Wealth Distribution: The State of the Art

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Introduction

Now we have half a dozen explanations for why the top 1% are so rich:

1. **Bequests**
2. **Rate of return** heterogeneity.
   Rich households own mostly equity with high returns.
3. **Preference heterogeneity** Krusell and Smith (1998); Carroll et al. (2017).
   Even tiny heterogeneity in patience generates lots of wealth inequality.
4. Rare **high-income states** Castaneda et al. (2003).

Plus a few less common stories, such as health or old age expenditure risk.

What Comes Next?

Each explanation supposedly accounts for more than half of the high top 1% wealth holdings.

- Clearly, they cannot all be as important as the authors claim.

The final step: Horse races.

- Put several of the explanations into a single model.
- Quantify their relative importance.

Empirical Progress

New administrative data

- large sample sizes
- include the very richest households
- long panels

We can measure

- incomes and wealth of the very rich
  (US tax returns)
- income sources of the rich
  (Register data for Norway and Sweden)
- time series changes in top wealth and income shares

Top Income Shares

Figure 1
Top 1 Percent Income Share in the United States

Source: Source is Piketty and Saez (2003) and the World Top Incomes Database.
Notes: The figure reports the share of total income earned by top 1 percent families in the United States from 1913 to 2011. Income is defined as pre-tax market income; it excludes government transfers and nontaxable fringe benefits. The figure reports series including realized capital gains (solid squares) and series excluding realized capital gains (hollow squares).

Alvaredo et al. (2013)

Top Wealth Shares

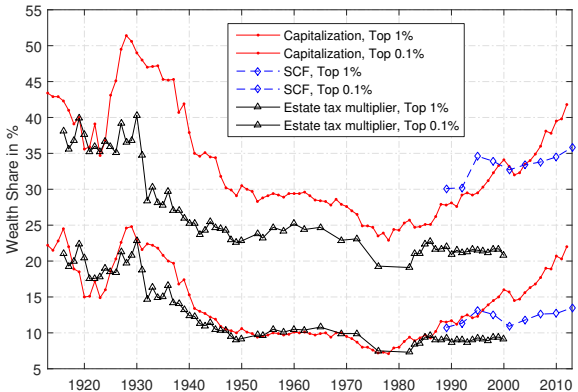
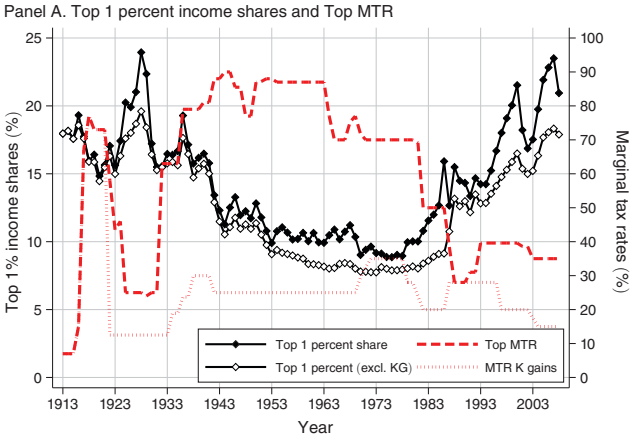


Figure 1: Top wealth share measurements over time

Hubmer et al. (2020)

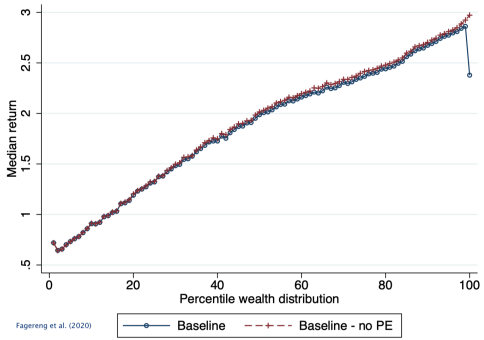
Top Marginal Tax Rates

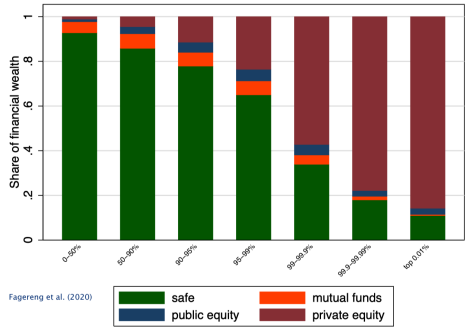


Piketty et al. (2014)

Obvious hypothesis: Taxes drive top wealth shares.

Rates of Return





The rich hold risky, high return assets.

Obvious hypothesis: high returns explain high wealth of the rich.

The Horse Race

Now we are getting to the state of the art: Hubmer et al. (2020)

Two contributions:

1. Quantify the sources of wealth inequality.
   Horse race with earnings shocks, preference heterogeneity, and rate of return heterogeneity.
2. Use the model to quantify why the wealth distribution changed over time.

The Model

Demographics: There is a unit mass of infinitely lived households.

- Note: Cannot quantify the role of bequests (or get them right).

Preferences:

$$u(c_0) + \mathbb{E}\sum_{t=1}^{\infty} D_t u(c_t) \tag{1}$$

- Stochastic discount factor: $D_t = \prod_{s=0}^{t-1} \beta_s = \beta_0 \times \cdots \times \beta_{t-1}$.
- The period discount factors β_t are random.

Endowments

Discount factors: β_t (Markov)

Labor supply in efficiency units: $l(p, v)$

- p: persistent shock (Markov)
- v: transitory shock (i.i.d.)

Technology and Markets

Technology: $F(K,L)+(1-\delta)K = C+K'$

Markets: Competitive markets for

- goods (numeraire)
- labor rental (w)
- capital rental (complicated...)

Rate of Return Heterogeneity

The household's individual rate of return depends on wealth:

$$\underline{r}_t + r_t^X(a_t) + \sigma_t^X(a_t)\,\eta_t \tag{2}$$

where

- $\underline{r}_t$: common aggregate return
- η_t: i.i.d. shock
- $r_t^X(a_t)$: time-varying rich/poor gradient in mean returns
- $\sigma_t^X(a_t)$: time-varying shock variance

Motivation

Why these model ingredients?

Rate of return heterogeneity

- Empirical estimates for Nordic countries (good data!)
- Clear evidence that mean and variance of returns are higher for richer households.

Preference heterogeneity

- A mop-up factor
- Unmodeled heterogeneity that allows the model to match data.

Everything else is standard (as it should be!)

Household Problem

Cash on hand (current period resources):

$$x_t \equiv a_t + y_t - \tau_t(y_t) + (1 - \tilde{\tau}_t)\tilde{y}_t + T_t \tag{3}$$

where

- a = assets
- y = income subject to income tax τ

$$y_t = \left(\underline{r}_t + r_t^X(a_t)\right) a_t + w_t l(p_t, v_t) \tag{4}$$

- $\tilde{y}$ = income subject to capital income tax $\tilde{\tau}$

$$\tilde{y}_t = \sigma_t^X(a_t)\,\eta_t a_t \tag{5}$$

Household Problem

Budget constraint: $c_t = x_t - a_{t+1}$.

$$V_t(x,p,\beta) = \max_{a' \geq \underline{a}} u\left(x - a'\right) + \beta \mathbb{E} V_{t+1}\left(x', p', \beta'\right) \tag{6}$$

Notes:

- β_t is a state
- t is a state

Steady State Equilibrium

Objects:

- $K, \underline{r}, w, r, T$
- household value functions and decision rules.
- $\Gamma(a, p, \beta, \nu, \eta)$: distribution of households.

Equilibrium conditions:

1. Household: as usual.
2. Firms: w, r are marginal products.
3. Government budget constraint: T equals total tax revenues.
4. Capital market clears: $K = \int a \times d\Gamma(a, p, \beta, \nu, \eta)$
5. Capital income identity

$$rK = \int \left(\underline{r} + r^X(a) + \sigma^X(a)\,\eta\right) \times d\Gamma(a, p, \beta, \nu, \eta) \tag{7}$$

Calibration

Base parameters: 1967 steady state.

- standard parameters for technology (Cobb-Douglas)
- risk aversion

Time-varying + observable:

1. Tax schedules.
2. Earnings process.
3. Asset returns (below)

Fixed and unobservable:

- Discount rate heterogeneity
- Matches 1967 wealth distribution

Calibration: Asset Returns

Take as given and fixed:

- portfolio shares by wealth $w_c(a)$
- richer household hold more equity
- mean excess returns by asset class and wealth $\tilde{r}_c^X(a)$
- variance of excess returns by asset class and wealth $\sigma_c^X(a)$
- Swedish data: Fagereng et al. (2020)

Time-varying (observable)

- mean excess return of each asset class $\bar{r}_{c,t}$

Wealth Distribution 1967

#	Hubmer et al. (2020), Tb 2	top 10%	top 1%	top 0.1%	top 0.01%	Gini
1	β-heterogeneity	8.8%	7.7%	3.8%	2.0%	0.050
2	earnings heterogeneity	−27.5%	−17.8%	−9.5%	−6.4%	−0.173
3	persistent	−5.0%	−7.5%	−4.2%	−2.9%	0.009
4	transitory	−11.6%	−4.3%	−1.7%	−0.9%	−0.109
5	tax progressivity	−21.3%	−61.8%	−71.2%	−67.1%	−0.148
6	return heterogeneity	29.5%	18.4%	6.6%	2.8%	0.192
7	mean differences	25.8%	16.7%	6.0%	2.6%	0.174
8	return risk	0.7%	2.2%	3.3%	2.5%	0.004

Contribution of each channel.

Example: Tax progressivity **lowers** top 1% share by 62%

Key points

Rate of return heterogeneity is important.

- Without it, top 1% share falls from 27% to 9%
- We would be back to Huggett (1996)

Preference heterogeneity also important.

Tax progressivity is key for limiting wealth inequality.

Time Series Experiment

Solve the model forward (perfect foresight equilibrium).

Main finding: Tax progressivity is the main driver of rising top wealth shares.

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