

The Role of Human Capital Specificity in Entrepreneurship

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The micro and macro of job mobility

Job mobility within and across occupations

Gyetvai (2024)

Job search with preference shocks

Arcidiacono, Gyetvai, Maurel, and Jardim (2025 *REStud R&R*)

Job finding through past coworker networks

Gyetvai and Zhu (2025 *Labour Econ*)

Job switching after health shocks

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Entering and exiting entrepreneurship

Gyetvai and Tan (2026)

Background

Small and medium-sized enterprises are “engines of growth”

(OECD, 2026)

Extensive interest in spurring entrepreneurship

- Typical initiatives aim to reduce financial barriers to entry

Most entrepreneurs exit

- Over 50% of startups exit within 5 years
- Long-term exit hazard is 6–10%

(Sterk, Sedláček, and Pugsley, 2021)

(Karahan, Pugsley, and Şahin, 2024)

Entry is driven not only by financial barriers, but also *outside option* after exit

- Only 3.5% serial entrepreneurs
- Can failed entrepreneurs return to their previous careers?
- Or does an entrepreneurial past improve their careers?

Research questions

- ① *What are the labor market outcomes of entrepreneurs upon exit?*
- ② *How does this outside option shape entrepreneurial dynamics?*

The two parts of this paper

① Empirical evidence: entrepreneurship impacts return option to wage employment

- Portuguese linked employer-employee data with *entrepreneurs* 
- Return-entrepreneurs *earn 3.7% more* relative to never-entrepreneur counterfactual
- Gains & losses are *heterogeneous* along labor productivity and other margins

② Quantitative model: entry & exit is driven by human capital risk

- Human capital from entrepreneurship to wage employment is *imperfectly transferable*
- Risk of losing entrepreneurial human capital *deters entry*
- Lowering human capital risk *spurs entry*, eliminating financial barriers does *not*

Literature

Barriers to entry and growth in entrepreneurship

Buera and Shin (2013); Midrigan and Xu (2014); Tan and Zeida (2024)

- ▶ Human capital as barrier

Investment specificity & irreversibility

Lanteri (2018); Bhandari, Martellini, and McGrattan (2025); Baley and Blanco (2026); Tan (2026)

- ▶ Specificity of human capital investment

Outside option of returning to wage employment

Vereshchagina and Hopenhayn (2009); Choi (2017); Catherine (2022); Gottlieb, Townsend, and Xu (2022)

- ▶ Endogenous co-evolution with entrepreneurship

Firm dynamics vis à vis entry and exit

Buera and Shin (2013); Clementi and Palazzo (2016); Lanteri, Medina, and Tan (2023)

- ▶ Human capital channel

1. Empirical evidence

Portuguese linked employer–employee data



Quadros de Pessoal (QP)

- Universe of work histories at private firms with 1+ employee, 1985–2020
- Detailed wage & hours information in wage employment

Sistema de Contas Integradas das Empresas (SCIE)

- Universe of balance sheet & income statements at private firms, 2004–2020
- Detailed sales & other performance measures in entrepreneurship

Entrepreneurs = owner-managers at newly established firms (Queiró, 2022)

- i Employers (owners) according to their professional status
- ii Directors according to their 4-digit occupation
- iii Managers according to their worker qualification
 - Firm is born in sample

Sample

Empirical approach in a nutshell

Ideal experiment: compare outcomes of two ex ante identical potential entrep.

Challenge: potential entrepreneurs are unobservable

Our solution: compare return-entrepreneurs to *matched* never-entrepreneurs

- Difference-in-differences ... with a twist!
- Matching on trajectory, not only on set of observations

Workers' earnings profile

A worker i of age j_{it} at time t earns

$$\log e_{it} = X_{it}\beta + \nu_{it}, \quad \nu_{it} = \phi(j_{it}) + \varepsilon_{it}$$

- X_{it} : observable worker characteristics
- $\phi(\cdot)$: mean residual earnings profile
- Akin to nonparametric Mincer equation

Calculating counterfactual earnings gap

- ① Residualize earnings of entrepreneurs before entry & never-entrepreneurs

Math

- Take out gender, calendar year, occupation, education, sector, location

- ② Match earnings trajectory of entrepreneurs before entry to never-entrep.

Procedure

- Custom matching procedure on distance *& slope!*

- C.f. synthetic DiD (Arkhangelsky, Athey, Hirshberg, Imbens, and Wager, 2021)

SDID

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SDID

- ③ Estimate earnings profile of never-entrepreneurs

- Separately by age of entry for matched return-entrepreneurs

- ④ Assign counterfactual earnings to return-entrepreneurs

- ⑤ Calculate gap (e_{it}^{gap}) between actual & counterfactual earnings

Gap characteristics

- ⑥ Estimate labor productivity \bar{e}

\bar{e} vs. firm performance

$$\log e_{it}^{\text{gap}} = \beta_0 + \beta_1 \log e_{i,t-1}^{\text{gap}} + \bar{e}_i + \varepsilon_{it} \implies \bar{e}_i$$

Measuring the earnings impact of entrepreneurship

“Difference-in-differences”:

$$\log e_{it}^{\text{gap}} = \theta \mathbb{1}(\text{Post}_{it}) + \varepsilon_{it}$$

Event study:

$$\log e_{it}^{\text{gap}} = \sum_{s=-5}^7 \theta_s D_{i,t-s} + \varepsilon_{it}$$

$s \leq -1$: before entry, $s \geq 0$: after exit

Heterogeneity by labor productivity:

$$\log e_{it}^{\text{gap}} = \theta_1 \mathbb{1}(\text{Post}_{it}) + \theta_2 \mathbb{1}(\text{Post}_{it}) \times \bar{e}_i + \varepsilon_{it}$$

Earnings gains decrease with labor productivity

	$\log e_{it}^{gap}$	
	(1)	(2)
$\mathbb{1}(\text{Post})$	0.037*** (0.0033)	0.020*** (0.0030)
$\mathbb{1}(\text{Post}) \times \bar{e}$		-0.32*** (0.013)
Observations	91,022	76,520

(2) 1 s.d. below mean $\sim +10.3\%$ 1 s.d. above mean $\sim -6.3\%$

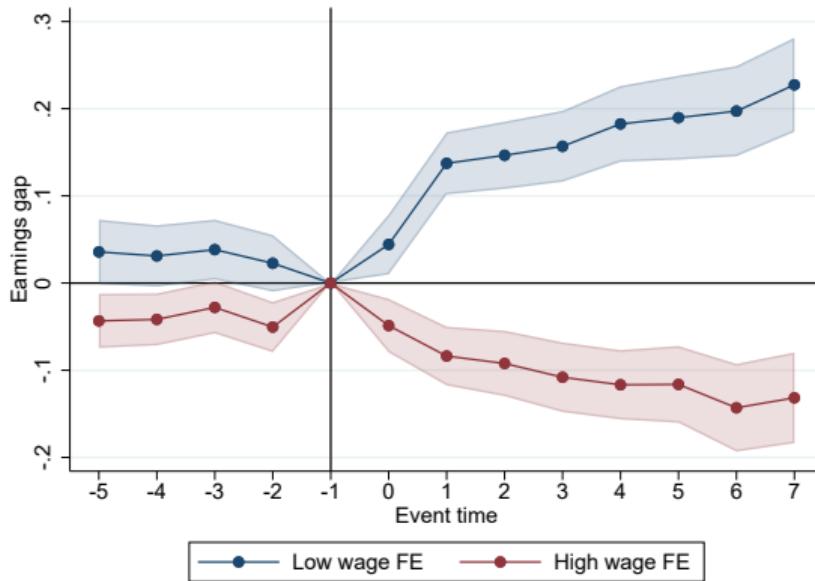
60% of entrepreneurs gain 7.7%, 40% lose 6.1%

Age of entry

Placebo test

SDID

Earnings gains decrease with labor productivity



Low & high earnings FE: bottom & top quintile of \bar{e}

Age of entry

Placebo test

Outside options and firm outcomes

	$\log e_{it}^{gap}$			
	(1) Pooled	(2) Low \bar{e}	(3) High \bar{e}	(4) Pooled
1(Post)	-0.15*** (0.0079)	-0.029* (0.016)	-0.45*** (0.023)	0.041*** (0.0045)
1(Post) \times sales	0.032*** (0.0014)	0.039*** (0.0035)	0.058*** (0.0034)	
1(Post) \times tenure				-0.0077*** (0.0014)
Observations	70,257	13,986	14,056	76,520

Turning point: (1) 108K EUR, (2) 2K EUR, (3) 2.3M EUR, (4) 6 years

Event study

Placebo test

Taking stock

Return option to wage employment *evolves endogenously* with entrepreneurship

Earnings gains...

- decrease with labor productivity
- increase with sales
- decrease with entrepreneurial tenure

Empirical patterns...

- are incompatible with fixed outside option
- point to imperfectly transferable human capital across wage emp. and entrep.

Taking stock

Return option to wage employment *evolves endogenously* with entrepreneurship

Earnings gains...

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Empirical patterns...

- are incompatible with fixed outside option
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What does this mean for entrepreneurial entry and exit?

2. Quantitative model

Bird's-eye view of the model

Life-cycle model with endogenous “occupational” choice and incomplete markets

Individuals are characterized by...

- Two types of human capital, specific to wage employment (h) and entrep. (q)
- Ability to accumulate human capital (a_h & a_q)
- Bond holdings (b)

Income in both wage employment and entrepreneurship is uncertain

- Precautionary savings for consumption and financing business

Workers

Earnings & savings

- HC shocks: $\tilde{h} = h\textcolor{teal}{s}$, $\log s \sim N(\mu_s, \sigma_s)$
 - Earnings: $w\tilde{h}$ \Rightarrow Savings: $b' = w\tilde{h} - c + (1+r)b \geq 0$

Entry choice

- $o = 0$: stay in wage employment
 - $o = 1$: enter entrepreneurship after paying switching cost ξ_{WE}

HC evolution at age j

- In wage employment: $h' = \tilde{h} + a_h (\tilde{h} f(j))^{\theta_h}$ (Huggett, Ventura, and Yaron, 2011)
 - In entrepreneurship: $q' = \begin{cases} (1 - \delta_q)q & \text{if } o = 0 \\ (1 - \delta_q)q + \lambda_h \tilde{h} & \text{if } o = 1 \end{cases}$

Entrepreneurs

Earnings & savings

- HC shocks: $\tilde{q} = q\bar{z}$, $\log z \sim N(\mu_z, \sigma_z)$
- Earnings: $A\tilde{q}(k^\alpha l^{1-\alpha})^\nu - (r + \delta_k)k - wl \implies$ Savings: $b' = \text{earnings} - c + (1+r)b \geq 0$
- Borrowing constraint: $k \leq (1 + \phi)b$ (max LTV is $\frac{\phi}{1+\phi}$)

Exit choice

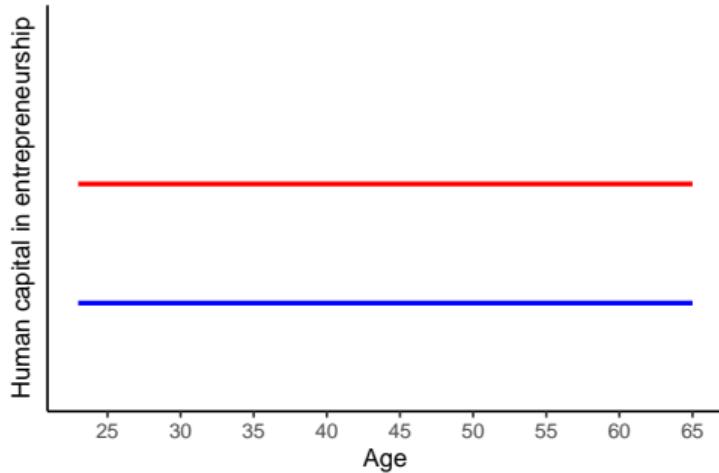
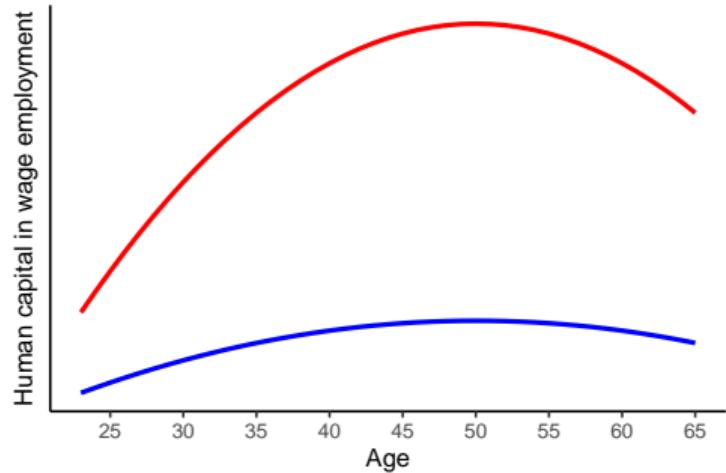
- $o = 1$: stay in entrepreneurship and enjoy non-pecuniary benefit ψ
- $o = 0$: exit entrepreneurship after paying switching cost ζ_{EW}

HC evolution at age j

- In entrepreneurship: $q' = \begin{cases} \tilde{q} + a_q (\tilde{q} f(j))^{\theta_q} & \text{if } o = 1 \\ 0 & \text{if } o = 0 \end{cases}$
- In wage employment: $h' = \begin{cases} (1 - \delta_h)h & \text{if } o = 1 \\ (1 - \delta_h)h + \lambda_q \tilde{q} & \text{if } o = 0 \end{cases}$

Illustrating the model mechanism

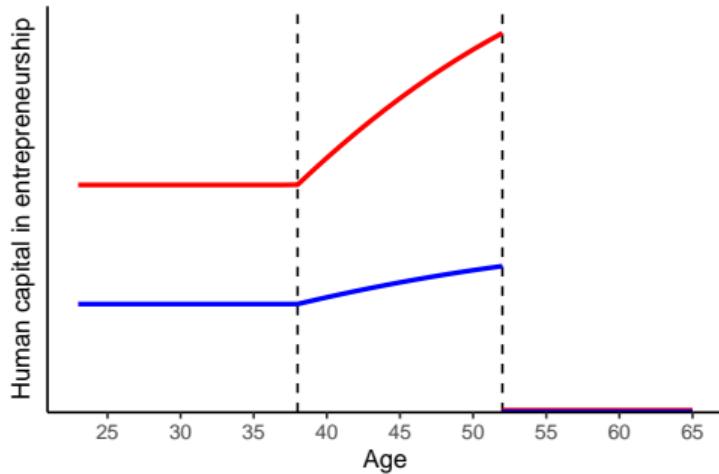
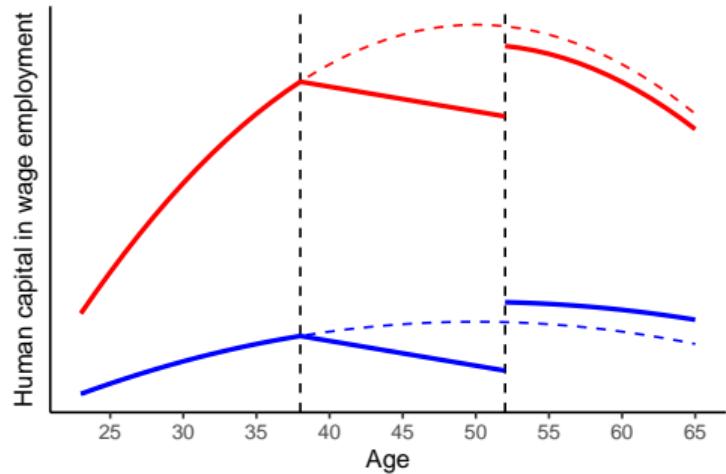
Never-entrepreneurs



Predictions

Illustrating the model mechanism

Return-entrepreneurs



Predictions

Bellman equation: workers

$$V_j^W(h, q, s, b; a_h, a_q) = \max_{b', o} U(c) + \beta \underbrace{\left(\int_{z'} V_{j+1}^E(h', q', z', b'; a_h, a_q) dF_{z'} - \xi_{WE} \right)}_{\text{entering entrepreneurship}} \\ + \beta (1 - o) \underbrace{\int_{s'} V_{j+1}^W(h', q', s', b'; a_h, a_q) dF_{s'}}_{\text{staying in wage employment}}$$

such that

$$\tilde{h} = hs$$

$$b' = w\tilde{h} - c + (1+r)b \geq 0$$

$$h' = \tilde{h} + a_h (\tilde{h} f(j))^{\theta_h}$$

$$\log s' \sim N(\mu_s, \sigma_s)$$

$$\log z' \sim N(\mu_z, \sigma_z)$$

$$q' = \begin{cases} (1 - \delta_q)q & \text{if } o = 0 \\ (1 - \delta_q)q + \lambda_h \tilde{h} & \text{if } o = 1 \end{cases}$$

Bellman equation: entrepreneurs

$$V_j^E(h, q, z, b; a_h, a_q) = \max_{b', o} U(c) + \psi + \beta \underbrace{o \int_{z'} V_{j+1}^E(h', q', z', b'; a_h, a_q) dF_{z'}}_{\text{staying in entrepreneurship}} \\ + \beta \underbrace{\left((1 - o) \int_{s'} V_{j+1}^W(h', q', s', b'; a_h, a_q) dF_{s'} - \xi_{EW} \right)}_{\text{returning to wage employment}}$$

such that

$$\tilde{q} = qz$$

$$b' = A\tilde{q} (k^\alpha l^{1-\alpha})^\nu - (r + \delta_k)k - wl$$

$$- c + (1 + r)b \geq 0$$

$$k \leq (1 + \phi) b, \quad \phi \geq 0$$

$$q' = \begin{cases} \tilde{q} + a_q (\tilde{q} f(j))^{\theta_q} & \text{if } o = 1 \\ 0 & \text{if } o = 0 \end{cases}$$

$$\log z' \sim N(\mu_z, \sigma_z)$$

$$h' = \begin{cases} (1 - \delta_h)h & \text{if } o = 1 \\ (1 - \delta_h)h + \lambda_q \tilde{q} & \text{if } o = 0 \end{cases}$$

$$\log s' \sim N(\mu_s, \sigma_s)$$

① Simplifying assumptions

i. $a_h = a_q = a$

- ▶ Rate of HC accumulation is perfectly correlated across h and q

ii. $\delta_q = 0$

- ▶ Unused q does not depreciate

iii. $\log \begin{pmatrix} h_o \\ q_o \\ a \end{pmatrix} \sim N \left(\begin{pmatrix} \mu_h \\ -\sigma_q^2 \\ \mu_a \end{pmatrix}, \begin{pmatrix} \sigma_h^2 & \rho_{hq}\sigma_h\sigma_q & \rho_{ha}\sigma_h\sigma_a \\ \rho_{hq}\sigma_h\sigma_q & \sigma_q^2 & 0 \\ \rho_{ha}\sigma_h\sigma_a & 0 & \sigma_a^2 \end{pmatrix} \right)$

- ▶ Mean q_o is normalized to 1

- ▶ q_o and a are uncorrelated

② Wage employment: HC shocks

- *Indirect inference*: two-step optimal GMM on older never-entrepreneurs
(Huggett, Ventura, and Yaron, 2011)

Estimator

Parameter	Value
μ_s	-0.077
σ_s	0.102
σ_ε	0.237

- δ_h calibrated to average decay of h : $\delta_h = 1 - \exp(\mu_s + 0.5\sigma_s^2) = 0.069$

③ Wage employment: HC accumulation

- *Indirect inference*: method of simulated moments

Estimator

Parameter	Value
θ_h	0.719
$f(\cdot)$	[1.604, 0.006, 8.128, 30]
μ_h	-0.238
μ_a	1.090
σ_h	0.516
σ_a	0.134
ρ_{ha}	0.897

Taking the model to the data

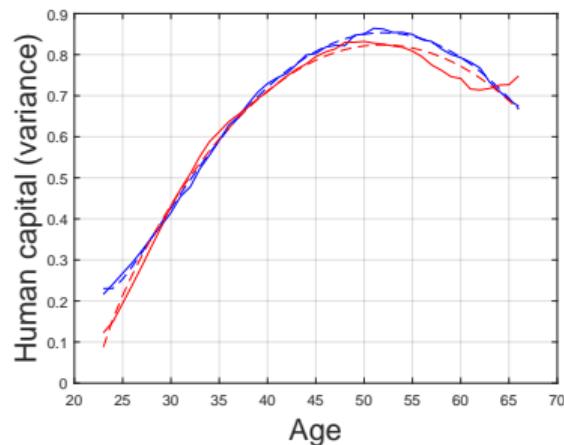
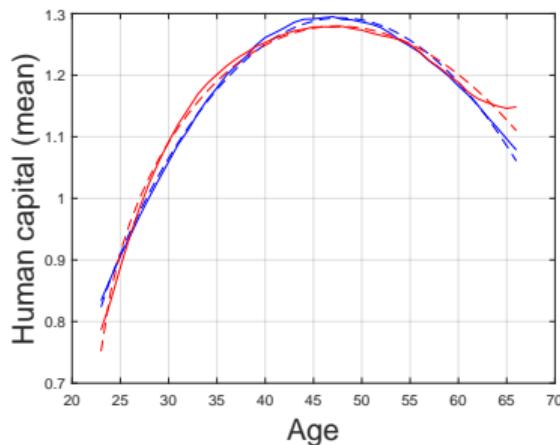
Step 3 of 5

③ Wage employment: HC accumulation

- *Indirect inference*: method of simulated moments
- Model fit is excellent

Estimator

Other moments



Taking the model to the data

Step 4 of 5

④ Externally set parameters

- Set to standard values in literature

Parameter	Description	Value
α	Capital share	$1/3$
ν	Returns to scale in production	$3/4$
δ_k	Capital depreciation rate	0.067
γ	Risk aversion	2
β	Discount factor	0.96
ϕ	Collateral constraint	0.5
r	Rental rate of capital	0.04
w	Rental rate of labor	1

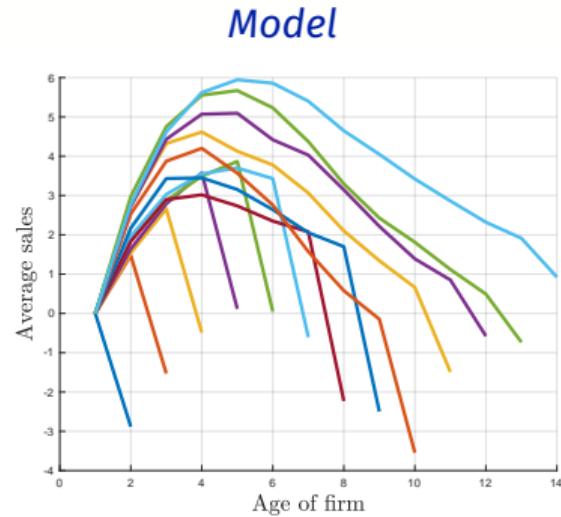
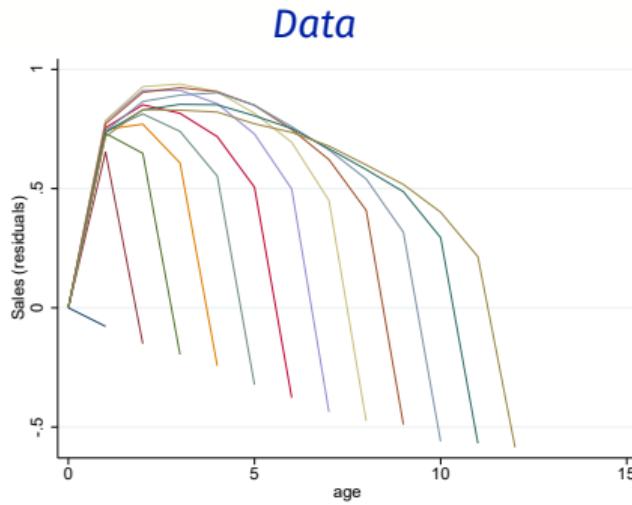
⑤ Internally calibrated parameters

Parameter	Value	Target	Data	Model
μ_z	0.342	Average sales growth	-0.135	-0.100
		St.d. sales growth	0.632	0.976
σ_z	0.925	Reg. sales growth on lagged sales growth	-0.083	-0.010
		Reg. sales growth on $2 \times$ lagged sales growth	-0.004	-0.022
σ_q	0.394	St.d. average sales	1.67	6.27
ρ_{hq}	0.327	Elas. average sales to \bar{e}	1.96%	1.73%
θ_q		Reg. sales on lagged sales	0.826	0.936
	0.750	Reg. sales on $2 \times$ lagged sales	0.767	0.784
		Average sales at exit – entry	-0.03	-1.90
A	0.255	Employment share of entrepreneurs	25%	22%
ψ	0.29	Population share of entrepreneurs	4.5%	3.6%
ξ_{WE}	2.827	Entry rate	0.36%	1.09%
ξ_{EW}	3.510	Exit rate	7.4%	23.7%
λ_h	0.500	Average age at entry	33.6	36.7
λ_q	0.144	DiD result	0.037	0.037

Taking the model to the data

Step 5 of 5

- ⑤ Internally calibrated parameters
- Model replicates sales dynamics



Two counterfactual exercises

- ① Remove financial frictions ($\phi \rightarrow \infty$)
 - \implies unconstrained borrowing

- ② Reduce human capital specificity ($\lambda_q \uparrow$)
 - \implies average earnings gain doubles

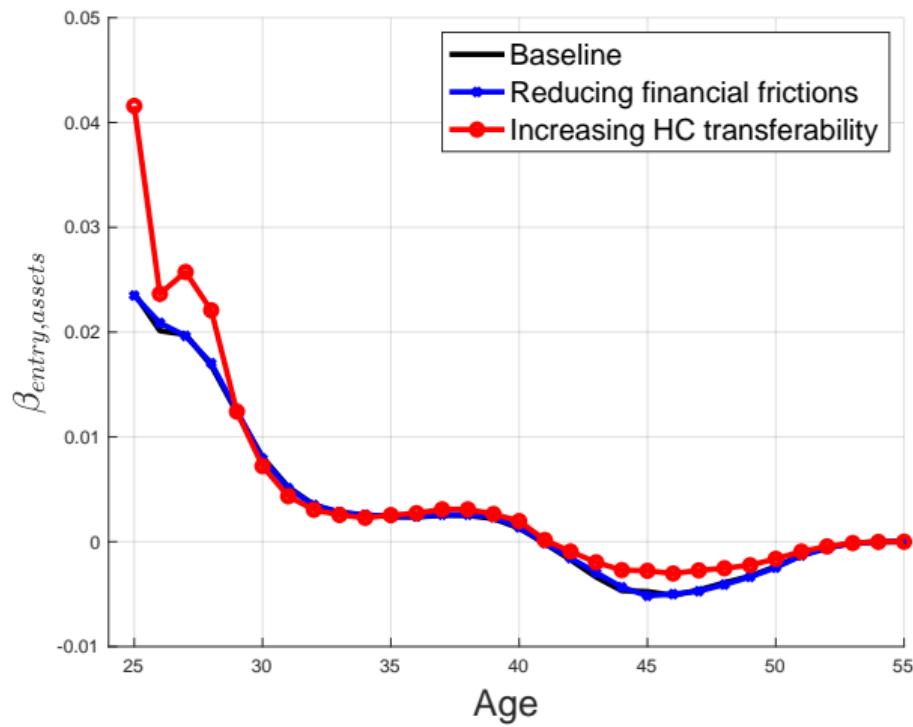
Quantitative results

	<i>Baseline</i>	<i>Removing FF</i>	<i>Reducing specificity</i>
Avg. impact on earnings (%)	3.70	3.70	7.90
<i>Impact on entrepreneurship</i>			
% entrepreneurs	3.60	3.80	4.49
Entry rate (%)	1.09	1.11	1.40
HC (h) of entrants (% rel.)	–	-2.21	8.44
HC (q) of entrants (% rel.)	–	1.82	-4.52
Avg. sales (% rel. to baseline)	–	29.7	3.58

Entry decision is driven by HC risk considerations

	<i>Baseline</i>	<i>Removing FF</i>	<i>Reducing specificity</i>
Avg. impact on earnings (%)	3.70	3.70	7.90
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Financial constraints do not matter for entry



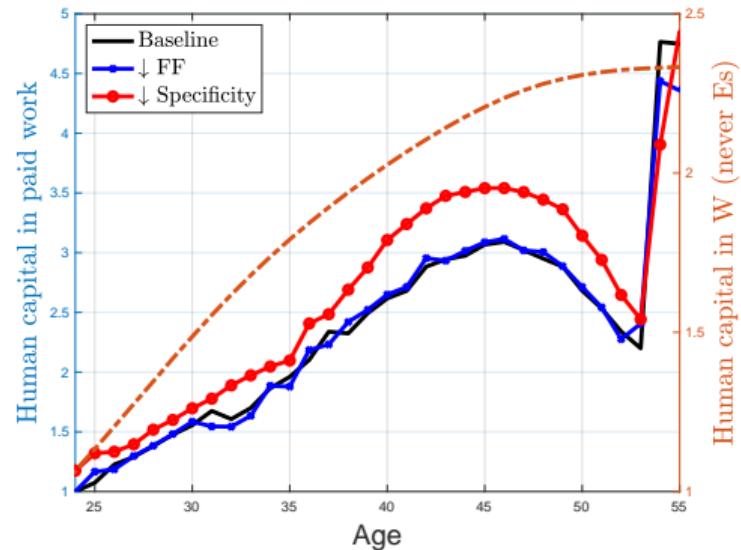
Entrep. rate
Entry rate
Constrained entrep.
Value of entry

“Insurance” against HC risk subsidizes low-quality entry

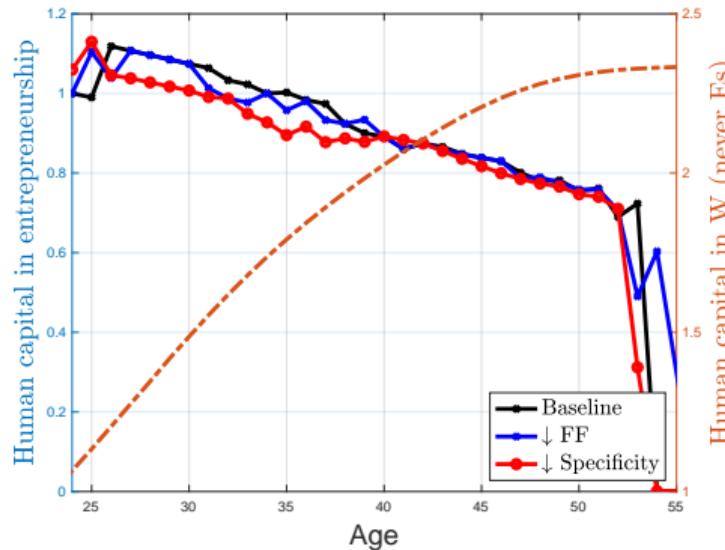
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“Insurance” against HC risk subsidizes low-quality entry

Wage employment (h)



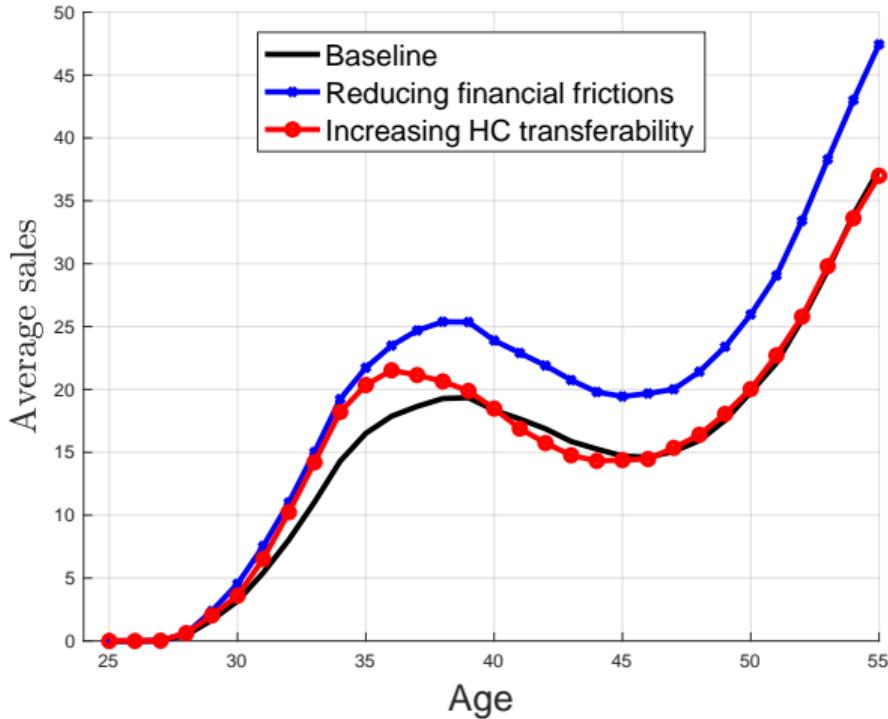
Entrepreneurship (q)



Financial constraints matter for entrepreneurial scale

	<i>Baseline</i>	<i>Removing FF</i>	<i>Reducing specificity</i>
Avg. impact on earnings (%)	3.70	3.70	7.90
<i>Impact on entrepreneurship</i>			
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Avg. sales (% rel. to baseline)	–	29.7	3.58

Financial constraints matter for entrepreneurial scale



Conclusion

Takeaways

First study on implications of entrepreneurial human capital specificity

① Empirical evidence

- Entrepreneurship impacts the return option to wage employment
- Return-entrepreneurs earn more than their never-entrepreneur counterfactual selves
- ...but gains accrue to low-productivity workers

② Quantitative model

- Human capital is imperfectly transferable from entrepreneurship to wage employment
- Risk due to human capital specificity is the key driver of entrepreneurial entry & exit
- Lowering human capital risk spurs entry, but eliminating financial frictions does not

<https://attilagyetyai.com>

Backup slides

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Entrepreneurs

- Only ever held one job per year
- Only entrepreneur → wage employment (no entrepreneur → non-participants)
- No serial entrepreneurs

Counterfactual entrepreneurs

- “Matched” workers

A worker i of age j_{it} at time t earns

$$\log e_{it} = X_{it}\beta + \nu_{it}, \quad \nu_{it} = \phi(j_{it}) + \varepsilon_{it}$$

- X_{it} : gender + calendar year + occupation + education + sector + location
- $\phi(\cdot)$: mean residual earnings profile

- ① Residualize earnings for all workers & entrepreneurs *before* entry $\sim \tilde{e}_{it}(j_{it})$
- ② Match entrepreneurs to workers using *earnings trajectory* $\{\tilde{e}_{it}(j_{it})\}_{j_{it} < j_i^{\text{entry}}}$ Procedure
- ③ Estimate residual earnings profiles $\hat{\phi}(\cdot)$ using workers only
- ④ Assign counterfactual earnings to return-entrepreneurs as $\hat{\phi}(j_{it})$ for $j_{it} > j_i^{\text{exit}}$
- ⑤ Construct earnings gaps as $\log e_{it}^{\text{gap}} = \log \tilde{e}_{it}(j_{it}) - \hat{\phi}(j_{it})$ AR(1)

Earnings difference between worker i and *future* entrepreneur i' :

$$\Delta(j) = \log \tilde{e}_{i't}(j_{i't}) - \log \tilde{e}_{it}(j_{it}) \text{ for } j_{it} = j_{i't} = j$$

Loss function:

$$Q = U + V,$$

$$U = \frac{1}{j^{entry} - 23} \sum_{j=23}^{j^{entry}} \Delta(j)^2$$

$$V = \frac{1}{j^{entry} - 23} \sum_{j=23}^{j^{entry}} \left(\Delta(j) - \frac{1}{j^{entry} - 23} \sum_{j=23}^{j^{entry}} \Delta(j) \right)^2$$

Match future entrepreneur i' to set of workers with smallest loss

$$(\hat{\theta}^{\text{SDID}}, \hat{\alpha}, \hat{\tau}) = \arg \min_{\theta, \alpha, \tau} \sum_{i=1}^N \sum_{t=1}^T (\log e_{it} - \alpha_i - \tau_t - X_{it}\beta - \theta \mathbb{1}(\text{Post}_{it}))^2 \hat{\omega}_i \hat{\lambda}_t$$

with

$$\hat{\omega} = \arg \min_{\omega} \sum_{t=1}^{T_{\text{pre}}} \left(\omega_0 + \sum_{i=1}^{N_c} \omega_i \log e_{it} - \frac{1}{N_t} \sum_{i=1}^{N_t} \log e_{it} \right)^2 + \zeta^2 T_{\text{pre}} \|\omega\|_2^2 \quad \text{and}$$

$$\hat{\lambda} = \arg \min_{\lambda} \sum_{i=1}^{N_c} \left(\lambda_0 + \sum_{t=1}^{T_{\text{pre}}} \lambda_t \log e_{it} - \frac{1}{T_{\text{post}}} \sum_{t=+1}^{T_{\text{post}}} \log e_{it} \right)^2$$

Persistence of earnings FEs

Evidence: Methods

	$\log e_{it}^{\text{gap}}$	$\log e_{it}^{\text{gap}}$	$\log \frac{e_{it}^{\text{gap}}}{e_{i,t-1}^{\text{gap}}}$
	(1)	(2)	(3)
ρ	0.780	0.343	
$\sigma(\epsilon)$	0.287	0.232	
$\sigma(\bar{e})$		0.258	
η			0.123

$$(1) \quad \log e_{it}^{\text{gap}} = \rho \log e_{i,t-1}^{\text{gap}} + \epsilon_{it}$$

$$(2) \quad \log e_{it}^{\text{gap}} = \rho \log e_{i,t-1}^{\text{gap}} + \bar{e}_i + \epsilon_{it}$$

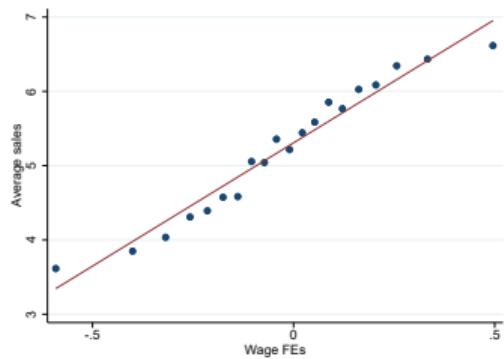
$$(3) \quad \log \frac{e_{it}^{\text{gap}}}{e_{i,t-1}^{\text{gap}}} = \eta \bar{e}_i + \epsilon_{it}$$

◀ Back

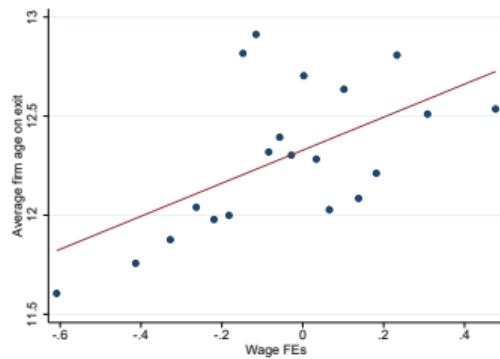
Earnings FEs vs. firm performance

Evidence: Methods

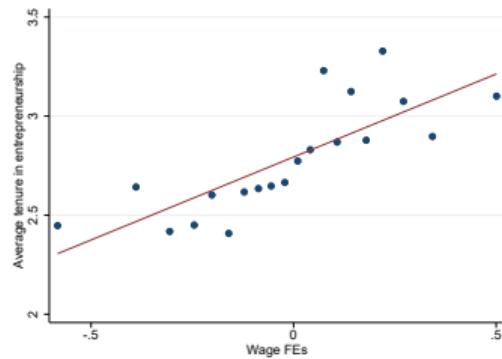
Average sales



Average firm age on exit



Average tenure



◀ Back

Outside options decline with age of entry

Evidence: Results

	$\log e_{it}^{gap}$		
	(1) Pooled	(2) Low \bar{e}	(3) High \bar{e}
1(Post)	0.065*** (0.0058)	0.18*** (0.014)	-0.074*** (0.014)
1(Post) \times age of entry	-0.0029*** (0.00057)	-0.0048*** (0.0012)	0.0053*** (0.0012)
Observations	91,022	14,454	16,512

Low & high \bar{e} : bottom & top quintile of earnings FEs

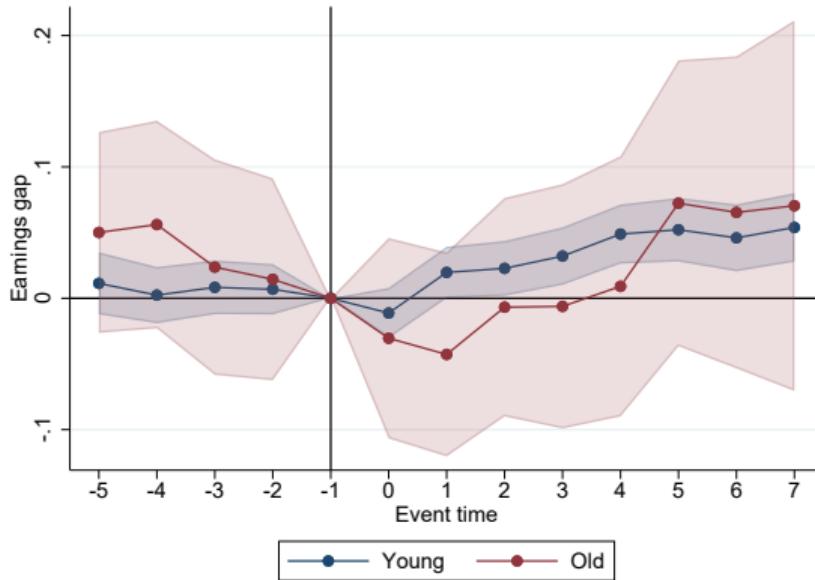
Turning point: (1) 23 years, (2) none, (3) 14 years

Placebo test

◀ Back

Post-exit earnings decrease with age of entry

Evidence: Results



Young: enter before age 35. Old: enter after age 45

DiD

Placebo test

◀ Back

Assign “fake entry” to matched never-entrepreneurs

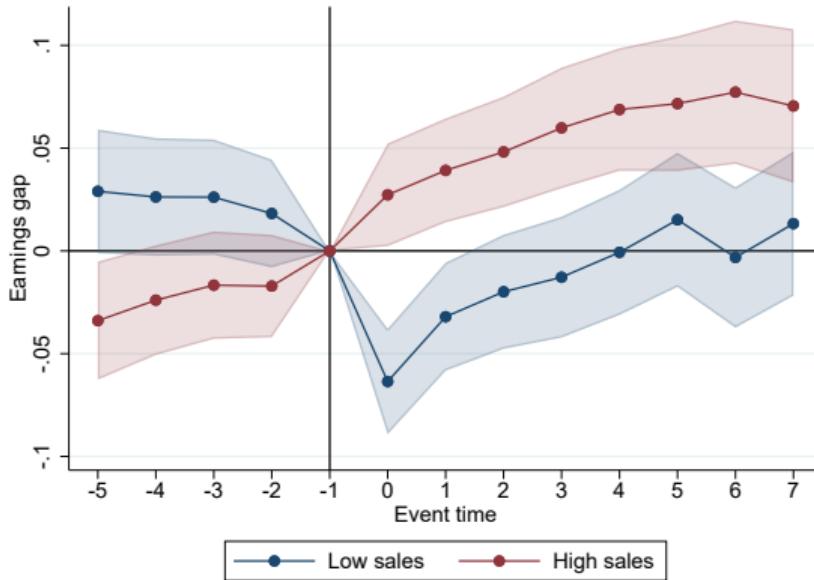
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}(\text{Post})$	-0.0013 (0.0035)	-0.013*** (0.0026)	-0.015*** (0.0020)	0.00056 (0.0050)	-0.044*** (0.0098)	0.10*** (0.0096)
$\mathbb{1}(\text{Post}) \times (E = 1)$	0.047^{***} (0.0047)	0.073^{***} (0.0036)	0.0048 (0.0030)	0.087^{***} (0.0073)	0.28^{***} (0.015)	-0.12*** (0.015)
$\mathbb{1}(\text{Post}) \times \bar{e}$		0.19*** (0.013)	-0.097*** (0.0096)			
$\mathbb{1}(\text{Post}) \times (E = 1) \times \bar{e}$		-0.55*** (0.016)	-0.10*** (0.013)			
$\mathbb{1}(\text{Post}) \times \text{age}$				0.0000027 (0.00052)	0.0016* (0.00086)	-0.00097 (0.00082)
$\mathbb{1}(\text{Post}) \times (E = 1) \times \text{age}$				-0.0044*** (0.00074)	-0.0082*** (0.0013)	0.0035*** (0.0013)
Observations	228897	221098	187059	228897	43828	44620

	$\log e_{it}^{gap}$		
	(1)	(2)	(3)
Pooled			
1(Post)	0.067	0.249	-0.078
Observations	30,362	30,362	30,362

Due to data limitations, (i) estimator is applied to a 1 percent sample of return-entrepreneur and never-entrepreneur wage histories; and (ii) clustered bootstrap standard errors are not available.

Earnings gains increase with sales

Evidence: Results



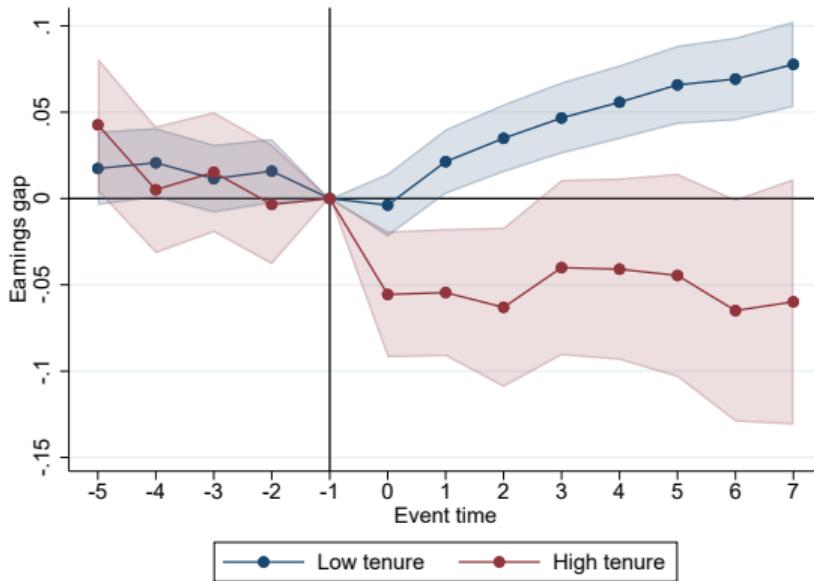
Low & high sales: sales at exit is below & above median

Placebo test

◀ Back

Earnings gains decrease with entrepreneurial tenure

Evidence: Results



Low & high tenure: less than & over 5 years

Placebo test

◀ Back

- ① High earnings profile: *earnings loss* upon return
- ② Low earnings profile: *earnings gain* upon return
- ③ High earnings profile: *earnings loss* is decreasing in age of entry
- ④ Low earnings profile: *earnings gain* is decreasing in age of entry
- ⑤ Aggregate impact is ambiguous

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CRRA utility:

$$U(\{c\}_{j=1}^J) = \sum_{j=1}^J \beta^j \frac{c_j^{1-\gamma}}{1-\gamma}$$

$$U(c) = \frac{c^{1-\gamma}}{1-\gamma}$$

HC age profile: at age j ,

$$f(j) = \kappa_1 \left(\frac{1}{1 + \exp(\kappa_2(j - \kappa_3))} \right)^{\kappa_4}$$

◀ Back

Model earnings with measurement error:

$$\hat{e}_j \equiv e_j + \epsilon_j$$

$$\hat{e}_j - \hat{e}_{j-1} = \log \left(s_j \left(h_{j-1} s_{j-1} + a_h (h_{j-1} s_{j-1} f(j-1))^{\theta_h} \right) \right) - \log (h_{j-1} s_{j-1}) + \log \epsilon_j - \log \epsilon_{j-1}$$

For older workers with $f(\cdot) \rightarrow 0$:

$$\hat{e}_j - \hat{e}_{j-1} \approx \log s_j + \log \epsilon_j - \log \epsilon_{j-1}$$

$$\Delta e_{j,n} \equiv \hat{e}_{j+n} - \hat{e}_j \approx \sum_{i=1}^n s_{j+i} + \log \epsilon_{j+n} - \log \epsilon_j$$

Step 2 of 5: HC shocks for workers, GMM (cont'd)

Model: Calibration

Moment conditions:

$$\text{var}(\Delta e_{j,n}) = n\sigma_s^2 + 2\sigma_\varepsilon^2 \quad (1)$$

$$\text{cov}(\Delta e_{j,n}, \Delta e_{j,m}) = m\sigma_s^2 + \sigma_\varepsilon^2 \quad \text{for } m < n \quad (2)$$

Sample analogs:

$$1/N_j \sum_{i=1}^{N_j} \left(\Delta e_{j,n}^i - \overline{\Delta e_{j,n}} \right)^2$$

$$1/N_j \sum_{i=1}^{N_j} \left(\Delta e_{j,n}^i - \overline{\Delta e_{j,n}} \right) \left(\Delta e_{j,m}^i - \overline{\Delta e_{j,m}} \right)$$

Estimate on 55+ never-entrepreneurs using two-step optimal GMM

Calibrate μ_s to match earnings decline above age 55

◀ Back

Model: 10,000 simulations

Data: residualized log hourly earnings by age and calendar years for never-entrepreneurs above the minimum wage ($= \tilde{h}$)

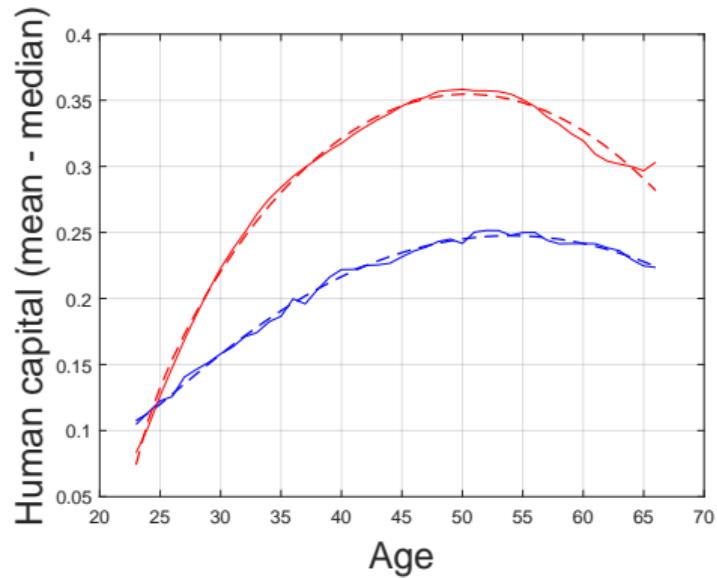
$$\hat{\Theta} = \arg \min_{\hat{\Theta}} (\mathbf{m}^{\text{sim}} - \mathbf{m}^{\text{data}})' (\mathbf{m}^{\text{sim}} - \mathbf{m}^{\text{data}})$$

where

$$\mathbf{m}^p = [\text{mean}_i(\tilde{h}_{i,j}^p), \text{var}_i(\tilde{h}_{i,j}^p), \text{mean}_i(\tilde{h}_{i,j}^p) - \text{median}_i(\tilde{h}_{i,j}^p)]_{j=23}^{65}, \quad p \in \{\text{sim}, \text{data}\}$$

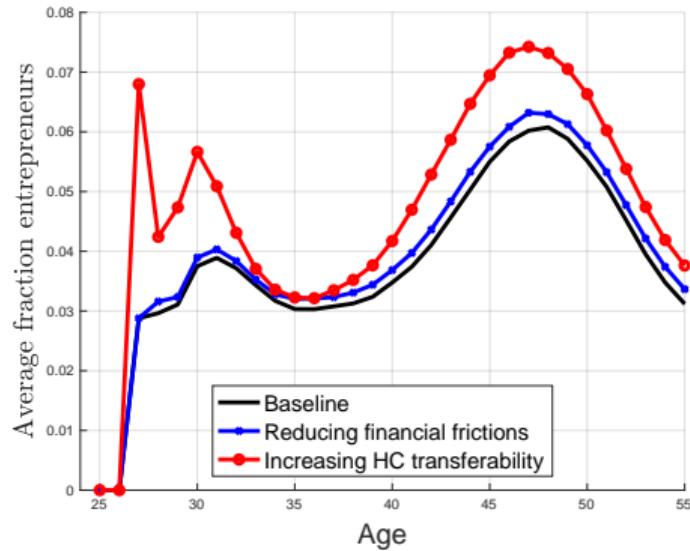
Step 3 of 5: HCA for workers, model fit

Model: Calibration

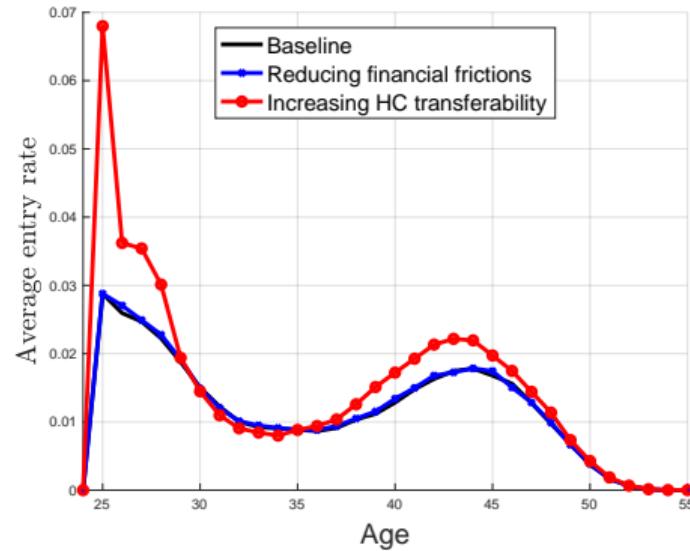


◀ Back

Fraction of entrepreneurs

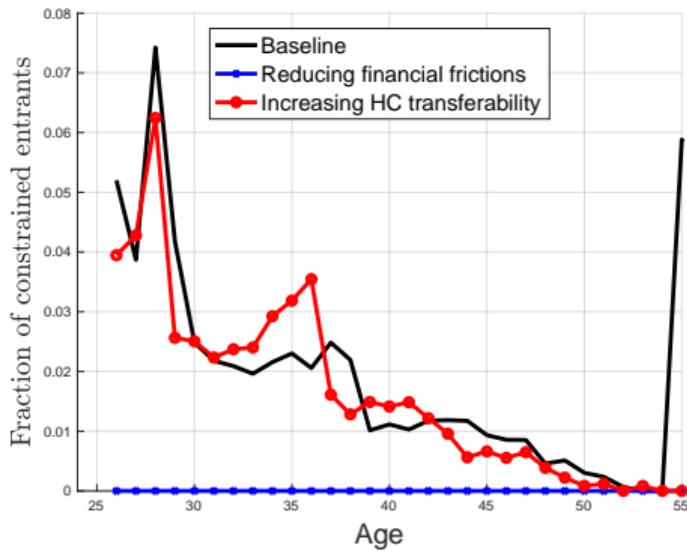
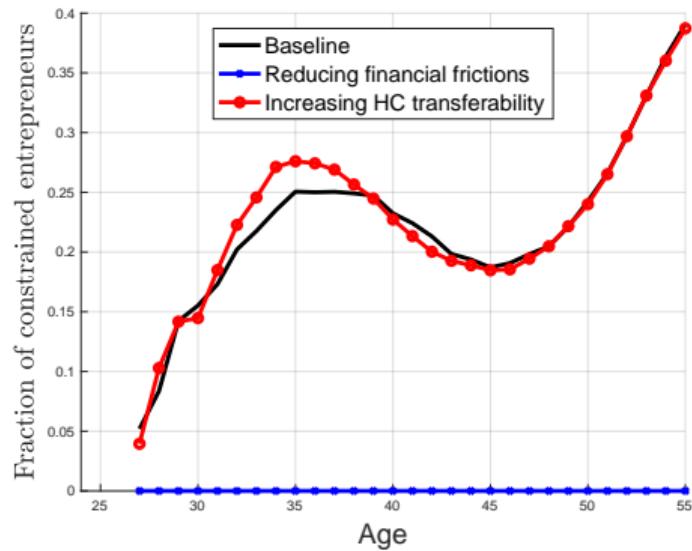


Entry rate



Constrained entrepreneurs

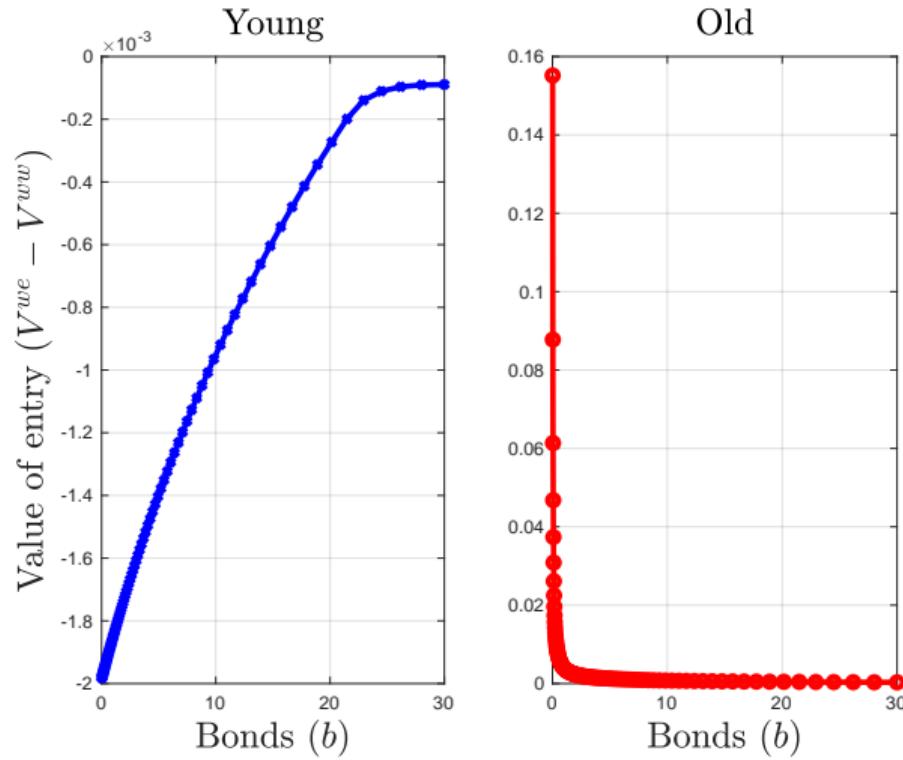
Model: Results



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Value of entry

Model: Results



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