Finance and (Wealth) Inequality

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Three issues driving my thoughts on wealth inequality

(Centered on the role of returns on wealth;)

- Inequality in earnings cannot be the (whole) thing (with J. Benhabib, M. Luo, S. Zhu)
- Non-stationary dynamics are not as hard as you (may) think (with J. Benhabib, M. Luo)
- Long-run persistence, instead, does not come easy (with J. Benhabib, R. Fernholz)

All published papers available at
https://wp.nyu.edu/albertobisin/wealth-inequality/;
some of the research discussed is in progress.

Earnings and wealth inequality - theory

- Suppose consumption (hence savings) is linear in wealth, $c_{t+1} = \psi w_t + \chi_{t+1}$, and assume $\psi, \ \chi_{t+1} \geq 0$. For these economies,

$$w_{t+1} = (r_{t+1} - \psi)\, w_t + (y_{t+1} - \chi_{t+1}) \,. \tag{1}$$

- Equation (1) defines a *Kesten process* if i) (r_t, y_t) are independent and *i.i.d* over time; and if ii) it satisfies:

$$y > 0, \ \ 0 < E(r_t) - \psi < 1, \text{ and } prob\,(r_t - \psi > 1) > 0,$$

  for any $t \geq 0$. These assumptions guarantee, respectively, that earnings act as a reflecting barrier in the wealth process and that wealth is contracting on average, while expanding with positive probability.

Earnings and wealth inequality - theory

Theorem (Grey 1994). Suppose $(r_t - \psi)$ and $(y_t - \chi_t)$ are both random variables, independent of w_t. Suppose the accumulation equation (1) defines a *Kesten process* and $(y_t - \chi_t)$ has a thick right-tailed with tail-index $\beta > 0$. Then,

- If $E\left((r_t - \psi)^{\beta}\right) < 1$, and $E\left((r_t - \psi)^{\gamma}\right) < \infty$ for some $\gamma > \beta$, under some regularity assumptions, the right-tail of the stationary distribution of wealth will be β.
- If instead $E\left((r_t - \psi)^{\gamma}\right) = 1$ for $\gamma < \beta$, then the right-tail index of the stationary distribution of wealth will be $\alpha = \gamma$.

The right-tail index of the wealth distribution is either γ (from the stochastic properties of returns) or β (the right-tail of earnings): It is never the case that the tail index of earnings could amplify the right-tail index of the wealth distribution.

Earnings and wealth inequality - theory

Microfoundations: asymptotic linearity

- The microfoundation of the accumulation equation (1) requires adding idiosyncratic returns to Aiyagari- Bewley economies (the workhorse heterogeneous agents' economies in macro); furthermore,
- Grey's Theorem is based on Kesten's - and it requires linearity of the accumulation equation (1)
- Both problems can be solved: with or without idiosyncratic returns to wealth (entrepreneurial investment risk)
  - Indeed in Aiyagari- Bewley economies accumulation is not linear: the consumption function is concave in wealth
  - But consumption - and hence the accumulatiuon equation - is asymptotically linear in wealth
  - And an extension of Kesten's Theorem due to Mirek gives the characterization of the tail

Earnings and wealth inequality - some evidence

Wealth-tail thicker generally than earnings-tail (as measured by Gini-indexes)

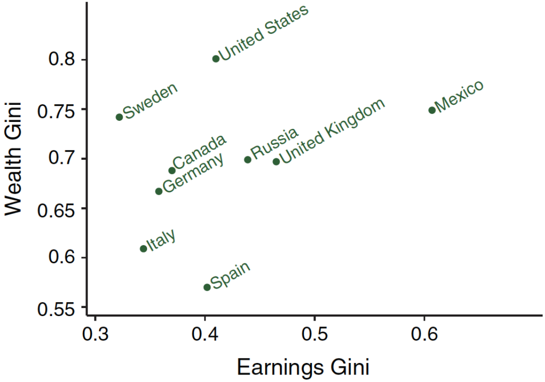


FIGURE 1. EARNINGS AND WEALTH GINI

Sources: Wealth: Davies et al. (2011). Earnings: (Krueger et al. 2010).

Earnings and wealth inequality - some evidence

Stochastic returns needed for the stationary wealth-tail of a macroeconomic model of life-cycle consumption and savings to match the one in SCF data

TABLE 15—MODEL FIT: COUNTERFACTUALS

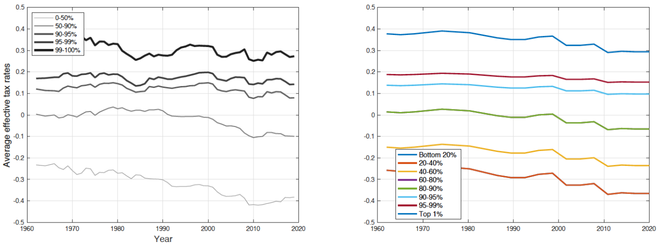
	Wealth distribution							
Percentile	0–20	20–40	40–60	60–80	80–90	90–95	95–99	99–100
Wealth share (data)	−0.002	0.001	0.045	0.112	0.120	0.111	0.267	0.336
Wealth share (model)								
1. Baseline	0.049	0.077	0.111	0.110	0.110	0.076	0.142	0.325
2. Constant r	0.055	0.087	0.129	0.184	0.128	0.116	0.148	0.153
3. Constant w	0.002	0.008	0.057	0.191	0.171	0.126	0.186	0.259
4. $\mu = 2$	0.069	0.111	0.160	0.230	0.159	0.106	0.119	0.046

	Social mobility				
Percentile	0–20	20–40	40–60	60–80	80–100
Transition diagonal (data)	0.349	0.197	0.201	0.210	0.340
Transition diagonal (model)					
1. Baseline	0.349	0.197	0.201	0.210	0.340
2. Constant r	0.258	0.265	0.271	0.244	0.418
3. Constant w	0.564	0.579	0.489	0.430	0.438
4. $\mu = 2$	0.258	0.271	0.242	0.250	0.360

Non-stationary wealth dynamics

- Consider fitting the implied dynamics of the wealth distribution of a macroeconomic model of life-cycle consumption and savings to SCF data from 1962 (initial condition) until 2019
  - never imposing stationarity
  - importing earnings form data and a stochastic process for effective tax rates whose realizations match data (allowing for agents' expectations not to perfectly forecast realizations)

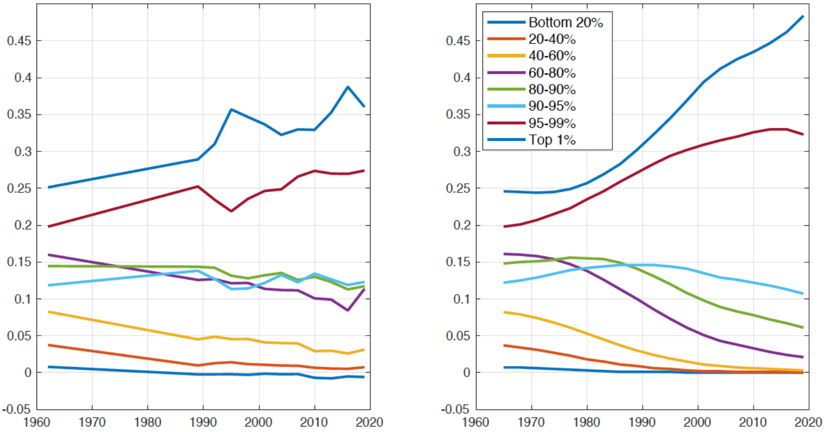
Figure 4: Effective average tax rates



Notes: The left panel is data. The right panel is simulated results.

Non-stationary wealth dynamics

Figure 5: Wealth distribution moments comparison



Long-run persistence

- Evidence on long-run dynastic wealth-rank correlation:
  - high persistence of wealth across five generations using data on rare surnames in England and Wales between 1858 and 2012 (Clark, 2014; Clark and Cummins, 2015)
  - significant positive wealth elasticities as well as occupational persistence for families in Florence between 1427 and 2011 (Barone and Mocetti, 2016)
  - large grandparent-child correlations (Stuhler, 2012; Braun and Stuhler, 2018)

Long-run persistence

- "Approximate" the microfounded wealth dynamics

$$w_i(t+1) = \lambda(r_{i,t})w_i(t) + \beta(r_{i,t}, y_{i,t}) \tag{2}$$

- with the rank-based wealth dynamics

$$d\log w_i(t) = \alpha_{\rho_t(i)}\, dt + \sigma_{\rho_t(i)}\, dB_i(t), \tag{3}$$

  where $\rho_t(i)$ denote the wealth-rank of household i at time t, so that $\rho_t(i) < \rho_t(j)$ if and only if $w_i(t) > w_j(t)$ or $w_i(t) = w_j(t)$ and $i < j$
- and with the rank-based wealth dynamics with permanent heterogeneity

$$d\log w_i(t) = \left(\gamma_i + \hat{\alpha}_{\rho_t(i)}\right) dt + \sigma_{\rho_t(i)}\, dB_i(t), \tag{4}$$

Long-run persistence - simulations

	Data	Approximated Rank-Based Model	Perman. Heterog. Rank-Based Model
Wealth Distribution			
Top 1%	33.6%	31.9%	34.0%
Top 1-5%	26.7%	17.1%	16.6%
Top 5-10%	11.1%	9.5%	9.2%
Top 10-20%	12.0%	11.2%	10.8%
Top 20-40%	11.2%	13.1%	12.7 %
Top 40-60%	4.5%	8.3%	8.1%
Bottom 40%	-0.1%	8.9%	8.5%
Wealth-Rank Correlations			
Parent-Child Rank Coeff.	0.191	0.229	0.255
Grandparent-Child Rank Coeff.	0.116	0.018	0.077
Long-Run Persistence Coeff.	0.105	0.000	0.100

Table 2: Upper part: Average wealth shares from 1,000 simulations of the different models - data from the Survey of Consumer Finances. Lower part: Average coefficients from regressions of child rank on parent rank and grandparent rank from 1,000 simulations of the different models - data from Danish wealth holdings for three generations in Boserup et al. (2014). Average coefficient from regressions of household rank in generation t on household rank in generation $t-23$ (585 years) from 1,000 simulations of the different models - data from estimates of very long-run (585 years) dynastic wealth holdings in Florence, Italy, in Barone and Mocetti (2016).

Long-run persistence - simulations

	Data	Auto-Correlated Returns Model ($\theta = 0.95$)	Perman. Heterog. Rank-Based Model
Wealth Distribution			
Top 1%	33.6%	31.5%	34.0%
Top 1-5%	26.7%	20.6%	16.6%
Top 5-10%	11.1%	12.3%	9.2%
Top 10-20%	12.0%	13.5%	10.8%
Top 20-40%	11.2%	12.8%	12.7%
Top 40-60%	4.5%	5.8%	8.1%
Bottom 40%	-0.1%	3.5%	8.5%
Wealth-Rank Correlations			
Parent-Child Rank Coeff.	0.191	0.407	0.255
Grandparent-Child Rank Coeff.	0.116	0.044	0.077
Long-Run Persistence Coeff.	0.105	0.041	0.100

Table 4: See the notes to Table 2.

Long-run persistence - simulations

Why persistent types and not return correlation?

- Slow decay

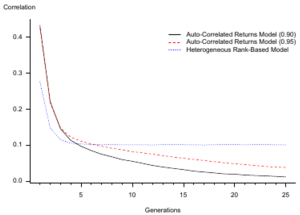


Figure 7: Rank correlations across multiple generations from 1,000 simulations of the permanently heterogeneous rank-based and auto-correlated returns models.

- High variance: the coefficient from a regression of child return rank on parent return rank, averaged across 1,000 simulations, is equal to 0.08 for the permanently heterogeneous model and is equal to 0.95 for the auto-correlated returns model (it is .16 in Norway's data in Fagereng et al., 2021).

Conclusions

Interesting times ahead - with new data and conceptual costructs

- on inequality measures: but see Catherine, Miller, and Sarin (2020); Kuhn, Schularick, Steins (2019); Larrimore, Burkhauser, Auten and Armour (2017)
- on returns (from entrepreneurship, dependence on wealth, revenue diversion): but see Bach, Calvet, and Sodini (2020), Fagereng, Guiso, Malacrino, and Pistaferri (2020), Fagereng, Mogstad, and Ronning (2020); Benhabib and Hager (2021);
- on long-run persistence - cultural and institutional factors - Bourdieu (1984, 1998), Acemoglu and Robinson (2008); Bisin and Verdier (2010)