Why are the Wealthiest So Wealthy?

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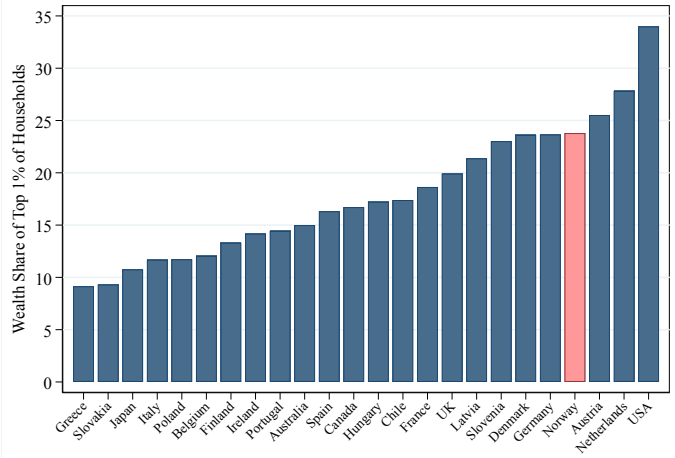
Introduction

Motivation: Wealth is concentrated at the top in many countries



Source: OECD, Statistics Norway, and SCF using most updated data.

- Wealth is very concentrated at the top (Piketty, 2014; Saez and Zucman, 2016; Bricker et al., 2018; Smith et al. 2020, ...)
- This concentration has sparked a debate if and how wealth should be taxed (Guvenen et al. 2021, Boar and Midrigan, 2022)
- Critically, policy depends on economic forces behind wealth accumulation

Why are the wealthiest so wealthy?

- **Income heterogeneity:** high earnings or high earnings risk
  (Modigliani, 1988; Cataneda et al., 2003, De Nardi et al., 2010,...)
- **Rate of return heterogeneity:** large and/or persistent heterogeneity in returns to wealth
  (Quadrini 2000, Bach et al., 2020; Cagetti and De Nardi, 2006; Fagereng et al., 2020; Benhabib et al, 2019,...)
- **Inheritance heterogeneity:** receive larger inheritances and intervivos transfers
  (Kotlikoff and Summers 1981; Gale and Scholz, 1994, De Nardi, et al., 2015; Boserup et al. 2016;,...)

We study life-cycle wealth dynamics

Earlier literature studied these forces mostly using **cross-sectional** data and calibrated quantitative models

(Notable exceptions: Pugh, 2020; Fagereng et al., 2020, 2021; Black et al. 2021,...)

- SCF (cross-sectional tri-annual), PSID (panel but miss the top), US tax data (strong assumptions)
- Data on **dynamics** of wealth accumulation distinguishes and quantifies the importance of various mechanisms

Using Norwegian administrative data, we follow households to document their **lifecycle wealth dynamics**

- Dynamic wealth profiles and portfolio shares
- Components of lifetime resources (eg. labor and capital income, inheritances, etc.)
- Rates of return

Main comparisons: Rich vs. Poor Households and "Old Money" vs. "New Money"

Quantitative model

Estimate OLG model to quantify importance of different forces

- Labor income inequality, entrepreneurial risk (rate of return heterogeneity), and bequest heterogeneity
- Why the wealthiest are so wealthy?
  - Combination of **return and bequest heterogeneity** is key

Equilibrium policy experiment

- Inheritance tax: reduces GDP and wealth inequality
  - From status quo, raising wealth tax preferred by majority

Data and Definitions

Data and sample selection

We use high quality, administrative panel data for entire population of Norway from 1993 to 2015

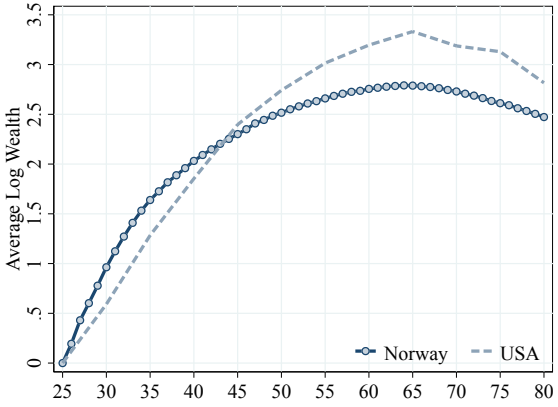
Fagereng-Guiso-Malacrino-Pistaferri (2020); Fagereng-Mogstad-Ronning (2020); Alstadsæter-Jacob-Kopczuk-Telle (2017)...

- Rich panel following individuals for 23 years with data on assets/liabilities and income sources:
  - deposits, bonds, public stocks, mutual funds, private equity (book value), imputed housing values, liabilities
  - interest, dividends, retained earnings, imputed income from housing (‣ chart)
- No top-coding, limited misreporting (third-party reporting), and little attrition (death/migration)
- Excludes pension wealth, "hidden" offshore wealth

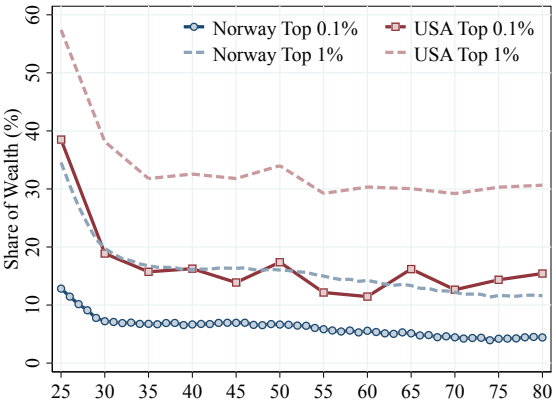
Minor sample selection

- Include individuals >=25 years with non-missing wealth ‣ Sample
- Total sample of ~51.1 million hhs-year obs with an average of ~2.2 million hhs per year ‣ Shares ‣ Tax

Cross-Sectional View: Average wealth and concentration over the lifecycle



(a) Average Wealth Profile



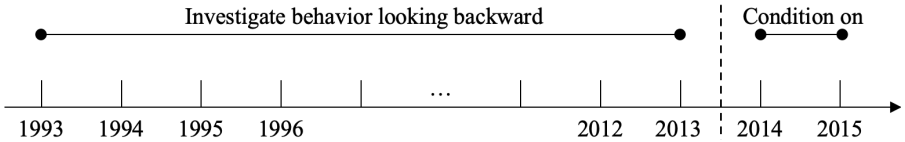
(b) Wealth Concentration

Average wealth hump-shaped (↑~270 log points). Inequality decreases over lifecycle

▸ Portfolio-Age ▸ Portfolio-Wealth ▸ Time Series

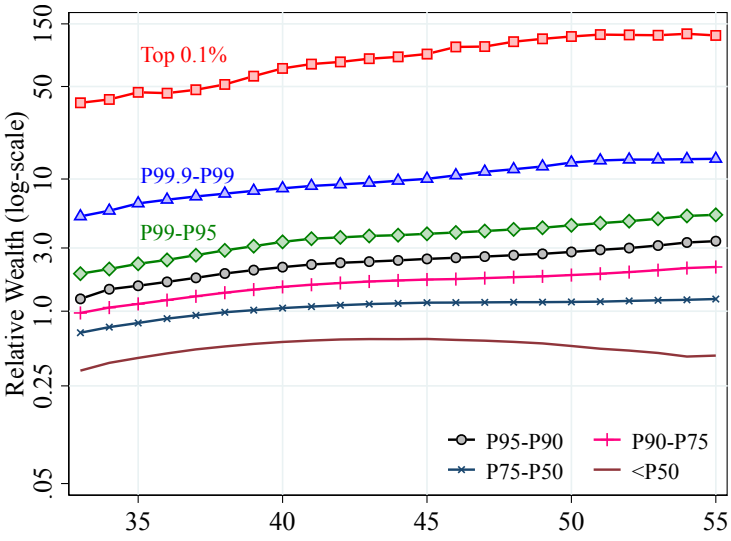
The Dynamics of Wealth Accumulation

Backward-looking approach: From where did the rich come from?



- Rank head of households by average net wealth in 2014-15 within 5-year age groups
  - Wealth groups: (i) top 0.1%, (ii) P99.9/P99, (iii) P99/P95 etc.
- Follow groups of households *backward* for 21 years over 1993–2013 period
  - Compute moments of wealth distribution, portfolio composition, returns, etc.
- Limitation: selecting on an endogenous variable
  - Complement with **forward-looking approach** and quantitative model

Dynamic average wealth profiles

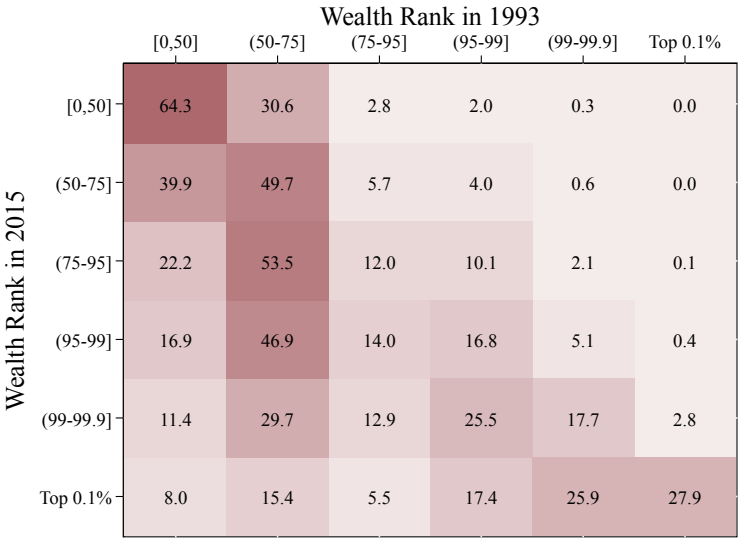


Large dispersion already at age 30: e.g. top 0.1% own ~38 times average wealth

On average, high persistence of wealth: but significant heterogeneity within these groups (next)

‣ Age ‣ Median ‣ Forward

Retrospective transition matrix



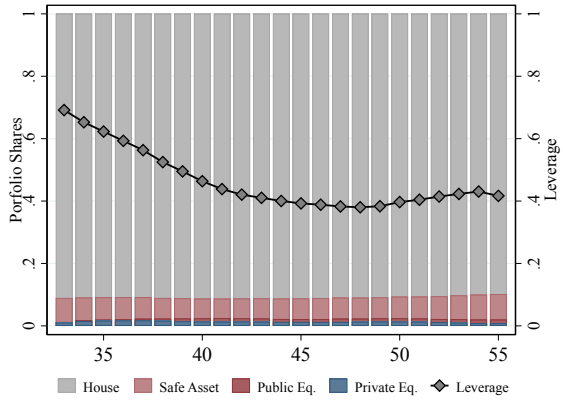
Old Money: Half of top 0.1% in 2015 were already in top 1% in 1993

New Money: Quarter of top 0.1% in 2015 came from below 75 pctile in 1993 ▸ Age ▸ Forward

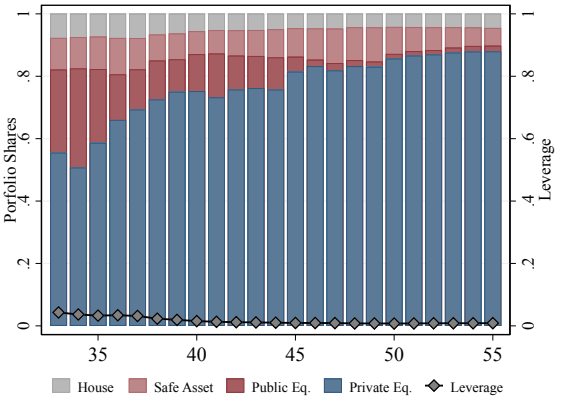
The Dynamics of Wealth Accumulation

Portfolios, Sources of Income, and Returns

Retrospective portfolio shares for 55 year old



(a) Households at bottom 50%



(b) Households at top 0.1%

- Rich have high and increasing private equity share; low-mid wealth have mostly housing ▸ Forward

▸ Age ▸ Entrepreneurs

Decomposing lifetime resources

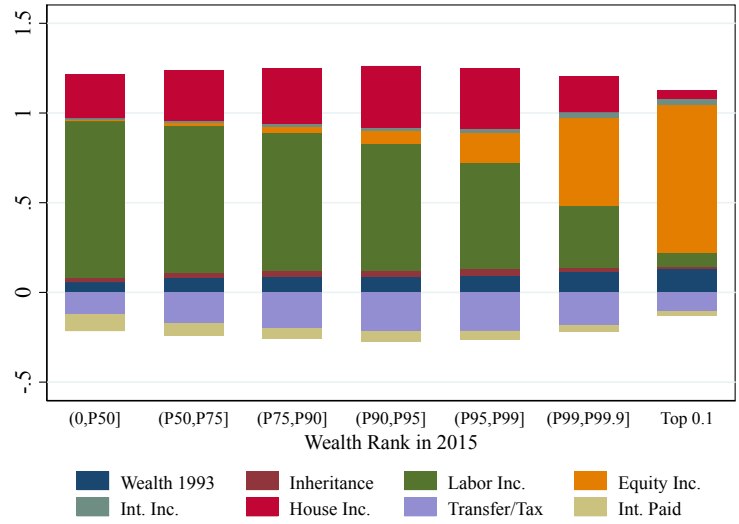
To understand the sources of wealth accumulation, we consider household budget constraint
(Similar to Black, Devereux, Landaud, Salvanes, 2020, 2022)

$$W_{i,2015} = \underbrace{W_{i,1994} + \sum_{t=1994}^{2014} L_{i,t} + \sum_{t=1994}^{2014} H_{i,t} + \sum_{t=1994}^{2014} RK_{i,t} + \sum_{t=1994}^{2014} T_{i,t} - \sum_{t=1994}^{2014} LB_{i,t}}_{\sum Y_{it}\text{=total lifetime resources}} - \sum_{t=1994}^{2014} C_{i,t}$$

- $W_{i,t}$ is net wealth of household i in $t \in \{1994, 2015\}$
- $L_{i,t}$ is labor income of i in year t
- $H_{i,t}$ is inheritances and intervivos
- RK_{it} is capital income
- T_{it} taxes and transfers
- LB_{it} is interest paid for liabilities
- C_{it} is consumption

Normalize by total lifetime resources, $\sum Y_{it}$, and compare hhs across wealth distribution

Decomposition of lifetime resources for 55 year old



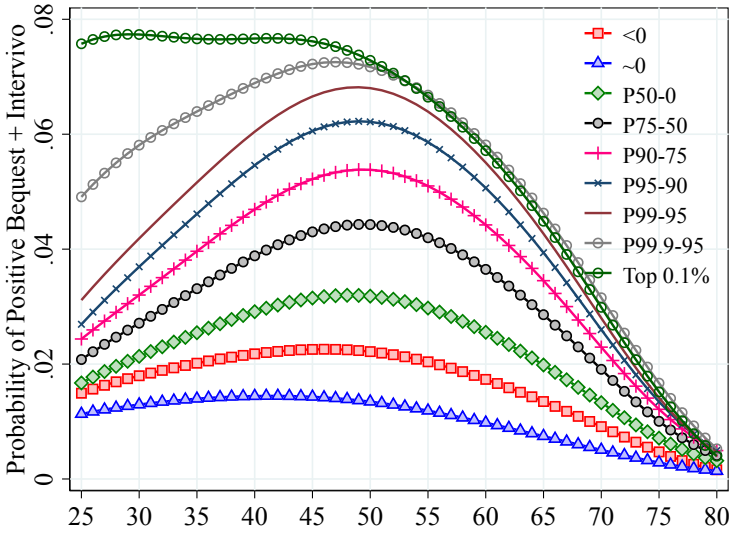
Wealthy: lifetime income mostly from **equity**

Middle income and the poor: lifetime incomes mainly from **labor**

Initial wealth and **inheritances** on average account for small fraction of resources even at top

- Detailed
- Forward
- Heterogeneity
- Dynamic decomposition

Timing of the inheritances and inter-vivos transfers



Wealthy: Higher probability of inheritances/intervivos earlier in the life cycle

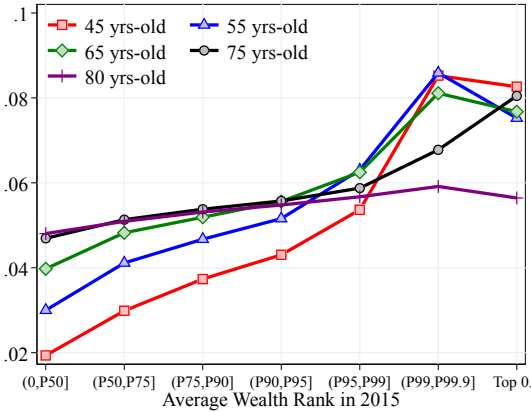
▸ Inter vivos

Middle and low wealth: Probability of inheritances + intervivos hump-shaped over the life cycle

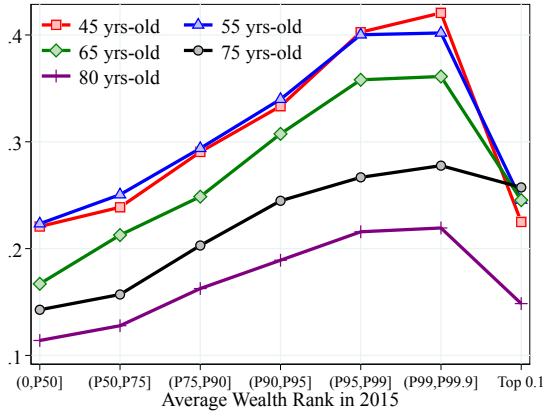
Portfolio composition of inheritances: for wealthy mostly private equity; for rest mostly housing

▸ details

Lifetime returns on assets across the wealth distribution



(a) Returns on Net Wealth



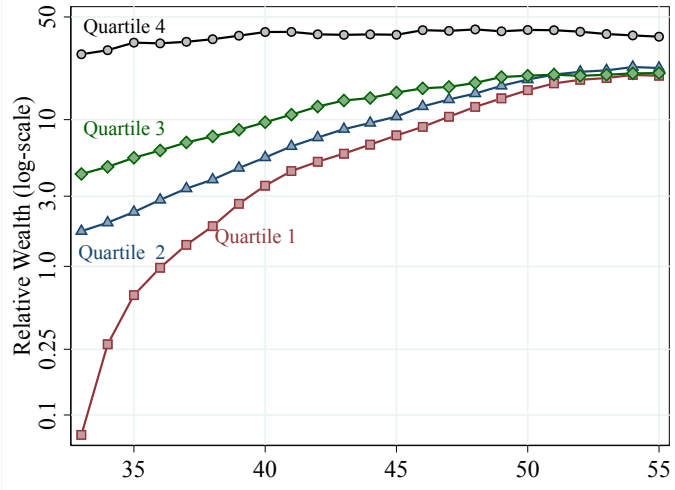
(b) Returns on Equity

- Calculate returns on assets (Fagereng et al., 2020) over 21 yrs average ‣ Details ‣ Others
- Wealthy HHs experience higher average lifetime returns, mostly from equity ‣ Forward

The Dynamics of Wealth Accumulation

“Old Money” versus “New Money”

Old Money vs. New Money: wealth profiles



Note: Average wealth within group, normalized by economy-wide average. Hhs at top 1% of wealth distribution in 2015 ranked by wealth quartile in 1993. Sample of 2,005 hhs in 2015 (40K obs).

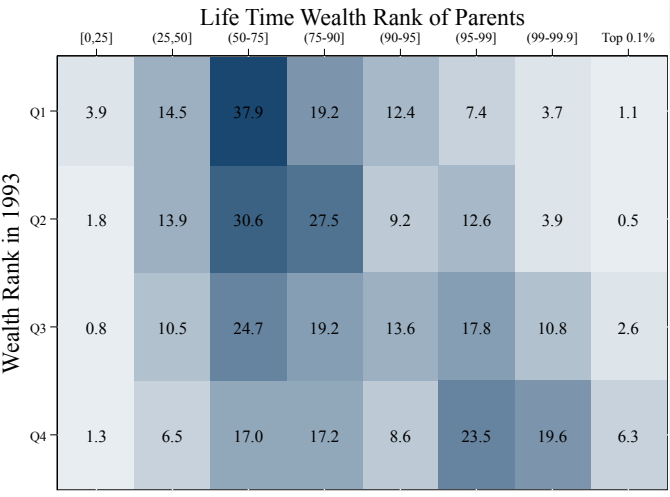
Wealth profile for top 1% at age 55 by initial wealth quartile

"New-Money" households (Q1): significant wealth growth (by construction)—start out with just 10% of average wealth in the economy

Similar results for top 0.1%

▸ Top 0.1 ▸ Forward ▸ Education ▸ Earnings

Old Money vs. New Money: parental wealth ranks



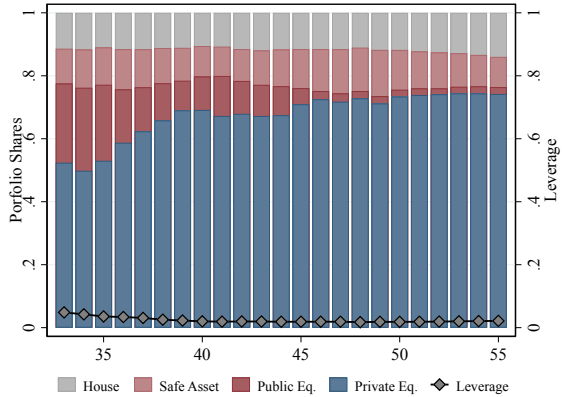
Note: intergenerational transition matrix, showing parental lifetime wealth rank distribution (column) conditional on new money/old money ranking group of child (row).

Do new money come from modest backgrounds?

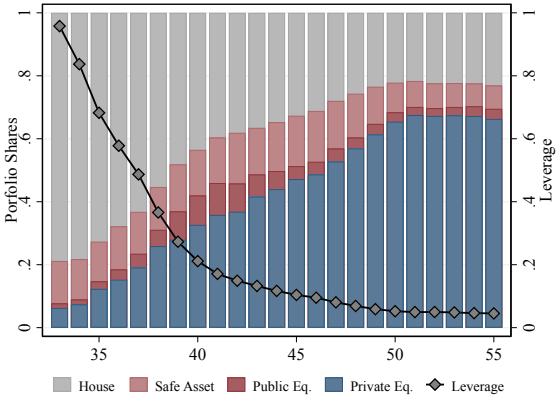
New-Money (Q1): only 12% have parents in top 5%, more than half have parents below P75

Old-Money (Q4): almost half of them have parents in top 5%

Old Money vs. New Money: portfolio shares



(a) Old Money (Qrtile 4 in 1993)



(b) New Money (Qrtile 1 in 1993)

Significant accumulation of Private Equity of "New-Money" Households

▸ Other Age ▸ Forward ▸ Entrepreneurs ▸ Comparison ▸ Returns

Quantitative Model

Model overview

OLG model with finitely-lived households

Quadrini 2000, Cagetti and De Nardi 2006, Guvenen et al. 2020, Hubmer et al. 2020,...

- Workers/entrepreneurs who supply labor and invest in a risk-free asset and/or their business
- Rich heterogeneity in labor market efficiency and in entrepreneurial ability

Population Dynamics

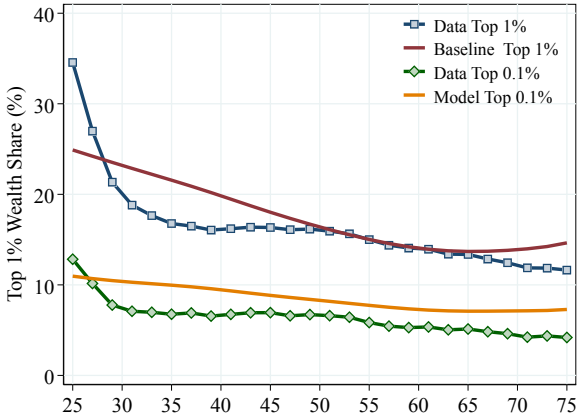
- At death, replaced by offspring who inherits assets, labor and entrepreneurial ability (imperfectly)
- Timing of inheritance is stochastic, consistent with the data

Production Technology

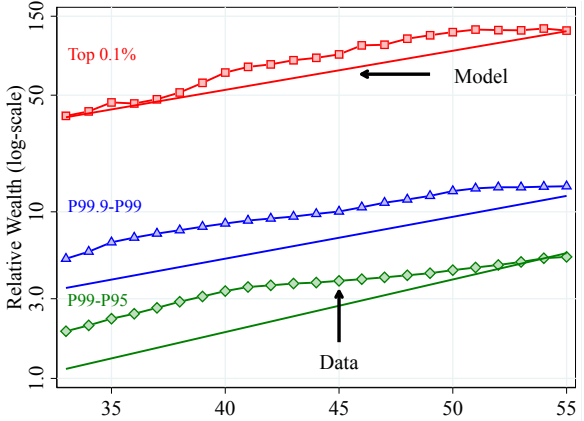
- Entrepreneurs produce differentiated goods using capital, subject to collateral constraint

▸ Problem ▸ Production ▸ Heterogeneity ▸ Bequests ▸ Estimation

Model Fit: Concentration and dynamic profiles



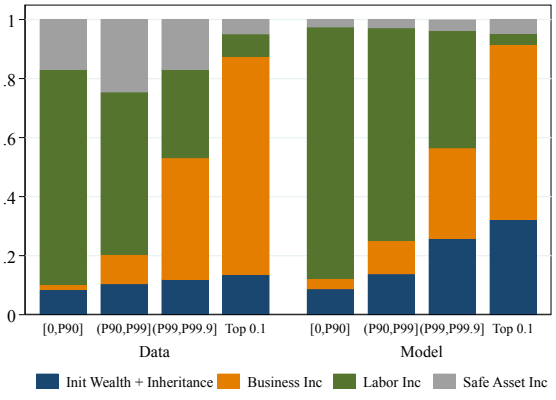
(a) Concentration over the Life Cycle



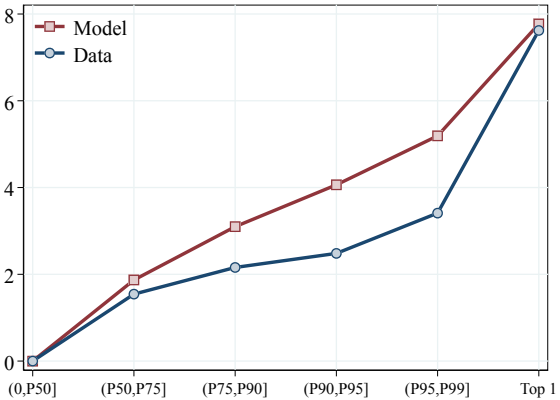
(b) Backward Wealth Profiles

Model matches well life-cycle inequality and dynamic wealth profiles

Model Fit: Sources of income and returns



(a) Sources of Lifetime Income



(b) Returns across wealth distribution

Model matches well the sources of life time income and wealth-return profile

Quantitative analysis

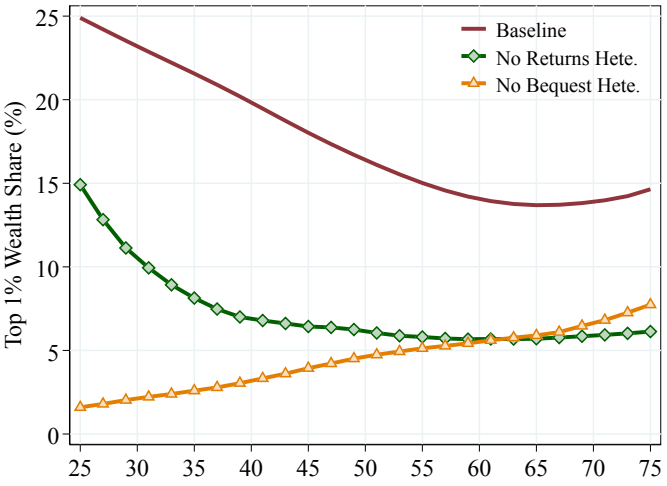
Shut down key features of the model one at a time

- Rate of return heterogeneity
- Bequests heterogeneity
- Tax on inheritances

Under counterfactual parameterizations, we ask

- **Decomposition:** What happens to wealth concentration over the life cycle?
- **Bequest taxes:** What is output and welfare impact of eliminating inheritance tax?

Decomposition: Wealth concentration over the lifecycle



Note: Top 1% share of wealth within each age groups in data and model.

Figure shows life-cycle inequality

Return heterogeneity affects level of inequality, but not profile

Bequest heterogeneity has significant impact on life-cycle inequality

General equilibrium effects of inheritance tax

	Baseline	Eliminate Inheritance Tax and		
		drop transfers	raise wealth tax	raise cap. inc. tax
Bequest tax (avg, progressive)	12.5%	0.0%	0.0%	0.0%
Wealth Tax (above threshold)	0.2%	0.2%	0.36%	0.20%
Capital Income Tax (flat)	28.0%	28.0%	28.0%	30.2%
Δ GDP		+1.21%	+1.09%	+0.59%
Δ C of median hh.		+0.15%	+0.80%	+0.46%
Δ Top 1% wealth share		+1.09 pp.	+0.92 pp.	+0.29 pp.

Eliminate tax on inheritances and **cut transfers**

- Increases incentives to save: GDP ↑
- Increases starting capital of (on average) high-ability offsprings of wealthy entrepreneurs: GDP ↑
- However, inquality ↑, C of median hh. barely moves and majority disapproves from ex-ante welfare perspective

General equilibrium effects of inheritance tax

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		drop transfers	**raise wealth tax**	**raise cap. inc. tax**
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Δ% C of median hh.		+0.15%	+0.80%	+0.46%
Δpp. Top 1% wealth		+1.09 pp.	+0.92 pp.	+0.29 pp.

Eliminate tax on inheritances and **raise wealth or cap income taxes** (revenue neutral)

- Raise wealth tax: ↑ GDP as wealth tax distorts entrepreneurs less
  - Also preferred by majority rule and utilitarian planner: ↑ C of median hh.
- capital income tax: inferior to raising wealth tax as loads more on productive high-return

Conclusions

We find that those that reach the top of the wealth distribution

- Start significantly richer with large fraction of wealth in private equity early in life,
- are more likely to receive inheritances earlier in life (mostly equity), and
- enjoy higher returns over the life cycle (overall and within asset class)
- New money households: but some start their life very poor
    - Experience steep wealth growth and high returns on equity

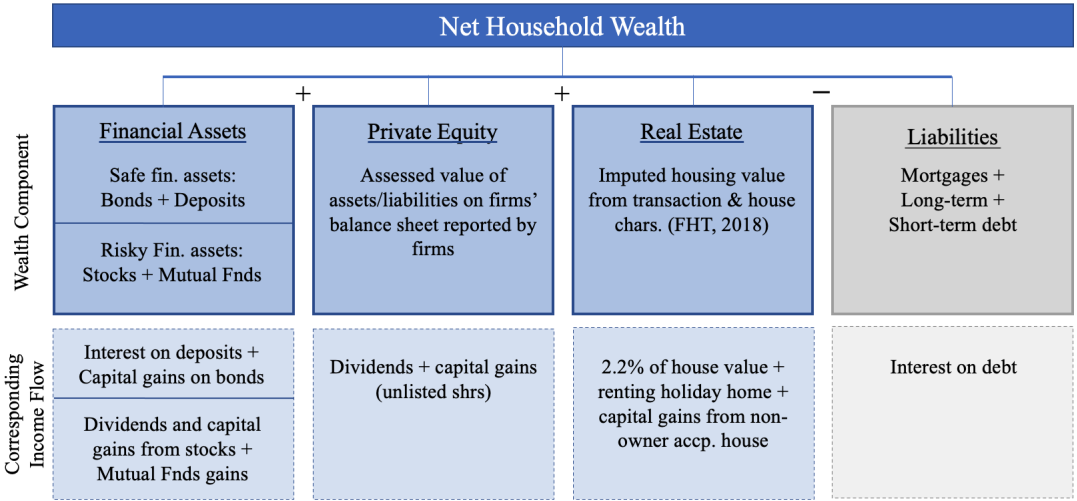
Then estimate quantitative model to quantify importance of return and inheritance heterogeneity

- Both crucial for wealth inequality in cross-section and over life cycle
- Inheritance taxes generate significant distortions, raising wealth tax preferred

Appendix

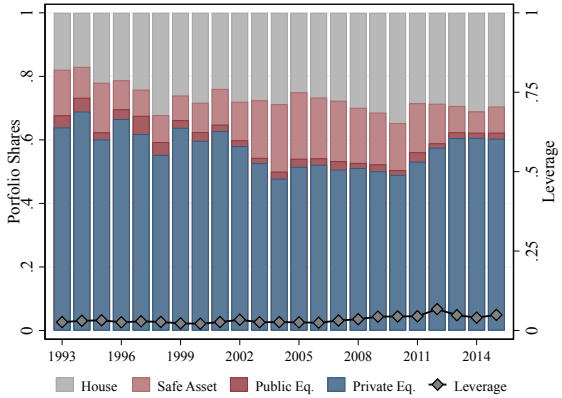
Wealth and income measures

Back

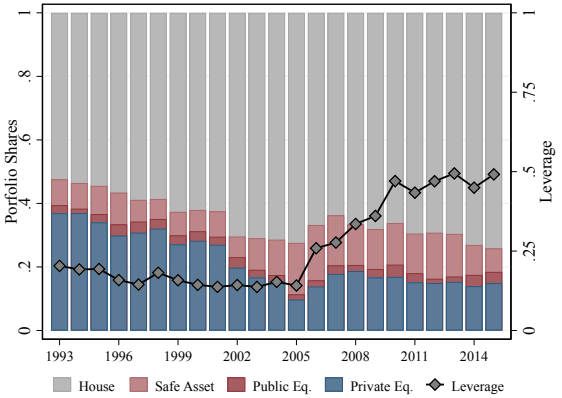


Forward-Looking Portfolio Shares and Leverage

Back



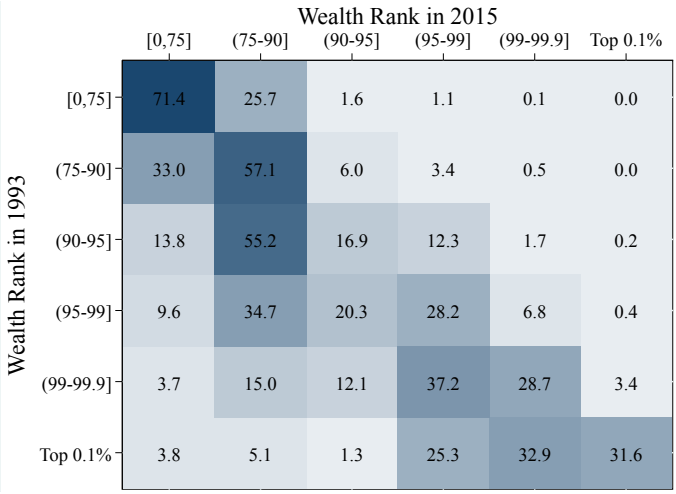
(a) Top-to-Top Transition (Q4)



(b) Top-to-Bottom Transition (Q1)

- Those that start and remain at the top maintain high share of risky assets
- Households start at the top but fall to the bottom quartile reduce their share in risky assets

Intragenerational Transition Matrix (Forward)



The figure shows intragenerational transition matrix between 25 and 55 years old (Forward)

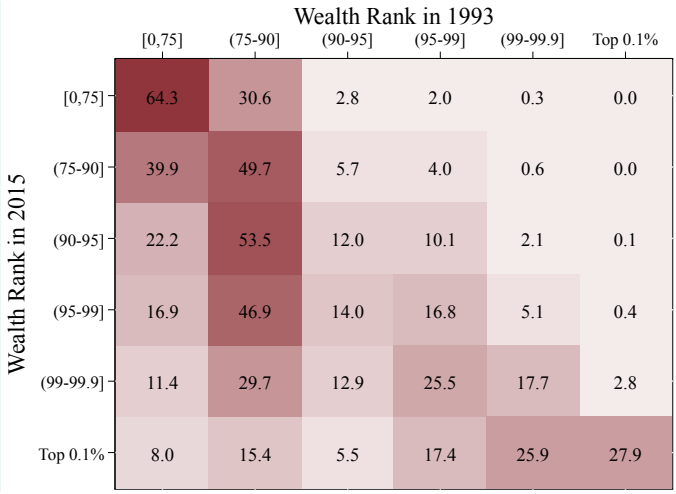
Similar results to backward looking

There is significant persistence at the top

But there is a significant fraction of household going bottom-to-top

▸ Back

Intragenerational Transition Matrix (Backward)



The figure shows intragenerational transition matrix between 25 and 55 years old (Backward)

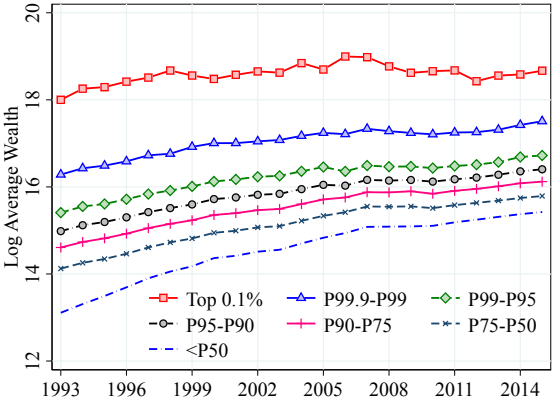
Similar results to backward looking

There is significant persistence at the top

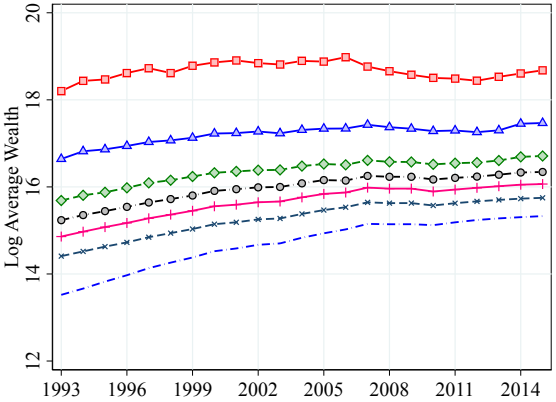
But there is a significant fraction of household going bottom-to-top

Forward-Looking: Average Wealth Profile for Different Age Groups

Back



(a) Forward Looking: 40/45 yrs old in 1993

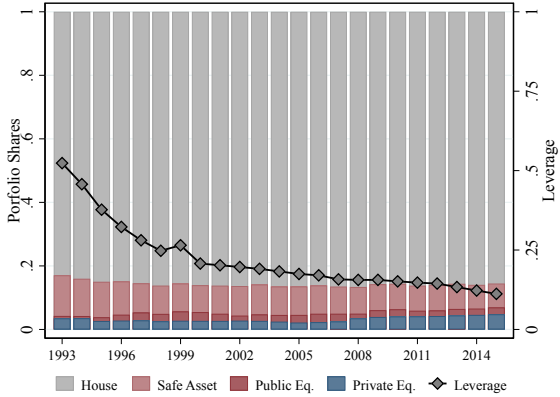


(b) Forward Looking: 50/55 yrs old in 1993

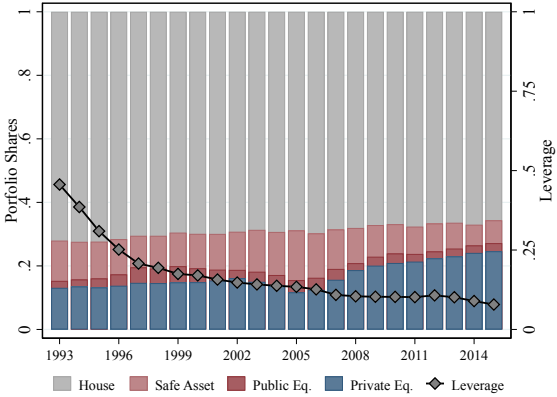
- The figures show the average wealth profile for different age groups
- Persistence of wealth level increases with age

Backward-Looking: Retrospective Portfolio Shares for 50/55 year-olds in 2015

Back



(a) Households in 90/95 pcts



(b) Households in 99/99.9 pcts

- Figure shows the portfolio shares over the life cycle conditional on wealth rank at age 55 in 2015
- As we look at higher percentiles, there is an increase in share of private equity across all ages

Old Money vs. New Money: lifetime returns

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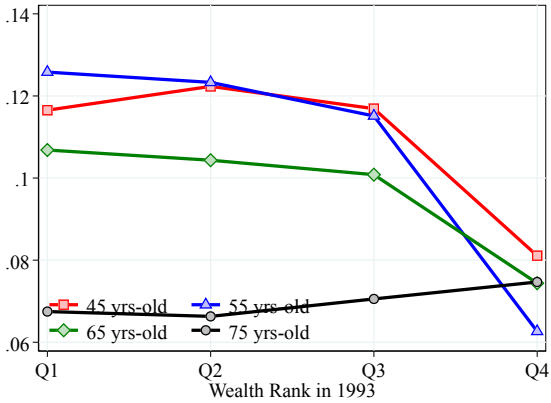
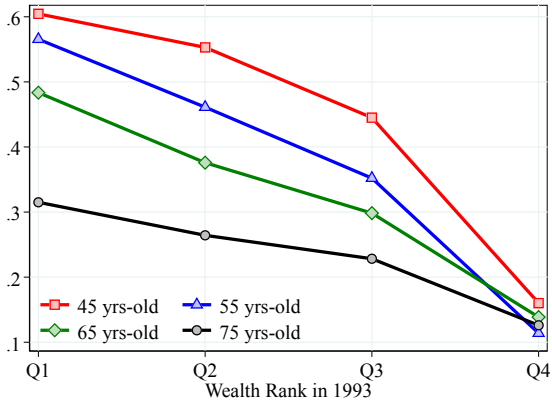


(a) Returns on Net Wealth



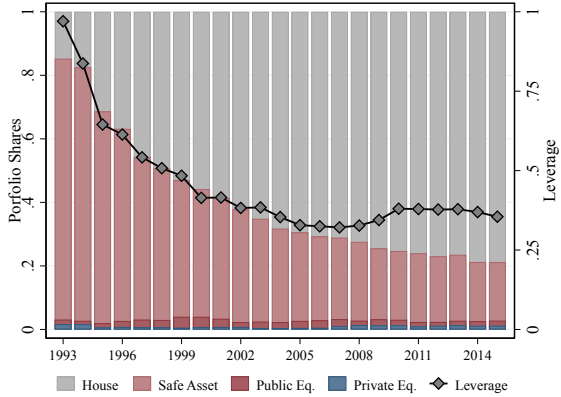
(b) Returns on Equity

- Average lifetime return for 2015-top 1% group by their 1993 wealth
- "New-money" households (Q1) earn higher returns mostly from equity

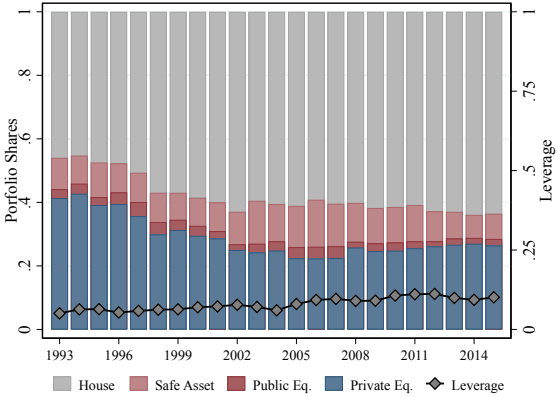
Forward

Those at top hold a large share of wealth in private equity (Forward Looking)

Back



(a) Household at bottom 50%



(b) Household at top 0.1%

- Figure shows the portfolio composition over the life cycle conditional in the wealth rank at age 25 in 1993
- Rich hhs invest in private equity even at age 25; Low/middle wealth hhs increase housing

Wealth Tax System in Norway

‣ Back Data ‣ Back Model

Wealth Tax is taxed at 0.7% at municipality level and 0.15% at national level

- The tax applies to the value of wealth above NOK 1.2 million (140,000 USD) for single/not married taxpayers and NOK 2.4 million (280,000 USD) for married couples
- Hence, wealth tax kicks-in around the 55th percentile of the wealth distribution for individuals and households
- Capital income taxes have been flat at 28% from 1992-2012, thereafter gradually reduced to 22% today

Wealth Tax over time

- In 1994 tax was more progressive (max rate of 1.5%) with much lower threshold (NOK 120,000/$15,000 USD)
- The threshold has been adjusted up mainly in the last 10 years, together with a reduction in tax rates
- Different asset classes had varying degrees of rebates; Housing has always been taxed at 25% of its value

Inheritance Tax: Abolished in 2014

- Before abolition, inheritance and gift tax had a zero rate below NOK 470,000/$56,000 USD
- After that, rates were 6% to 15% depending on status of beneficiary and amount

Income Tax System in Norway

Back

Dual income tax system

- Proportional tax on all net income (23% in 2018)
  - Includes wages, pension, business, capital income less losses and interest paid.
  - Is split between local, regional, and central governments
- Progressive tax on gross labour and pension income
  - Starting at 174 000 NOK, rates from 1.9% to 16.2%
- 2 main deduction applied: Minimum standard deduction, Personal allowance

Shareholder model

- Dividends exceeding the risk-free rate are taxed as ordinary income
- The remainder is only taxed at the corporate tax rate (23%) with a marginal tax rate of (46.6%)

Household Heterogeneity

Back

- Income risk (match income profiles, income risk, and intergenerational income correlation)

$$
\begin{aligned}
\log y_{ih} &= \underbrace{\lambda_i}_{\text{permanent}} + \underbrace{\kappa_h}_{\text{lifecycle}} + \underbrace{e_{ih}}_{\text{AR(1)}}, \\
e_{ih} &= \rho_e e_{i,h-1} + \epsilon_e \\
\lambda_{child} &= \rho_\lambda \lambda_{parent} + \epsilon_\lambda
\end{aligned}
$$

- Returns heterogeneity (match intergenerational wealth correlation and returns)

$$
\begin{aligned}
x_{ih} &= z_{ih} k_{ih}, \\
\log z_{ih} &= \underbrace{\bar{z}_i}_{\text{permanent}} + \underbrace{\zeta_{ih}}_{\text{AR(1)}} \\
\zeta_{ih} &= \rho_\zeta \zeta_{i,h-1} + \epsilon_\zeta \\
\bar{z}_{child} &= \rho_z \bar{z}_{parent} + \epsilon_z
\end{aligned}
$$

Inheritance Heterogeneity

Back

Stochastic bequests over the life-cycle

- Given age h, a household of type $\theta = (\bar{e}, \bar{z})$ draws from an type-specific inheritance distribution Γ_θ with age- and type-specific probability $p_{h,\theta}$
- Γ_θ is an equilibrium object, corresponding to the distribution of parental bequests (which equals the distribution of wealth at death, integrating over parental types θ' conditional on child type θ)
- Note if $p_{1,\theta} = 1$ and $p_{h,\theta} = 0$ for all $h \geq 2$ and for all θ, then this setup reduces to offsprings receiving a deterministic bequest in first period

- Final goods producer buys intermediate goods and combines with labor to produce the final given by

$$Y = Q^{\alpha} L^{1-\alpha} \text{ with } Q = \left(\int_i x_i^{\mu} \right)^{1/\mu}$$

- The problem of the final good producer can be written as

$$\max_{\{x_i\}, L} \left(\int_i x_i^{\mu} \right)^{\alpha/\mu} L^{1-\alpha} - \int_i p_i x_i - wL,$$

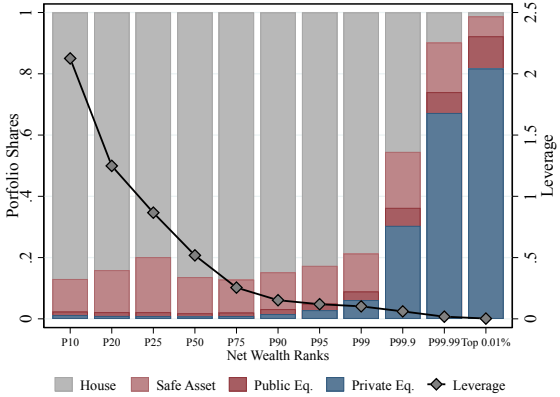
  where p_i is the price of the intermediate good i and w is the wage rate

- The entrepreneurs/household produce intermediate goods using capital k and ability z

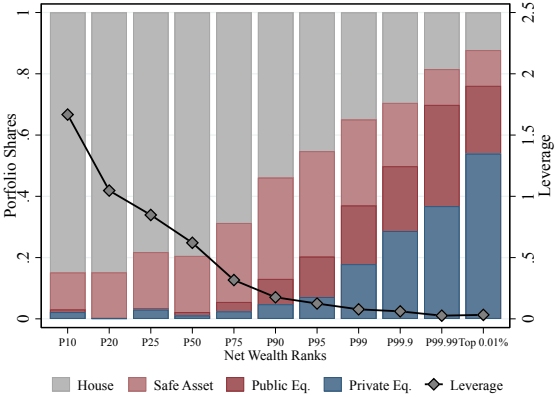
$$\begin{aligned} \pi(k,z) &= p(kz)kz - \delta k = \alpha (kz)^{\mu} Q^{\alpha-\mu} L^{1-\alpha} - \delta k \\ k &\leq \vartheta a \text{ with } \vartheta \geq 1 \end{aligned}$$

Cross-Sectional View: Portfolio Composition

Back



(a) Norway

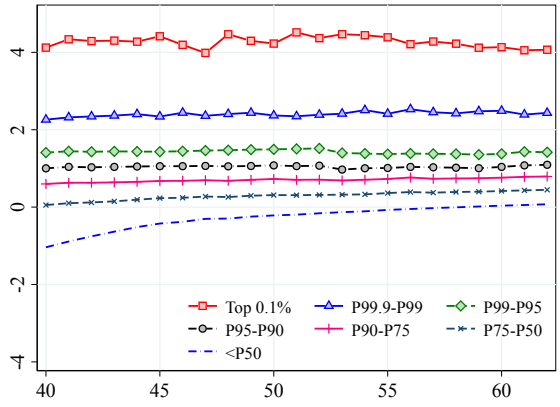


(b) United States (SCF)

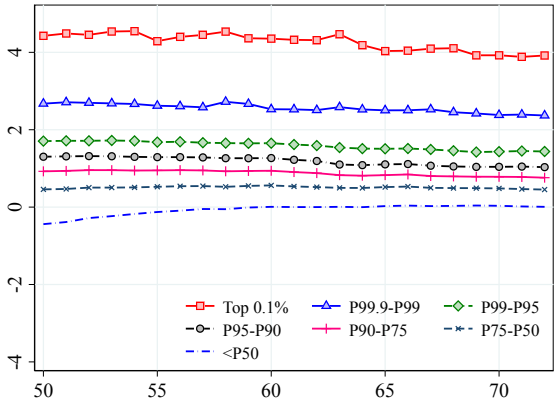
- Large fraction of private + public equity at the top of the distribution: ~80% in Norway and ~60% in the United States
- Large difference in public equity: stock market in Norway (~0.65 GDP in 2017) is smaller than in the US (~1.5 GDP in 2017)

Forward-Looking Wealth Profiles for Other Age Groups

Back



(a) Forward-Looking Profile (40/44)



(b) Forward-Looking Profile (50/54)

- Figure shows forward-looking profiles for different age groups ranked by wealth in 1993
- We find little convergence at top percentiles of the distribution

A Flexible Income Process

Back

We estimate an econometric process that has the following features: (i) an AR(1) process (z_t^i) with innovations drawn from a mixture of normals, whose mixture probability can vary with age; and (ii) an i.i.d. normal mixture transitory shock (ε_t^i), whose mixture probability can again vary with age:

$$\text{Level of log earnings:} \quad y_t^i = g(t) + \alpha^i + z_t^i + \varepsilon_t^i \tag{1}$$

$$\text{Persistent component:} \quad z_t^i = \rho z_{t-1}^i + \eta_t^i, \tag{2}$$

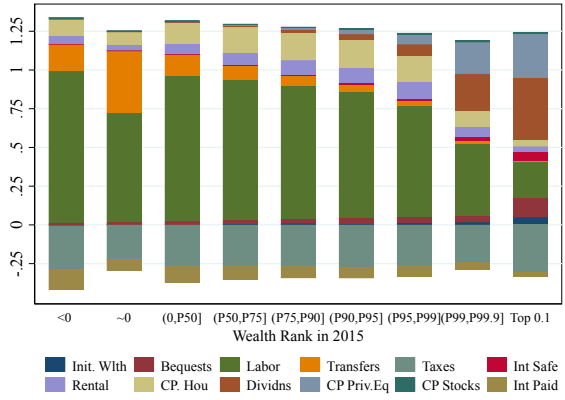
$$\text{Innovations to AR(1):} \quad \eta_t^i \sim \begin{cases} \mathcal{N}(\mu_{\eta,1}, \sigma_{\eta,1}) & \text{with prob. } p_{z,t} \\ \mathcal{N}(\mu_{\eta,2}, \sigma_{\eta,2}) & \text{with prob. } 1 - p_{z,t} \end{cases} \tag{3}$$

$$\text{Initial condition of } z_t^i\text{:} \quad z_0^i \sim \mathcal{N}(0, \sigma_{z_0}) \tag{4}$$

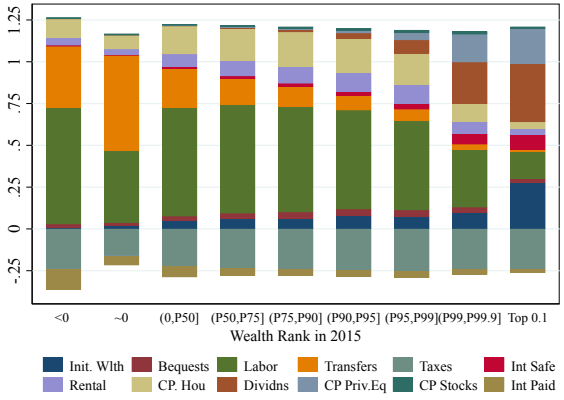
$$\text{Transitory shock:} \quad \varepsilon_t^i \sim \begin{cases} \mathcal{N}(\mu_{\varepsilon,1}, \sigma_{\varepsilon,1}) & \text{with prob. } p_{\varepsilon,t} \\ \mathcal{N}(\mu_{\varepsilon,2}, \sigma_{\varepsilon,2}) & \text{with prob. } 1 - p_{\varepsilon,t} \end{cases} \tag{5}$$

Backward-Looking Decomposing: Total Resources Between 1993-2015

Back



(a) Heads of HHs of 45/49 yrs old

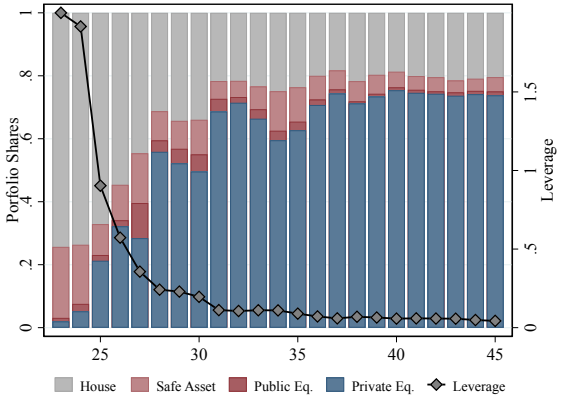


(b) Heads of HHs of 65/69 yrs old

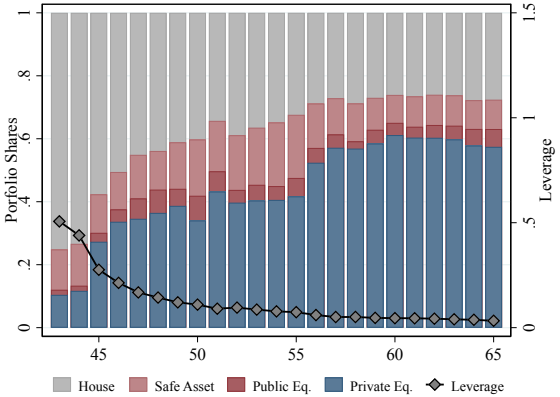
- Figure shows the share of cumulative resources for households between 1993/2015 for two age groups
- The share of initial wealth increases with age as individuals had more time accumulate resources

Backward-Looking Portfolio Shares and Leverage

Back



(a) New Money (Q1 in 1993 and 45/49 yrs old in 2015)

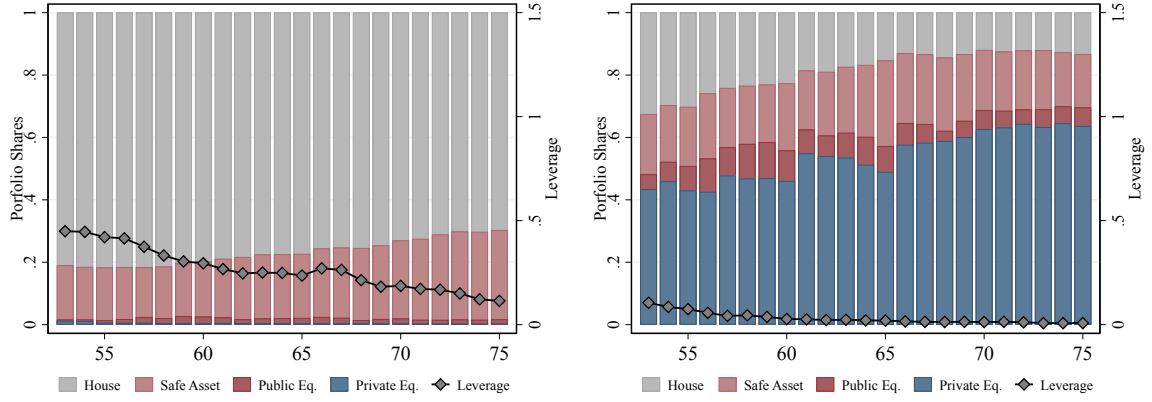


(b) New Money (Q1 in 1993 and 65/69 yrs old in 2015)

- Similar results for other age groups: those that reach the top of the wealth distribution do so by accumulating private equity
- and taking leveraged positions against their assets (mostly housing at early stages)

Backward-Looking: Retrospective Portfolio Shares for 75/79 years-old in 2015

Back



(a) Households at bottom 50%

(b) Households at top 0.1%

- Figure shows the lifecycle portfolio shares conditional on wealth rank at age 75/79 in 2014/15
- Rich have larger share of wealth on private equity than mid-wealth households over their lifetime

Calculation of Returns on Assets

Back

We follow Fagereng et al. (2020) and calculate returns on assets as

$$r_{it}^{n} = \frac{y_{it}^{s} + y_{it}^{e} + y_{it}^{h} - y_{it}^{b}}{w_{it}^{g} + F_{it}^{g}/2},$$

- y_{it}^{s}, y_{it}^{e}, and y_{it}^{h} are income from financial assets (e.g. bonds), equity (e.g. stock and private equity), and housing
- y_{it}^{b} is the sum of interest paid in all forms of debt
- w_{it}^{g} is the stock of wealth at the beginning of the period
- F_{it}^{g} is net flows of gross wealth during period (assets yields happens during year and hhs add/subtract from assets)

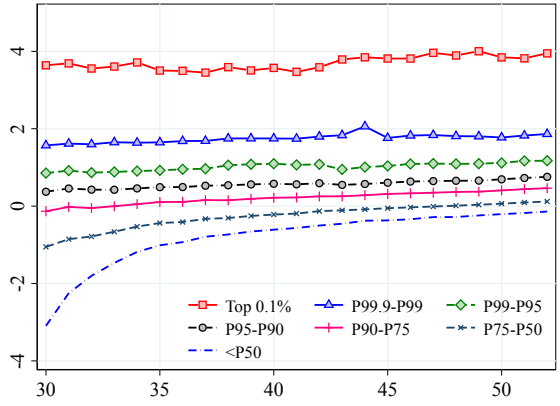
We calculate similar returns for safe assets, equity, and housing, which income flows are calculated as follows

- y_{it}^{s}: interest income
- y_{it}^{e}: dividend income + capital gains from stock + capital gains from stocks
- y_{it}^{h}: income from non occupied house + capital gains from housing

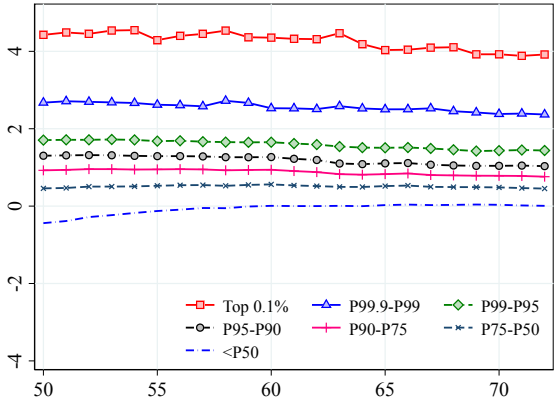
We calculate returns for household with assets above \$500 USD and trim top/bottom 0.5% in each year

Forward-Looking Wealth Profiles for Different Age Groups

Back



(a) Wealth Profile for 30/34 yrs old in 1993

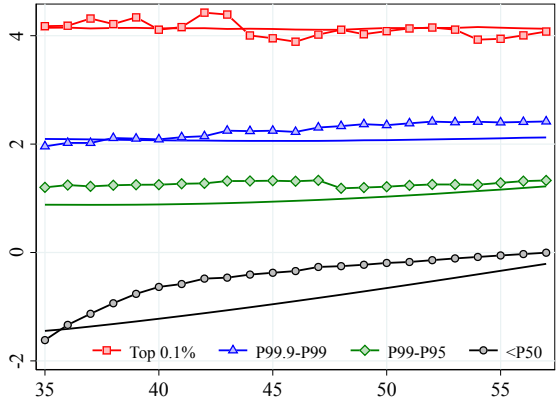


(b) Wealth Profile for 50/54 yrs old in 1993

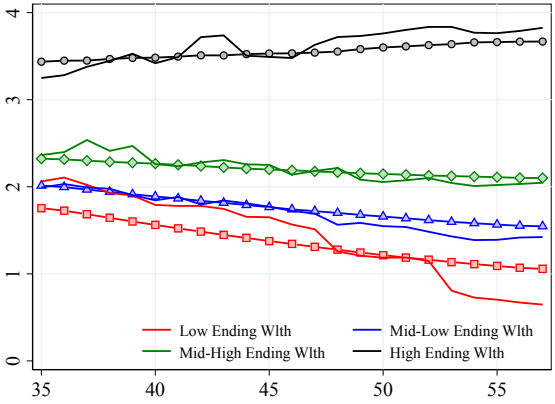
- Wealth differences persist later in life as workers move into retirement (right plot)
- with little catch-up from households at bottom half of the distribution

Model Fit: Forward-Looking Profiles by Wealth Ranks

Back



(a) Mean Wealth by Wealth Rank (2015)

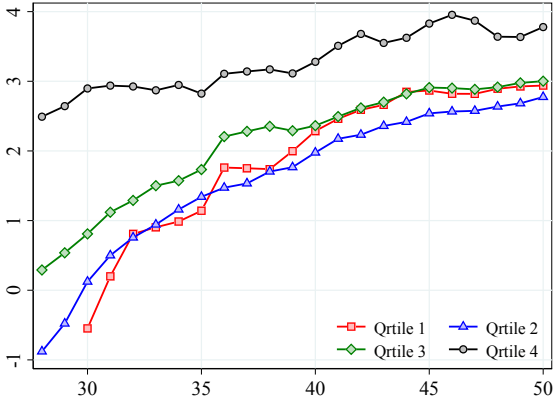


(b) Top 1% Mean Wealth (1995) by Qtiles of Wealth (2015)

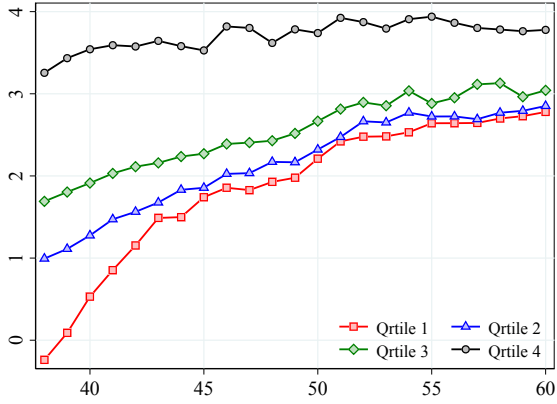
- Model matches wealth accumulation for rich hhs looking forward
- It fails in accounting for the rapid increase in wealth experienced by those that start poor

Backward-Looking: Average Wealth for those at top 1% in 2015 for Age Groups

▸ Back



(a) Relative wealth for 45/49 yrs old in 2015

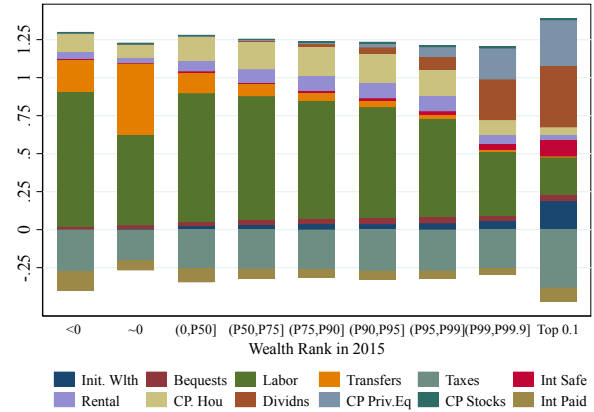


(b) Relative wealth for 65/69 yrs old in 2015

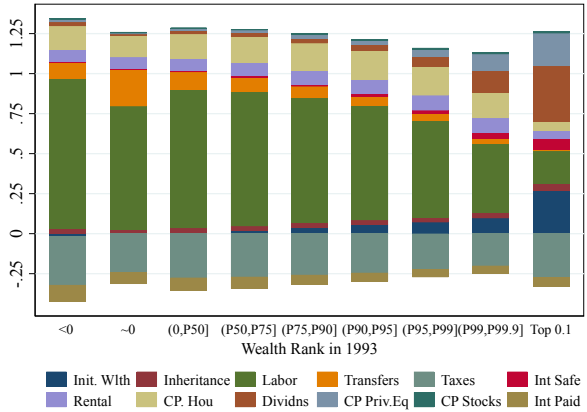
- Evolution of log-wealth conditional on last-period wealth rank (top 1% in 15) and by starting wealth quartile (in 93)

Total Resources Between: Details and Forward

Back



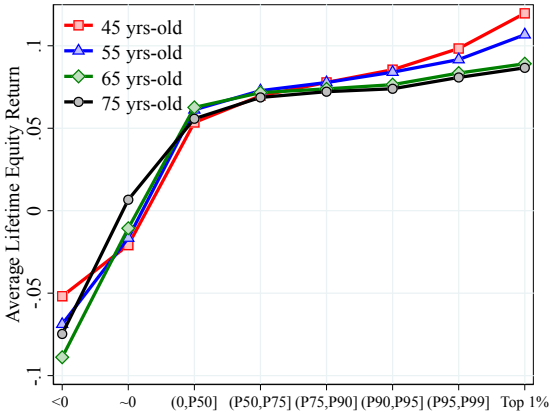
(a) Backward-Looking (Ranked in 2015)



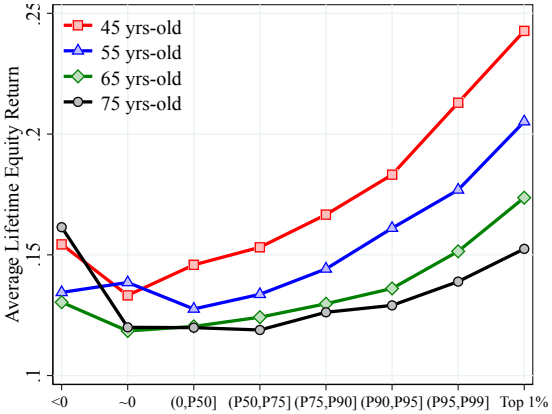
(b) Forward-Looking (Ranked in 1993)

Forward-Looking Lifetime Returns on Assets,

Back



(a) Returns on Total Assets

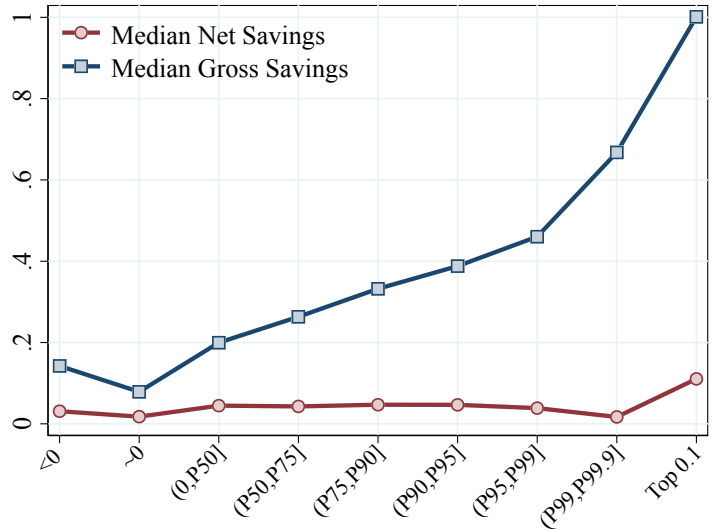


(b) Returns on Private Equity

- We rank individuals in 1993 and we look returns on assets looking forward
- Hhs at the top experience larger lifetime returns, mostly from equity;

Forward Looking Saving Rate Across the Distribution

Back



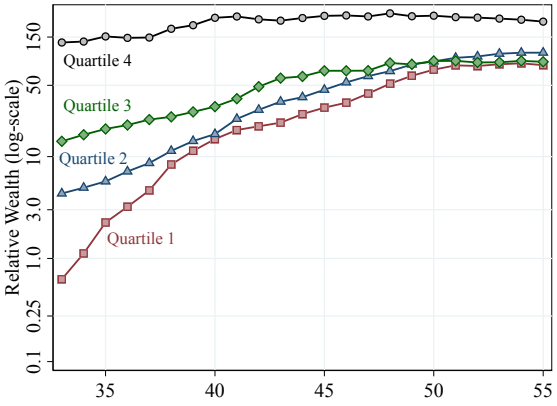
Average saving rate over lifetime
Fagereng-Blomhoff-Moll-Natvik (2020)

Households ranked with respect to wealth in 1993

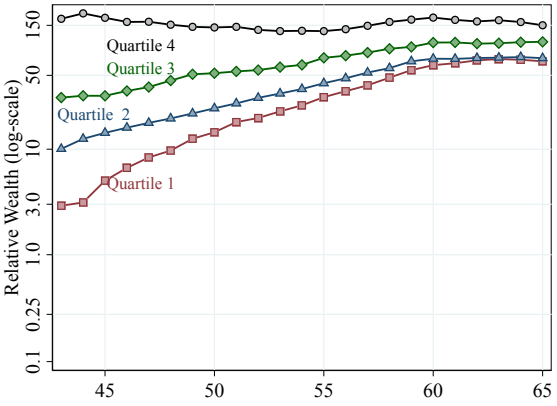
Rich household have higher saving rates over lifetime

Backward-Looking: Average Wealth for those at top 0.1% in 2015

Back



(a) Households of 55 yrs old

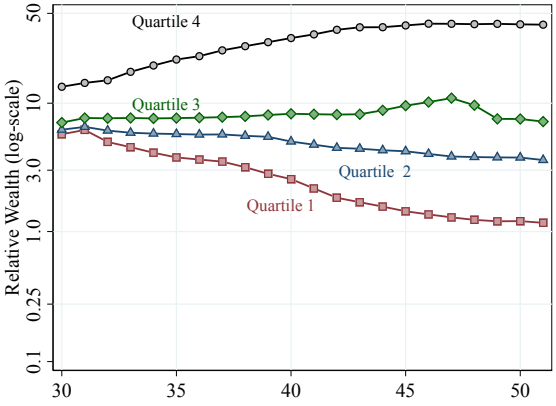


(b) Households of 65 yrs old

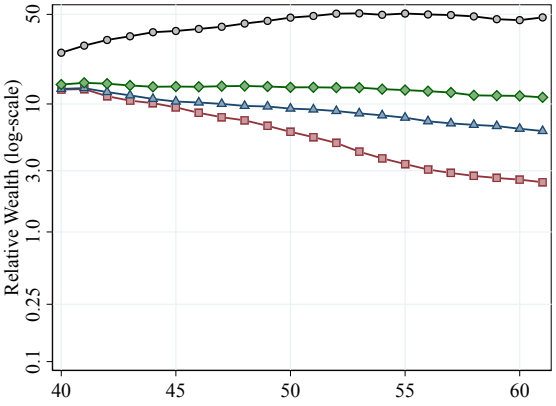
Households that reach the Top 0.1% experience rapid wealth growth early in life

Forward-Looking: Average Wealth for those at top 1% in 2013

Back



(a) Households aged 30 in 1993

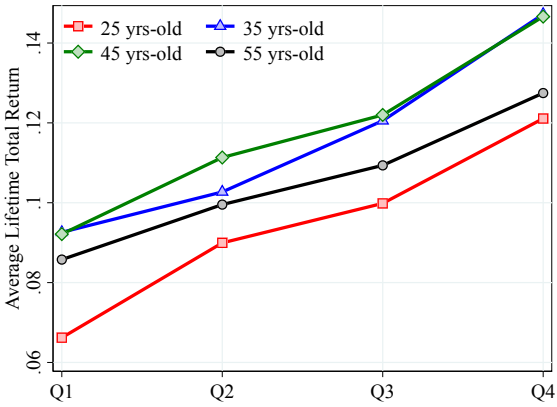


(b) Households aged 40 in 1993

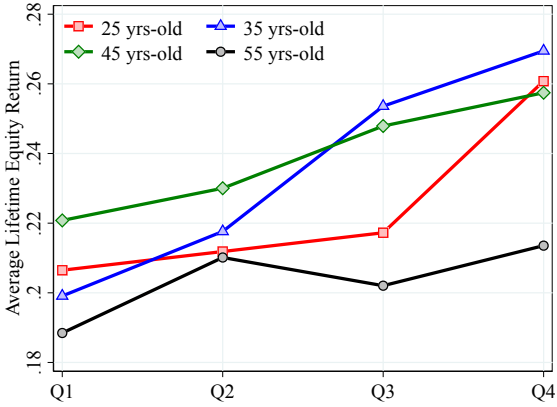
Those households that drop from top 1% do so by slowly reducing their wealth

Forward-Looking: Lifetime Returns on Assets

Back



(a) Returns on Total Assets

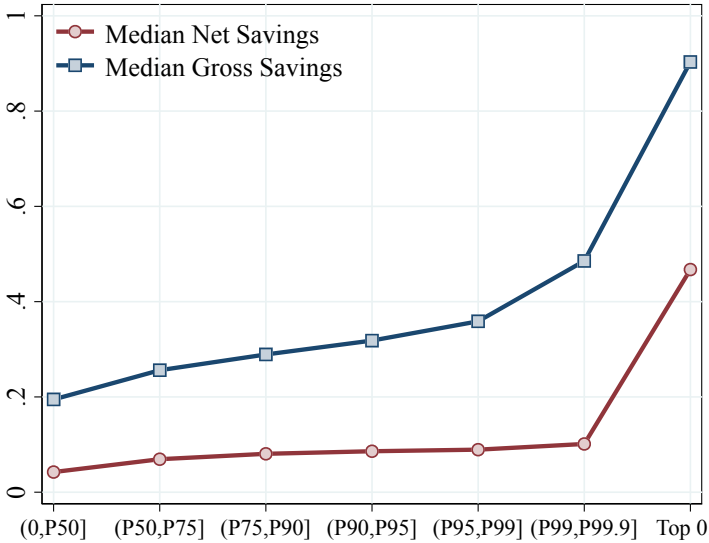


(b) Returns on Equity

- Average lifetime return for Top 1ers in 1993 by 2015 wealth quartile
- Those that fall to the bottom of the distribution, experience lower returns that those that remain at the top

Saving Rate Across the Wealth Distribution

Back



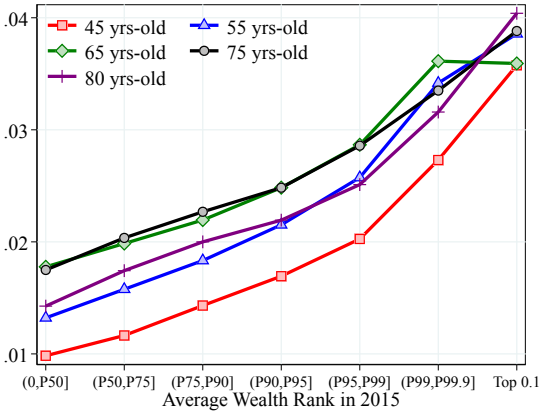
Average saving rate over lifetime
Fagereng-Blomhoff-Moll-Natvik (2020)

Rich household have higher saving rates over lifetime

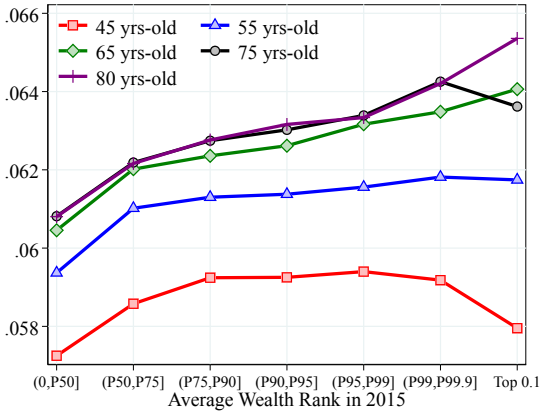
Forward

Lifetime Returns on Assets Across the Wealth Distribution

Back



(a) Returns on Safe Assets



(b) Returns on Housing

- Calculate returns on assets (Fagereng et al., 2020) and calculate 21 yrs average Details
- Rich households experience higher returns on housing and safe assets

Household Problem

Back

Working Periods: define $a = k + b$, then for a given state vector $\mathbf{S} = (\bar{e}, \eta, \xi, \bar{z}, \zeta)$:

$$V_h(a,\mathbf{S}) = \max_{c,a'} \left\{ u(c) + \beta\psi_{h+1} E\left[V_{h+1}(a' + I^b \tilde{\tau}^b(b)), \mathbf{S}') \mid \mathbf{S} \right] + (1 - \psi_{h+1}) v(\tilde{\tau}^b(a')) \right\},$$

subject to

$$c + a' = \tilde{\tau}^a(a) + (1 - \tau^k)\pi(a,z) + w e_h(\bar{e}, \eta, \xi), \qquad a' \geq 0.$$

Retirement Periods: individuals retire in period R and get retirement income y_R

$$V_h(a,\mathbf{S}) = \max_{c,a'} \left\{ u(c) + \beta\psi_{h+1} E\left[V_{h+1}(a', \mathbf{S}') \mid \mathbf{S} \right] + (1 - \psi_{h+1}) v(\tilde{\tau}^b(a')) \right\},$$

s.t. with the convention $V_{H+1} = 0$, and subject to

$$c + a' = \tilde{\tau}^a(a) + (1 - \tau^k)\pi(a,z) + s(\bar{e}, \eta), \qquad a' \geq 0.$$

- $\tilde{\tau}^b(b), \tilde{\tau}^a(a)$, are net-of tax schedules for bequests, resp. wealth; τ^k is cap income tax
- Retirement income, $s(\bar{e}, \eta)$, following Norway replacement rate

SMM: Estimated Parameters

Back

Table 1: Estimated parameters

Parameter		*Value*
Discount factor	β	0.900
Fixed entrepreneurial ability, inter-generational persistence	ρ_z	0.778
Fixed entrepreneurial ability, standard deviation	σ_z	0.287
Stochastic entrepreneurial ability, standard deviation	σ_ζ	0.887
Decreasing returns to scale	μ	0.991
Fixed cost of operating business	ψ	2.827
Bequest utility weight	χ	49.758
Bequest utility curvature	γ_b	4.872
Scalar bequest period one	ω	28.059

SMM: Targeted Moments

Back

Table 2: Targeted Moments in Data and Model

Moment	*Data*	*Model*
Life-cycle profile of mean wealth	Figure **??**	
Life-cycle profile of top 1% wealth share	Figure **??**	
Mean wealth at death (normalized)	0.800	0.805
Annual return, standard deviation (%)	10.180	9.336
Difference mean return P99+ vs. P50-75 by wealth (%)	6.190	5.901
Return fixed effect, standard deviation (%)	4.210	3.990
Return fixed effect, inter-generational persistence	0.094	0.089
Fraction business owners	0.072	0.073
Wealth-labor income ratio	6.368	6.619

Fraction with Large Inheritance or Initial Wealth by Age 50

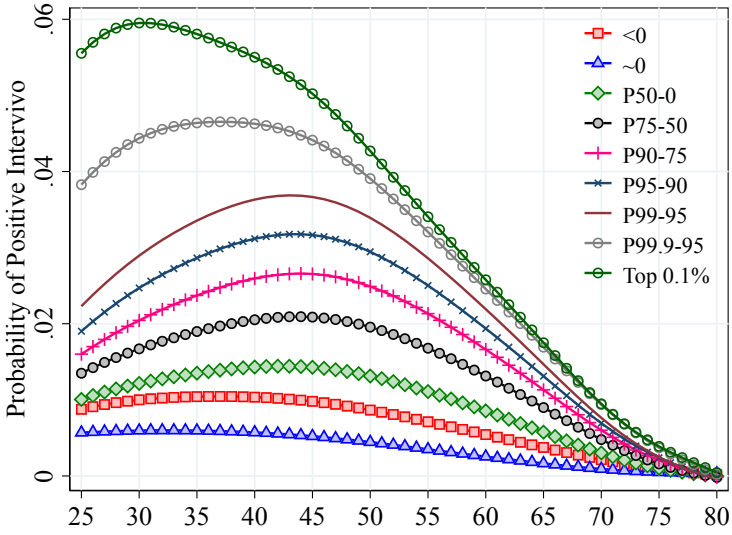
Back

	Share out of Total Lifetime Resources							
	Top 0.1% Wealth Group				Top 1% Wealth Group			
	P50	P90	P95	P99	P50	P90	P95	P99
Inheritance	0%	4%	9%	34%	0%	5%	10%	32%
Initial Wealth	8%	74%	85%	99%	14%	55%	70%	86%
Inheritance+Init. Wealth	10%	77%	86%	99%	16%	58%	71%	89%

- Previous decomposition shows average shares out of total resources—**masking heterogeneity**
- The table shows the percentiles of the share of inheritances and initial wealth out of total resources
- Initial wealth/inheritances: relatively small on average but some rich hhs get large estates

Timing of the Inter Vivos

Back



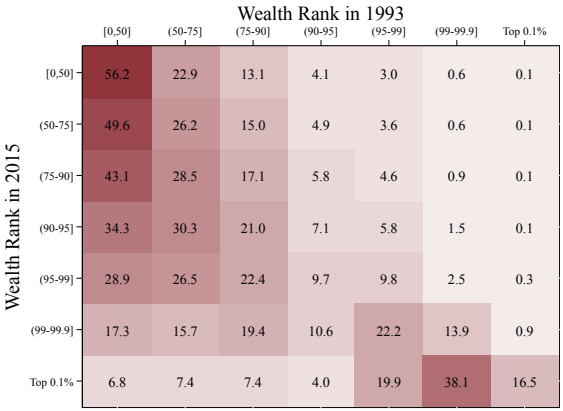
Wealthy: Higher probability of receiving inter vivos earlier in the life cycle.

Inter vivos

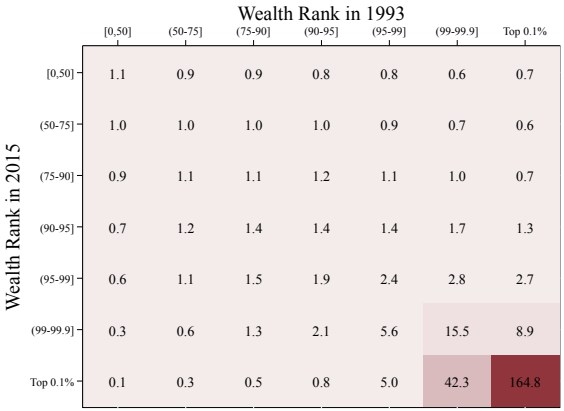
Middle income and the poor: Probability of inter vivos follow hump-shaped over the life cycle.

21-Year Retrospective Transition Matrix for 45-Year Olds

Back

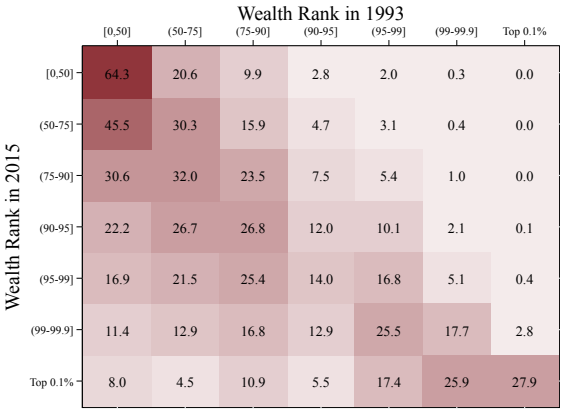


(a) Retrospective Transition Matrix

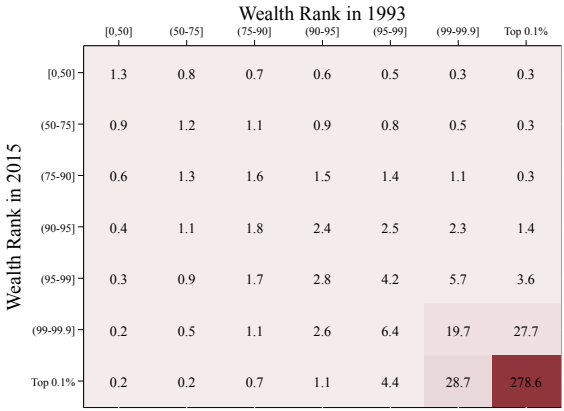


(b) Normalized Transition Matrix

21-Year Retrospective Transition Matrix for 55-Year Olds

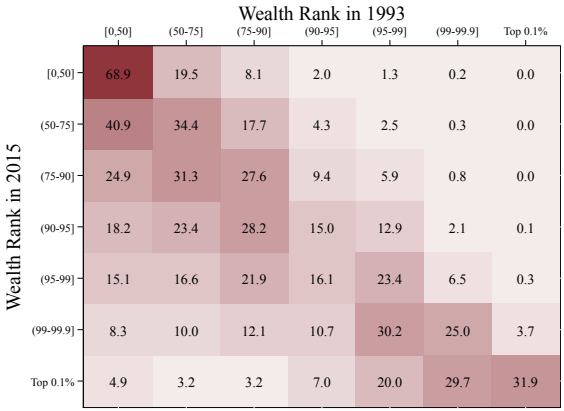


(a) Retrospective Transition Matrix

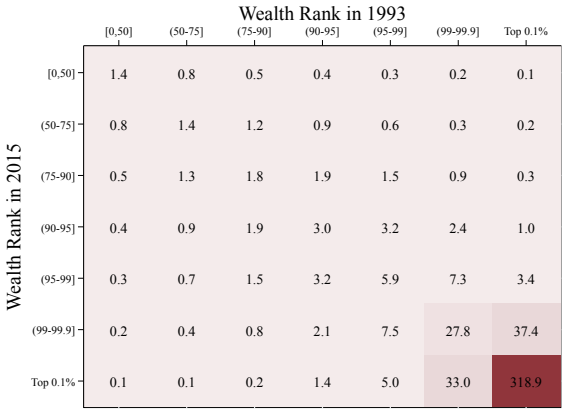


(b) Normalized Transition Matrix

21-Year Retrospective Transition Matrix for 65-Year Olds

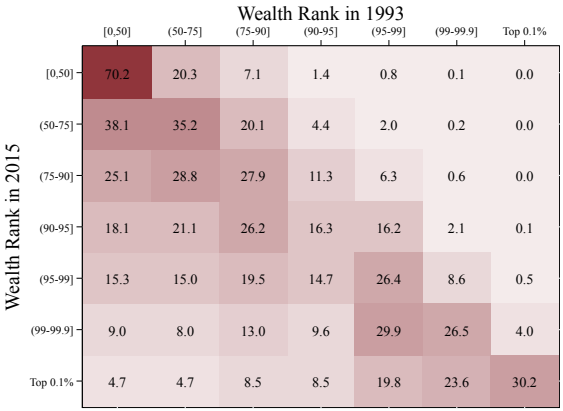


(a) Retrospective Transition Matrix

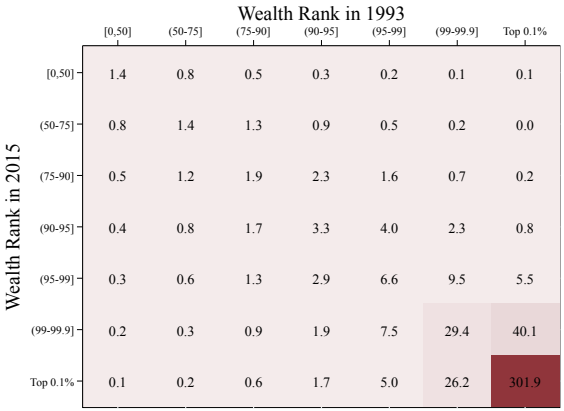


(b) Normalized Transition Matrix

21-Year Retrospective Transition Matrix for 75-Year Olds

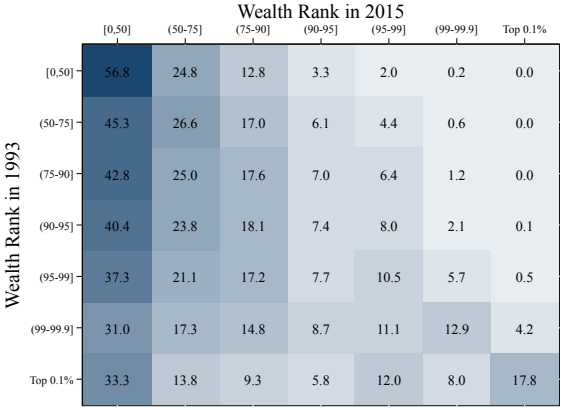


(a) Retrospective Transition Matrix

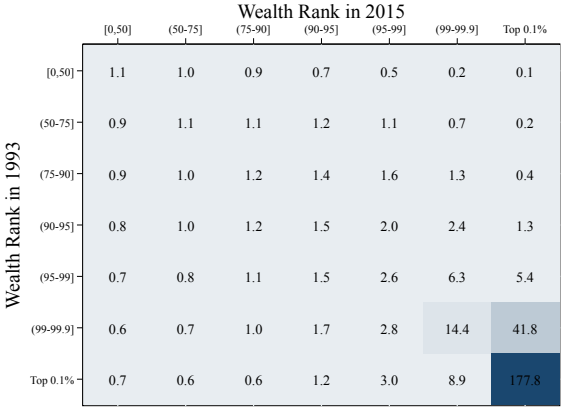


(b) Normalized Transition Matrix

21-Year Forward LookingTransition Matrix for 25-Year Olds

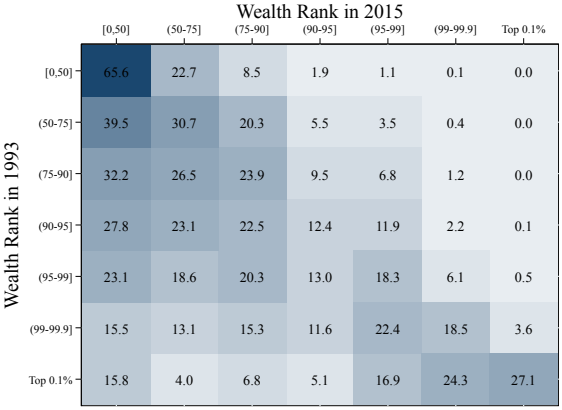


(a) Forward Looking Transition Matrix

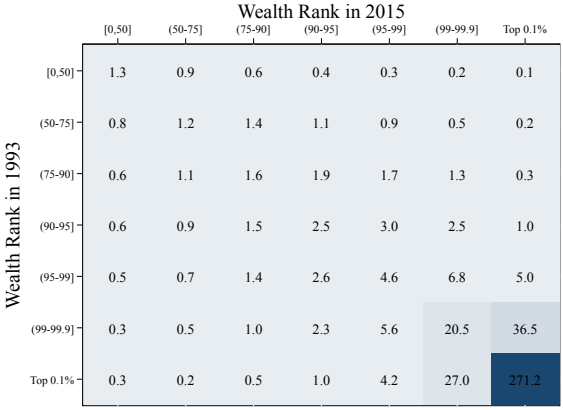


(b) Normalized Transition Matrix

21-Year Forward LookingTransition Matrix for 35-Year Olds

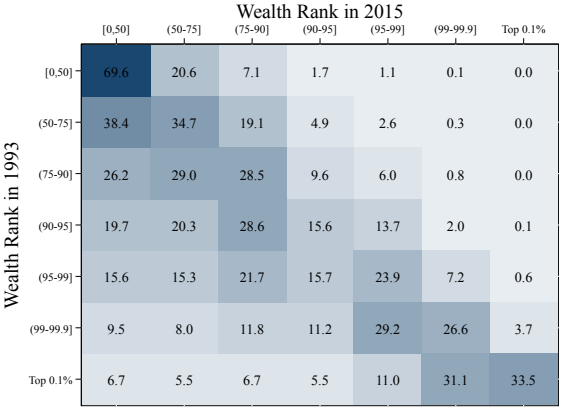


(a) Forward Looking Transition Matrix

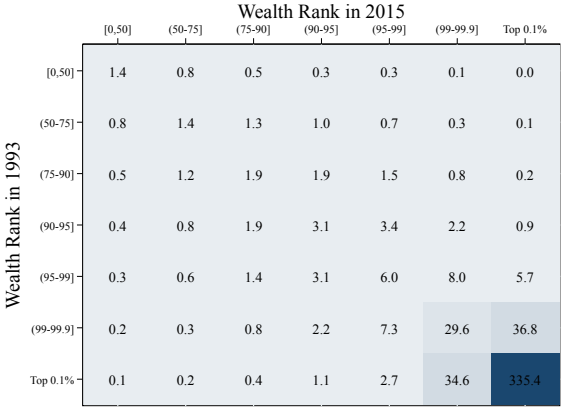


(b) Normalized Transition Matrix

21-Year Forward LookingTransition Matrix for 45-Year Olds

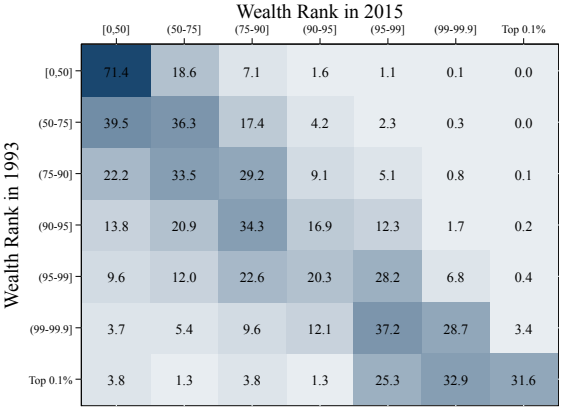


(a) Forward Looking Transition Matrix

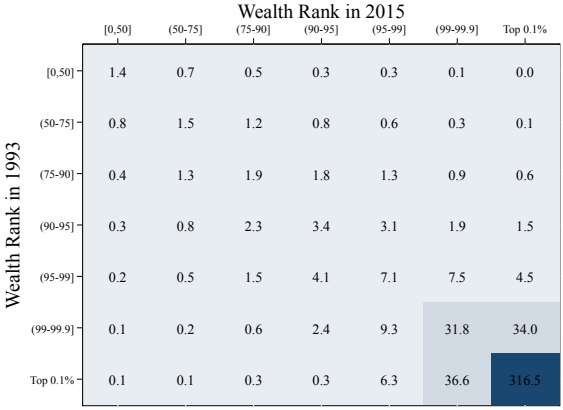


(b) Normalized Transition Matrix

21-Year Forward LookingTransition Matrix for 55-Year Olds

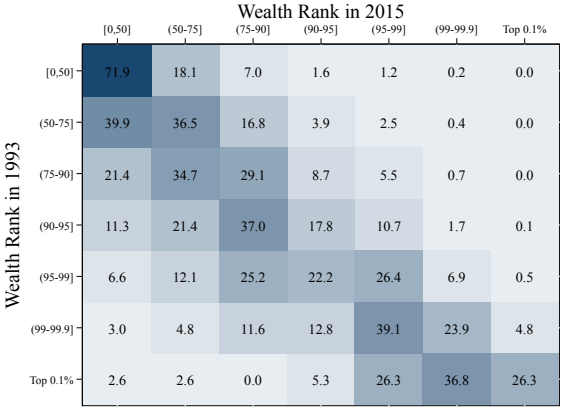


(a) Forward Looking Transition Matrix

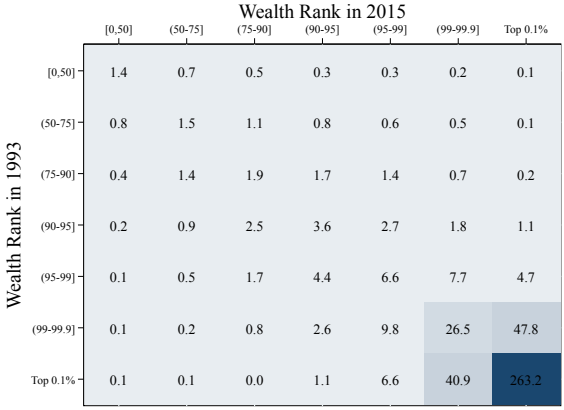


(b) Normalized Transition Matrix

21-Year Forward LookingTransition Matrix for 65-Year Olds



(a) Forward Looking Transition Matrix



(b) Normalized Transition Matrix

Sample Statistics

Back

Panel A: Population Shares					
	1995	2000	2005	2010	2015
Age 25/44	43.80%	43.00%	40.90%	39.20%	36.30%
Age 45/64	30.10%	32.90%	35.60%	36.30%	36.40%
Age 65+	26.00%	24.10%	23.50%	24.50%	27.30%
Male	63.20%	62.60%	62.50%	62.60%	62.10%

Panel B: Descriptive Statistics (US$ of 2018)							
	Mean	SD	P10	P50	P90	P99	P99.9
Safe Assets	42,869	204,242	345	12,001	102,886	408,838	1,474,710
Public Equity	7,899	303,496	0	0	11,036	118,260	642,274
Private Equity	35,205	2,312,932	0	0	490	409,833	4,425,962
Housing	285,608	300,826	0	222,809	638,730	1,384,161	2,192,636
Gross Wealth	371,581	2,551,564	2,778	259,693	749,967	1,922,639	6,978,503
Debt	92,417	114,888	0	45,135	250,202	464,635	678,678
Net wealth	279,164	2,546,067	-24,242	16,0147	637,285	1,731,470	6,750,314
Household Observations: 51,3371,531							

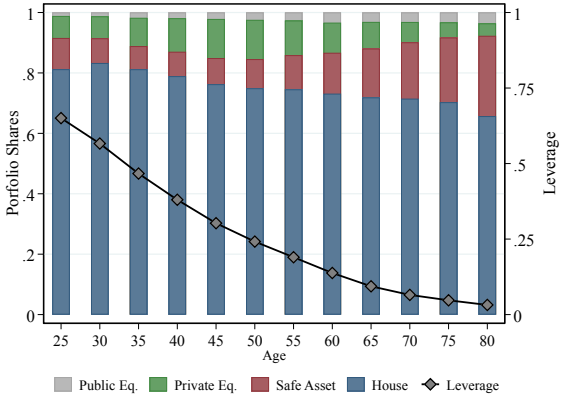
Concentration of Wealth and Income in Norway

Back

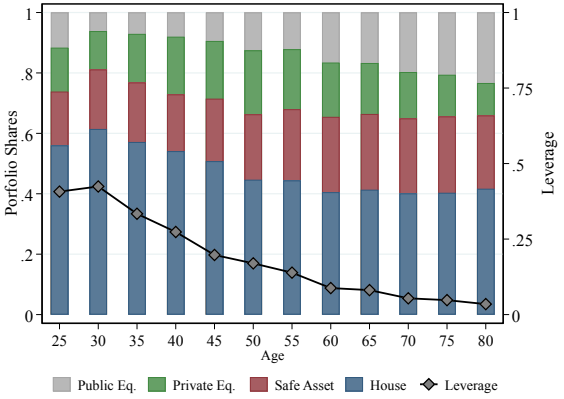
	Bottom 50	Top 10%	Top 5%	Top 1%	Top 0.1%	Top 0.01%
Income	8.77	32.33	19.19	5.69	3.41	1.1
Safe Assets	4.54	58.52	43.38	20.85	15.37	7.67
Public Equity	0	90.92	80.73	55.44	46.06	29.44
Private Equity	0	99.88	98.93	86.61	77.81	56.02
Housing	13.18	33.76	20.94	6.14	3.31	0.83
Gross Wealth	13.36	39.26	27.52	13.2	10.27	6.28
Debt	5.38	38.88	23.38	6.76	3.28	0.86
Net wealth	4.29	47.19	33.7	16.89	13.33	8.29

Cross-Sectional View: Life Cycle Portfolio

Back



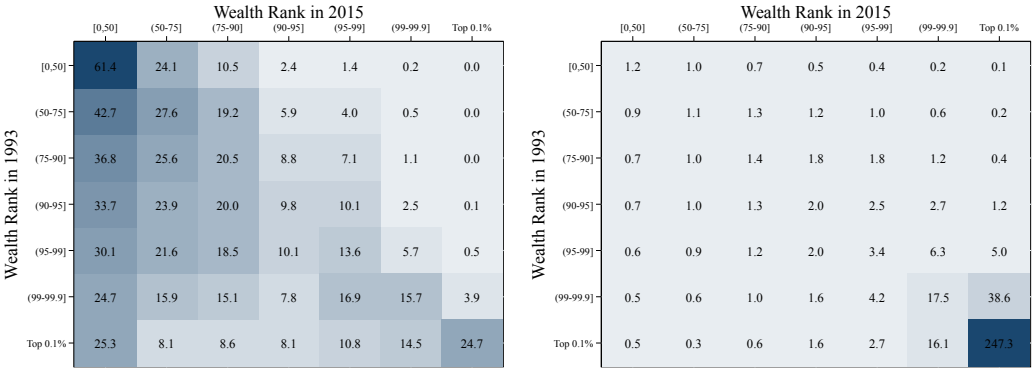
(a) Norway



(b) United States (SCF)

Norway and US differ in share of public equity; Similar decrease of housing and leverage over lifecycle

21-Year Forward LookingTransition Matrix for 30-Year Olds ▸ Back



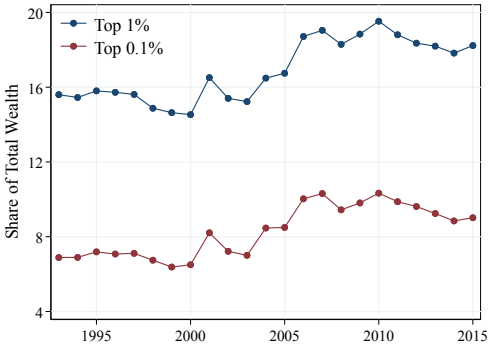
(a) Forward Looking Transition Matrix

(b) Normalized Transition Matrix

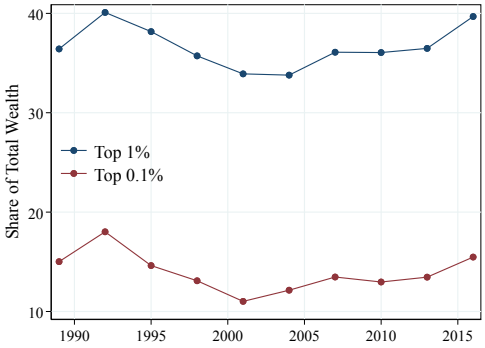
- Old Money: Around half of the top 0.1% in 1993 are still in the top 1% in 2015. ▸ Age
- Those in the 0.1% in 1993 are 247 times as likely to be in the 0.1% in 2015.

Wealth Inequality in Norway and the USA

Back



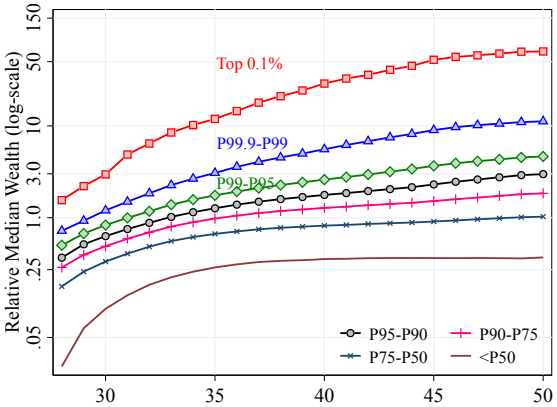
(a) Norway



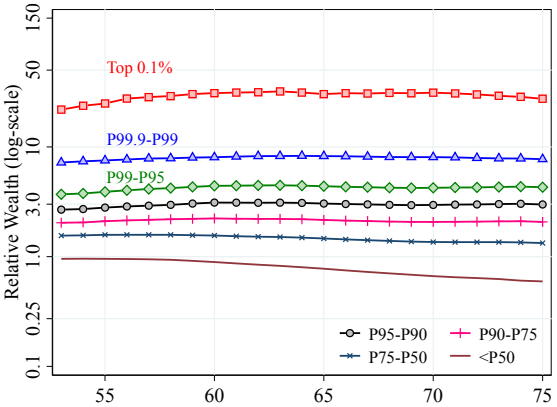
(b) United States

Dynamic Median Wealth Profiles

Back



(a) Age 50 to 55

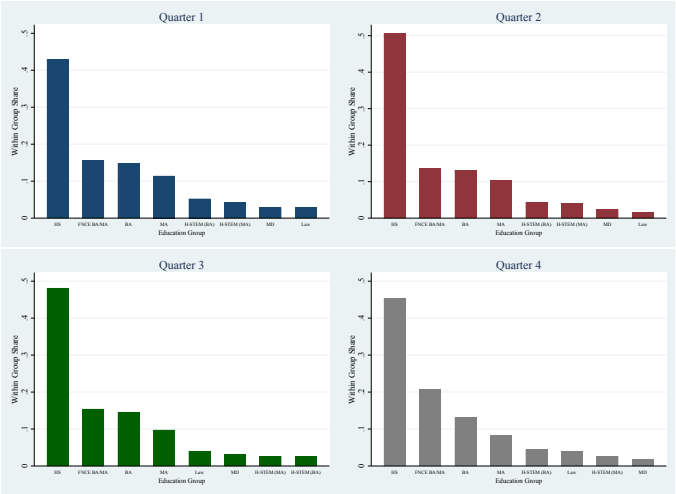


(b) Age 75 to 80

- Large dispersion at age 30: Top 0.1% owns ~2 times the average wealth

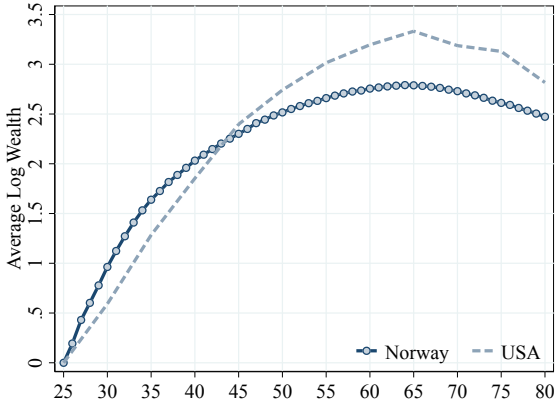
Old vs. New Money: Education Shares

Back

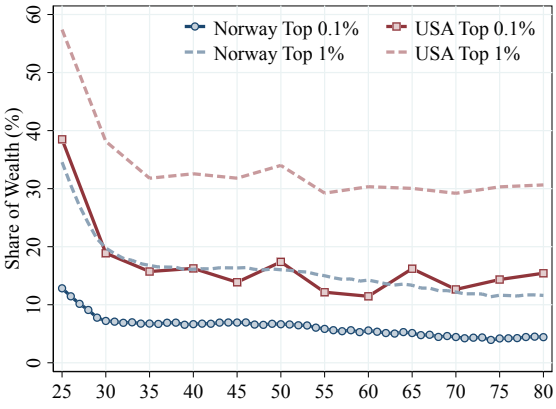


Note: HS is High-school or less, FNCE BA/MA is Bachelor or MBA on a finance or business administration major, BA and MA are other bachelor degrees or master degrees, MD is Medical Doctor or Dentist, H-STEM is BA or MA on a health related degree (expect for Medical Doctor or Dentist) and STEM major.

Cross-Sectional View: Average Wealth and Concentration over the Lifecycle



(a) Average Wealth Profile

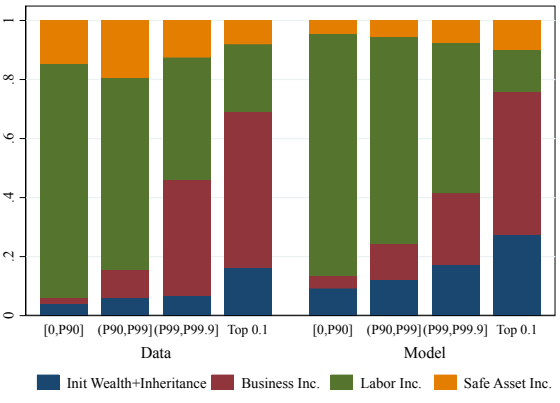


(b) Wealth Concentration

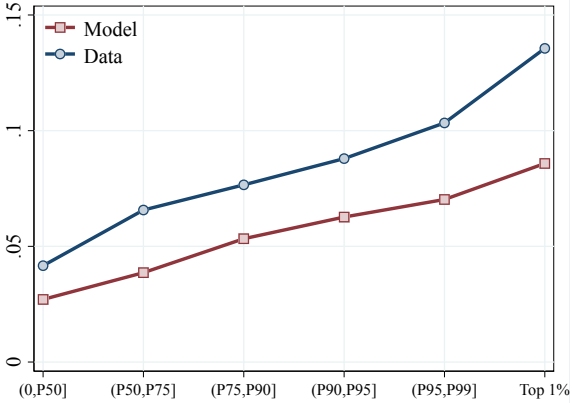
Average wealth is hump-shaped (↑~270 log points). Inequality decreases over the lifecycle ▸ Portfolio

Model Fit: Sources of Income and Returns

Back



(a) Sources of Lifetime Income

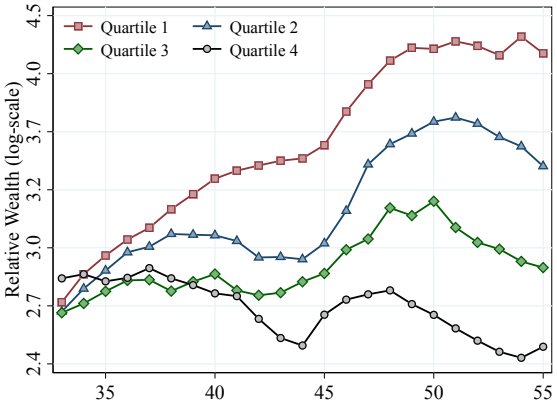


(b) Returns on Assets

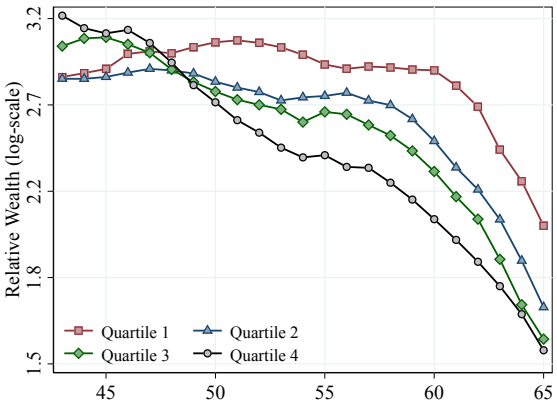
Model matches well wealth profiles, lifetime concentration, sources of income, and rate of returns

New Money Versus Old Money: Average Labor Income

Back



(a) 55yo households



(b) 65yo households

New Money earn modestly higher labor income: factor 3 to 4 compared to economy-wide average

Calibration and estimation

Parameters obtained externally

- Estimate y_{ih} to match labor earnings levels and growth rates ‣ More
- Others are standard values or Norway specific (taxes on income, wealth, replacement rates)

Parameters estimated internally—simulated method of moments (SMM)

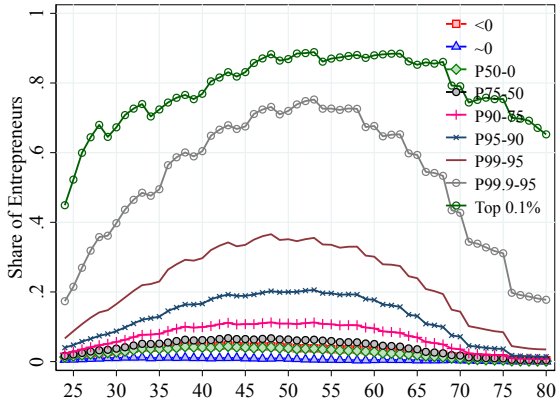
- Target life-cycle wealth (mean+concentration), return distribution (fixed/transitory dispersion; gradient by wealth), share of entrepreneurs, bequests profiles, etc. ‣ More

Why SMM? Example: Mapping empirical estimates to persistent returns heterogeneity

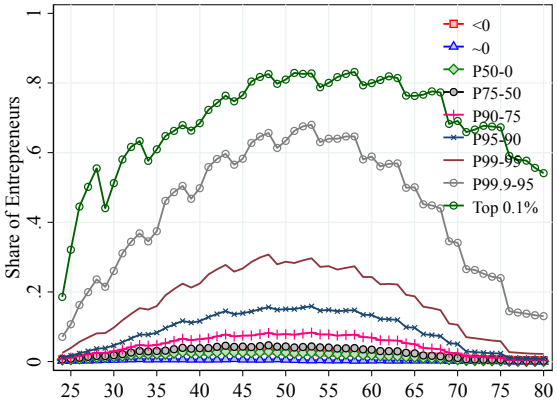
- Return heterogeneity and wealth inequality in Norway jointly matched
- Imposing Fagereng at al. (2020) fixed return over lifetime overstates wealth inequality
  (closer to US level, Benhabib-Bisin-Luo, 2019)
- Why? In data, transitory return variation not averaged out fully over 11 years

Share of entrepreneurs over the Lifecycle

Back



(a) Own +20% of Firm

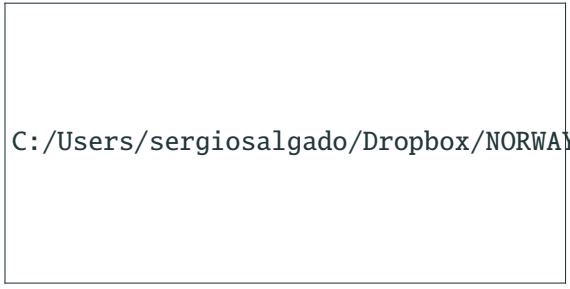


(b) Owns +50% of firm

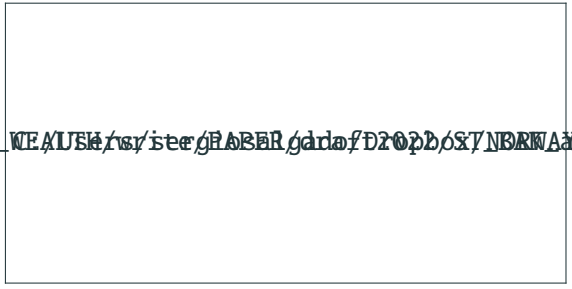
Share of entrepreneur is the highest among top wealth owners over the lifecycle

New and Old Money: Share of entrepreneurs over the Lifecycle

Back



(a) Own +20% of Firm

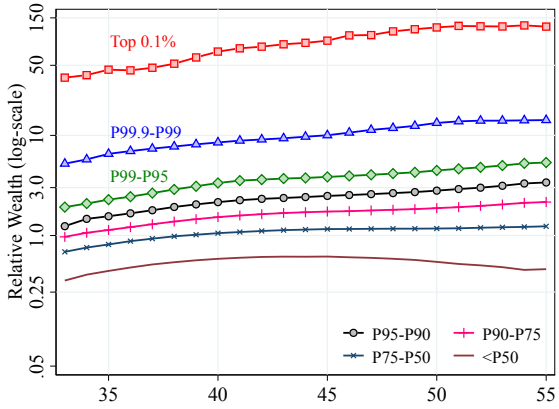


(b) Owns +50% of firm

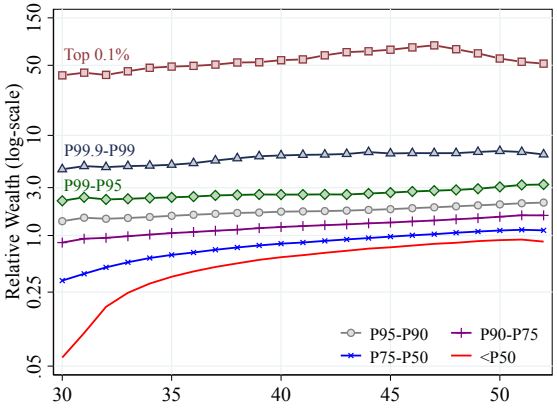
Share of entrepreneur is the highest among top wealth owners over the lifecycle

Dynamic average wealth profiles

Back



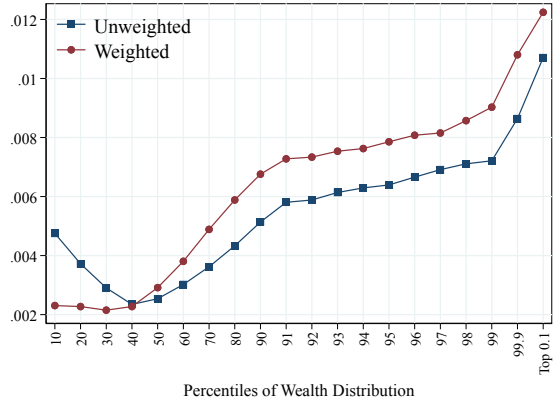
(a) Backward-Looking



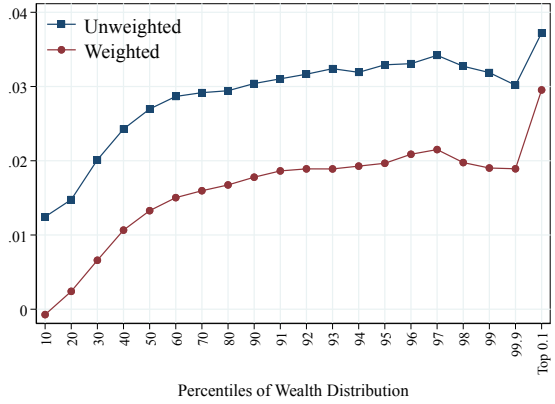
(b) Forward-Looking

- Large dispersion at age 30: Top 0.1% owns ~38 times (~40 for forward) the average wealth
- No convergence at the top: decline in lifetime inequality comes from lower-half Age Median

Cross-Sectional Average Returns



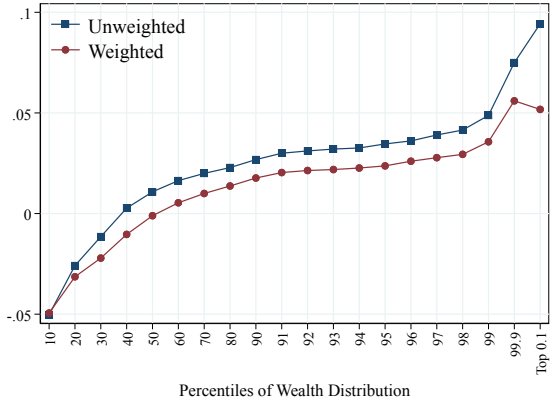
(a) Returns on Safe Assets



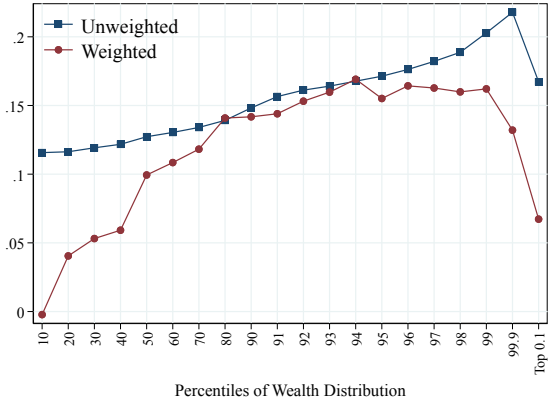
(b) Returns on Housing

- Returns on the Cross Section PUT IN APPENDIX

Cross-Sectional Average Returns



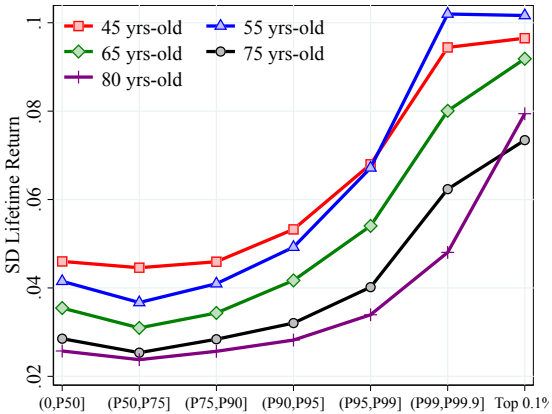
(a) Returns on Assets



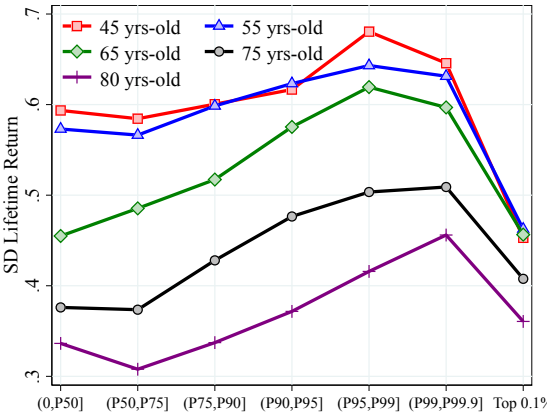
(b) Returns on Equity

- Returns on the Cross Section PUT IN APPENDIX

SD: Lifetime returns on assets across the wealth distribution



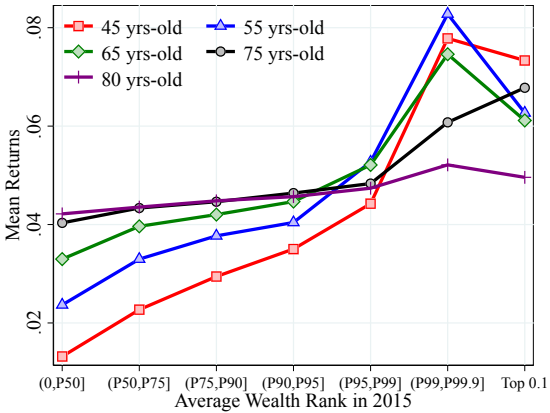
(a) Returns on Net Wealth



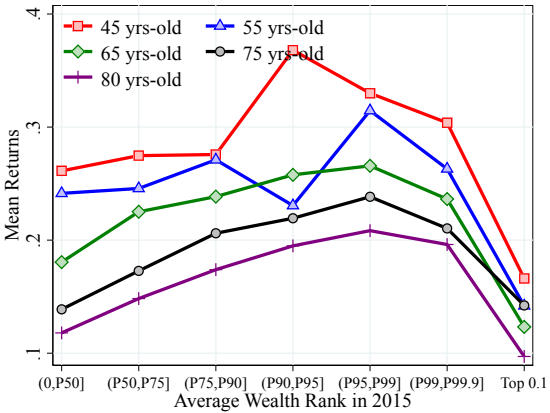
(b) Returns on Equity

- standard deviation of household returns

IND: Lifetime returns on assets across the wealth distribution



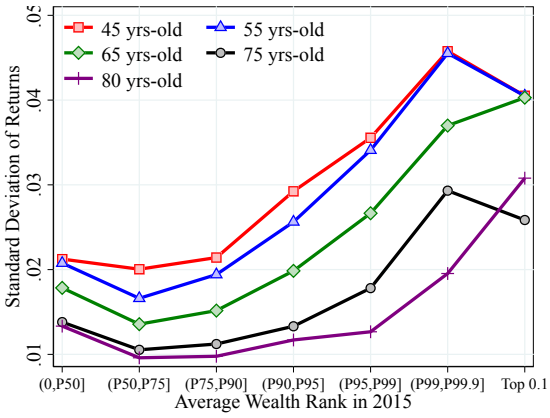
(a) Returns on Net Wealth



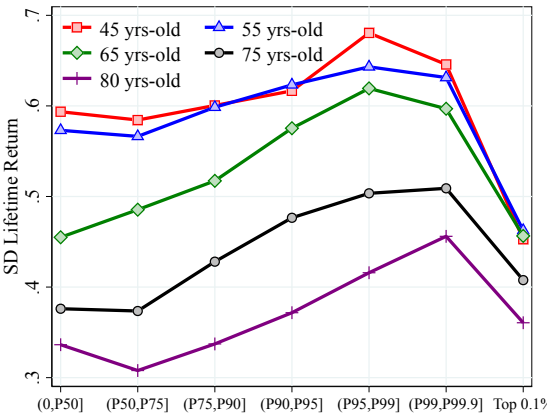
(b) Returns on Equity

- individual returns

SD IND: Lifetime returns on assets across the wealth distribution



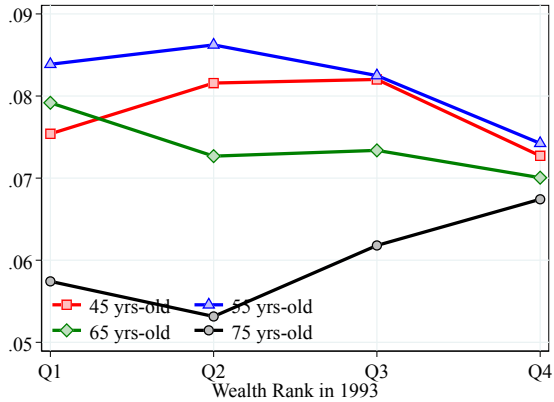
(a) Returns on Net Wealth



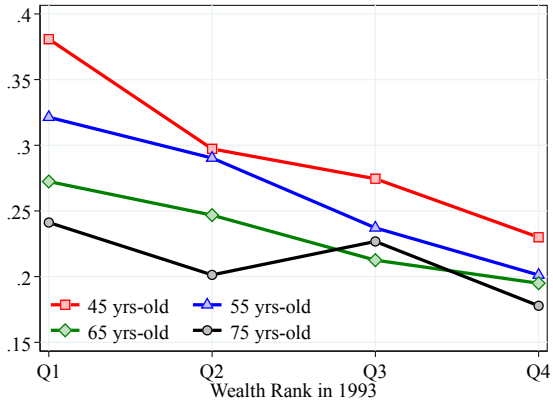
(b) Returns on Equity

- standard deviation of asset returns of individuals

INDIVIDUAL: Old Money versus New Money: lifetime returns



(a) Returns on Net Wealth



(b) Returns on Equity

- INDIVIDUAL

Dynamic decomposition: Why are the wealthiest so wealthy?

	No Return Hete.			No Bequest Hete.			Neither		
	Top 0.1%	99.9-99	<95	Top 0.1%	99-99.9	<95	Top 0.1%	99-99.9	<95
Top 0.1%	47%	49%	4%	23%	11%	66%	17%	7%	76%
P99-P99.9	1%	88%	11%		55%	45%		52%	48%
P95-P99		65%	35%		63%	37%		49%	51%

- **Without returns heterogeneity:** only 47% reach the top 0.1% at age 55 under baseline cutoff

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- **Without inheritances heterogeneity:** only 23% reach top 0.1% at age 55 under baseline cutoff

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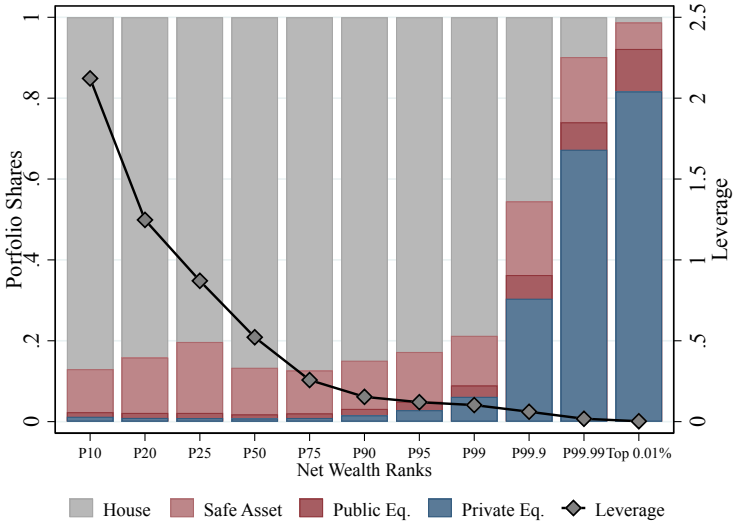
P99-P99.9	1%	88%	11%		55%	45%		52%	48%
P95-P99		65%	35%		63%	37%		49%	51%

- **Without returns heterogeneity:** only 47% reach the top 0.1% at age 55 under baseline cutoff
- **Without inheritances heterogeneity:** only 23% reach top 0.1% at age 55 under baseline cutoff
- **The effect compounds:** only 17% reach top 0.1% at age 55 under baseline cutoff
  - high-returns individuals are also those that receive high bequest
  - high-skill parents (high returns) leave high bequests and have high-skill children

Portfolio composition of inheritances

back



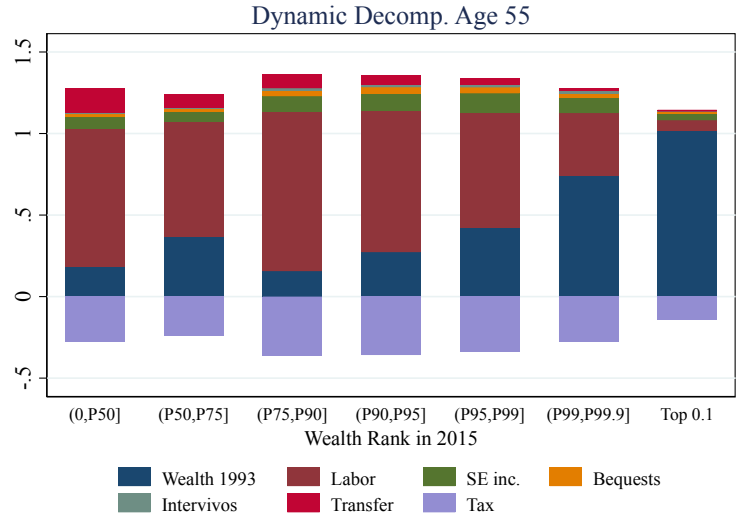
Inheritance: portfolio composition at death

Wealthy: bequests in form of equity

Middle and low wealth: bequest in form of houses

Alternative Dynamic Decomposition of lifetime resources (55 year old)

back



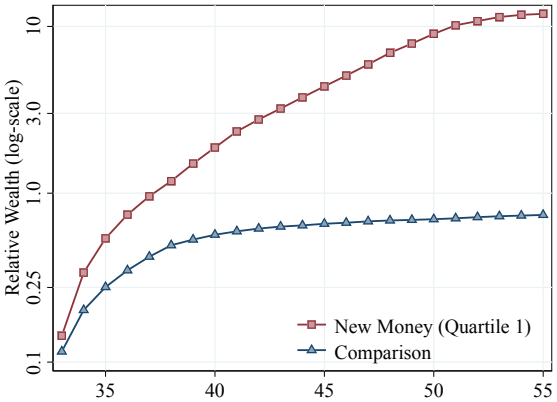
Dynamic Decomposition: iteratively assign capital income to wealth, labor income etc. in proportion to their share of resources

- e.g. if initial wealth twice as high as labor income in '94, assign 2/3 of '94 cap income to initial wealth and 1/3 to labor; then iterate forward

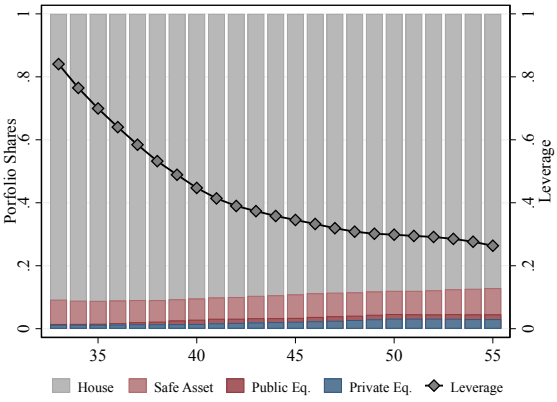
Initial wealth accounts for vast majority of resources of those that end up wealthy

Comparing New Money with similar household

Back



(a) Median Wealth



(b) Portfolio Composition

- Households who started as rich as New Money household
- Large differences in portfolio allocation