Wealth Distribution

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Key facts

Wealth is more concentrated than earnings and income.

Wealth Gini: **0.8**.

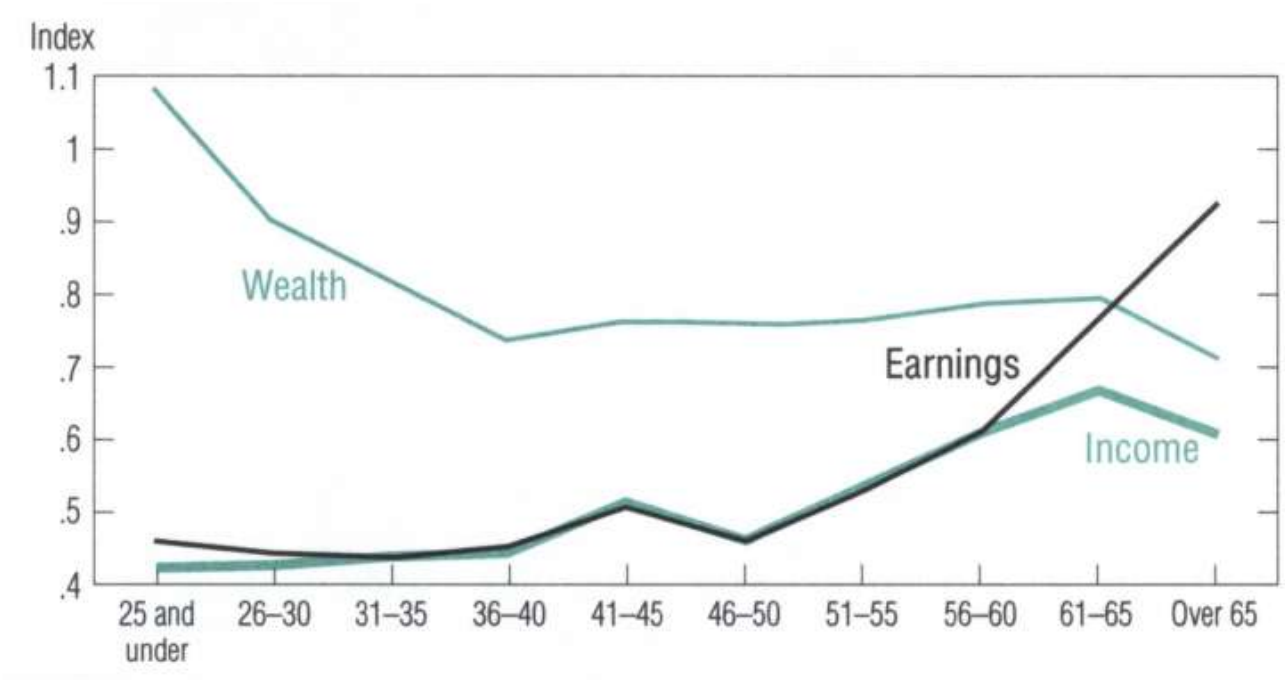
Top 1% hold **35%** of wealth

Bottom 10% hold negative wealth

Bottom **40%** hold negligible wealth.

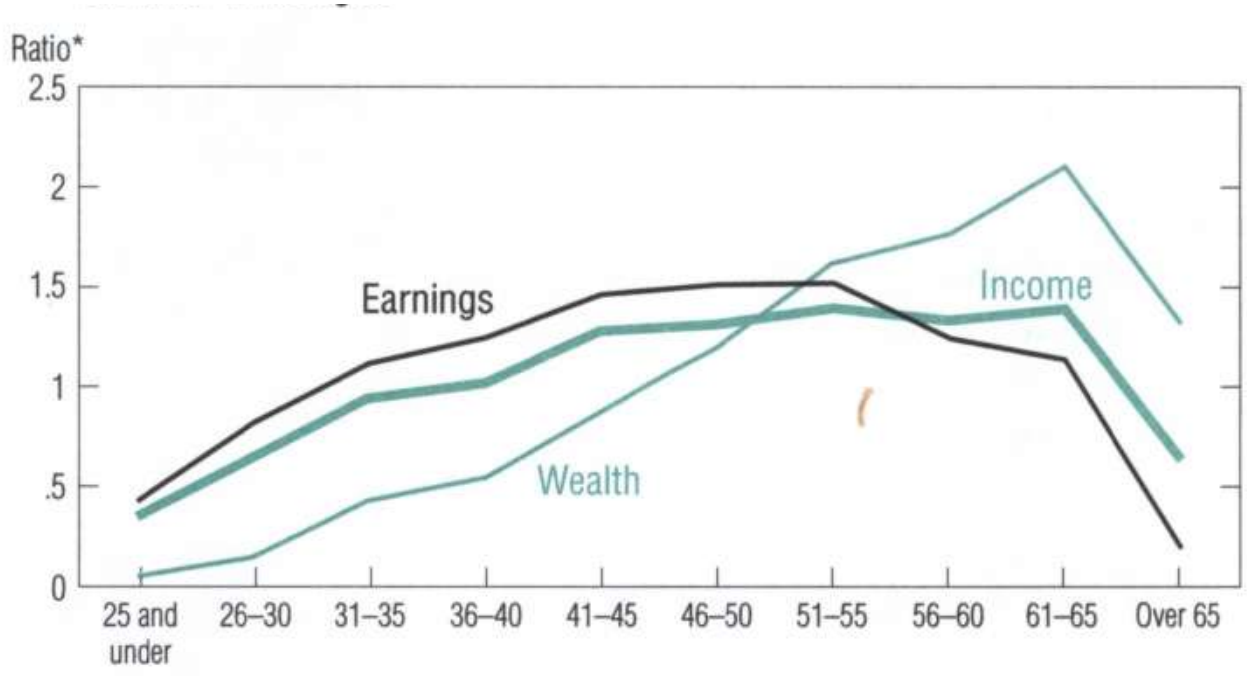
The role of age

Age does not account for wealth inequality.



Source: Rodríguez et al. (2002)

Age profiles



Source: Rodríguez et al. (2002)

The figure shows mean wealth / income / earnings by age.

Wealth peaks much later than earnings.

A benchmark model

Can the standard life-cycle model account for wealth concentration?

Starting point: Huggett (1996)

Purpose:

- Explore implications of the simplest, reasonable models
- What is hard to get?

Model Features

Demographics:

- In each period, $1/a_D$ identical households are born.
- Each lives for a_D periods (years).
- Age of retirement is fixed (a_R).

Preferences:

$$\mathbb{E} \sum_{a=1}^{a_D} \beta^a u(c_a) \tag{1}$$

Model Features

Technology:

$$F(K,L) = (1-\delta)K + C + G + K' \tag{2}$$

Endowments:

- Working agents are endowed with labor efficiency $\eta_a e_a$
- η_a: age-efficiency profile (deterministic; exogenous)
- e_a: labor efficiency (wage) shock; Markov chain

Model Features

Government:

- Taxes labor income: $T = \tau_w w L$
- Eats G
- Pays transfers X to retired households (annuitized income in the data)
- Balanced budget: $G + X = T$

Markets:

- Labor: wage w
- Capital rental: r
- Goods: numeraire.

Household problem

Exogenous state variables $s = (a, e)$ are

- age a
- labor endowment e: .

Endogenous state variable: wealth k.

Borrowing constraint: $k \geq 0$.

Household Dynamic Program

$$V(k,s) = \max u\left(y(k,s) - k'\right) + \beta \mathbb{E} V\left(k', s'\right) \tag{3}$$

with

$$y(k,s) = Rk + w(1-\tau_w)\eta_a e + \varpi(s) \tag{4}$$

subject to $k' \geq 0$.

Euler equation:

$$u'(c) \geq \beta R \mathbb{E} u'(c') \tag{5}$$

with equality if $k' > 0$.

Solution is a consumption function $c(k,a,e)$

Stationary equilibrium: objects

- $\Gamma(k,s)$: distribution of households over states
- Household policy function $c(k,s)$ and value function $V(k,s)$.
- Aggregate quantities: K, L, X.
- Price functions: $r(K,L), w(K,L)$.

Equilibrium conditions

Household policy and value functions are optimal.

Prices equal marginal products:

- $r = F_K(K,L), w = F_L(K,L)$.

Goods market clears: $Y = C + I + G$.

Labor market clears: $L = \sum_s e(s)\eta(s)\Lambda(s)$.

Capital market clears: $K = \sum_s \int_k \Gamma(k,s)\, k\, dk$.

Distribution of households is stationary.

Calibration

Standard functional forms (e.g., Cobb Douglas technology).

Calibrated parameters: β, δ, A.

Calibration targets: K/Y, $w = 1$, R.

Labor efficiencies: approximate an AR(1) that is estimated from panel data (PSID).

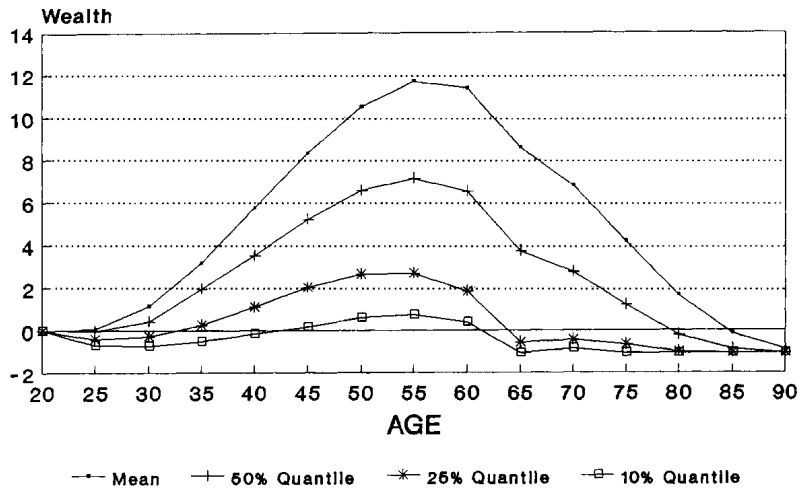
Results

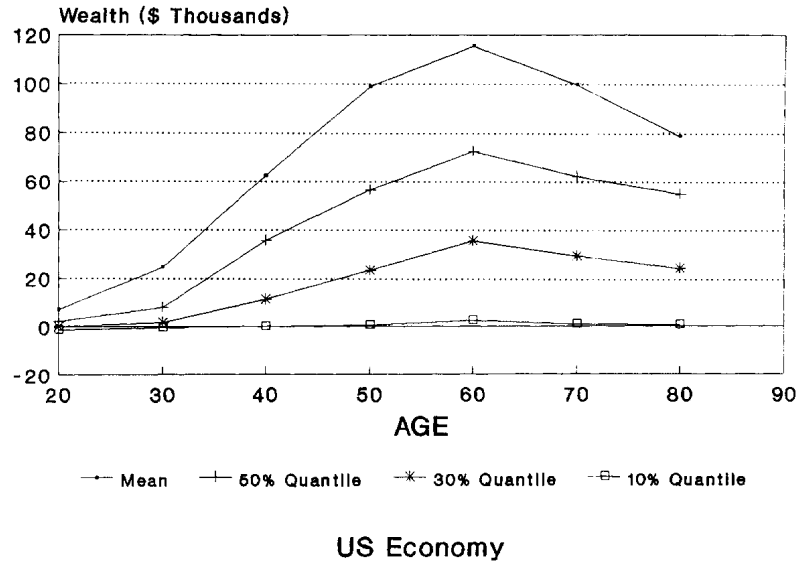
Fraction held by top	1%	5%	20%	Gini	Fraction neg. wealth
Huggett (1996)	10.8	32.4	68.9	0.70	19%
U.S. data	**34.7**	57.8	81.7	0.80	11%

The model has too many households without wealth.

Still, wealth inequality is lower than in the data.

Age profiles





US Economy

The old dissave much too fast.

Age matters too much

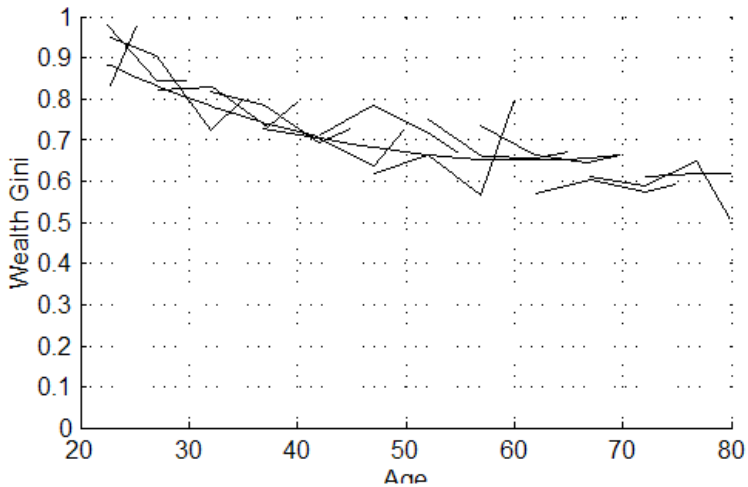
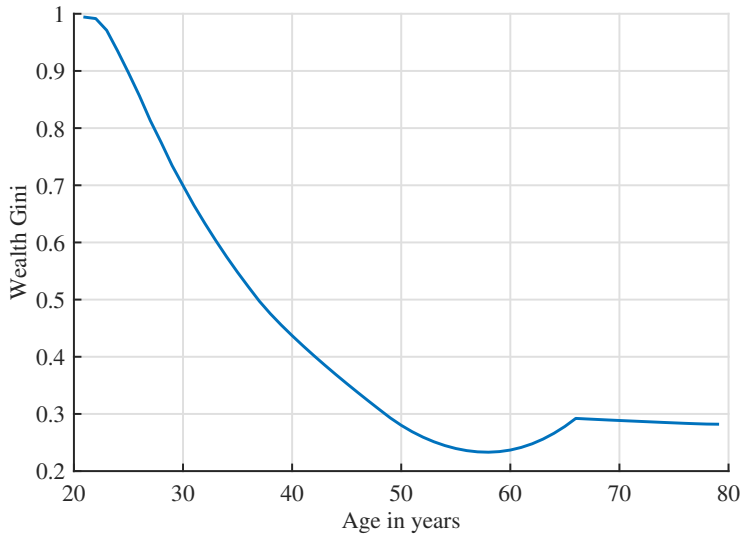


Figure 1: Gini coefficients of wealth by age. PSID data.



Source: Hendricks (2007)

An accounting problem

Given the estimated earnings process, it is not feasible for Huggett's households to accumulate the highest SCF wealth observations.

- The earnings process is estimated from the PSID.
- Wealth is estimated from the SCF.
- The SCF over-samples the rich; the PSID does not.

The model cannot account for the highest wealth observations *by construction*.

- The highest PSID incomes are simply not large enough.

Problem: There is no publicly available U.S. dataset from which an untruncated earnings process could be estimated.

Possible solutions

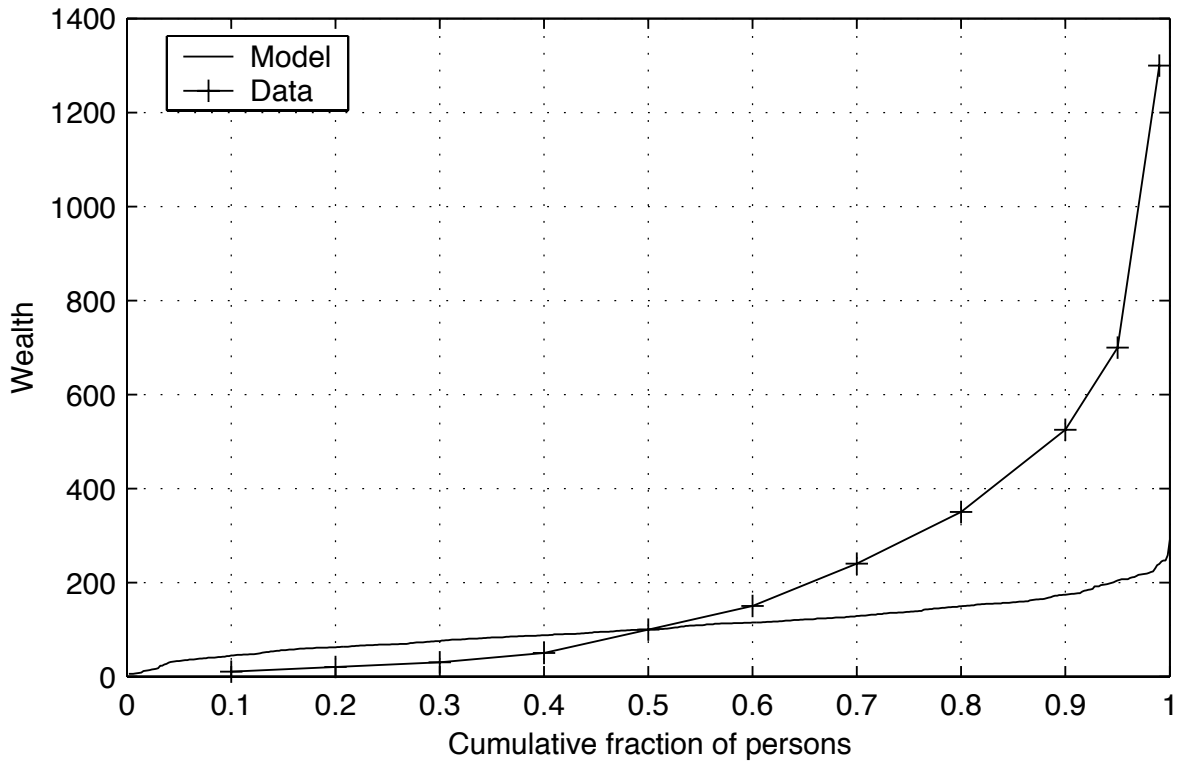
One solution: Castaneda et al. (2003)

- Invent an earnings process that is consistent with the cross-sectional distribution of earnings from the SCF

Use administrative data: (De Nardi et al., 2018)

Wealth and earnings

Wealth and lifetime earnings are too strongly correlated.



Life-cycle model versus Venti and Wise (2000) data (5th lifetime income decile)

Conclusion

Huggett's model goes a long way towards accounting for wealth inequality.

Main discrepancies:

- Model misses the very top of the distribution.
  This may be due to the truncated earnings process.
- Wealth is decumulated too slowly at old age.
- The model only accounts for the cross-sectional distribution
  How does it do with respect to other moments?

Surveys

- De Nardi and Fella (2017)
- Benhabib and Bisin (2018)

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