

INEQUALITY

Harvard Economics 1011B
Professor Gabriel Chodorow-Reich
Spring 2020

OUTLINE

- 1 INEQUALITY AND MACROECONOMICS
- 2 DATA AND MEASUREMENT
- 3 50-10 AND 90-50
- 4 THE VERY TOP

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MOTIVATION: DIFFERENT PREDICTIONS

- Borrowing constraints and marginal propensities to consume.
- Decline in saving rate from 1975-2007 caused by inequality and “keeping up with the jones”?
- Political enthusiasm for mortgage expansion as offset to rising inequality?

MOTIVATION: SOCIAL WELFARE FUNCTION

- Economy contains N households (N is large).
- Each household maximizes utility over consumption and labor supply:

$$U_{i,0} = \max_{c_{i,t}, \ell_{i,t}} \sum_{t=0}^{\infty} \beta_i^t u(c_{i,t}, \ell_{i,t})$$

subject to budget constraint:

$$\sum_{t=0}^{\infty} \frac{c_{i,t}}{1 + i_{0,t}} = \sum_{t=0}^{\infty} \frac{(1 - \tau_{i,t}) w_{i,t} \ell_{i,t}}{1 + i_{0,t}} + B_{i,0}.$$

- Sources of heterogeneity: discount factor, wage stream, income tax/subsidy, initial assets.
- Social planner chooses wage taxes/subsidies to solve:

$$\max \sum_{i=1}^N \omega_i U_{i,0} \text{ s.t. } \sum_{t=0}^{\infty} \sum_{i=1}^N \frac{\tau_{i,t} w_{i,t}}{1 + i_{0,t}} = 0.$$

- In words: given social welfare weights $\{\omega_i\}$, choose wage taxes/subsidies to maximize welfare subject to balanced budget constraint.

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INEQUALITY MEASURE: QUANTILE RATIOS

- Definition: the q th quantile of a distribution is the value below which q percent of the distribution lies.
- Definition: a quantile ratio is the ratio of two quantiles.
 - ▶ Example: 90-10 ratio of income distribution is income of unit at 90th percentile divided by income of unit at 10th percentile.
- Definition: the q th quantile share is the share of total income accruing to units above the q th quantile.
- Useful to think of two types of inequality:
 - ▶ Inequality in bulk of distribution. Summarize by 90-10 (or sometimes 50-10 and 90-50).
 - ▶ Inequality at the very top: $q = 99, q = 99.9, q = 99.99$.

WHERE DO DATA ON INCOMES COME FROM?

1 Tax records.

- ▶ Defined at level of tax unit (household if 1040, individual if W2).
- ▶ Historical coverage to introduction of income tax in 1913 (16th amendment).
- ▶ Data limited to taxpayers, limited demographic information.
- ▶ Income definition is taxable income.
- ▶ Best data for studying top incomes.
- ▶ Data below from IRS as available on Emmanuel Saez's webpage.

2 Household surveys.

- ▶ Defined at either individual or household level.
- ▶ Shorter and sparser historical coverage.
- ▶ Data on all households and detailed demographic information but limited coverage at the top (sampling and top-coding).
- ▶ Income may include nontaxable income and in-kind transfers.
- ▶ Best data for studying broad distribution.
- ▶ Data below from: Current Population Survey Outgoing Rotation Groups, downloaded from Economic Policy Institute's State of Working America Data Library.

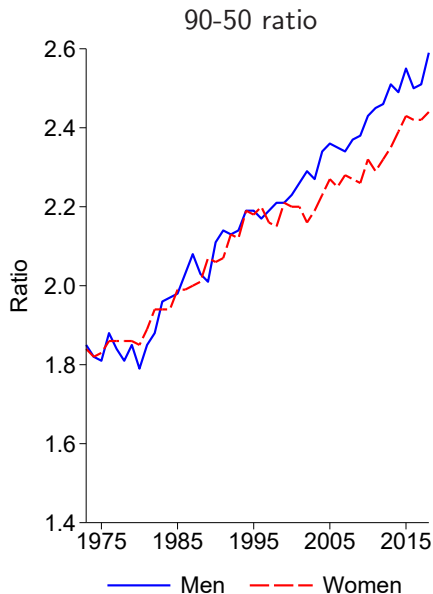
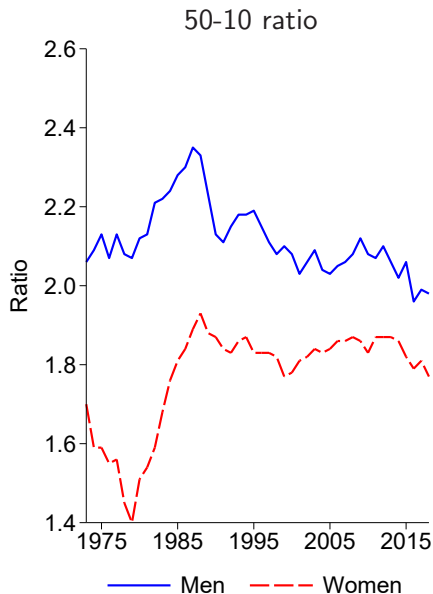
FACTS SUMMARY

- ① Very little change in inequality in the bottom half (50-10) of the distribution in past 40 years.
- ② Rising inequality in top half (90-50) in past 40 years.
- ③ U-shaped pattern of inequality at the very top over past century.
- ④ Recent rise in top income inequality most rapid at the very top.
- ⑤ These facts and what follows pertain to U.S. experience. Other rich countries differ.

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50-10 AND 90-50 HOURLY WAGE RATIOS

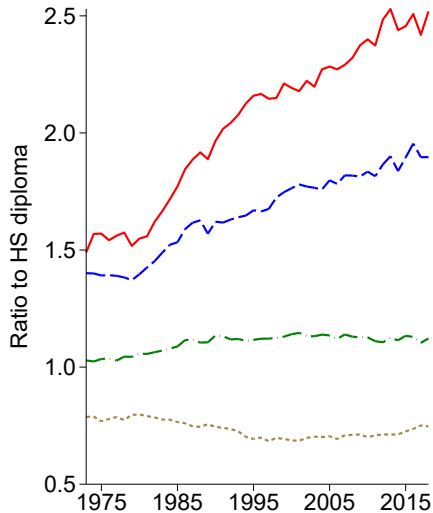


EXPLANATIONS

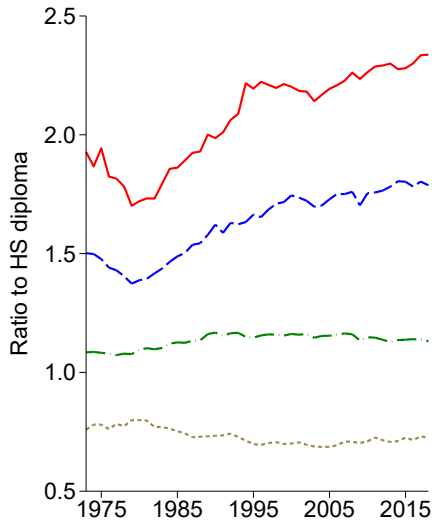
- ① Skill biased technical change (sbtc).
- ② Task routinization and job polarization.
- ③ Minimum wage.
- ④ Union power.

EDUCATIONAL ATTAINMENT WAGE PREMIA

Men



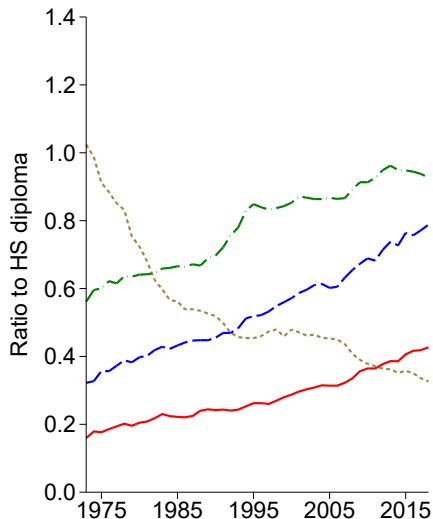
Women



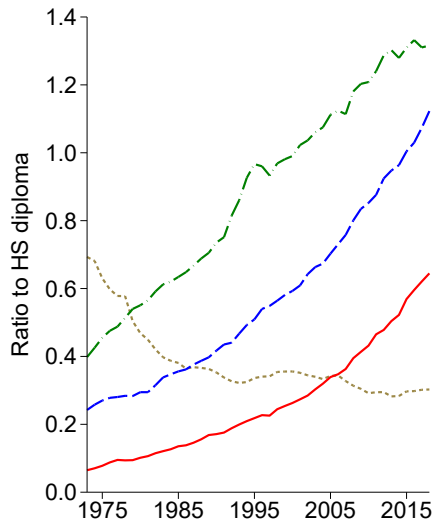
--- <HS - . - Some college - - - Bachelors degree - Advanced degree

EDUCATIONAL ATTAINMENT SHARES OF EMPLOYMENT

Men



Women



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SKILL BIASED TECHNICAL CHANGE (SBTC)

- Relative supply of more educated workers rising.
- Relative price (wage) of more educated workers also rising.
- Must be that relative demand for more educated workers also rising.
- Insight called skill biased technical change.
- Other evidence:
 - 1 Similar pattern across countries.
 - 2 Skill upgrading within sectors and even plants.
 - 3 Cross-industry: more skill upgrading in higher technology industries.

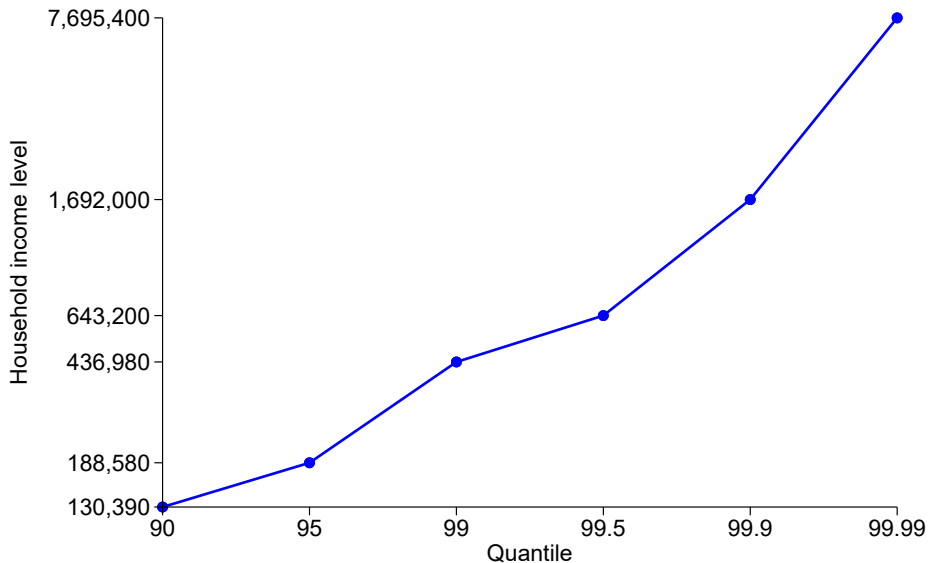
TASK ROUTINIZATION AND JOB POLARIZATION

- Tasks and technology:
 - ① Manual: limited complementarity/substitution with technology.
 - ② Abstract: complementary to technology.
 - ③ Routine: substitute to technology.
- Distribution of employment has shifted away from routine jobs.
- Explains why 50-10 ratio hasn't changed.

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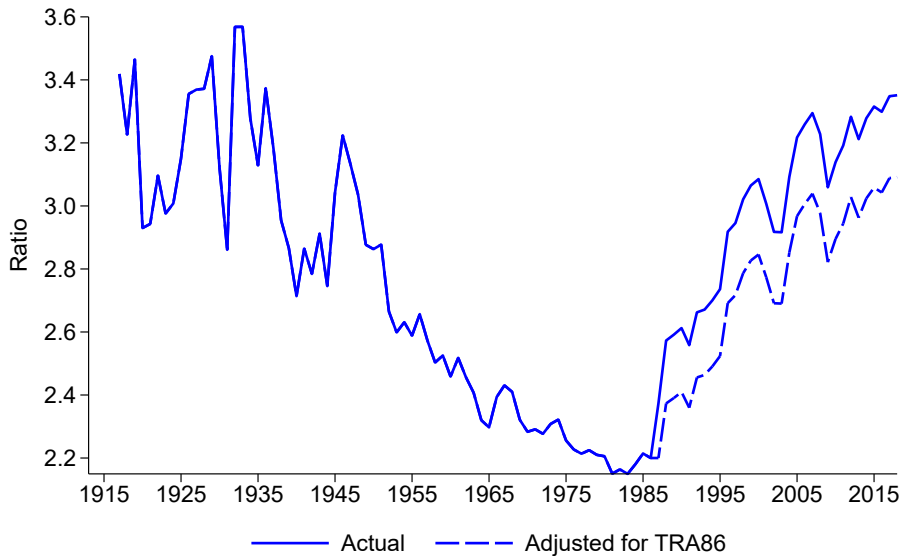
2018 INCOME CUTOFFS AT THE VERY TOP



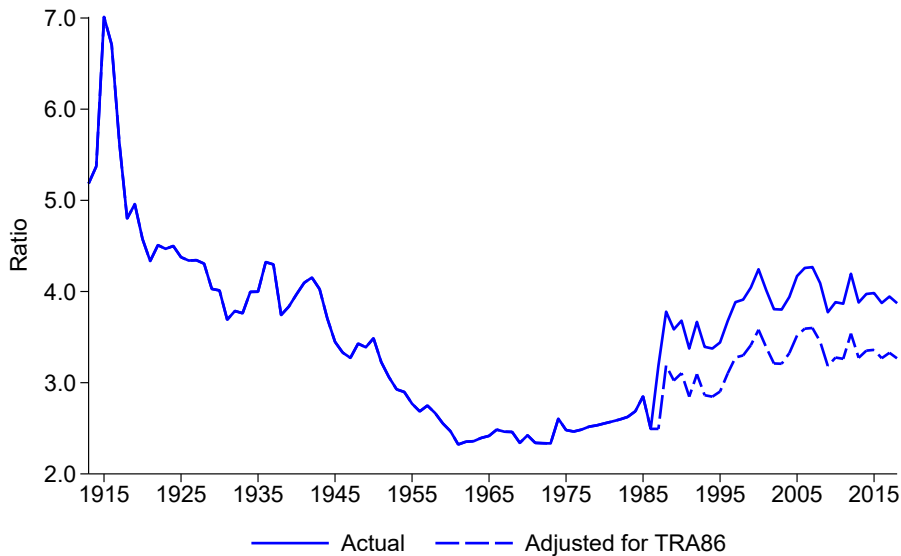
INCOME SHIFTING

- Tax Reform Act of 1986 reduced:
 - ▶ Top marginal income tax rate from 50% to 28%.
 - ▶ Top corporate income tax rate from 46% to 34%.
- Many businesses can choose corporate form:
 - ▶ C-corporation: taxed at corporate income rate.
 - ▶ S-corporation: taxed at individual income rate.
- For high earners with business income, TRA86 created incentive to change from C-corp to S-corp.
- Called income shifting. Generates “artificial” rise in income at the top.
- Reversed by TCJA: now corporate rate is 21% and top personal rate is 37% with pass-through exception.

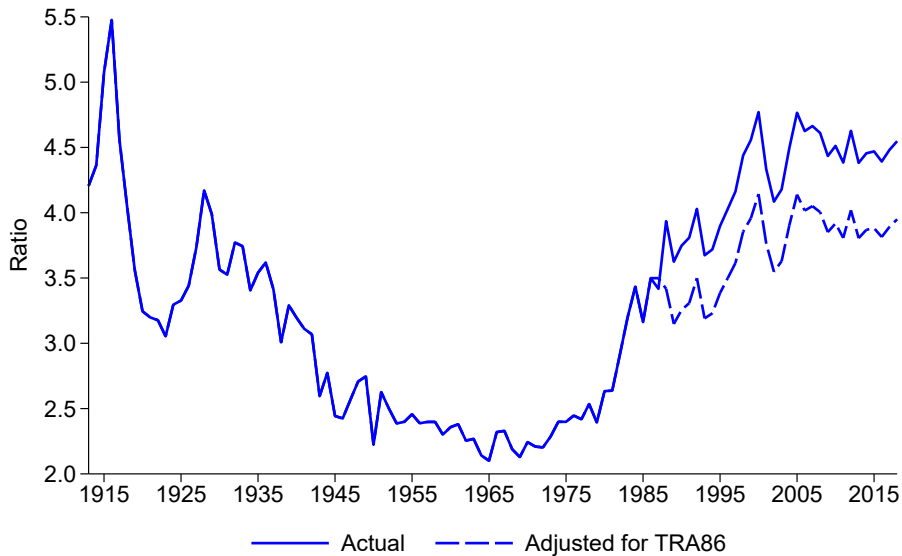
99-90 INCOME RATIO



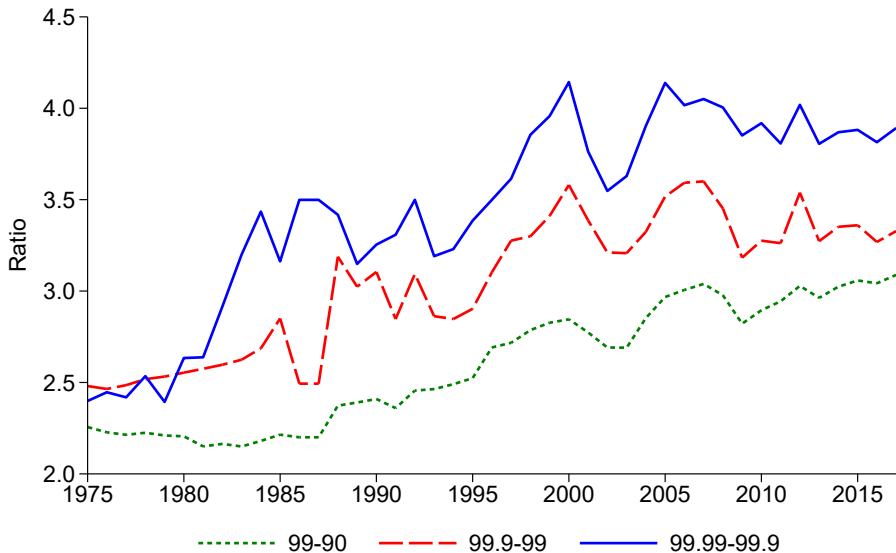
99.9-99 INCOME RATIO



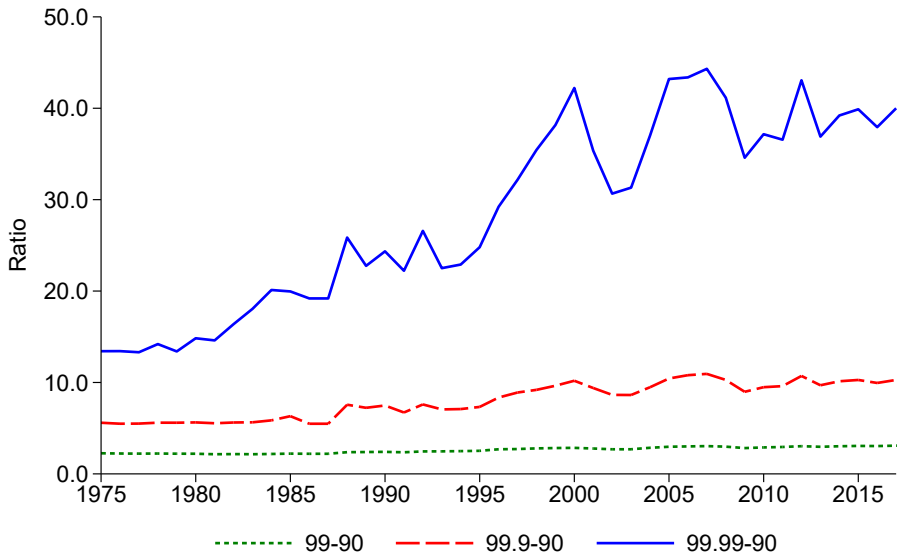
99.99-99.9 INCOME RATIO



ZOOMING IN: THE RISE IN TOP INCOME RATIOS



ZOOMING IN: THE RISE IN TOP INCOME RATIOS



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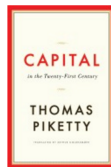
4 WEEKS ON THE LIST

CAPITAL IN THE TWENTY-FIRST CENTURY

by Thomas Piketty | Belknap/Harvard University

A French economist's analysis of centuries of economic history predicts worsening inequality and proposes solutions.

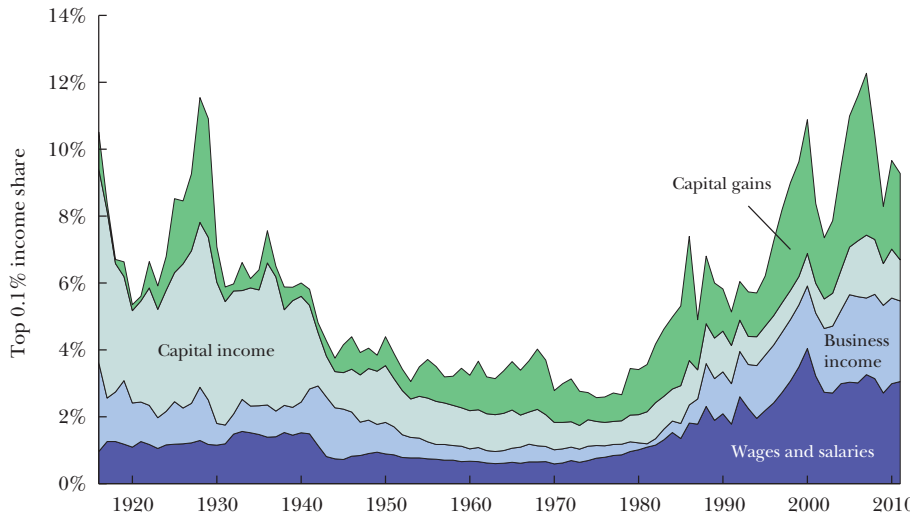
Buy ▾



- ➊ Data, theory, and prediction.
- ➋ Prediction is rising inequality from rising capital share of income.
- ➌ Whether theory predicts a rising capital share is an interesting application of the neoclassical growth model you studied earlier in the course.
- ➍ Focus today on explaining the past, not predicting the future.
- ➎ Rising inequality so far mostly a story of labor and not capital income.

RISE IN TOP INCOME SHARE BY SOURCE

The Top 0.1 Percent Income Share and Its Composition, 1916–2011



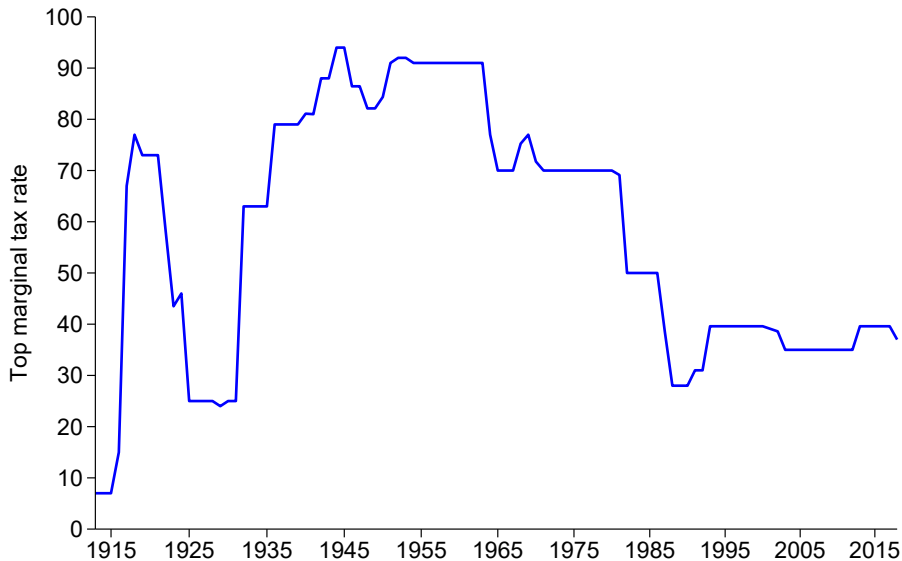
EXPLANATIONS

① Tax rates.

② Social norms.

③ Superstars.

TAX RATES



SOCIAL NORMS

- From “The Treaty of Detroit” to the Reagan-Thatcher revolution.
- Compensation of CEOs set by compensation committees made up of peers.
- The rich fly first class, the very rich fly private.

PARETO DISTRIBUTION

Income group	Percent of all returns	Percent of returns over 0.5m	Mean income	Ratio of mean to cutoff
\$500,000 or more	0.98	100.0	1,554,002	3.1
\$1,000,000 or more	0.32	32.9	3,352,331	3.4
\$1,500,000 or more	0.18	18.1	5,106,351	3.4
\$2,000,000 or more	0.12	12.1	6,792,742	3.4
\$5,000,000 or more	0.03	3.4	16,360,852	3.3
\$10,000,000 or more	0.01	1.3	31,259,606	3.1

Constant ratio of mean to cutoff characteristic of Pareto distribution:

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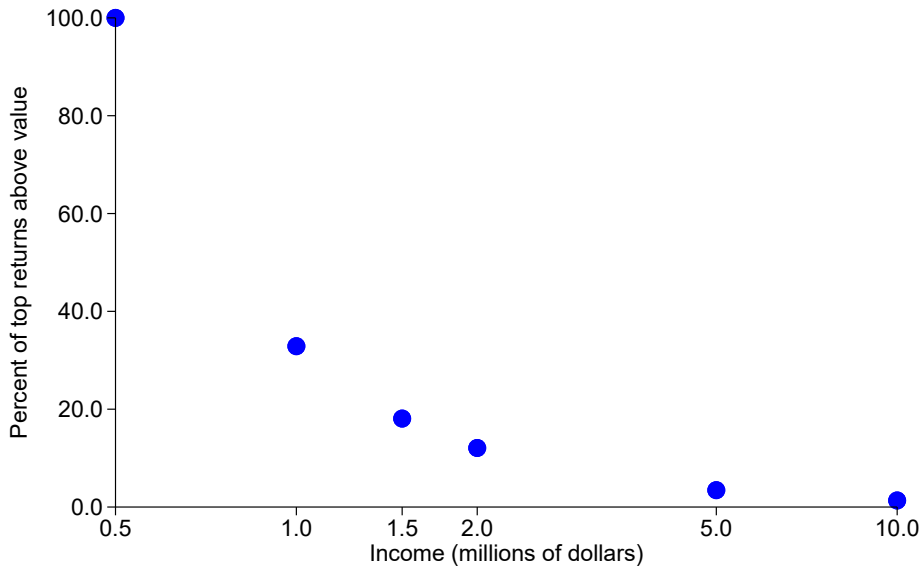
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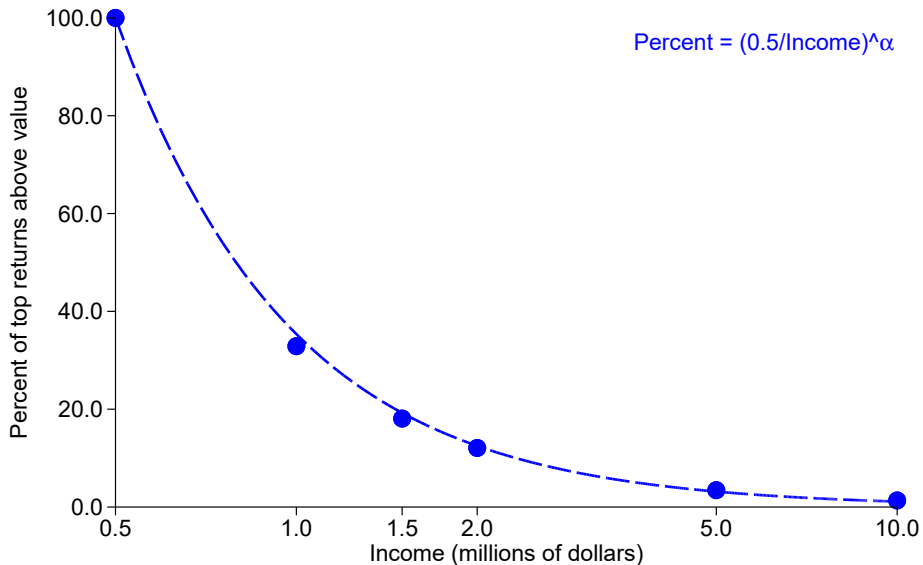
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 &= \frac{\alpha}{1-\alpha} y_m \left(\frac{y_m}{y}\right)^{\alpha-1} \Big|_{y_m}^{\infty} = \frac{\alpha}{\alpha-1} y_m.
 \end{aligned}$$

PARETO DISTRIBUTION



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WHY ARE TOP INCOMES PARETO? WALL STREET MODEL

- Each period new college graduates join financial firms and earn starting salary y_m .

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- Pareto distribution of top incomes:

$$\Pr\{y > Y | y > y_m\} = \Pr\{t > t(Y)\} = e^{-\delta t(Y)} = e^{-\frac{\delta}{\mu} \ln(Y/y_m)} = \left(\frac{y_m}{Y}\right)^{\frac{\delta}{\mu}}.$$

INTERPRETING THE MODEL

$$Pr\{y > Y | y > y_m\} = \left(\frac{y_m}{Y}\right)^{\frac{\delta}{\mu}} = \left(\frac{y_m}{Y}\right)^{\alpha}.$$

- Distribution of income in finance industry is pareto.
- Pareto coefficient smaller (more inequality) when:
 - ▶ μ is larger: faster growth with tenure.
 - ▶ δ is smaller: more individuals reach very high income levels.
- Model applies to other fields with “tournament” structure: law, medicine, performing arts, sports, corporate ladder...
- Sometimes better to think of unit of observation as particular role (e.g. best boxer) than individual.

WHY ARE TOP INCOMES PARETO? MUSIC MODEL

- Suppose new user to platform downloads songs partly in proportion to existing downloads.
- Formally, chooses share $1 - p$ of songs randomly and p in proportion to existing download share.
- Called “rich getting richer” or “cumulative advantage”.
- Can show that distribution of download frequencies is Pareto with shape parameter $\alpha = 1/p$.

WHY HAS α DECREASED? ROSEN'S SUPERSTARS

- Technology and globalization make tournament structure more pronounced.
- In 1800, the best quartet in the world could be heard by at most a few hundred patrons and every city had it's own orchestra.
- Today, Yo-Yo Ma has recorded more than 90 albums.
- Technology and globalization make it possible for the very best to now reach much larger audiences.
- Applies to firms as well as to workers.
- Could also be that norms against steep pay scales have receded.

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