The Life-Cycle Dynamics of Wealth Mobility

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- Intergenerational “social” wealth mobility key as context for large wealth inequality
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  - How much? Who moves how? What is behind these mobility patterns?

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Today: Flexibly and non-parametrically characterize lifetime wealth mobility

Possible with **Norwegian administrative data** on wealth 1993–2017

This paper

1. Study individuals as they transition across the wealth distribution over their lives
   - Study individuals' relative and absolute mobility (within-cohort wealth ranks + wealth levels)
   - But: as many different wealth histories as individuals
   - Use clustering techniques to find "typical" trajectories responsible for mobility

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1. Study individuals as they transition across the wealth distribution over their lives
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   - But: as many different wealth histories as individuals
   - Use clustering techniques to find "typical" trajectories responsible for mobility
2. Study how "typical" trajectories relate to other observable characteristics
   - Role of heterogeneity in income and returns
   - Lifetime choices and events (portfolio composition, income, etc.)
   - To which extent do individual characteristics at age 30 predict future trajectories?

Contributions

1. New evidence on wealth mobility and wealth accumulation: Full life cycle trajectories
   - Add to results for the super wealthy (Gomez; Ozkan, Hubmer, Salgado, Halvorsen), the role of individual factors (Huggett, Ventura, Yaron; Black, Devereux, Landaud, Salvanes), and short-run mobility and race (Hurst, Luoh, Stafford, Gale).
2. New facts documenting the distribution of changes in wealth ranks
   - Extensive literature on income (Guvenen, Ozkan, Karahan, Song; Guvenen, Pistaferri, Violante; Arellano, Blundell, Bonhomme; De Nardi, Fella, Paz-Pardo)
3. Inter-generational links to full life cycle wealth dynamics
   - Complements "snapshot" links in income (Solon; Aaronson, Mazumder; Chetty, Hendren, Kline, Saez, Turner; Chetty, Grusky, Hendren, Hell, Manduca, Narang) & wealth (Charles, Hurst; Boserup, Kopczuk, Kreiner; Fagereng, Guiso, Malacrino, Pistaferri; Fagereng, Mogstad, Rønning)
4. Dimension reduction methods in economics & applications to labor markets
   - K-Means (Bonhomme, Lamadon, Manresa; Gregory, Menzio, Wiczer), Sequence Analysis (Humphries), Hidden Markov (Ahn, Hobijn, Şahin), Finite Mixture

Norwegian Wealth Data

Data: Norwegian Tax Registry 1993 – 2017

- No top-coding + Limited misreporting or measurement error (third-party reporting)
  - Focus on wealth (e.g., don't include public pensions)
  - No transaction data (e.g., changing houses or selling stocks $\longrightarrow$ limited info. on returns)
- We adjust the tax value of real estate to market values (Fagereng, Holm, Torstensen, 2023)
- We focus on wealth at the individual level (additional results for household wealth)
- Key: We link to administrative records (Education, Family, Civil Status, Income)

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Sample selection: Norwegian residents 1993–2017 (no immigrants after 25/2011, no emigrants)

- Focus on birth cohort born between 1960 and 1965 (first observed in early 30s)
  - 292,222 individuals in this sample (279,002 after balancing)

Ranks and Histories

- Compute within cohort ranks as

$$r_{i,t} = 100 \times F_w\left(w_{i,t} | t, i \in BC(i)\right)$$

  - Computed separately for each year and each cohort

- Trajectories: Histories of ranks

$$\mathbf{R}_i = \left(r_{i,1993}, r_{i,1994}, \ldots, r_{i,2016}, r_{i,2017}\right) \in [0, 100]^{25}$$

We are interested in the distribution of the trajectories $\mathbf{R}_i$

- Relative mobility in rank $\implies$ absolute mobility in wealth level
  - At the median, $+10$ ranks $\approx$ 60k USD at age 40

Wealth and Income Mobility

Measuring average intra-generational mobility

Relative Mobility Measures

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Relative Mobility Measures

- Rank-rank persistence: $r_{i,t} = \alpha_t + \rho_t r_{i,0} + u_{i,t}$; $M_t^R \equiv 1 - \rho_t$.
- Shorrocks Index: Transitions out of quintiles; $M_t^S \equiv 1 - \sum_i \mathbb{1}\{Q_{it} = Q_{i,0}\}$.

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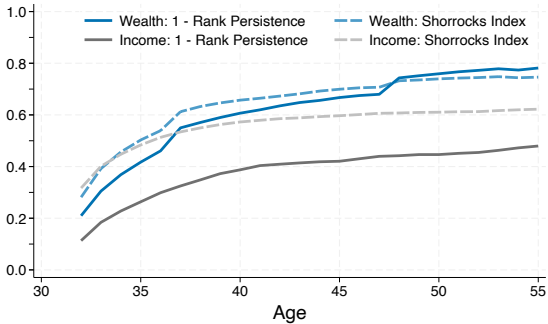
Exercise: Plot intra-generational relative mobility for income and wealth

Wealth is more mobile than income (!)



- Declining intra-generational persistence $\longrightarrow$ Increased (cumulative) mobility
  - Wealth: $M_t^R = 0.78$ and $M_t^S = 0.75$ by age 55
  - Income: $M_t^R = 0.48$ and $M_t^S = 0.58$ by age 55

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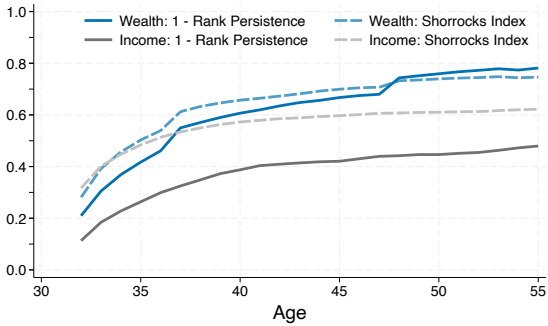

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- How broad-based is mobility? What (who) drives patterns?

Clustering Wealth Histories

Grouping Individuals Into Typical Histories

Goal: Identify patterns in (ex-post) life cycle paths without restricting to a single statistic

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Method: Agglomerative Hierarchical Clustering to group rank histories

- Start with $G = N$ groups (one for each individual)
- Recursively merge groups by selecting *similar* pairs: $\underset{g,g' \in G,\, g \neq g'}{\operatorname{argmin}} \; d(g, g')$.

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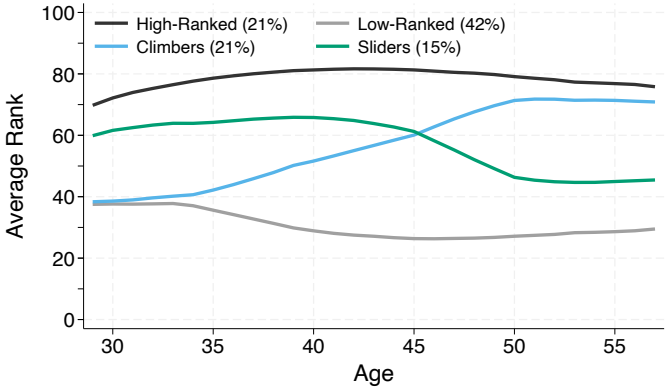
Result: Hierarchy of partitions ranging from $G = N$ to $G = 1$.

- Global result with nested clusters (feasible in large datasets)
- Asymptotically consistent as we observe longer trajectories, even for fixed N
  (Borysov, Hannig, Marron, 2014; Egashira, Yata, Aoshima, 2024)
- We use $G = 4$ in our baseline: exposition + 50% of variation in ranks

Typical Rank Histories

Cohort Ranks

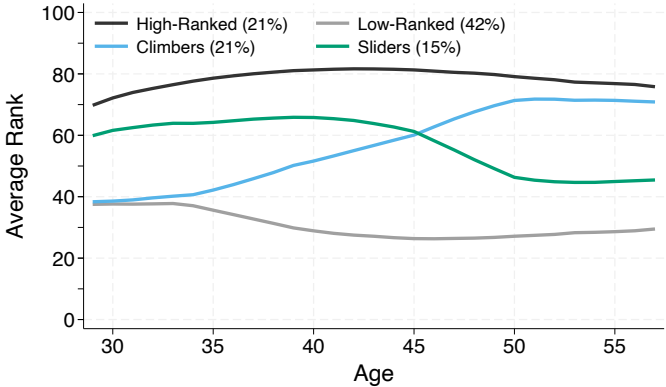


Four largest groups

- Wealthy/High Ranked: always at top of the distribution
- Poor/Low Ranked: always at the bottom of the distribution
- Middle: one group of Climbers and one group of Sliders

Typical Rank Histories

Cohort Ranks

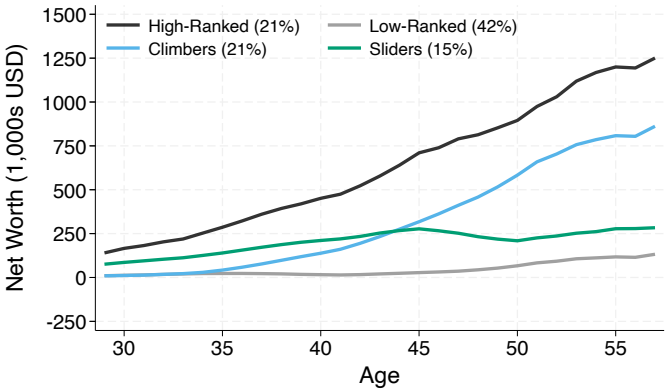


Robust pattern

- Alternative clustering algorithm: same pattern
- Not mechanical: get four horizontal lines if we cluster with income ranks
- Still a lot of within-cluster variation
  - Segmented mobility
  - Sub-cluster analysis
  - Not today!

Wealth Histories Across Segments of the Distribution

Net Worth ($1000s)

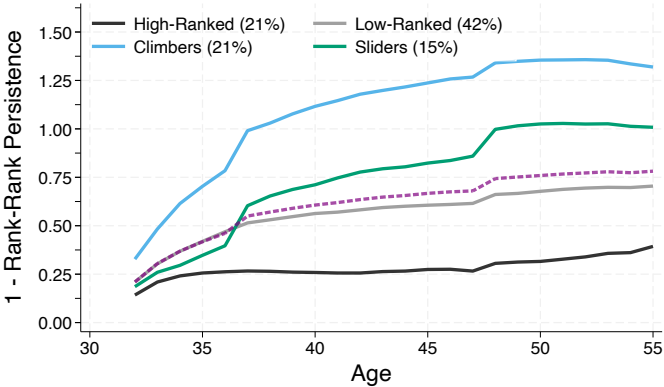


Significant diff. in wealth profiles

- Top: Maintaining rank means level growth (8-10%)
- Bottom: Stay very low
- Climbers: Grow on avg. 18%/y
- Sliders: ahead in 30s + low growth (5%) + Great Recession

Decomposing Mobility

Linear rank-rank persistence: $y^k_{i,t} = \alpha_t + \rho_t^{g(i)} y^k_{i,0} + u_{i,t}$



- Top: Immobile over 25y
- Bottom: Track population movements *within segment*
- Climbers: Reversal of fortune within 1 decade
- Sliders: No memory in long run

- Middle-class mobility drives population mobility patterns. Climbers are key.

Interpreting Mobility Groups

Wealth mobility in models of wealth dynamics

Two exercises to contextualize our results:

1. Buffer-stock models of savings (Zeldes, 1989; Deaton, 1991; Carroll, 1992; Straub, 2019)
    - Skill differences (alone) cannot generate observed wealth+income dynamics
    - Analytical results building on Straub (2019)

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   - Skill differences (alone) cannot generate observed wealth+income dynamics
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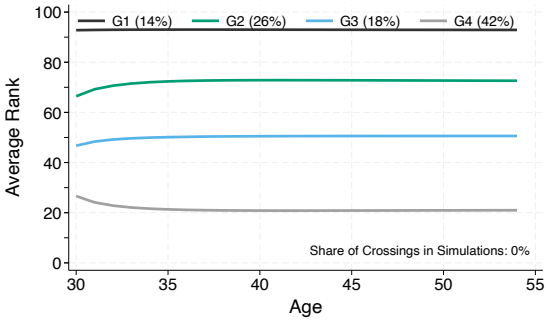
2. Statistical models of wealth (Benhabib & Bisin, 2018; Gomez, 2023)
   - Approximation for broad class of life-cycle models
   - Vary parameters of two-equation model

$$w_{i,t+1} = (1 + r_i)\, w_{i,t} + s y_{i,t}; \qquad \log y_{i,t+1} = \rho \log y_{i,t} + \epsilon^y_{i,t}; \quad \epsilon^y_{i,t} \sim N(0, \sigma(\epsilon^y))$$

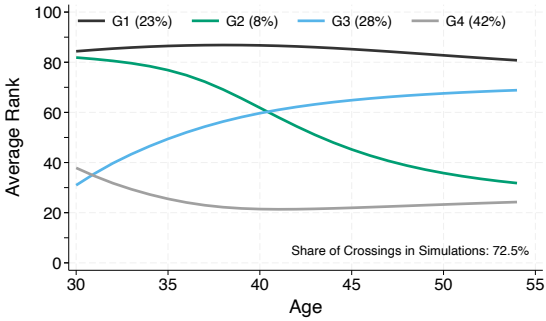
Wealth mobility in models of wealth dynamics

From literature: $s = 0.25$ (Fagereng, Holm, Moll, Natvik, 2019) and $\rho, \sigma(\epsilon^Y)$ (Fagereng, Holm, Natvik, 2021)

Baseline: $\sigma(r_i) = 0 \ + \ \text{Corr}(w_{i,0}, r_i) \ = 0$



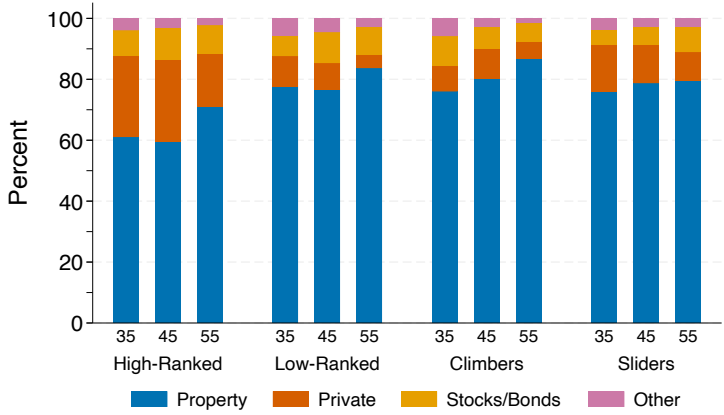
Return Het $+$ $\text{Corr}(w_{i,0}, r_i) \ < 0$



- Return or savings rate heterogeneity is key along with distribution of initial conditions
- **Challenge:** Marginal distribution of wealth by age is off by a lot in standard models!

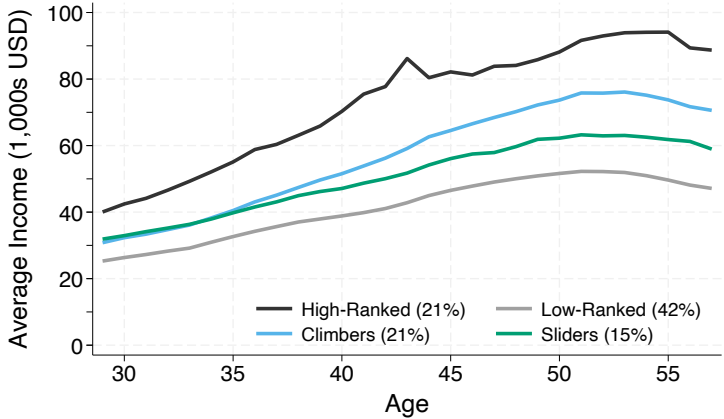
Drivers of Wealth Accumulation

Portfolio composition: Mostly housing (except at the top!)



- Private business wealth more important at the top and for sliders

Income Histories Across Segments of the Distribution



- Distribution of individual income across clusters compressed relative to wealth

Towards Determinants of Trajectories

Hereditary Advantage: Wealth vs Human Capital

Goal: Understand role of different circumstances/characteristics in determining trajectories

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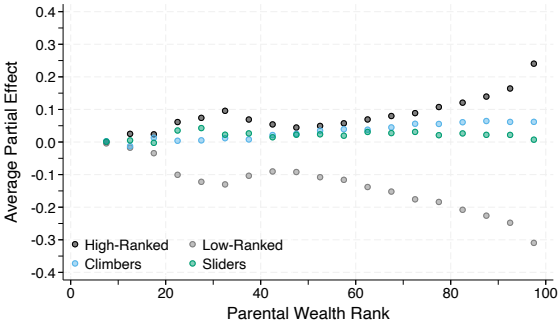
$$Pr\left(g=j\right)=F\left(\alpha_0^j+\beta_{q(i)}^j+\gamma_{educ(i)}^j+\delta_{subj(i)}^j+\lambda_{male(i)}^j+\mu_{bcounty(i)}^j\right)$$

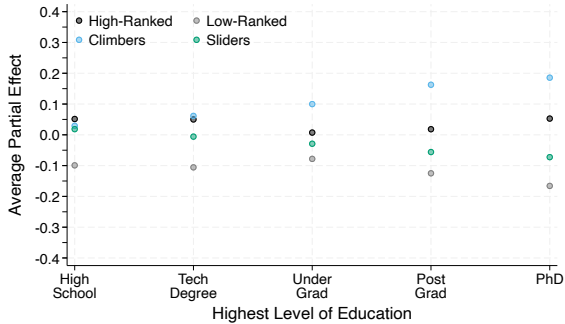
- $\beta_{q(i)}^j$: Indicators for 1993 parental wealth (cohort rank by ventile)
- $\gamma_{educ(i)}^j$, $\delta_{subj(i)}^j$: Indicators for education level and subject (only for higher ed.)
- $\lambda_{male(i)}^j$: Indicator for sex
- $\mu_{bcounty(i)}^j$: Indicator for birth location

Non-Linear Effects of Parental Wealth and Education

Parental Wealth



Education



- Parental wealth tells high-ranked/low-ranked apart
- Education tells climbers/sliders apart

Summary

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Contribution: Flexibly and non-parametrically characterize lifetime wealth mobility

Key takeaways:

1. Find evidence of substantial changes in wealth ranks over a quarter century
2. Mobility driven by selected groups in the middle of the distribution
3. Simulations point to differences across groups beyond income (returns, savings)
4. Parental background and education predict distinct wealth trajectories