Who becomes an entrepreneur?
Labor market prospects and occupational choice

Markus Poschke
McGill University

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Who becomes an entrepreneur?

- The most able? (Gates, Rockefeller...)
- The least able? (corner shop, dry cleaner)

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- people differ in one dimension (e.g. ability, Lucas 1978)
  ⇒ one end of the distribution chooses entrepreneurship
  ⇒ can’t explain empirics well
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- people decide whether to be a worker or an entrepreneur
- have heterogeneous ability in both activities

Outcomes of interest:

- who becomes worker/entrepreneur?

  \[ \Rightarrow \text{firm size/productivity distribution and aggregate productivity} \]

Particular focus: low-ability entrepreneurs.

Explaining their presence helps

- estimate macro models
- explain productivity differences
- evaluate policies
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Entrepreneurship rates are U-shaped in education

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<td>Denmark, 1980-96</td>
<td>10.9  10.9  7.4  3.6 12.9</td>
</tr>
</tbody>
</table>
Entrepreneurship rates are U-shaped in education

U-shape still there when controlling for age, gender, marital status, immigrants, etc.:

- Blanchflower (2000) with micro data across 19 OECD countries
- Schjerning and Le Maire (2007) for Denmark

Linear specifications (years of schooling) cannot pick this up.
More facts on entrepreneurship

1. Many entrepreneurs “out of necessity”
   Global Entrepreneurship Monitor (GEM) data: 12.3% in U.S., 16.9% in CAN, 46.7% in BRA, 6.1% in DEN

2. Many small firms:
   55% of employers in U.S. have < 5 employees

3. Small/low-productivity firms more likely to exit

4. but controlling for age, effect of size on survival becomes small
   ⇒ many small/low-productivity firms persist

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Who becomes an entrepreneur? This paper

- the most able *and* the least able
- outside option in the labor market matters
- but heterogeneity alone not enough: ability to search for good project essential

- entrepreneurship “out of necessity” explains persistence of low-productivity firms
  ⇒ meaningful lower tail of the firm size distribution
  ⇒ composition effect on aggregate productivity

- correlation between productive and entrepreneurial ability shapes firm size distribution
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Related literature

- Ancestor: Roy (1951).
- Two dimensions:
  - Lloyd-Ellis and Bernhardt (2000), wealth and entrepreneurial ability.
  - Cagetti and De Nardi (2006), focus on borrowing constraints.
  - Jovanovic (1994).
Agents

- continuum of measure 1, risk neutral
- at beginning of every period, $\lambda$ people born
- probability $\lambda$ of retiring $\Rightarrow$ constant population
- entrepreneur retires: firm closes down
- income from working or from running firm
- discount factor $\beta \in (0, 1)$
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Two dimensions of ability

**Individuals** have observable productive ability \( a \)

**Firms** have total factor productivity \( \alpha \):
\[
y(\alpha, n) = \alpha n^\gamma, \quad 0 < \gamma < 1
\]
(\( n \) is labor in efficiency units)

**Timing** \( \alpha \) is drawn upon entry – ex ante unknown
once \( \alpha \) is known: can continue or reject

\( a \) and \( \alpha \) for a founder, distribution of \( \alpha \) may depend on his \( a \)

Assume: \( a \) shifts \( \Phi^a(\alpha) \), the cdf of \( \alpha \)
location of \( \Phi^a(\alpha) \) given by \( g(a) \)
before entry, know \( a \) but not \( \alpha \): use \( \Phi^a(\alpha) \)
Two dimensions of ability

**Individuals** have observable productive ability $a$

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Decide whether to work or start a firm, given own $a$ and $w(a)$

- need to know values $V(a)$ and $W(a)$ of the two options
- value $W(a)$ of working trivial
- value $V(a)$ of starting a firm depends on how demanding entrepreneur is

⇒ get this next
Firm value

Firm enters with productivity $\alpha$. Alternatives:

- continue: get $F(\alpha)$: $\pi(\alpha) = c_0 \alpha^{1/(1-\gamma)} w^{-\gamma/(1-\gamma)}$ until retire
- exit, try again: get $V(a)$

Entrepreneur’s problem:

- draw $\alpha$ from a distribution $\Phi^a(\alpha)$
- problem is when to accept, stop drawing: like McCall search
- value of accepting $\uparrow$ in $\alpha$, value of rejecting independent of $\alpha$

$\Rightarrow$ solution: reservation productivity $\alpha_R(a)$ s.t. $V(a) = F(\alpha_R)$

$$F(\alpha_R(a)) = V(a) = \beta E[\max(F(\alpha_R(a)), F(\alpha))|a]$$
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Occupational choice

Rewrite threshold condition:

\[ F(\alpha_R(a)) = \frac{\beta}{1 - \beta} \int_{\alpha_R(a)}^{\infty} F(\alpha') - F(\alpha_R(a)) d\Phi^a(\alpha') \]
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\( a \uparrow: \)
1. face better distribution of \( \alpha \)
   \( \Rightarrow \) RHS up: higher value of trying again
   \( \Rightarrow \) \( \alpha_R(a), V(a) \) up in \( a \)

2. success probability up for any fixed cutoff
   \( \Rightarrow \) value of trying again convex in \( a \) for any fixed cutoff
   \( \Rightarrow \) even with linear \( F(\alpha) \) and \( g(a), V(a) \) convex
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\[\Rightarrow \text{ even with linear } F(\alpha) \text{ and } g(a), V(a) \text{ convex}\]
$V(a) \text{ vs } W(a)$
Occupational choice

Corollaries:

- $V(a)$ more convex if $F(\alpha)$ or $g(a)$ convex
- $V(a)$ still convex for some concave $g(a)$
What drives the choice?

Low-\(a\) agents:

- some probability of a good draw \(\Phi^a(0) < 1\) \(\Rightarrow V(0) > 0\)
- ability to search for good opportunity, abandon bad ones is crucial
- opportunity cost of search is very low

High-\(a\) agents:

- if \(F'' > 0\) (the standard case): can leverage high productivity through use of variable factor
For comparison: Roy result

Original setting: abilities known and permanent
⇒ correlation and variances drive sectoral choice.

Related objects here: $g'(a)$, $\text{var}(a)$, $\text{var}(\alpha|a)$

Substantial differences in results:

• convexity of $V$ ⇒ high $a$ choose entrepreneurship; variances do not matter for them

• search changes the situation for low $a$: option to reject adds value ⇒ choose entrepreneurship
Success probability up in $a$

Clear that $\alpha_R$ increasing in $a$.

Success probability $1 - \Phi^a(\alpha_R(a))$ up in $a$:

- to the contrary, suppose constant success probability $(\alpha_R$ up in line with $g(a))$
- with this policy, benefit of trying again same for all $a$
- but cost up

$\Rightarrow$ not optimal; need to raise success probability to compensate;
$\Rightarrow$ success probability up in $a$, $\alpha_R$ increases less than $E[\alpha|a]$
The Data

Model results fit with

- U-shape of entrepreneurship in education
- existence and persistence of low-productivity firms: left tail of the firm size distribution
- large variance in returns to entrepreneurship

Now show

- U-shape of entrepreneurship in wages
- low-ability entrepreneurs reject more projects
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### NLSY: Descriptive statistics

<table>
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<th>mean</th>
<th>standard deviation</th>
<th>individuals</th>
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<td>ever entrepreneur</td>
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<td>duration</td>
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<td>relative duration</td>
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<td>share of one-year firms</td>
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<td>average firm duration</td>
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Entrepreneurship and education: a U-shape again
Entrepreneurship and wages: another U-shape

<table>
<thead>
<tr>
<th>dependent variable</th>
<th>entrepreneur at least once (1)</th>
<th>time spent as entrepreneur (2)</th>
<th>enter entrepreneur (3)</th>
<th>enter entrepreneur (4)</th>
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<tr>
<td>wage/10</td>
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<td>-2.238 ***</td>
<td>-0.009 **</td>
<td>-0.010 ***</td>
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<td></td>
<td>(0.047)</td>
<td>(0.709)</td>
<td>(0.004)</td>
<td>(0.004)</td>
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<td>(wage/10)^2</td>
<td>0.055 ***</td>
<td>0.735 **</td>
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<td>experience/100</td>
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<td>0.291 ***</td>
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<td>(0.073)</td>
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<tr>
<td>(experience/100)^2</td>
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Entrepreneurship and wages: another U-shape

**Figure:** Predicted probability of ever being an entrepreneur as function of the wage
Low-ability entrepreneurs reject more projects

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<tr>
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<th>average firm life (2)</th>
<th>average firm life (3)</th>
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<td>wage</td>
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<td>0.093 ***</td>
<td>0.039 **</td>
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<td>(0.005)</td>
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<td>2501</td>
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Wrap-up

New:

• low-productivity firms persist if owners have low outside option: entrepreneurship “out of necessity”
• fits U-shape of entrepreneurship in education/wages
• fits large dispersion of returns to entrepreneurship
• empirical evidence supports model predictions