Establishment Dynamics in Post-War Japan: Missing Entry and Shrinking Size

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August 22, 2024
JER Conference: Heterogeneity and Macroeconomics

Outline

Motivations

1. **Market dynamics** (firm/est. entry, exit, growth, ...) is important for economy while declined in recent decades among some countries
   - Important as creative destruction and allocation efficiency
   - Various driving forces in the literature
2. **Japan** is well-known for its low market dynamism and full of SMEs but w/o systematic checks on the long-term trends
   - Important to know the history in order to understand the current
   - External validity tests for many explanations

This Paper

1. Exploit historical statistics (1957-2006) to document the long-run evolution of market dynamics in post-war Japan

2. Employ a workhorse (Hopenhayn) firm dynamics model to study the potential driving forces of the evolution

Things Learned One: New Facts about The Evolution of Japanese Market Dynamics

1. Entry rates declined continuously between late 1950s and mid 1990s (8+% $\rightarrow$ 4%)
2. Average establishment size saw a marked reduction during the 1960s and 1970s (24 workers $\rightarrow$ 16 workers)
3. Downward shifts in lifecycle growth due to strong cohort effects in certain sectors (age 1/20: 15/19 $\rightarrow$ age 1/20: 11/14 workers)

- ▷ Many more details soon
- ▷ *These facts, as far as I know, have largely not been documented!*
- ▷ Implications on literature of Japanese economy and firm dynamics

Things Learned Two: Mixed Results about Model Testing on Potential Drivers

1. Labor supply growth decline can explain entry rate decline, but only in a very mechanical way
2. Decline in fixed operation cost and ex-ante productivity dispersion can account for entry & avg. size declines
3. Changes in entry cost, exit value, and labor market distortions cannot generate reasonable size changes

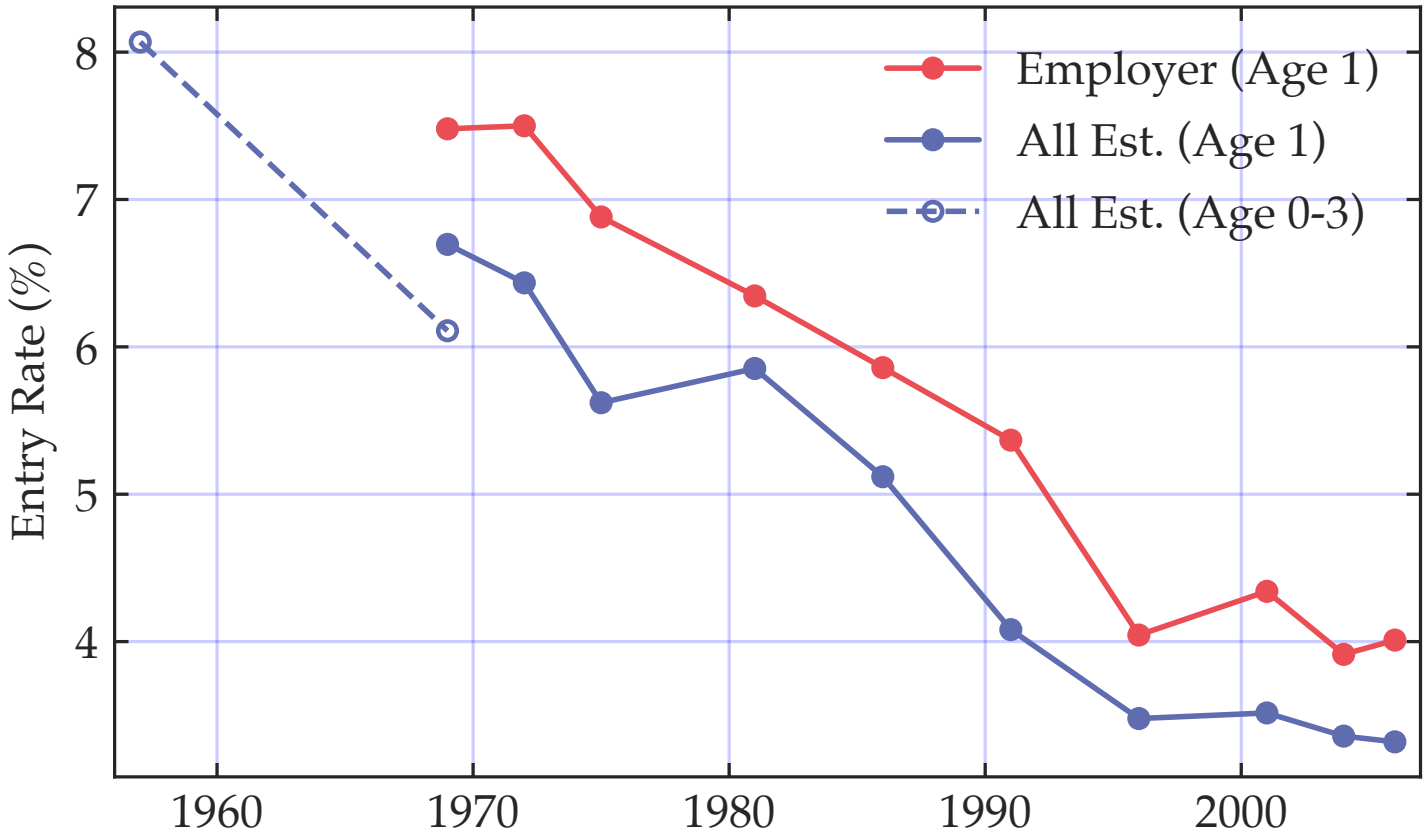
- ▷ The extent of est. heterogeneity plays important roles
- ▷ *Coherent explanations via model lens rather than definitive answers!*
- ▷ Uncaptured empirical evidence; Other potential factors

Outline

Data Source

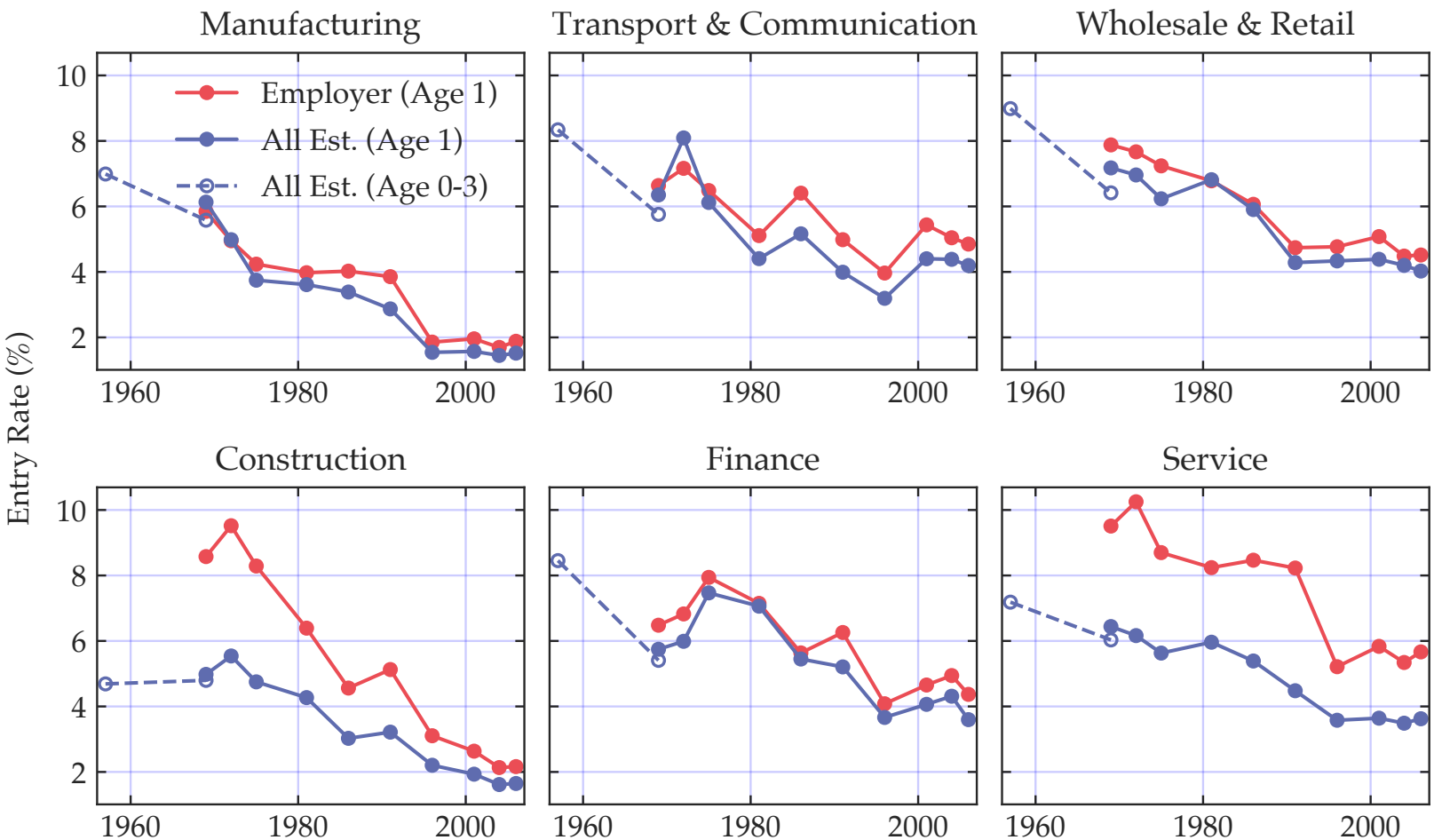
- ”Establishment Census of Japan”:
  - All private est. in non-primary sectors btw. 1951-2006
  - Conducted every 3 or 5 years
  - Aggregate tabulations on est. mass and employment
  - Age-related statistics in 1957 and since 1969
- Focus on incorporated establishments (”Employers”)
  - Est. of individual proprietorship (”Nonemployers”) are likely ”subsistence entrepreneurs” and not to grow ◂ details
- Focus on establishment rather than firm
  - Data available in long term
  - Over 80% of the firms are single-establishment
  - Simple unit in thinking of market dynamics

Fact 1a: Long-Run Decline in Entry Rate

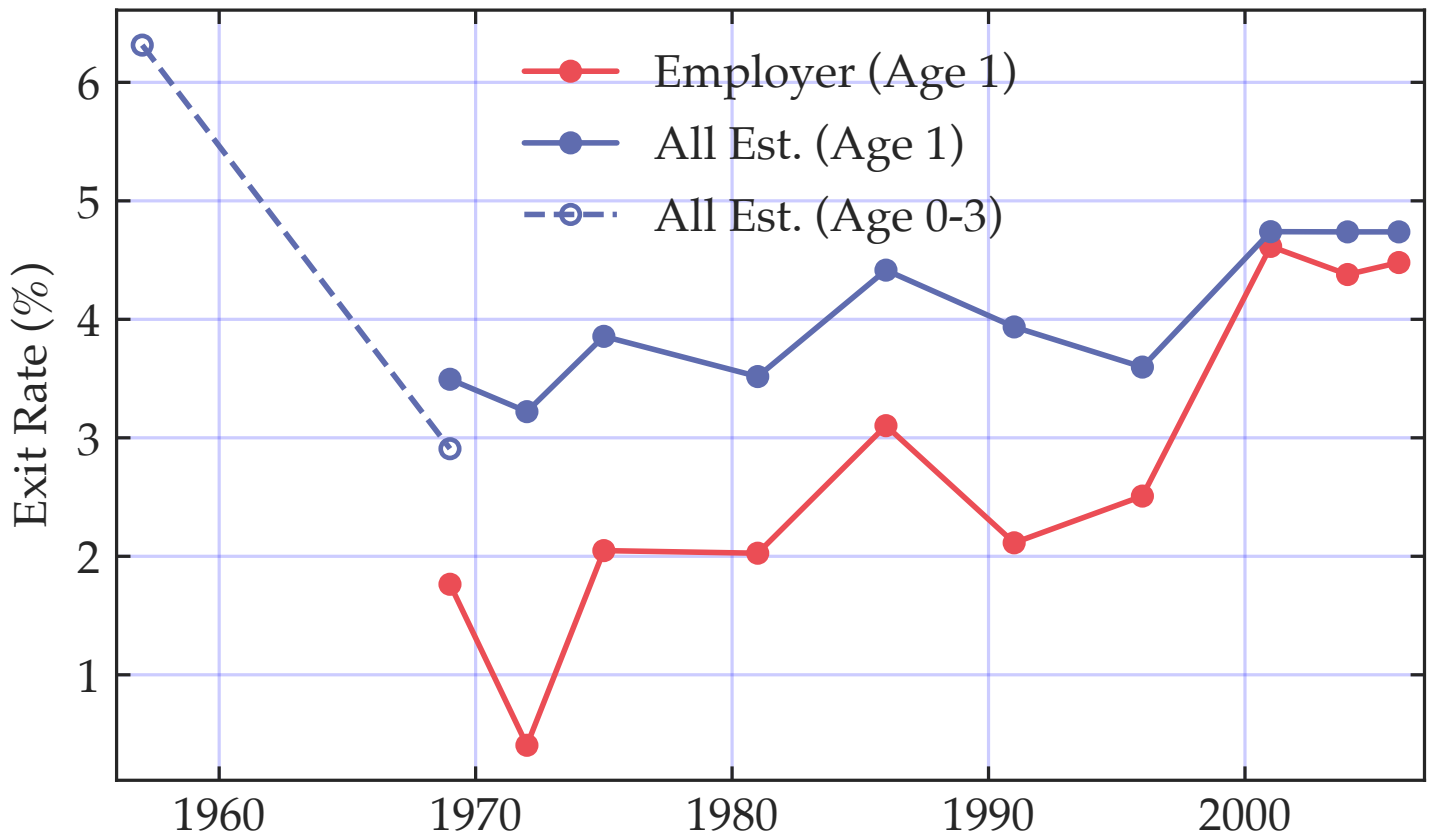


- ▷ Entry rate$_t$ = Age-1 mass$_t$ / Total mass$_{t-1}$ ▸ differ from official statistics
- ▷ Persistent decline started since at least late 1950s and stopped at late 1990s ▸ firm entry rate

Fact 1a': Entry Rate Decline Pervasive across All Industries

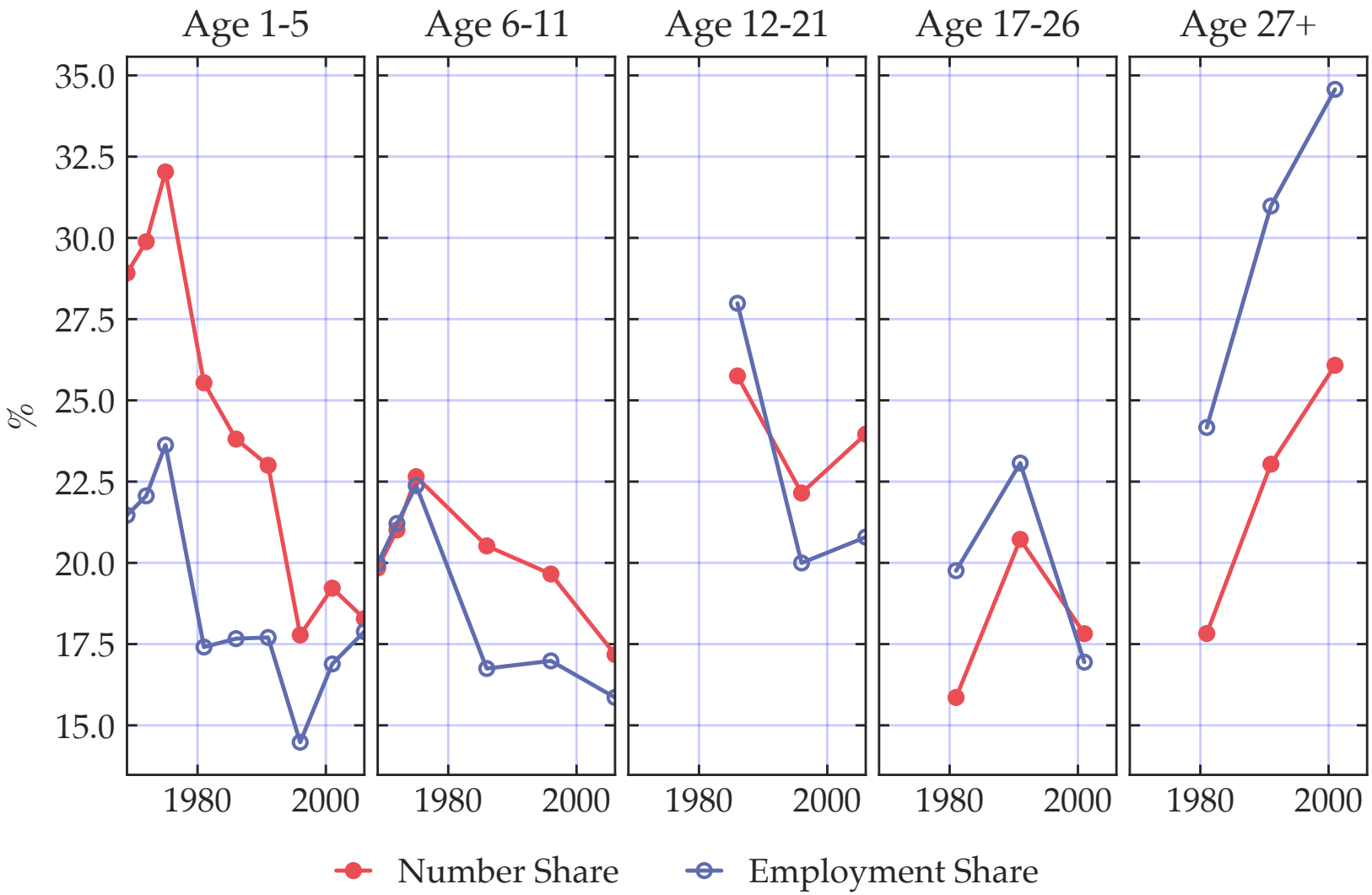


Fact 1b: Low and Stagnated Exit Rate

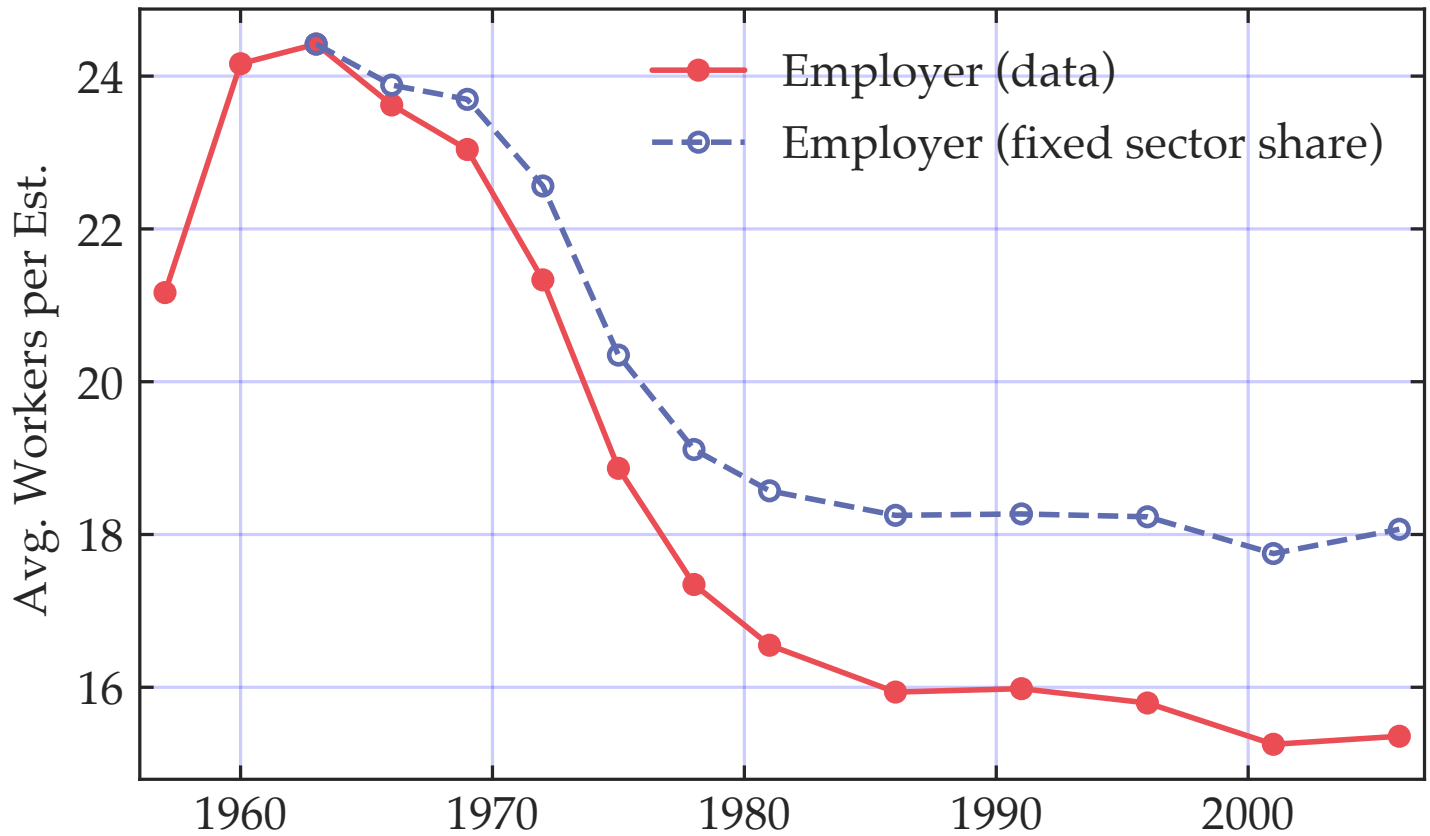


- Exit rate$_t$ = Total mass change rate$_t$ - Entry rate$_t$
- Extremely low in 1970s and 1980s
- Even at age-1, the exit rates are 3-5% ▸ age-exit profiles

Fact 1c: A Natural Outcome is Aging of Businesses in Japan

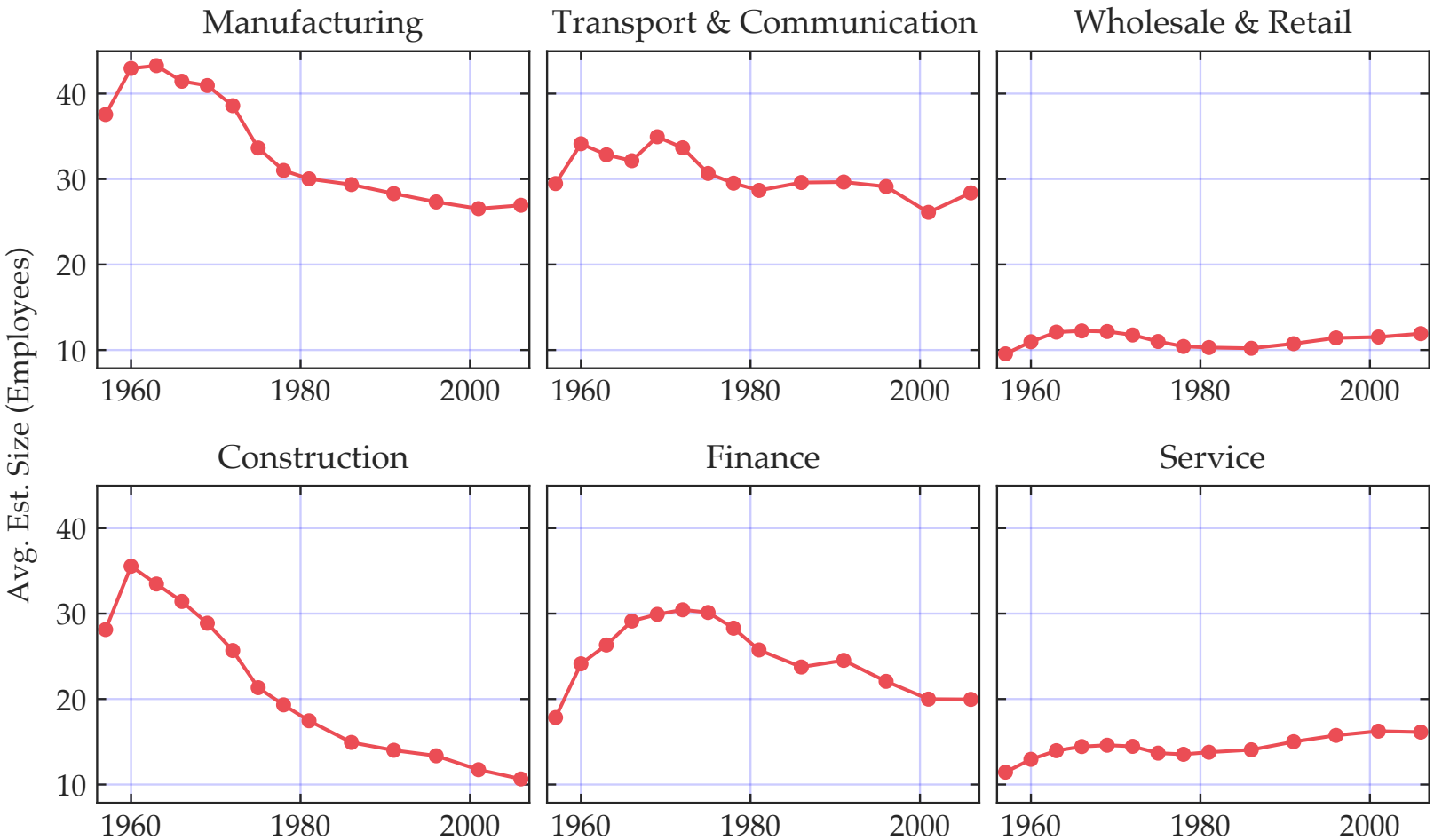


Fact 2: Shrinking Average Establishment Size



- Over 35% decline; Over 25% within 2-digit industry

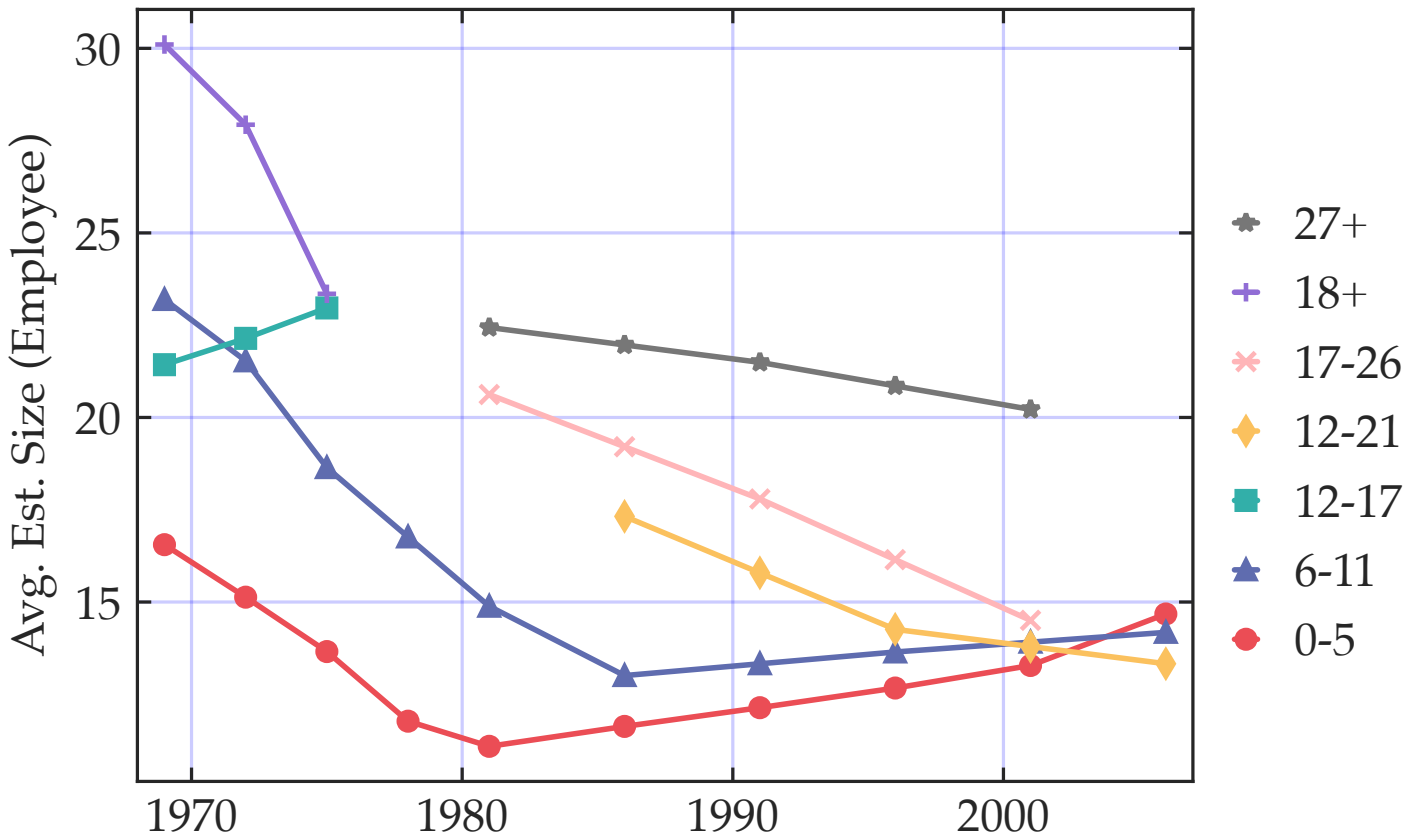
Fact 2': Average Size Declines Differ by Industry



- Manufacturing and Construction declined the first and the most
- Wholesale&Retail and Service recovered since 1980s

Fact 2": Average Size Declines Differ by Age

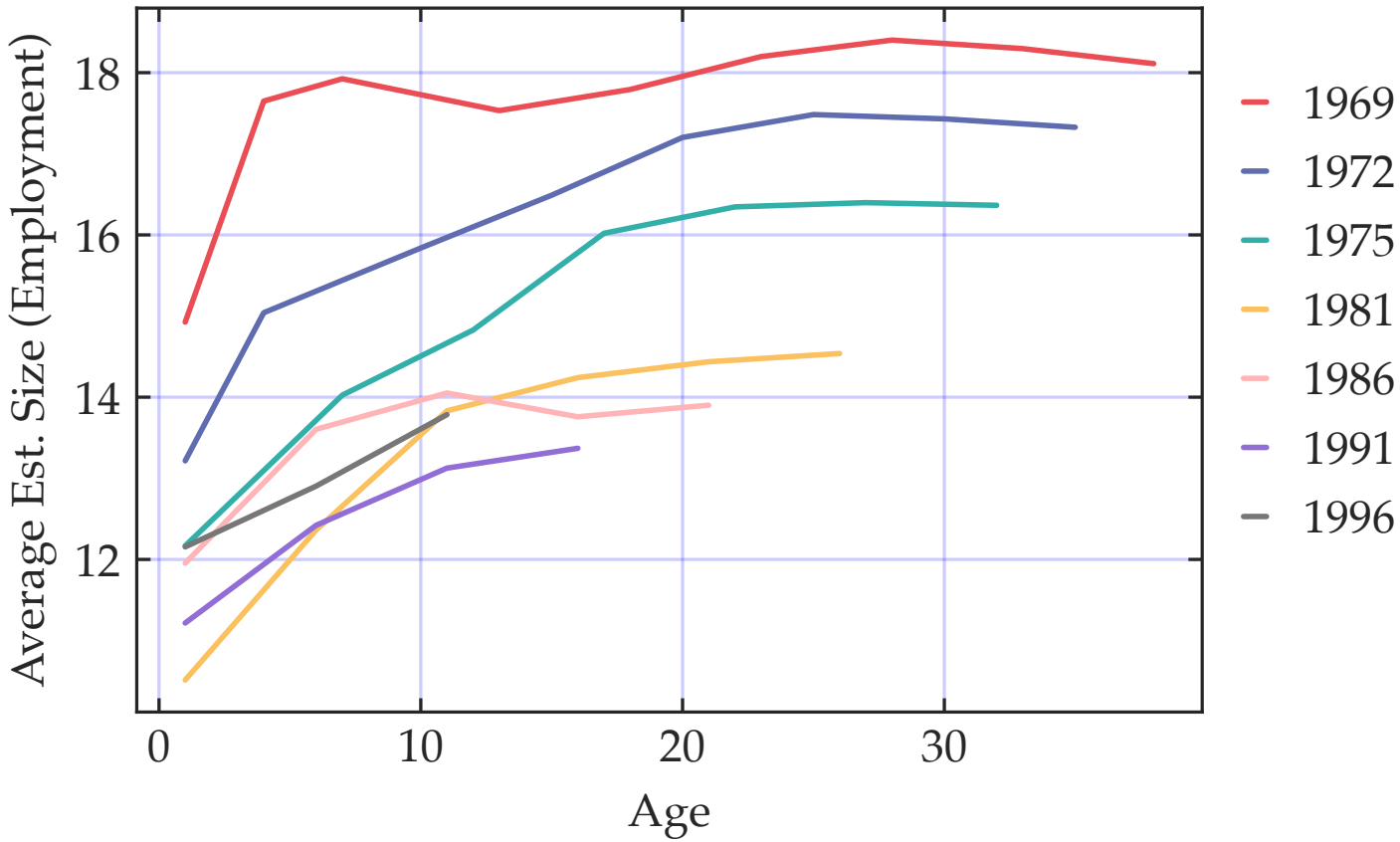
▸ by Industry ▸ decomposition



- Before 1980, most age groups declined
- Since 1980s, young groups recovered while elder ones kept drop
- Can be decomposed into age, year, and cohort effects

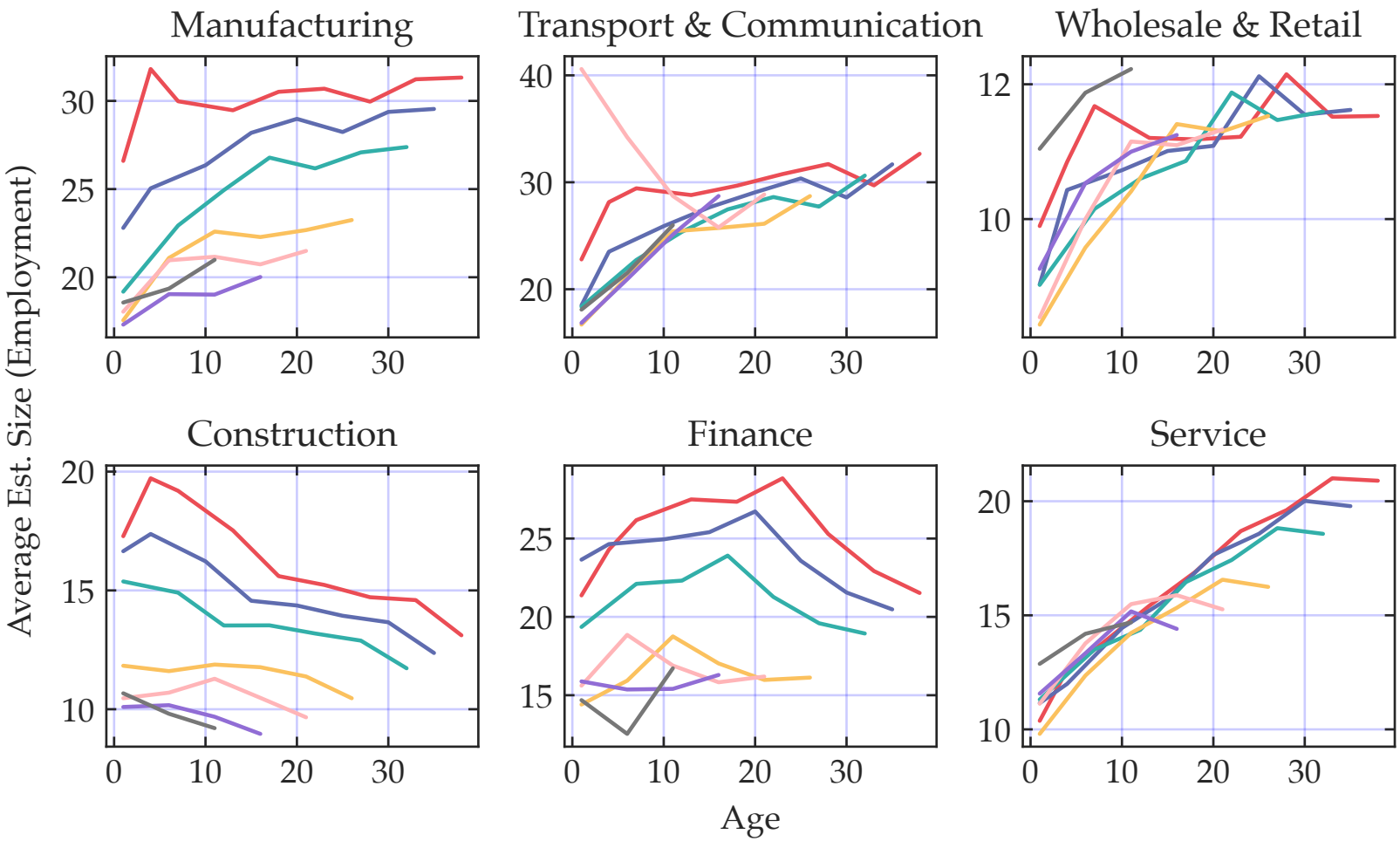
Fact 3: Birth Cohort Effect on Life Cycle Growth

- imputed from cross-sectional size-age correlation
- cohort effects before 1969



- Growth of a cohort mainly occurs when young
  - very small in cross-country comparison
- More recently, lifecycle growth also becomes more flatten

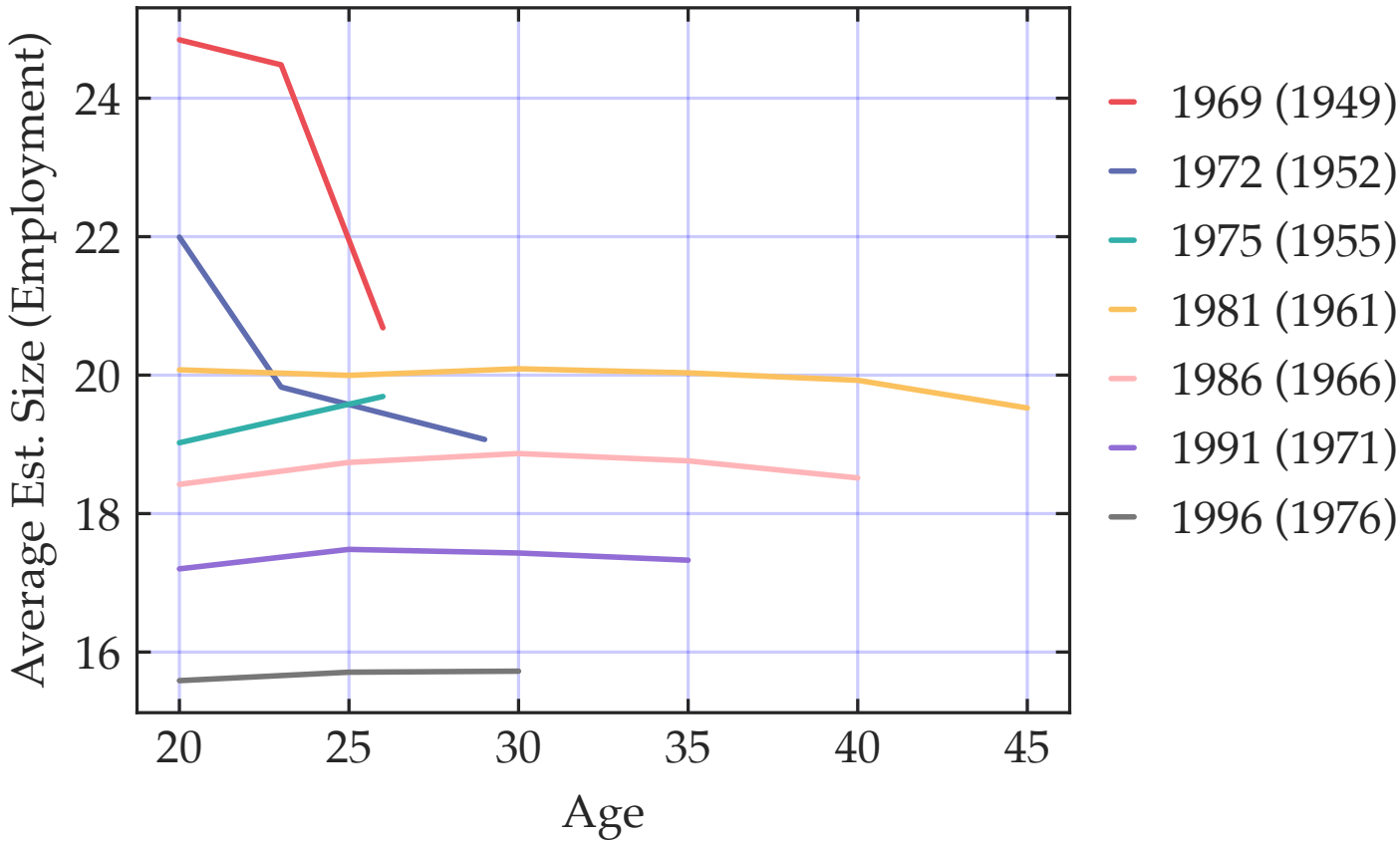
Fact 3': Birth Cohort Effects Also Differ by Industry



- Strong cohort effects mainly in certain industries (related to Fact 2)

Fact 3": (Late) Life Growth of Earlier Cohorts

▸ by Industry ▸ age-10



- In 1960s/70s, there were year effects in addition to cohort effects
- Earlier cohorts have larger sizes when mature

Implication 1: 40+ Years' Decline in Market Dynamism in Japan

- Potential long-run forces driving down entry rates
  - Since early post-war times
  - Despite fast post-war economics growth
  - Unlikely financial constraints
- Lost decade $\neq$ Lost market dynamism
  - Entry rates plateaued; Exit rates rebounded; Entry size recovered
  - At odds with arguments of "malfunctioning of market selection" (Nishimura et al., 2005) or "zombie firms" (Caballero et al., 2008)
- *Low market dynamics in Japan is a result of long-run evolution!*

Implication 2: A Puzzle of Establishment Size Decline

- Some forces push down the avg. est. employment in 1960s/70s
  - For both young and elder groups
  - Esp. in manufacturing and construction
- At odds with literature: a positive relationship btw. dev and size (Bento and Restuccia, 2017; Poschke, 2018; Akcigit et al., 2021)
  - Inverse causality in cross-sectional relationship?
  - Japan and Portugal (Braguinsky et al., 2011) cases differ from US or Denmark
- *Importance of country- and period-specific factors!*

Implication 3: Cohort Effects in Lifecycle Growth

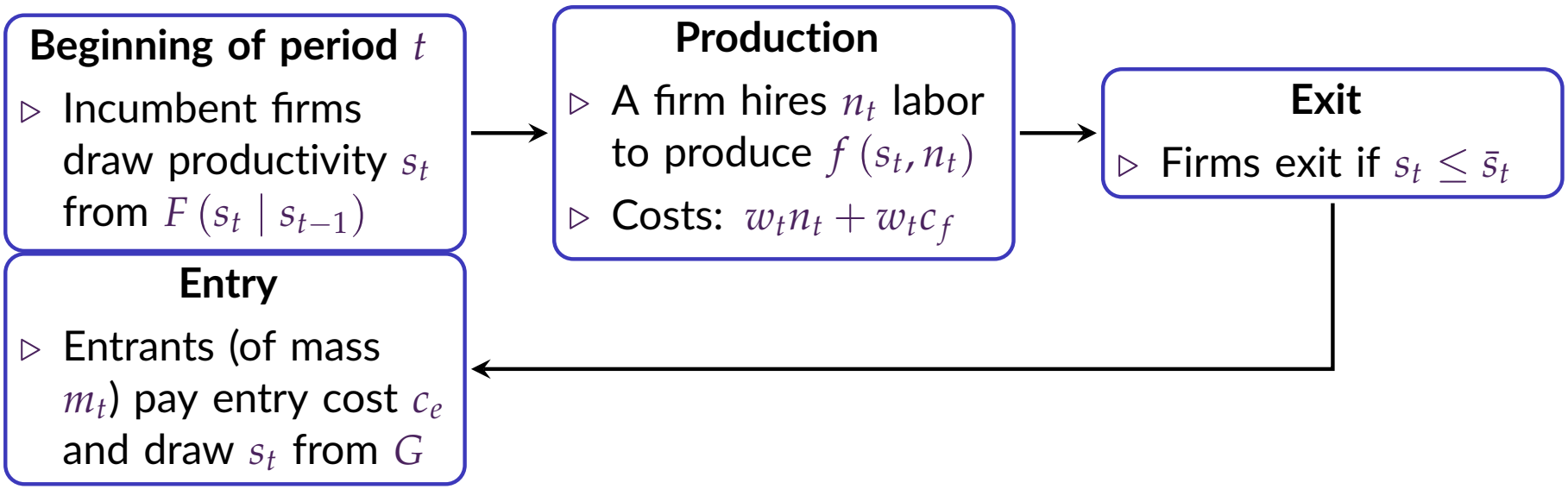
- Lifecycle growth downward shift for cohorts born in 1960s/70s
  - Account for avg. size decline in 1960s/70s
  - Account for elder est. size decline even after 1980s
  - Again mainly in manufacturing and construction
- Complements to the US evidence
  - Cohort effects due to business cycle (Sedláček and Sterk, 2017)
  - Decline in ex-ante high-growth startups since 1980s (Sterk et al., 2021)
- *History matters: weak entrants generate small est. 20 years later!*

Outline

Motivation

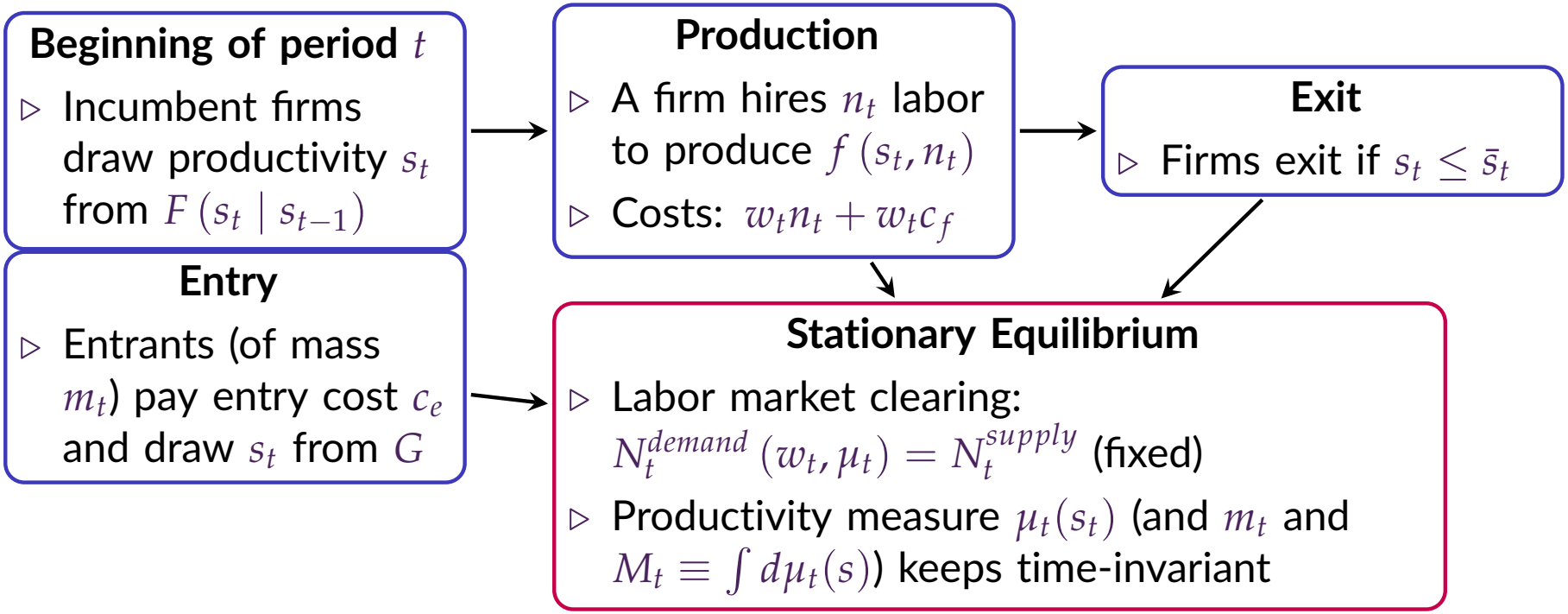
- Many historical trends $\rightsquigarrow$ Unlikely one story
- Test commonly suggested explanations in the literature
- Exploit the workhorse Hopenhayn-type firm dynamics model

Model in Action



- Free entry: $V^e(\mathbf{w}_t) = \int V(s, \mathbf{w}_t)\, dG_t(s) - c_e \geq 0$
- Optimal exit: $\bar{s}_t = \inf\{s \mid \mathbb{E}V(s_{t+1}, \mathbf{w}_{t+1} \mid s_t) \geqslant \text{Exit Value} = 0\}$

Model in Equilibrium



- Labor demand: $N_t^{demand}(\mu_t, w_t) = \int n(s, w_t)\, d\mu_t(s) + c_f M_t$
- Law of motion:
  $\mu_{t+1}(S) = \int\int_{s' \in S, s \geq \bar{s}_t} dF(s' \mid s)\, d\mu_t(s) + m_{t+1} \int_{s' \in S} dG_{t+1}(s')$

Model in Steady-State

Beginning of period t

- Incumbent firms draw productivity s_t from $F(s_t \mid s_{t-1})$

Entry

- Entrants (of mass m_t) pay entry cost c_e and draw s_t from G

Production

- A firm hires n_t labor to produce $f(s_t, n_t)$
- Costs: $w_t n_t + w_t c_f$

Exit

- Firms exit if $s_t \leq \bar{s}_t$

Stationary Equilibrium

- Labor market clearing: $N_t^{demand}(w_t, \mu_t) = N_t^{supply}$ (fixed)
- Productivity measure $\mu_t(s_t)$ (and m_t and $M_t \equiv \int d\mu_t(s)$) keeps time-invariant

Balanced Growth Path

- Assume N_t^{supply} grows at a constant rate η
- In BGP, m_t, M_t, and μ_t also grow at rate η; normalized $\tilde{m}_t$, $\tilde{M}_t$, and $\tilde{\mu}_t$ remain constant

- Labor market clearing: $\int \left\{ n(s, w^*) + c_f \right\} d\tilde{\mu}^*(s) = 1$
- Law of motion:
  $\tilde{\mu}^*(A) = \frac{1}{1+\eta} \int\int_{s' \in A, s \geq \bar{s}^*} dF(s'|s) d\tilde{\mu}^*(s) + \tilde{m}^* \int_{s' \in A} dG(s')$

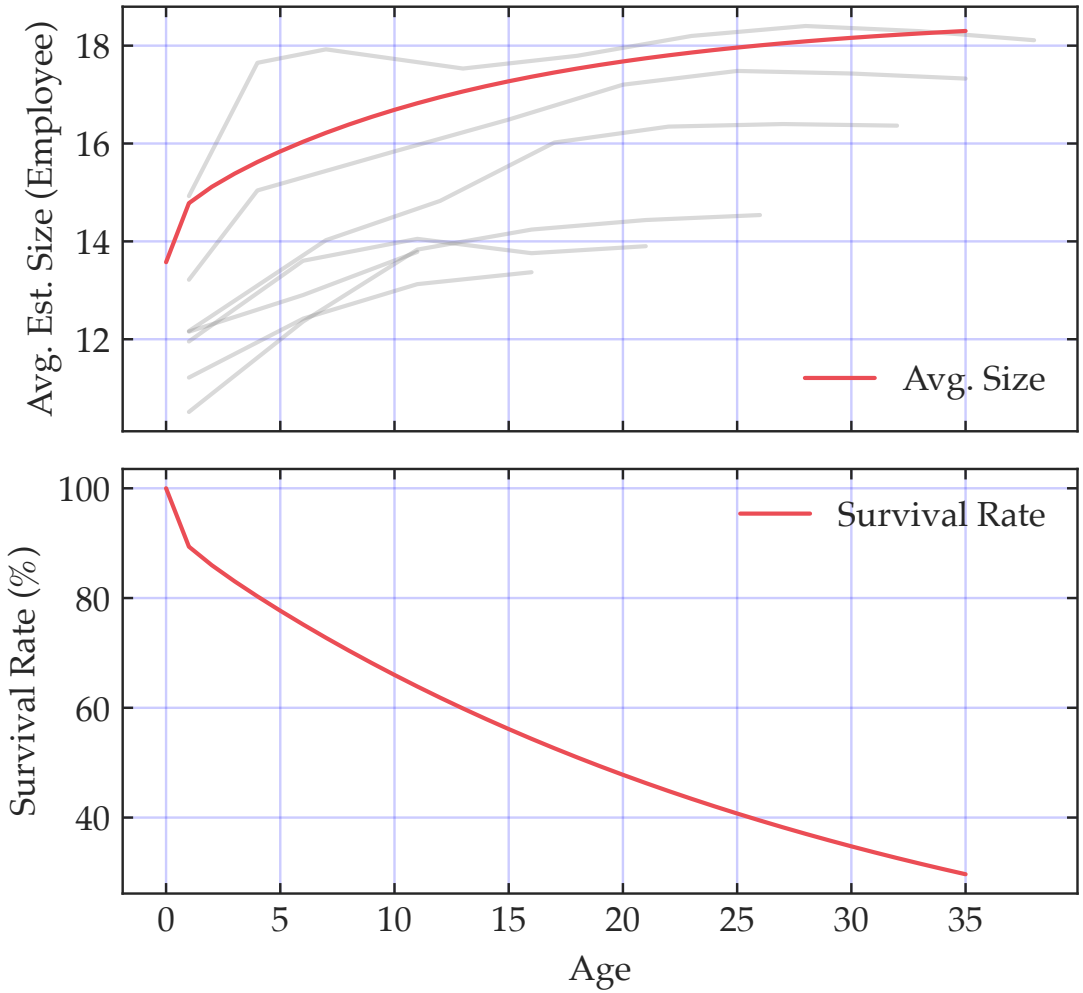
Calibrating to Period Average Moments

▸ parameters

- Calibrate our benchmark model to the average firm statistics (1969-2006) and average life cycle growth (1969-1981)

Moments	Data	Model	
Entry rate, %	5.76	5.62	Target
Exit rate, %	2.56	3.62	
Average establishment size	17.57	16.82	Target
Average entrant size	12.63	13.57	Target
Average life-cycle growth rate, % (conditional on survival)			
Age 1-10	21.65	21.88	Target
Age 1-20	30.17	29.72	Target
Age 1-26	31.98	32.32	
Number share by size, %			
Employment 1-9	61.64	63.86	Target
Employment 10-29	27.14	25.13	
Employment 30-99	9.03	8.76	
Employment 100+	2.16	2.25	
Number share of entrant by size, %			
Employment 1-9	67.98	67.40	Target
Employment 10-29	24.21	23.66	
Employment 30-99	6.55	7.53	
Employment 100+	1.19	1.41	

Simulated Life Cycle Growth and Survival Rate



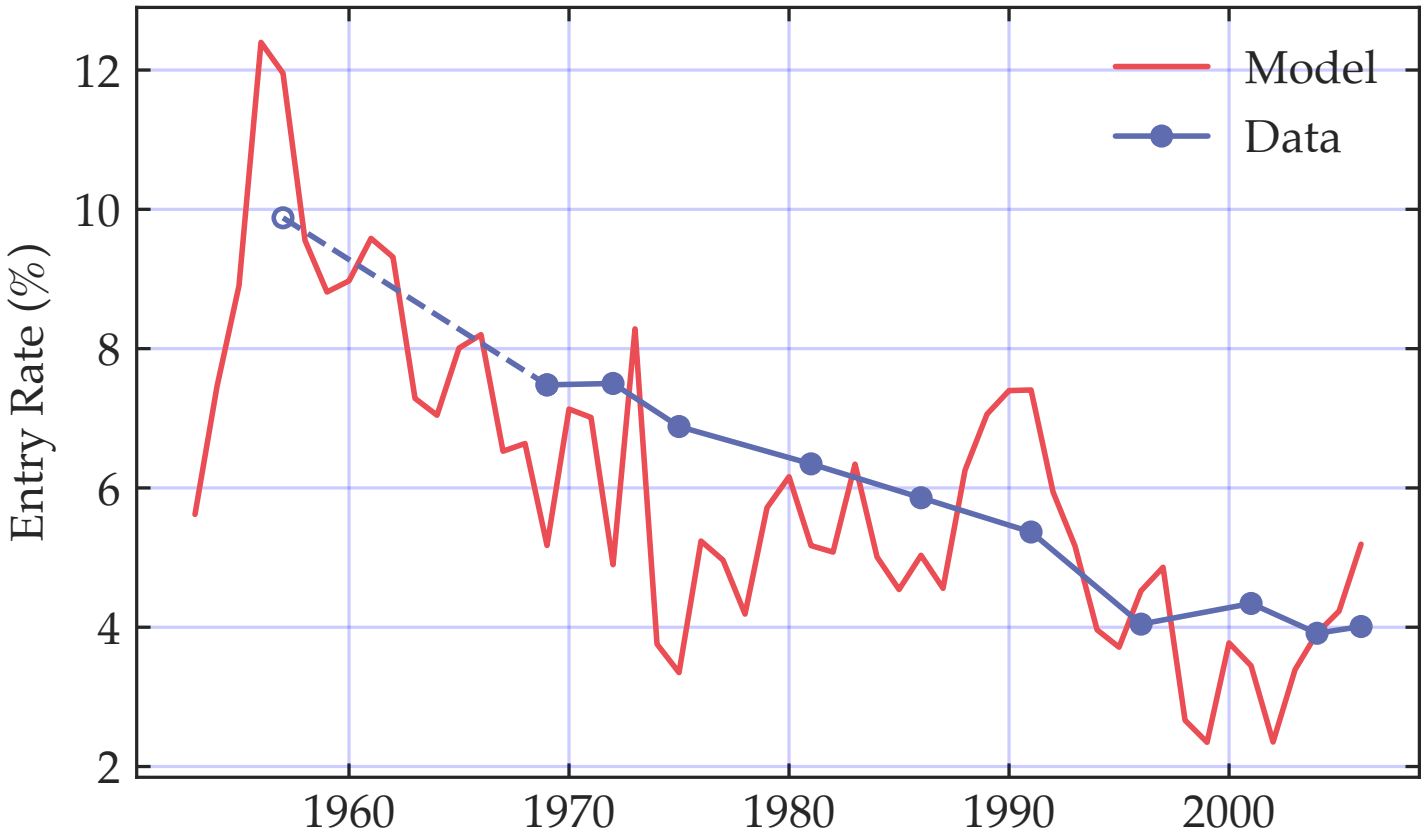
- Simulated life cycle growth between 1969 and 1972 moments (AR1 non-decreasing)
- Simulated survival curve close to being linear (50% at age 20)

Outline

Why Declined Entry Rate? 1. Labor Supply

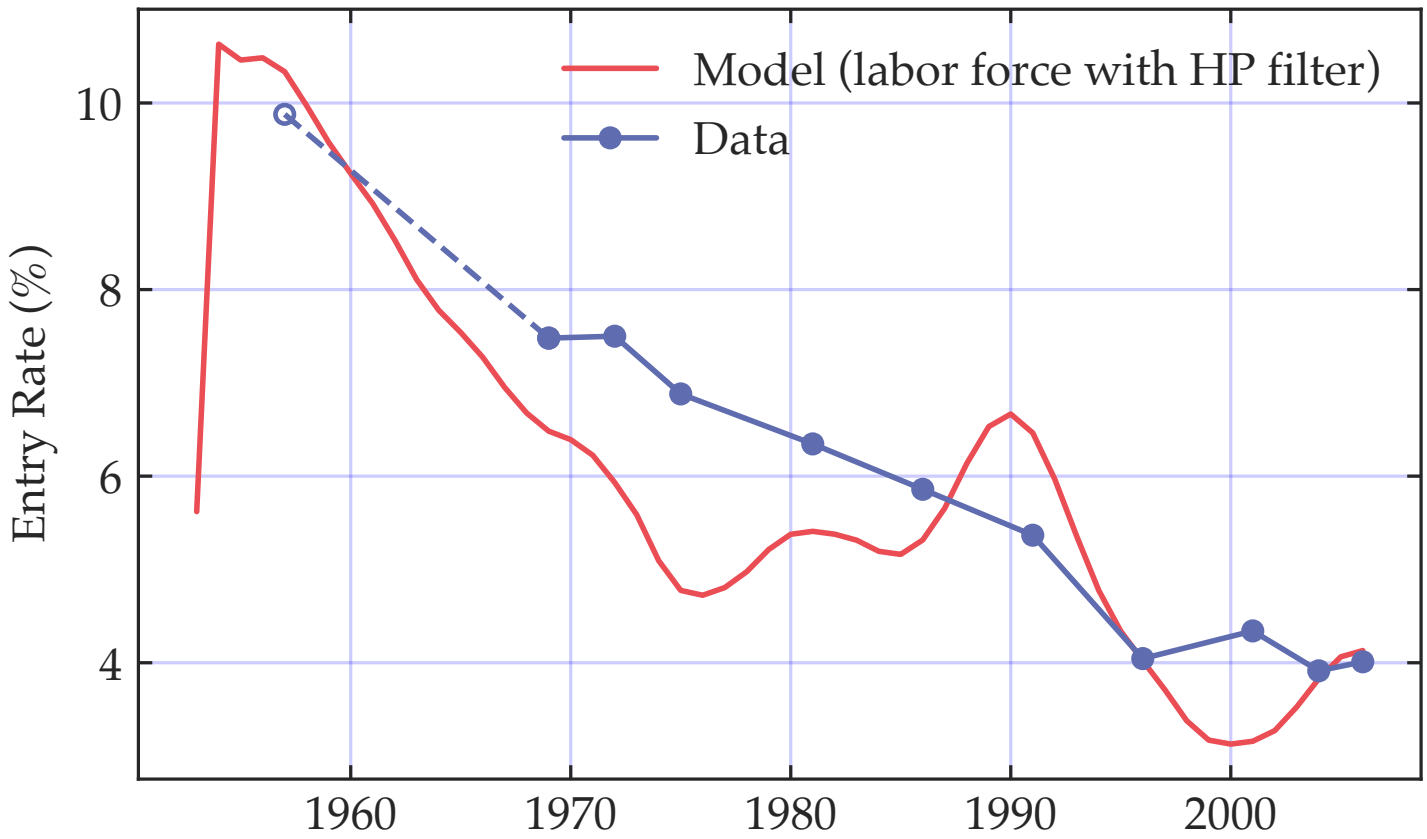
- Exogenous decline in the labor force growth rate (Karahan et al., 2019; Hopenhayn et al., 2020)
  - The logic is simple & mechanical: less labor available for new firms to form
  - In the model, entry margin is a perfectly elastic wedge between incumbent labor demand and labor supply
- Initial impulse also generates "feedback effect" due to compositional changes in age distribution
  - More older firms who are larger and less likely to exit
  - Occurring btw. two steady states and on transitional path
- Set our calibrated model as early 1950s and feed with employment growth rate in Japan

Why Declined Entry Rate? 1. Labor Supply



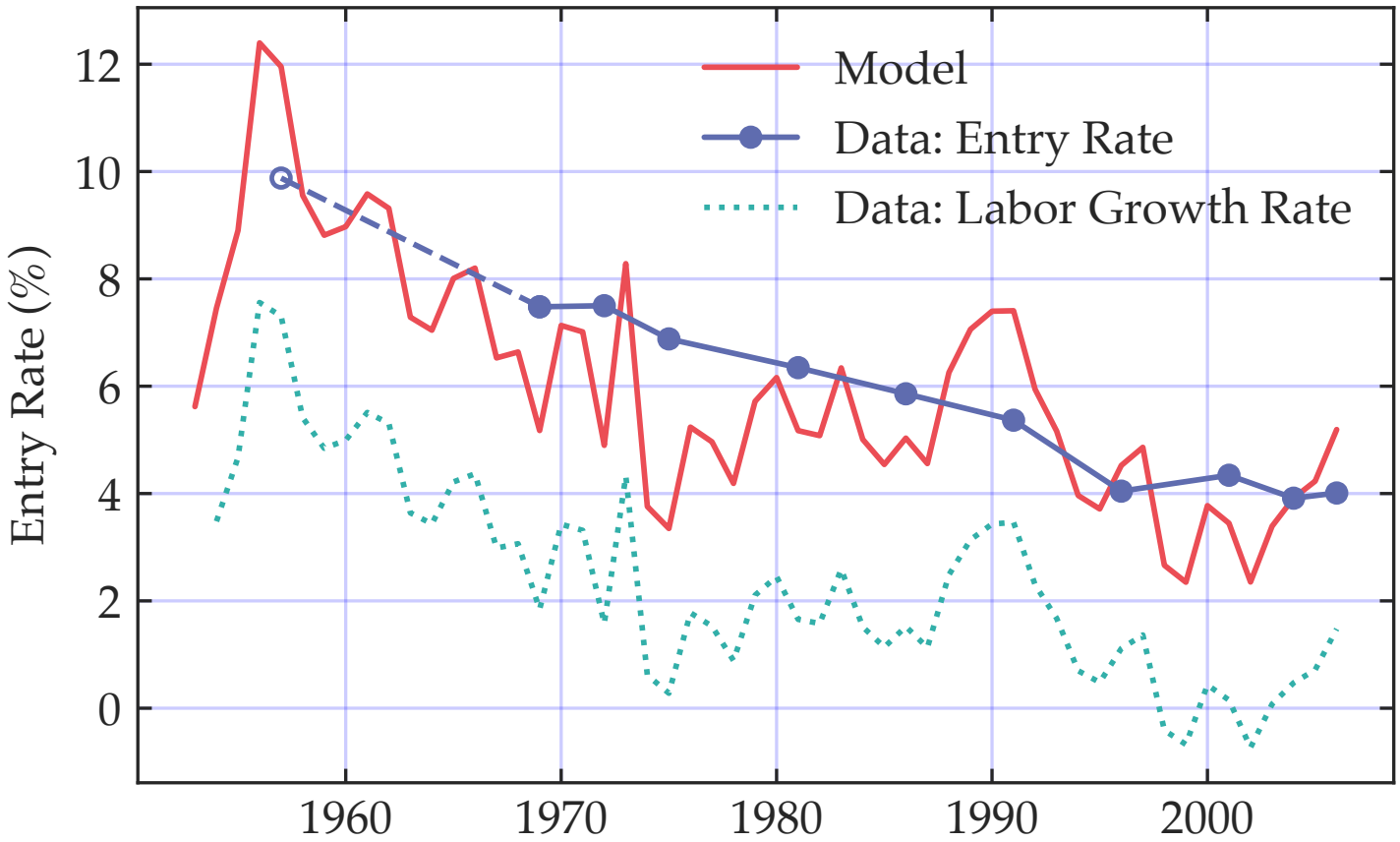
- Not bad!

Why Declined Entry Rate? 1. Labor Supply



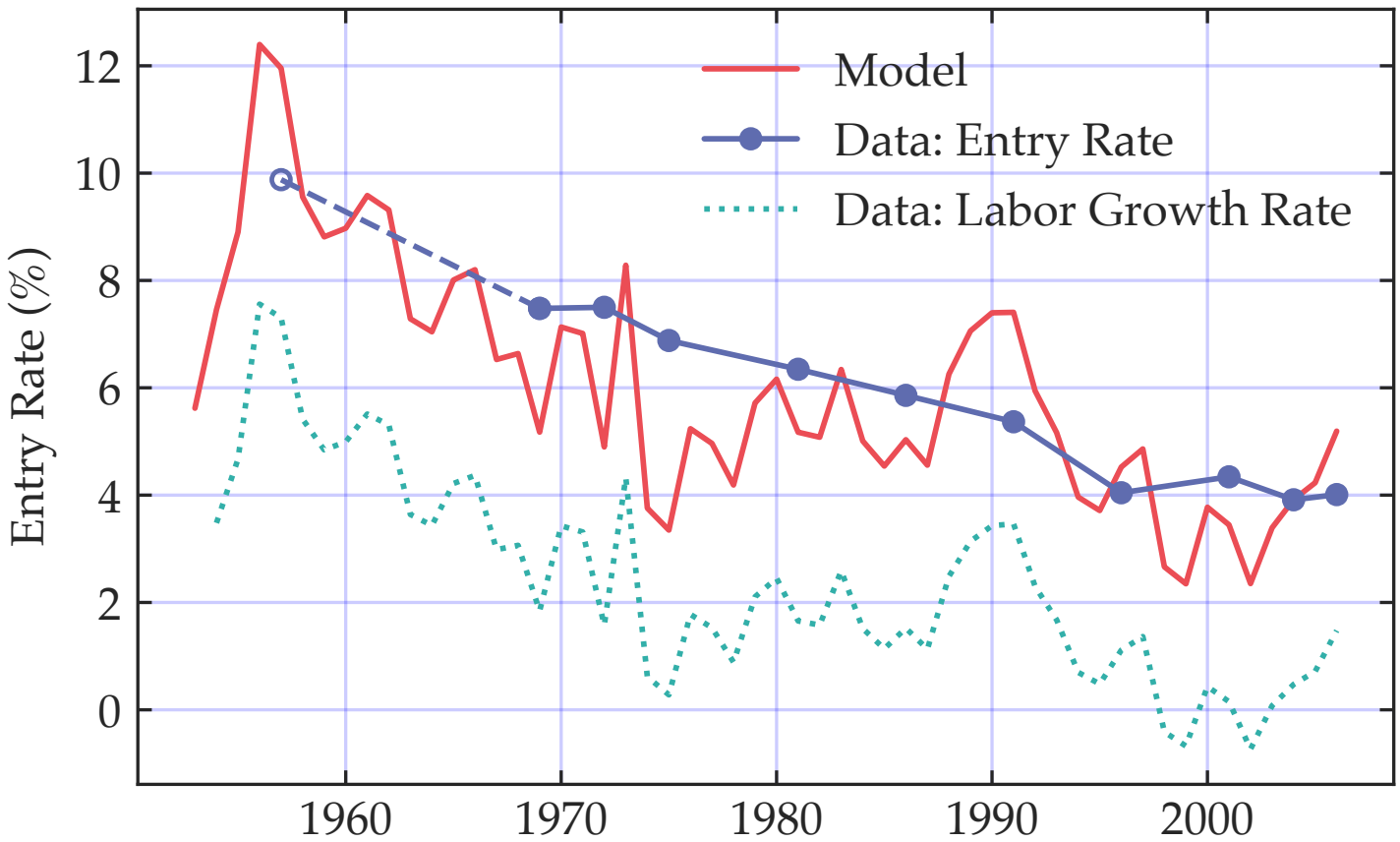
- Quite good!

Why Declined Entry Rate? 1. Labor Supply



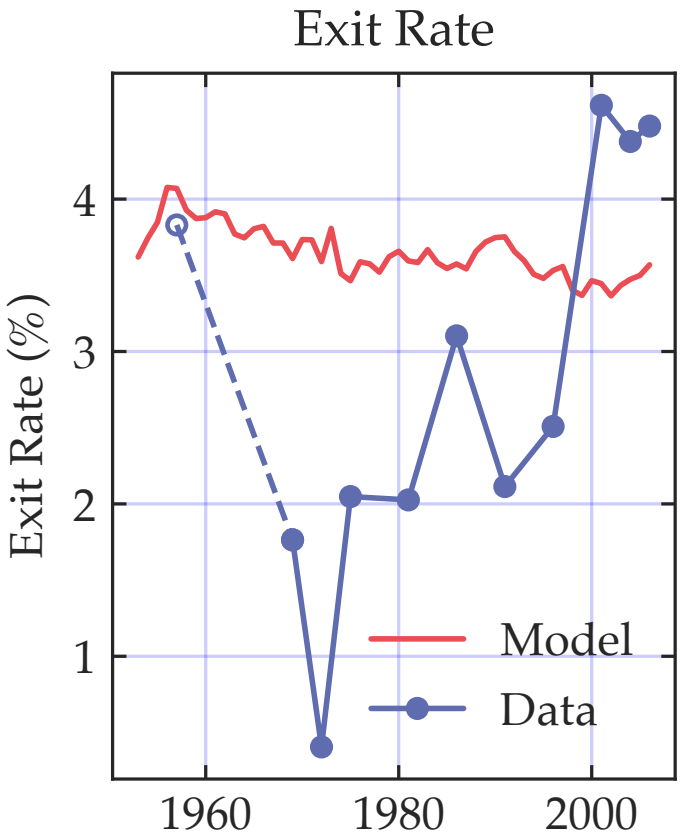
- Wait! Why?!

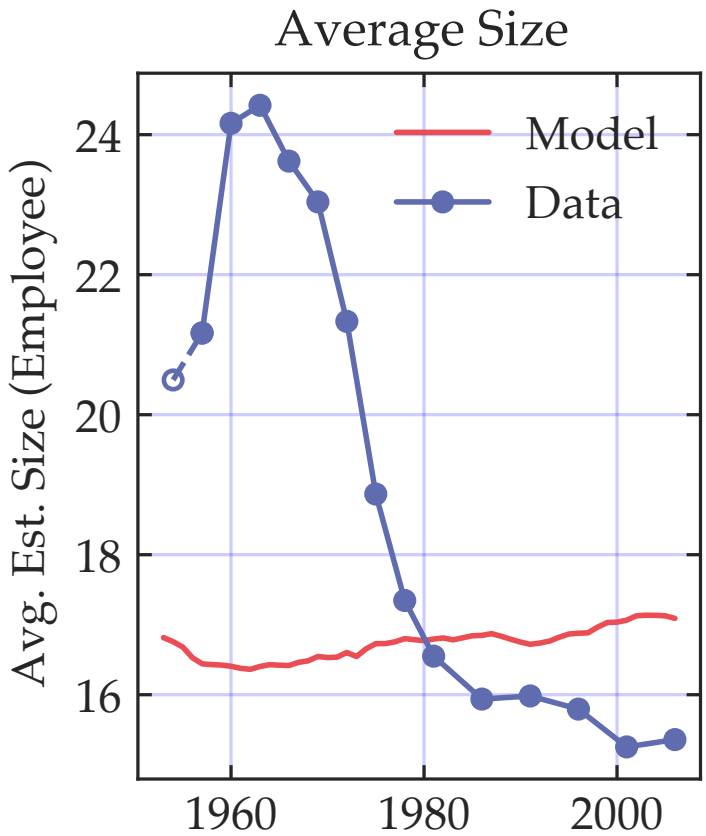
Why Declined Entry Rate? 1. Labor Supply



- Muted feedback effects b.c. low exit rate, flat age-exit profile, and modest lifecycle growth (i.e. small ex-post heterogeneity)
- The elasticity is only 1.1 btw. steady states (1.5 in US case)

Why Declined Entry Rate? 1. Labor Supply

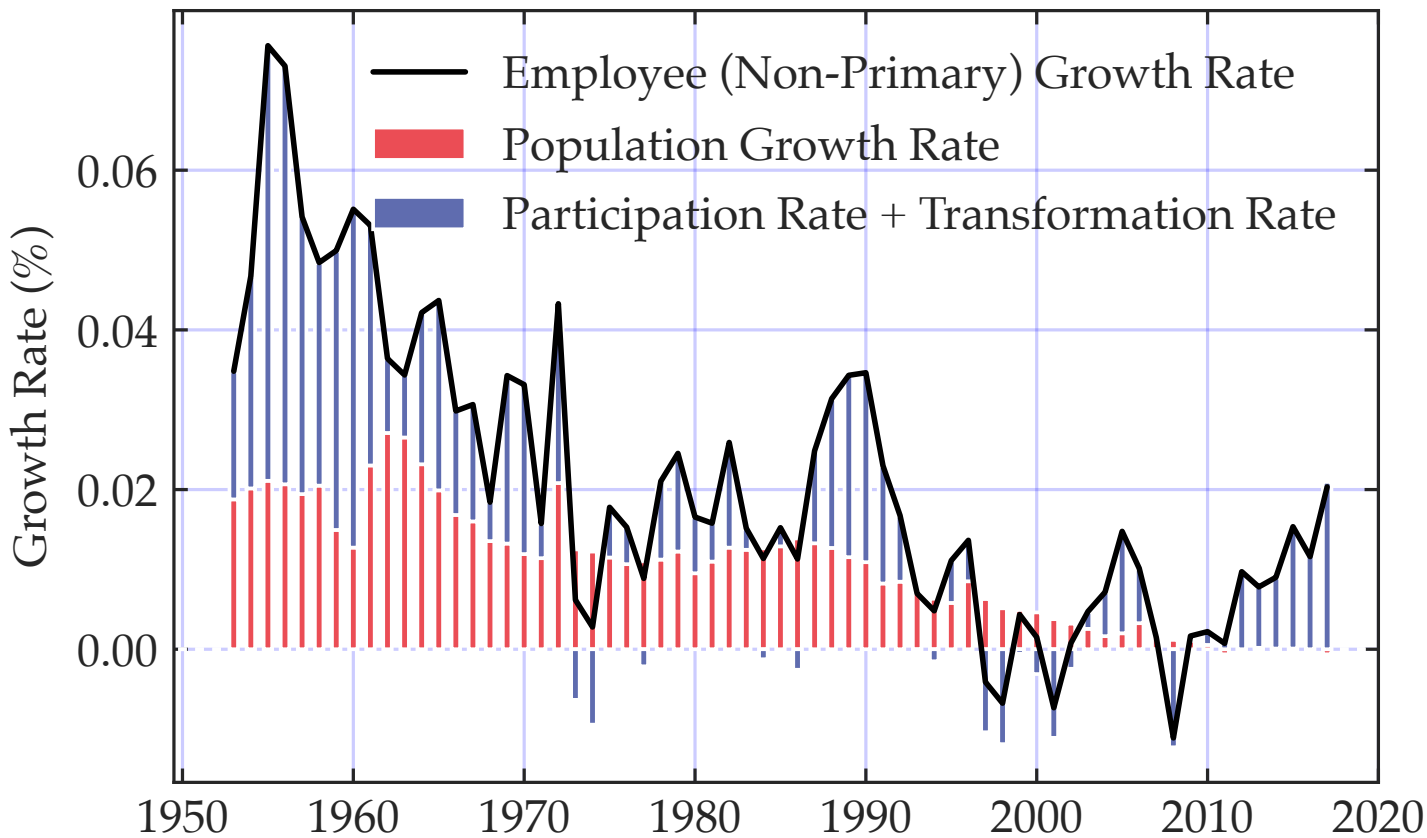




- Small changes in exit rate & avg. size
- Not capturing data trends at all

To What Extent is Labor Supply Growth Exogenous

▸ other labor series



- At least 2 percent points decline of labor supply growth can be attribute to rather ”exogenous” demographic changes

Why Declined Entry Rate? 2. Structural Parameters

- To achieve 2.2% entry rate decline

	Benchmark	Labor Growth	Entry Cost	Exit Value	Fixed Cost
η, %	2.00	0.00	-	-	-
c_e	76.05	-	136.05	-	-
V^x	0.00	-	-	-20.79	-
c_f	2.12	-	-	-	0.86
w^*	0.98	0.98	0.78	0.95	1.09
$\bar{s}^*$	1.32	1.32	0.82	0.82	0.82
Entry Rate, %	5.62	3.43	3.41	3.41	3.41
Exit Rate, %	3.62	3.43	1.41	1.41	1.41
Avg. Entry Size	13.57	13.57	23.49	14.68	9.46
Avg. Entry Size (after exit)	14.89	14.89	23.84	14.89	9.61
Avg. Est. Size	16.82	17.31	21.61	13.58	8.71
LifeCycle Growth Rate 10y, %	21.88	21.88	-2.51	-2.36	-2.51
LifeCycle Growth Rate 20y, %	29.72	29.72	-7.71	-7.25	-7.71

- Entry cost increase: Wage $\downarrow$ (esp. entry size$\uparrow$)
- Exit value decline: Selection $\downarrow$ (only overall size$\downarrow$)
- Fixed operation cost decline: Wage $\uparrow$ + Selection $\downarrow$

Why Declined Entry Rate? Combine 1. and 2.

- To achieve a further 1% entry rate decline after 2.2% decline

	Benchmark	Labor Growth	Entry Cost	Exit Value	Fixed Cost
η, %	2.00	0.00	0.00	0.00	0.00
c_e	76.05	-	99.88	-	-
V^x	0.00	-	-	-10.35	-
c_f	2.12	-	-	-	1.39
w^*	0.98	0.98	0.89	0.96	1.03
$\bar{s}^*$	1.32	1.32	1.09	1.09	1.09
Entry Rate, %	5.62	3.43	2.46	2.46	2.46
Exit Rate, %	3.62	3.43	2.46	2.46	2.46
Avg. Entry Size	13.57	13.57	17.29	14.22	11.30
Avg. Entry Size (after exit)	14.89	14.89	18.15	14.90	11.86
Avg. Est. Size	16.82	17.31	18.98	15.57	12.40
LifeCycle Growth Rate 10y, %	21.88	21.88	9.01	8.74	9.01
LifeCycle Growth Rate 20y, %	29.72	29.72	10.68	10.36	10.68

- More reasonable lifecycle growth rates
- Only fixed cost decline generates both entry size $\downarrow$ and overall size $\downarrow$

Why Declined Est. Size? 1. Ex-ante Heterogeneity

- Reduce the location and scale of entry productivity distribution

	Benchmark	Location		Scale	
	-	$G_\mu \times 0.9$	$G_\mu \times 0.8$	$G_\sigma \times 0.9$	$G_\sigma \times 0.8$
η, %	2.00	2.00	2.00	2.00	2.00
G_μ	1.20	1.08	0.96	1.20	1.20
G_σ	0.53	0.53	0.53	0.47	0.42
w^*	0.98	0.88	0.80	0.98	0.98
$\bar{s}^*$	1.32	1.07	0.86	1.29	1.29
Entry Rate, %	5.62	4.72	4.01	5.17	4.93
Exit Rate, %	3.62	2.72	2.01	3.17	2.93
Avg. Entry Size	13.57	13.14	12.57	13.08	12.63
Avg. Entry Size (after exit)	14.89	14.04	13.17	13.77	12.97
Avg. Est. Size	16.82	16.73	16.80	16.14	15.81
LifeCycle Growth Rate 10y, %	21.88	22.52	24.65	19.83	19.90
LifeCycle Growth Rate 20y, %	29.72	32.74	38.18	29.86	32.80

- Additional strong direct effects on entry size dist.
- Location decline: no effects on overall avg. size
- Scale decline: close to downward shift in lifecycle growth

Why Declined Est. Size? 2. Labor Market Distortions

- Size-correlated labor costs: $(1+\tau_i^w)w$, where $\tau_i^w = s_i^\gamma - 1$
  (Restuccia and Rogerson, 2008; Hsieh and Klenow, 2009, 2014)

	Benchmark	γ=0.04	γ=0.07	γ=0.12	γ=0.20
w^*	0.98	0.92	0.87	0.80	0.71
w min	0.98	0.83	0.72	0.58	0.43
w max	0.98	1.04	1.09	1.17	1.30
w max / w min	1.00	1.25	1.50	2.00	3.00
w (mean)	0.98	0.96	0.93	0.90	0.85
w (entry mean)	0.98	0.95	0.93	0.90	0.86
$\bar{s}^*$	1.32	1.26	1.20	1.12	0.99
Entry Rate, %	5.62	5.29	4.99	4.60	4.06
Exit Rate, %	3.62	3.29	2.99	2.60	2.06
Avg. Entry Size	13.57	13.59	13.60	13.63	13.67
Avg. Est. Size	16.82	16.07	15.44	14.62	13.55
LifeCycle Growth Rate 10y, %	21.88	16.77	12.53	7.11	0.47
LifeCycle Growth Rate 20y, %	29.72	22.31	16.20	8.40	-1.18

- Large wage gap required to reduce avg. size ▸ against empirical evidence
- Because no large diff btw. entry and overall dist. ▸ see dist.

Why Declined Est. Size? 2. Labor Market Distortions

- Labor adjustment costs: $\Phi\left(n_t, n_{t-1}\right) = \tau^a \cdot \max\left\{0, n_{t-1} - n_t\right\}$
  (Hopenhayn and Rogerson, 1993)

	Benchmark	Firing Cost		Firing + Hiring Cost	
	τ^a=0.00	τ^a=0.25	τ^a=0.50	τ^a=0.25	τ^a=0.50
w^*	0.98	0.95	0.93	0.92	0.88
$\bar{s}^*$ (mean)	1.32	1.29	1.26	1.26	1.20
Entry Rate, %	5.62	5.45	5.29	5.29	5.01
Exit Rate, %	3.62	3.45	3.29	3.29	3.01
Avg. Entry Size	13.67	11.56	10.70	10.64	9.71
Avg. Est. Size	16.93	16.51	16.34	16.28	15.92
LifeCycle Growth Rate 10y, %	21.85	42.10	53.53	53.74	67.03
LifeCycle Growth Rate 20y, %	29.66	50.47	61.82	62.07	75.62
Job Turnover Rate, %	0.47	0.29	0.24	0.24	0.18

- Entry size reduced to avoid large firing costs
- Limited effect on incumbent est. given a flat and smooth growth

Uncaptured Evidence and Further Drivers

▸ less likely drivers

- Uncaptured/Unexplained empirical evidence
  - Evolution of exit rates
  - Sector-specific trends in size & growth
- Further explanations on initial and lifecyle investment/choice
  - Complementarity bet. initial and later investment; Size-related distortions affect both (Bento and Restuccia, 2017)
  - Entry choice on niche or mass goods (Sedláček and Sterk, 2017)
  - Lower labor quality of entrepreneurs/workers of new est. due to labor market institutional changes or aging population
  - Increased subcontracting reduce initial and lifecycle growth

Outline

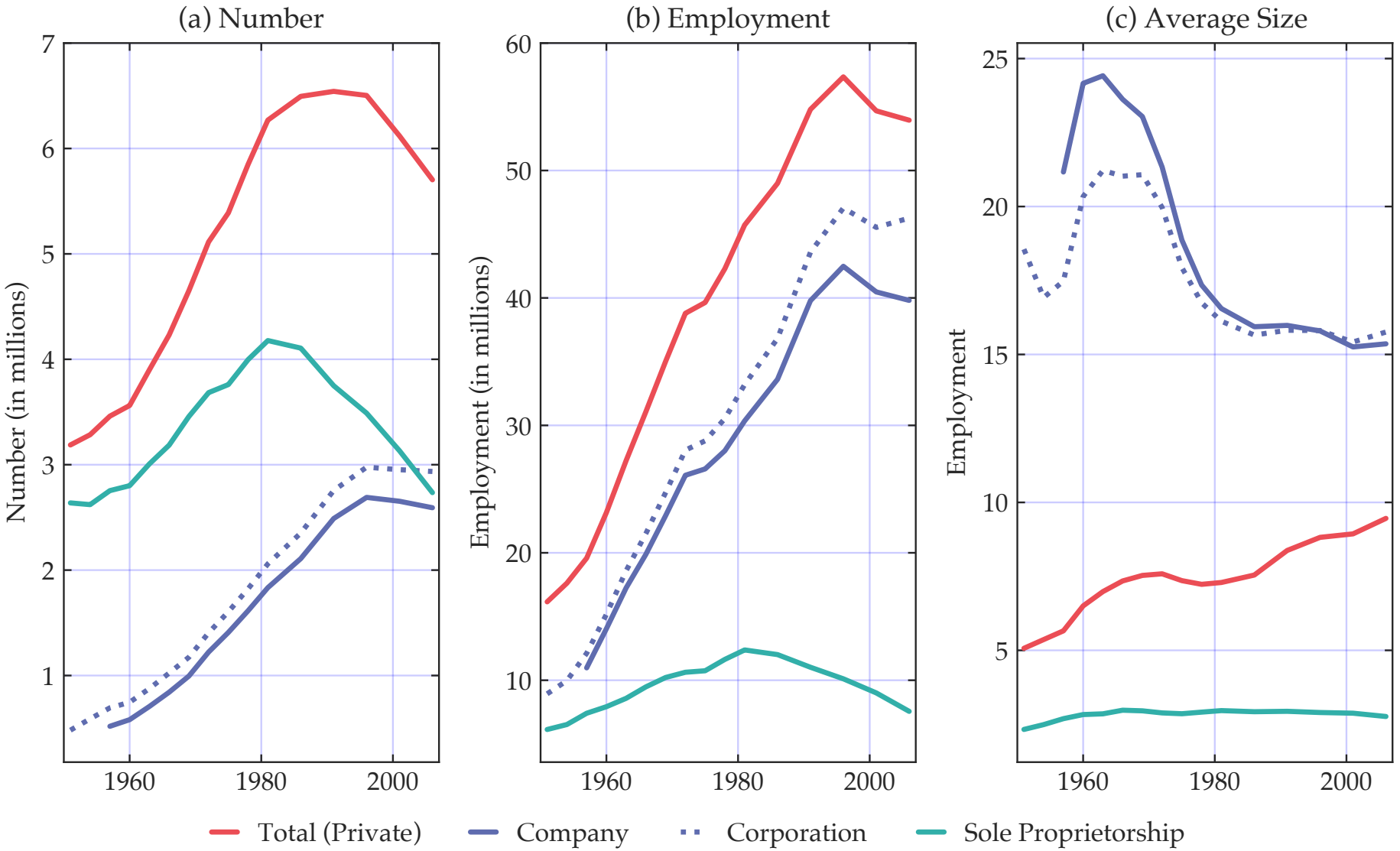
Takeaway for "Heterogeneity and Macroeconomics"

- This paper studies the long-run evolution of market dynamics in post-war Japan and its potential drivers
- The (lack of) heterogeneity of business units in Japan turns out to be a key
  - little ex-post heterogeneity
  - dampened ex-ante heterogeneity

Appendix

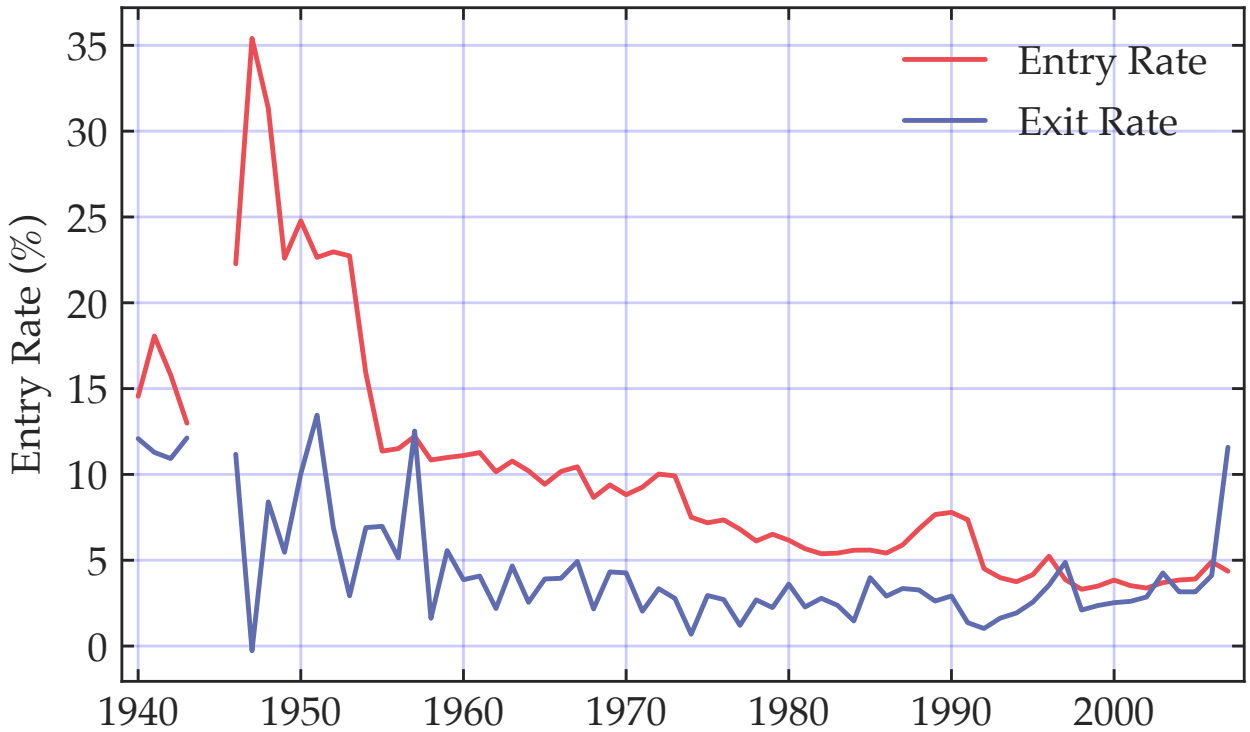
"Employer", "Nonemployer", and "Total"

Back



Firm Entry&Exit Rate

Back

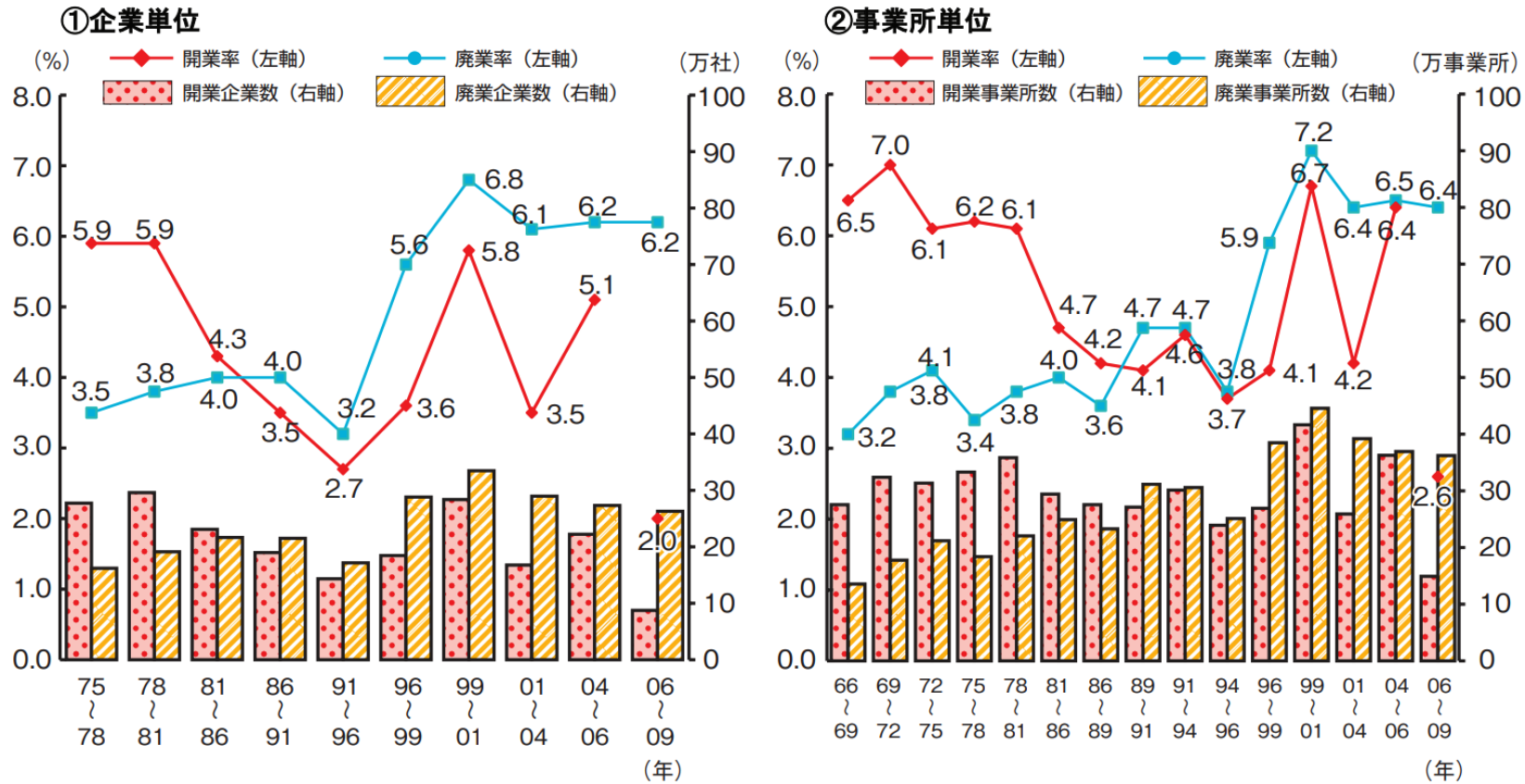


- Firm setup counts are from Statistics on Registration
- Firm counts are from Taxation Statistics

Entry Rates in SME White Book

第3-1-2図　事業所・企業統計調査及び経済センサス－基礎調査による開廃業率（年平均）

～企業単位でも事業所単位でも、1980年代末から、開業率が廃業率を下回る状況が続く～



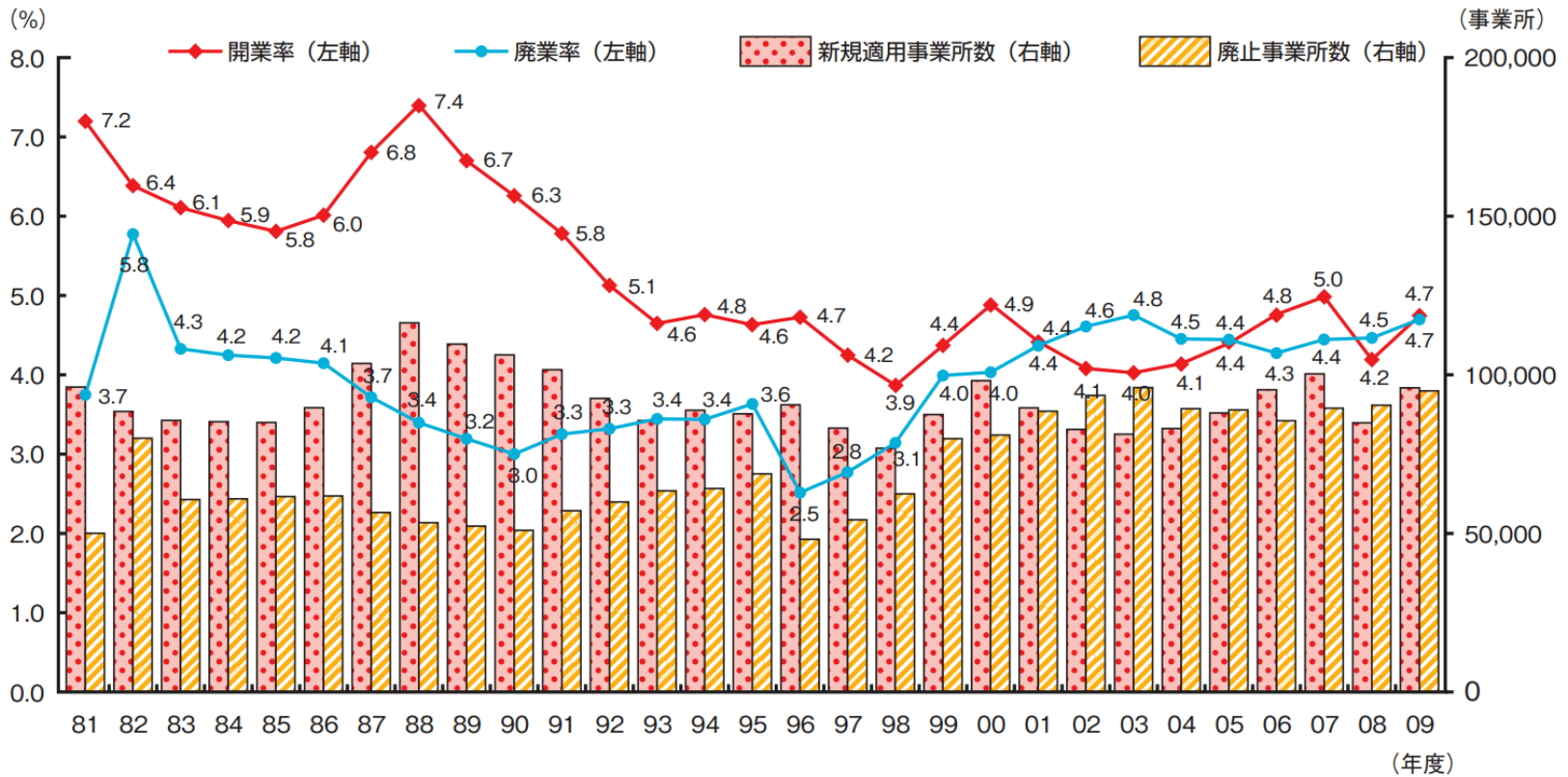
資料：総務省「事業所・企業統計調査」、「経済センサス－基礎調査」再編加工（中小企業庁試算）

（注）1. 企業数は、会社数及び個人事業所（単独事業所、本所・本社・本店、支所・支社・支店の事業所）数とする。
2. 事業所単位の開廃業率は、支所や工場の開設・閉鎖及び移転による開設・閉鎖を含む。
3. 2006年までは「事業所・企業統計調査」、2006～2009年は「経済センサス－基礎調査」に基づく。ただし、1991年までは「事業所統計調査」、1989年は「事業所名簿整備」、1994年は「事業所名簿整備調査」として行われた。また、1999年及び2004年は簡易調査として実施された。
4. 開業率＝年平均開業企業（事業所）数／期首の企業（事業所）数×100。
2006年期首の企業（事業所）数は、平成21年経済センサス－基礎調査の存続及び廃業企業（事業所）数から算出した。
5. 廃業率＝年平均廃業企業（事業所）数／期首の企業（事業所）数×100。2006年期首の企業（事業所）数は、平成18年事業所・企業統計調査の数値を用いた。
6. 開業率については、開業企業（事業所）の定義が異なるため、06～09年の数値は、過去の数値と単純に比較できない。また、06～09年の数値については、開業企業（事業所）と廃業企業（事業所）の定義の違いにより、開業率と廃業率を単純に比較できない。開廃業率の算出の詳細については、付属統計資料4表参照。

Entry Rates in SME White Book

第3-1-4図　雇用保険事業年報による開廃業率

～2000年代初頭には廃業率が開業率を上回るも、近年は、開業率と廃業率が拮抗している～



資料：厚生労働省「雇用保険事業年報」

（注）1．開業率＝当該年度に保険関係が新規に成立した事業所数／前年度末の適用事業所数×100。

2．廃業率＝当該年度に保険関係が消滅した事業所数／前年度末の適用事業所数×100。

3．適用事業所とは、労働保険の保険料の徴収等に関する法律の規定により、雇用保険に係る労働保険の保険関係が成立している事業所をいう（雇用保険法第5条）。

Fact 1b': Flat Age-Exit Profiles

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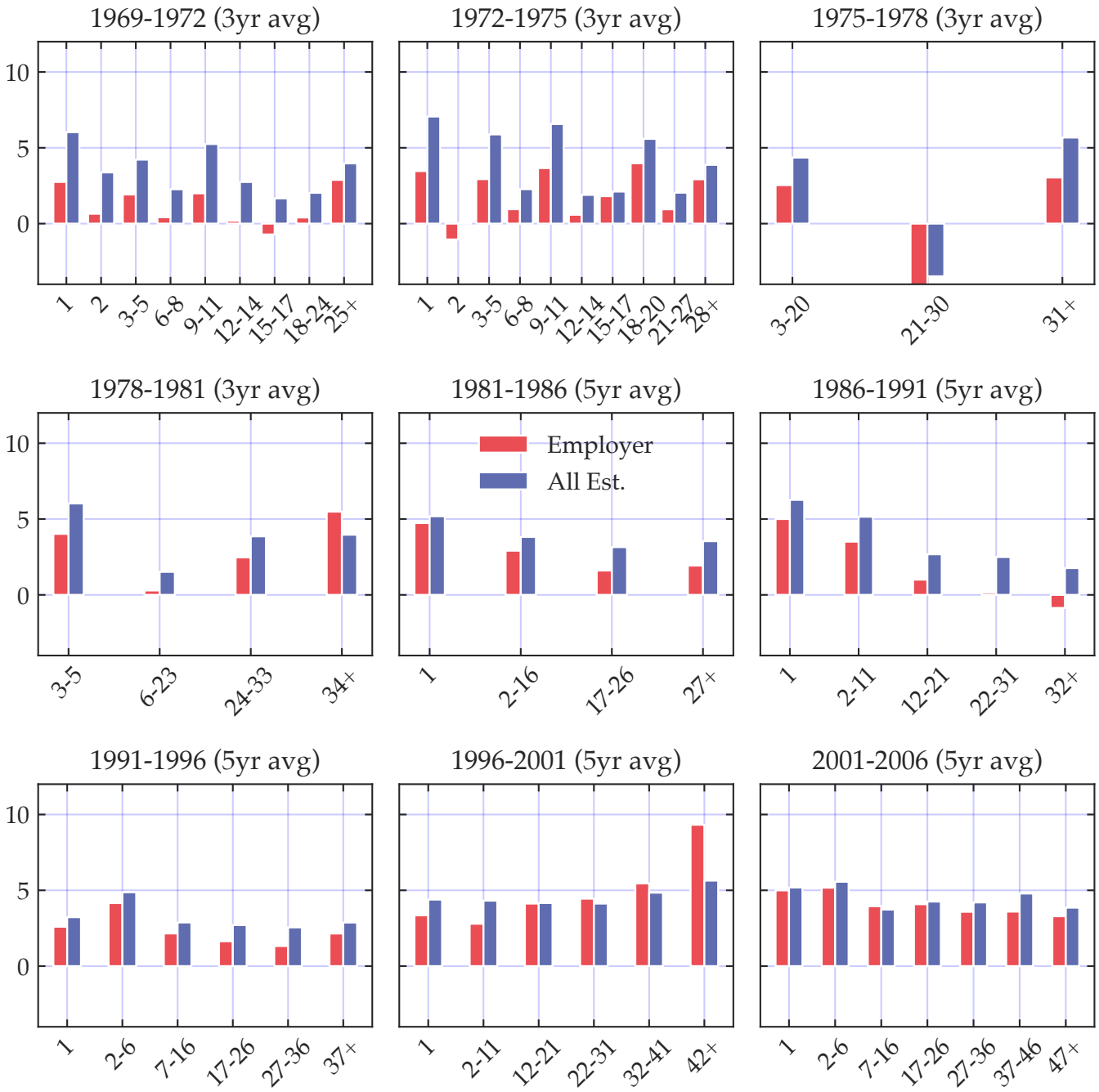

Survival Rates in Alternative Dataset

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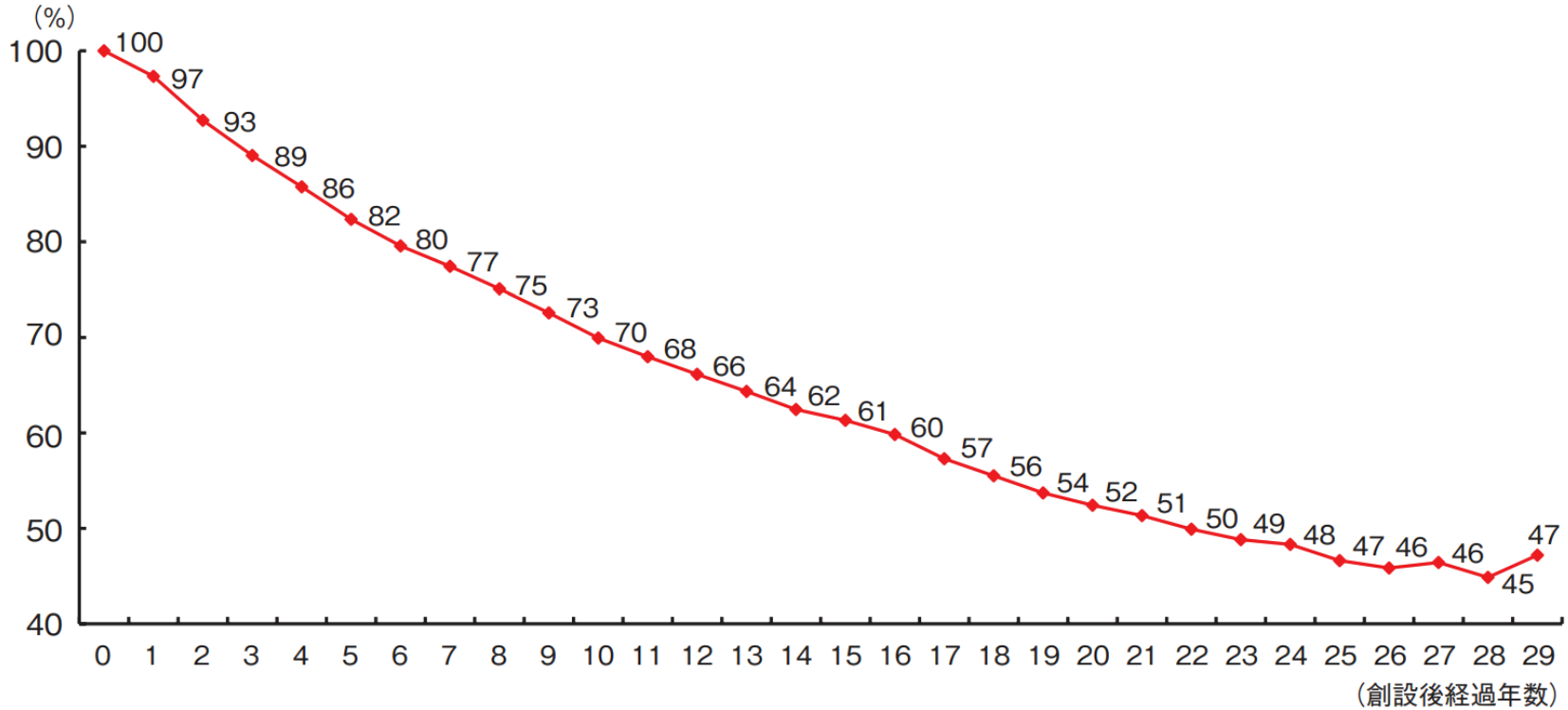
第3-1-11図 企業の生存率

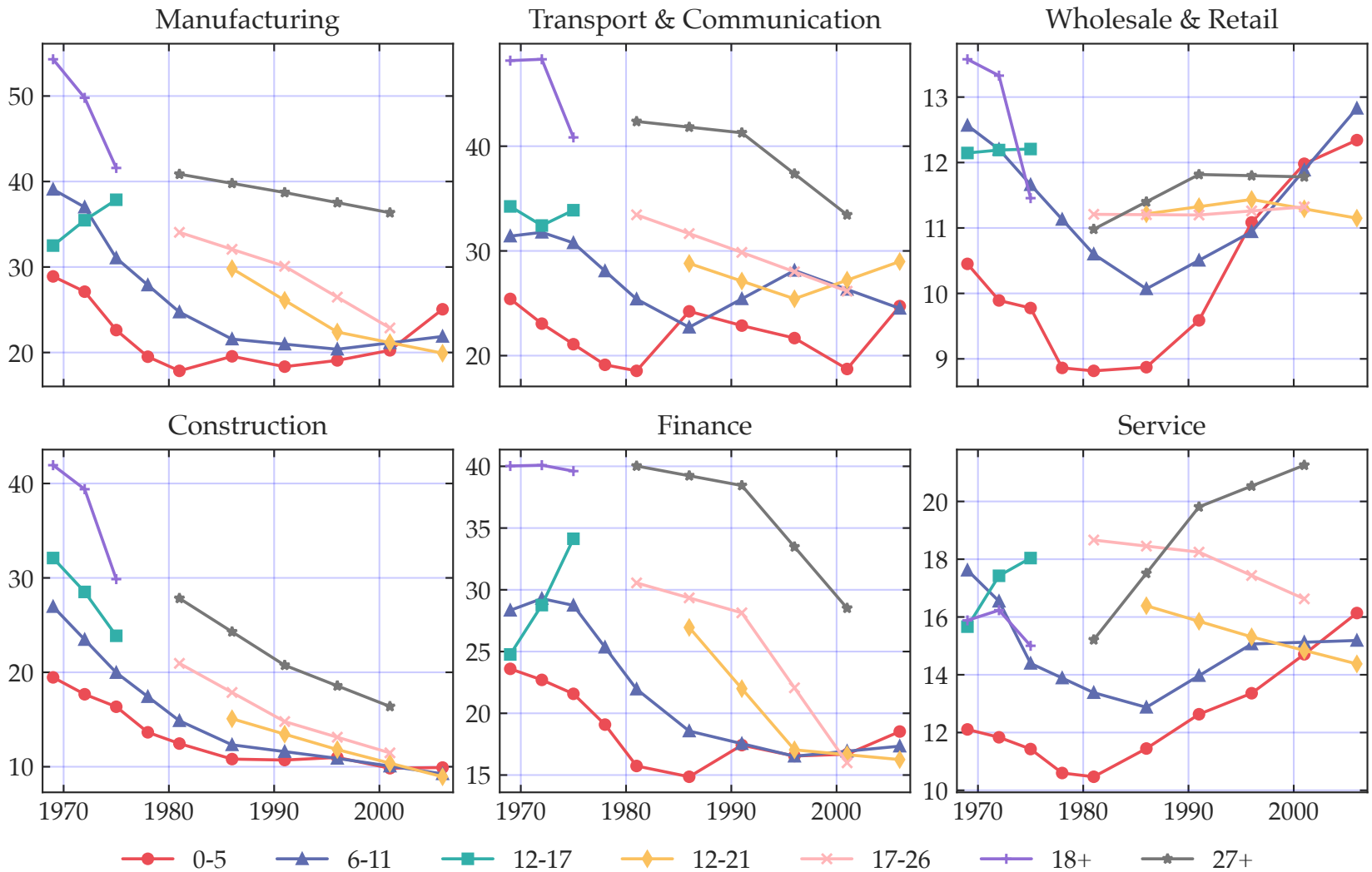
～起業した後、10年後には約3割の企業が、20年後には約5割の企業が退出しており、起業後の淘汰もまた厳しい～



資料：(株)帝国データバンク「COSMOS2企業概要ファイル」再編加工

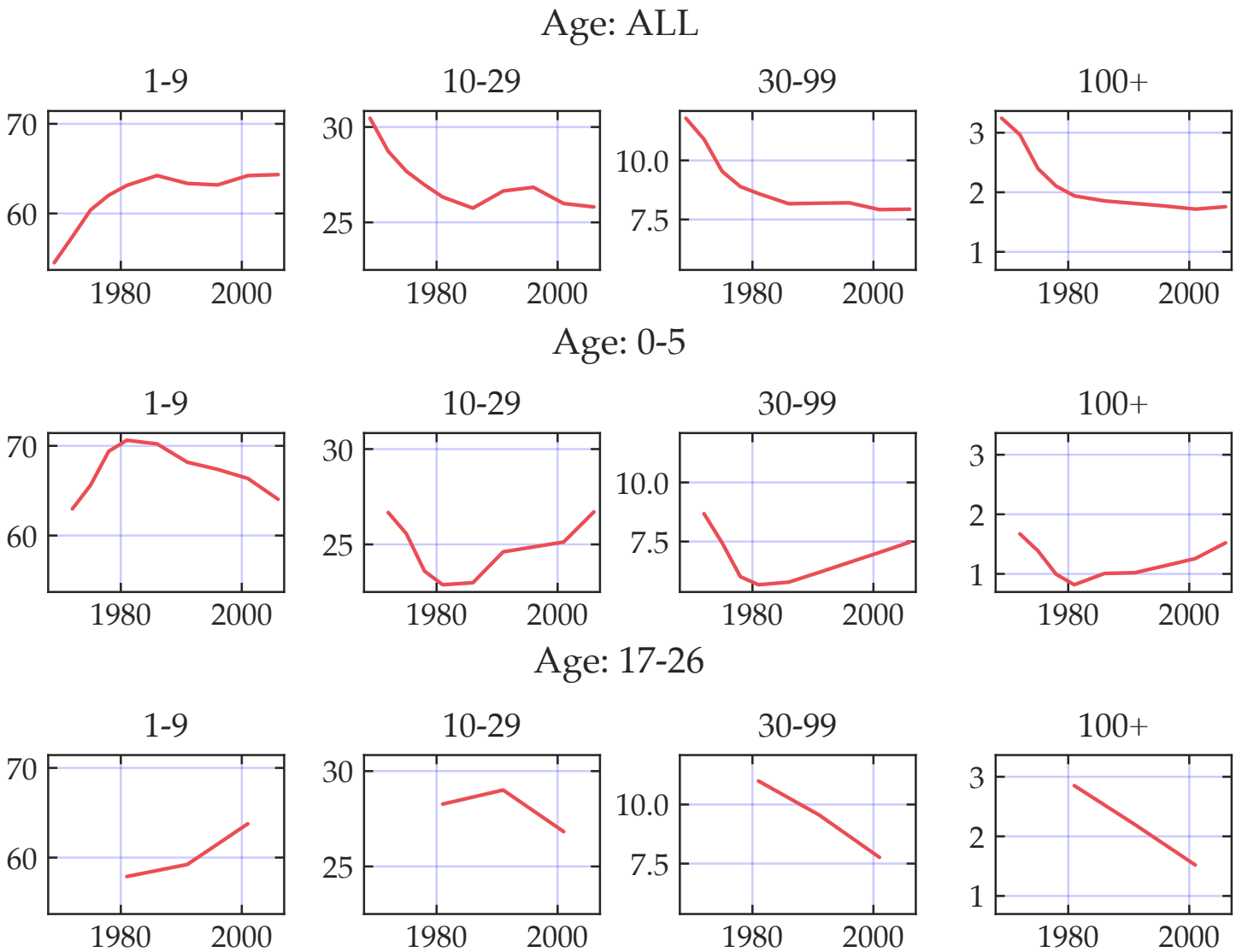
(注) 1. 創設時からデータベースに企業情報が収録されている企業のみで集計。
2. 1980～2009年に創設した企業の経過年数別生存率の平均値を取った。
3. 起業後、企業情報がファイルに収録されるまでに一定の時間を要し、創設後ファイルに収録されるまでに退出した企業が存在するため、実際の生存率よりも高めに算出されている可能性がある。

Average Size Trends by Age Groups by Industry



The Trend of Mass Share By Age and Size

Back



Decomposition of Average Size Change

▷

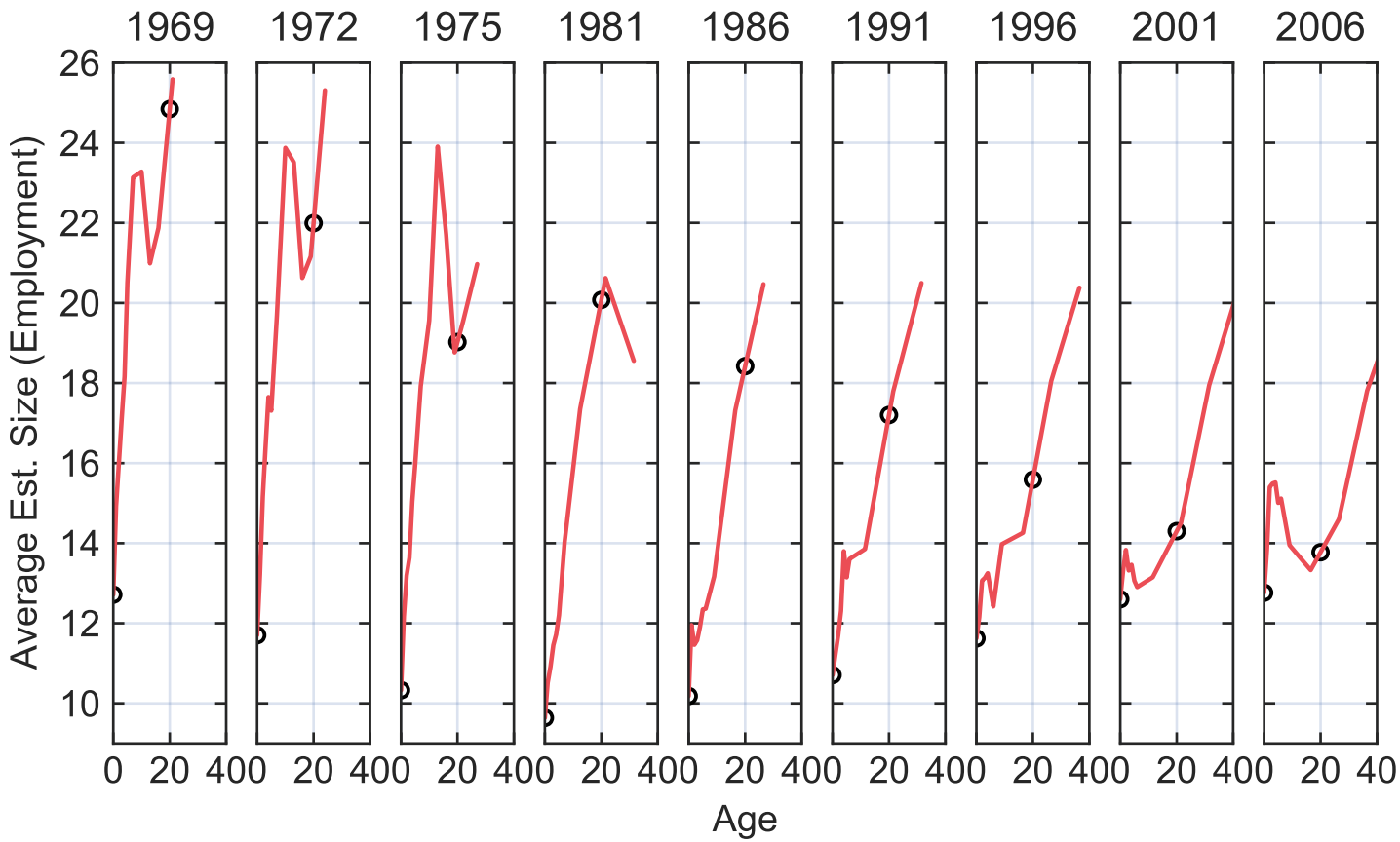
$$\ln\left(\frac{\bar{n}_{t+m}}{\bar{n}_t}\right) = \underbrace{\sum_a \ln\left(\frac{\bar{n}_{t+m-a,0}}{\bar{n}_{t-a,0}}\right)\frac{\bar{n}_{t,a}}{\bar{n}_t}\frac{M_{t,a}}{M_t}}_{\text{Birth Cohort Effect}} + \underbrace{\sum_a \left(\sum_j^a \ln\left(\frac{g_{t+m-a+j,j}}{g_{t-a+j,j}}\right)\right)\frac{\bar{n}_{t,a}}{\bar{n}_t}}_{\text{Life Cylge Growth Effect}}$$

$$+ \underbrace{\sum_a \left(M_{t+m,a} - M_{t,a}\right)\frac{\bar{n}_{t,a}}{\bar{n}_t}}_{\text{Age Composition Effect}} + \underbrace{\varepsilon_{t+m,t}}_{\text{Covariance}}$$

▷ where $g_{t,a} = \frac{\bar{n}_{t,a}}{\bar{n}_{t-1,a-1}}$

Correlation Between Average Size and Age

Back



Life Cyle Growth in Manufacturing (Hsieh & Klenow 2014)

Back

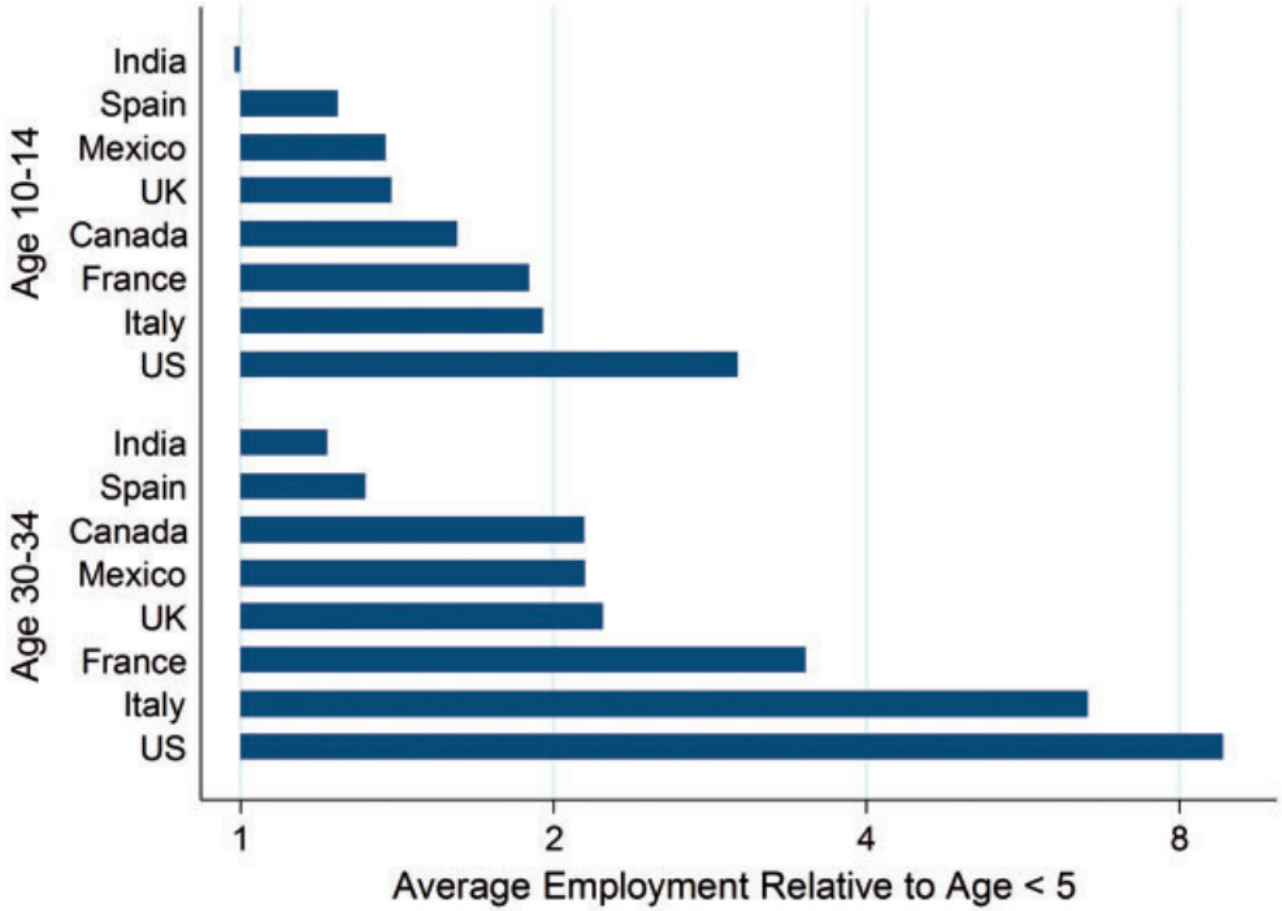


FIGURE IX

Employment Growth over the Life Cycle

Employment growth by age 10–14 and age 30–34 relative to age < 5. Indian data are from plants in the 2009–2010 ASI/NSS. Data for France, Italy, and Spain are for firms in the 2006–2007 Amadeus Database. U.K. data are for plants from 1997–2001 to 2002–2006 in the ARD. Canadian data are for plants from 1999–2001 to 2004–2006 in the Canadian ASM. See Appendix I for additional details.

Life Cycle Growth for Age 20 Cohorts By Industry

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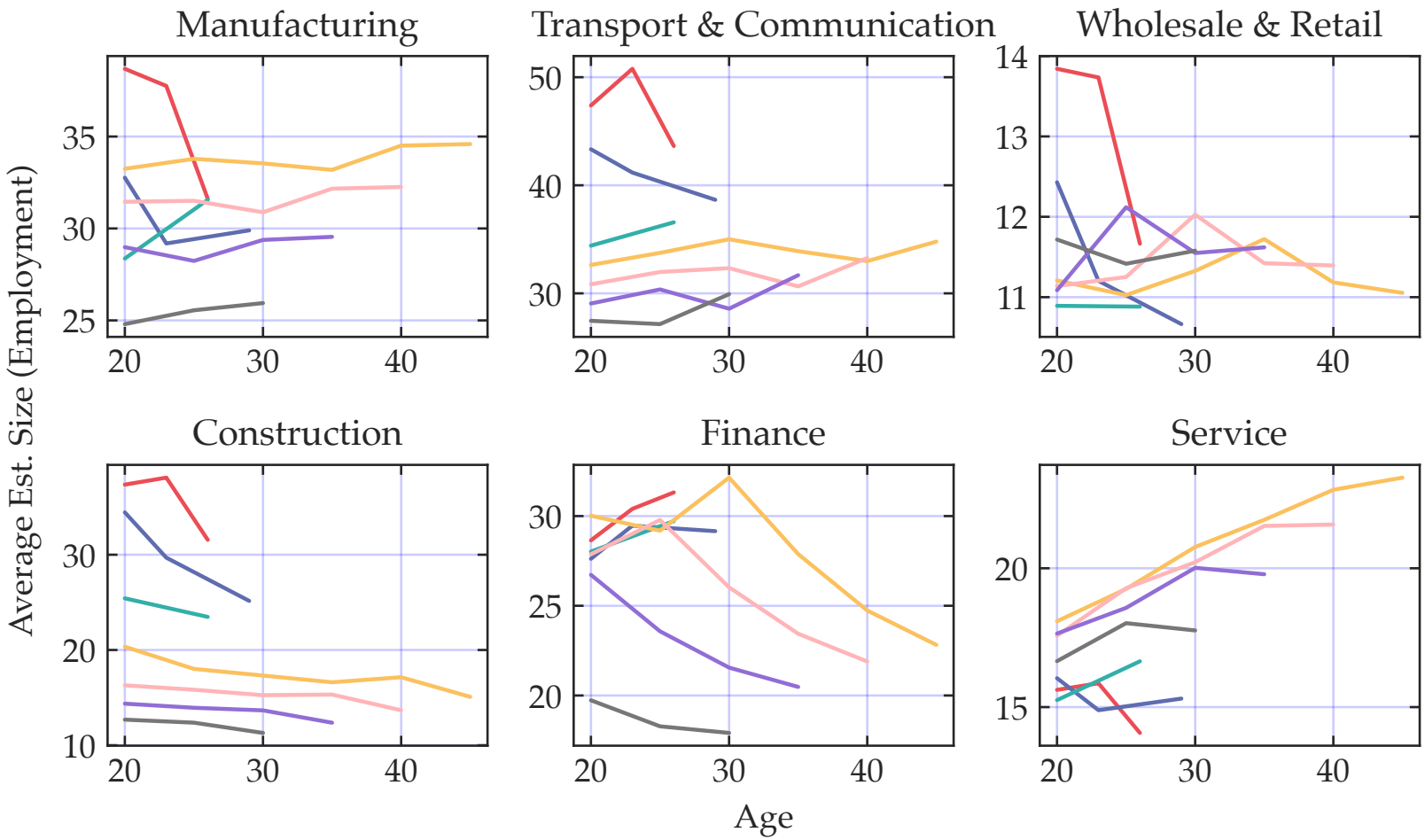
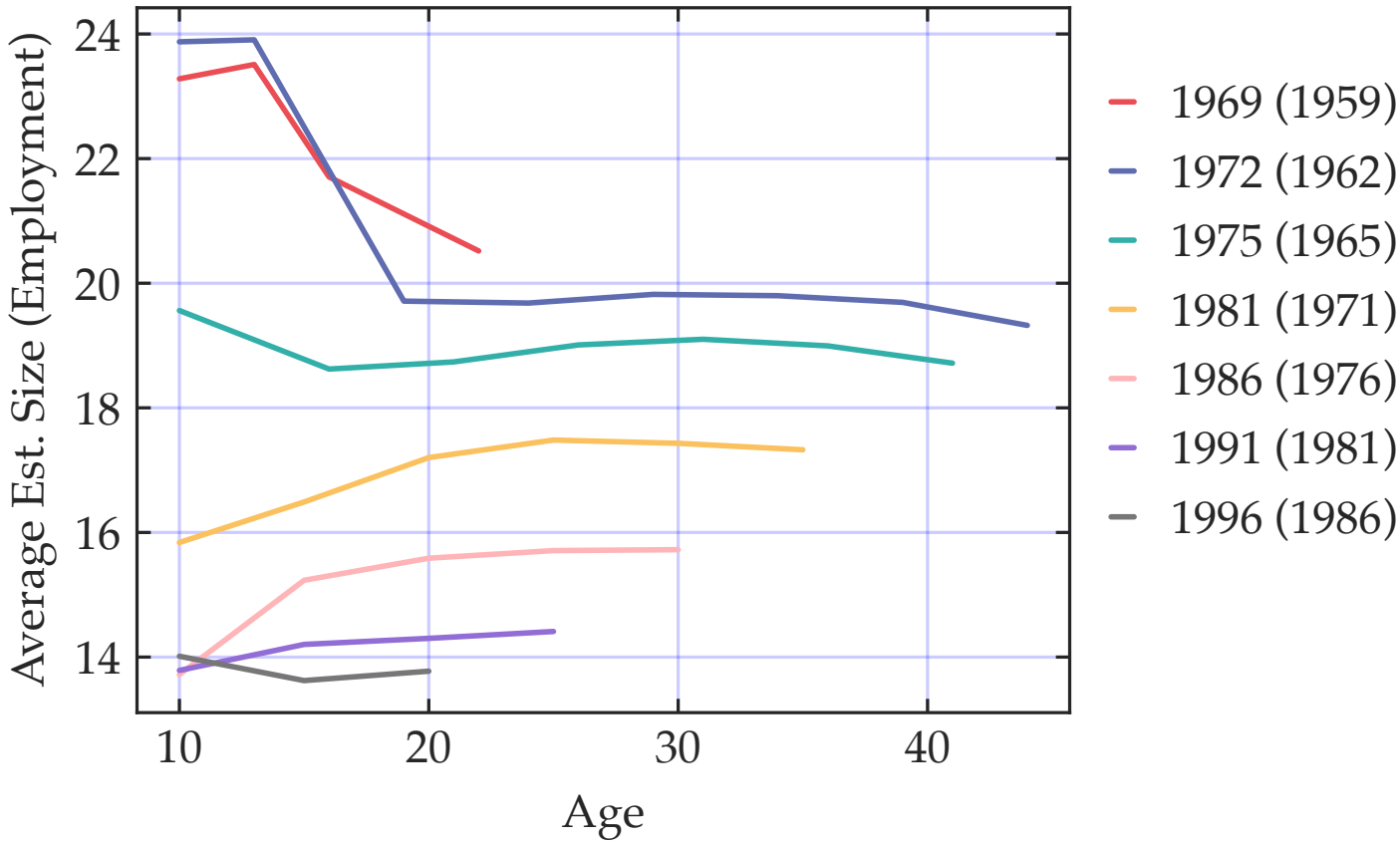
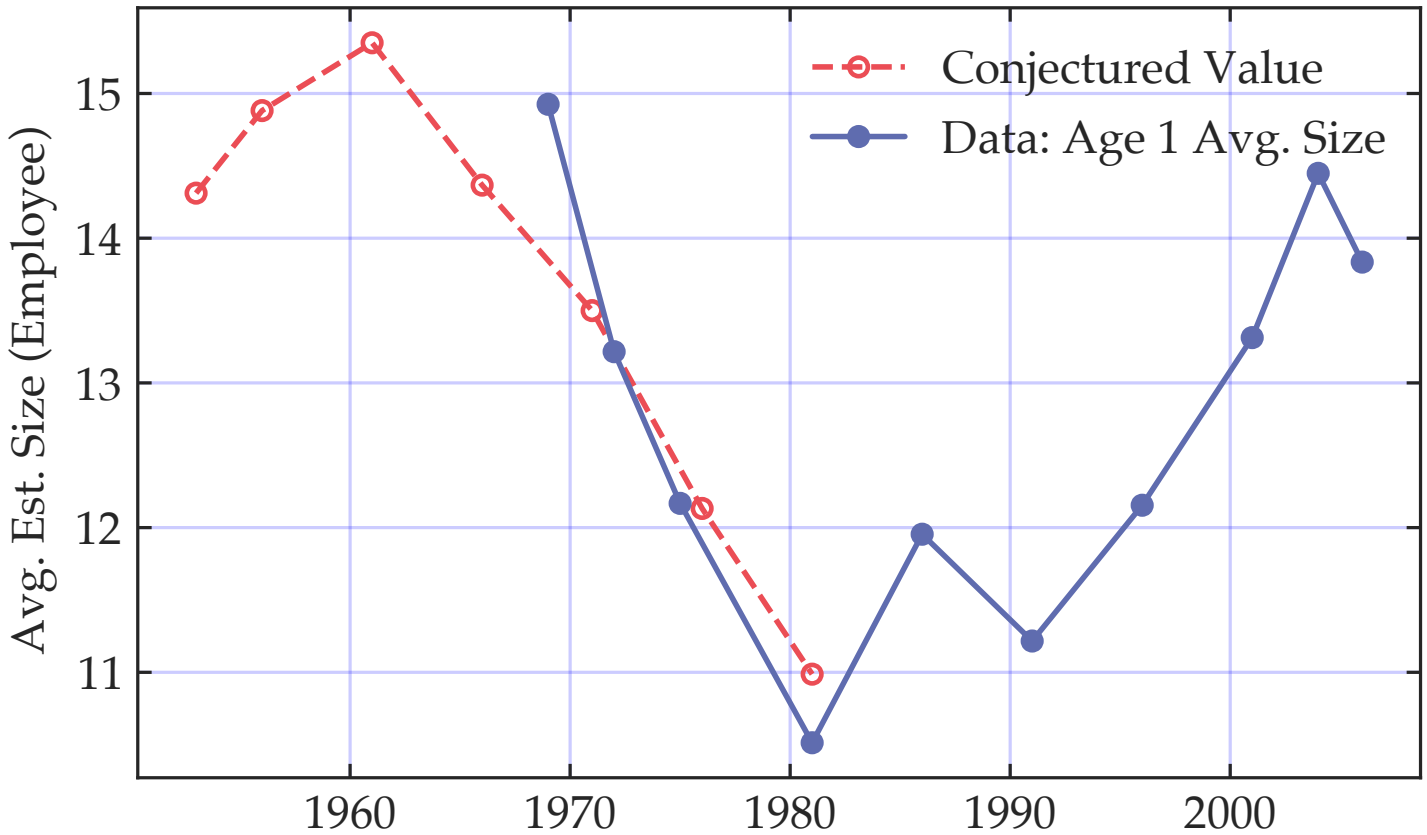


Life Cycle Growth for Age 10 Cohorts

Back



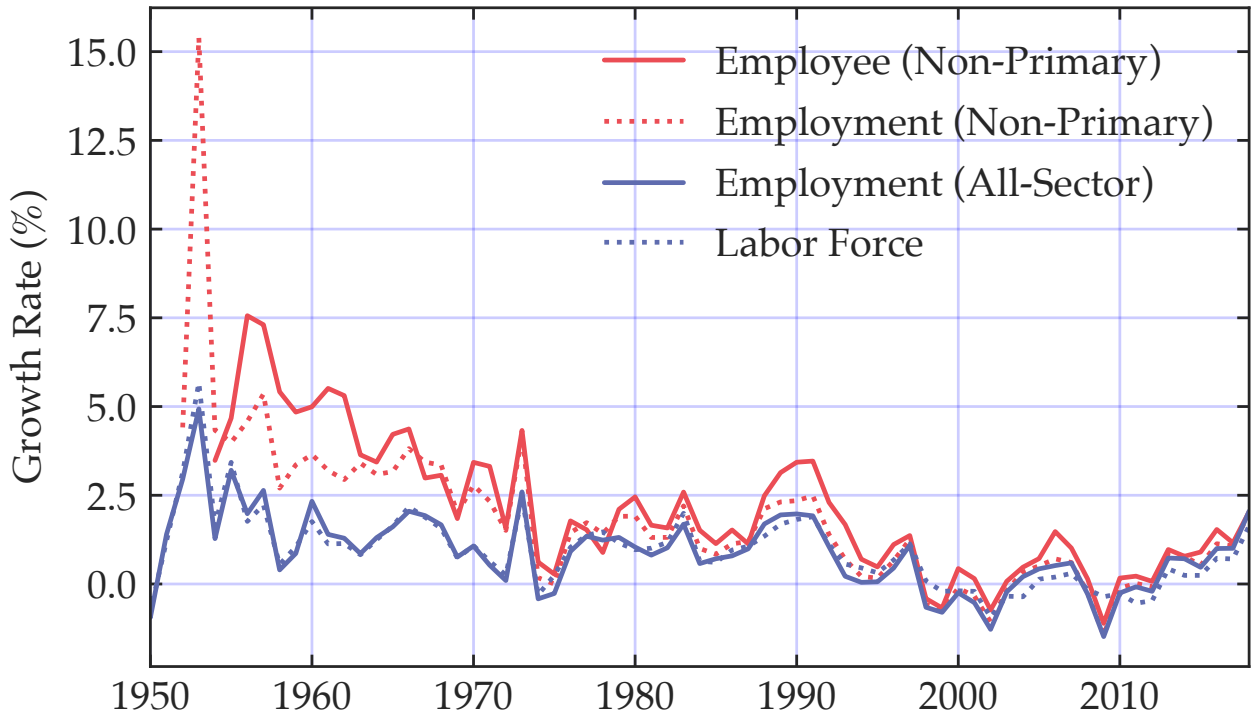
Conjectured Average Entrant Size in Early Periods



- Assume age effects for cohort before 1969 similar to those in 1969-1981
- The decline in cohort effect coincided the decline in avg. size

Labor Force Growth Rate

Back



Benchmark Model: Calibrating to Period Average

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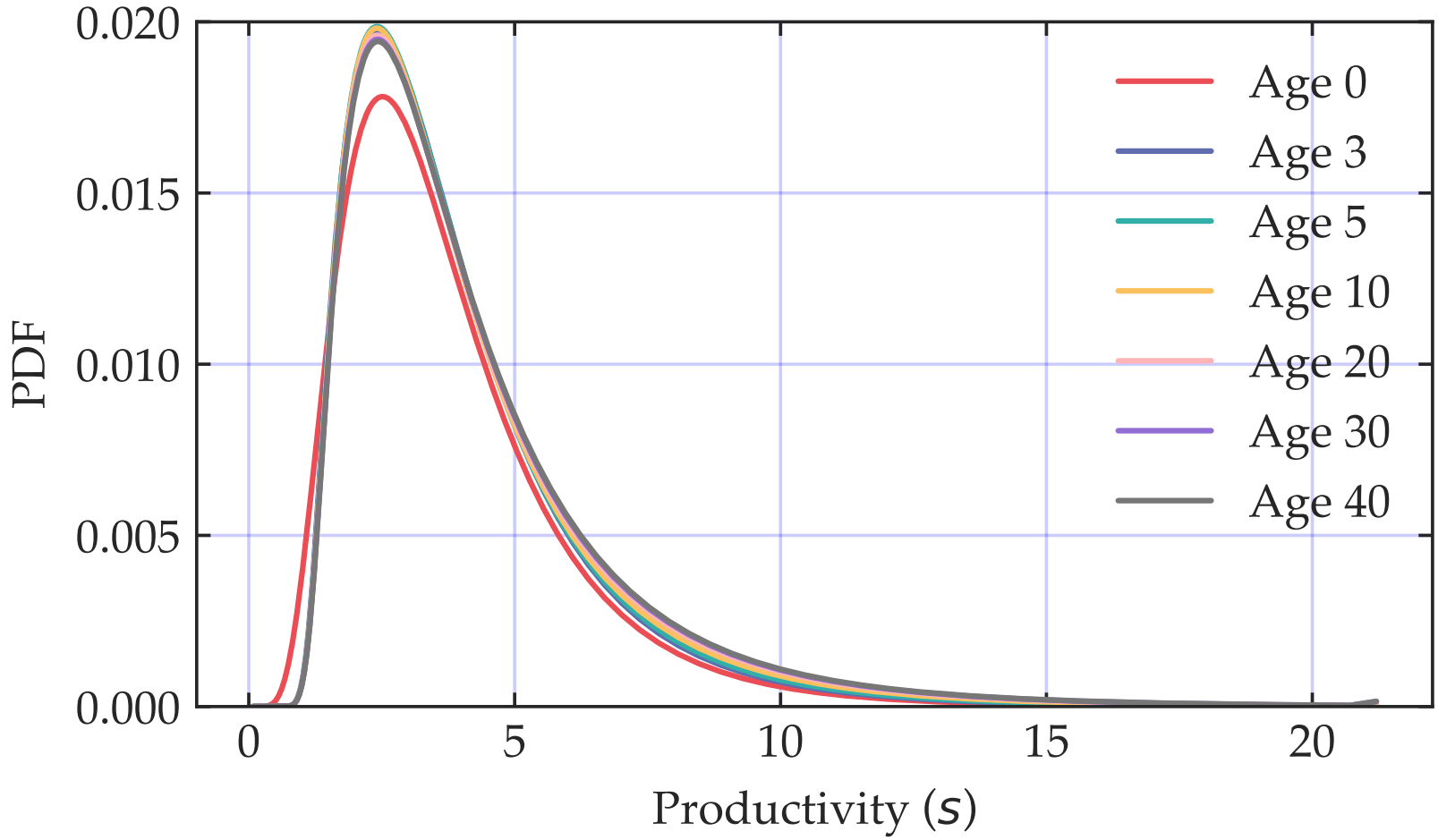
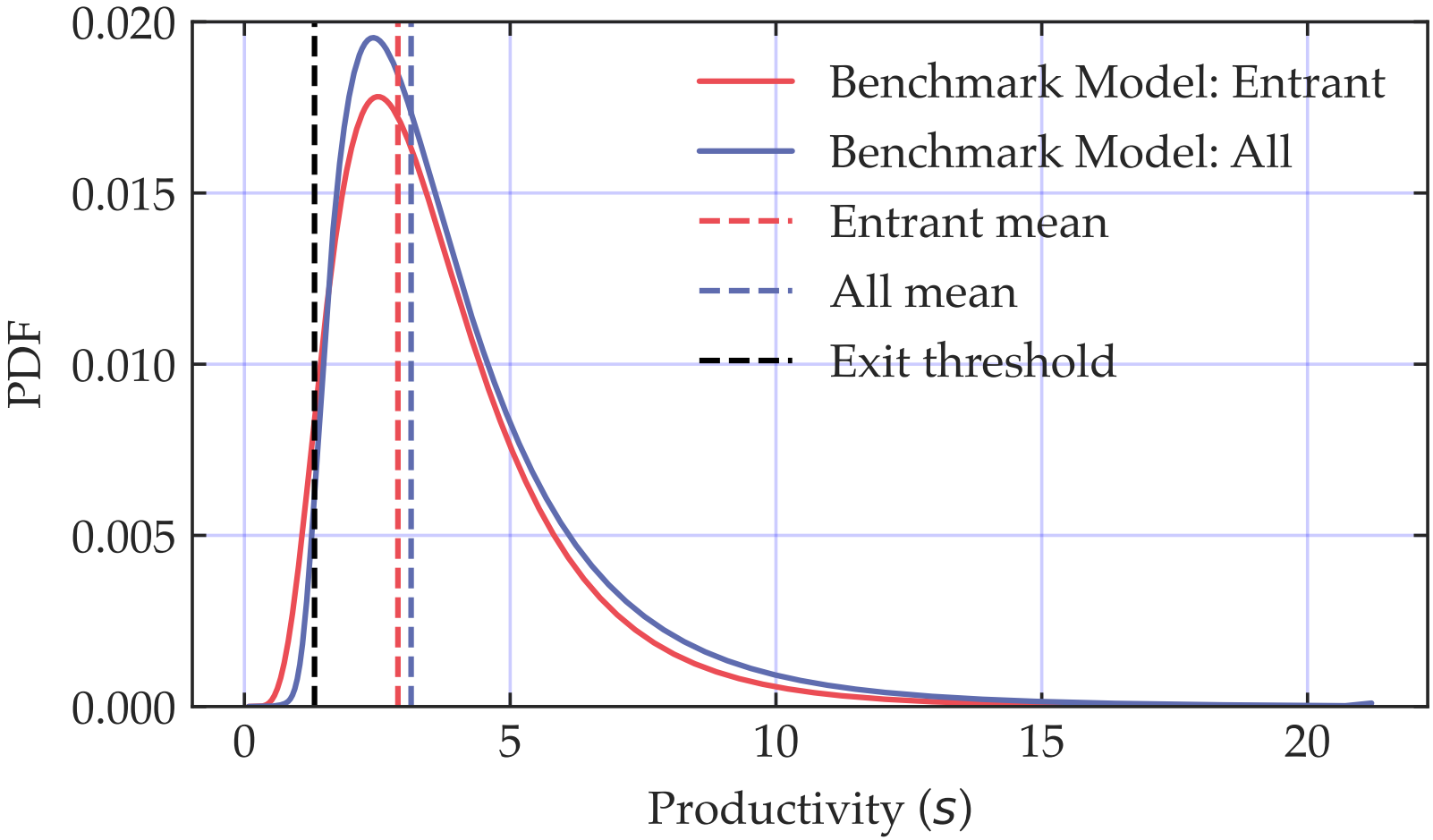
Parameters	Values	Definition	Calibration
β	0.96	Discounter factor	Assigned
θ	0.64	Labor share (”span of control”)	Assigned
η	0.02	Average labor force growth rate	Assigned
c_e	76.050	Entry cost (in unit of product)	Jointly Calibrated
c_f	2.123	Operation cost (in unit of labor)	Jointly Calibrated
a	0.008	Drift in AR(1)	Jointly Calibrated
ρ	0.966	Persistence in AR(1)	Jointly Calibrated
σ_ε	0.181	Std. of AR(1) shocks	Jointly Calibrated
μ_G	1.200	Mean of entrant productivity (log normal)	Jointly Calibrated
σ_G	0.527	Std. of entrant productivity (log normal)	Jointly Calibrated

- Entry cost c_e is very large in order to pin down the low entry and exit rate in Japan

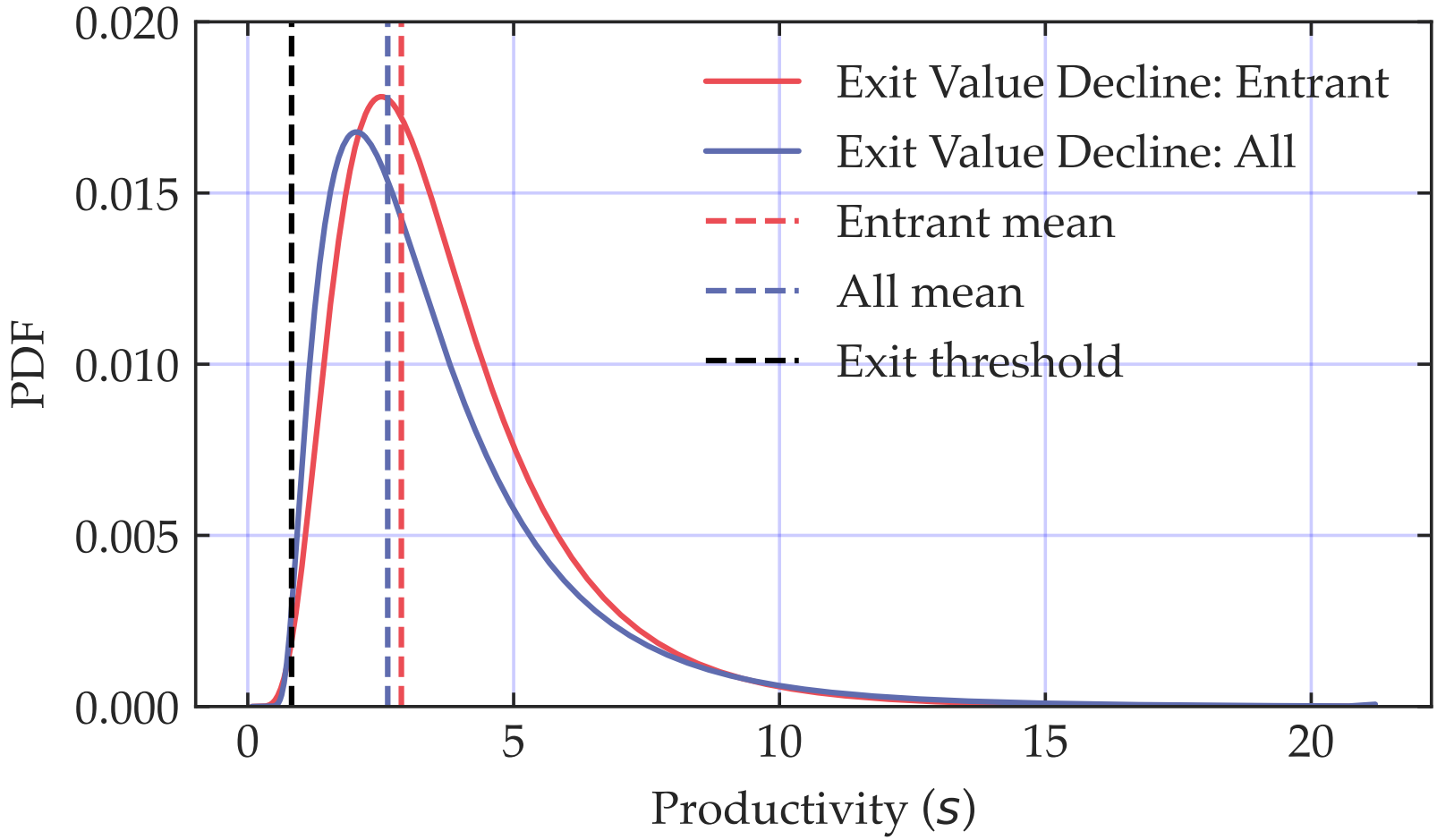
Model-Generated Evolution of Cohort Productivity Distribution



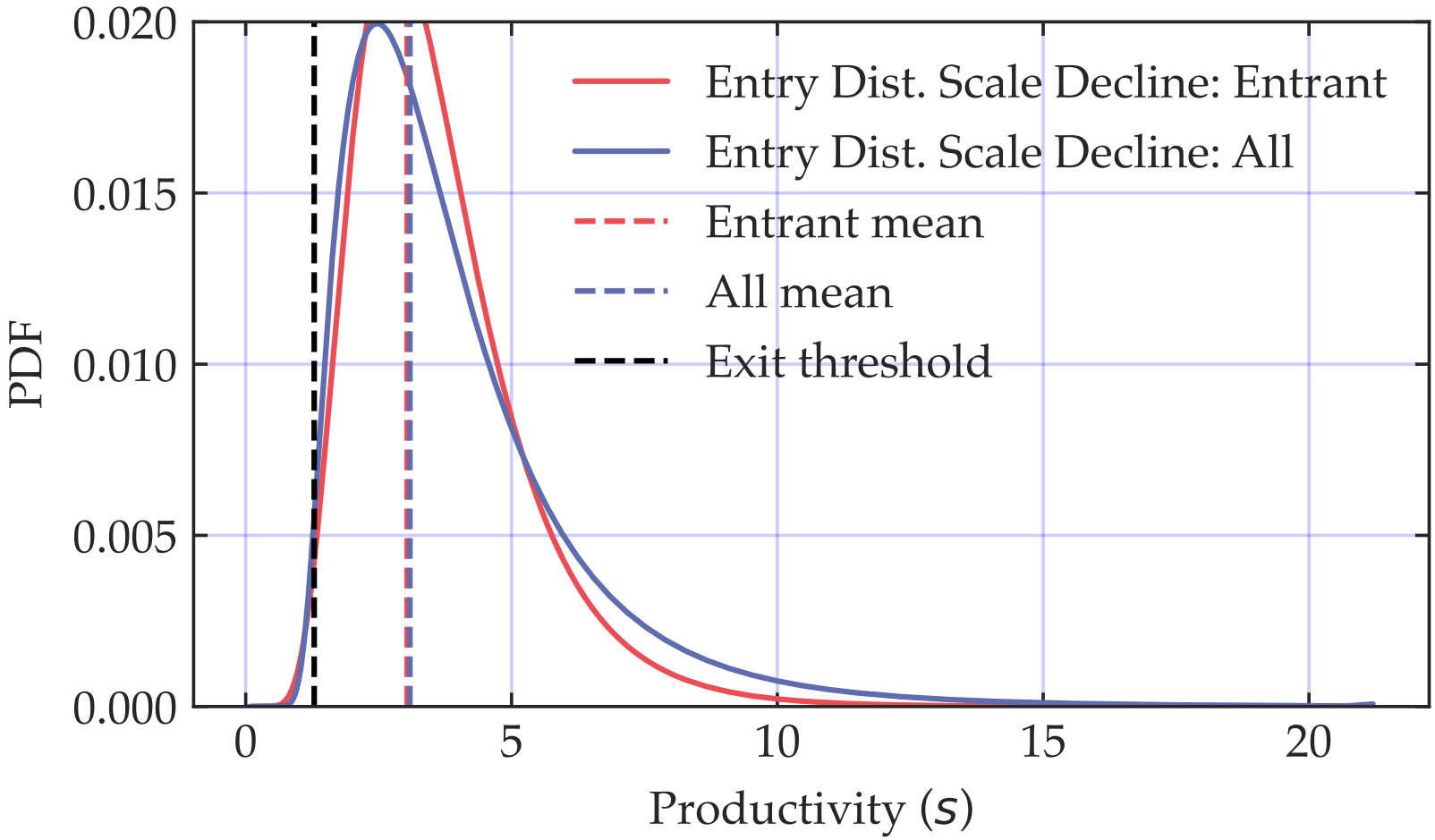
Model-Generated Productivity Distribution



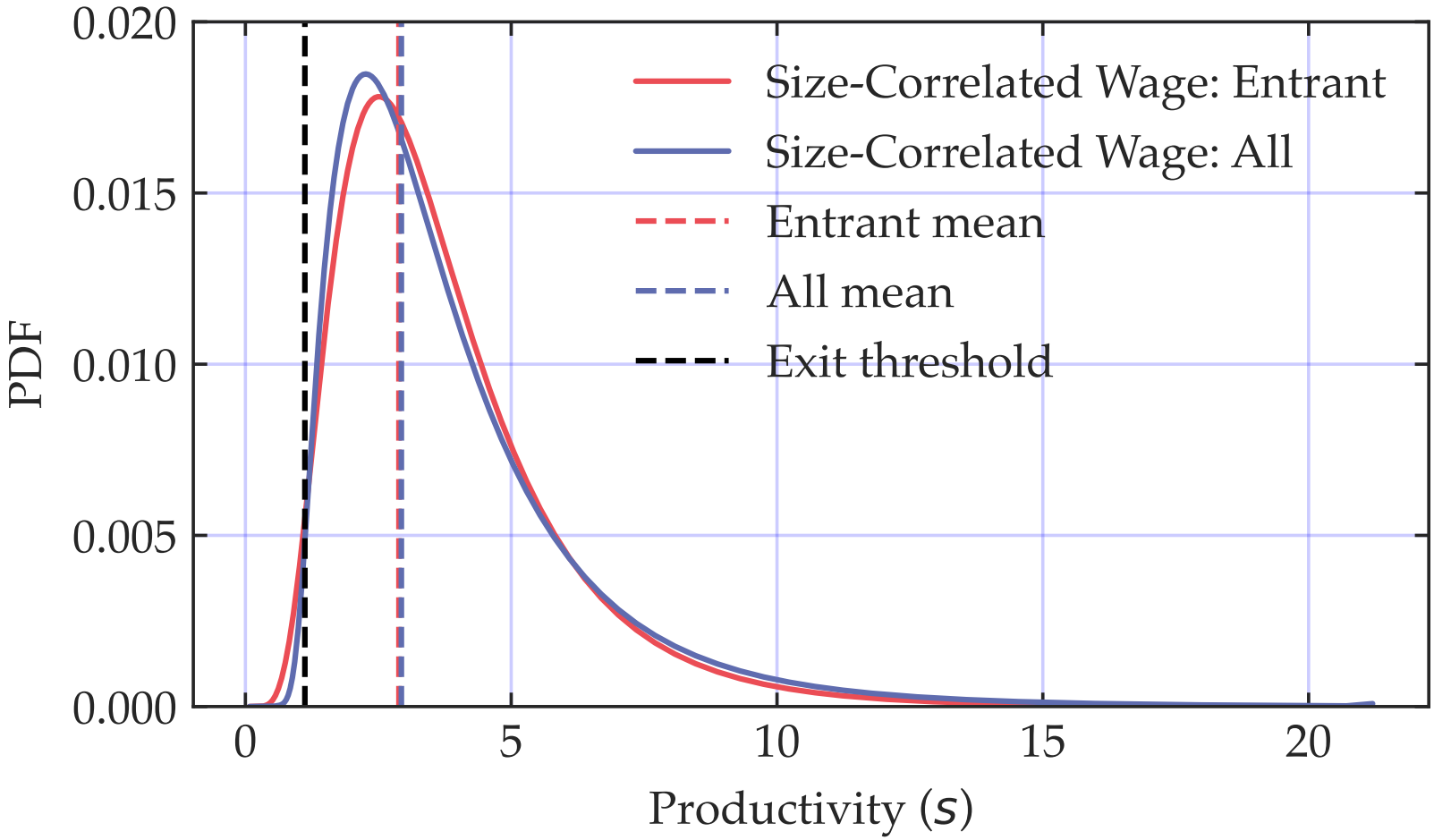
Model-Generated Productivity Distribution



Model-Generated Productivity Distribution

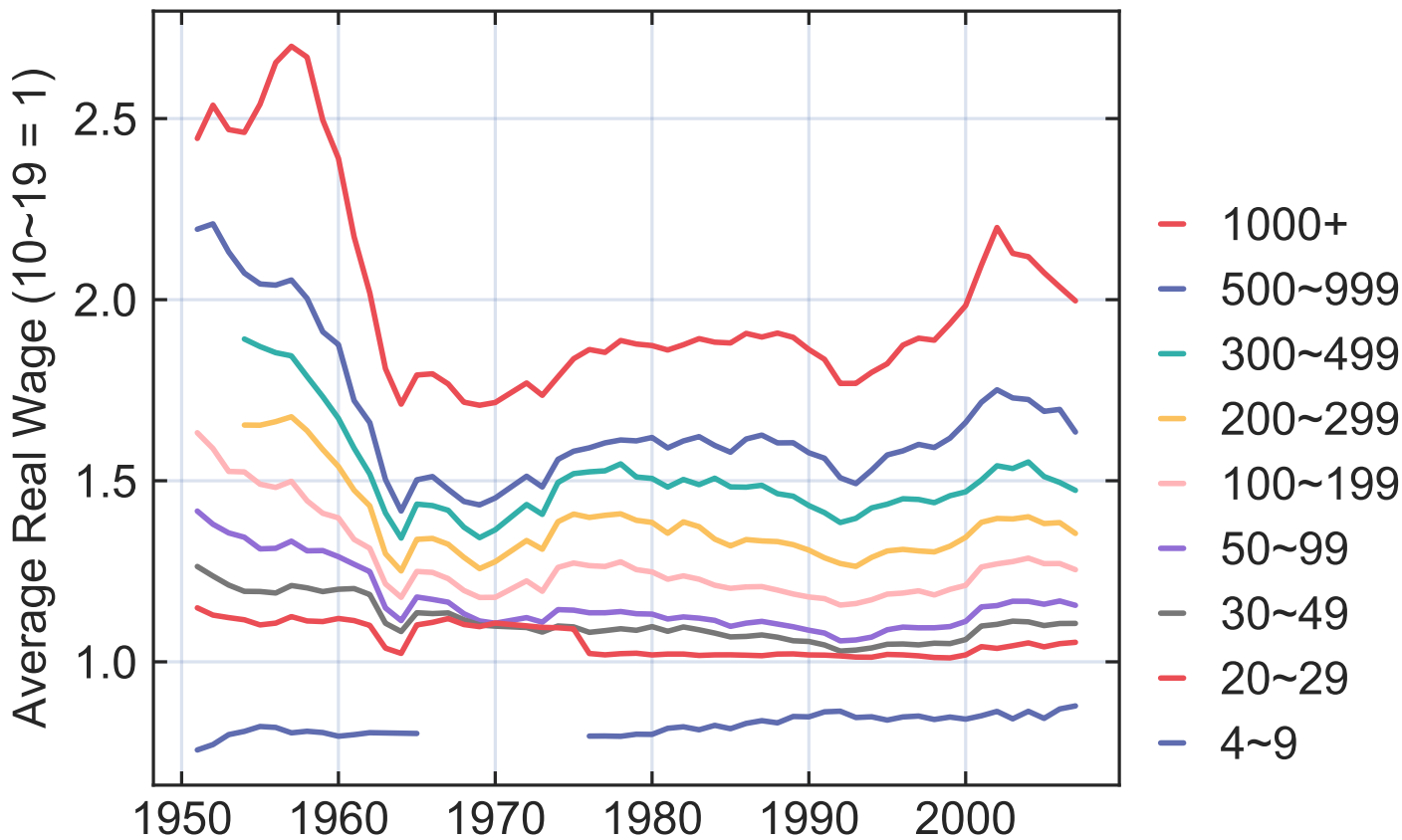


Model-Generated Productivity Distribution



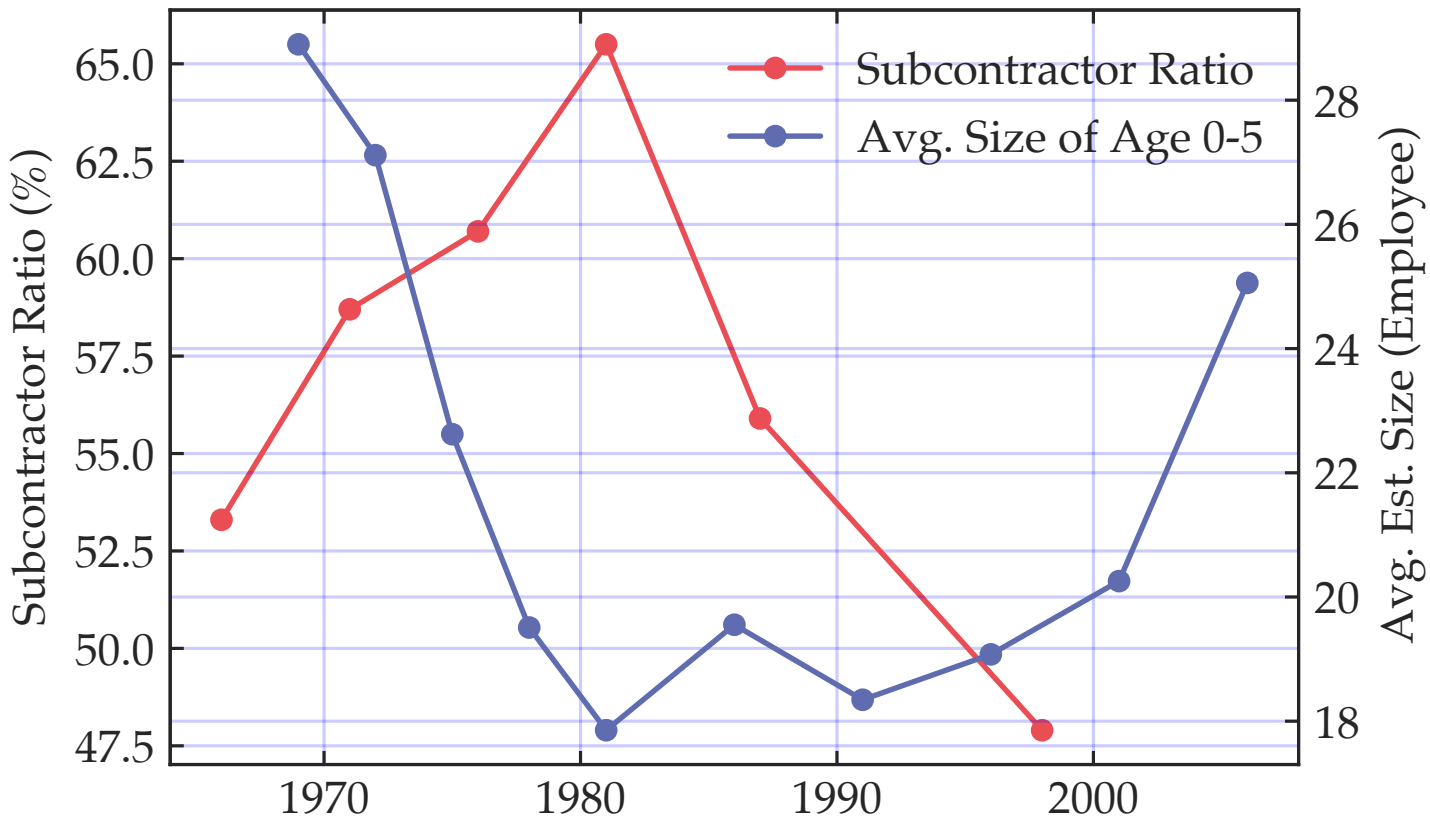
Real Wage by Firm Size in Manufacturing Census

Back



- Size-correlated wage inequality decreased before 1960s and increased only moderately thereafter

Subcontracting Ratio in Manufacturing



- Source: Basic Survey on Commercial and Manufacturing Structure and Activities

Other Potential Explanations on Declined Size and Growth

- Changing demand (preference) for variety and niche goods? (Sedláček and Sterk, 2017)
  - Why only 1960-1980?
  - Subcontracting can be also seen as a form of producing niche products
- Substitution between capital and labor?
  - But labor share in manufacturing does not decline in Japan
- Improvement in the human capital (education) of new labor force? (Ignaszak, 2020)
  - More skilled labor higher capital & labor demand; New firms employ few workers due to higher wage but grow faster
  - Entrants in Japan grow slower