Topics in Economics

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Sciences Po, CNRS & CEPR

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On Inequality and Redistribution

- History of Modern Macroeconomics

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  - First-generation models: dynamic models with rational expectations
    - Equilibrium, solve, calibrate with a representative agent

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    - Macro shocks $\Rightarrow$ inequality, welfare

On Inequality and Redistribution

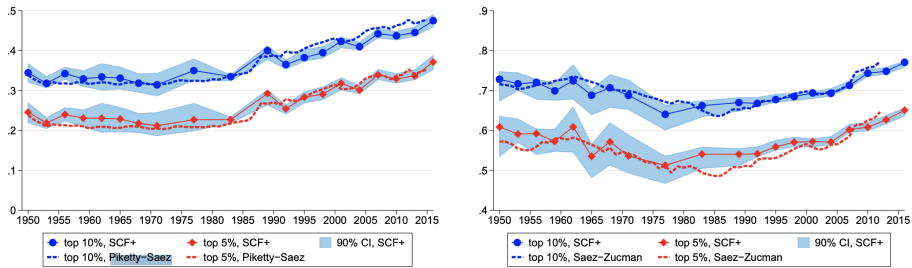
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- This class: **On inequality and the welfare state**
  - Long run, business cycles

Rising Income and Wealth Inequality

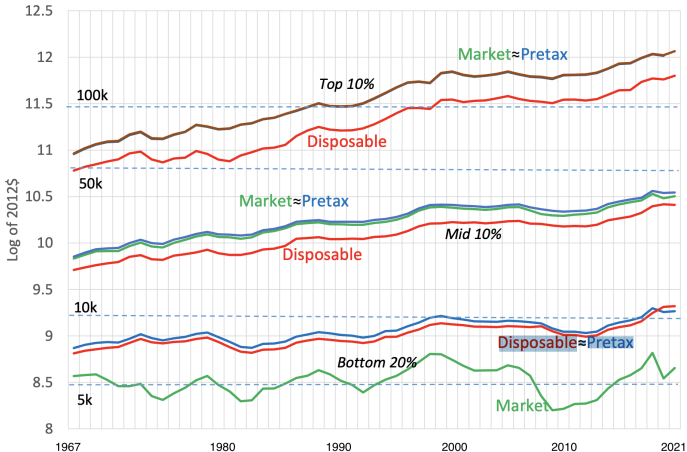
Figure 5: Top 5% and top 10% income and wealth shares



(a) Income (b) Wealth

- Top-income and -wealth shares have increased (SCF+, United States)
  Kuhn, Schularick and Stein (2020)

No Income Growth for the Poor



- Household income has been flat for 5 decades at the bottom (CPS, United States)

  Heathcote, Violante, Perri and Zhang (2023)

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    - *"Use It or Lose It: Efficiency and Redistributional Effects of Wealth Taxation"*
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- **On business cycles:** Should we use fiscal policy to dampen recessions?
  - Targeted instruments? Ferriere and Navarro, IMFER 2025

Capital Income Taxes

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- Why do people accumulate so much wealth?

Heterogeneous Capital Returns Theory

- New theoretical literature in the early 2010s: **heterogeneous capital returns**
  - Benhabib, Bisin, and Zhu (2011), Benhabib, Bisin, and Luo (2019)
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- A simple example with Bob and Jane
  - Bob and Jane start with a stock of wealth $w_0 = 100$ (consume $c = 0$)
  - Bob earns $y_\ell^b = 110$ and makes 10% of returns on wealth
  - Jane earns $y_\ell^j = 100$ and makes 20% of returns on wealth

Heterogeneous Capital Returns Theory

- A simple example with Bob and Jane (cont.)
  - In year 1, Bob has $w_1 = w_0 + y_\ell^b + r^b \times w_0 = 100 + 110 + 10 \times 100 = 220$

    Jane has $w_1 = w_0 + y_\ell^j + r^j \times w_0 = 100 + 100 + 20 \times 100 = 220$

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    Jane has $w_1 = w_0 + y_\ell^j + r^j \times w_0 = 100 + 100 + 20 \times 100 = 220$
  - In year 2, Bob has $w_2^b = w_1 + y_\ell^b + r^b \times w_1 = 220 + 110 + 10 \times 220 = 352$

    Jane has $w_2^j = w_1 + y_\ell^j + r^j \times w_1 = 220 + 100 + 20 \times 220 = 364$

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  - In year 5, Bob has $w_5^b = 832$, Jane has $w_5^j = 992$
  - In year 10, Bob has $w_{10}^b \approx 2012$, Jane has $w_{10}^j \approx 3215$
  - ...

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- Needed ingredients for capital returns to generate (a lot of) wealth inequality
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- Plausible in the data?

Heterogeneous Capital Returns **Data**

Fagereng, Guiso, Malacrino, and Pistaferri (2020)

- Norwegian administrative data
  - Individual tax records 2005-2015
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- Compute individual returns to wealth
  - 33 millions of observations (pooling all years)

Heterogeneous Capital Returns **Data**

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- Large heterogeneity in portfolios
- Very heterogeneous returns on wealth
  - Large heterogeneity *overall*
    - Large heterogeneity across assets
    - Large heterogeneity within classes of assets
  - Large scale dependence: from net worth-10th to -90th percentile
  - Strong persistence across generations

Heterogeneous Capital Returns Portfolio Compositions

TABLE 1A

PORTFOLIO COMPOSITION OF NET WORTH, BY SELECTED FRACTILES[a]

	Gross Wealth Shares				Leverage Ratios			
	Safe	Risky	Housing	Private Equity	Consumer Debt	Student Debt	Long-Term Debt	Gross Wealth (Logs)
Bottom 10%	0.51	0.03	0.43	0.02	0.50	2.47	9.08	10.73
10–20%	0.78	0.03	0.18	0.01	0.42	3.08	3.39	9.06
20–50%	0.31	0.02	0.66	0.01	0.01	0.05	0.40	11.89
50–90%	0.11	0.02	0.86	0.02	0.00	0.01	0.21	13.42
90–95%	0.12	0.02	0.81	0.05	0.00	0.00	0.12	14.12
95–99%	0.13	0.03	0.73	0.11	0.00	0.00	0.10	14.55
99–99.9%	0.15	0.04	0.44	0.36	0.00	0.00	0.07	15.41
99.9–99.99%	0.14	0.04	0.11	0.71	0.00	0.00	0.04	16.94
Top 0.01%	0.08	0.04	0.03	0.85	0.00	0.00	0.02	18.78

[a]The table reports the share of gross wealth in safe assets (cash/deposits, bonds, outstanding claims and receivables), risky assets (foreign assets, mutual funds, directly held listed stocks), housing, private business wealth, consumer debt, student debt, and long-term debt (mortgages and personal loans) for Norwegian taxpayers against selected fractiles of the net worth distribution. Debt leverage values are winsorized at the top 1%. In the last column, we report the logarithm of real gross wealth. Data are for 2005–2015.

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TABLE 3

RETURNS TO WEALTH: SUMMARY STATISTICS[a]

Wealth Component	Mean	St. Dev.	Skewness	Kurtosis	P10	Median	P90
Net worth (before tax)	0.0379	0.0859	−0.79	47.75	−0.0308	0.0321	0.1109
Net worth (after tax)	0.0365	0.0781	−0.71	36.88	−0.0283	0.0316	0.1067
Net worth (before tax, unweighted)	0.0004	0.2205	−6.73	68.46	−0.0600	0.0230	0.1037
Net worth (after tax, unweighted)	0.0155	0.1546	−5.28	56.42	−0.0449	0.0247	0.1040
Financial wealth	0.0105	0.0596	−1.78	22.17	−0.0171	0.0084	0.0530
Safe fin. assets	0.0078	0.0188	4.38	53.52	−0.0106	0.0059	0.0268
Risky fin. assets	0.0425	0.2473	−0.08	6.22	−0.2443	0.0418	0.3037
Non-financial wealth	0.0511	0.0786	1.80	15.47	−0.0215	0.0429	0.1275
Housing	0.0485	0.0653	0.73	9.95	−0.0209	0.0441	0.1165
Private equity	0.1040	0.5169	18.01	836.79	−0.0531	0.0052	0.3616
Debt	0.0236	0.0216	2.51	29.50	0.0030	0.0215	0.0461
Long-term debt	0.0230	0.0209	3.54	56.92	0.0038	0.0209	0.0446
Consumer debt	0.0961	0.1086	4.60	82.60	−0.0124	0.0741	0.2119
Student debt	0.0078	0.0260	0.68	4.14	−0.0213	0.0074	0.0399

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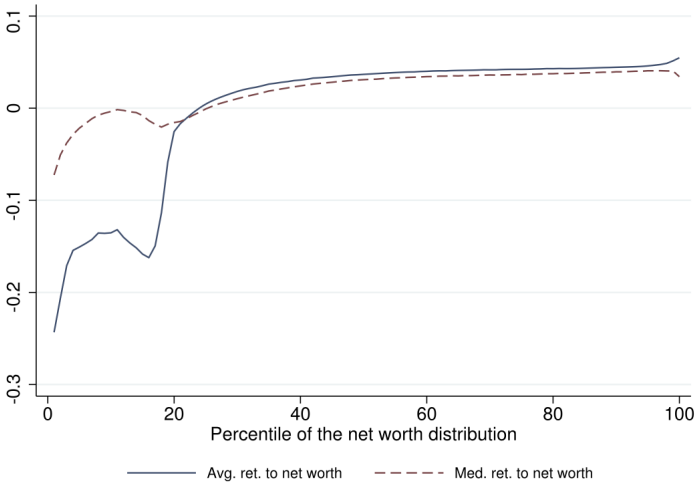
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Heterogeneous Capital Returns Scale Dependence



Panel A: Average and median return to net worth

Heterogeneous Capital Returns Scale and Type Dependence

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- Active literature
  - *"Why Are the Wealthiest So Wealthy?"* Salgado, Halvorsen, Ozkan and Hubmer, Econometrica (2025)
  - Many other papers looking at ...

Implications for Taxation

- New question for taxation: should we tax capital income? Or the stock of capital?
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- Under **homogenous returns**, taxing capital = taxing wealth

$$(1 + r(1 - \tau_k))a_i = (1 - \tau_a)(1 + r)a_i$$

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    - Equivalent as long as $\tau_a = \tau_k r/(1 + r)$

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  - Should we tax capital or wealth?

- Under **homogenous returns**, taxing capital = taxing wealth

$$(1 + r(1 - \tau_k))a_i = (1 - \tau_a)(1 + r)a_i$$

  - τ_k is a tax on capital income
  - τ_a is a tax on the stock of capital (wealth)
    - Equivalent as long as $\tau_a = \tau_k r/(1 + r)$

- What if returns are heterogeneous?

$$(1 + r_i(1 - \tau_k))a_i \text{ vs. } (1 - \tau_a)(1 + r_i)a_i$$

"Use it or lose it!" Guvenen et al. (2023)

- Assume two agents, a and b,
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"Use it or lose it!" Three channels

In a dynamic general-equilibrium model

1. "Use-it-or-lose-it" channel
    - Capital reallocates toward more productive entrepreneurs

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1. "Use-it-or-lose-it" channel
   - Capital reallocates toward more productive entrepreneurs
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   - More productive entrepreneurs will save more
3. "Price" channel
   - Wages and interest rates will adjust

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- Overlapping generations (OLG) model
  - Age h, live up to H years
  - Wealth inheritance

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  - Consumption-savings decision
  - Portfolio choice
    - Choose how much to invest in own technology ("entrepreneurship")

    $=>$ No occupation decision, intensive margin

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  - Stochastic transition downwards

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- Final good: $Y = Q^{\alpha} L^{1-\alpha}$
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  - Intermediates: $Q = \left(\int x_{ih}^{\mu} \right)^{\frac{1}{\mu}}$, with $\mu = 0.9$
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$$\begin{aligned}\Pi(a,z;\tau) &= a + (ra + \pi(a,z) \times (1-\tau_k)) \\ &= a \times (1-\tau_a) + (ra + \pi(a,z))\end{aligned}$$

Environment Household dynamic problem

- Choose how much to work (when $h \leq R$), consume, and save in assets

$$V_h(a, \bar{z}, \mathcal{I}, e, \kappa) = \max_{c,n,a'} u(c, n) + \beta s_{h+1} \mathbb{E}\left[V_{h+1}(a', \bar{z}, \mathcal{I}', e', \kappa)\right]$$

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- Equilibrium: $\int a = \int k$

Calibration

- Standard earnings risk
- Dynamics of entrepreneurship to match fast wealth growth of super wealthy (Forbes 400)
- Collateral constraint: $\nu(z) = 1 + \varphi(\bar{z} - \bar{z}_0)$, with φ to match business debt/GDP

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- Taxes: $\tau_k = 25\%$, $\tau_\ell = 22.4\%$, $\tau_c = 7.5\%$, $\tau_a = 0\%$

Calibration

$\Rightarrow$ Generates high wealth inequality!

	top-50	top-10	top-1	top-0.5	top-0.1
Data (SCF+)	0.99	0.75	0.36	0.27	0.14
Model	0.97	0.66	0.36	0.31	0.23

- Model : 50% households with no business income, 7% earn majority of income from business ("entrepreneur")

Main Experiment A Wealth Tax

- Suddenly and unexpectedly . . . steady-state comparison
- Set $\tau_k = 0$, balance budget with a wealth tax
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  - Lower r, higher wages, large welfare gains: $+6.8\%$! (2022 calibration)

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- Why does capital increase? Three channels

Main Experiment A Wealth Tax

- Why does capital increase? Three channels
  - "Use-it-or-loose-it" [fixing prices & decision rules to benchmark] $K \uparrow$
  - GE effects [with prices of new equilibrium] $K \downarrow$
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- All three channels are approximately of the same magnitude!

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- Welfare gains by age and entrepreneurial ability

TABLE IX – Welfare Gain/Loss by Age Group and Entrepreneurial Ability

	Entrepreneurial Ability Groups ($\bar{z}_i$ Percentiles)					
Age	0–40	40–80	80–90	90–99	99–99.9	99.9+
groups:	*RN Reform*					
20	7.0	7.3	7.9	8.9	10.6	11.7
21–34	6.5	6.3	6.3	6.6	7.0	6.8
35–49	5.1	4.4	3.9	3.3	1.7	0.1
50–64	2.3	1.8	1.4	0.8	–0.6	–1.8
65+	–0.2	–0.3	–0.4	–0.6	–1.2	–1.8

  - The high-wealth/low-z (= the old) **loose**
  - The young **benefit**... from $\tau_k = 0$ (high z), from higher w (low a)

Optimal Taxation Capital and Wealth Taxes

Optimize steady-state fiscal system

- Optimal wealth tax:
  - $\tau_a \approx 3\%$, $\tau_\ell \approx 14\%$
  - Much larger welfare gains: $+$ 8.7%

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- Transitions

Taxing Capital? Taking Stock 1/2

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    - When some households are rich and poor and face a borrowing constraint
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    - When the young work and save "too much" to accumulate for retirement
  - No! $\tau_k = -14\%$! When there is (also) inequality in capital income
    - Some individuals are better than other in investing in good projects
    - Better allocation of capital

Taxing Capital? Taking Stock 2/2

- With heterogeneous capital returns, positive wealth tax
  - Mostly for efficiency reasons! Reallocation
  - Does it decrease wealth inequality? Not necessarily

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  - Does it decrease wealth inequality? Not necessarily
- Implementability?
- What if high returns reflect rents? Gaillard and Wangner (2024)

Going Forward Data

- What else can we study with the admin Norwegian dataset?
  - Many papers: on who becomes rich, who gives what to their kids, housing, ...

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- *"Why Are the Wealthiest So Wealthy? New Longitudinal Empirical Evidence and Implications for Theories of Wealth Inequality"*

  Ozkan, Hubmer, Salgado, Halvorsen, Econometrica (forthcoming)
  (graphs from an older working paper version, 2024)

Empirical Approach

- Study lifecycle dynamics of wealth accumulation
  - 1993-2015 Norwegian panel data on wealth and income

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  - How many of the wealthiest at age 50 were already wealthy at age 25?
    - "Old Money" vs. "New Money"
  - Where does the wealth of the wealthiest at age 50 come from?
    - Labor income, capital returns, saving rates, inheritances, initial wealth?
- Complementary frontwards approach

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- Complementary frontwards approach
- Accounting . . . complemented with models!

Methodology

- Build measures of net wealth and capital returns
  - Follow Fagereng et al. (2020)

Methodology

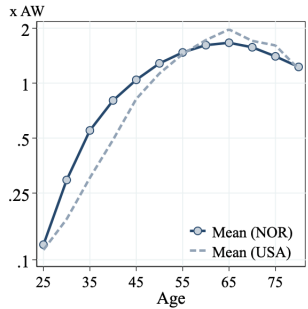
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  - Value of equity owned excludes intangibles

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  - Follow Fagereng et al. (2020)
  - Indirect ownership for retained earnings (7 layers)
  - Inheritance severely undervalued
  - Value of equity owned excludes intangibles
- Average wealth (AW) $\approx$ \$437,000 in 2015
  - Life-cycle similar to the US

FIGURE 3 – WEALTH DIST

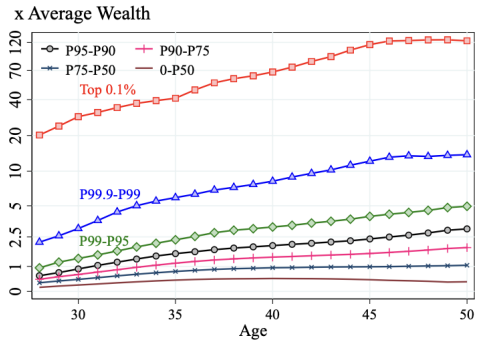
(A) Average Net Worth



Backwards Life-Cycle Profiles

- The Rich Started Rich
  - Top-0.1% 50-54y have 125 AW $\approx$ \$55 million
  - In their late 20s have already 20 AW $\approx$ \$9 million
  - Higher within-cohort inequality earlier in life

(a) Backward-Looking Wealth Profile



Backwards Life-Cycle Profiles

$< P75$	$[P75, P90)$	$[P90, P95)$	$[P95, P99)$	$[P99, P99.9)$	$\geq P99.9$
A. 1994 Wealth Quantile for $BW^{50-54}_{\geq P99.9}$ households					
21.4%	7.4%	5.9%	13.0%	23.2%	29.2%

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  - 1/3 of the wealthiest at age 50 started in the top-0.1%

    $\Rightarrow$ "Old Money"
  - 1/5 started with very little wealth

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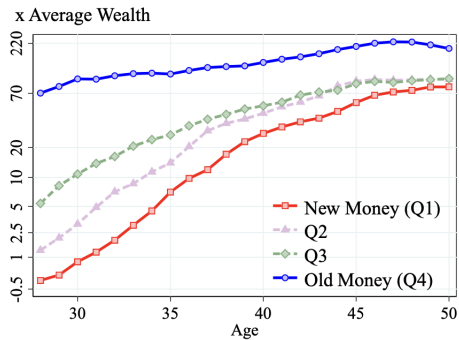
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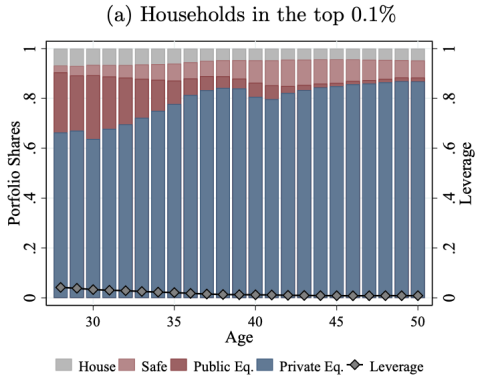
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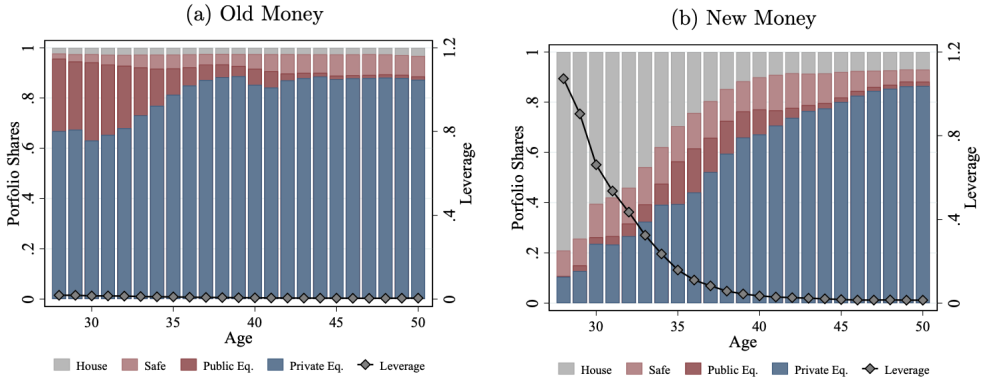


Portfolio Compositions The Rich Hold Equity



- Public + Private equity always above 80%, with little leverage

Portfolio Compositions The Rich Hold Equity



- Public + Private equity always above 80%, with little leverage
  - Old Money: even less housing at younger ages
  - New money: leveraged at younger ages

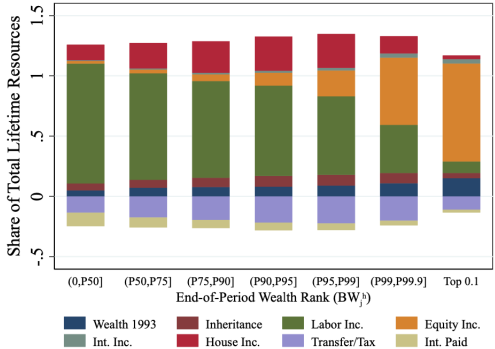
Sources of Income Income of the Rich is Equity Returns

- Accounting equation

$$W_{i,\tau} = W_{i,1993} + \sum_{t=1994}^{\tau} [L_{i,t} + H_{i,t} + R^E_{i,t} + R^S_{i,t} + R^H_{i,t} + T_{i,t} - I^L_{i,t}] - \sum_{t=1994}^{\tau} C_{i,t}$$

Sources of Income Income of the Rich is Equity Returns

Figure 6 – Decomposition of Total Lifetime Resources



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Why are the Wealthiest so Wealthy?

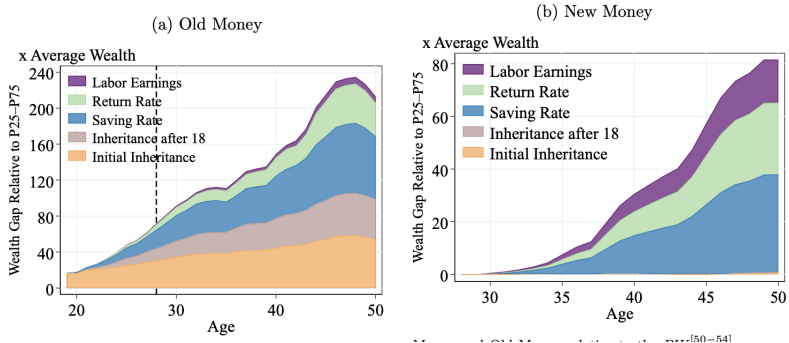
- End wealth can differ because of: inheritances, labor earnings, return rates & saving rates
- Accounting: Shapley-Owen decomposition
  - Simulate the counterfactual evolution of wealth factor by factor

Why are the Wealthiest so Wealthy? Inheritances!



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Why are the Wealthiest so Wealthy? Taking Stock

- A third is "Old-Money"
  - $\approx 40\%$ comes from inheritances
  - Returns on equity and saving rates
- A fifth is "New-Money"
  - No inheritance, more labor income, mostly returns on equity and saving rates

Why are the Wealthiest so Wealthy? Taking Stock

- A third is "Old-Money"
  - $\approx 40\%$ comes from inheritances
  - Returns on equity and saving rates
- A fifth is "New-Money"
  - No inheritance, more labor income, mostly returns on equity and saving rates
- How many individuals?...
  - Norway: 5 million individuals ... Age $50-54 \approx 250{,}000$?
  - Top 0.1% of $50-54 \approx 250$ individuals
  - Old Money ≈ 75 individuals, New-Money ≈ 50 individuals?

Why are the Wealthiest so Wealthy?

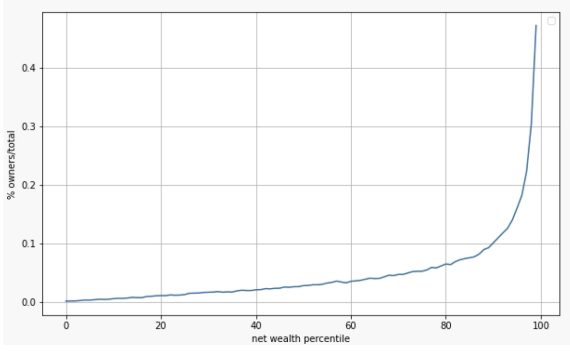
- Going forward: opening the black box of private equity

Why are the Wealthiest so Wealthy?

- Going forward: opening the black box of private equity
- Going forward: Bacher, Ferriere, Irarrazabal, Lizarraga and Zheng (2026)
  - Same data
  - Focus on private limited liability companies
  - Entrepreneurs or investors? *"Skill vs Money: A Fresh Take on Business Ownership"*

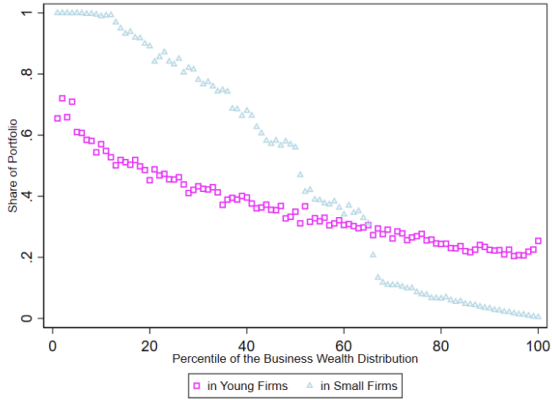
Private Businesses and Wealth Accumulation

- Where are private business owners situated in the net wealth distribution?
  - In the top of the distribution



Private Businesses and Wealth Accumulation

- Where are private business owners situated in the net wealth distribution?
- What kind of firms do they owe?
  - Heterogeneity



Private Businesses and Wealth Accumulation

We have a sample of 45,011,44 obs of 422,347 unique individuals and 362,398 unique firms from 2006-2018.

	Mean	Std. Dev.	P10	Median	P90	P99
		Person Level				
Age	49.92	12.30	34.00	49.00	67.00	77.00
Business wealth (thous.)	316.36	3,910.09	5.49	36.74	449.57	4,225.22
Net worth (thous.)	986.25	7,722.64	38.84	367.46	1,725.10	9,585.05
Return on business wealth (%)	19.23	82.17	-35.99	13.26	86.75	302.20
No. bus. owned	17.72	72.75	1.00	2.00	26.00	347.00
		Company Level				
Age	10.65	11.87	1.00	7.00	24.00	56.00
Equity (thou.)	1,698.57	6,1297.74	8.80	98.64	1345.95	1,9414.57
No. person owners	19.29	136.18	1.00	2.00	6.00	595.00

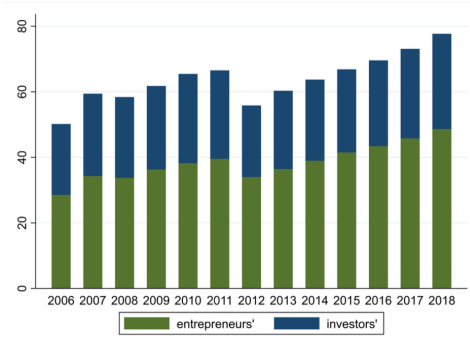
Notes: All monetary variables are expressed in thousands of 2015 USD.

- Sample selection: owning at least 1e-6% of firm's share (directly, indirectly)
  - Data cleaning, negative equity

Investors or Entrepreneurs

- Empirical distinction bw entrepreneurs & investors
  - Owners who also supply skill
  - Owners who only supply money
- Role Database
  - Entrepreneurs if have a Role and some shares
  - Multiple layers

Investors or Entrepreneurs Total Wealth



- Roughly 40% to investors and 60% to entrepreneurs

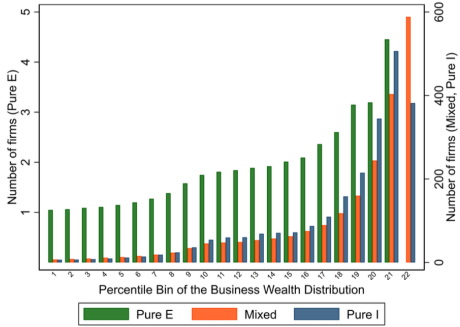
Investors or Entrepreneurs **Properties**

	All	Pure Entrepreneurs	Pure Investors	Mixed Owners
No. bus. owned	17.99	1.26	16.57	39.56
	(72.77)	(0.70)	(62.11)	(116.55)
Share of bus. owned (%)	31.85	75.88	12.43	27.40
	(33.43)	(25.87)	(16.79)	(22.29)
Net worth (thous.)	994.58	583.24	648.85	2,227.87
	(7,710.08)	(1,525.48)	(3,881.88)	(14,849.63)
Business wealth (thous.)	320.08	134.46	131.66	949.86
	(3,905.09)	(510.43)	(1,056.94)	(7,946.29)
Share of bus. wealth in E	42.44	100.00	0.00	75.18
	(46.94)	(0.00)	(0.00)	(28.65)
Return on business wealth (%)	19.14	19.01	18.08	21.69
	(82.14)	(91.69)	(79.13)	(77.55)
Return on E. bus. wealth (%)	21.68	19.01	–	24.60
	(89.85)	(91.69)		(87.69)
Return on I. bus. wealth (%)	6.37	–	18.08	-20.09
	(134.74)		(79.13)	(209.83)
No. obs	45,011,444	820,769	21,535,709	22,654,966

Investors or Entrepreneurs **Properties**

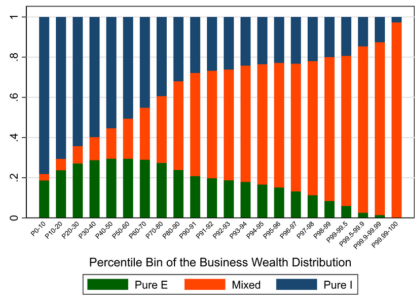
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Investors or Entrepreneurs Number of Firms

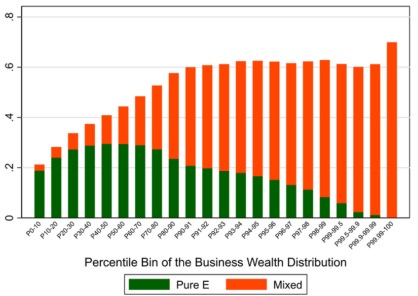


- Entrepreneurs hold fewer firms, the wealthiest are mixed and hold a huge number of firms

Investors or Entrepreneurs Cross-section



(a) Composition of Owners



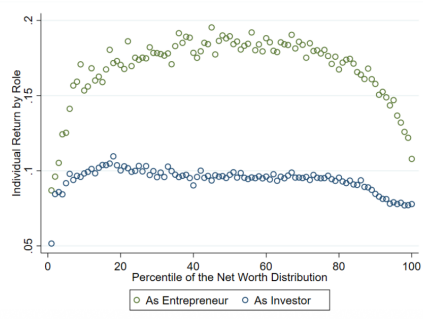
(b) Share of Business wealth in E

- Entrepreneur wealth increases in the business wealth distribution, the wealthiest are mixed

Investors or Entrepreneurs Scale dependance



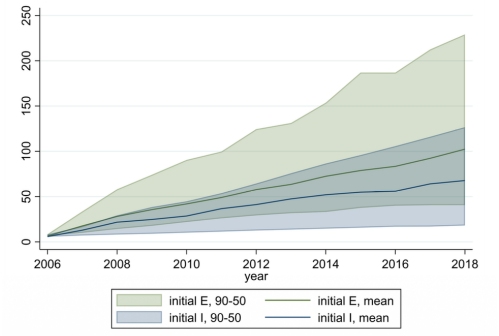
(a) Mean



(b) Median

- Returns on entrepreneurial wealth are higher, and exhibit much stronger scale dependance!

Investors or Entrepreneurs Life-cycle



- Business-wealth owners in the bottom quintile in 2008 (beware of the selection bias...)

Investors or Entrepreneurs

- Which investment has higher returns? As entrepreneur or investor?
- How do you make it to the very top? As entrepreneur or investor?

Investors or Entrepreneurs

- Which investment has higher returns? As entrepreneur or investor?
- How do you make it to the very top? As entrepreneur or investor?
- Who can invest in private businesses?
- Should we tax differently entrepreneurs and investors?