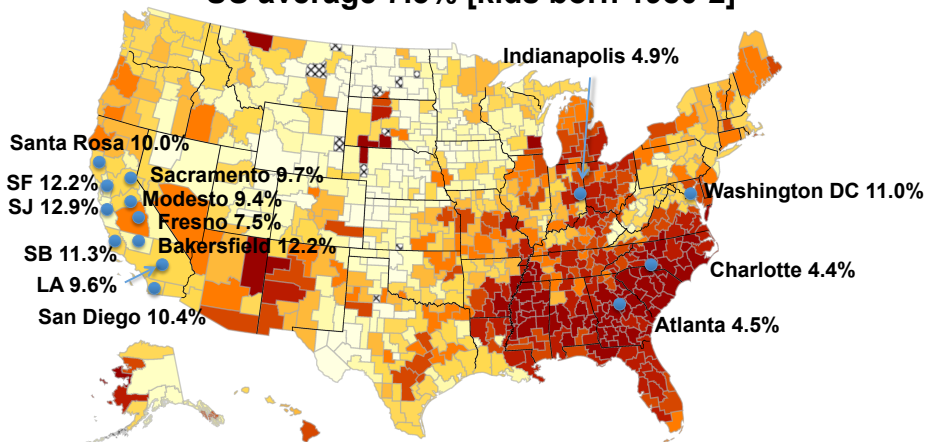
Download Statistics for Your Area at www.equality-of-opportunity.org

Source: Chetty et al. (2014)

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TABLE 1. Upward Mobility in the 50 Largest Metro Areas: The Top 10 and Bottom 10

Rank	Commuting Zone	Odds of Reaching Top Fifth from Bottom Fifth	Rank	Commuting Zone	Odds of Reaching Top Fifth from Bottom Fifth
1	San Jose, CA	12.9%	41	Cleveland, OH	5.1%
2	San Francisco, CA	12.2%	42	St. Louis, MO	5.1%
3	Washington, D.C.	11.0%	43	Raleigh, NC	5.0%
4	Seattle, WA	10.9%	44	Jacksonville, FL	4.9%
5	Salt Lake City, UT	10.8%	45	Columbus, OH	4.9%
6	New York, NY	10.5%	46	Indianapolis, IN	4.9%
7	Boston, MA	10.5%	47	Dayton, OH	4.9%
8	San Diego, CA	10.4%	48	Atlanta, GA	4.5%
9	Newark, NJ	10.2%	49	Milwaukee, WI	4.5%
10	Manchester, NH	10.0%	50	Charlotte, NC	4.4%

Note: This table reports selected statistics from a sample of the 50 largest commuting zones (CZs) according to their populations in the 2000 Census. The columns report the percentage of children whose family income is in the top quintile of the national distribution of child family income conditional on having parent family income in the bottom quintile of the parental national income distribution—these probabilities are taken from Online Data Table VI of Chetty et al., 2014a.

Source: Chetty et al., 2014a.

Govt Redistribution with Taxes and Transfers

Govt taxes individuals based on income and consumption and provides transfers: z is pre-tax income, $y = z - T(z) + B(z)$ is post-tax income

- 1) If inequality in y is less than inequality in $z \Leftrightarrow$ tax and transfer system is redistributive (or progressive)
- 2) If inequality in y is more than inequality in $z \Leftrightarrow$ tax and transfer system is regressive
 - a) If $y = z \cdot (1 - t)$ with constant t , tax/transfer system is neutral
 - b) If $y = z \cdot (1 - t) + G$ where G is a universal (lumpsum) allowance, then tax/transfer system is progressive
 - c) If $y = z - T$ where T is a uniform tax (poll tax), then tax/transfer system is regressive

Current tax/transfer systems in rich countries look roughly like b)

Federal US Tax System: Overview

- 1) Individual income tax (on both labor+capital income) [progressive](40% of fed tax revenue)
- 2) Payroll taxes (on labor income) financing social security programs [about neutral] (40% of revenue)
- 3) Corporate income tax (on capital income) [progressive if incidence on capital income] (15% of revenue)
- 4) Estate taxes (on capital income) [very progressive] (2% of revenue)
- 5) Minor excise taxes [regressive] (3% of revenue)

State+Local Tax System: Overview

- 1) Individual+Corporate income taxes [progressive] (30% of state+local tax revenue)
- 2) Sales + Excise taxes (tax on consumption = income - savings) [about neutral] (30% of revenue)
- 3) Real estate property taxes (on capital income) [slightly progressive] (30% of revenue)

<http://www.census.gov/govs/www/qtax.html>

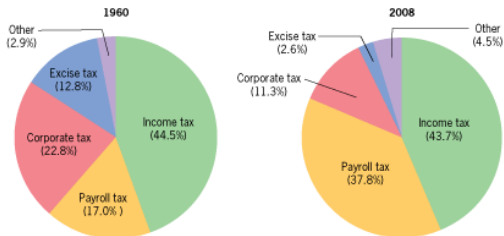
■ FIGURE 1-8

Distribution of Revenue Sources

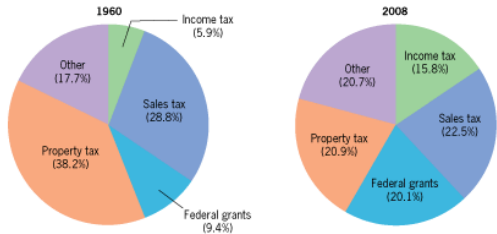
The Distribution of Federal and State Revenues, 1960 and 2008

This figure shows the changing composition of federal and state revenue sources over time, as a share of total revenues. (a) At the federal level, there has been a large reduction in corporate and excise tax revenues and a rise in payroll tax revenues. (b) For the states, there has been a decline in property taxes and a rise in income taxes and federal grants.

(a) Federal revenues (% of total revenue)



(b) State/local revenues (% of total revenue)



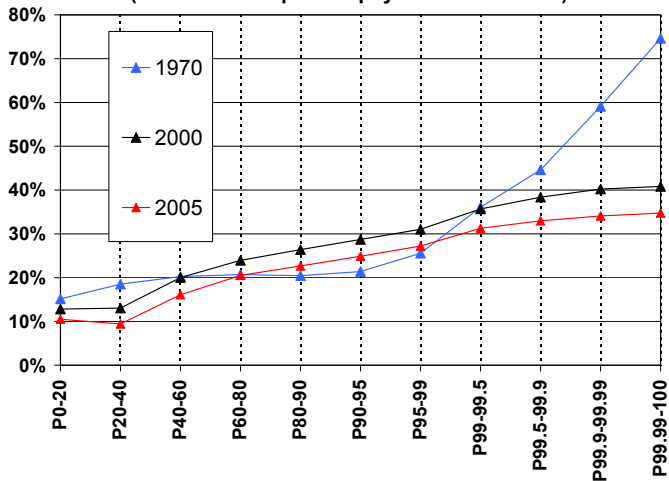
US Tax System: Progressivity and Evolution

1) Medium Term Changes: Federal Tax Progressivity has declined since 1970 but govt redistribution remains substantial especially when including transfers (Medicaid, Social Security retirement, DI, UI various income support programs)

2) Long Term Changes: Before 1913, US taxes were primarily tariffs, excises, and real estate property taxes [slightly regressive], minimal welfare state (and hence small govt)

<http://www.treasury.gov/education/fact-sheets/taxes/ustax.shtml>

2. Federal Average Tax Rates by Income Groups (individual+corporate+payroll+estate taxes)

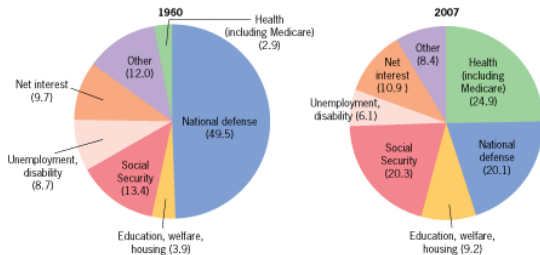


■ FIGURE 1-7

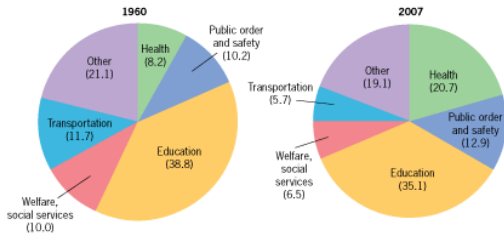
Distribution of Spending

The Distribution of Federal and State Expenditures, 1960 and 2007 • This figure shows the changing composition of federal and state spending over time, as a share of total spending. (a) For the federal government, defense spending has fallen and Social Security and health spending have risen. (b) For the states, the distribution has been more constant, with a small decline in education and welfare spending and a rise in health spending.

(a) Federal spending (% of total spending)



(b) State/local spending (% of total spending)



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