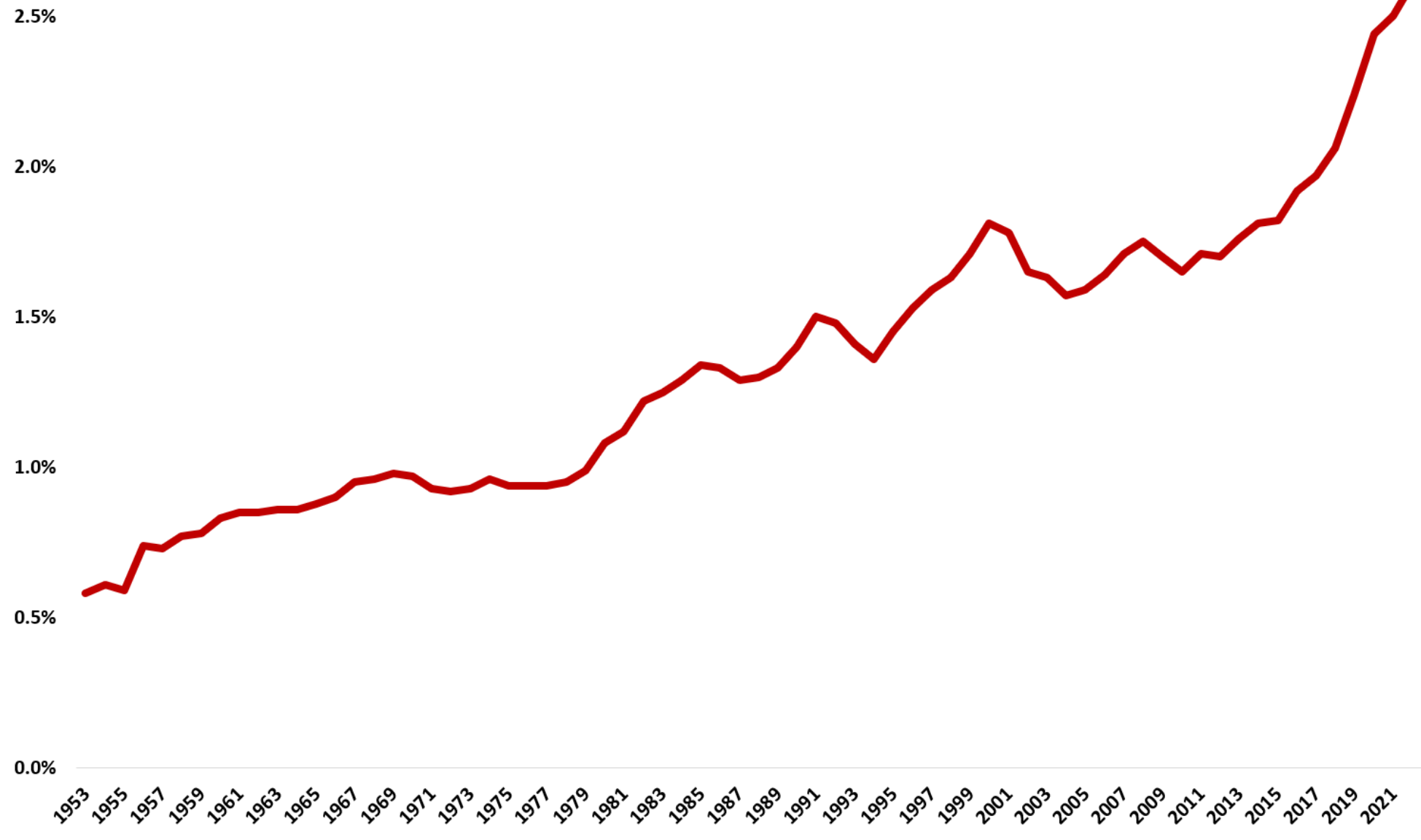


Innovation Paradox and Industrial Policy

Ufuk Akcigit
University of Chicago

October 27, 2024

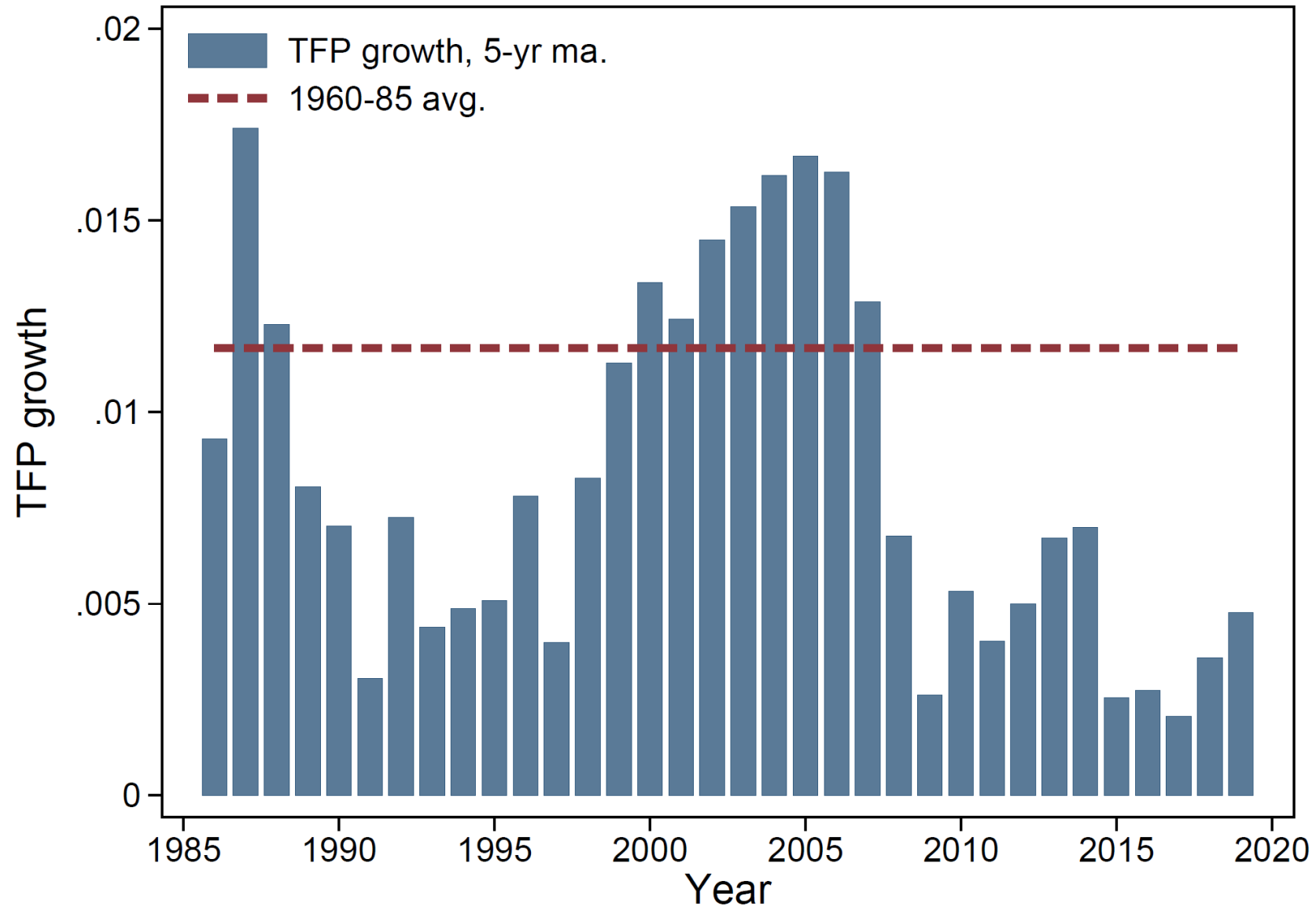
Business R&D / GDP



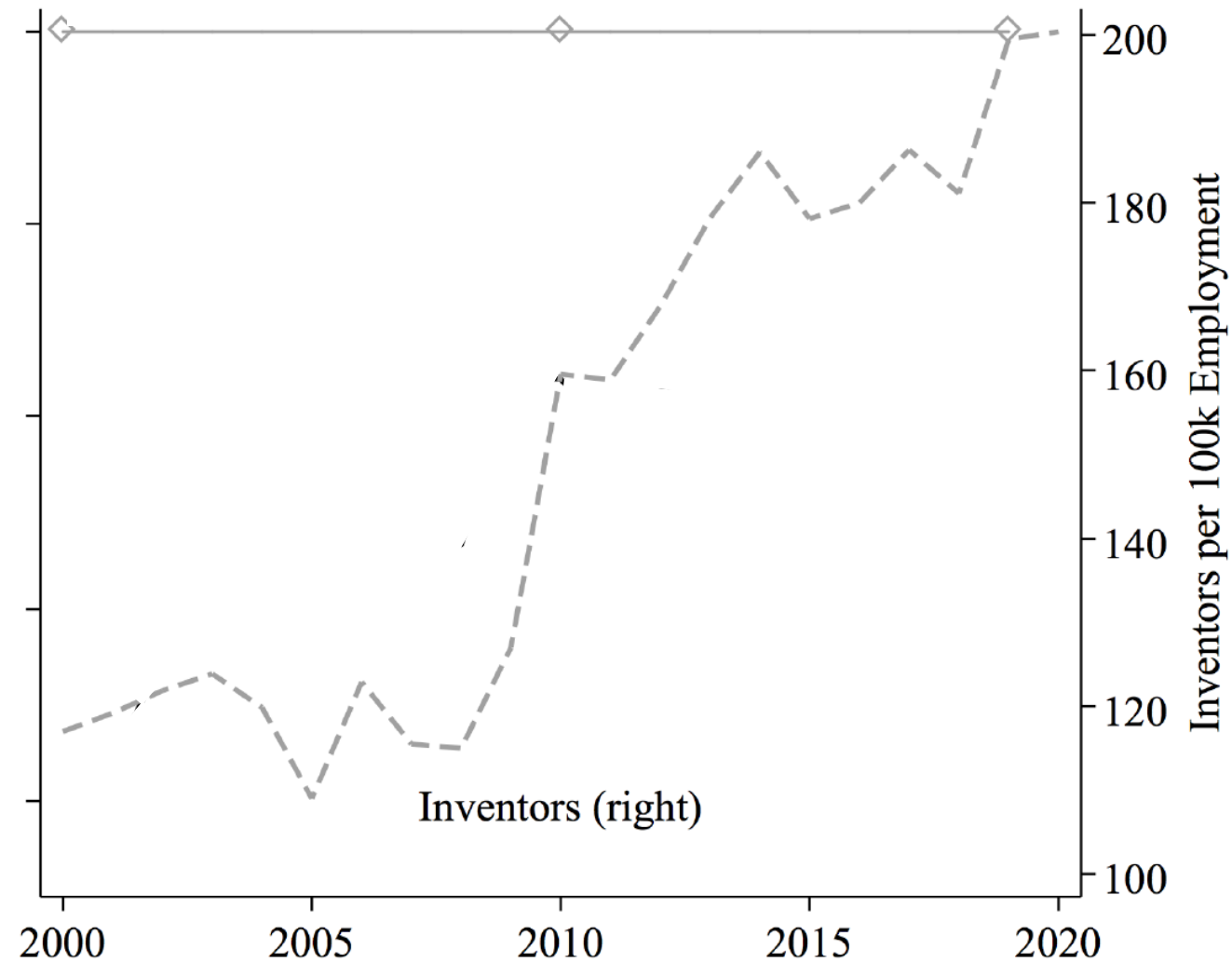
R&D Investment vs Productivity Growth

- With the increase in R&D efforts, all growth models predict a boost in economic growth.
- What does the data show about productivity dynamics?

TFP Growth

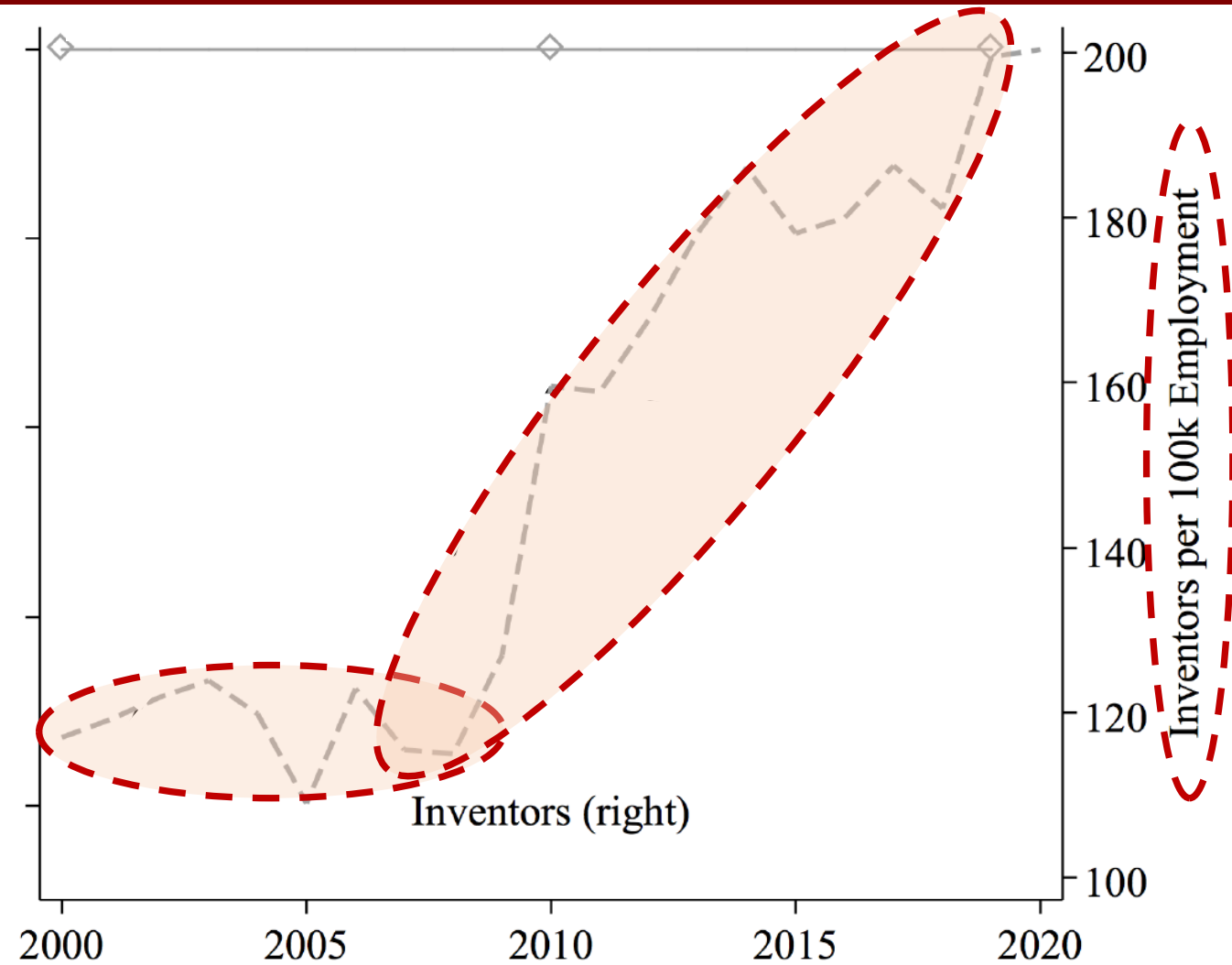


Inventor Employment Dynamics



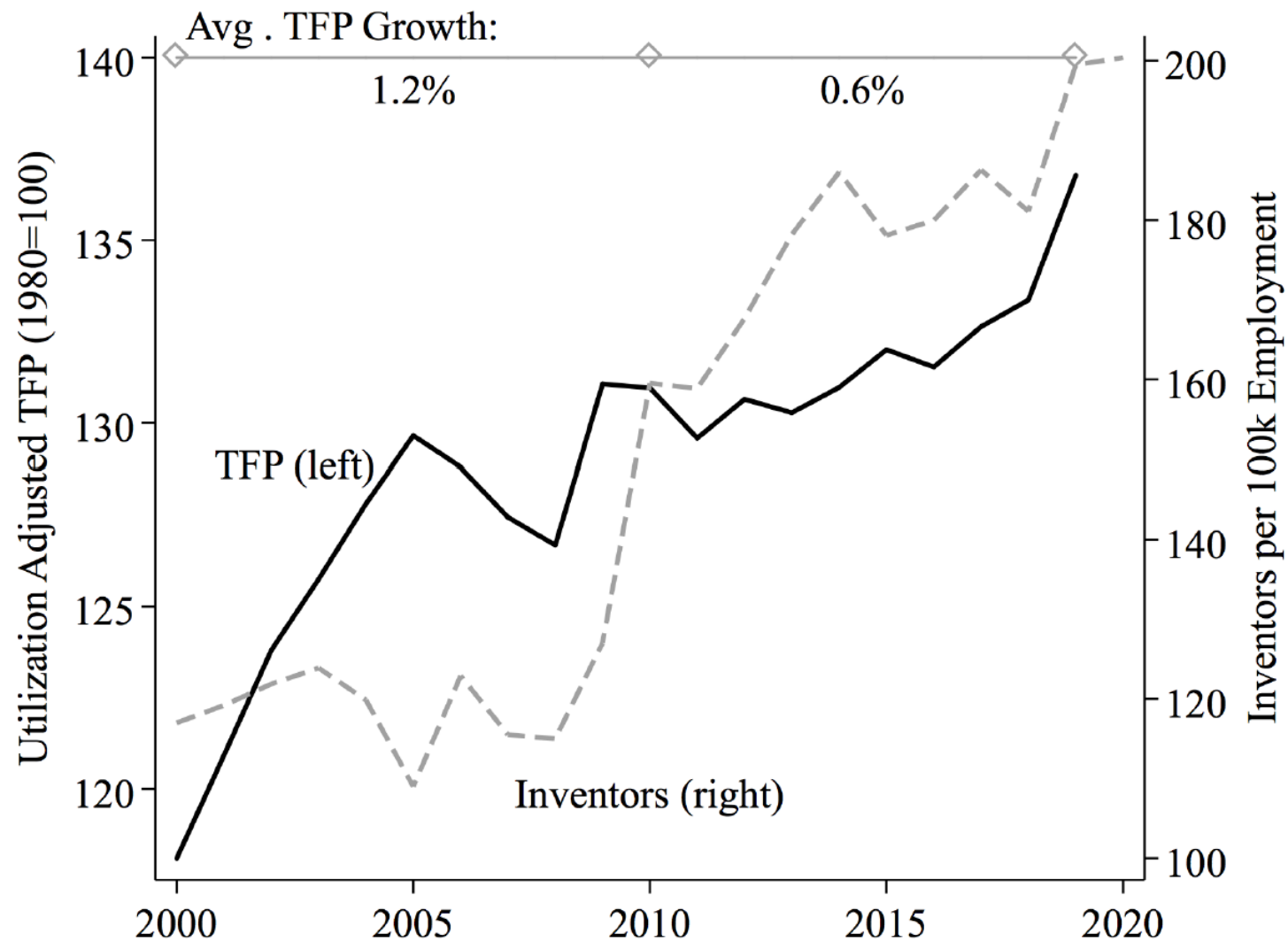
(A) TFP & INVENTORS

Inventor Employment Dynamics



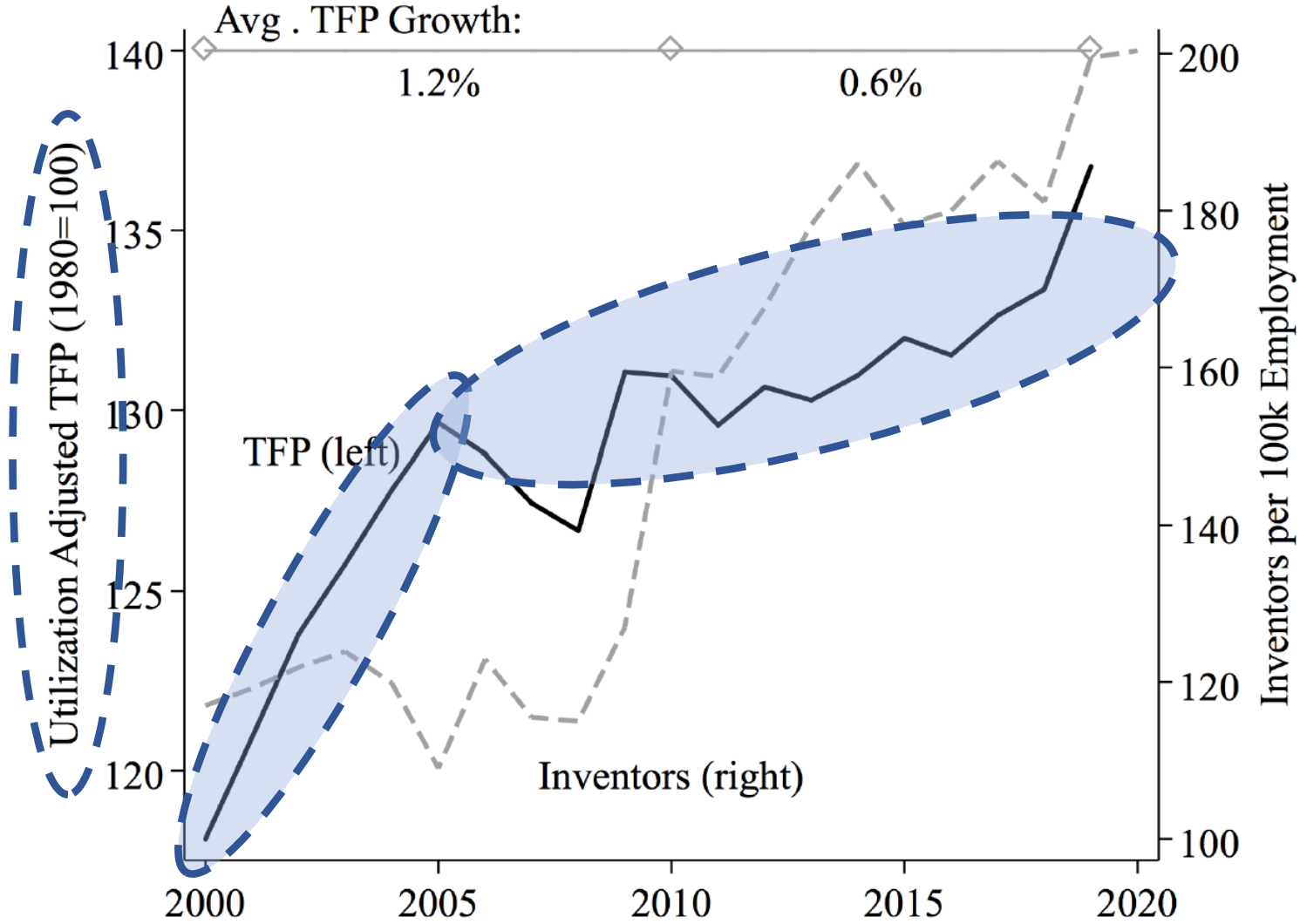
(A) TFP & INVENTORS

Inventor Employment Dynamics



(A) TFP & INVENTORS

Inventor Employment Dynamics



(A) TFP & INVENTORS

Why do higher investments in innovation in the U.S. result in lower returns over time?

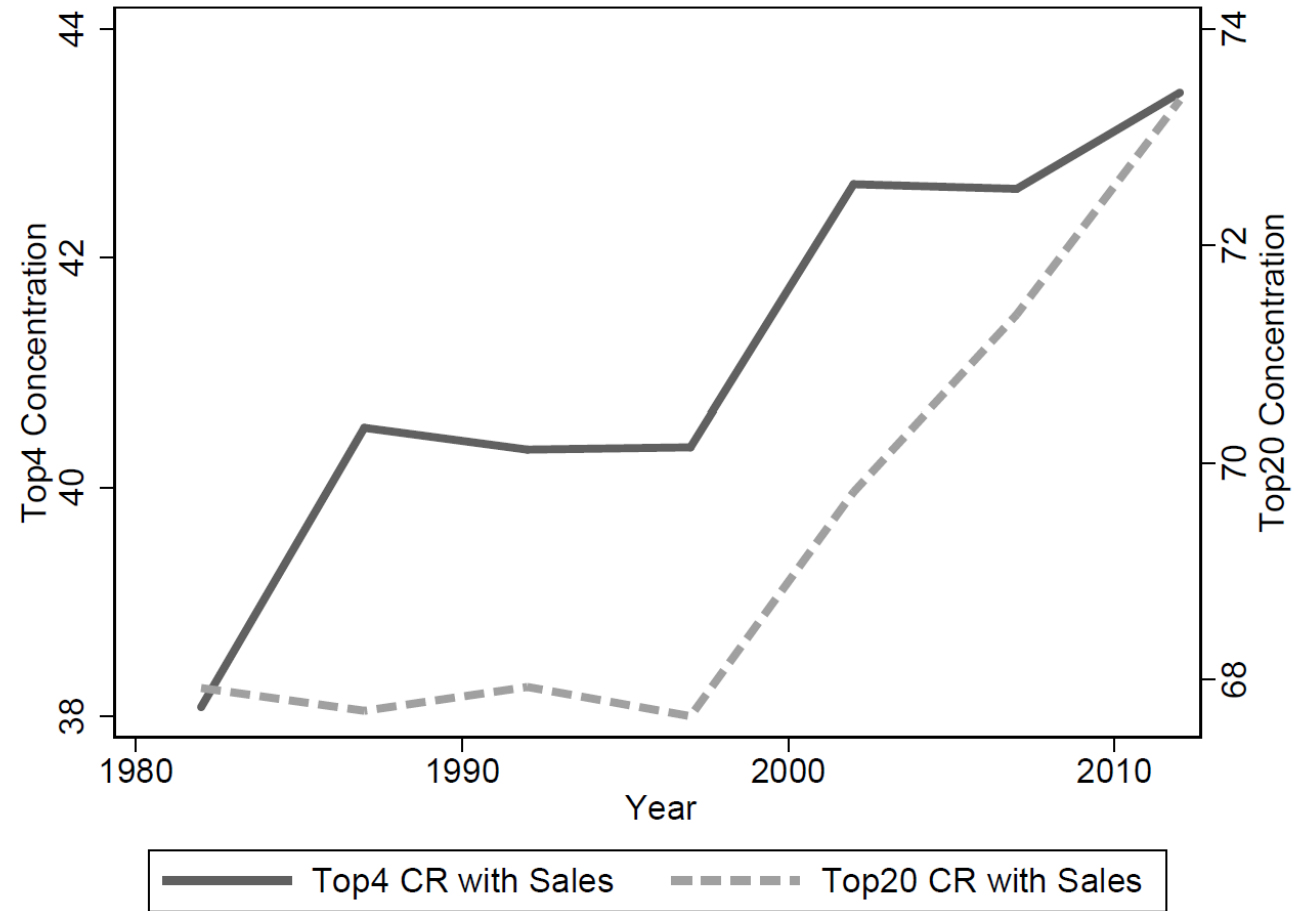
Why do higher investments in innovation in the U.S. result in lower returns over time?

Need to examine not only the total R&D investment but also its composition!

Firm Dynamics in the US

Fact 1: Market Concentration Has Risen

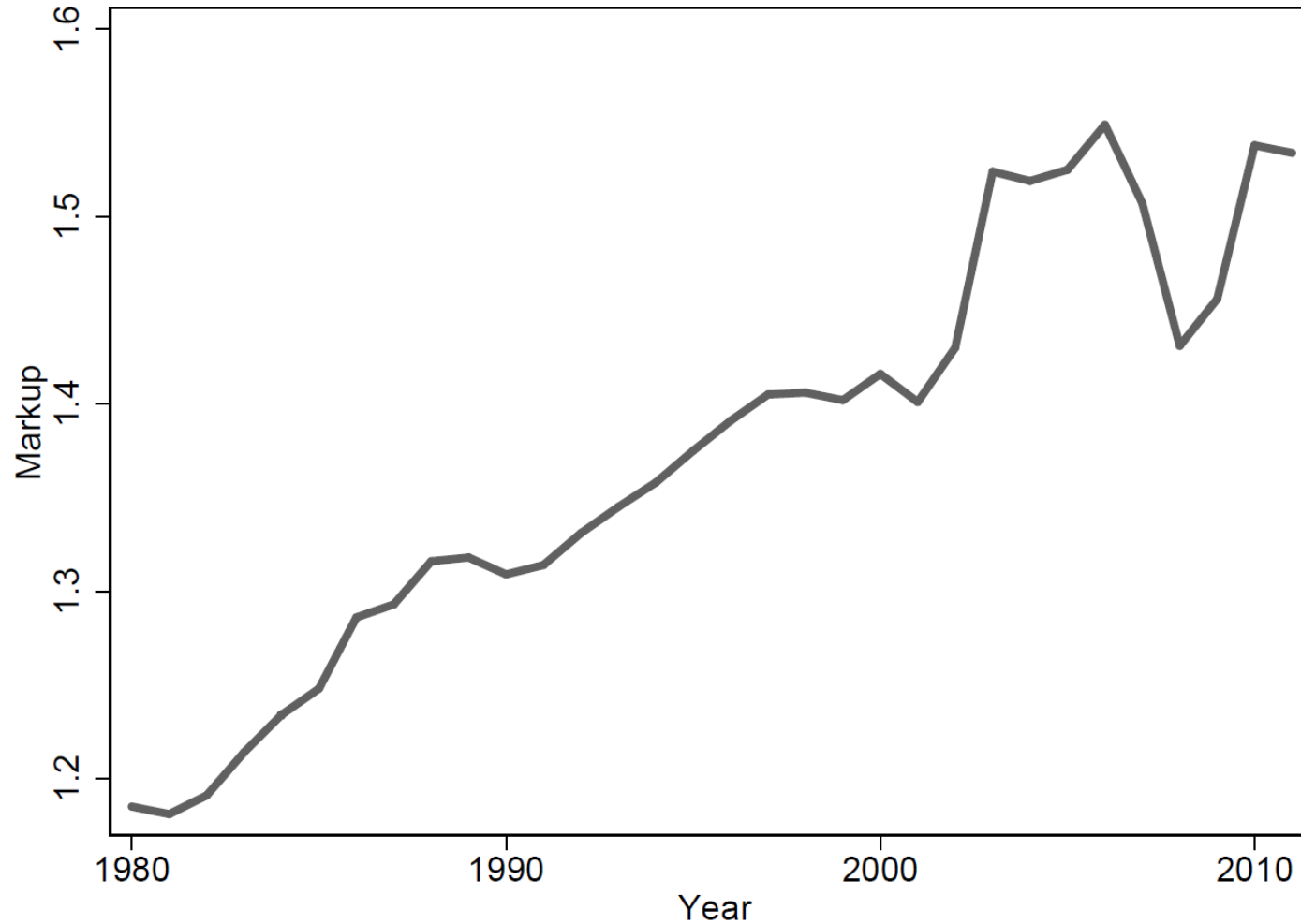
Figure: MARKET CONCENTRATION IN MANUFACTURING



Source: Autor, Dorn, Katz, Patterson, and Van Reenen
(2017).

Fact 2: Average Markup Has Increased

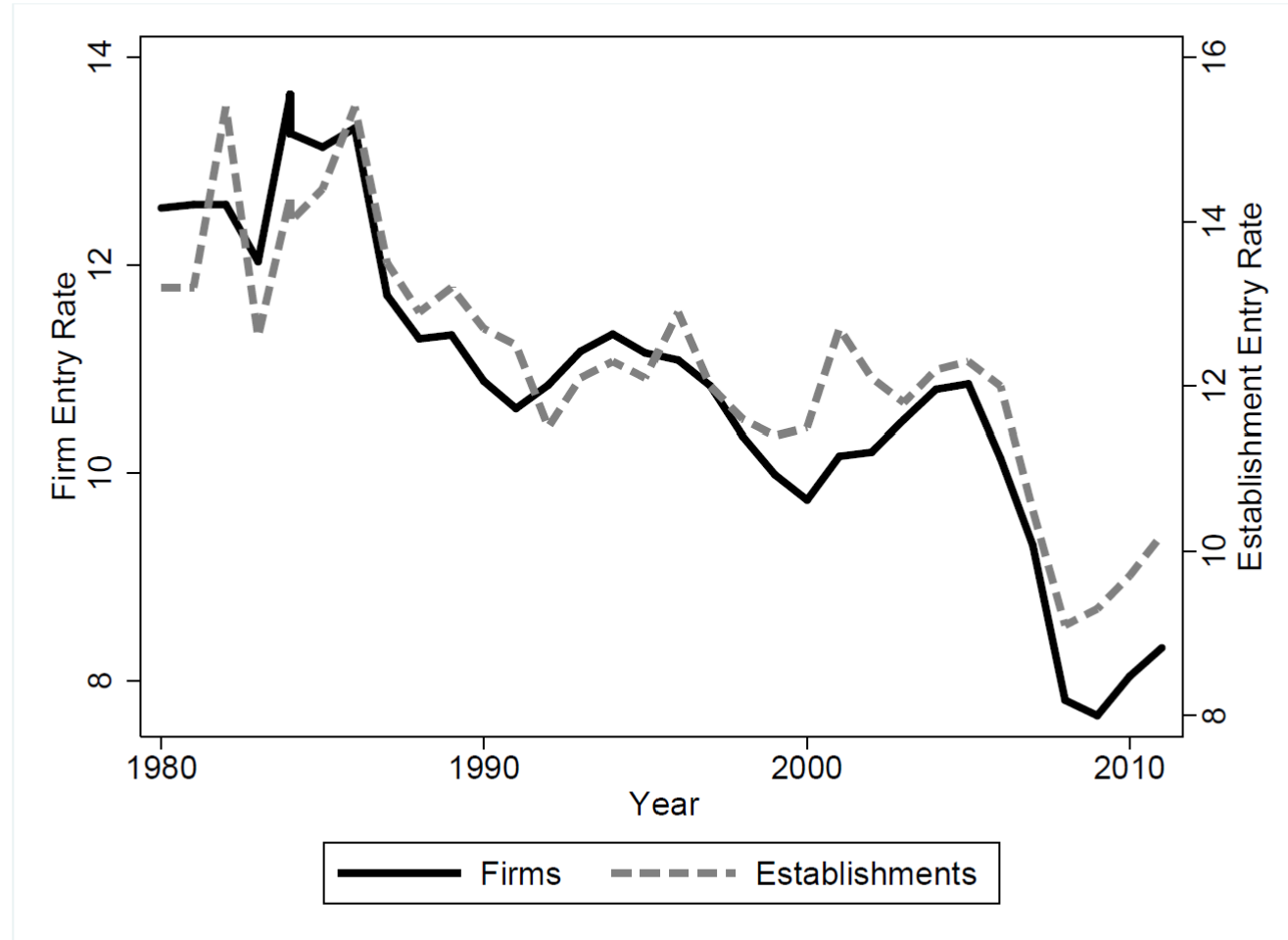
Figure: AVERAGE MARKUP OVER TIME



Source: De Loecker and Eeckhout (2017).

Fact 7: Firm Entry Rate Has Decreased

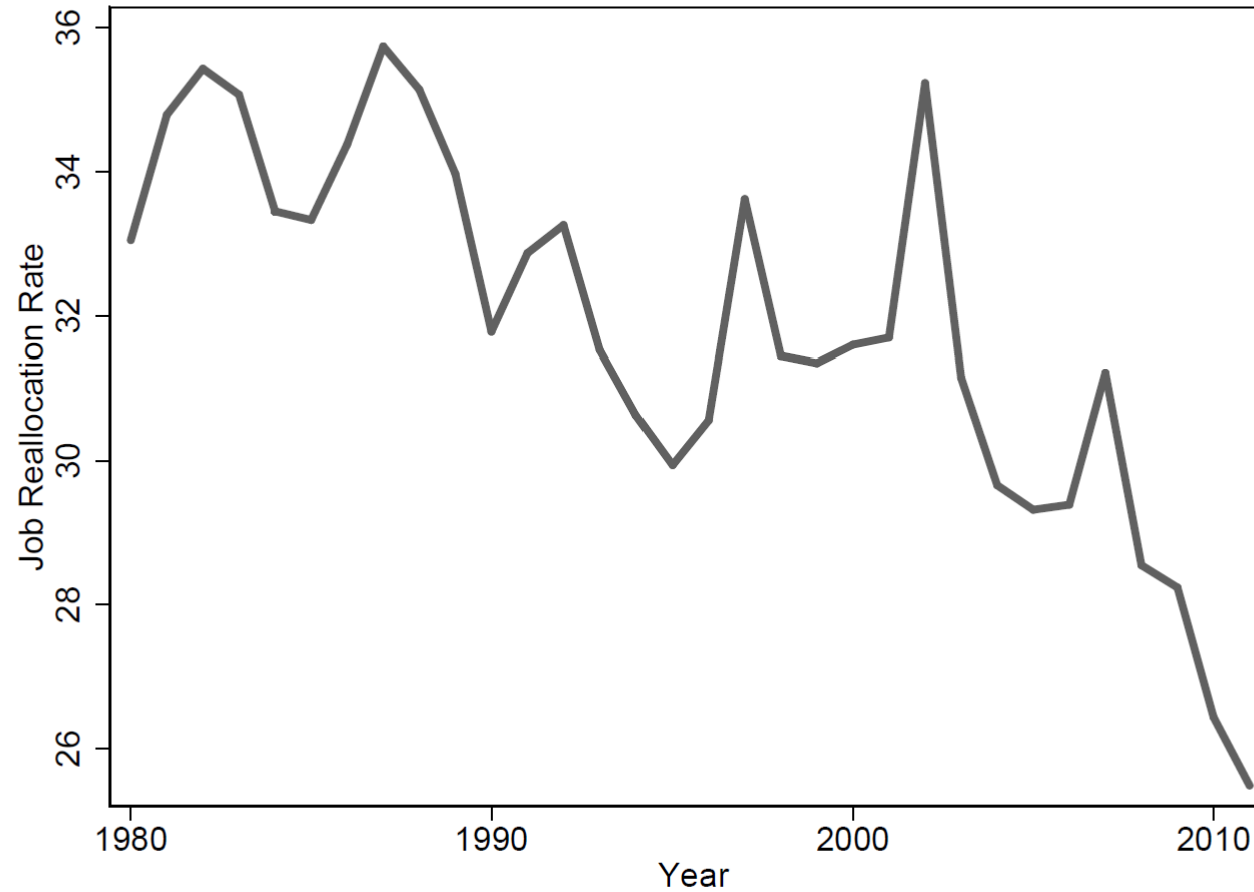
Figure: FIRM AND ESTABLISHMENT ENTRY RATES IN THE UNITED STATES



Source: Authors' calculations from BDS database [see also Decker, Haltiwanger, Jarmin, and Miranda (2016a).

Fact 9: Job Reallocation Has Slowed Down

Figure: GROSS JOB REALLOCATION

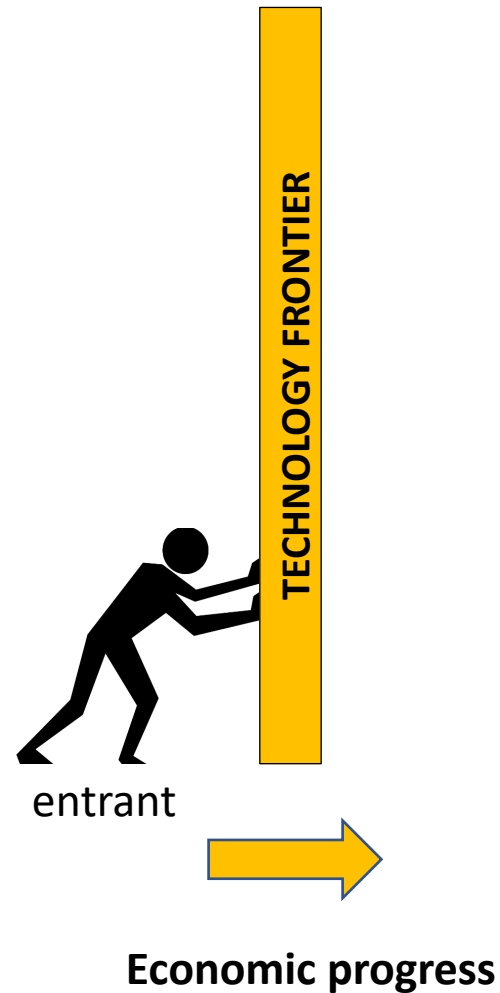


Source: Decker, Haltiwanger, Jarmin, and Miranda (2016a).

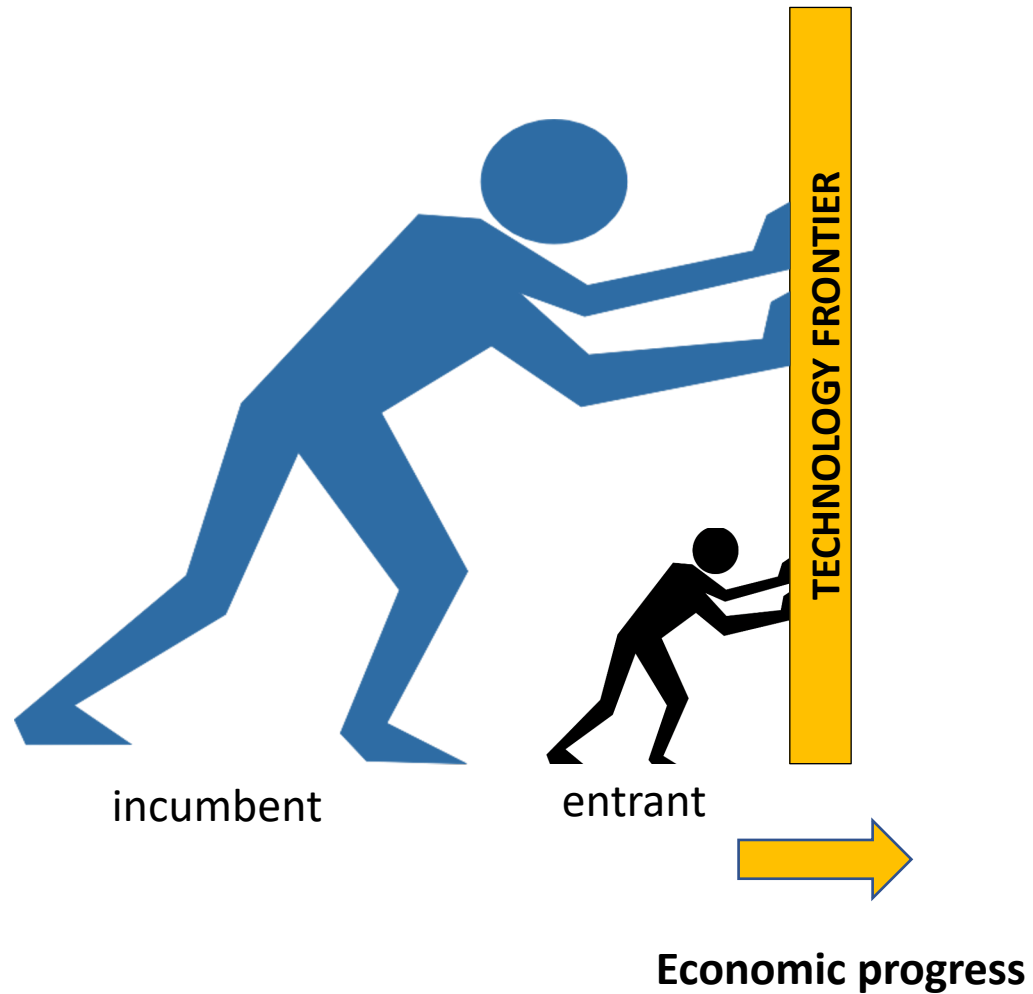
Summary: 10 Facts on US Business Dynamism

- The US economy has been experiencing a decline in its business dynamism:
 1. Market concentration has risen.
 2. Average markups have increased.
 3. Average profits have increased.
 4. The labor share of output has gone down.
 5. Market concentration and the labor share are negatively associated.
 6. The labor productivity gap between frontier and laggard firms has widened.
 7. Firm entry rate has declined.
 8. The share of young firms in economic activity has declined.
 9. Job reallocation has slowed down.
 10. The dispersion of firm growth has decreased.

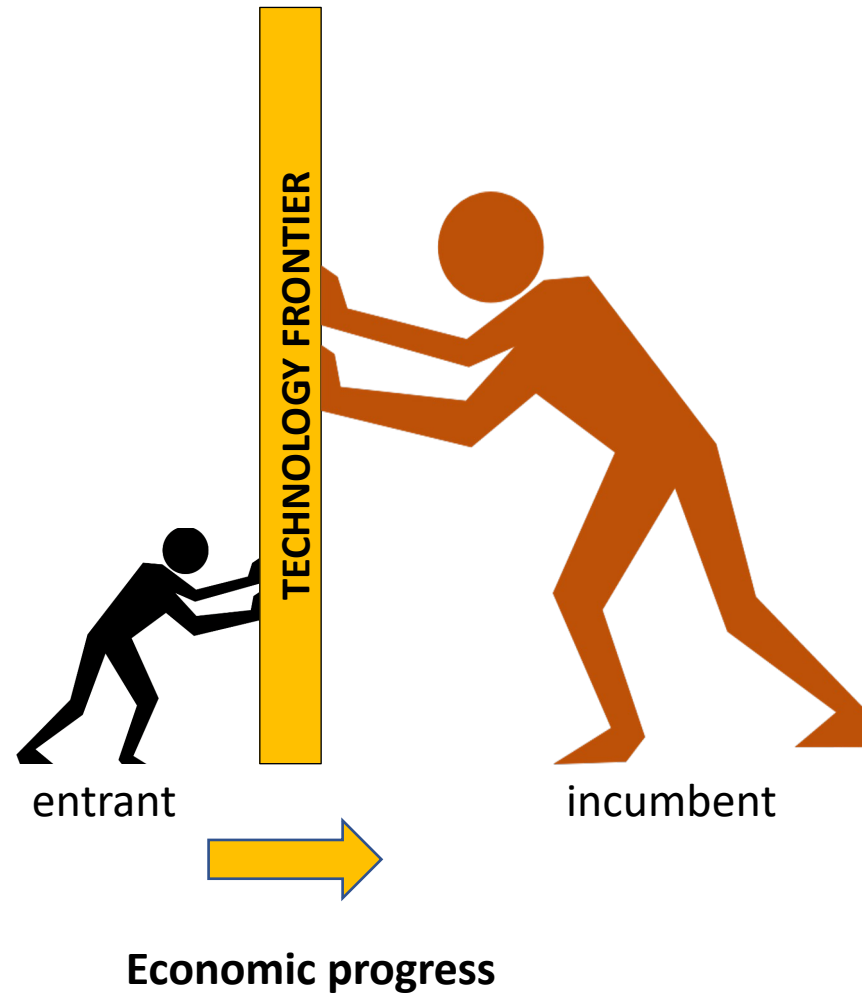
Entrants push the frontier through creative destruction



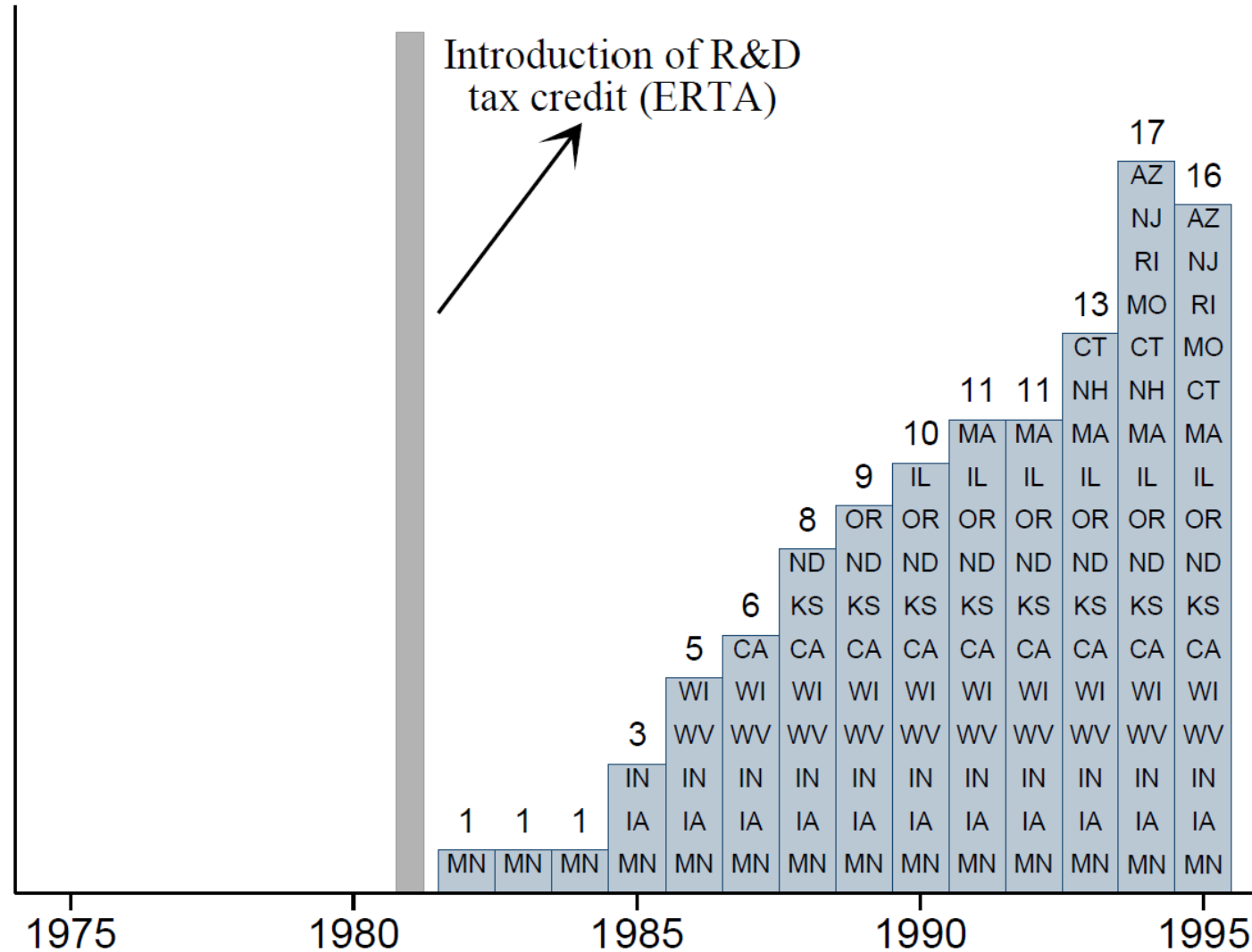
Incumbent joins the competition



Incumbent strategically resists the change

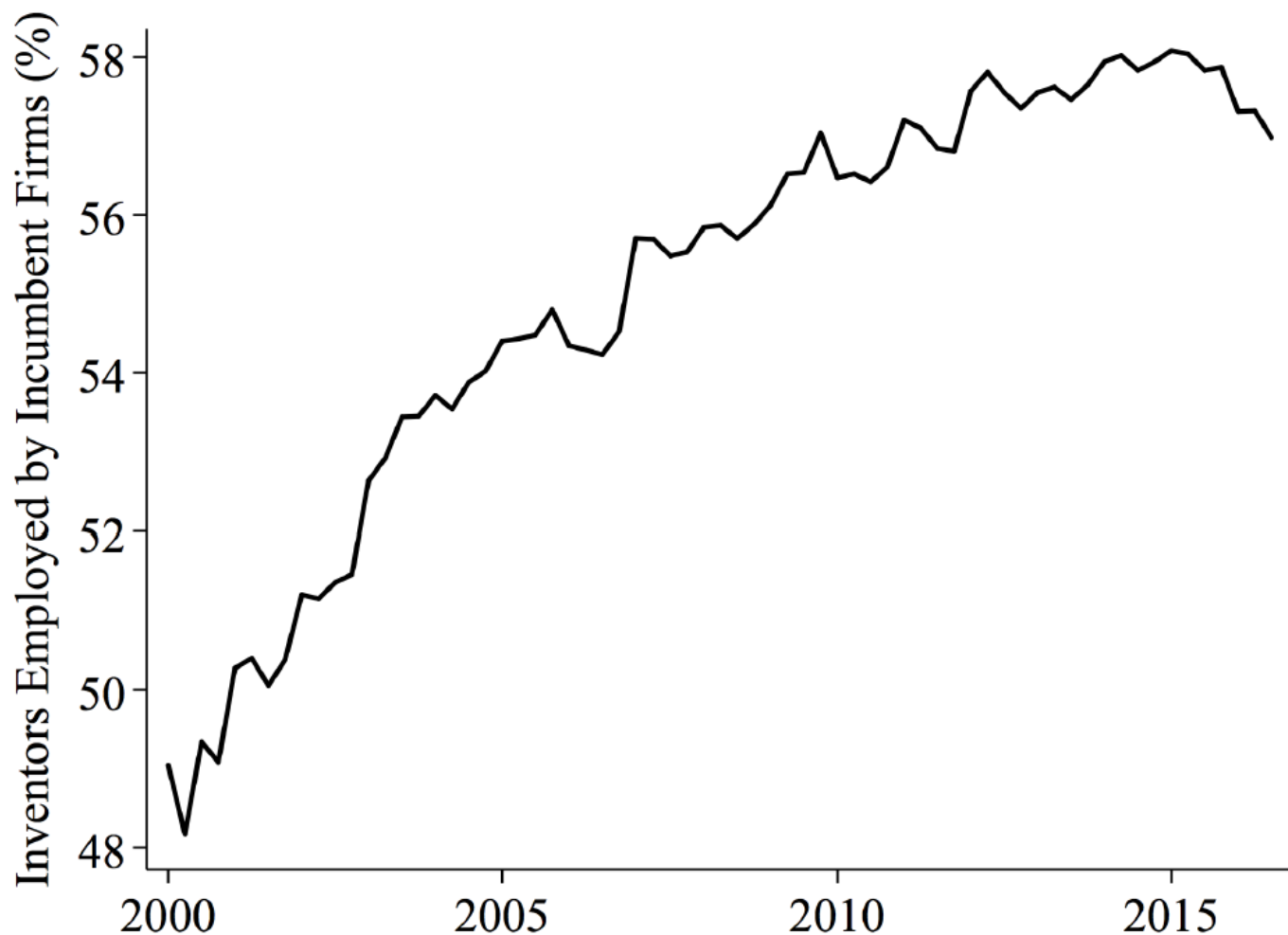


Federal and State-level R&D Tax Credit in the US



Talent (Inventor) Allocation in the US

Where Inventors Gather: The Pull of Big Companies



(B) INVENTORS AT INCUMBENT FIRMS

Inventors are increasingly clustering within large incumbent firms.

Incumbent firms $\equiv$
 ≥ 1000 employee, ≥ 20 years old.

Role of Different Sized Firms for Innovation

Figure: Innovation Intensity by Firm Size

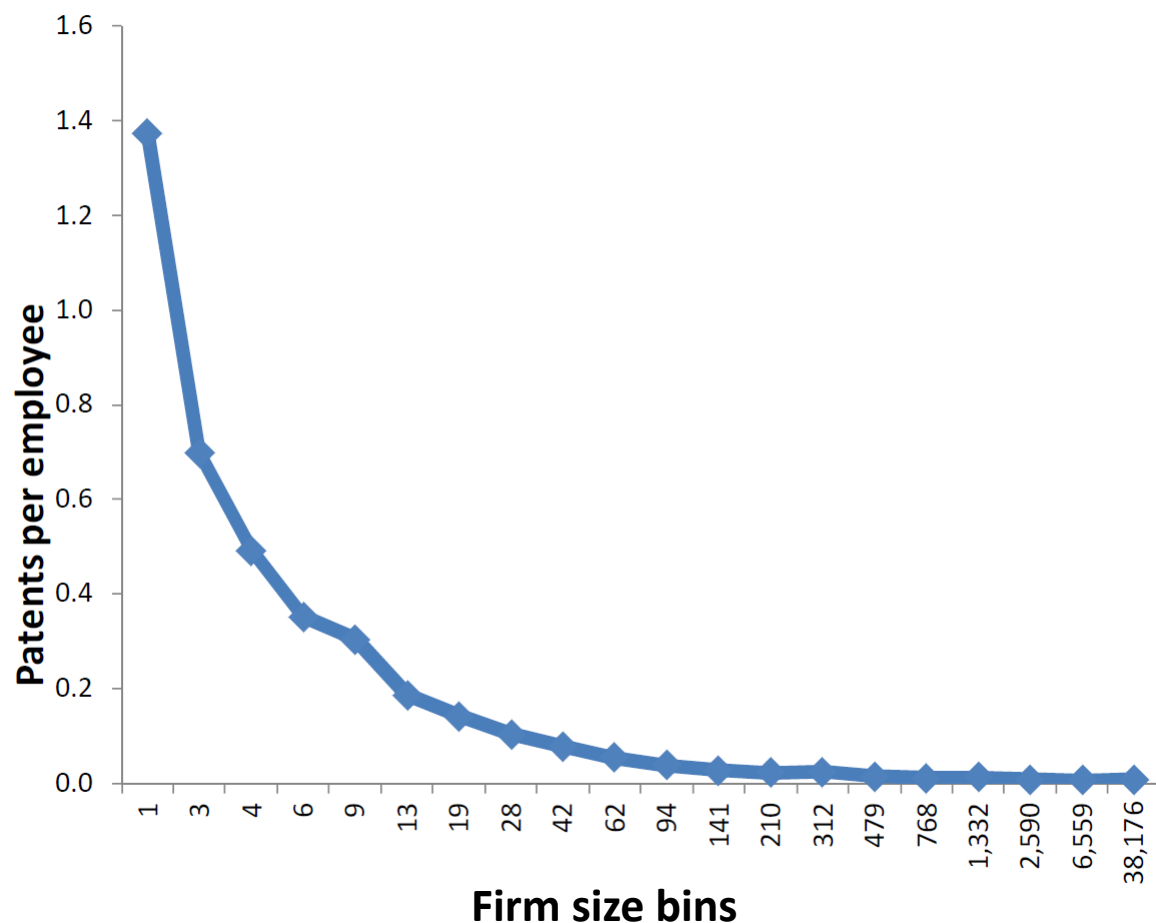
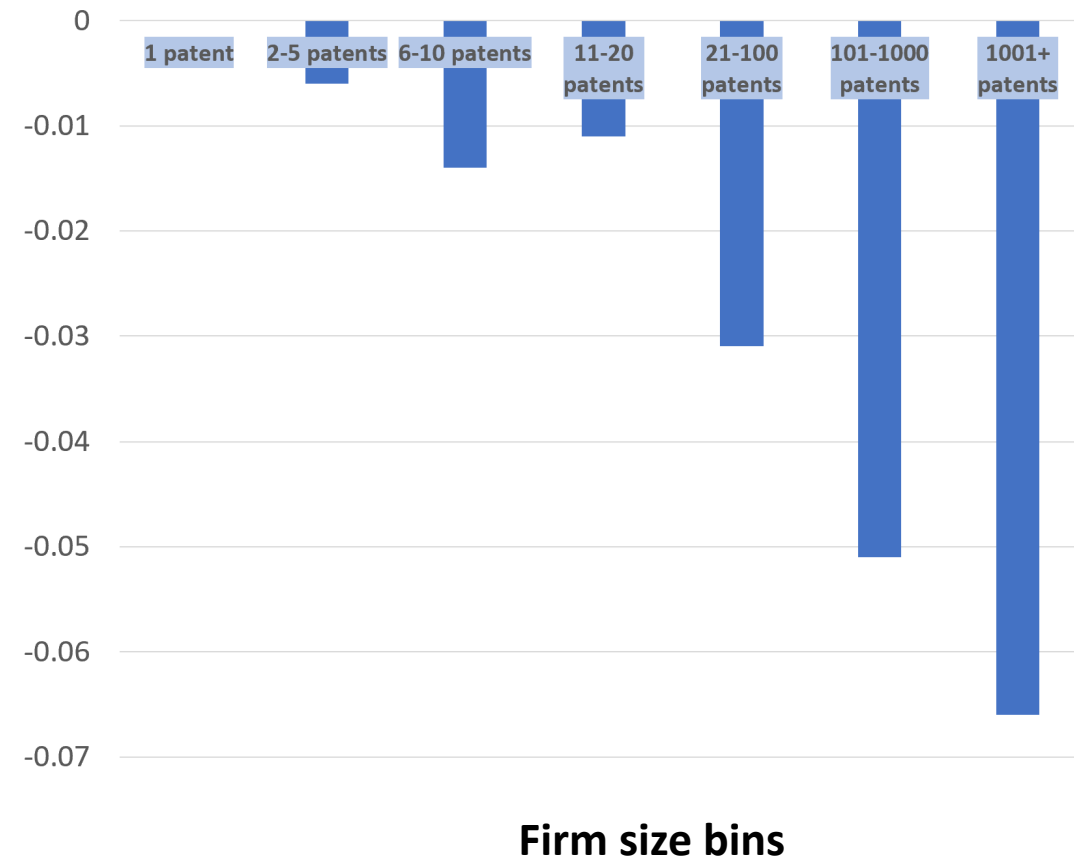


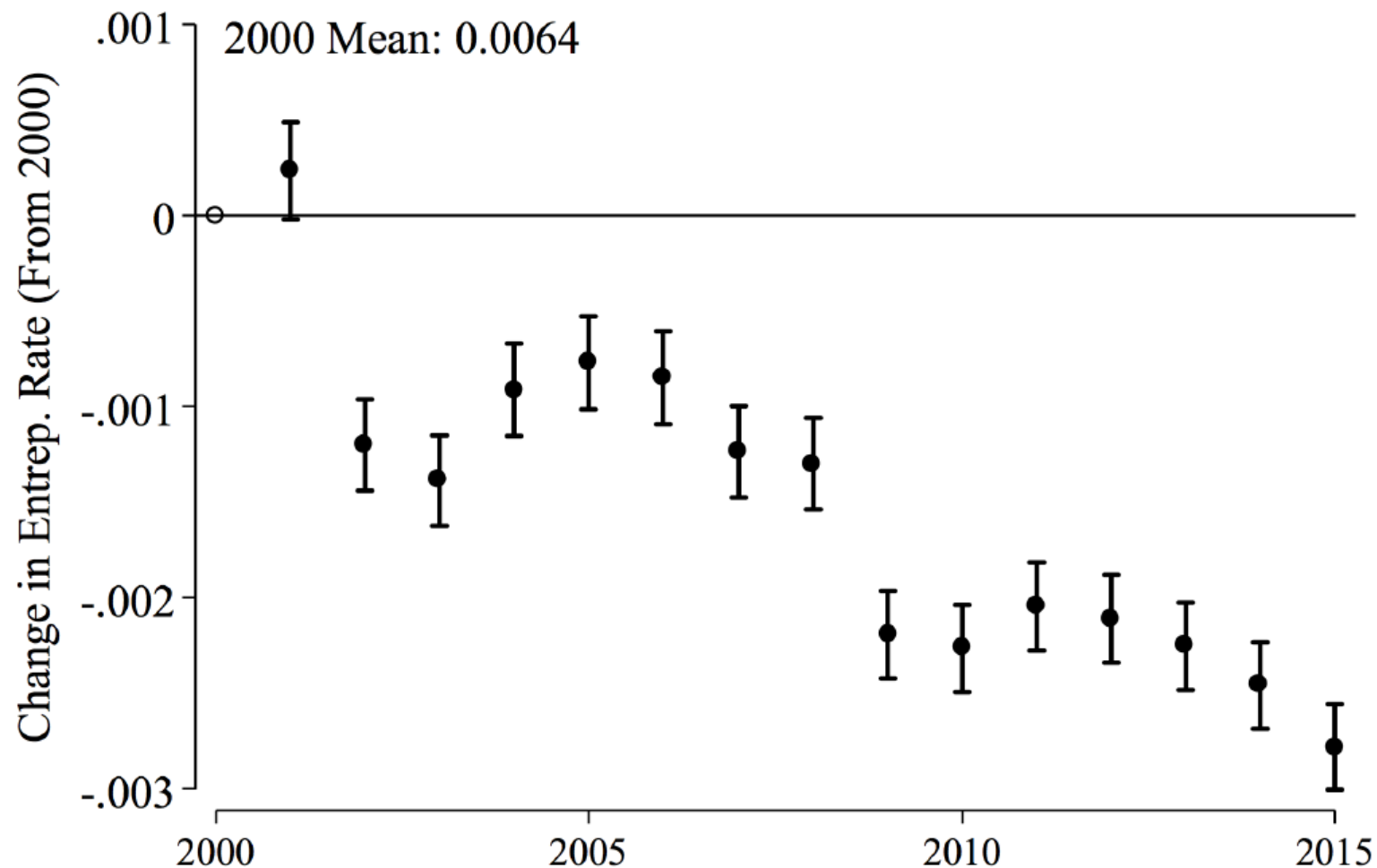
Figure: Fraction of Major Innovations by Firm Size



Source: Akcigit and Kerr (2018, JPE)

Data: US Census Bureau

Inventor-Entrepreneurship Dynamics

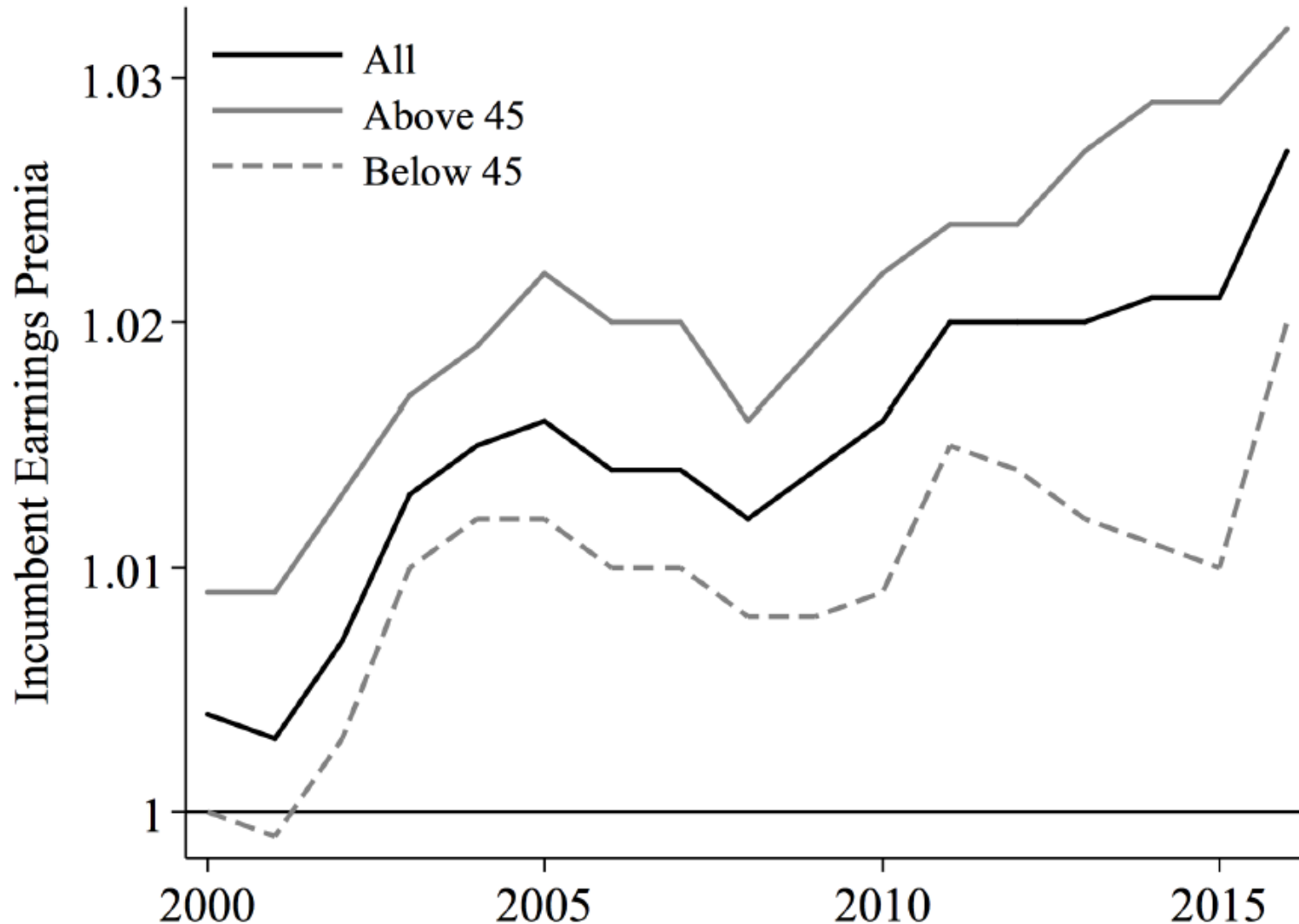


Entrepreneurship rate of inventors dropped by **44%** in 15 years.

(A) DECLINING INVENTOR ENTREPRENEURSHIP

Source: Akcigit and Goldschlag (2022)

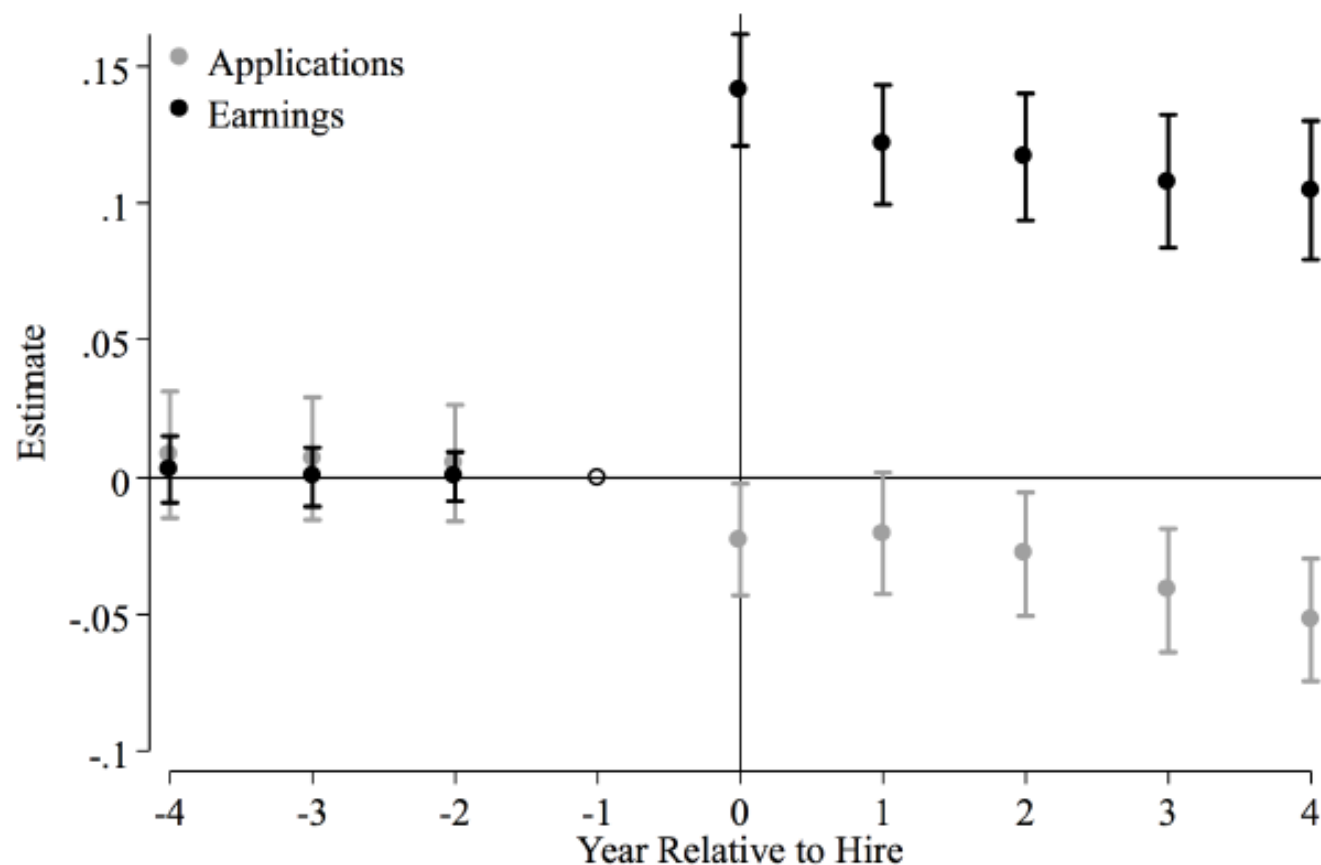
Incumbent Earnings Premium



Incumbents pay more to inventors over time. Relative incumbent pay to inventors **(incumbent premium)** increases by **20%**.

Event Study: Job-to-Job Transitions

FIGURE 4: YOUNG AND INCUMBENT INVENTOR HIRES

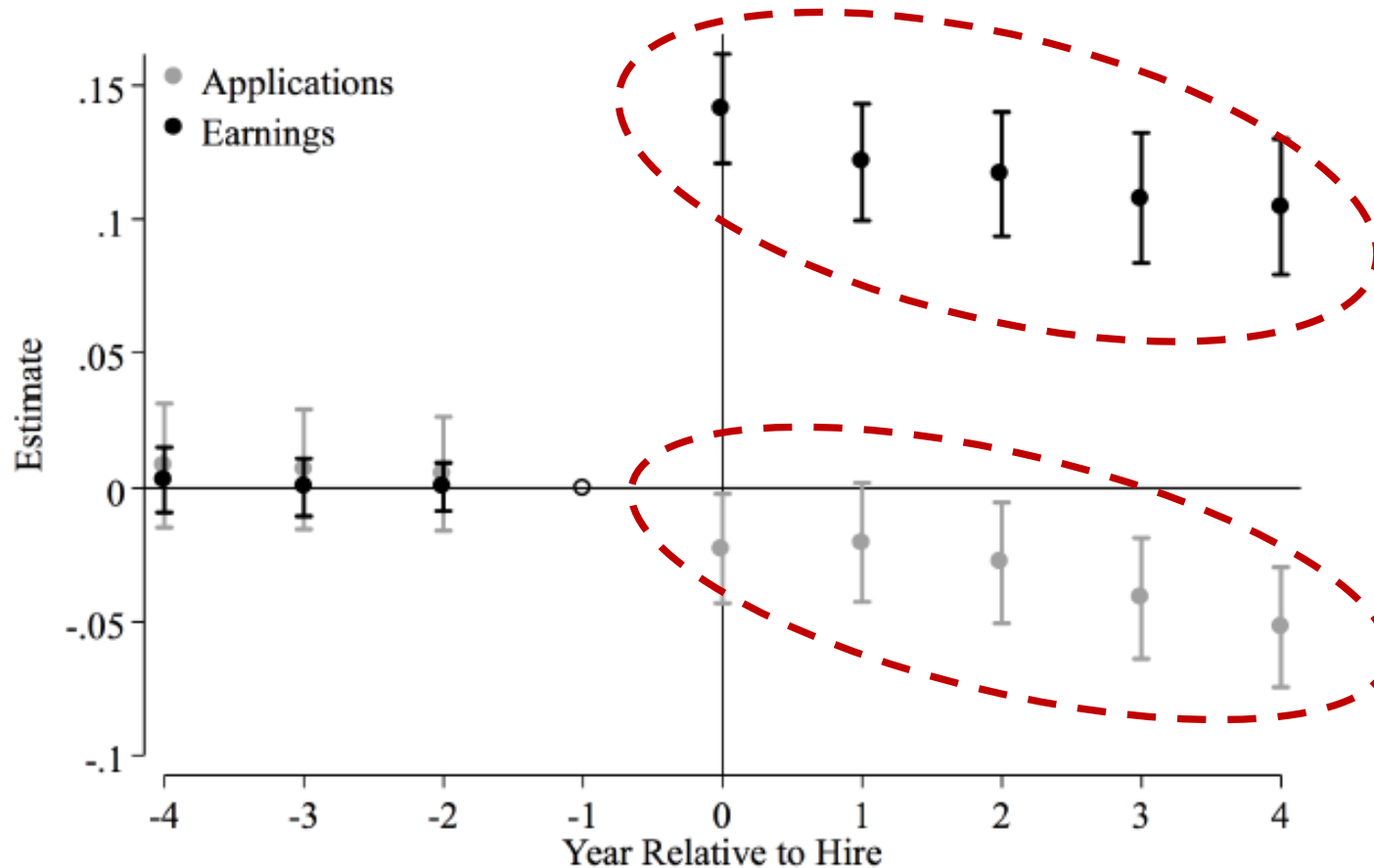


Source: Akcigit and Goldschlag (2023)

Data: US Census Bureau

Event Study: Job-to-Job Transitions

FIGURE 4: YOUNG AND INCUMBENT INVENTOR HIRES



Upon moving to an incumbent (relative to moving to young), inventor **earnings increase by 12%** and **innovation declines by 6%.**

Source: Akcigit and Goldschlag (2023)
Data: US Census Bureau

Firm Outcomes after Poaching

TABLE A7: SUPER STAR STARTUP INVENTOR POACHING, FIRM OUTCOMES

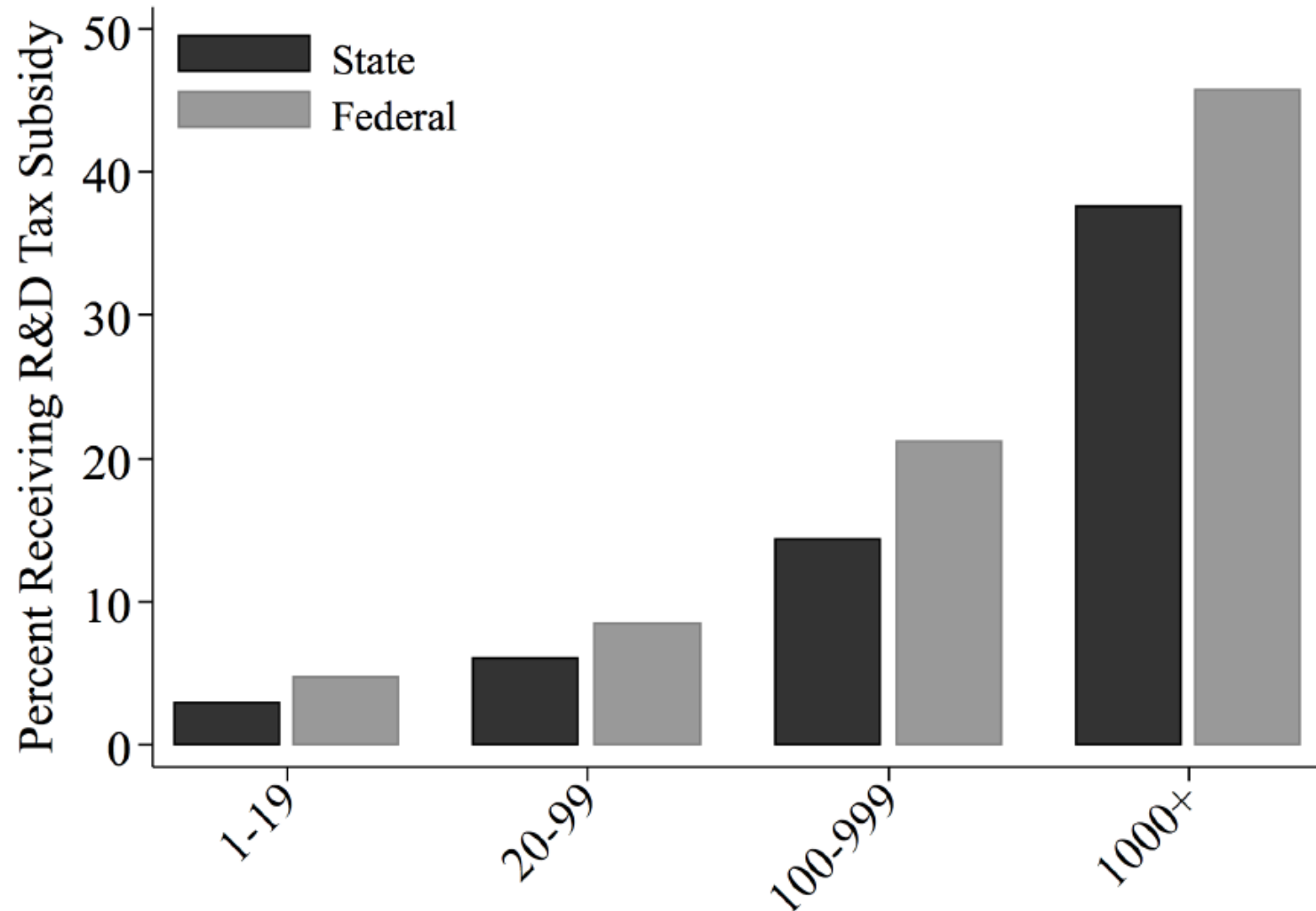
	Change in Employment	Change in Employment
Treated	-.06226*** (.01231)	
Post	.5647*** (.01314)	.5132*** (.01321)
Post × Treated	-.05113*** (.01874)	-.04681** (.01915)
Firm FE	N	Y
R ²	.1876	.4785
N	14000	14000
Pre-Hire Means		
Treated	75.02 166.7	
Control	74.78 163.7	

Superstar startups
experience a **10%**
slower growth in
employment after
their inventor being
poached by an
incumbent.

Policy Implications

Who Utilizes Government Subsidy?

FIGURE 7: FIRM SIZE AND R&D TAX CREDITS



Large corporations disproportionately utilize more government **R&D subsidies** compared to small firms.

Industry-States, R&D Subsidy, and Market Concentration

TABLE A10: R&D AND CONCENTRATION

	Large Firm Employment Share		Incumbent Inventor Share	
Has R&D Subsidy	.06557*** (.002618)	.005905*** (.002211)	.08022*** (.003243)	.01473*** (.003652)
State FE	N	Y	N	Y
Industry FE	N	Y	N	Y
R^2	.00759	.6897	.009317	.4001
N	65500	65500	56500	56500
LHS Means				
Has R&D 0	.3828 (.284)		.3619 (.3235)	
Has R&D 1	.4484 (.2395)		.4421 (.2901)	

Industry-States, R&D Subsidy, and Market Concentration

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Industries-states
implementing
R&D subsidy policies
have higher
market concentration.

Firm R&D Tax Credit (2016) and Strategic Hires

TABLE A11: FIRM R&D SUBSIDIES AND HIRES

	Hire Rate	Hires
	↑ Earnings, ↓ Apps	
R&D Tax Credit	-.0003902 (.0004846)	.0006089*** (.0001113)
Firm Size Controls	Y	Y
R ²	.0009022	.00006912
N	564000	564000
Means	.02736 (.1631)	.001579 (.0397)

Firm R&D Tax Credit (2016) and Strategic Hires

TABLE A11: FIRM R&D SUBSIDIES AND HIRES

	Hire Rate	Hires
	↑ Earnings, ↓ Apps	
R&D Tax Credit	-.0003902 (.0004846)	.0006089*** (.0001113)
Firm Size Controls	Y	Y
R ²	.0009022	.00006912
N	564000	564000
Means	.02736 (.1631)	.001579 (.0397)

Firms that leverage **government subsidies** are more likely to engage in **strategic hiring** practices (not any hiring!).

Conclusion

- **Why are R&D investments rising but productivity growth is falling?**
- Understanding aggregate productivity requires **micro-level analysis** of firm and inventor allocations.
- **Strategic behavior** observed among large incumbents influences productivity outcomes.
- Firm incentives vary by size—**heterogeneous motivations** matter.
- A more **nuanced approach** is needed to address productivity challenges.
- Poorly designed **industrial policies can worsen existing issues.**

Thank You!

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