Wealth Distribution: Entrepreneurship

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Econ 721

March 27, 2026

Introduction

The standard Huggett (1996) life-cycle model has trouble generating enough rich households.

One reason: the earnings of the rich are not high enough.

In the data, the rich are often business owners.

Can a life-cycle model with self-employment opportunities account for wealth concentration?

What is an Entrepreneur?

Mental distinction:

- Entrepreneur:
  - One person owns and runs the firm.
  - Limited access to financial markets.
  - Success tied to entrepreneur's skills.
- Corporation:
  - Many owners. Hired CEO.
  - Can issue equity.
  - Can replace CEO.

Various definitions ... about **13% of households** are entrepreneurs.

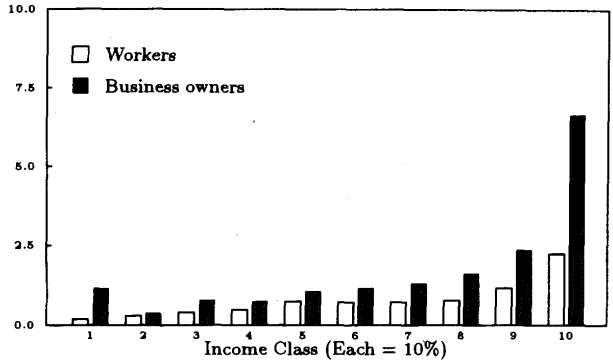
Many rich are entrepreneurs

TABLE 3
FRACTION (%) OF ENTREPRENEURS (According to Various Definitions) IN A GIVEN WEALTH PERCENTILE OF THE OVERALL U.S. WEALTH DISTRIBUTION

	WEALTH PERCENTILE, TOP			
	1%	5%	10%	20%
Business owners or self-employed	81	68	54	39
All business owners	76	62	49	36
Active business owners	65	51	42	30
Self-employed	62	47	38	26
Self-employed business owners	54	39	32	22

Source: Cagetti and De Nardi (2006)

Wealth distribution among entrepreneurs



Source: Quadrini (1999)

Many entrepreneurs are not rich (though that depends to some extent on the definition of entrepreurship)

The Key Question

How important is entrepreneurship for wealth concentration?

How to make that question precise?

One approach

- Write down a "reasonable" model of entrepreneurship.
- Does it get the top 1% wealth share?
- How much does the top 1% share fall when entrepreneurship is "switched off"?

What Model?

What should the model look like?

A benchmark model

Quadrini (1999) and Cagetti and De Nardi (2006)

- much of the literature consists of minor variations of this model

Overview: Huggett (1996) plus

- workers can start firms
- intended bequests
- stochastic aging

Why this Model?

The obvious approach:

Add entrepreneurship to Huggett (1996).

Why also add bequests?

Intuition: Without a saving motive, old entrepreneurs retire and consume.

Why stochastic aging?

A computational trick.

Stochastic Aging

Huggett (1996): need to compute a_D value functions.

- expensive!

One way of getting fewer value functions:

Make the model period longer.

- e.g., one model period is a decade

Drawbacks:

- There are no transitory shocks (each lasts at least 1 model period)
- Model cannot match any data at higher frequencies.
- But most entrepreneurs quit early on.

Stochastic Aging

Each agent goes through a small number of phases.

- In Cagetti and De Nardi (2006): work and retirement

Each period, the agents gets "older" with fixed probability.

- Each period within a phase is "the same."
- **Only need one value function per phase**.

Demographics and Preferences

Two life phases: work and retirement.

- Stochastic transition between phases

Dying agents are replaced by their children.

- Likely overstates the role of inheritances.

Preferences: same as Huggett.

Endowments

In each period:

- Draw a labor endowment y_t (Markov)
- Draw a self-employment productivity θ_t (Markov)
- One unit of labor (unless retired).

Technologies

Corporate sector: standard technology

$$F(K_c, L_c) = A K_c^{\alpha} L_c^{1-\alpha} \tag{1}$$

Entrepreneur sector:

$$g(k, \theta) = \theta k^{\nu} + (1 - \delta) k \tag{2}$$

- diminishing returns $\rightarrow$ finite firm size
- more productive $\rightarrow$ want bigger firm

Without corporate sectors, entrepreneurs would produce too much output and therefore get too much income.

Technologies

Resource constraint:

$$Y = C + I \tag{3}$$

where

- $Y = F(K_c, L_c) + G$
- $L_c =$ mass of all workers
- $G =$ sum of all entrepreneurial outputs θk^{ν}
- $C =$ sum of consumption of all agents
- $I = K' + (1 - \delta)K$
- $K = K_c + K_e$

Markets

1. Competitive goods market (numeraire)
2. Competitive labor market (w)
3. Rental market for K

Timing within periods

Enter the period with wealth a_t.

Decide whether to be a worker or an entrepreneur.

Workers earn wy

Entrepreneurs

- hire k subject to a borrowing constraint
- produce output
- repay k with interest

Choose consumption c_t and saving a_{t+1}.

Household Problem: Young

State: assets a, productivities y and θ.

$$V(a,y,\theta) = \max\{V_e(a,y,\theta), V_w(a,y,\theta)\} \tag{4}$$

All young households face this problem, even if they were entrepreneurs last year.

Firms only exist for one period.

Worker

$$V_w(a,y,\theta) = \max_{c,a'} u(c) + \beta \pi_y \mathbb{E} V(a',y',\theta') + \beta(1-\pi_y)\mathbb{E} W_r(a') \tag{5}$$

subject to

$$a' = (1+r)a + (1-\tau)wy - c \tag{6}$$

where

- π_y: probability of getting "old"
- τ: social security tax rate
- W_r: value of retirement as worker

Entrepreneurs

Use own assets and loans to invest k.

Immediately receive output

$$g(k,\theta) = (1-\delta)k + \theta k^{\nu} \tag{7}$$

No risk.

$$V_e(a,y,\theta) = \max_{c,k,a'} u(c) + \beta\pi_y \mathbb{E}V\left(a',y',\theta'\right) + \beta\left(1-\pi_y\right)W\left(a',\theta'\right) \tag{8}$$

subject to $a' \geq 0$ and

$$a' = g(k,\theta) + (1+r)(a-k) - c \tag{9}$$

where W is the value of being an old entrepreneur.

Borrowing constraints

The borrowing constraint $a' \geq 0$ is key.

Operating at efficient scale requires rich entrepreneurs.

Entrepreneurs have an incentive to save.

Later models have more sophisticated borrowing constraints where max k increases with a.

The Retired

If entrepreneur: can continue to run business

$$W(a,\theta) = \max\{W_e(a,\theta), W_r(a)\} \tag{10}$$

W_e looks basically like V_e.

$$W_r(a) = \max_{c,a'} u(c) + \beta\pi_o W_r(a') + \beta\underbrace{(1-\pi_o)}_{\text{die}}\underbrace{\mathbb{E}V(a',y',\theta')}_{\text{child}} \tag{11}$$

subject to

$$a' = (1+r)a + p - c \tag{12}$$

Dying means being young again...

Corporate sector

Representative firm with standard technology

$$F(K_c, L_c) = A K_c^{\alpha} L_c^{1-\alpha} \tag{13}$$

No direct interaction with startup sector (entrepreneurs).

Implication:

- Taxing entrepreneurs has little effect on most of the economy.

Calibration

Standard choices for preferences, depreciation, capital share, etc.

Self-employment productivity is either 0 or θ.

- Implications: **all** self-employed are rich (very different from data)
- 2x2 transition matrix is P_θ (2 independent parameters).

Six remaining parameters: $\beta, \theta, P_\theta, \nu, f$ are chosen to match:

- fraction of population self-employed (P_θ),
- length of self-employment spells (P_θ),
- K/Y (β) and K_C/K (θ, ν)
- fraction of output earned by entrepreneurs (θ, ν)
- aggregate bequest flows (which parameter pins that down?)

Remarks

Calibration of bequests is, as usual, data free.

- Unlike data, all rich leave big bequests.

Entrepreneurship is "nearly exogenous."

- With only 1 value for θ and with strong persistence of θ, households will almost always choose self-employment when possible.

Households are very impatient: $\beta = 0.87$.

- Intuition: relative to the basic life-cycle model, households save more (b/c of the possibility of future self-employment).
- But workers hold less wealth than in basic life-cycle model.

Results

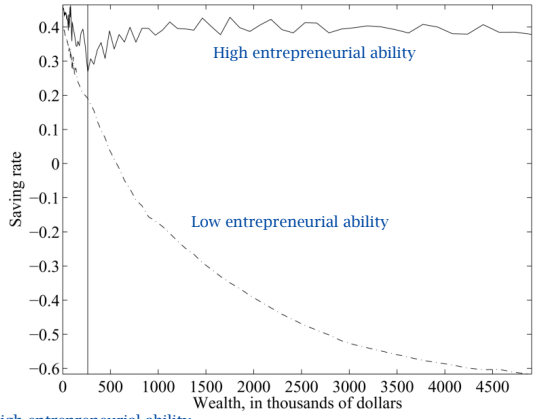
The model accounts for the cross-sectional wealth distribution.

TABLE 6
Comparing Data and Models with and without Entrepreneurs

	Capital-Output Ratio	Wealth Gini	Entrepreneurs	Percentage Wealth in Top			
				1%	5%	20%	40%
U.S. data	3.0	.8	7.55%	30	54	81	94
Baseline model without entrepreneurs	3.0	.6	.0%	4	20	58	95
Baseline model with entrepreneurs	3.0	.8	7.50%	31	60	83	94

Results are robust without altruism (Tb. 7)

Entrepreneurs have high saving rates



High entrepreneurial ability

FIG. 5.—Saving rate for highest-ability workers. Solid line: those with high entrepreneurial ability; dash-dot line: those with no entrepreneurial ability; vertical line: asset level at which high–entrepreneurial ability individuals enter entrepreneurship.

Key for generating high wealth concentration: the rich save a lot.

Main Conclusions

Entrepreneurship allows a "standard" model to generate the rich top 1%.

Mechanism:

1. Entrepreneurs are income rich (all of them!)
2. Rates of return to saving are high when borrowing constraints bind.
3. Therefore, even rich entrepreneurs save.

Open Questions

Does the model match other data moments?

1. Wealth distribution among workers / among self-employed?
   1.1 In the model, all self-employed are rich. Not true in the data.
   1.2 Are there any wealthy workers (managers, lawyers, ...)?
2. Is the correlation between inheritance and wealth too high?
3. What fraction of wealth is actually invested in businesses?
   In Herranz et al. (2015) the median is only 1/5.
4. Does the rate of return match up with data? (Moskowitz and Vissing-Jørgensen, 2002)
5. More data on the life-cycle of entrepreneurs.

Does this literature wildly overstate the role of entrepreneurs and bequests?

Data challenges

Lack of panel data.

Cannot answer:

- Are the rich rich because they are entrepreneurs?
- Or are the rich entrepreneurs because they are rich?
- What are the sources of lifetime income for the rich?
- Are a few people entrepreneurs most of their lives?
- Or are many people entrepreneurs for short spells?

A Newer Model

The Quadrini / Cagetti & De Nardi model has been widely used.

- even though entrepreneurs face no risk and are always rich

A model that "fixes" these limitations: Robinson (2026)

Key model features

Entrepreneurs choose **business risk**.

- Higher-risk: higher expected productivity, but also more dispersion.

Capital is illiquid: **liquidating capital is costly**.

- This is what generates downside risk
- We get poor entrepreneurs.

Frictions

Two financial frictions:

1. Collateral constraint: borrowing is limited by entrepreneur's assets.
2. No insurance against entrepreneurial risk.

Wealth plays a dual role:

- it relaxes borrowing constraints (allowing larger businesses) and
- enables self-insurance against risk (encouraging riskier, higher-productivity projects).

Only wealthy entrepreneurs "can afford" to choose the risky project.

Key model details

Workers - fairly standard (as Cagetti & De Nardi).

New entrepreneur - also standard

- but chooses permanent business risk x
- puts initial capital in place before knowing productivity

Incumbent entrepreneur

- productivity shock z
- capital liquidation cost χ

Incumbent entrepreneur

$$V^E(a,k,h^W,h^E,z,x) = \max_{n,c,a',I} \frac{c^{1-\sigma}}{1-\sigma} + \psi\beta + \max \begin{cases} \mathbb{E}[V^W(a',h^{W\prime},h^{E\prime})] \\ V^{NE}(a',h^W,h^E) \\ \mathbb{E}[V^E(a',k',h^{W\prime},h^{E\prime},z',x)] \end{cases} \tag{14}$$

subject to

$$c + a' + I = (zh^E)^{1-\gamma}(k^\alpha n^{1-\alpha})^\gamma - wn + (1+r^A)a \tag{15}$$

$$a' \geq -\phi k' \tag{16}$$

$$k' = \begin{cases} k(1-\delta) + I & \text{if } I \geq 0 \\ k(1-\delta) + \chi I & \text{if } I < 0 \end{cases} \tag{17}$$

a: assets; k: capital; h^W: worker ability; h^E: entr. ability; n: hired labor.

Results

The model matches (most of) the wealth distribution.

There are now rich and poor entrepreneurs.

Businesses are inefficiently small and inefficiently risky.

Main contribution:
A tractable model with risky entrepreneurs.

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