What does the pandemic surge in (U.S.) startups mean?

Ryan Decker, *Federal Reserve Board*

Prepared for The London Symposium at King's College London
June 17, 2025

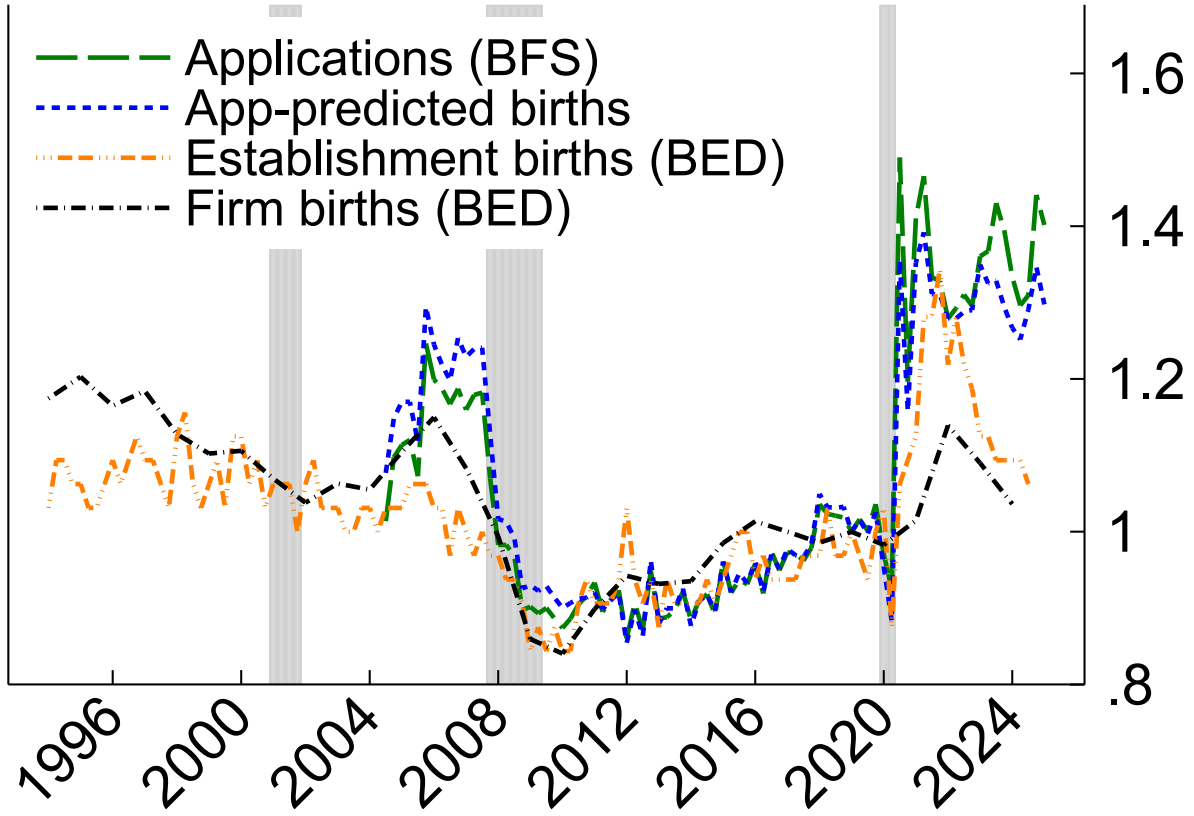
Without implication, this presentation is based largely on joint work with John Haltiwanger (U Maryland, NBER)

- "Surging business formation in the pandemic: Causes and consequences", Fall 2023 BPEA
- "High tech business entry in the pandemic era", FEDS Note
- "Surging business formation in the pandemic: A brief update", mimeo

The analysis and conclusions set forth here are those of the authors and do not indicate concurrence by members of the Federal Reserve staff or the Board of Governors.

The striking business entry surge in the U.S.

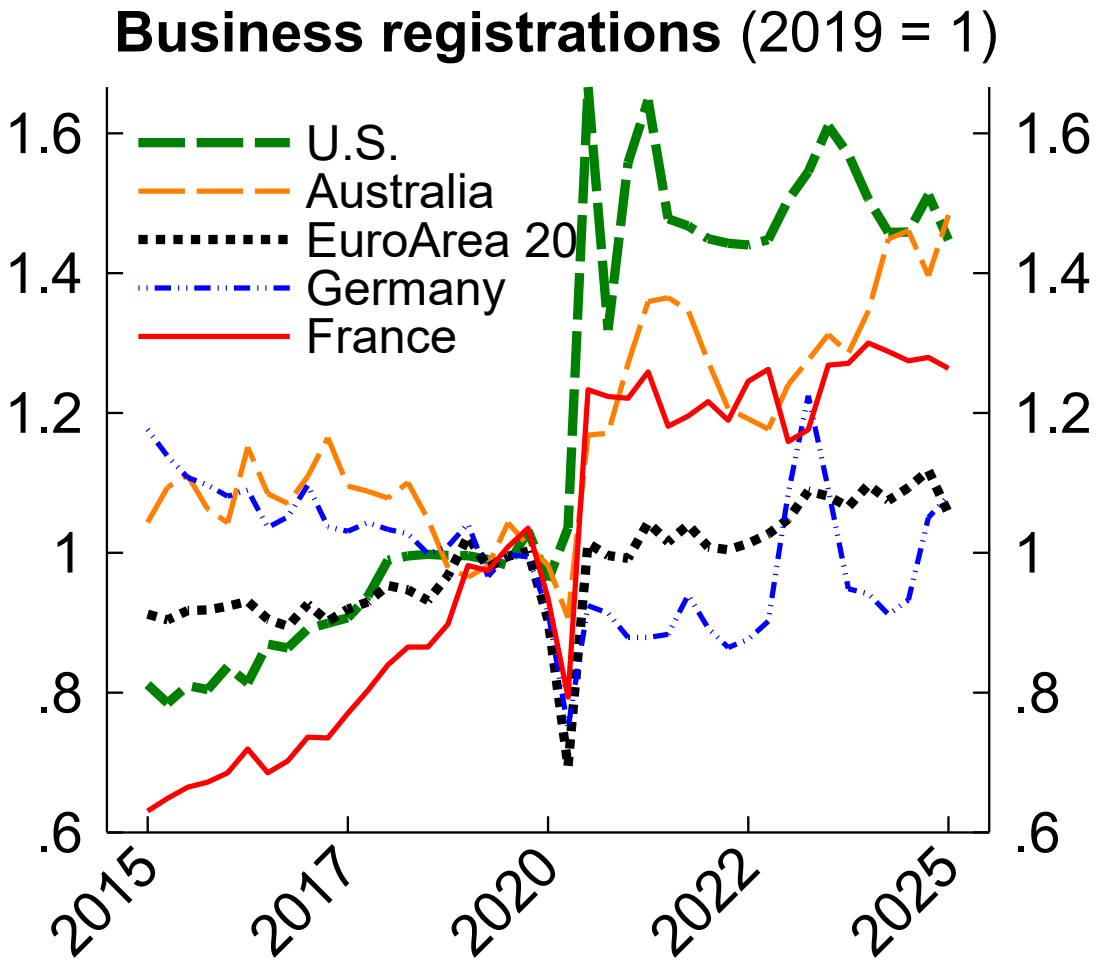
Entry rate indexes (2019:Q1 = 1)

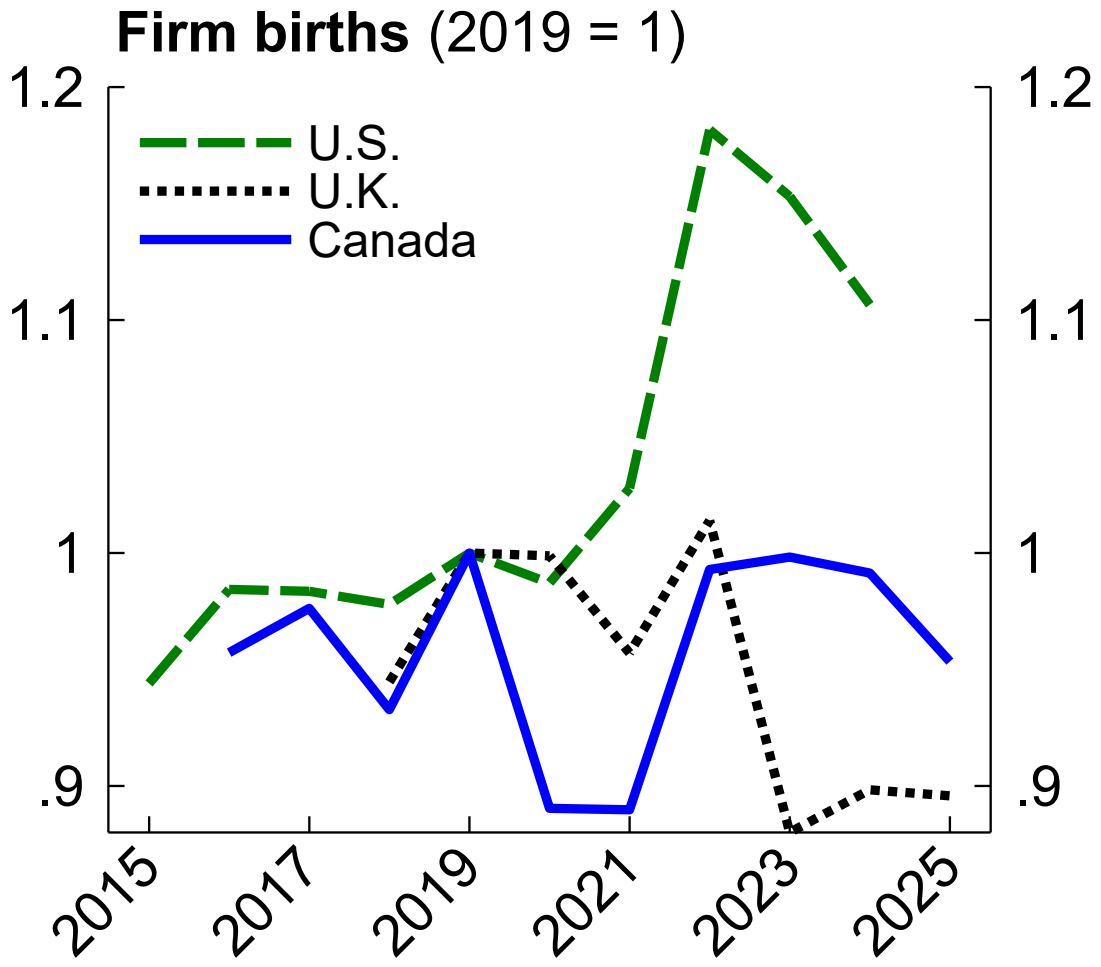


Note: Applications are likely employer (HBA).
All series expressed as rates except BFS. 8-quarter prediction

- **Business applications**/registrations surged starting in mid-2020.
  - High-quality applications up 35%
  - **Predicted firm births** based on detailed application characteristics.
- Followed by surging ***Establishment* births:**
  - 1 million jobs per quarter, 2021:Q2-2024:Q3 (vs. 850k in 2019)
  - "Establishment" = business location
- And ***firm* births** jumped starting in year through March 2022
  - 1.9 million jobs per year, 2022-24 (highest since 2007)
  - "Firm" = company

U.S. surge is relatively strong





Note: U.S. registrations is total applications. Australia and U.K. seasonally adjusted by authors.
Canada and UK are 4-quarter trailing moving averages matched to Q1 reference.
Source: BFS, BED, Haver

What does the U.S. entry surge mean? Through the lens of *pandemic stories*

1. Geographic reallocation
2. Industry patterns
3. The policy environment (preliminary)
4. (If time) Labor market dynamics

1. Geographic reallocation (first few years)

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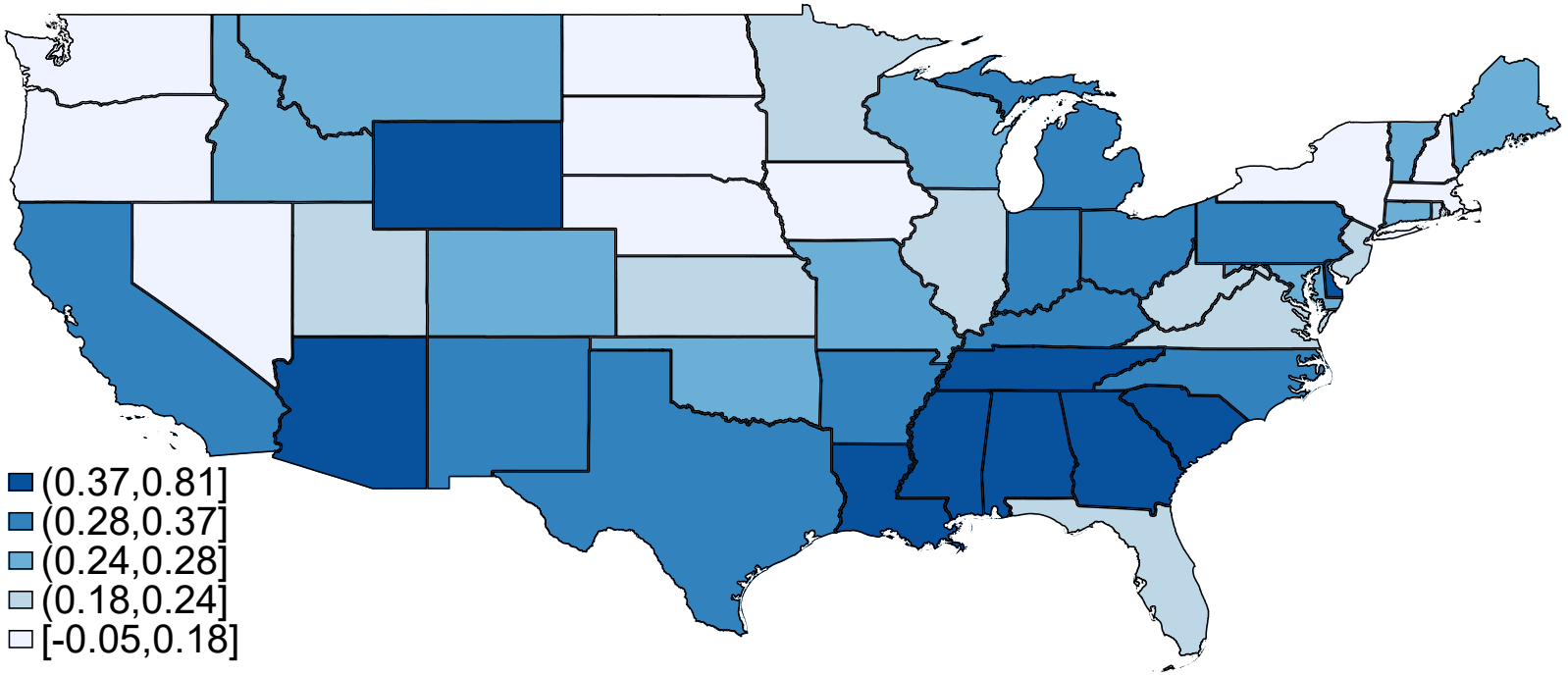
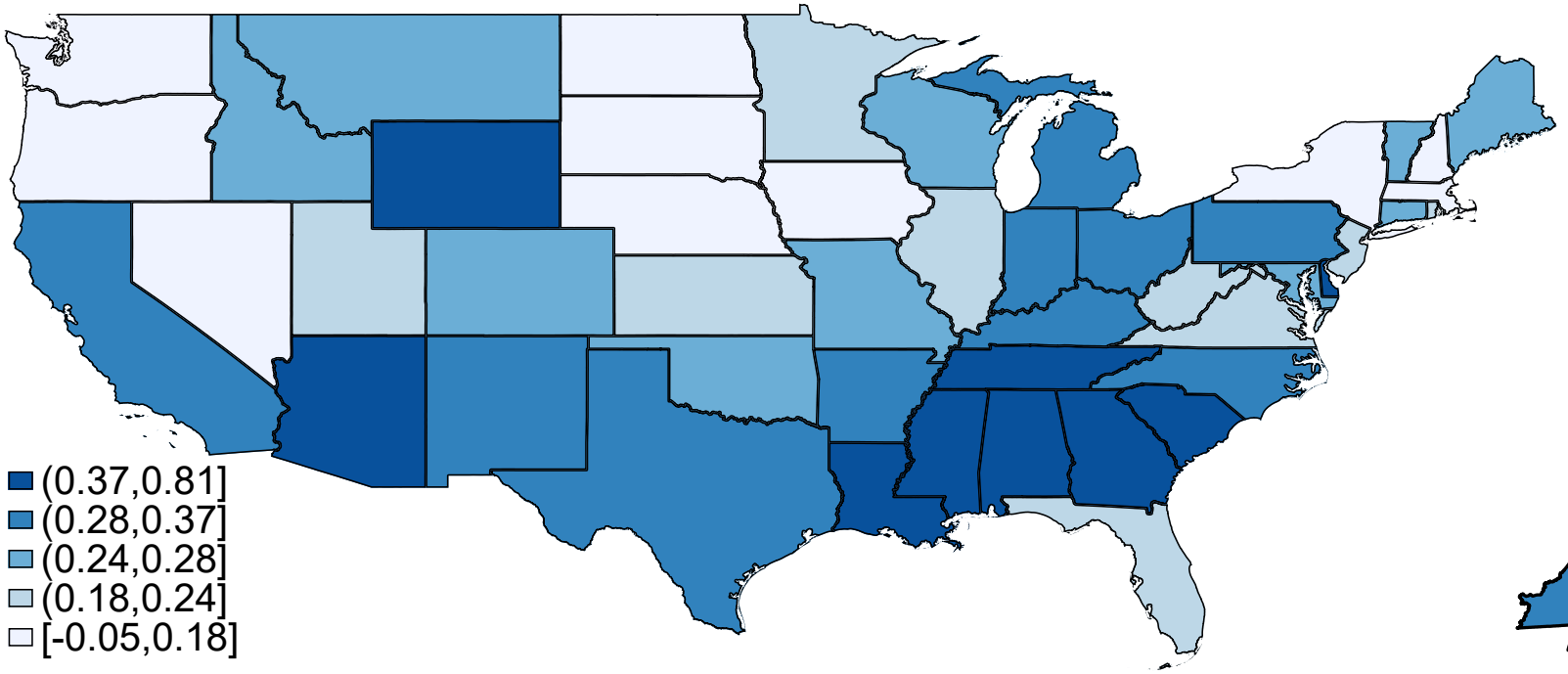


Note: Difference of average (log) likely employer applications per capita, 2020-2023 vs. 2010-2019.
Source: Census Bureau Business Formation Statistics and population estimates.

See also O'Brien 2022; Newman & O'Brien 2023; Newman & Fikri 2024

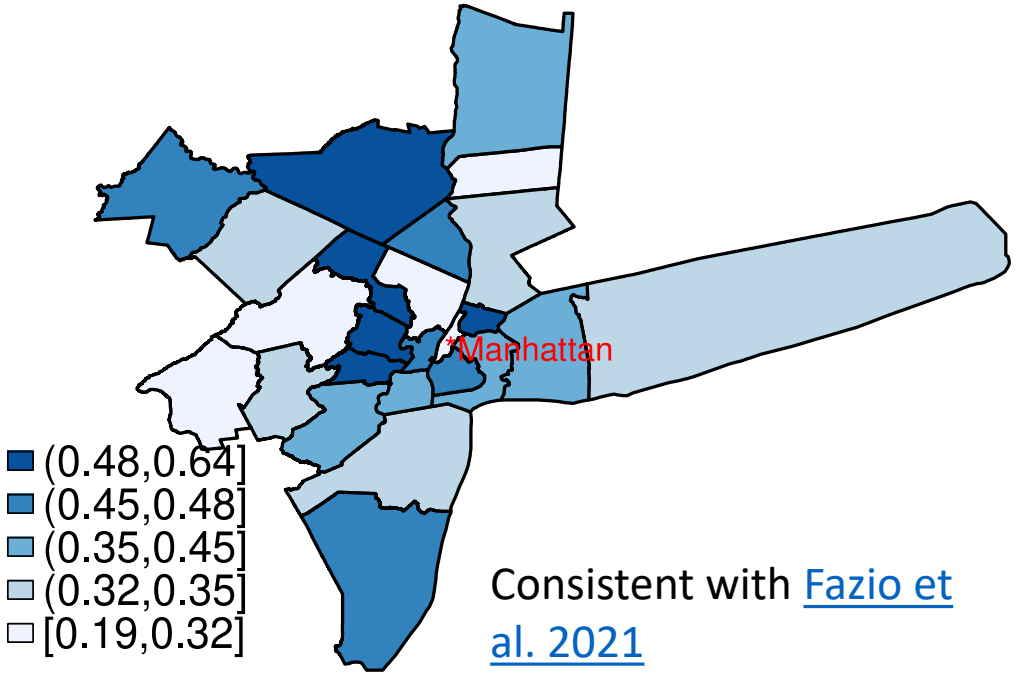
Note: State data for likely employer applications; county data for total applications

1. Geographic reallocation (first few years)



Note: Difference of average (log) likely employer applications per capita, 2020-2023 vs. 2010-2019.
Source: Census Bureau Business Formation Statistics and population estimates.

- **Donut effect** in cities related non-linearly to pop density, estab density, and changes in WFH.



Consistent with [Fazio et al. 2021]

See also O'Brien 2022; Newman & O'Brien 2023; Newman & Fikri 2024

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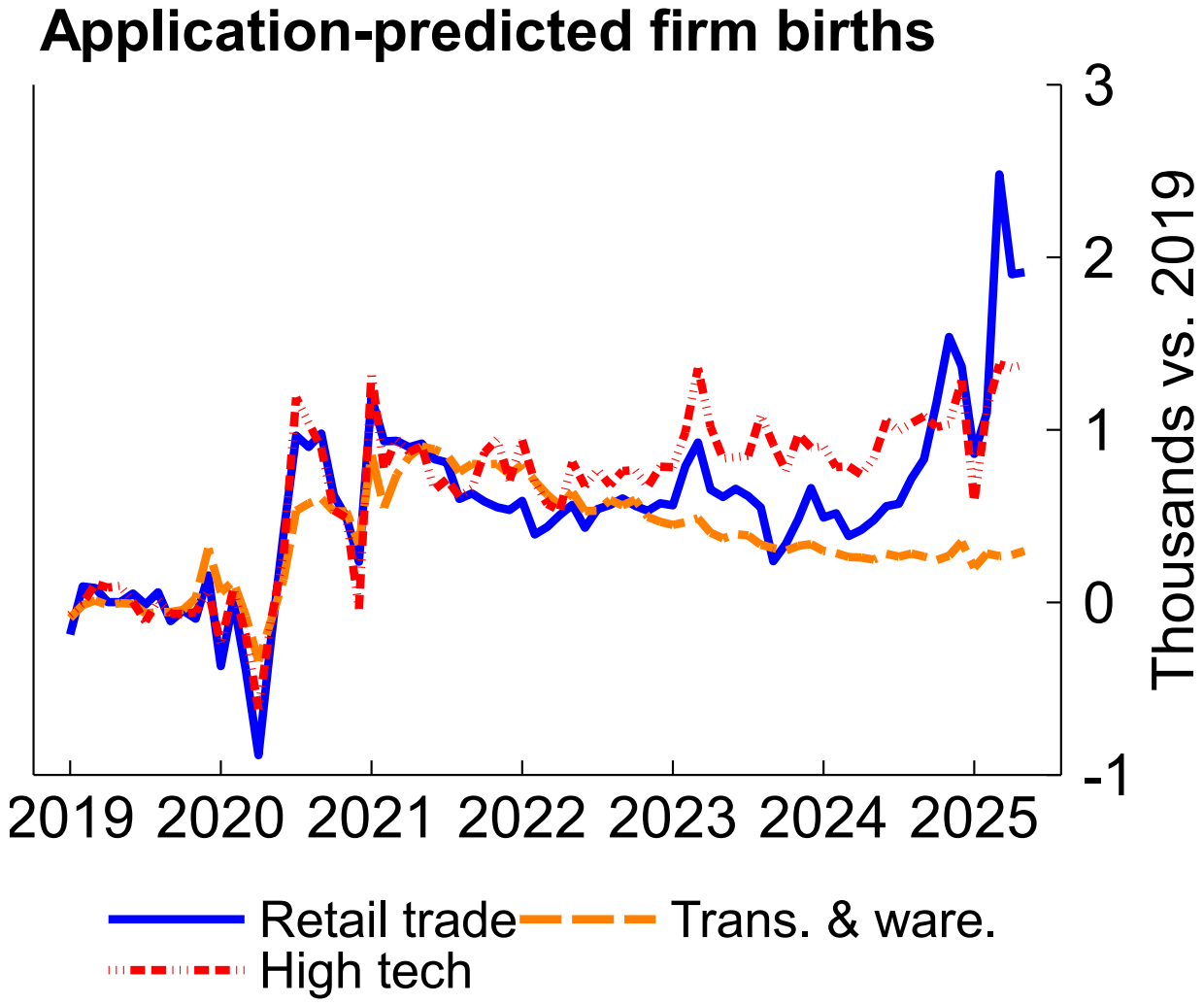
2. Industry patterns

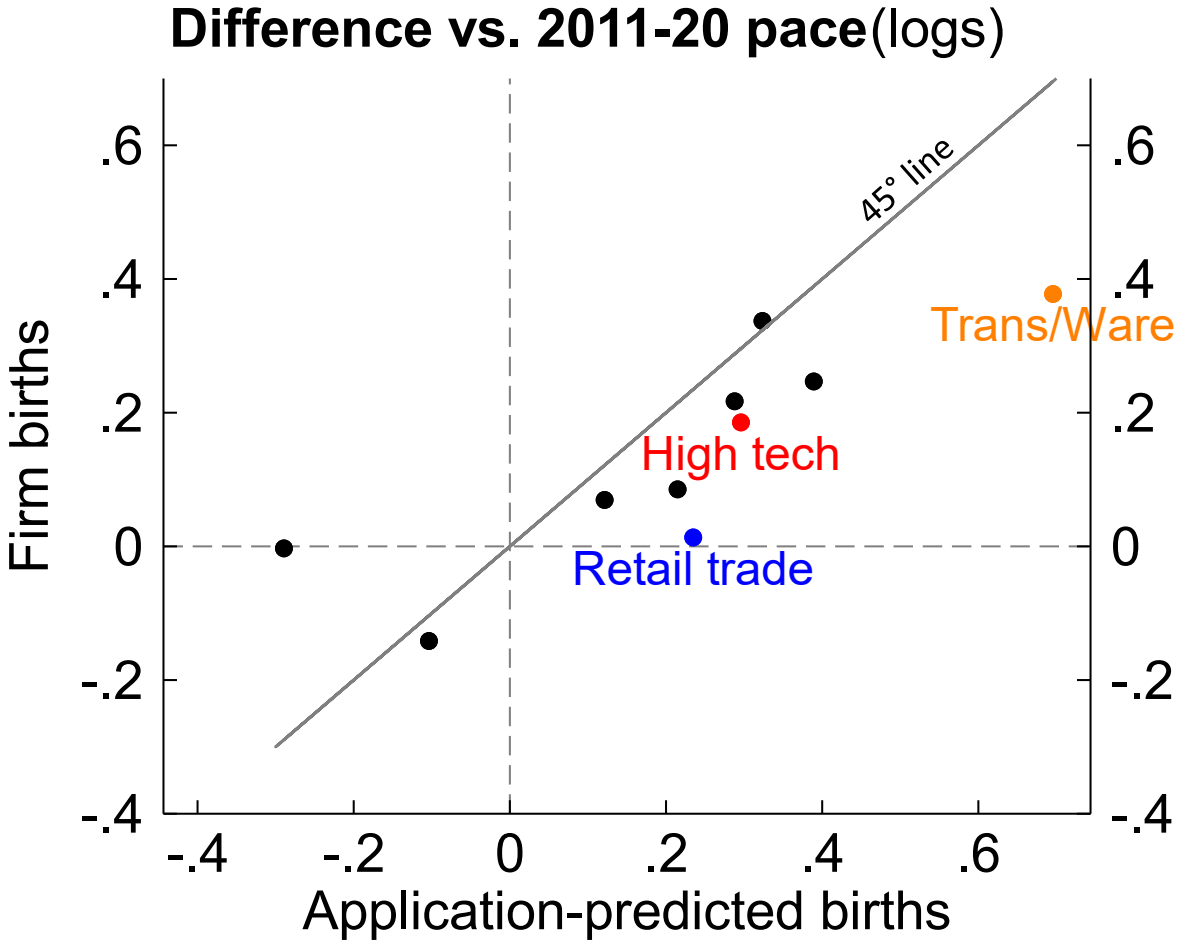
2. Industry patterns: Applications in retail, logistics, tech



Note: "High tech" here combines NAICS 51 and 54

- **Retail trade:**
  - Strong initial surge, some cooling, then recent resurgence
  - Driven largely by **online retail**
  - (Next slide) Low transition rates
- **Transportation and warehousing:**
  - Surge peaks during 2021 supply chain crises
  - e.g., nonscheduled air transport; couriers & delivery; truck transportation; freight arrangement; warehousing & storage; transportation support
- **High tech**
  - Steady surge, gradual gains recently

2. Industry patterns: Application -> prediction -> births

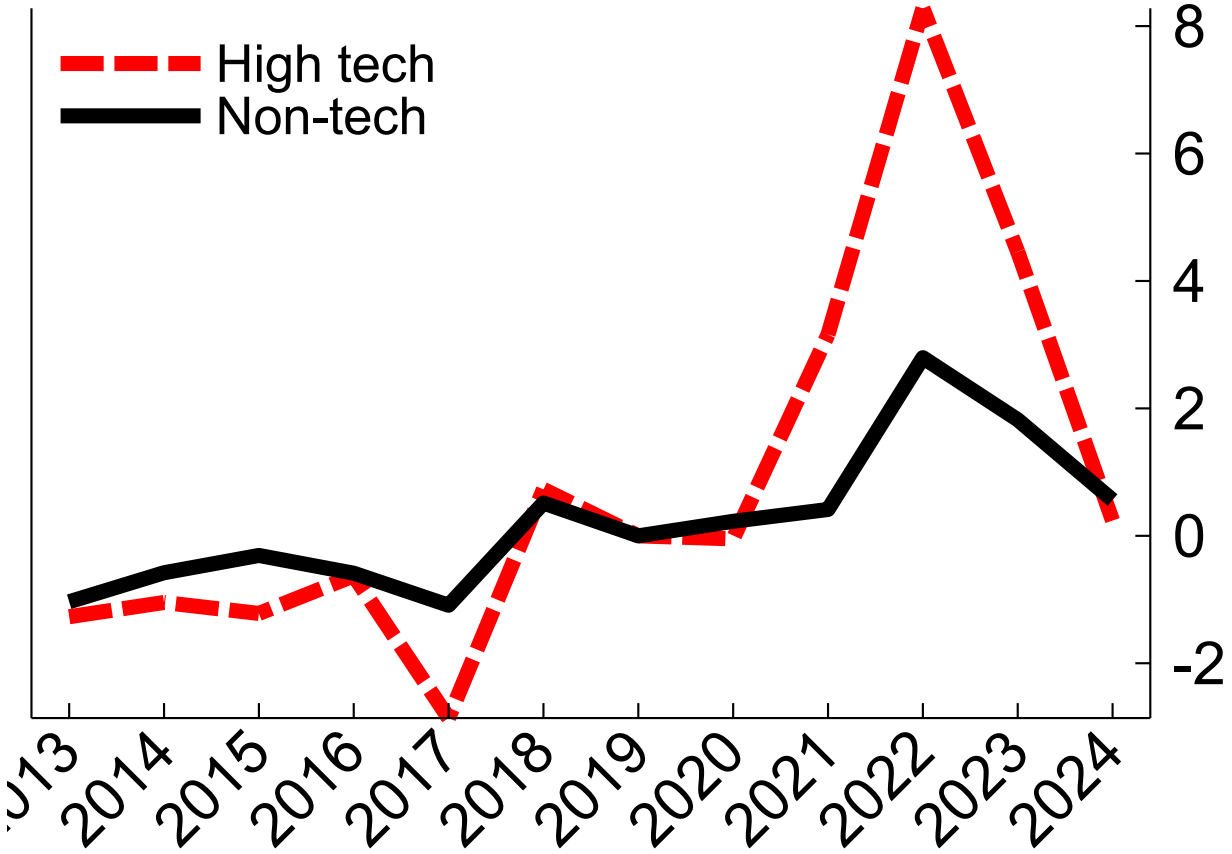


- Not all applications transition to firm births
- Census Bureau's application-based "predicted firm births" did well in most sectors…
- …But not **retail trade**. Likely a combination of
  - "Cheap talk" applications
  - Nonemployer merchant activity

Note: "High tech" here combines NAICS 51 and 54

2. Industry patterns: Surging high tech industries

Net establishment gains (logs; 2019 = 0)



Note: Annual (log) gains versus 2019. BDS tech definition.
Source: QCEW.

Surge industries include

- Software publishers
- Data processing, hosting
- Magnetic & optical media mfg
- Scientific R&D
- Pharma & medicine mfg
- Computer systems design
- Mgmt, sci, & tech consulting

Note: Some disagreement among U.S. data sources on the nature of the tech surge; more work needed

3. The (U.S.) policy environment (preliminary)

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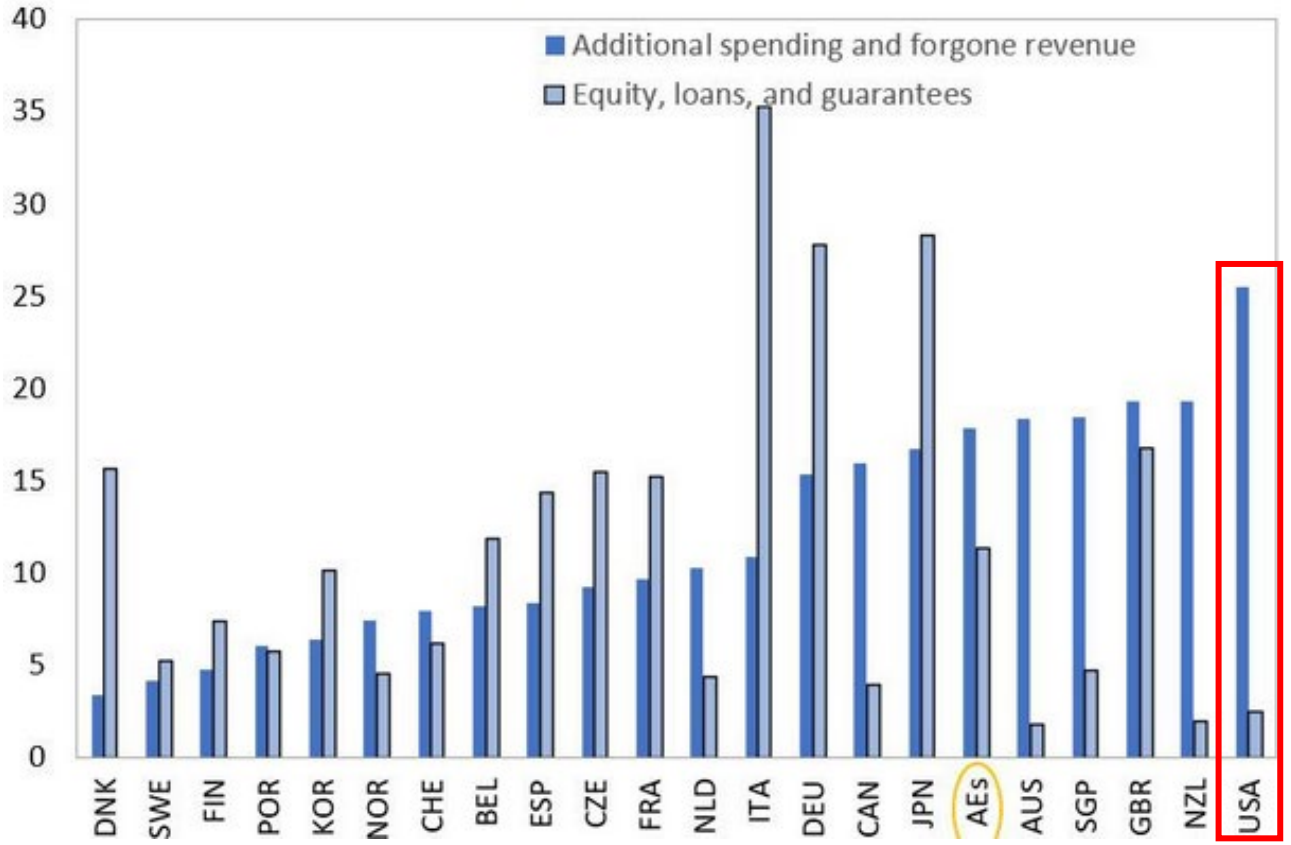
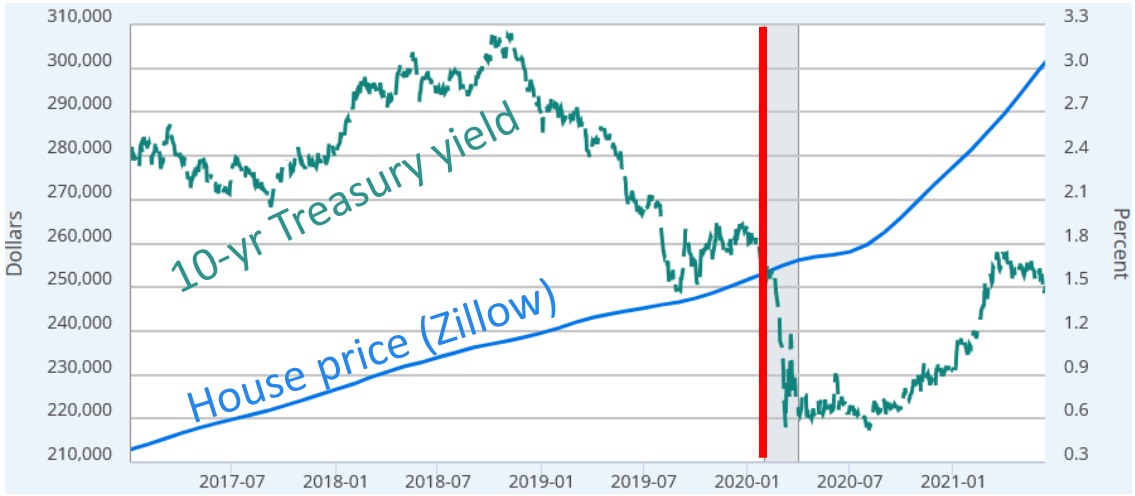
- Did the U.S. pandemic policy response induce entry?
  - Fiscal: cash to households, expanded unemployment insurance, direct support to businesses
  - Monetary policy easing → eased financial conditions





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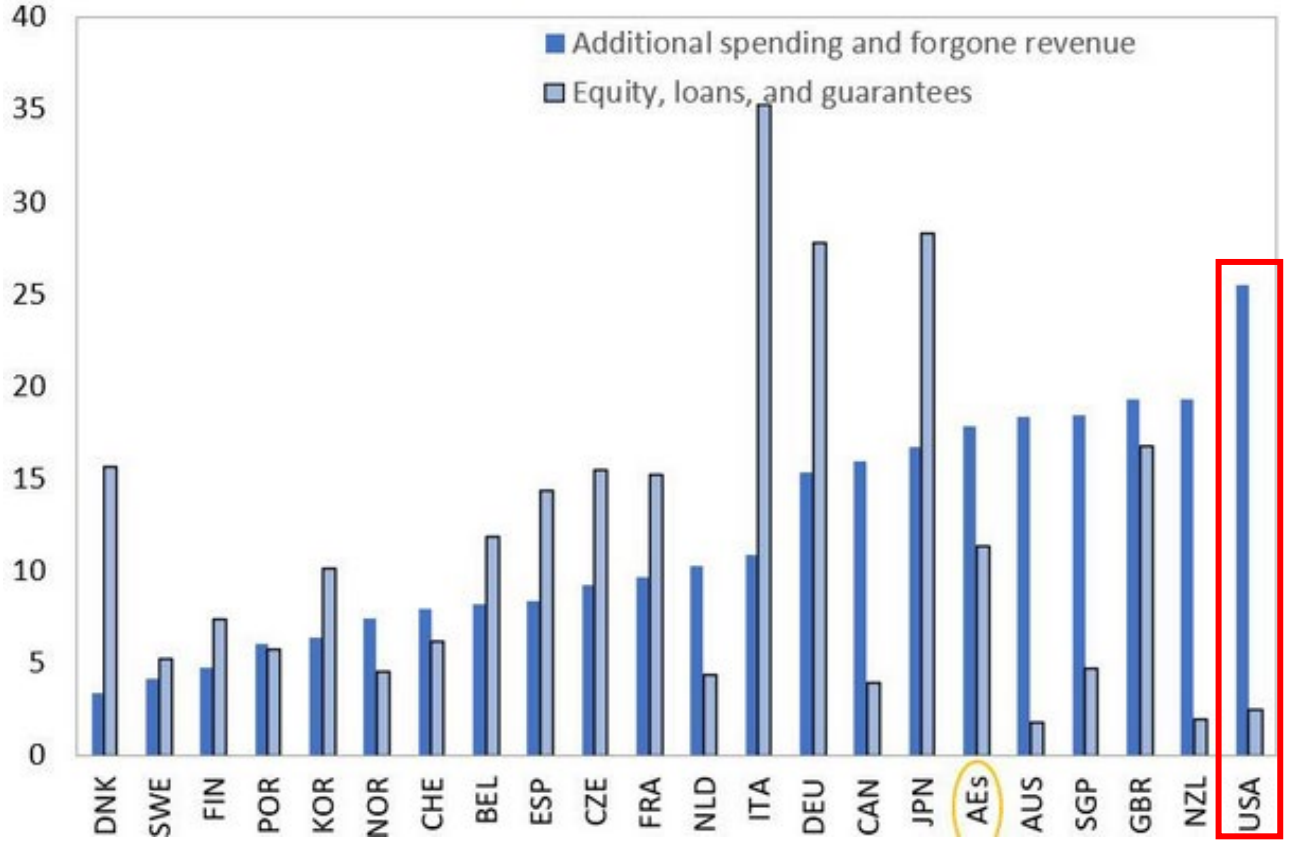

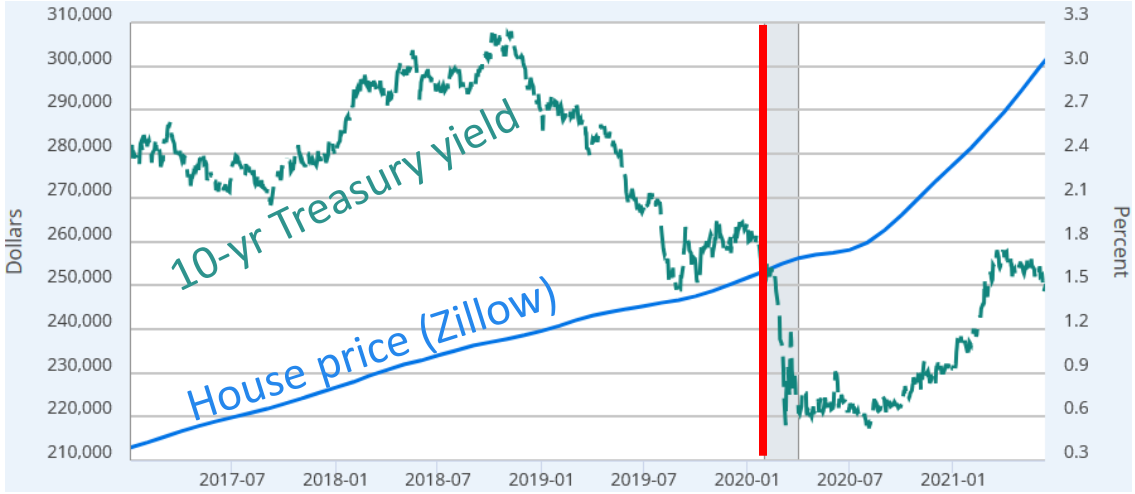

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  - Fiscal: cash to households, expanded unemployment insurance, direct support to businesses
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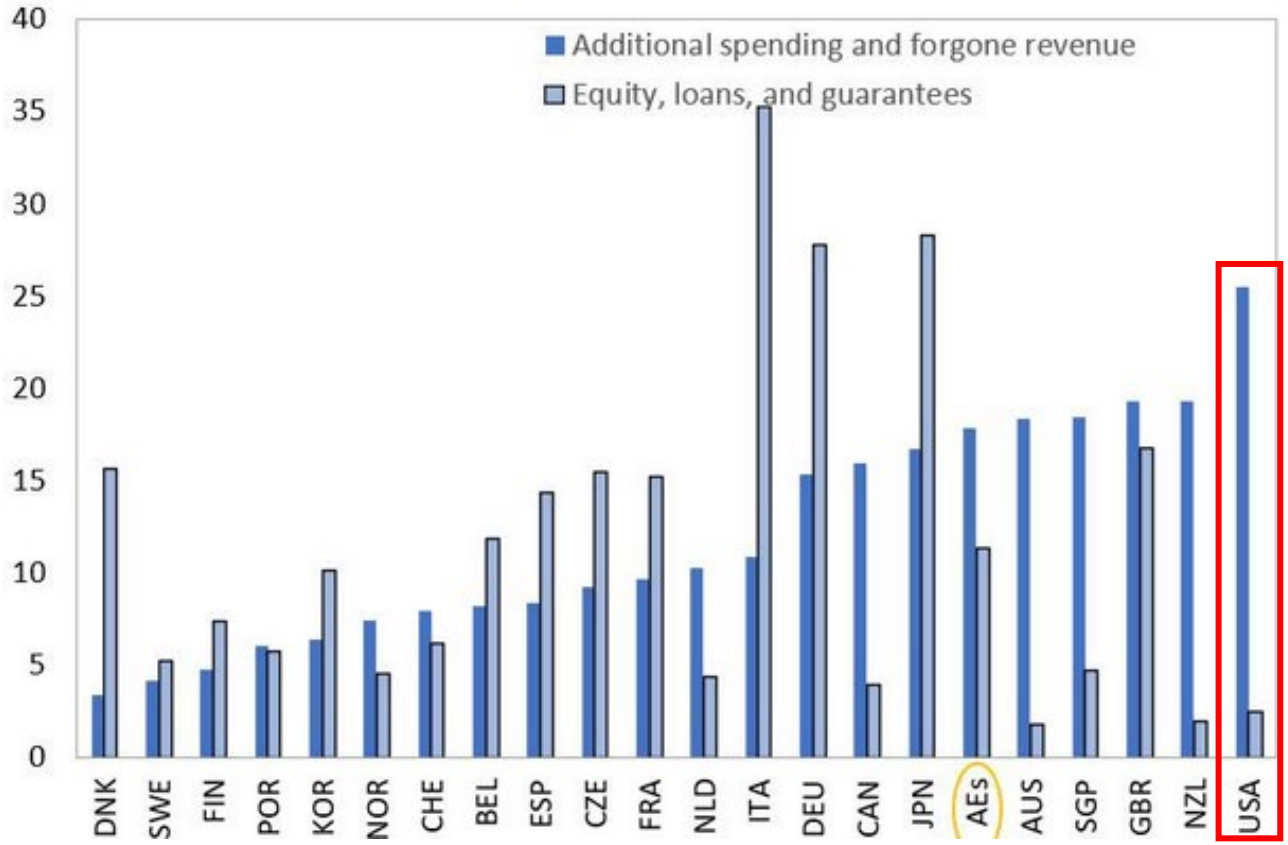
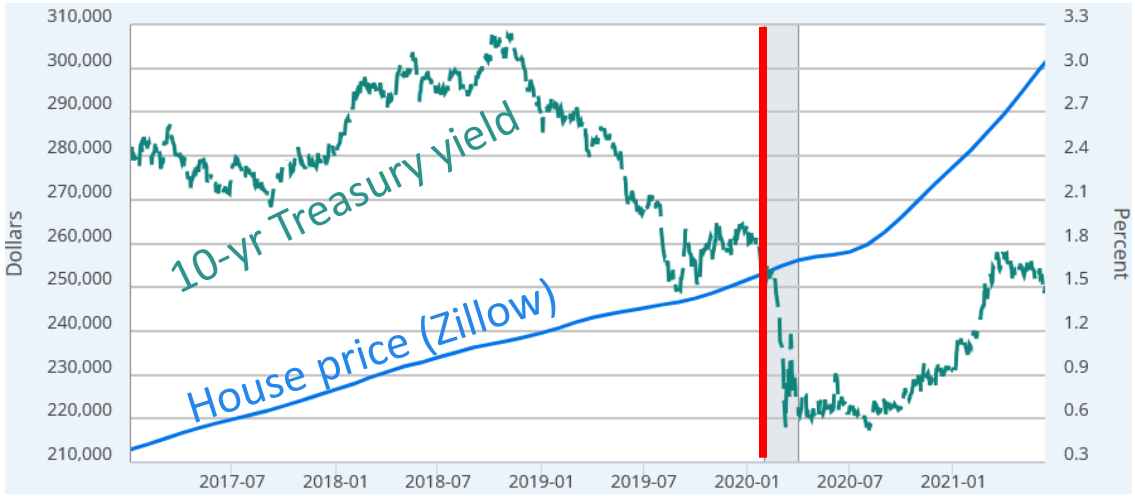
- Did low regulatory burden facilitate entry?
- For today: Use (within-U.S.) industry variation in historical policy exposure
  - For later? Use cross-country variation!





Industry fiscal beta

- **Fiscal beta:** Historical (pre-pandemic) correlation between fiscal stimulus and *industry* firm entry
  - Use discretionary fiscal effect from Cashin et al. 2018 (updated).

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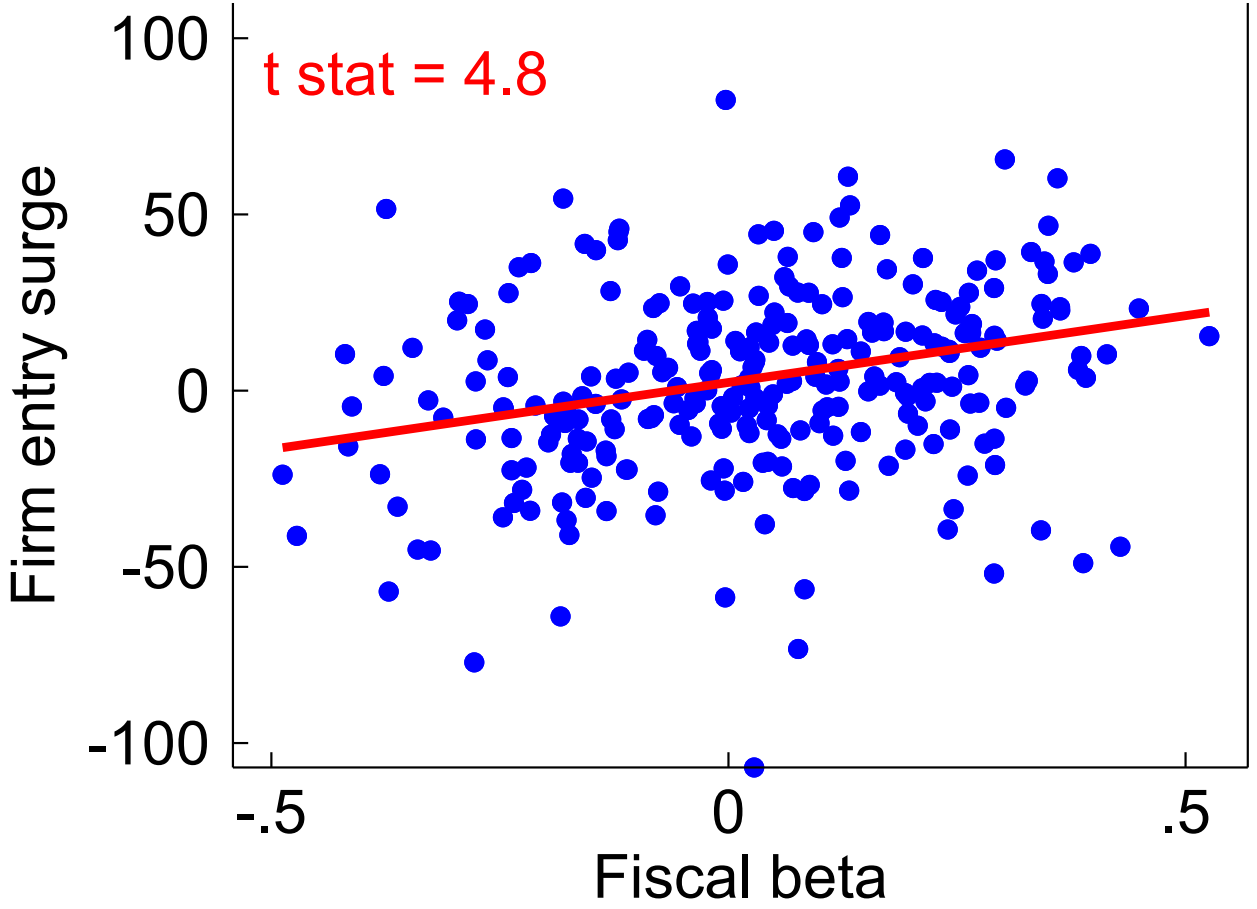
  - Use discretionary fiscal effect from Cashin et al. 2018 (updated).
- **Result:** Fiscally sensitive industries saw larger entry surge
  - Consistent with Fazio et al. (2021); Choi et al. (2024)



Note: Entry surge in logs, 2021-22 vs. 2013-2019.
Regression line weighted by firm count.
Source: BDS, Cashin et al. (2018), author calculations.

Industry financial beta - 10-year Treasury yield

- **10-year Treasury beta:** Historical (pre-pandemic) correlation between financial condition-based stimulus via 10-yr and *industry* firm entry
  - Use FCI-G from Ajello et al. 2023

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- **10-year Treasury beta:** Historical (pre-pandemic) correlation between financial condition-based stimulus via 10-yr and *industry* firm entry
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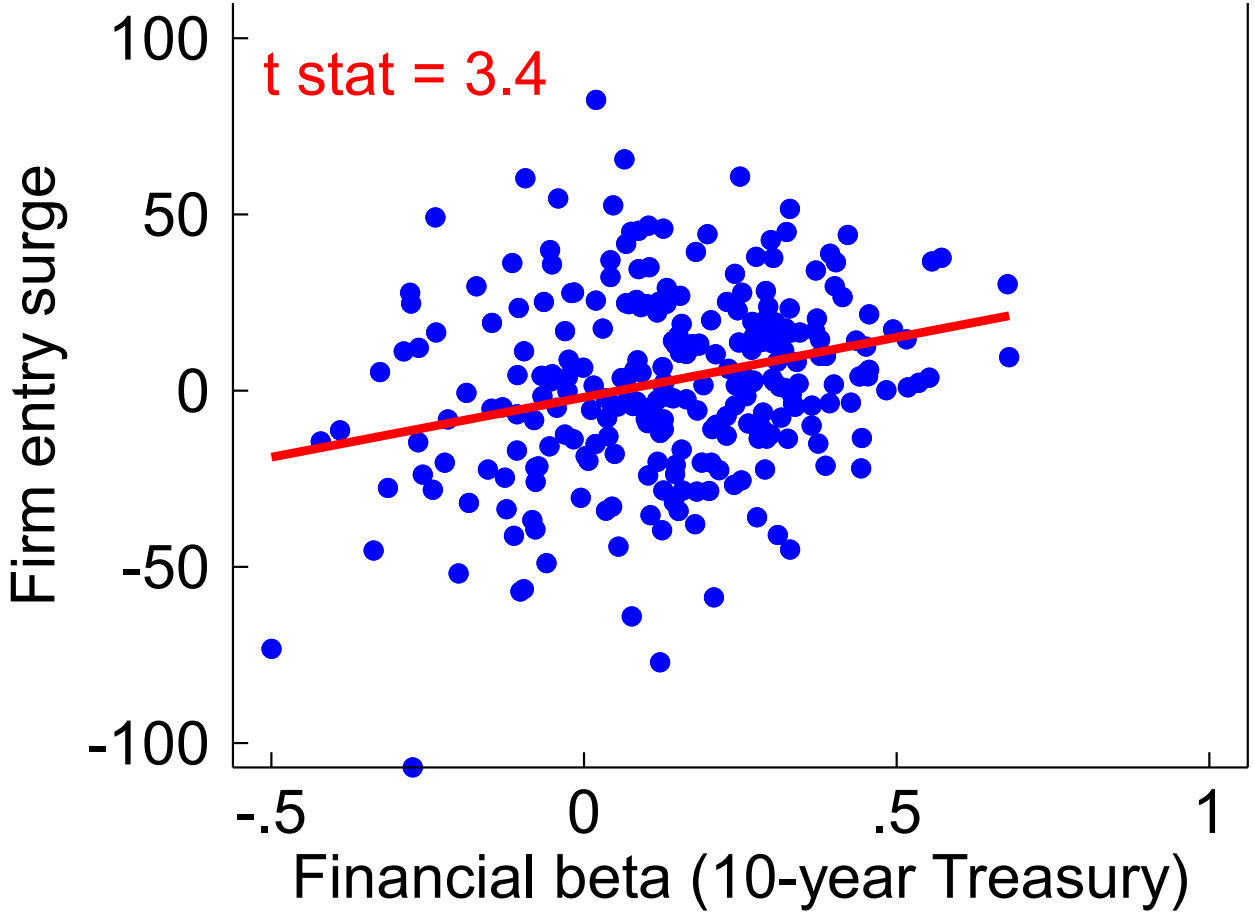
- **Result:** Industries sensitive to the 10-year saw larger entry surge
  - Consistent with Siemer 2019; Mehrotra & Sergeyev 2021



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Regression line weighted by firm count.
Source: BDS, Ajello et al. (2023), author calculations.

Industry financial beta – House prices

- **House price beta:** Historical (pre-pandemic) correlation between financial condition-based stimulus via house prices and *industry* firm entry
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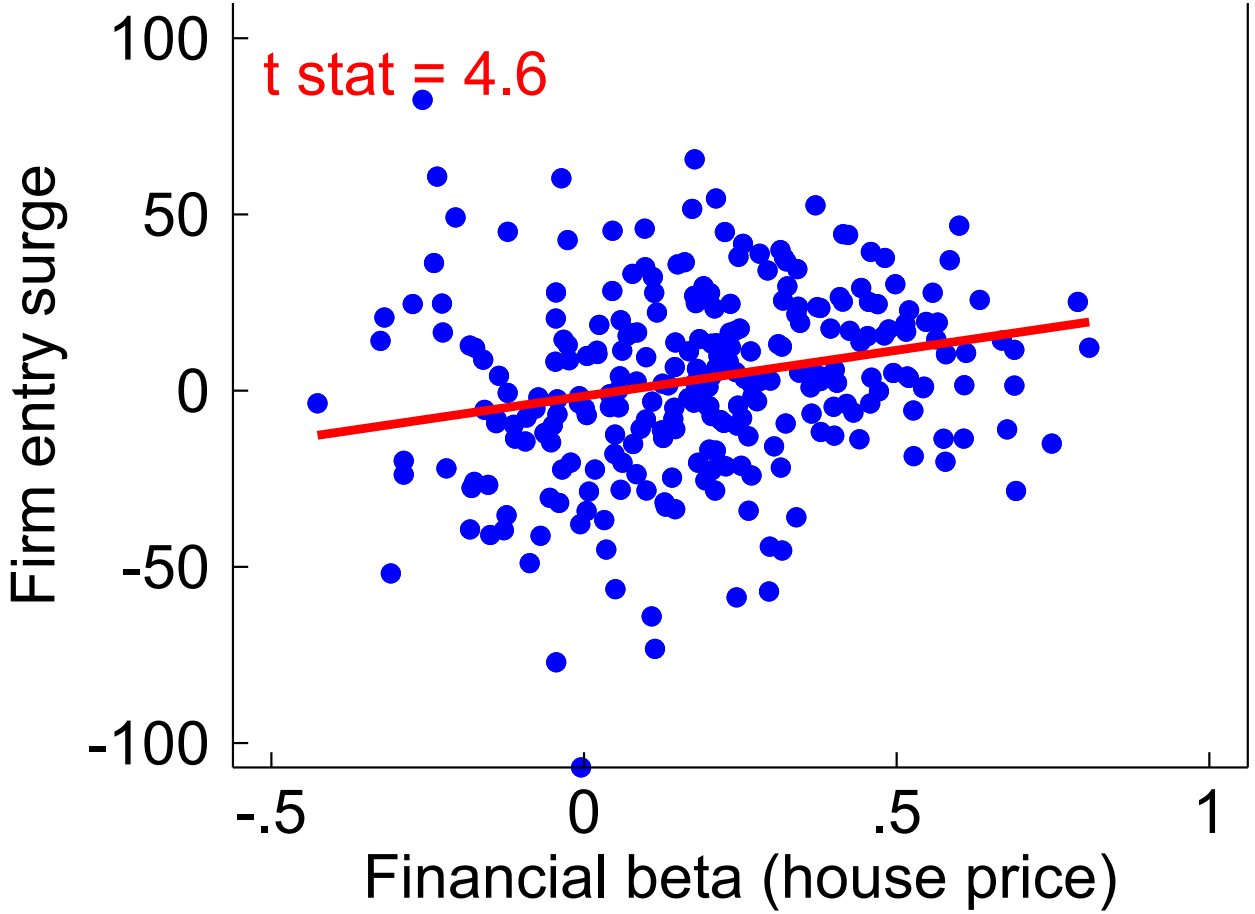
- **Result:** Industries sensitive to the house prices saw larger entry surge
  - Consistent with Blackwood 2025; Davis & Haltiwanger 2024; Fort et al. 2013; Decker 2015.



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Industry regulation

- **Regulation:** Industry-level federal regulatory burden as of 2019
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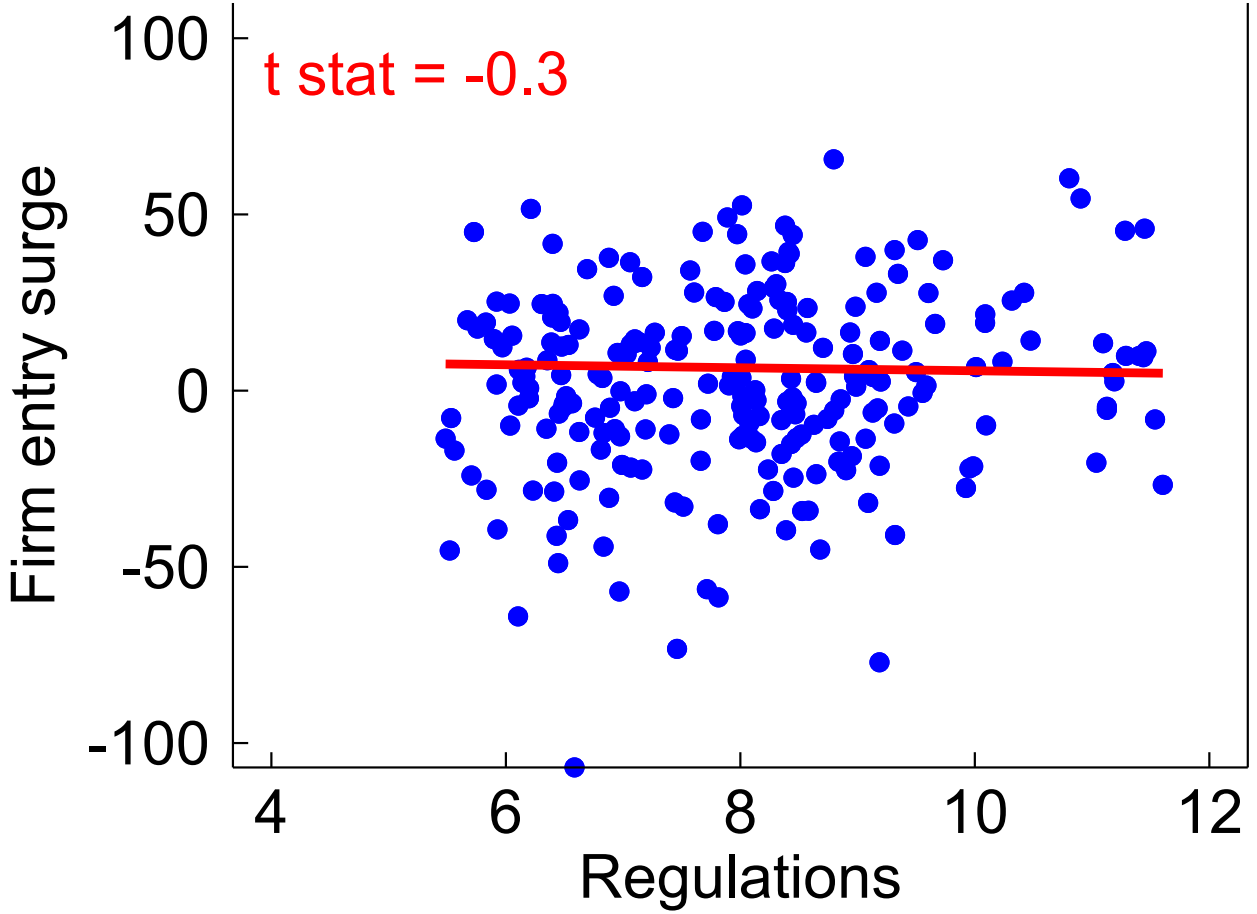
- **Result:**
  - No relationship in weighted regressions → no aggregate story
  - Not shown: Positive relationship in unweighted regressions → more regulated industries saw *larger* entry surge



Note: Entry surge in logs, 2021-22 vs. 2013-2019.
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Source: BDS, RegData, author calculations.

4. Labor market dynamics: “The Great Resignation”

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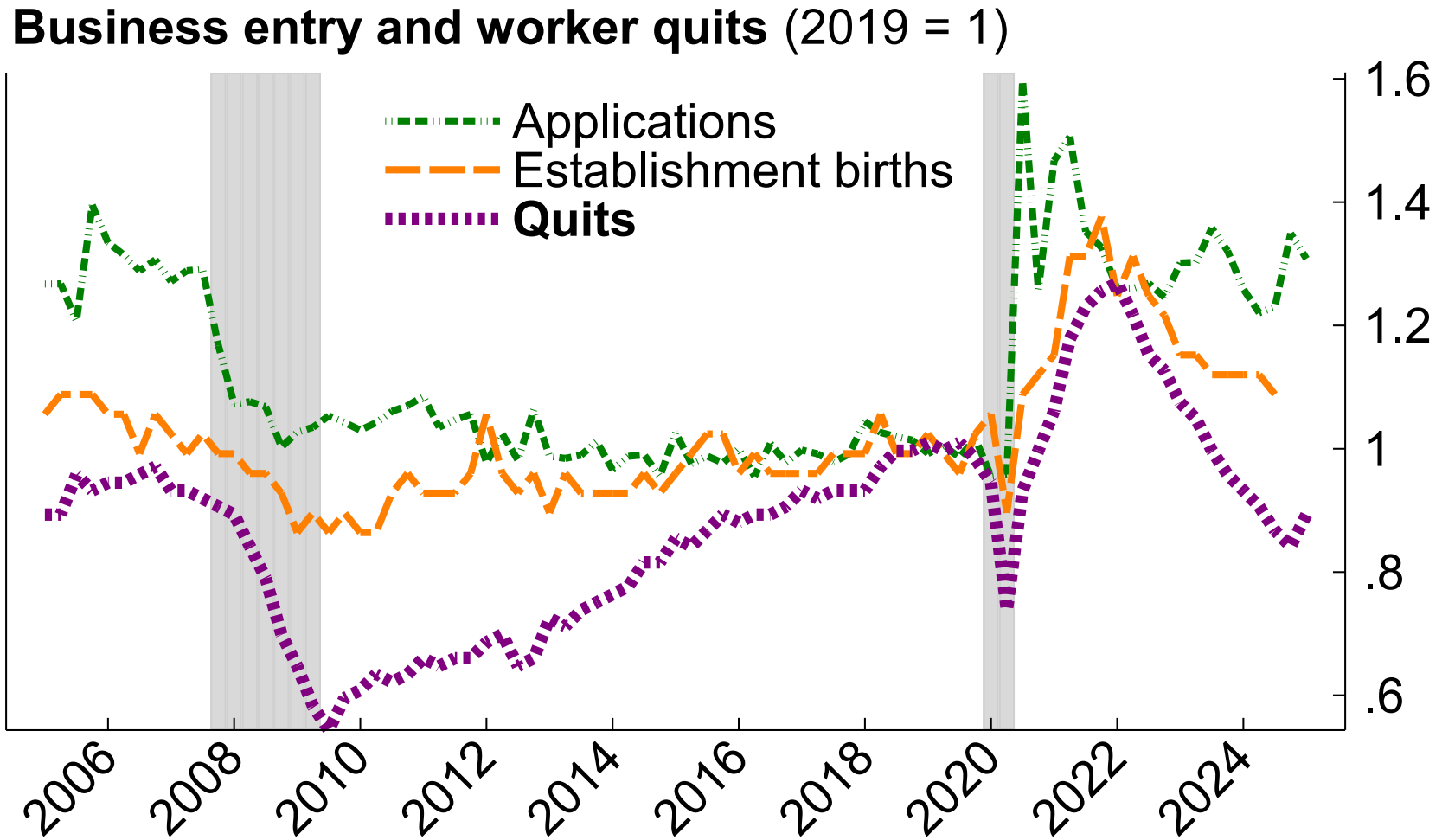
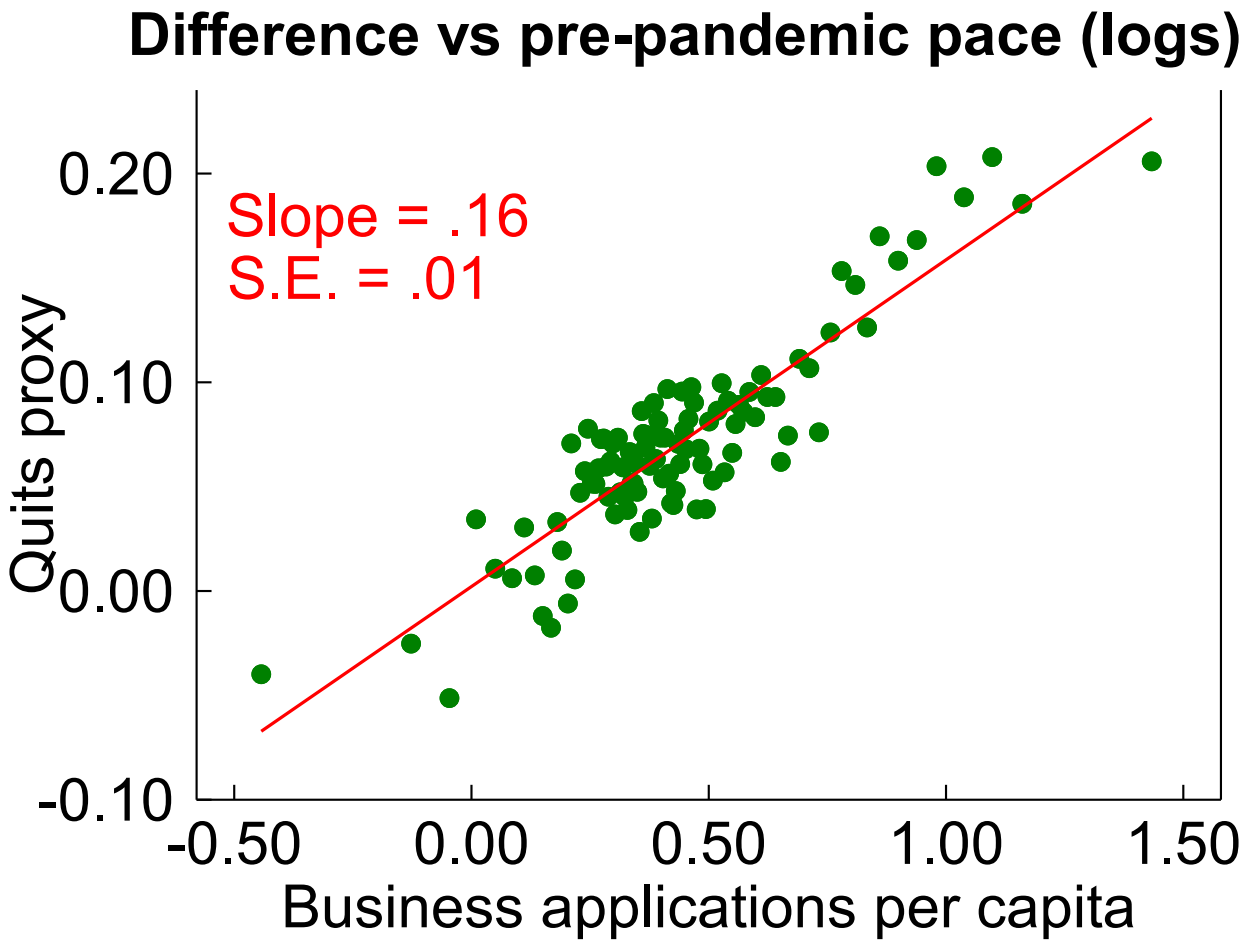


- The Great Resignation
- **Quits** surge and recede with **establishment births**
- Are the two related?

4. Labor market dynamics: Quitting to opportunity?



Note: 2020-2023 vs 2010-2019. County-level binscatter.
Quits proxied by QWI excess separations.

- Counties with big quits surge are the counties with big business applications surge
- Not shown: Correlation for "layoffs" much weaker.
- What is the story?
  - Likely: Many workers quitting to join (or start) new businesses
  - Not/less likely: Business formation surge explained by layoffs and weak labor market

What does America's pandemic entry surge *mean?*

- Never count out (potential) entrepreneurs!
- Industry and geography stories:
  - Pandemic entry surge was part of the economy's adjustment to changing patterns of consumption, work, and life
  - Tech entrepreneurship (and firm expansion) likely related to remote work, AI developments
- Policy: Macroeconomic policy likely helped
- Labor market story: The Great Resignation may have partly been workers flowing to new firms (as early employees or founders)

Open questions

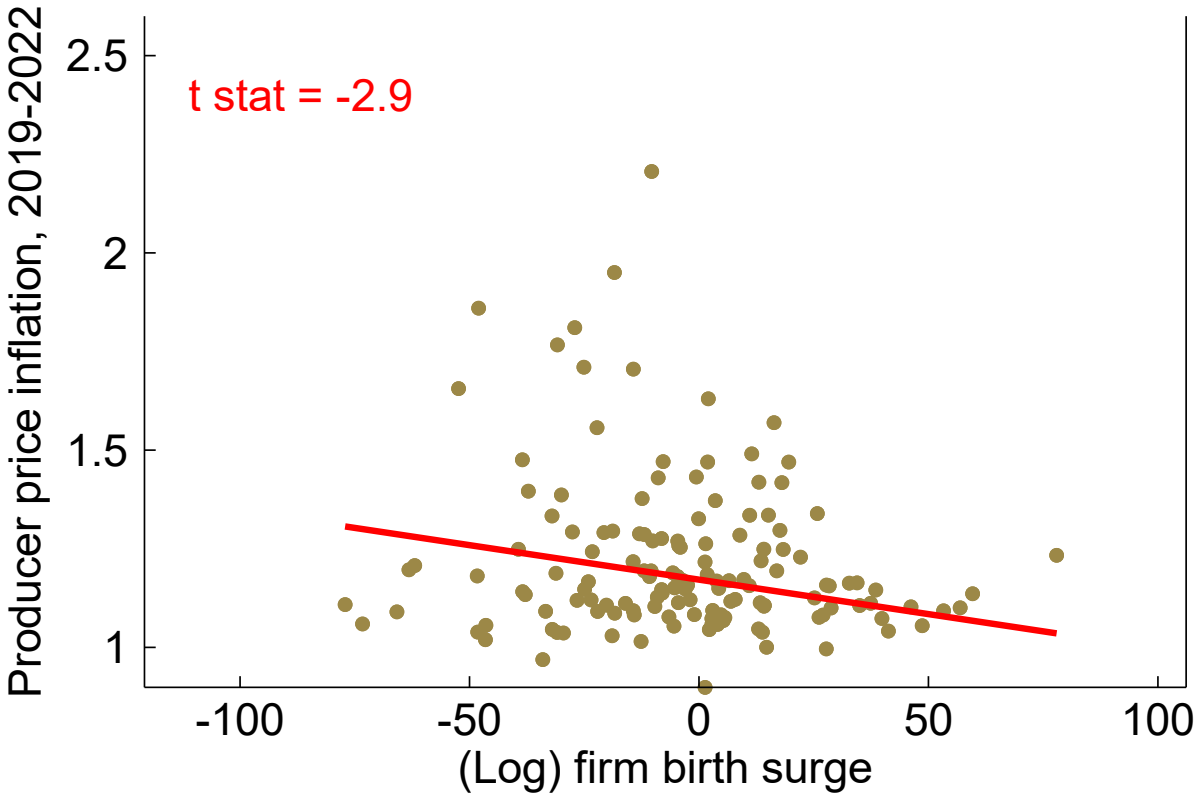
- What explains the **cross-country variation**? Some countries surged (U.S., Australia, France); most didn't.
  - U.S. policy evidence, AI may be clues
- Need more **policy analysis**! Country, state variation?
- What was entrepreneurs' role in post-pandemic **supply chain** crisis, **inflation**?
  - Entry surge in transportation, freight → entrants may have helped
  - Preliminary work: **Inflation** looks lower in high-entry industries
  - To do: Zero in on supply chain industries
- What about "**gig workers**" and nonemployer businesses? In progress…
- How has the surge **changed over time**?
  - Recent seeming divergence between applications and employer entry
  - Macro policy tightening
  - Recent **trade shocks**
- Eat your vegetables: Are our **statistical resources** up to the task?

Thanks

Extra slides

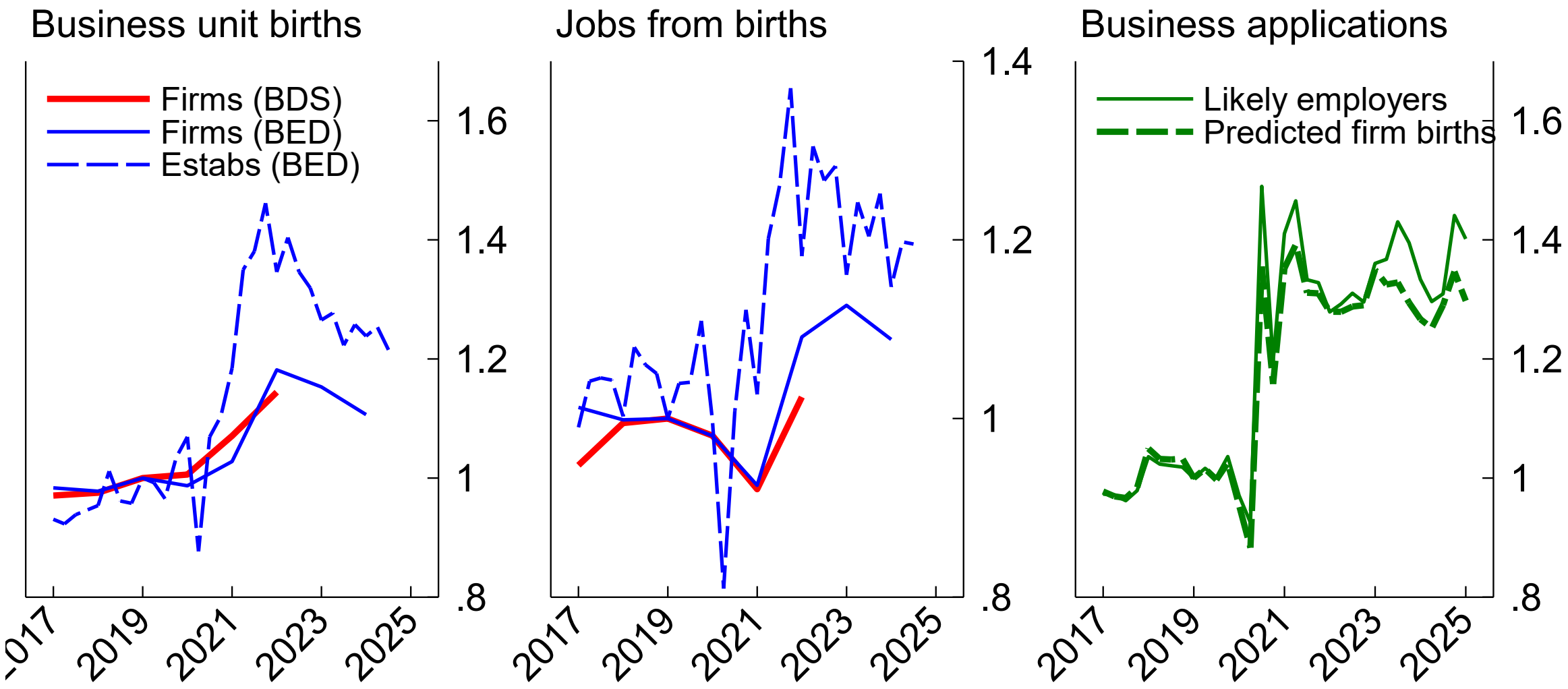
Inflation (preliminary and incomplete)*

- Could imagine causality either way:
  - Industries with high demand, inflation → entry incentive
  - Entry boosts industry supply → lower inflation
- Compare industry-level producer price inflation to firm entry, 2019-2022
- Regression weighted by employment (better weights in progress)



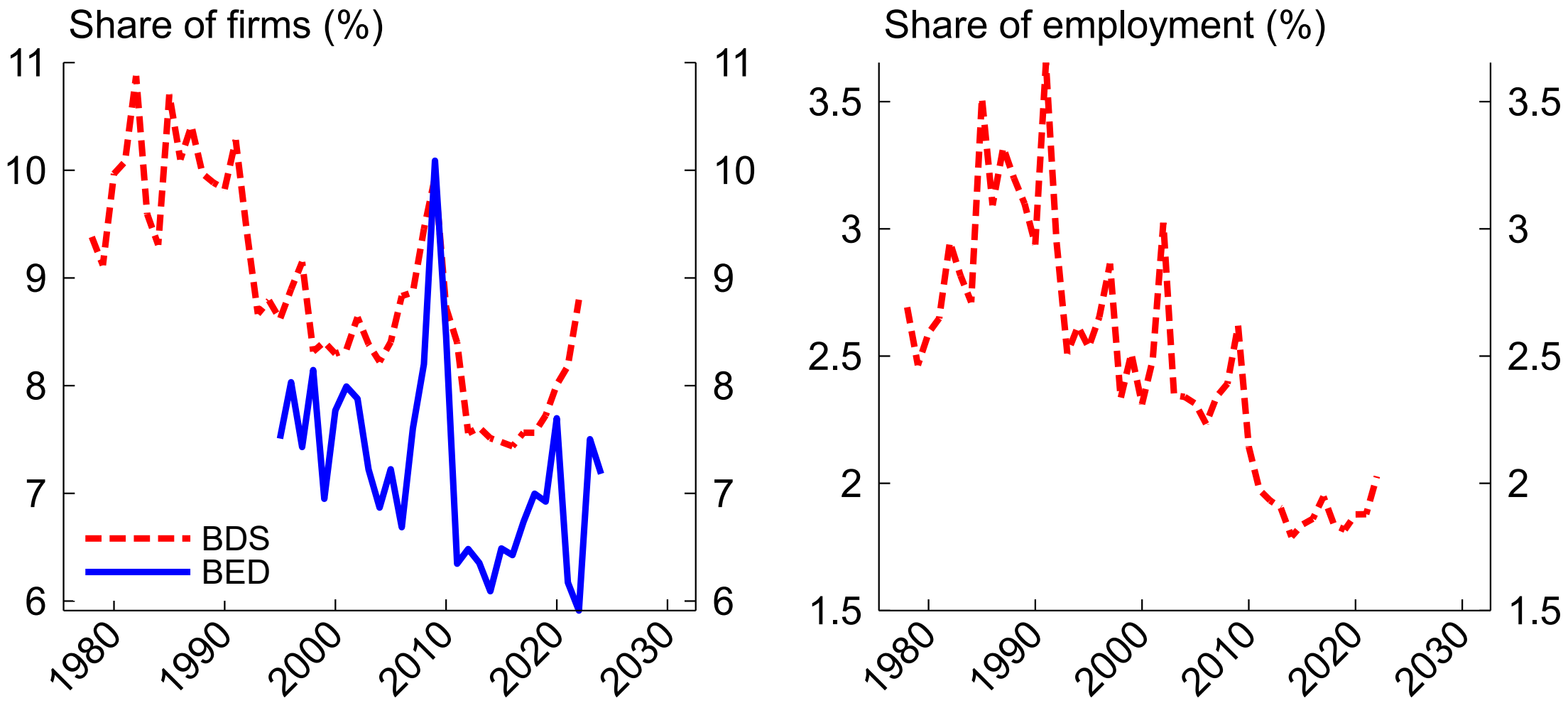
*Joint work with Jacob Williams (FRB)

Surge continues but may be cooling



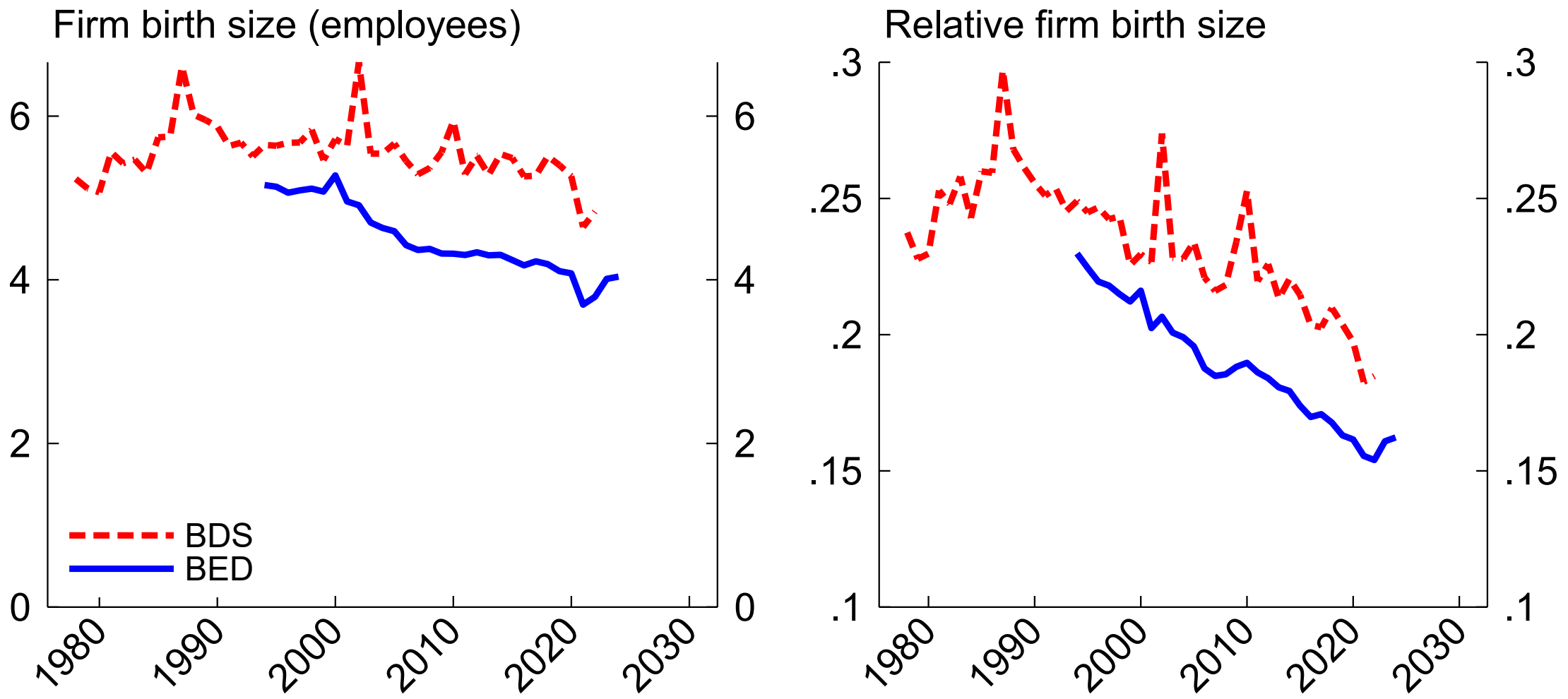
Note: 2019:Q1 = 1. Predicted firm births within 8 quarters.
Source: Census Bureau BDS, BLS BED, Census Bureau BFS.

Firm exit



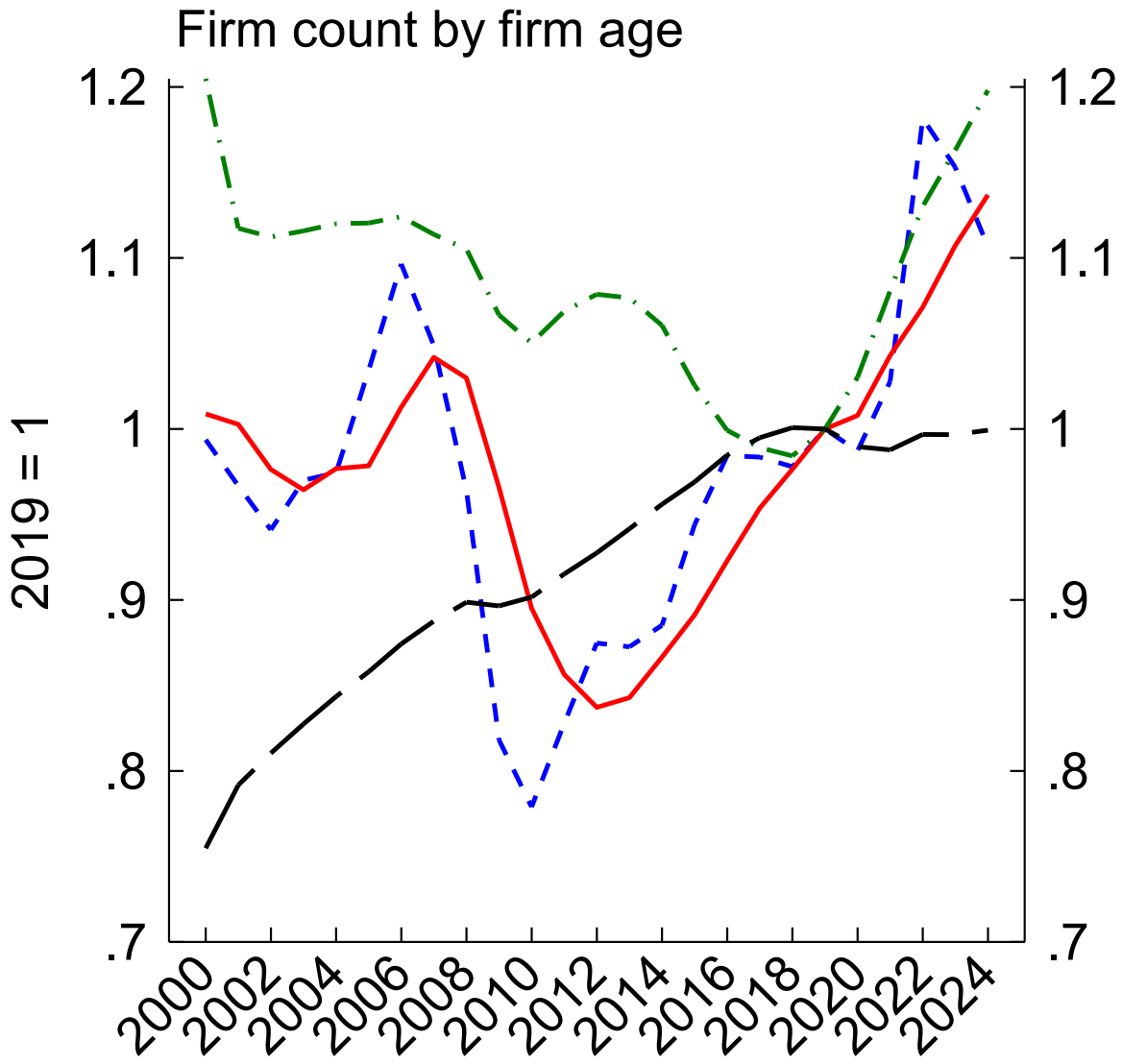
Note: Firm entry rates. Right panel uses DHS denominator.
Source: Business Dynamics Statistics (BDS) and Business Employment Dynamics (BED).

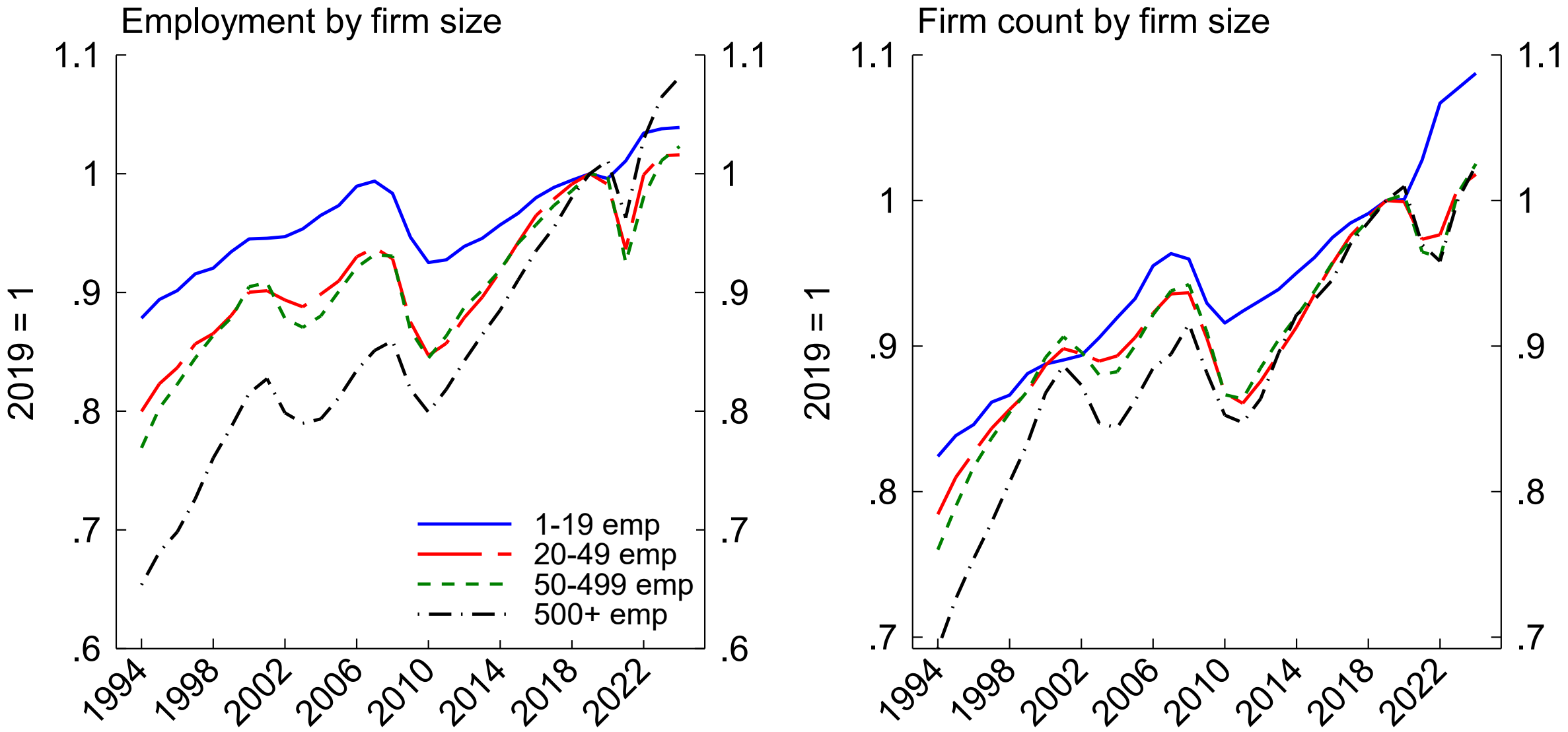
Entrant size



Note: Average size in first year (left); relative to incumbent average size (right).
Source: Business Dynamics Statistics (BDS) and Business Employment Dynamics (BED).

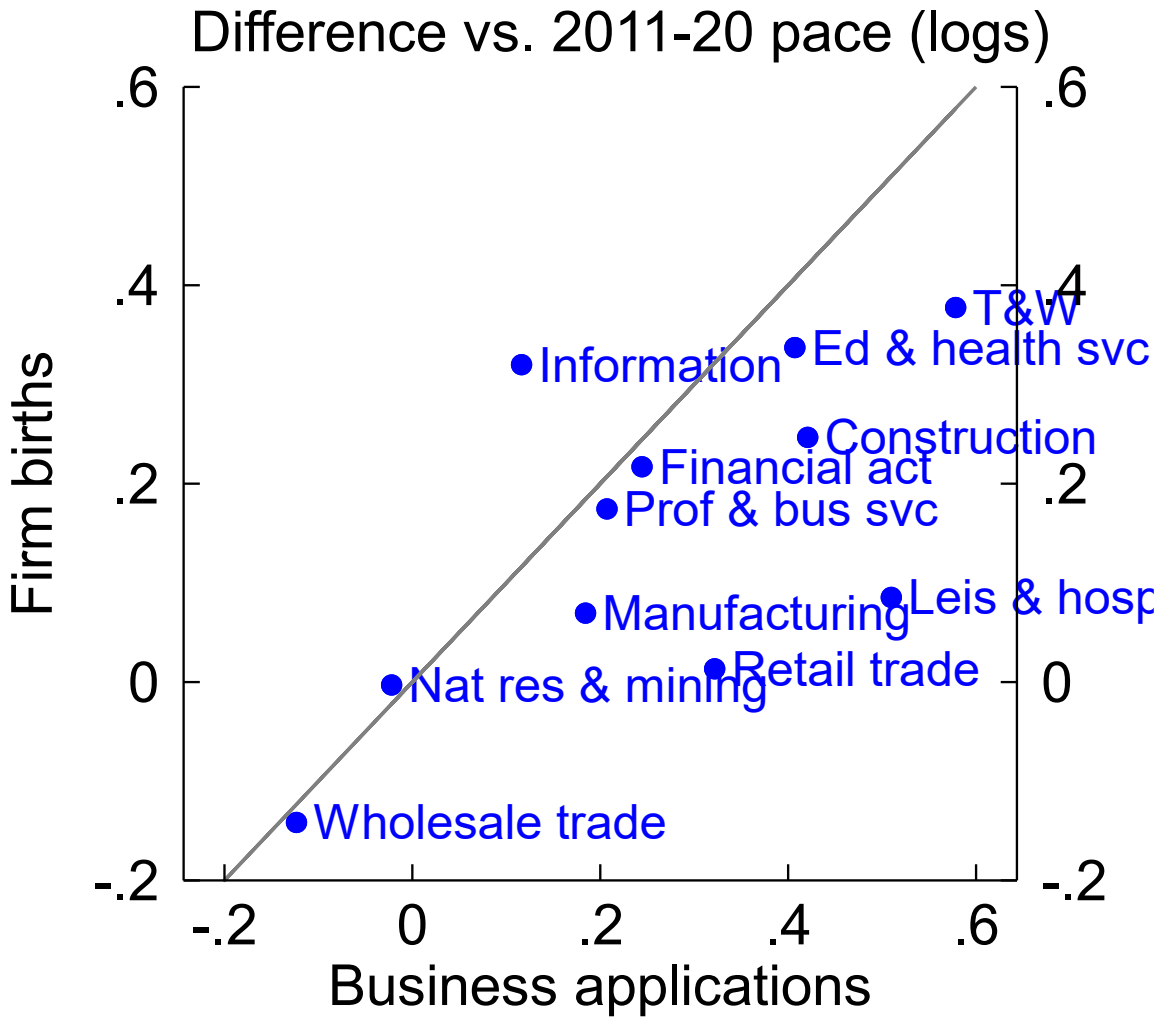

Employment by firm age
Age 0
Age 1-4
Age 5-9
Age 10+
2019 = 1
1.4
1.2
1
.8
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024

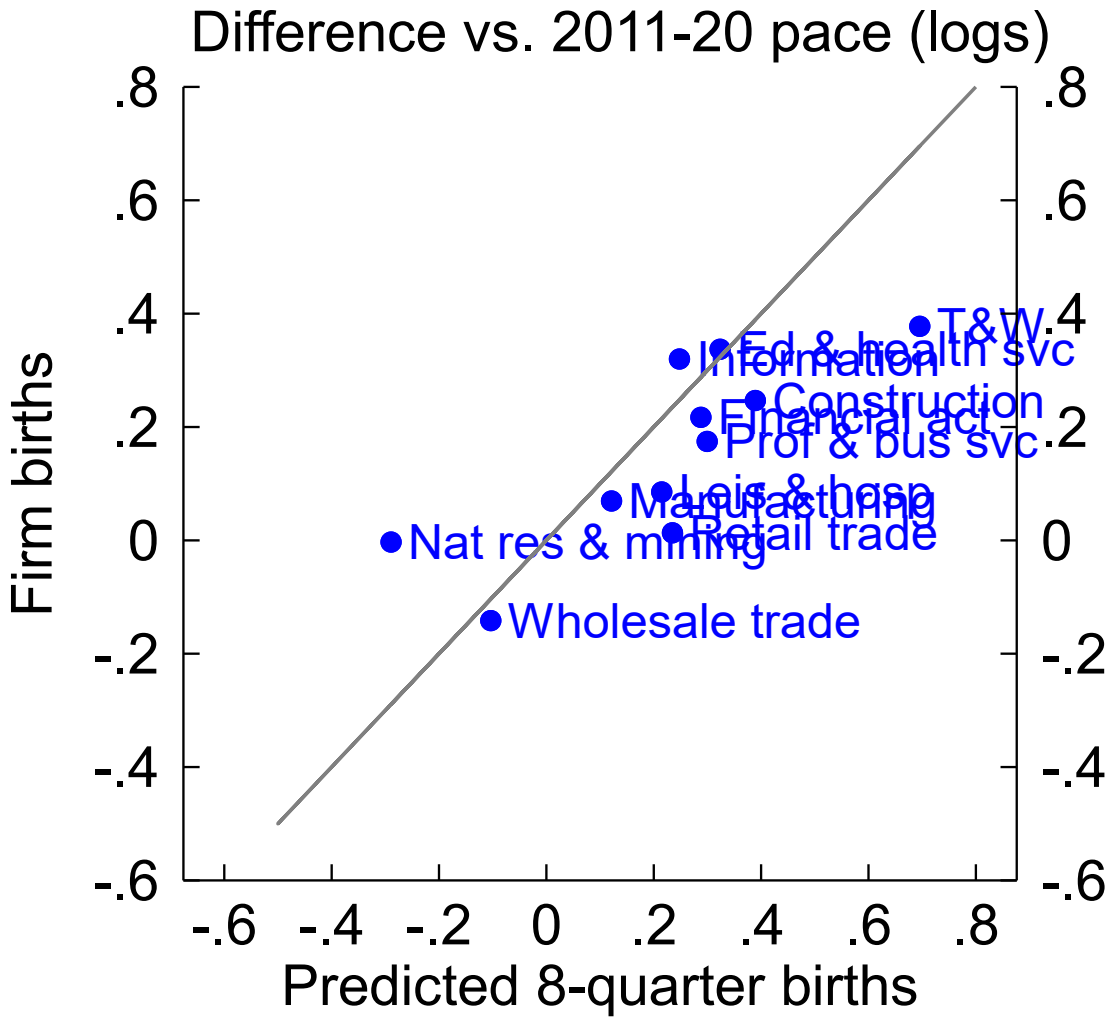

Firm count by firm age
2019 = 1
1.2
1.1
1
.9
.8
.7
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024



Note: March snapshots. For age classes above 0, employment measured as implied quarterly DHS denominator.
Source: Business Employment Dynamics (BED).

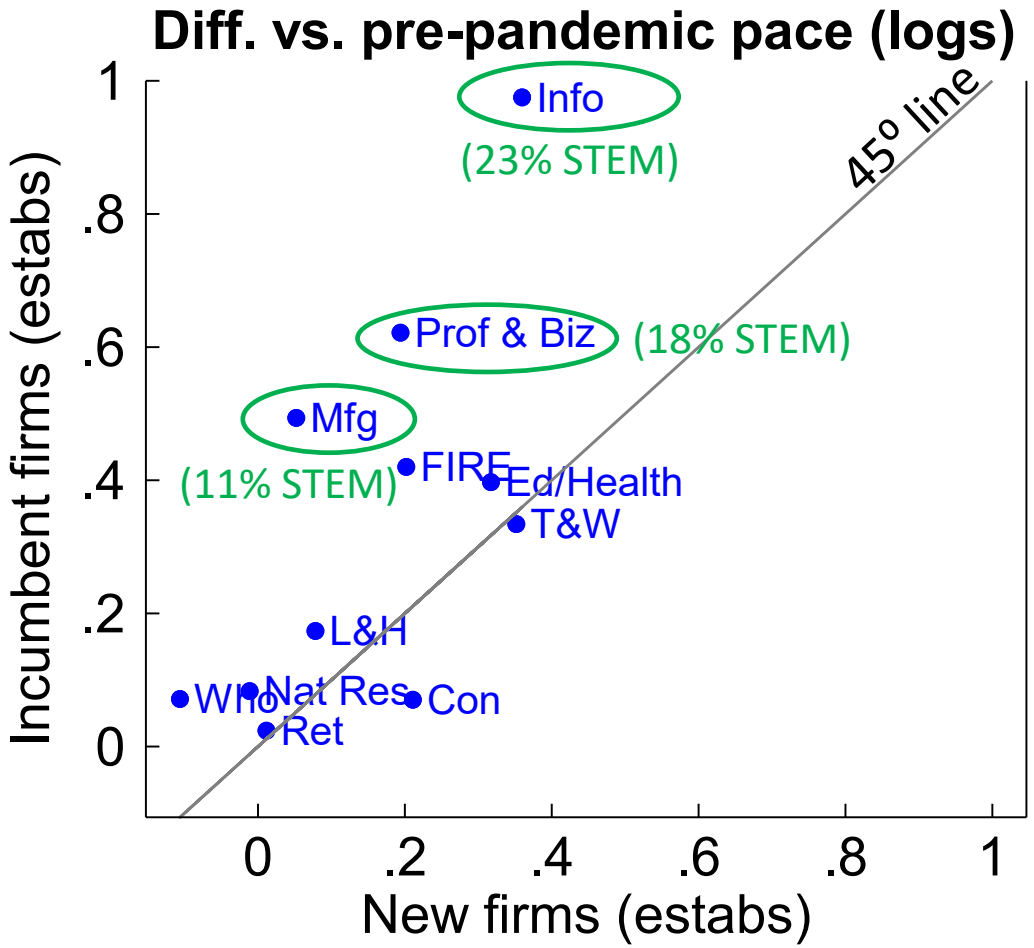
Transitions: application to firm birth

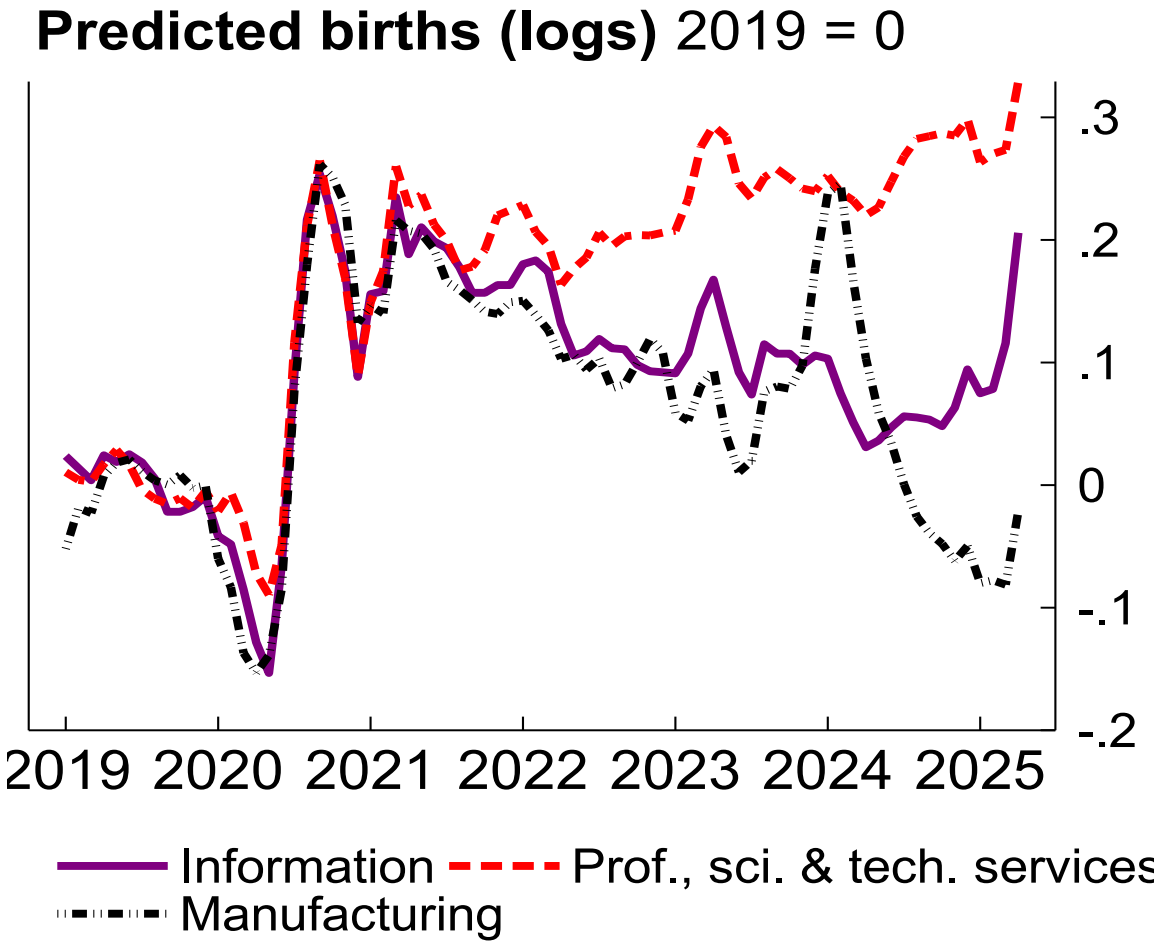




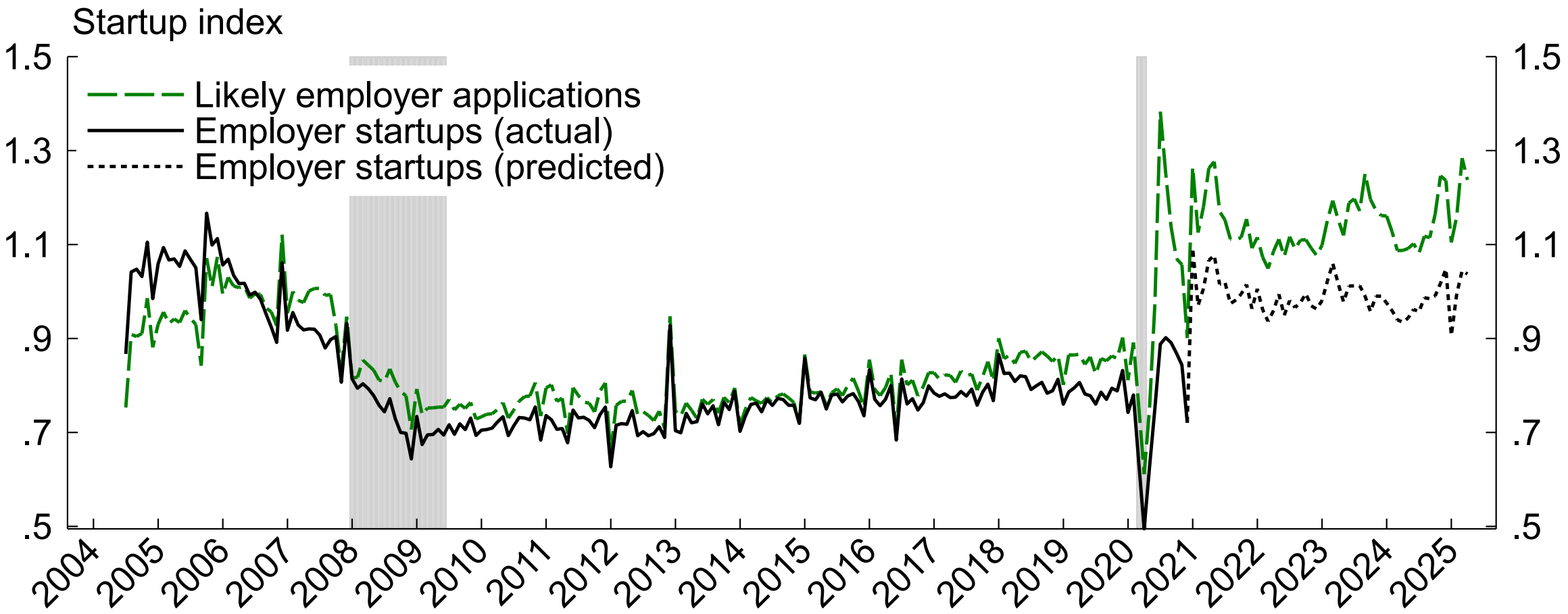
Note: 2021-2024. Solid line is 45-degree line. T&W is transportation & warehousing. Years end in March.
Source: Business Employment Dynamics (BED), Business Formation Statistics (BFS).

Tech estab. entry, incumbents vs. new firms

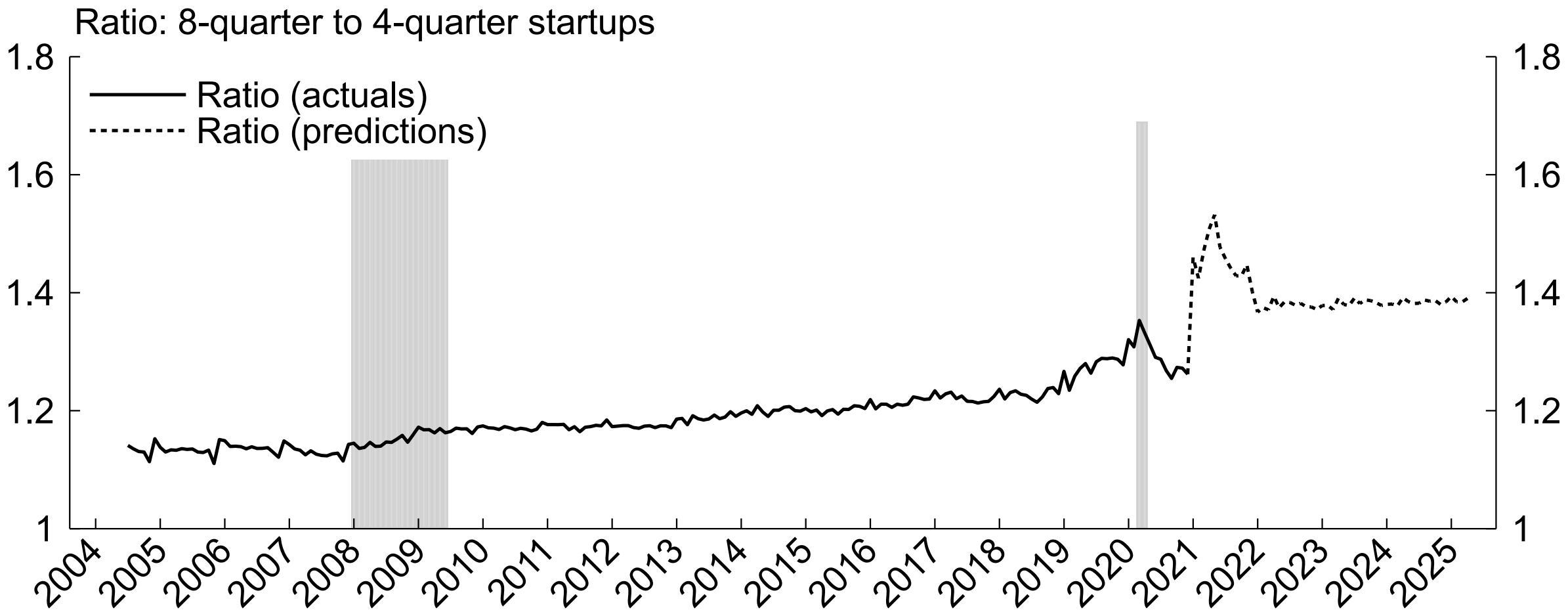




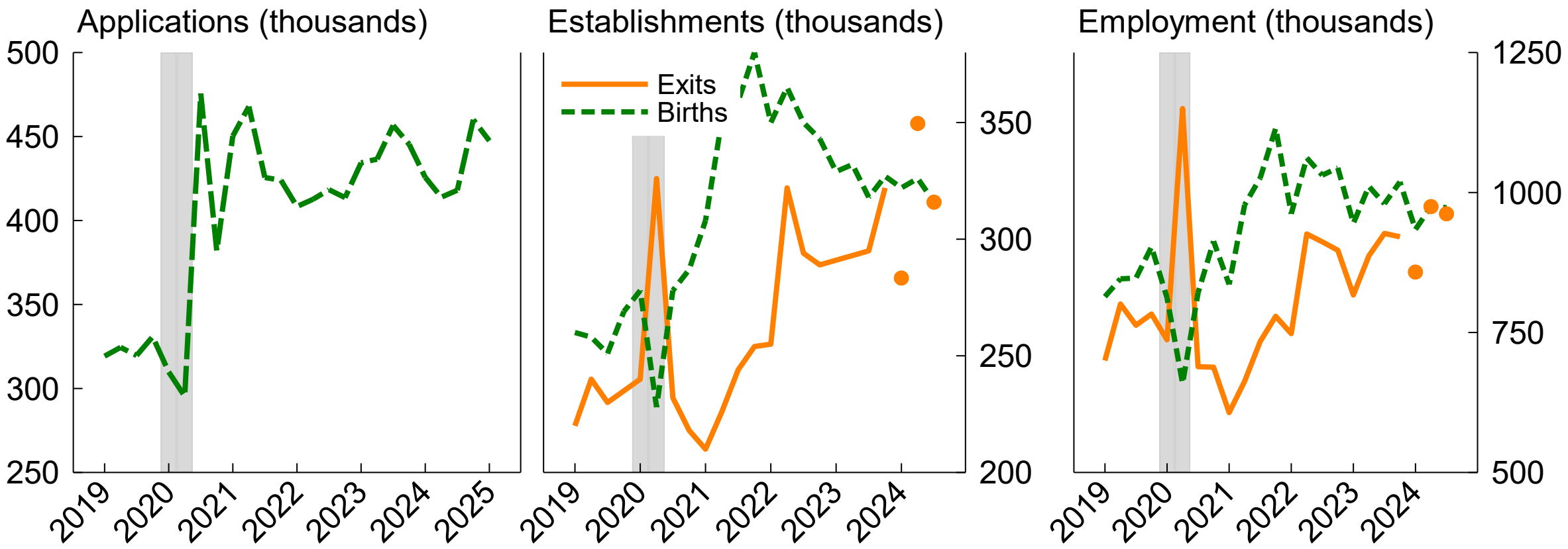
- **Top tech sectors** see more incumbent than new firm estab birth surge, but new firm surge apparent as well
- BFS predicted firm births in prof/sci/tech still elevated -> points to more tech firm births in future



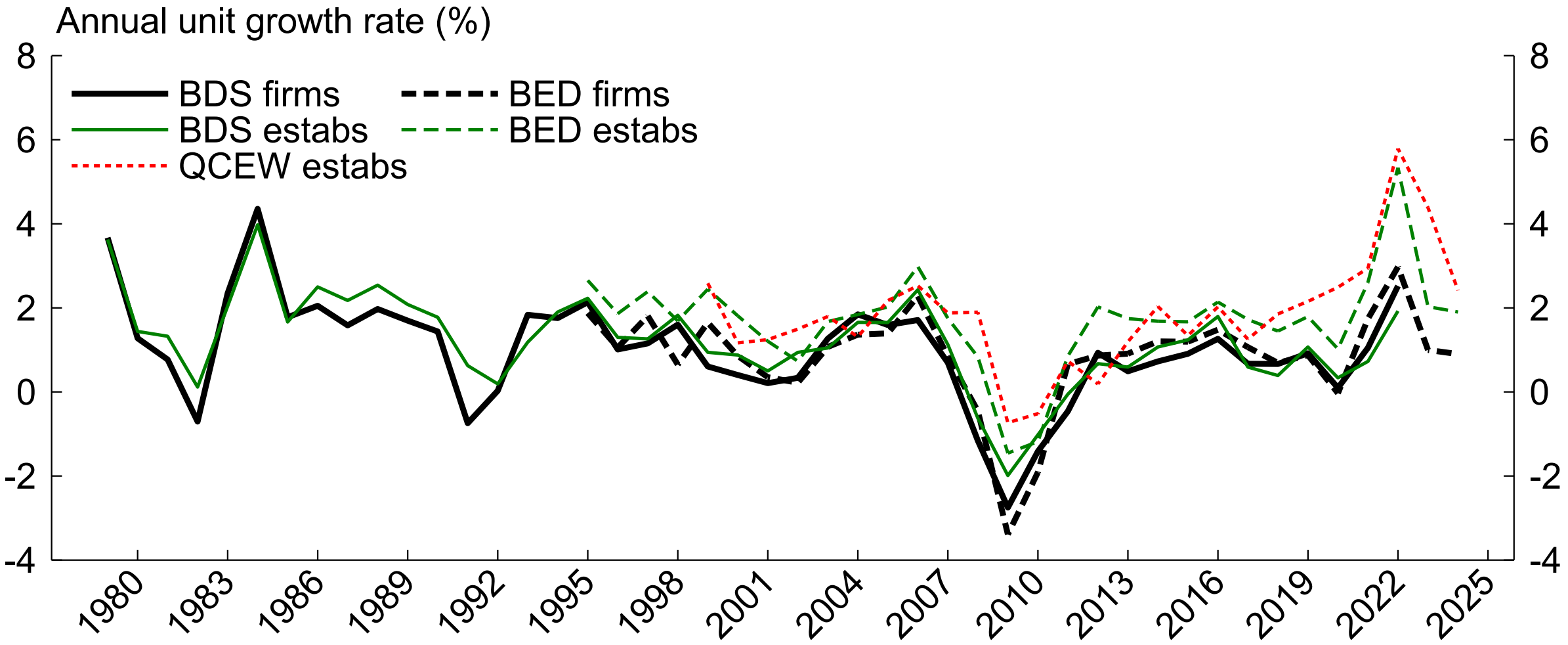
Note: Startups within 8 quarters. Seasonally adjusted. Normalized by average 2006 levels.
Shaded areas indicate NBER recession dates.
Source: Census Bureau Business Formation Statistics.



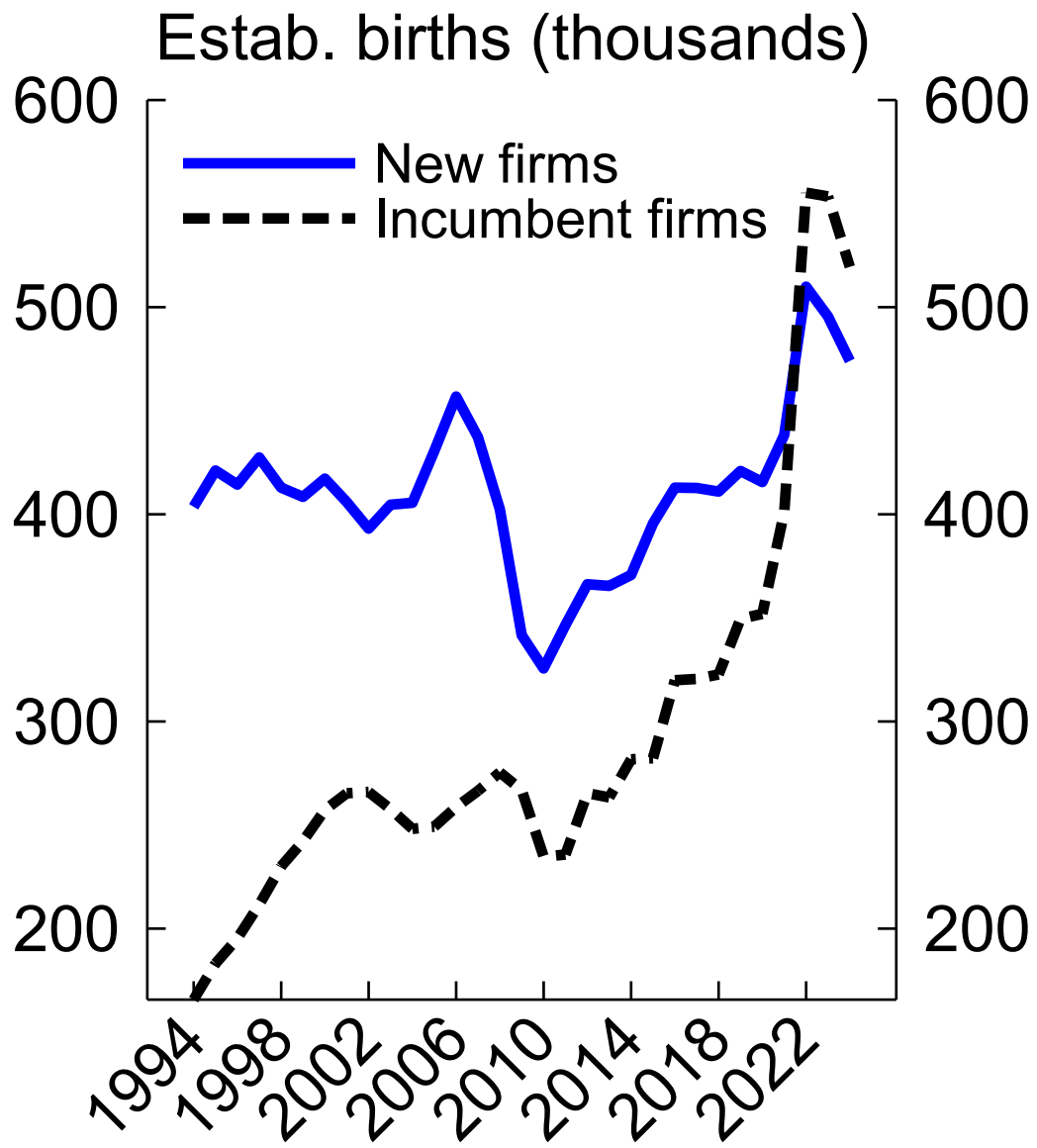
Note: Ratio of startups within 8 quarters of application to startups within 4 quarters of application. Seasonally adjusted before calculation. Shaded areas indicate NBER recession dates.
Source: Census Bureau Business Formation Statistics.

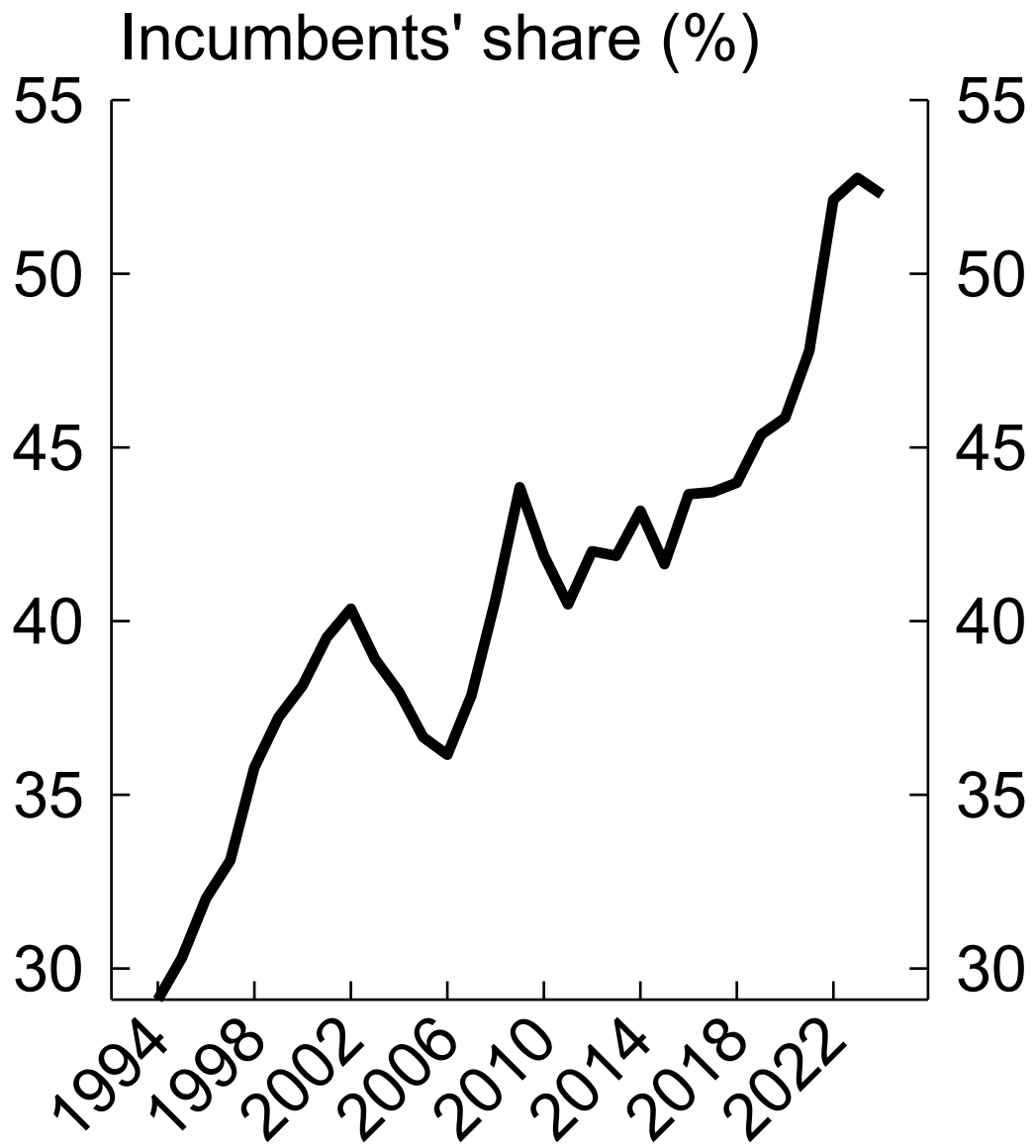


Note: Seasonally adjusted. Y axes may not start at zero. Shaded areas indicate NBER recession dates. High-propensity applications.
Exits after 2023q4 projected based on most recent share of exits in closures (orange dots).
Source: Census Bureau Business Formation Statistics (BFS) and BLS Business Employment Dynamics.

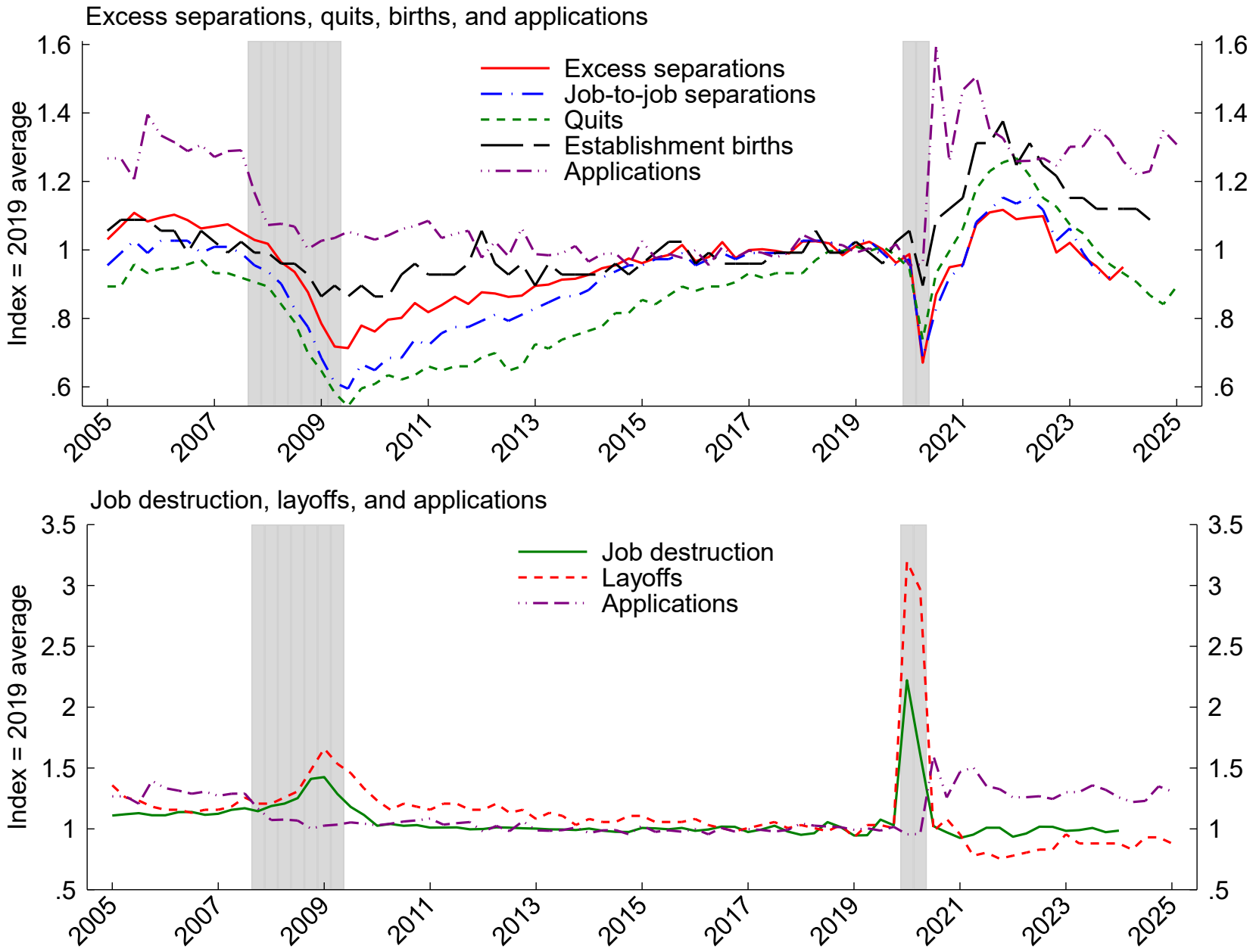


Note: Annual DHS growth rate of unit counts, Q1 versus year earlier.
Source: BDS, BED, QCEW.

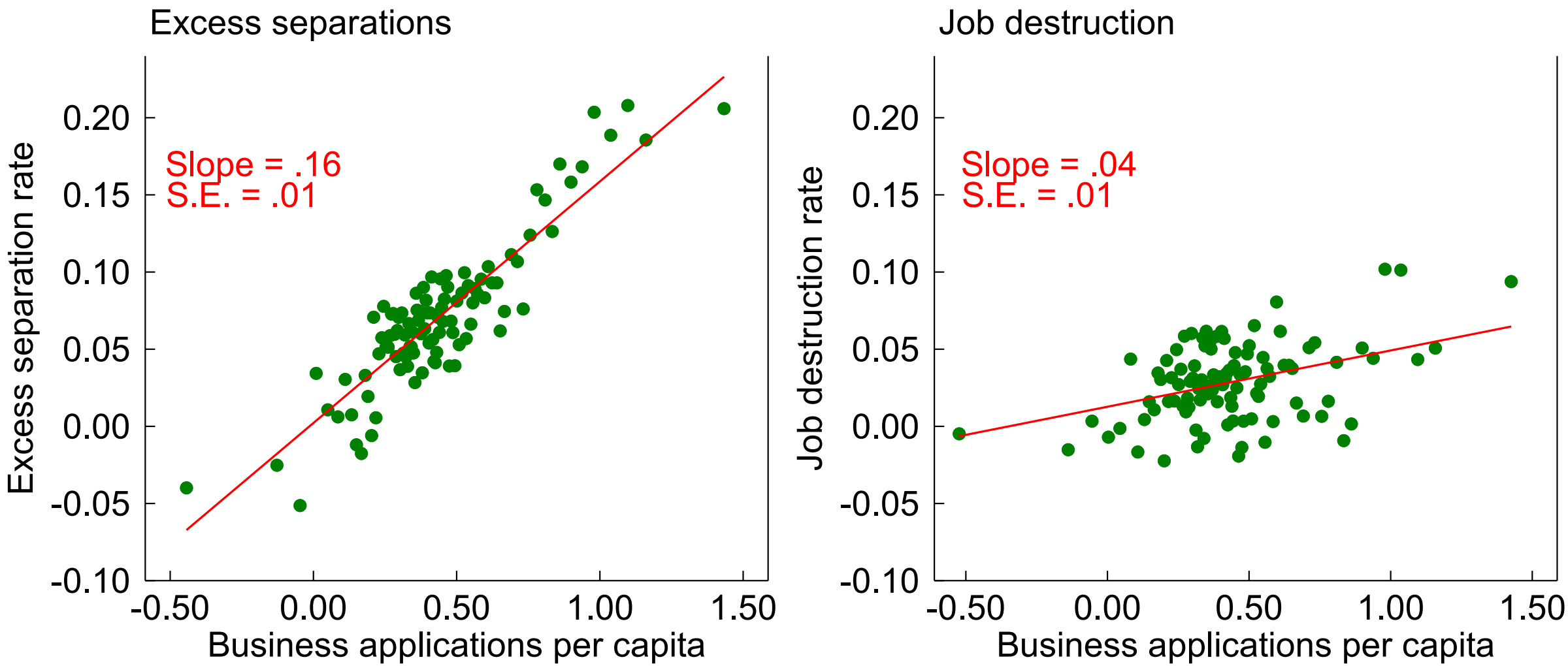




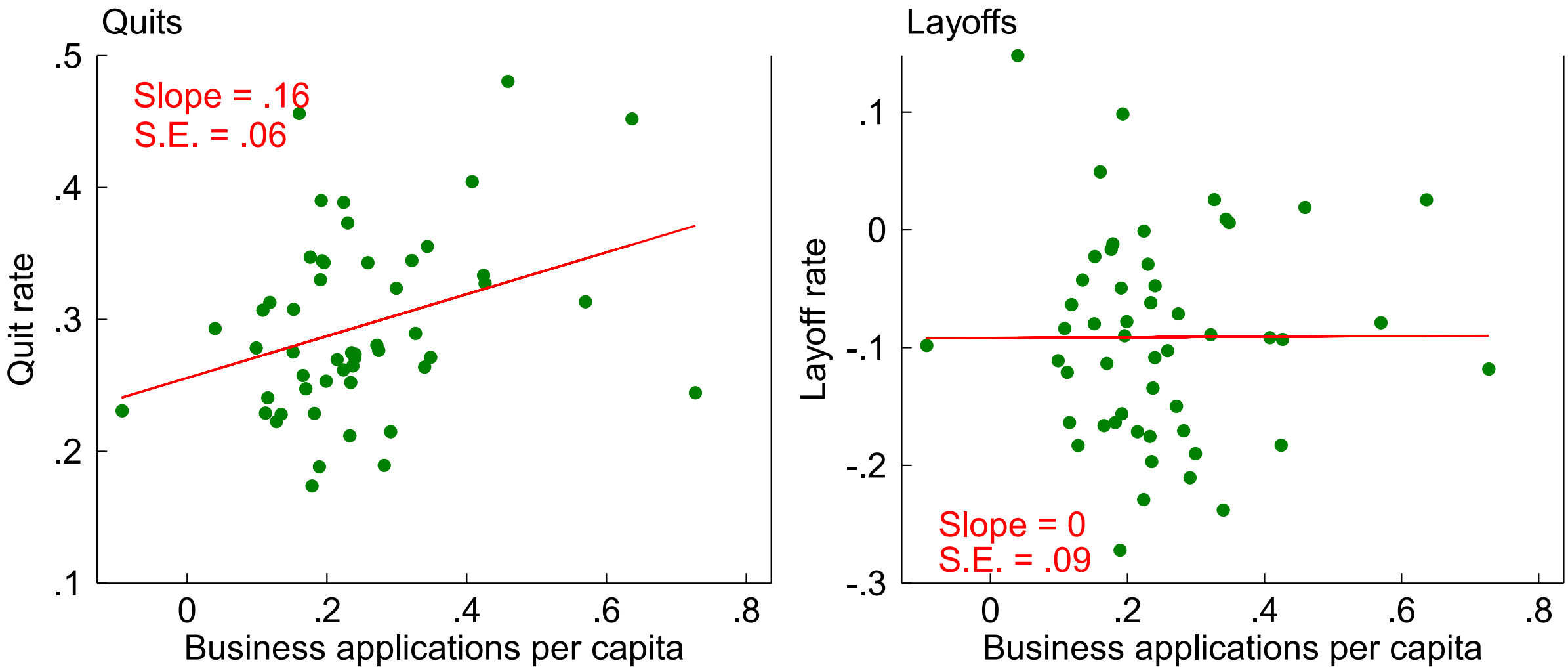
Note: Y axes may not start at zero.
Source: Business Employment Dynamics (BED).



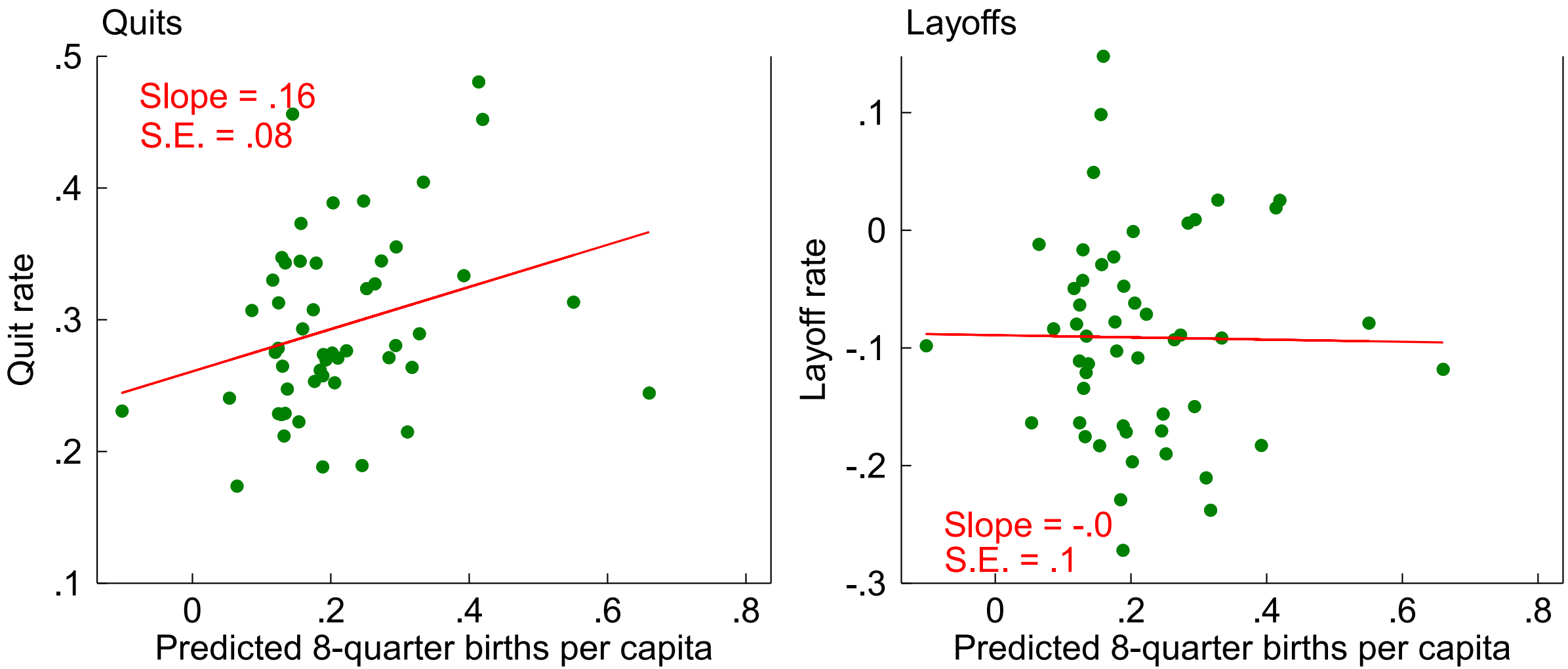
Note: Index of series expressed relative to employment or, for births, to establishments; seasonally adjusted. Applications are likely employers (HBA). Shaded areas indicate NBER recession dates.
Source: QWI, JOLTS, BED, BFS, and CES.



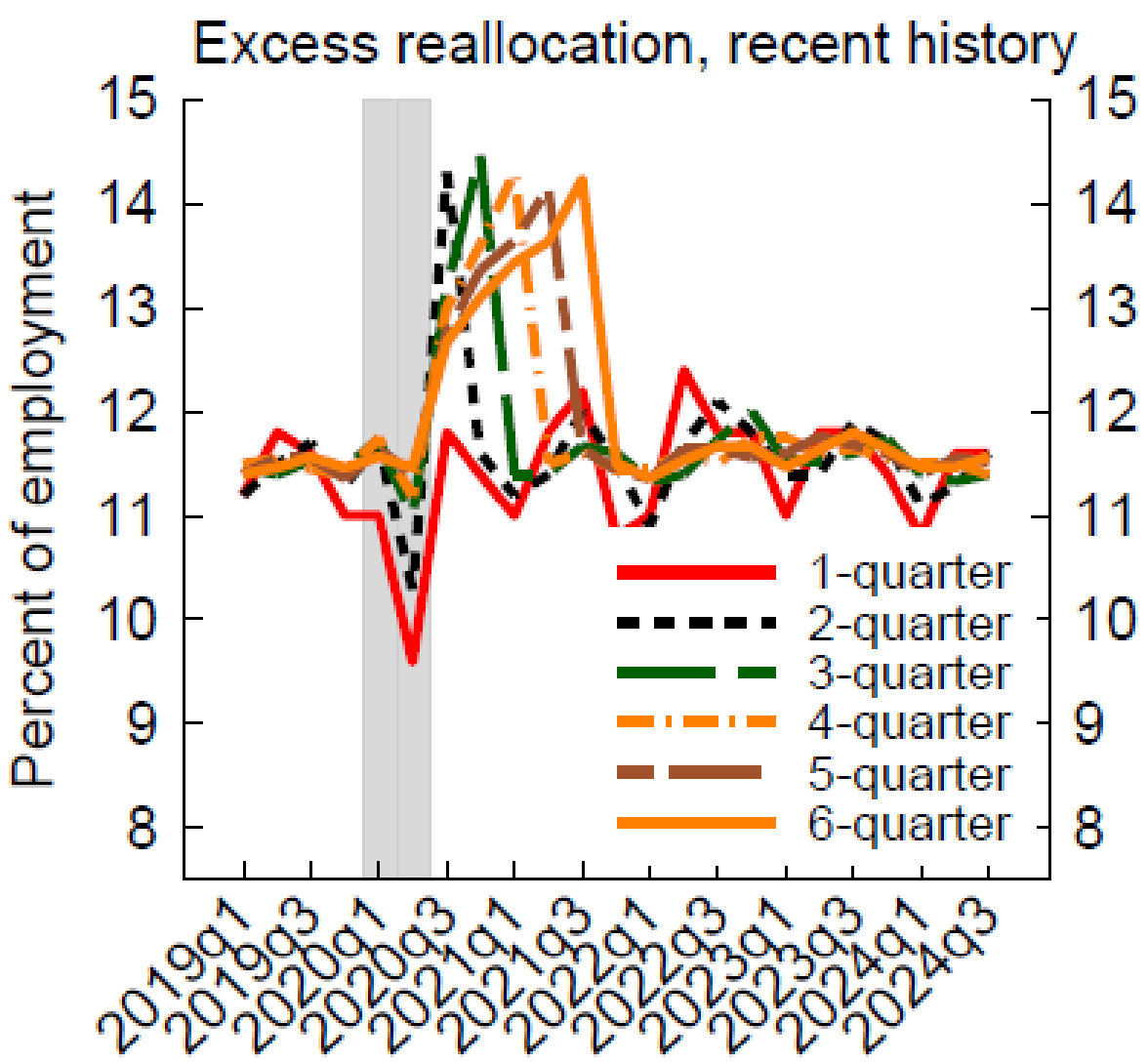
Note: County-level log differences of 2020-2023 vs. 2010-2019 seasonally adjusted pace. Red line is regression line with reported slope and standard error. Binscatter with 100 bins.
Source: Quarterly Workforce Indicators (QWI), Business Formation Statistics (BFS).

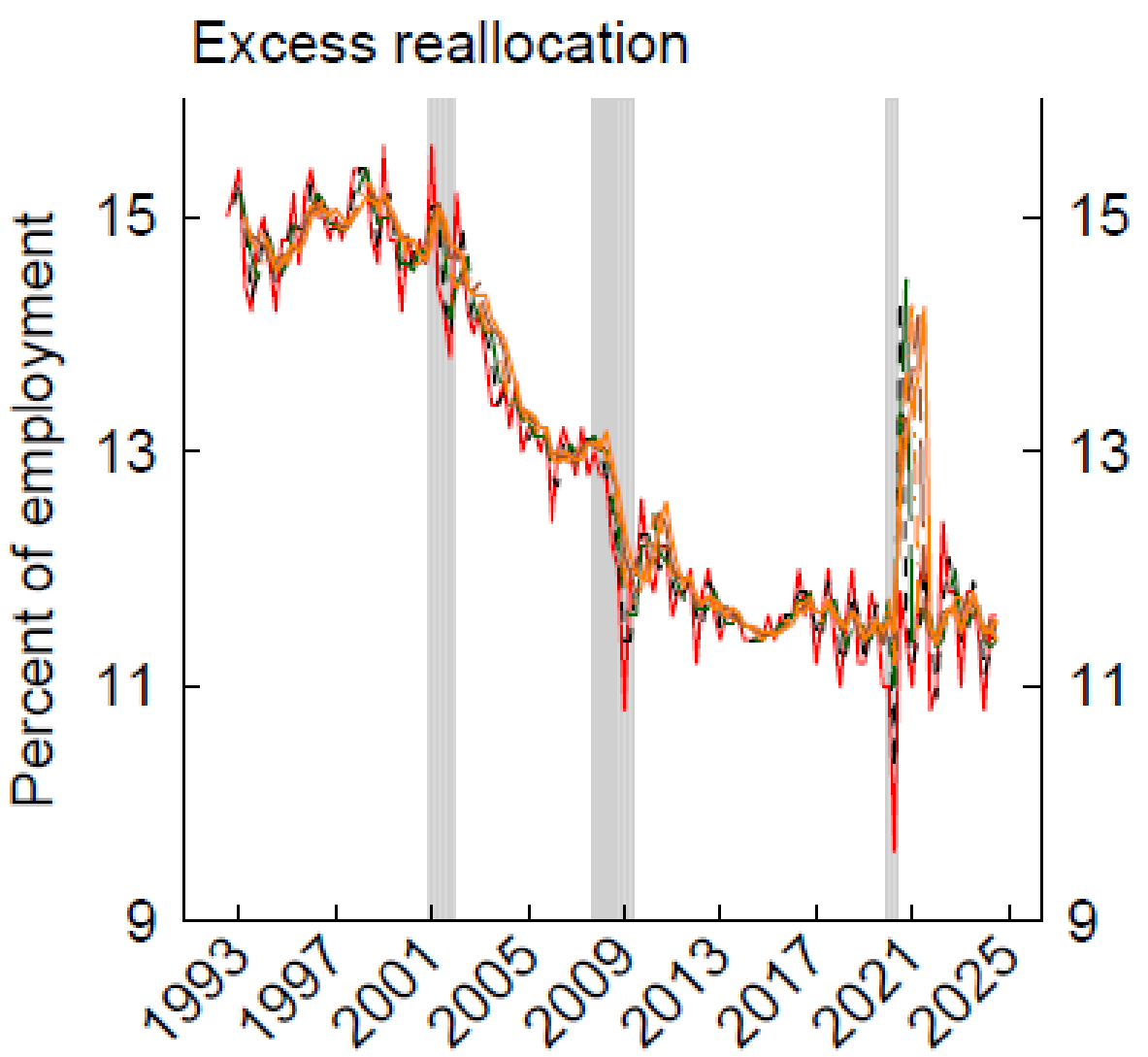


Note: State-level log differences of 2020-2023 vs. 2010-2019 seasonally adjusted pace. Red line is regression line with reported slope and standard error. Data through March 2025.
Source: JOLTS, Business Formation Statistics (BFS).



Note: State-level log differences of 2020-2023 vs. 2010-2019 seasonally adjusted pace. Red line is regression line with reported slope and standard error. Data through December 2023.
Source: JOLTS, Business Formation Statistics (BFS).



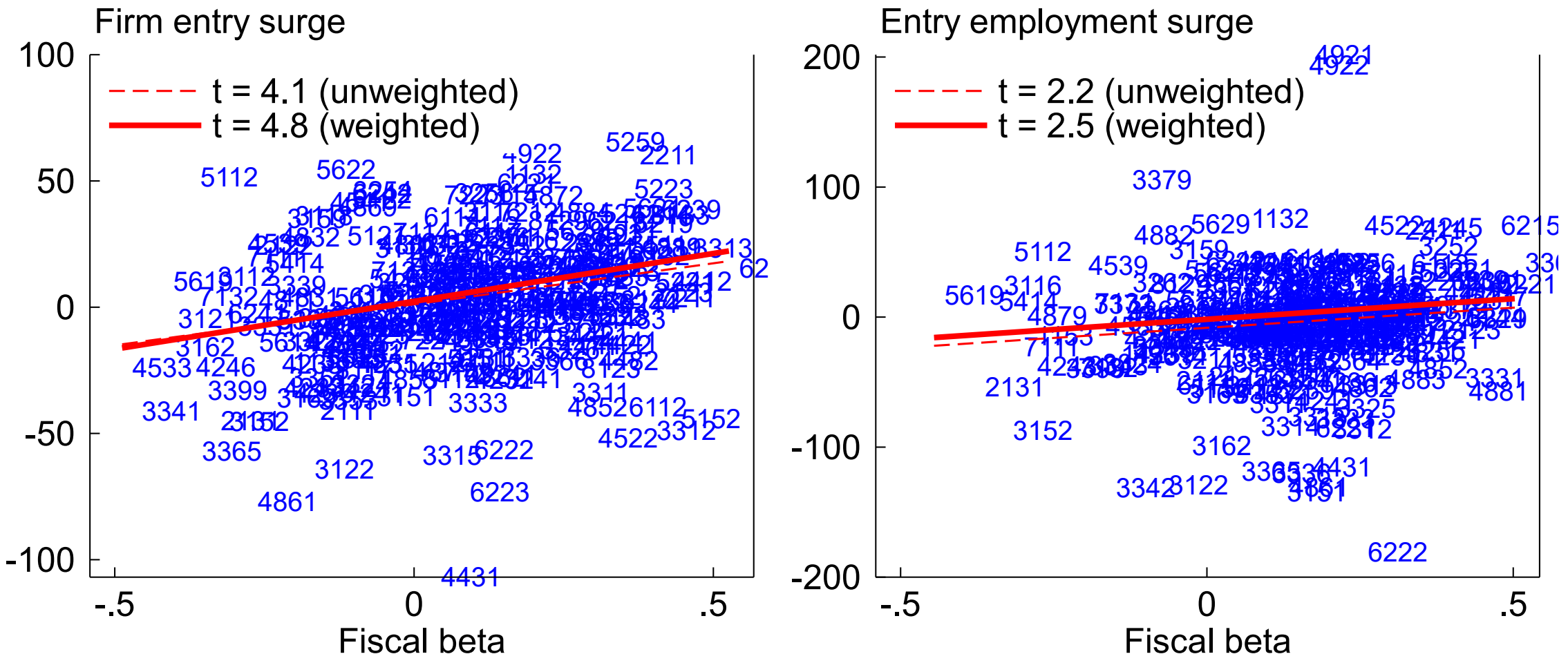


Note: Reallocation is JC+JD. Excess reallocation is JC+JD-|JC-JD|, with JC and JD averaged over indicated horizon. Seasonally adjusted. Shaded areas indicate NBER recession dates.
Source: Business Employment Dynamics (BED).

Joint regressions (t stats)

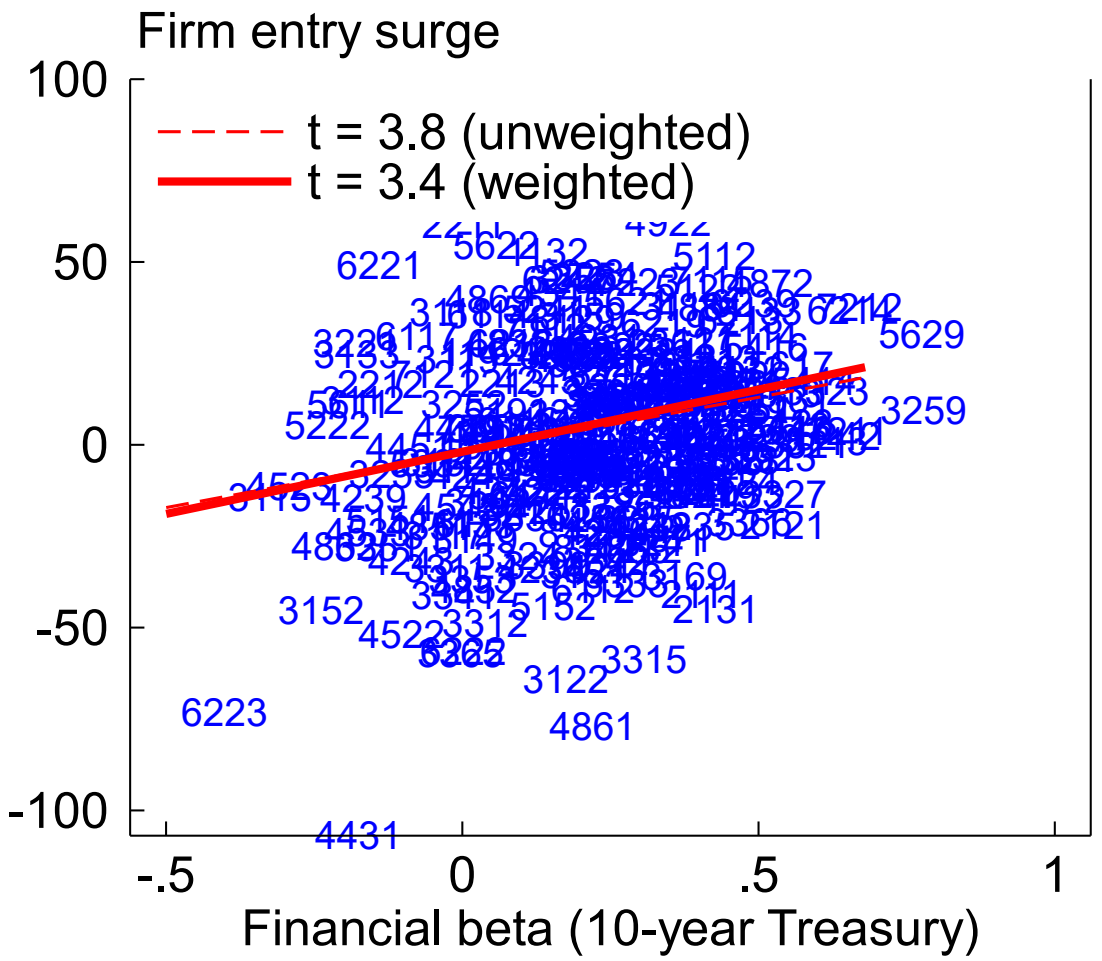
	Firm entry	Firm entry	Entry employment	Entry employment
Fiscal beta	**2.3**	**2.7**	1.8	-0.0
Financial: house price	1.7	**2.0**	1.9	0.9
Financial: Treasury	**2.2**	**2.2**	**3.0**	1.9
Regulation	**2.3**	-0.4	**2.2**	-0.2
R^2	.14	.21	.12	.25
Weighted?		Y		Y

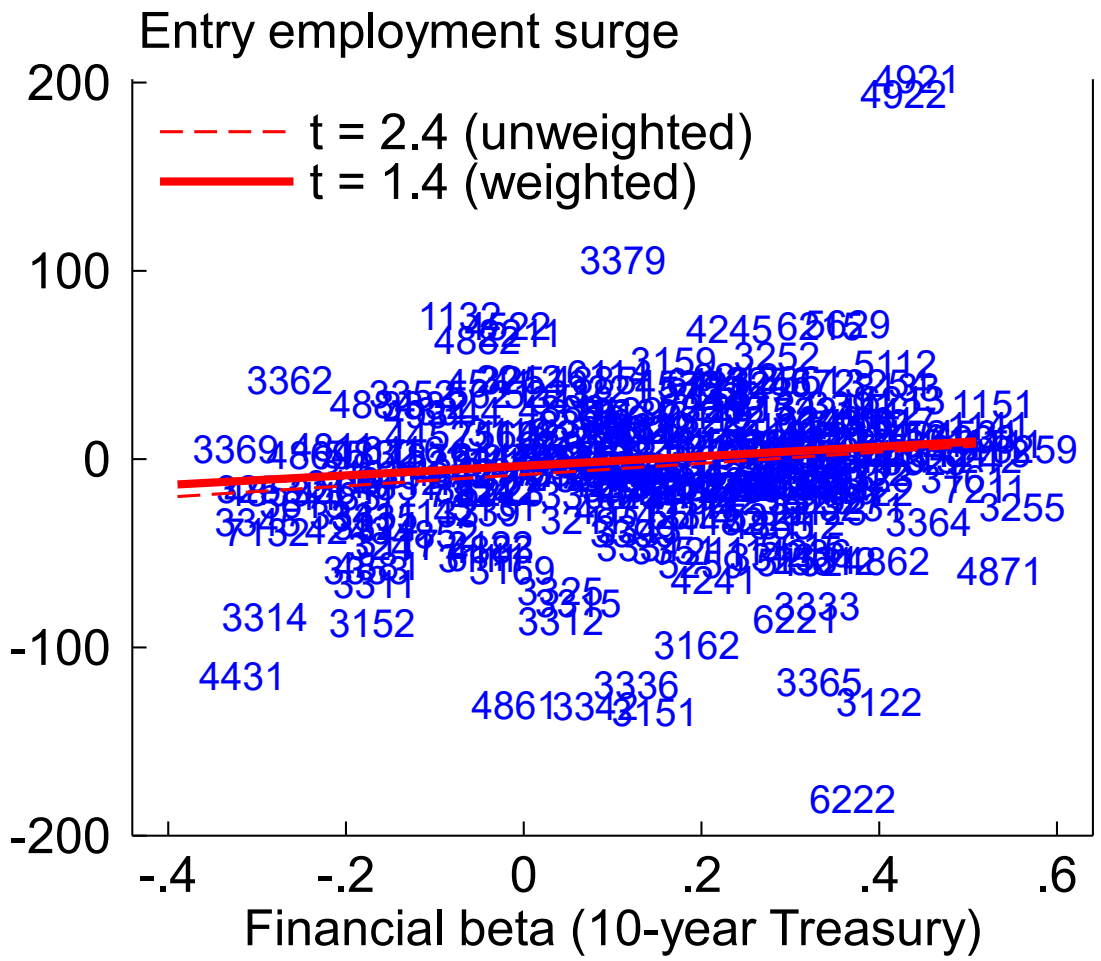
Fiscal beta



Note: Fiscal beta is correlation between industry entry and discretionary fiscal effect, 1978-2019.
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, Cashin et al (2018), author calculations.

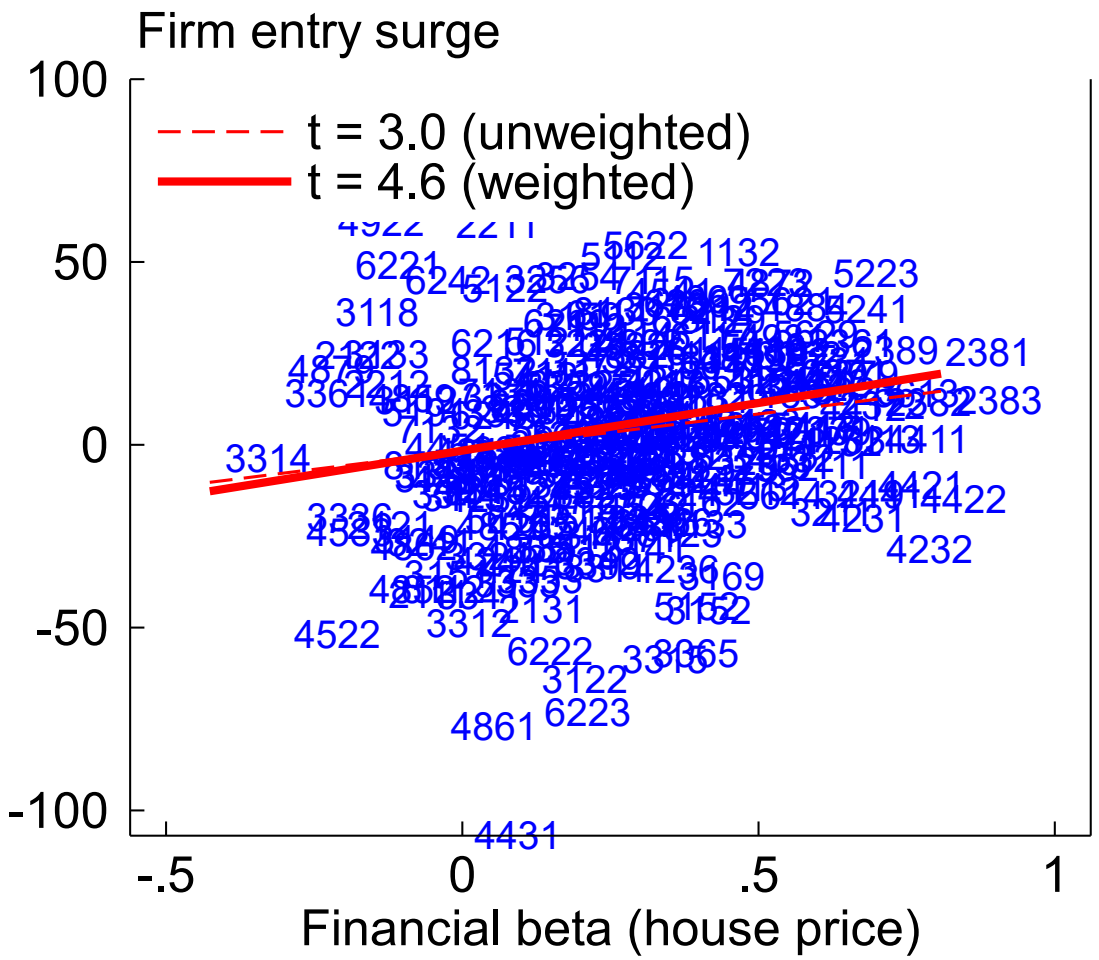
Financial beta: 10-year Treasury

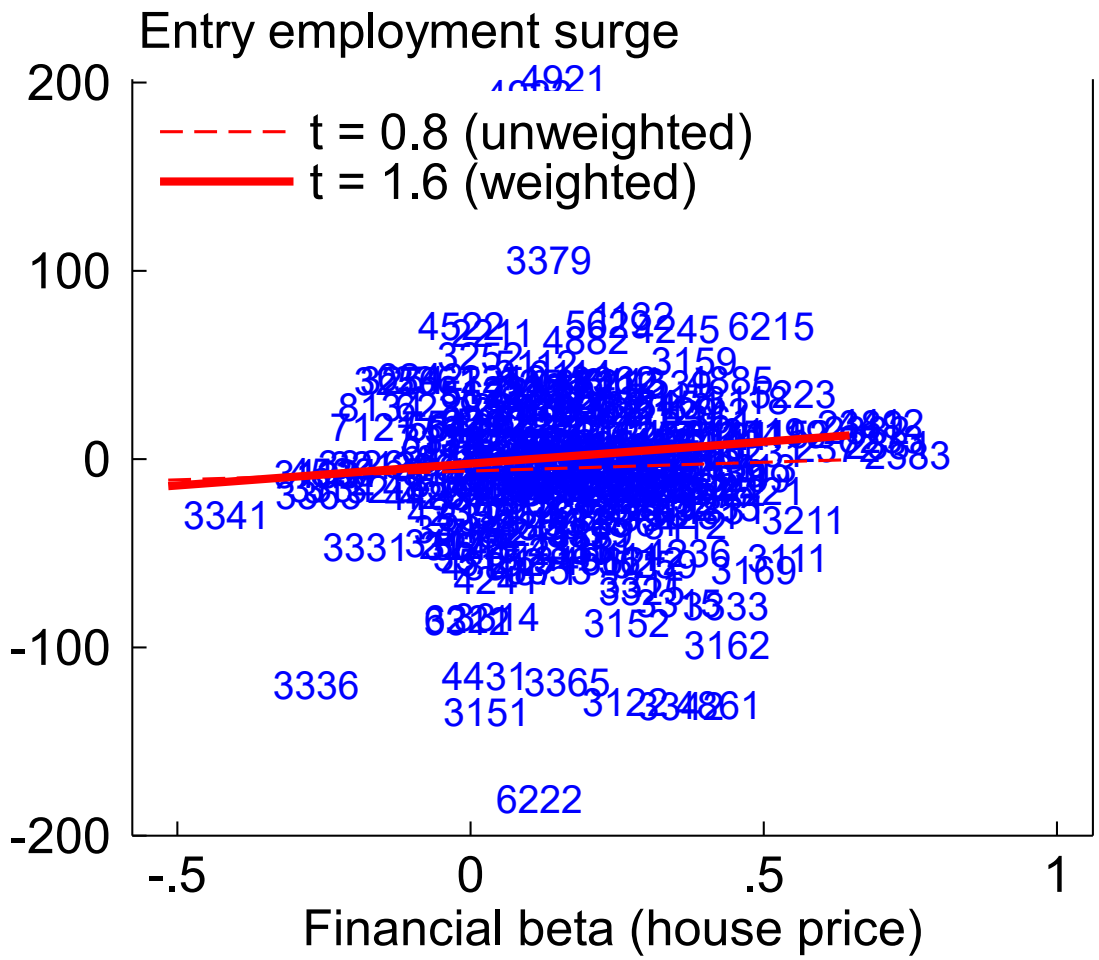




Note: Financial beta is correlation between industry entry and FCI-G 10-year Treasury component, 1991-2019. Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, Ajello et al (2023), author calculations.

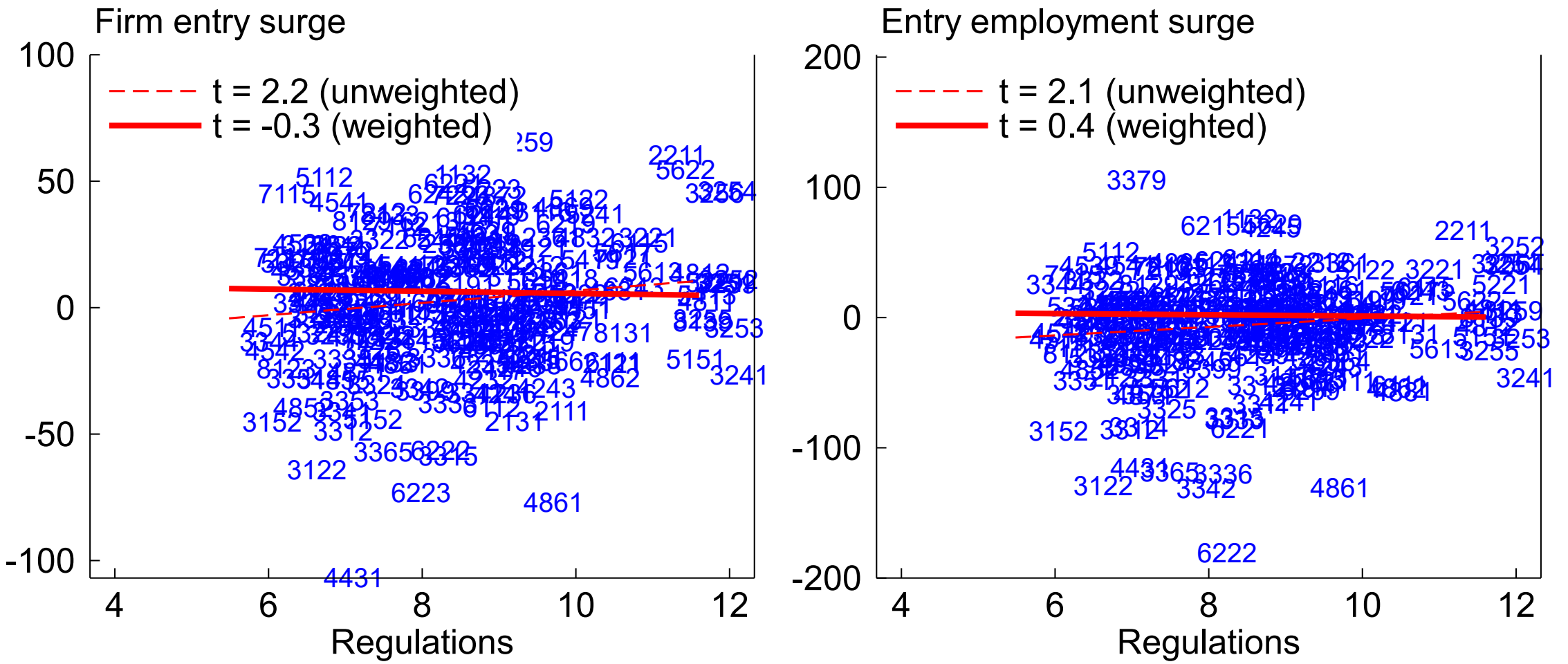
Financial beta: House prices





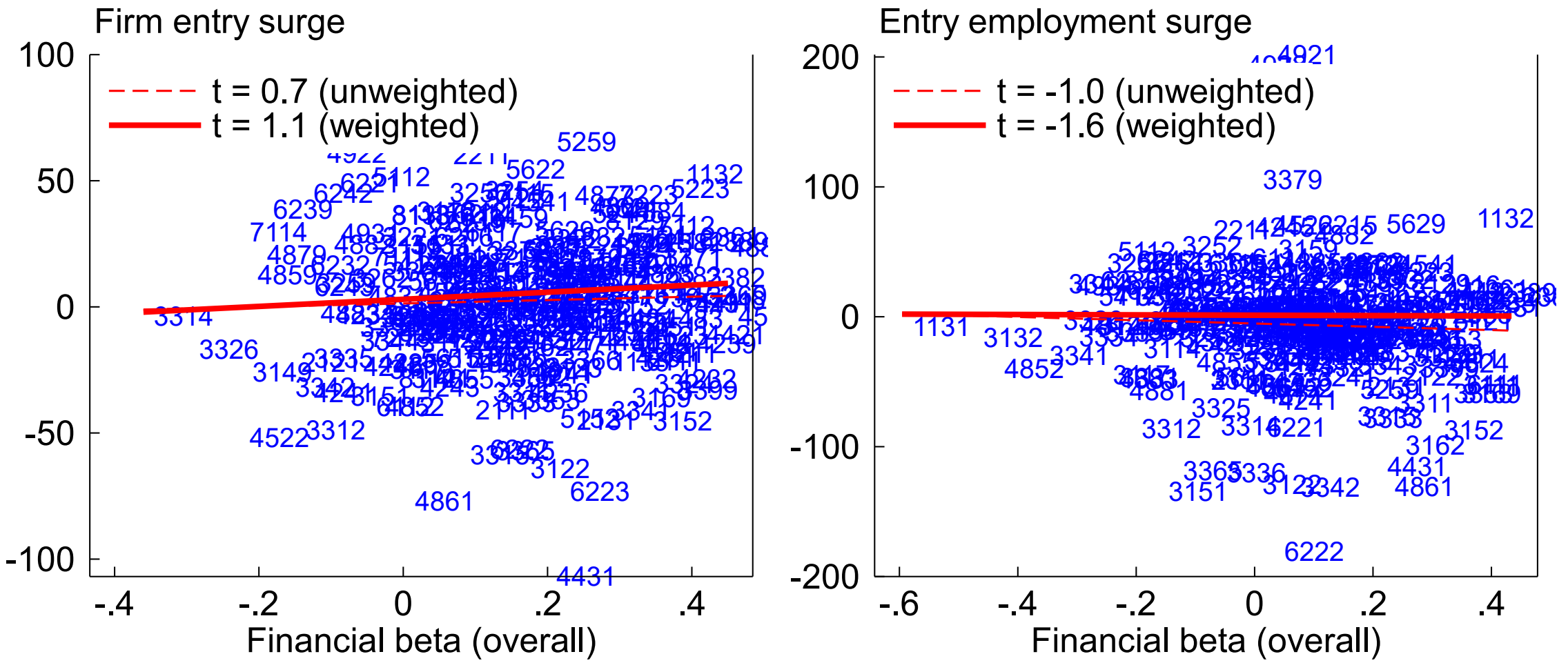
Note: Financial beta is correlation between industry entry and FCI-G house price component, 1991-2019.
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, Ajello et al (2023), author calculations.

Regulation



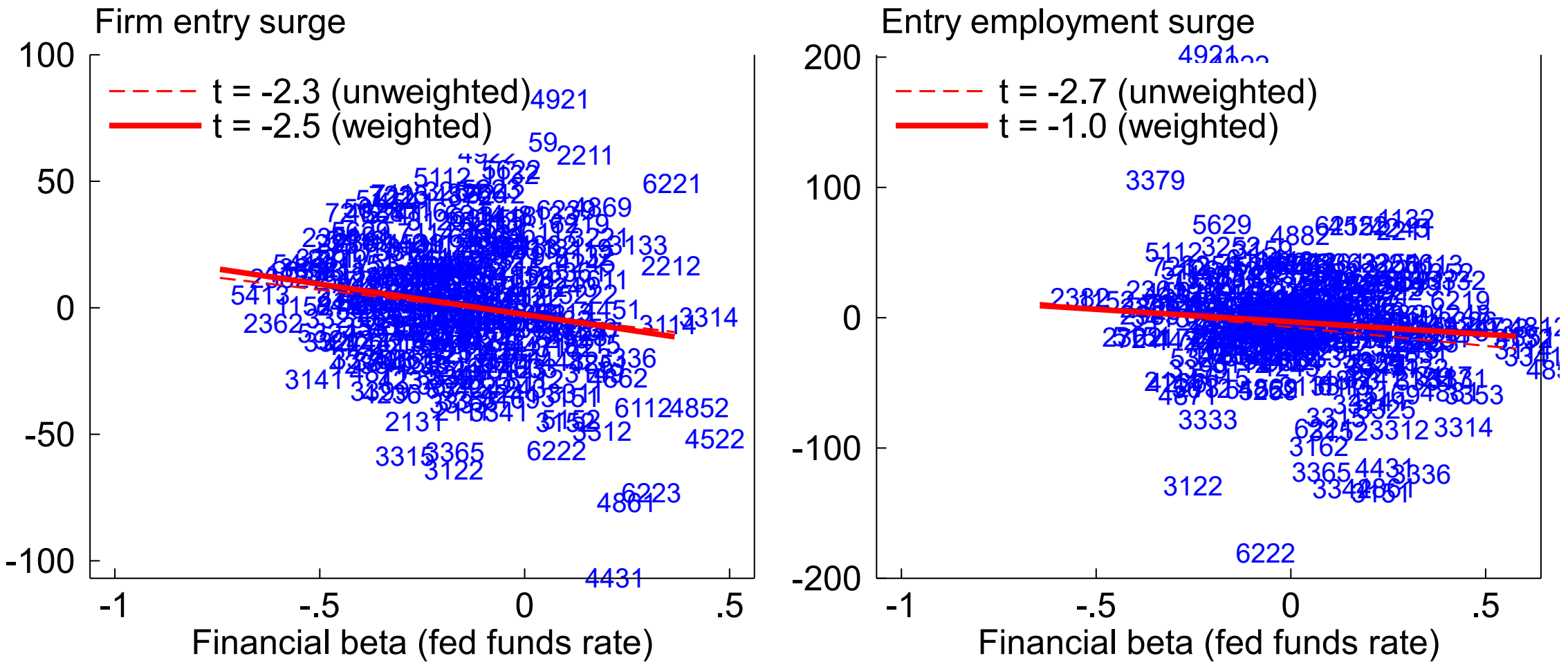
Note: (Log) regulation count from RegData 4.1, 2019.
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, RegData, author calculations.

Financial beta: overall



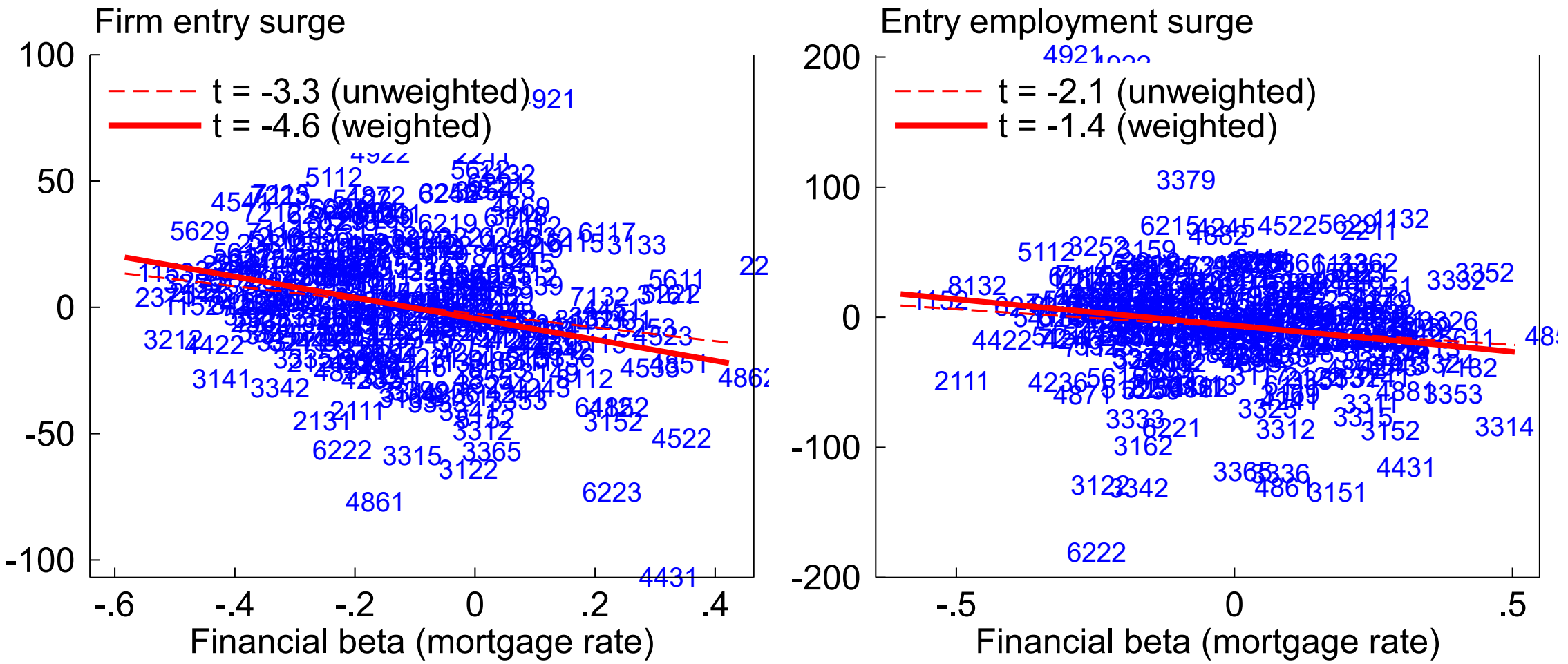
Note: Financial beta is correlation between industry entry and FCI-G, 1991-2019.
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, Ajello et al (2023), author calculations.

Financial beta: Federal funds rate



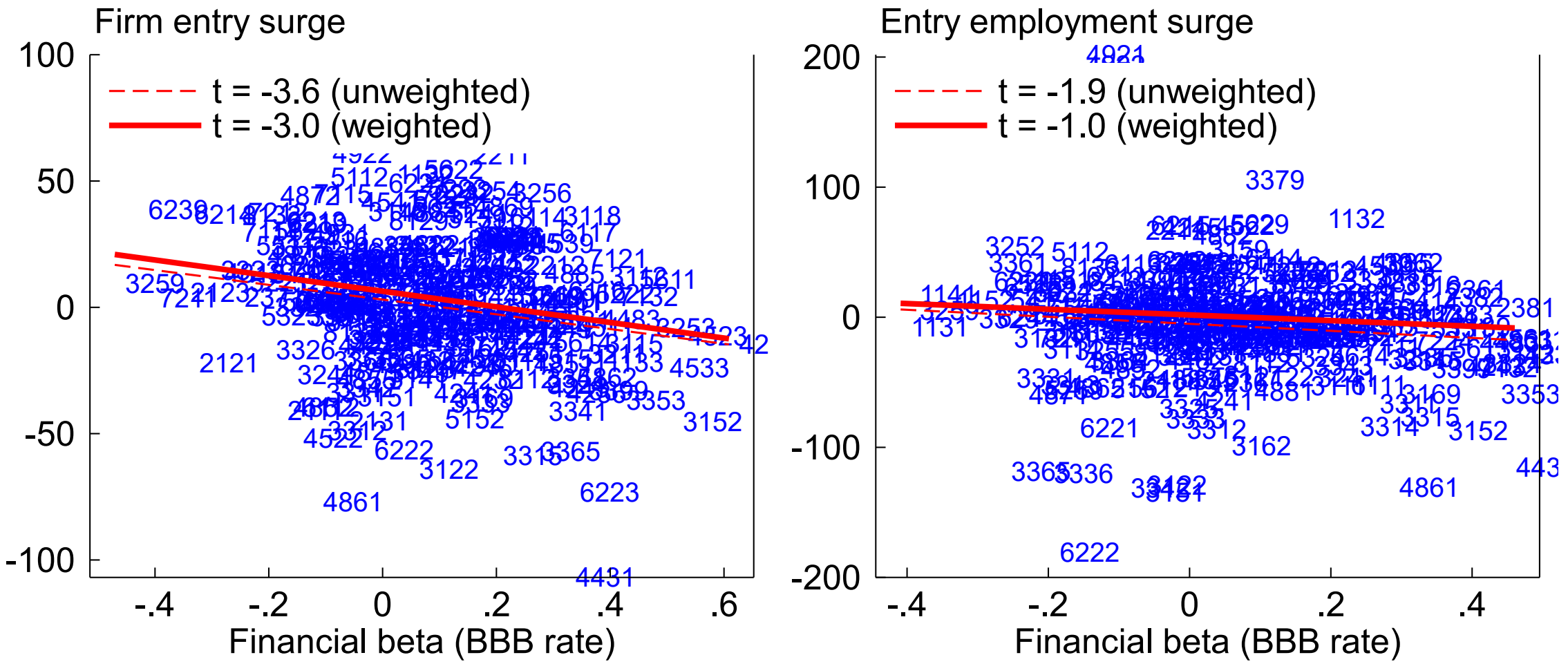
Note: Financial beta is correlation between industry entry and FCI-G FFR component, 1991-2019
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, Ajello et al. (2023), author calculations

Financial beta: 30-year mortgage rate



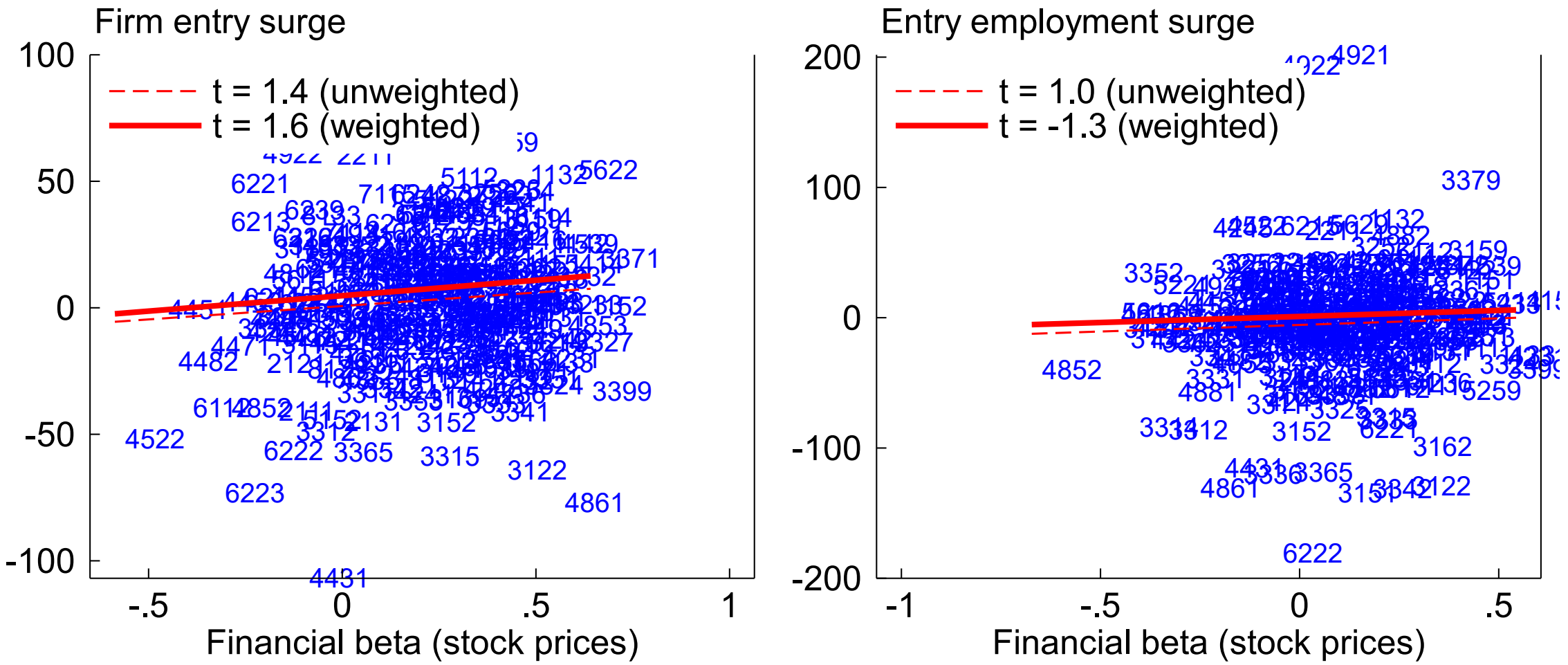
Note: Financial beta is correlation between industry entry and FCI-G 30-yr mortgage rate component, 1991-2019
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, Ajello et al. (2023), author calculations

Financial beta: BBB corporate bond rate



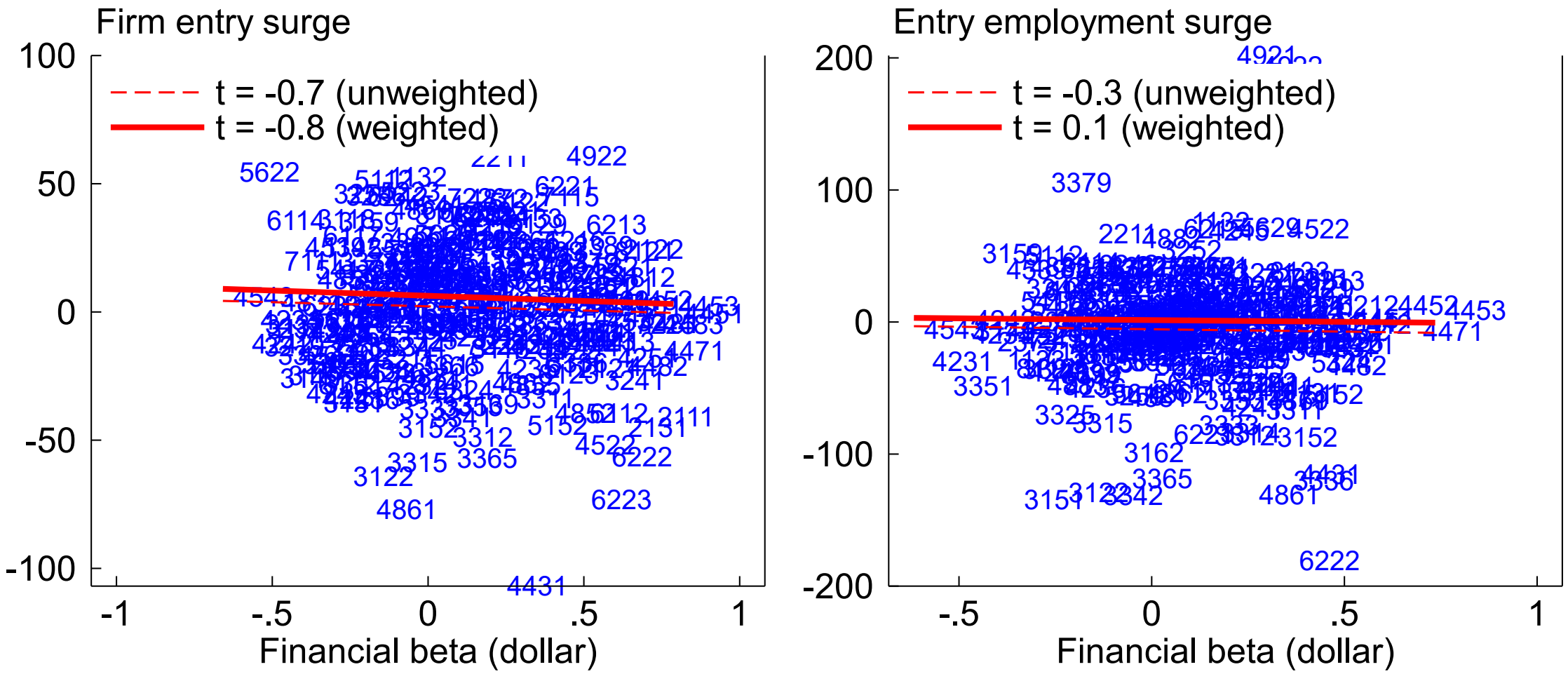
Note: Financial beta is correlation between industry entry and FCI-G corporate BBB rate component, 1991-2019
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, Ajello et al. (2023), author calculations

Financial beta: Stock market value



Note: Financial beta is correlation between industry entry and FCI-G stock price component, 1991-2019
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right)
Source: BDS, Ajello et al. (2023), author calculations

Financial beta: Broad nominal dollar

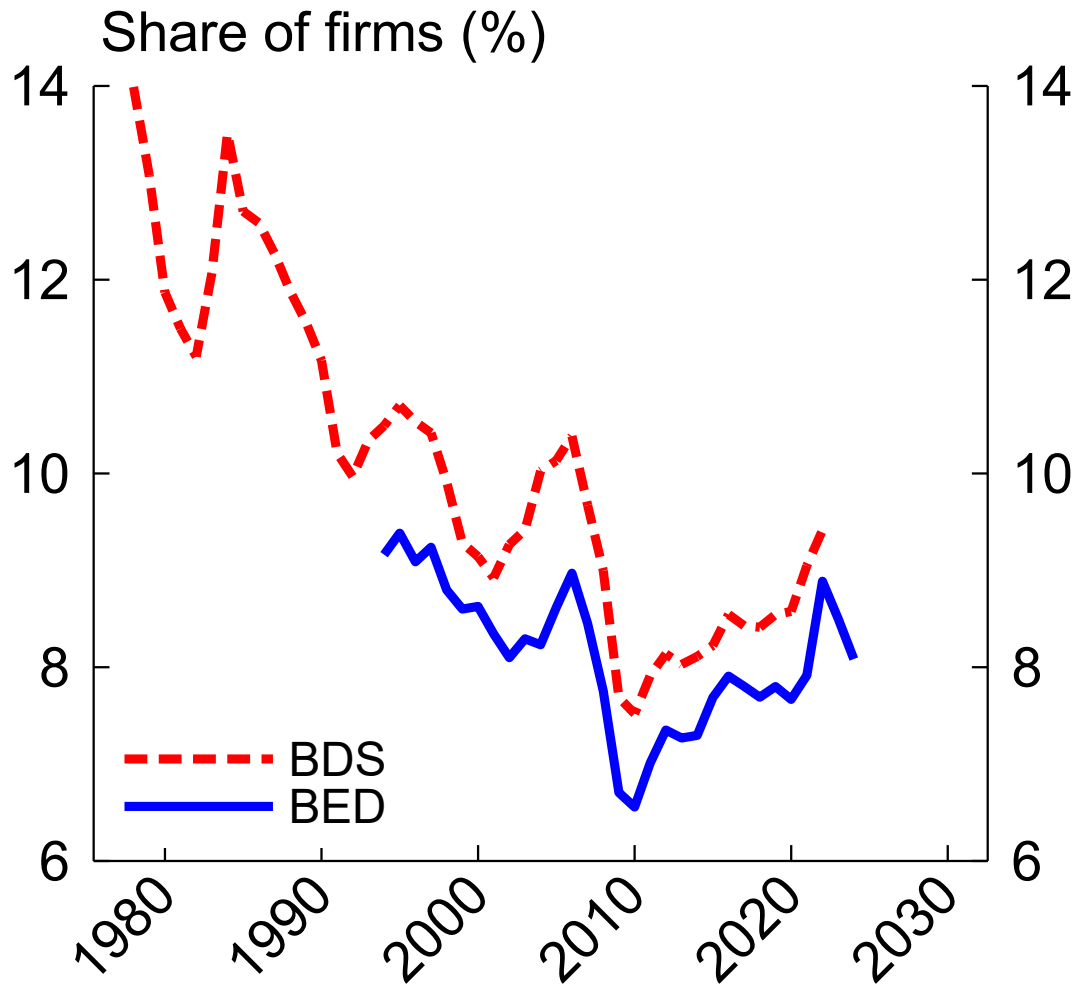


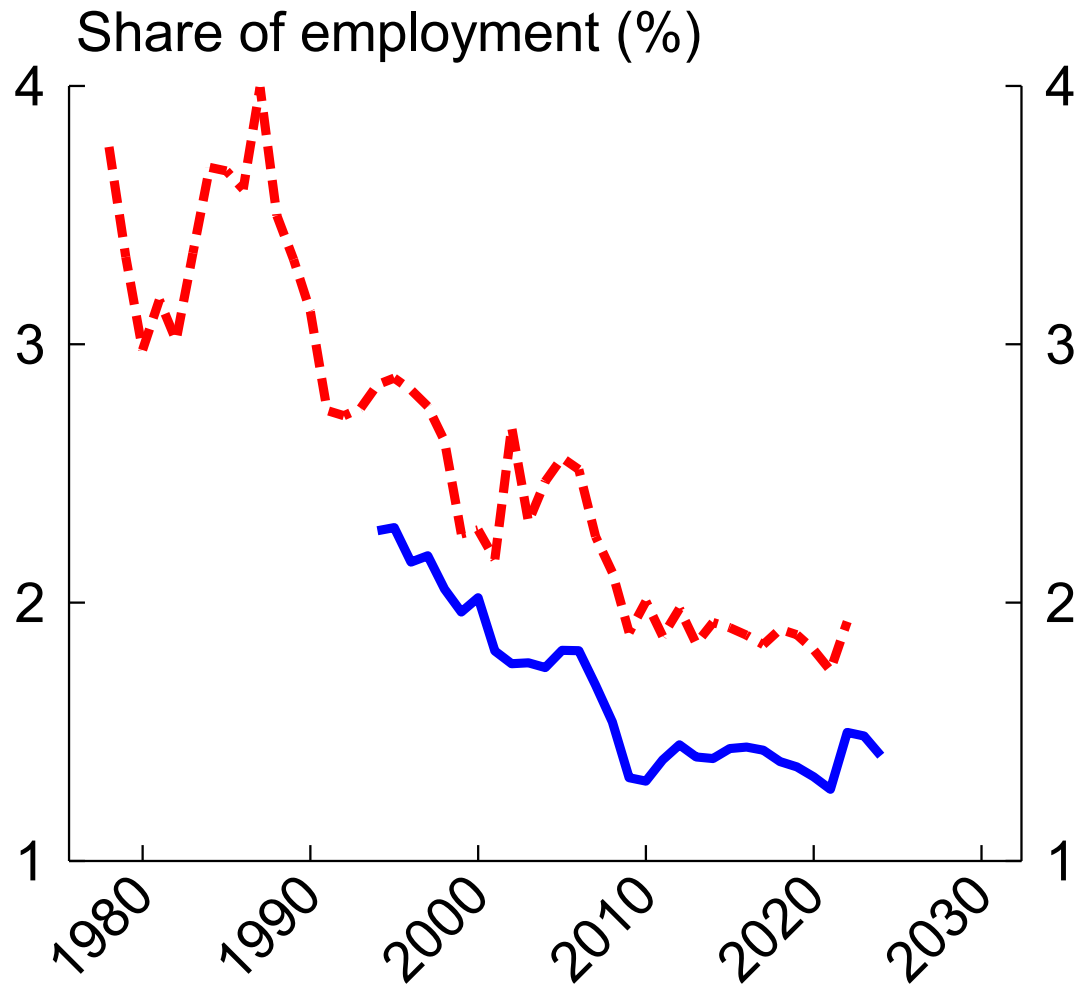
Note: Financial beta is correlation between industry entry and FCI-G broad dollar component, 1991-2019
Entry surge in logs, 2021-22 vs. 2013-2019. Regressions weighted by 2013-19 firm count (left) or employment (right
Source: BDS, Ajello et al. (2023), author calculations

Financial effect variables

	Firm entry	Firm entry	Entry employment	Entry employment
House price	**2.3**	**2.8**	1.1	1.0
Treasury	1.2	1.3	1.7	1.3
Fed funds rate	0.1	**3.3**	-1.2	-0.8
BBB rate	-1.1	1.2	-0.6	-1.0
Mortgage rate	0.6	**-3.0**	1.4	1.3
Stock prices	0.3	1.4	-1.3	0.3
Dollar	-0.2	1.2	-1.3	-0.1
R^2	.08	0.2	.07	.12
Weighted?		Y		Y

Pandemic firm entry surge follows trend decline





Note: Firm entry rates. Right panel uses DHS denominator.
Source: Business Dynamics Statistics (BDS) and Business Employment Dynamics (BED).

Secular decline in business dynamism

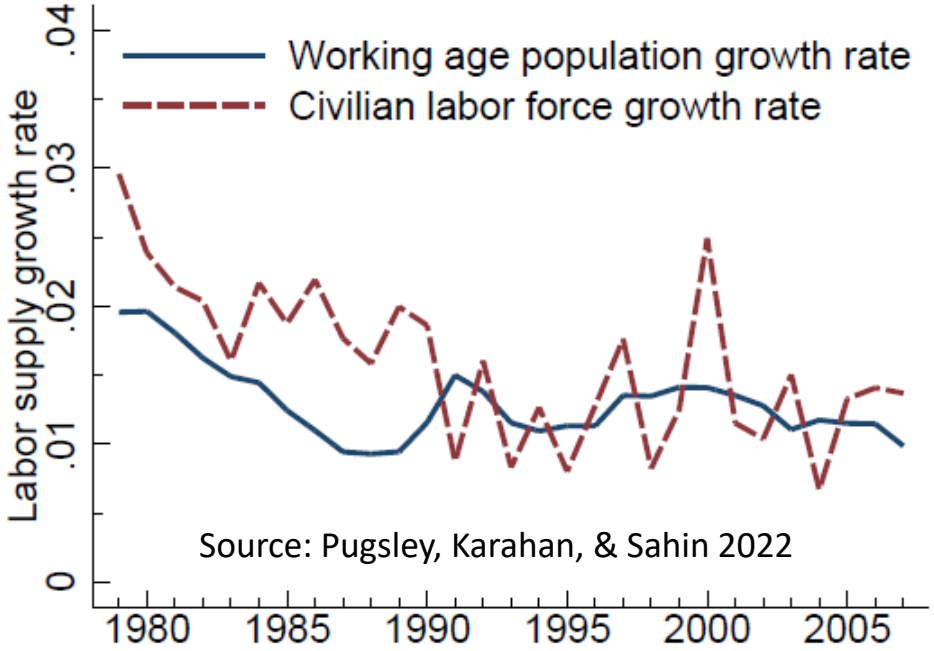
- Large literature on secular decline in business "dynamism" (e.g., Decker et al. 2014)
  - Declining entry rates, job reallocation, worker reallocation, migration
  - Weaker productivity "selection" (correlation between firm/establishment productivity and growth) (Decker et al. 2020)
  - Rising average firm size/concentration
  - Implications for aggregate job creation (Haltiwanger, Jarmin, & Miranda 2013), productivity (Decker et al. 2017, 2020), business cycle (Pugsley & Sahin 2019)

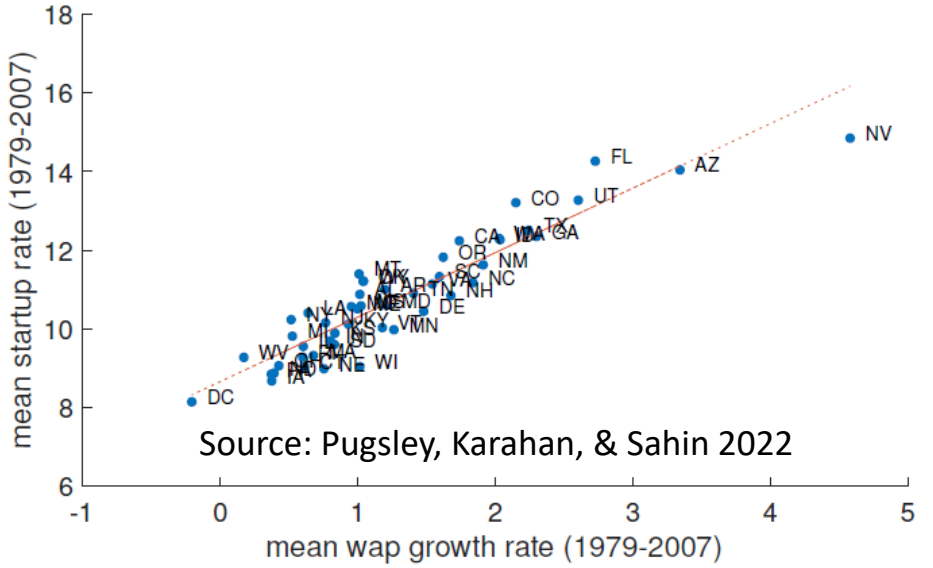
Secular decline in business dynamism

- Causes/consequences explored in literature
  - Demographics (Pugsley, Karahan, & Sahin 2022; Hathaway & Litan 2014; Ozimek 2017)
  - Regulatory/business policy environment (Davis & Haltiwanger 2015; Autor, Kerr, & Kugler 2007; Goldschlag & Tabarrok 2018; Johnson & Kleiner 2020)
  - Change in business model (e.g., retail consolidation, Decker et al. 2016; shift to nonemployers Abraham et al. 2019, Bento & Restuccia 2022)
  - Rising market power (De Loecker, Eeckhout, Mongey 2022; Albrecht & Decker 2024; Foster et al. 2024)
  - Knowledge investment or diffusion (De Ridder 2021, Akcigit & Ates 2023)
  - Debates about “skewness” and whether the decline is real (Guzman & Stern 2020)

Demographics

- In standard models, business entry is facilitated by labor force growth:
  - Slow population growth → Slow labor force growth → less entry (Pugsley, Karahan, & Sahin forthcoming)
  - But note: labor force growth decline concentrated in the 1980s
- Other potential population-related mechanisms: Hathaway & Litan (2014); Ozimek (2017)

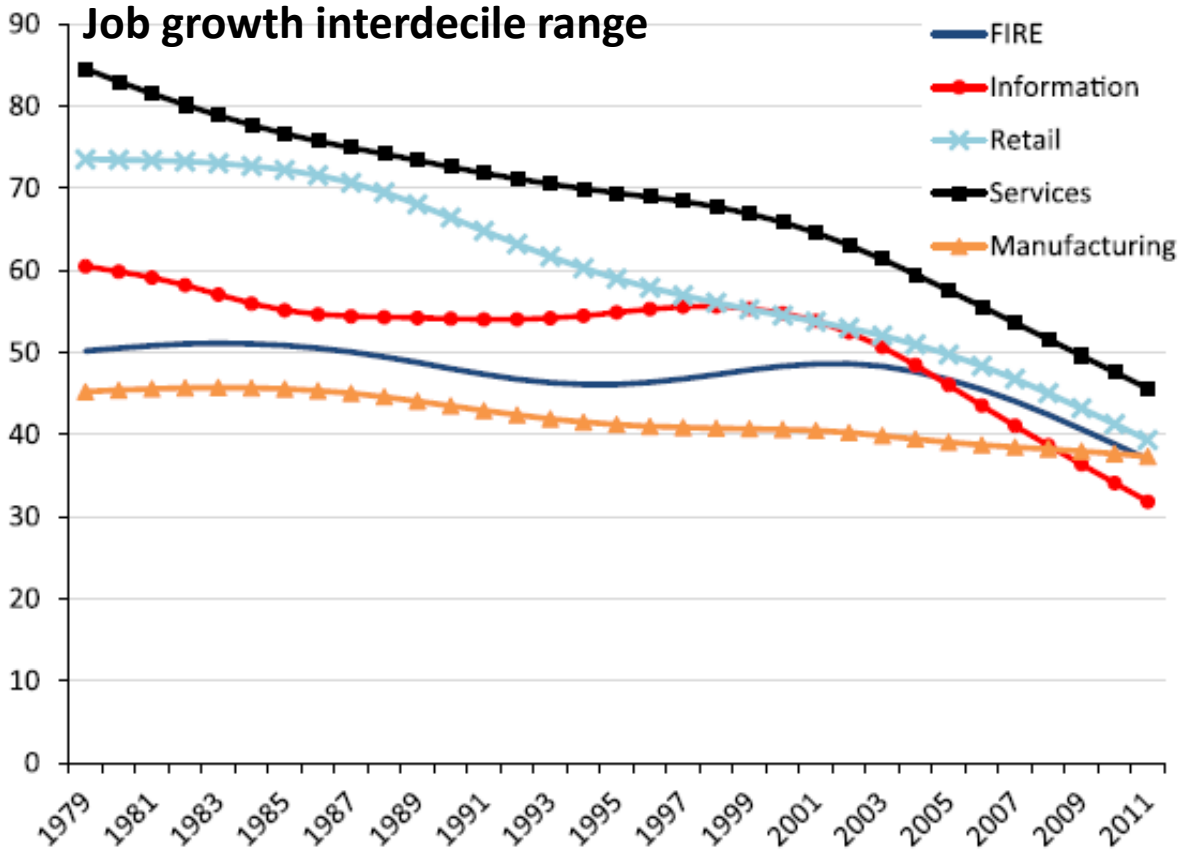


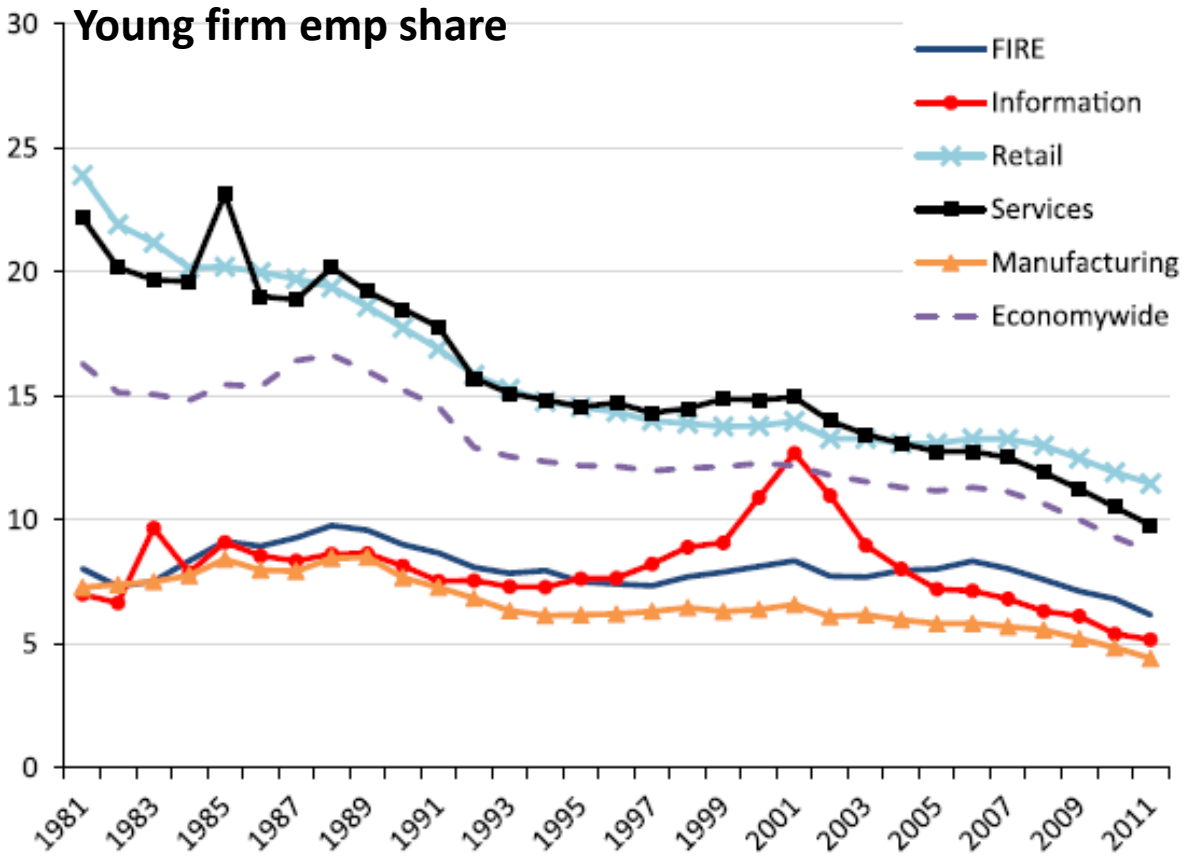


Regulatory environment

- “Death by 1000 cuts” (e.g., Davis & Haltiwanger 2015)
  - Unlawful discharge (Autor, Kerr, & Kugler 2007)
  - Occupational licensing (Johnson & Kleiner 2020)
  - Zoning & other limits on mobility
  - Federal regulation count? No clear relationship with estab. formation (Goldschlag & Tabarrok 2018)

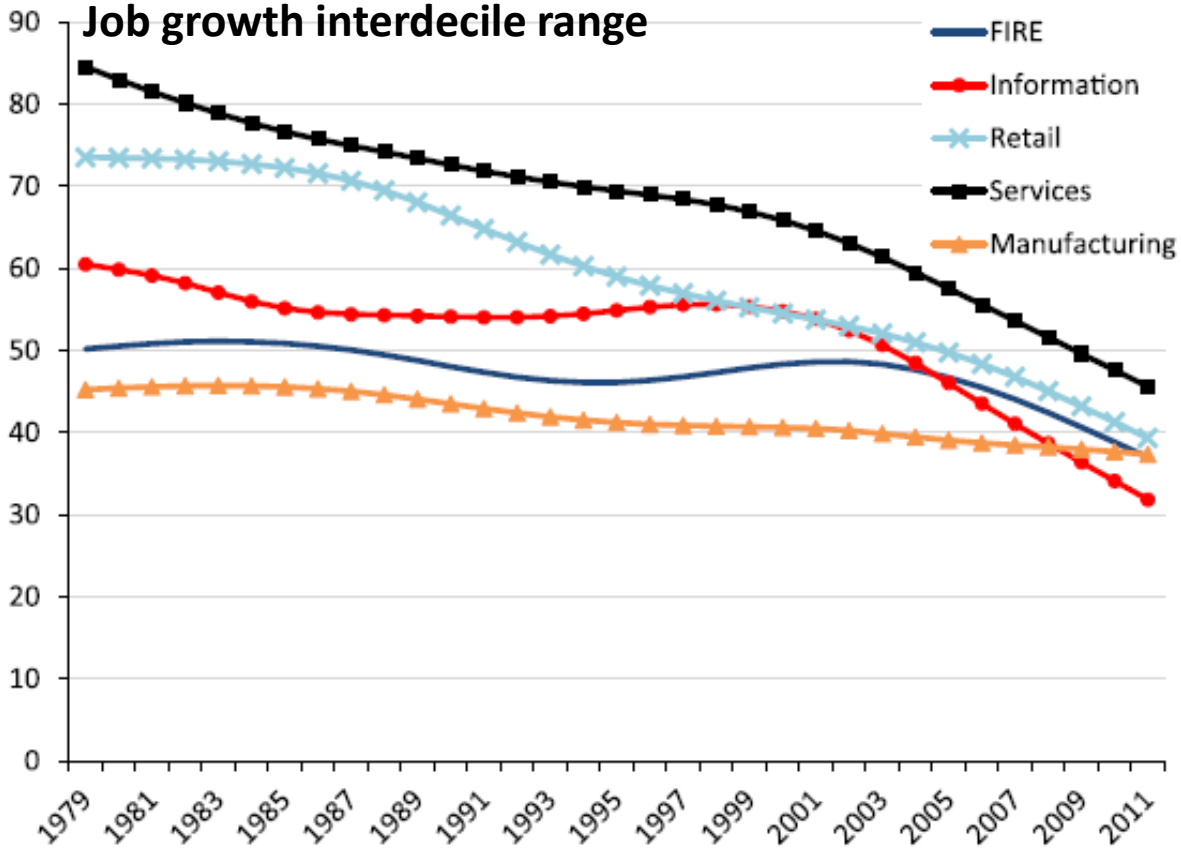
Changing business models



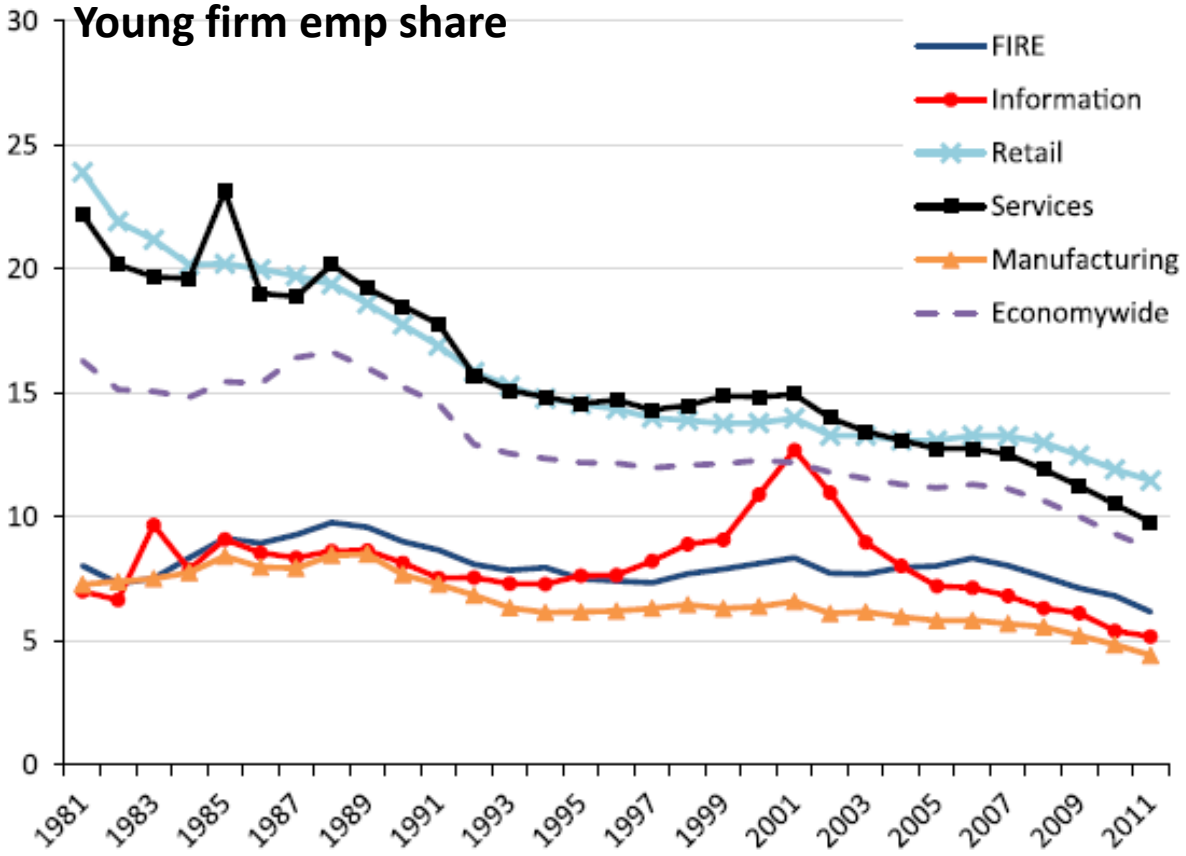


Source: Decker, Haltiwanger, Jarmin, & Miranda (2016) EER

Changing business models

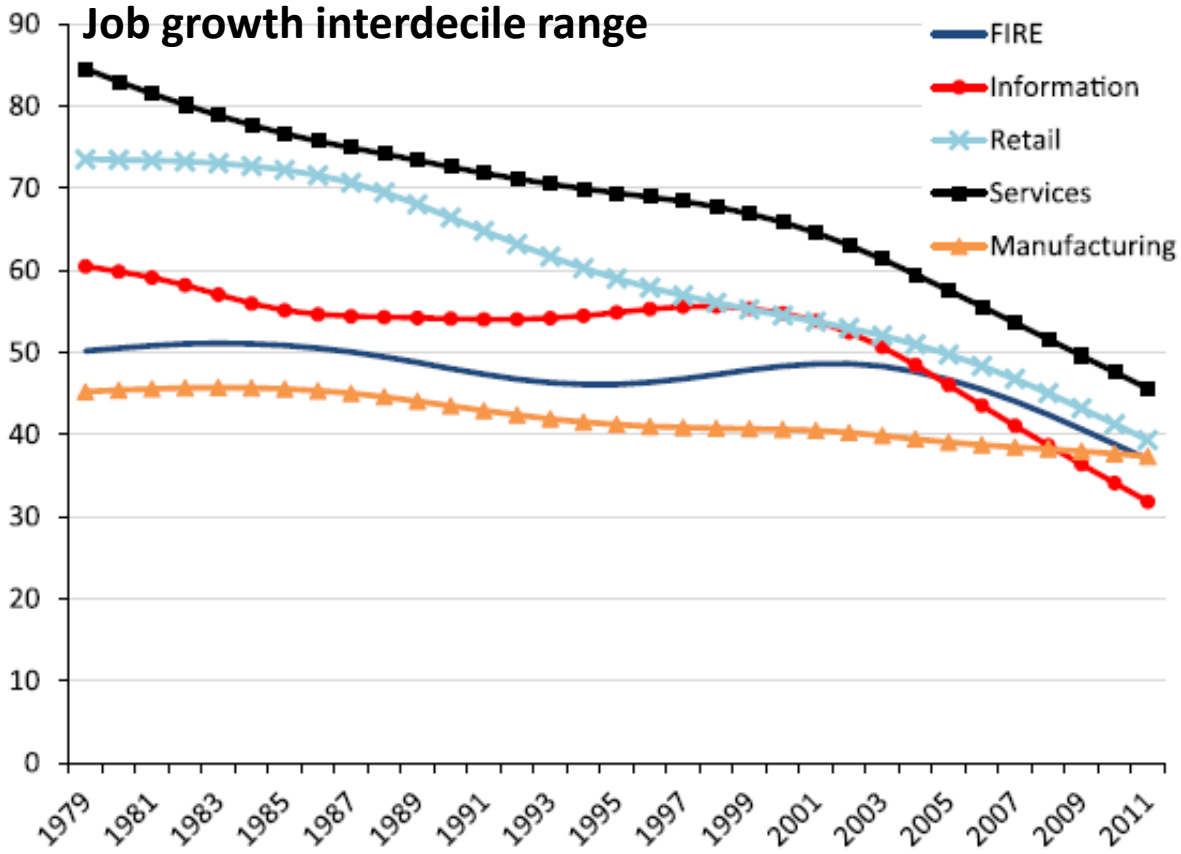


- Retail: decline of "mom and pop" entrepreneurship in favor of "big box" retailers.
  - 1980s-1990s retail consolidation (rise of "big box" retail) was productivity enhancing (Foster et al. 2006, 2016)



Source: Decker, Haltiwanger, Jarmin, & Miranda (2016) EER

Changing business models



- Tech, information decline starts after ~2000

- Retail: decline of "mom and pop" entrepreneurship in favor of "big box" retailers.
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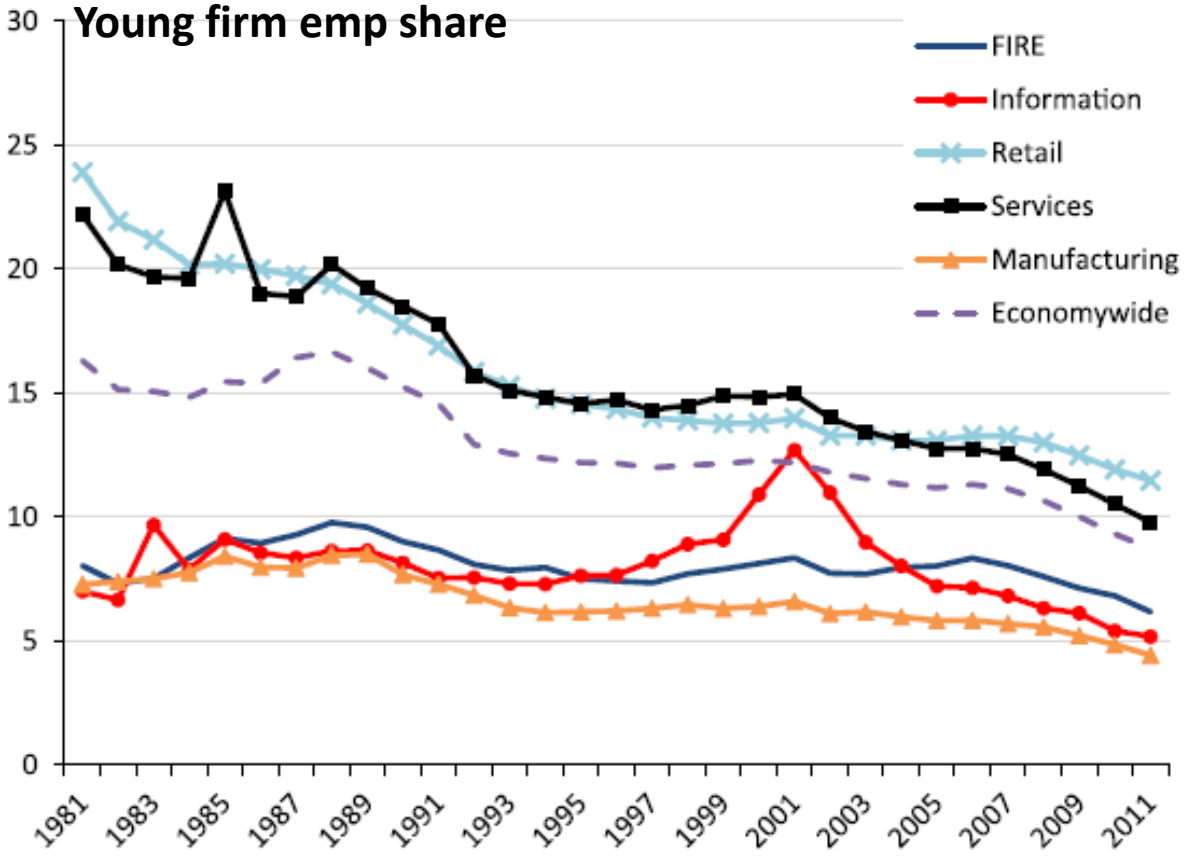
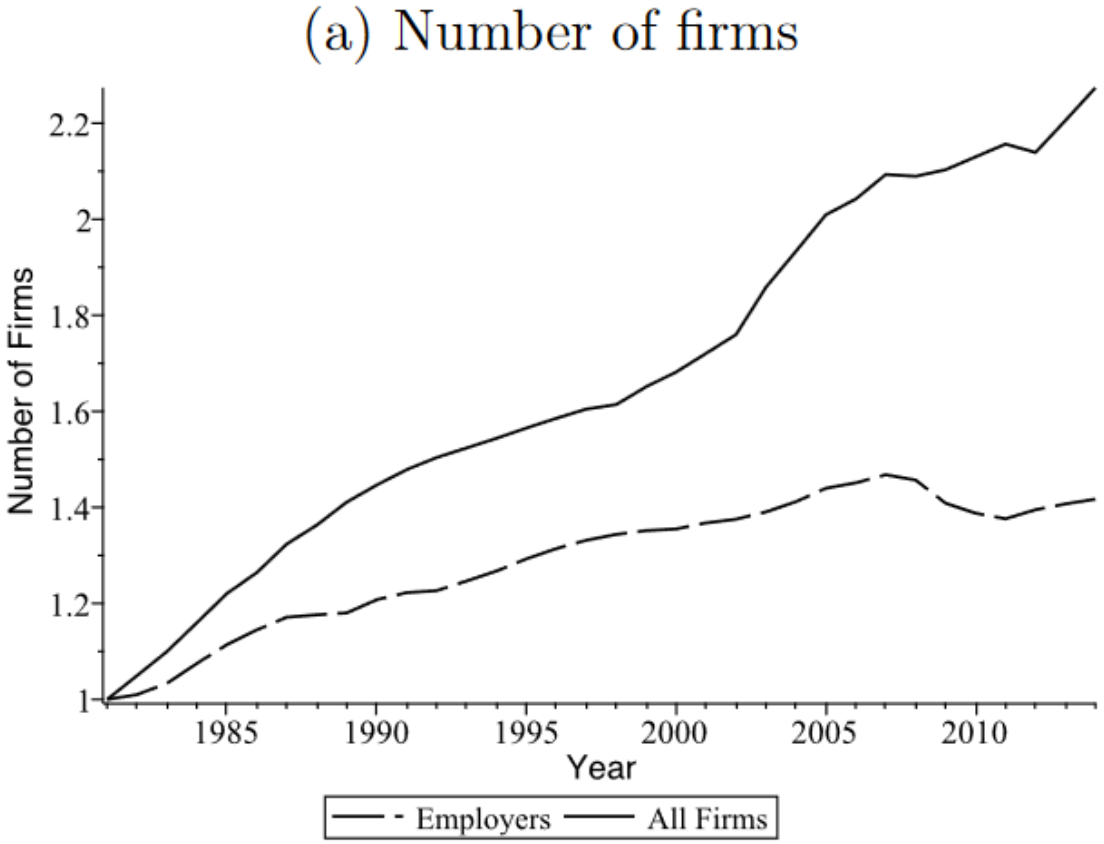


Source: Decker, Haltiwanger, Jarmin, & Miranda (2016) EER

Changing business models (2)

- Shift to nonemployer entrepreneurship (Bento & Restuccia 2022)
- Rise of “gig” economy?
  - Perhaps limited to transportation sector (Abraham et al. 2019)



Market power

- Rising market power/monopolies (De Loecker, Eeckhout, & Mongey 2022)
  - Market power makes firms less responsive to shocks (↓ reallocation), deters entry

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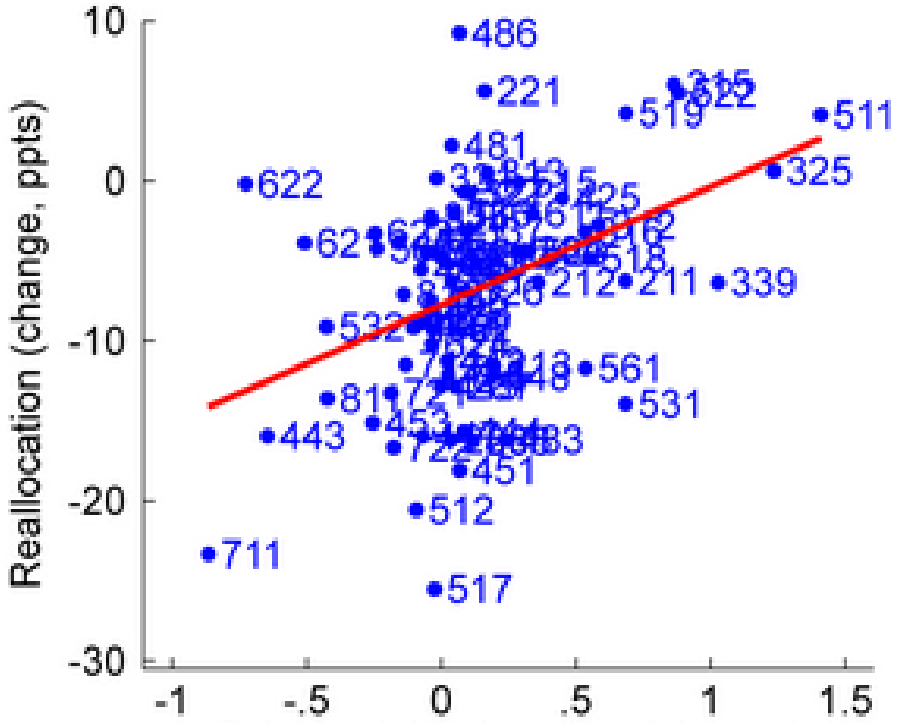
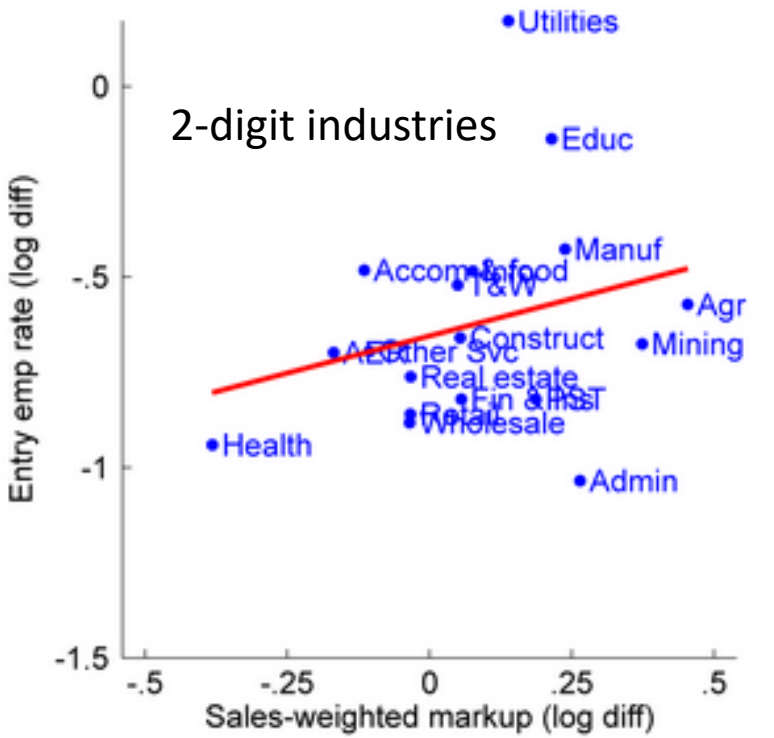
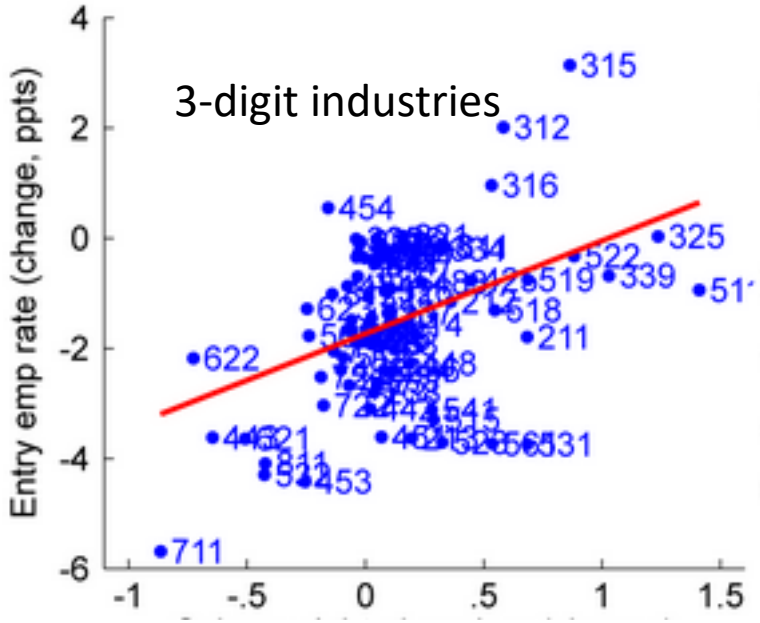






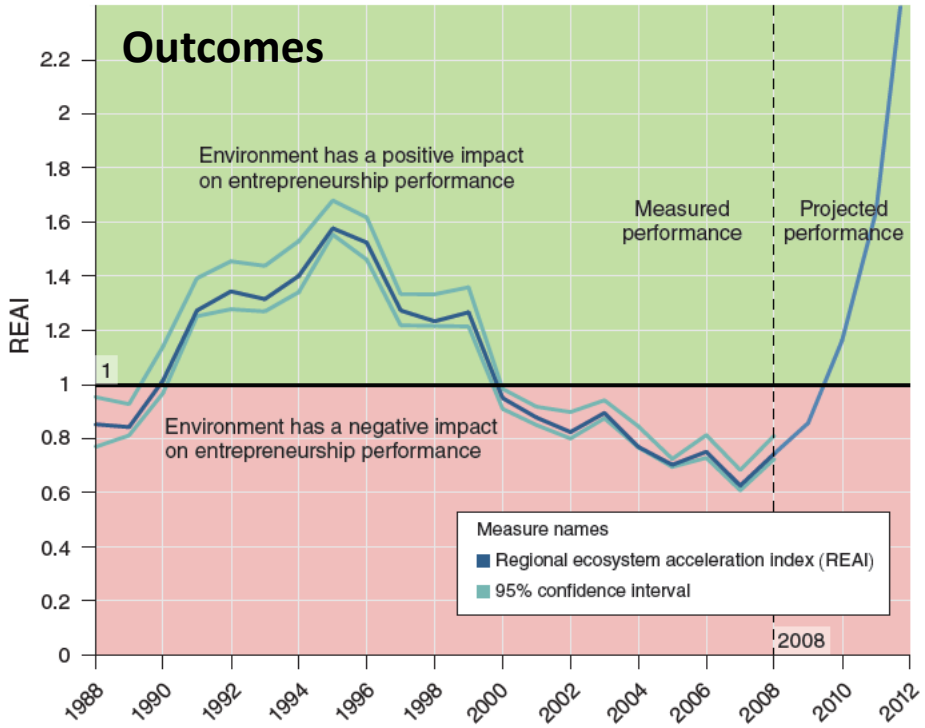
Source: Albrecht & Decker 2024

Knowledge investment or diffusion

- Higher entry costs due to rising importance of intangible capital (De Ridder 2021)
- Declining pace of knowledge diffusion from superstar firms (Akcigit & Ates 2023; Autor et al. 2020; Andrews, Criscuolo, & Gal 2016)
  - Perhaps more relevant for post-2000 decline of high growth young firms, less relevant in pre-2000 period?

Is the decline real?

- Guzman & Stern (2020): Model for identifying high-potential entrepreneurs at (or shortly after) founding



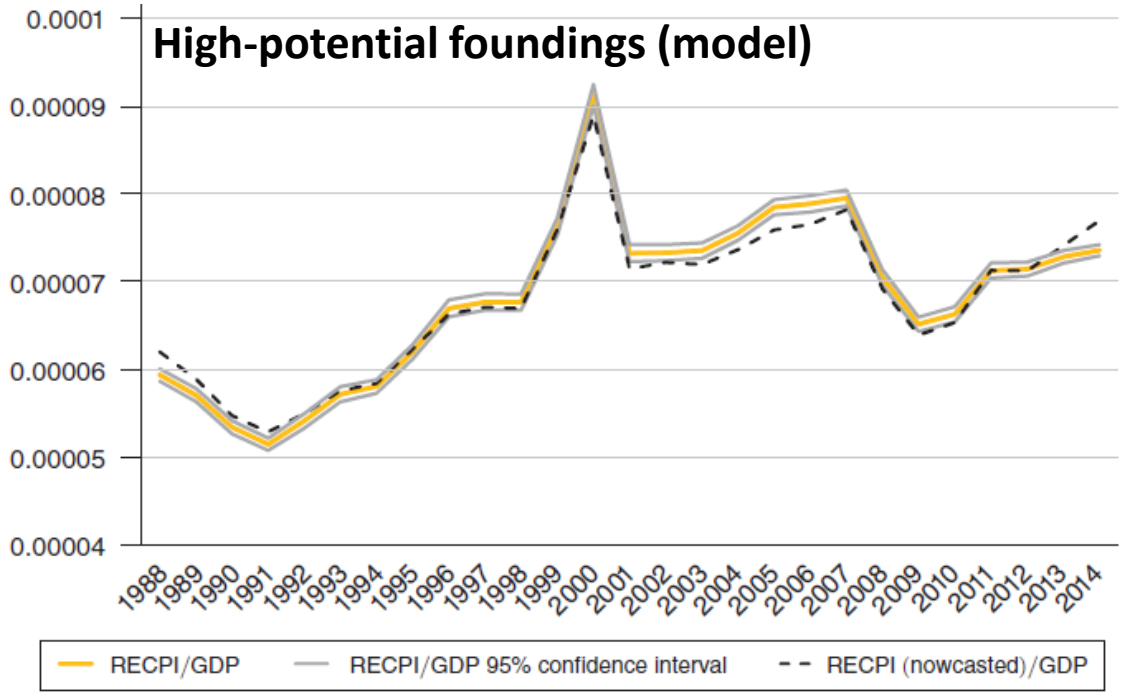


FIGURE 3. US AGGREGATE ENTREPRENEURSHIP REGIONAL ENTREPRENUERSHIP COHORT POTENTIAL INDEX (RECPI) BY YEAR

- Model says: High-potential foundings still robust after 2000
- But… outcomes lower than model expects
  - Consistent with post-2000 decline in high-growth firms & tech documented elsewhere

Explaining the (pre-pandemic) decline in dynamism

- Demographics (1980s?), regulation likely play some role
- Changing business models
  - Retail consolidation apparent in pre-2000 period—productivity enhancing
  - Shift to nonemployers?
- Market power story matches aggregate time series; less apparent in industry cross section
  - Some debate over markup measurement; e.g. Bond et al. (2021); Foster, Haltiwanger, & Tuttle (2024)
- Slowing knowledge diffusion, rising intangibles—potential stories especially for post-2000 decline of high-growth startups
- High-potential foundings (Guzman & Stern 2020) can still be robust without converting to growth outcomes

There is likely no single explanation for the 40-year dynamism decline.