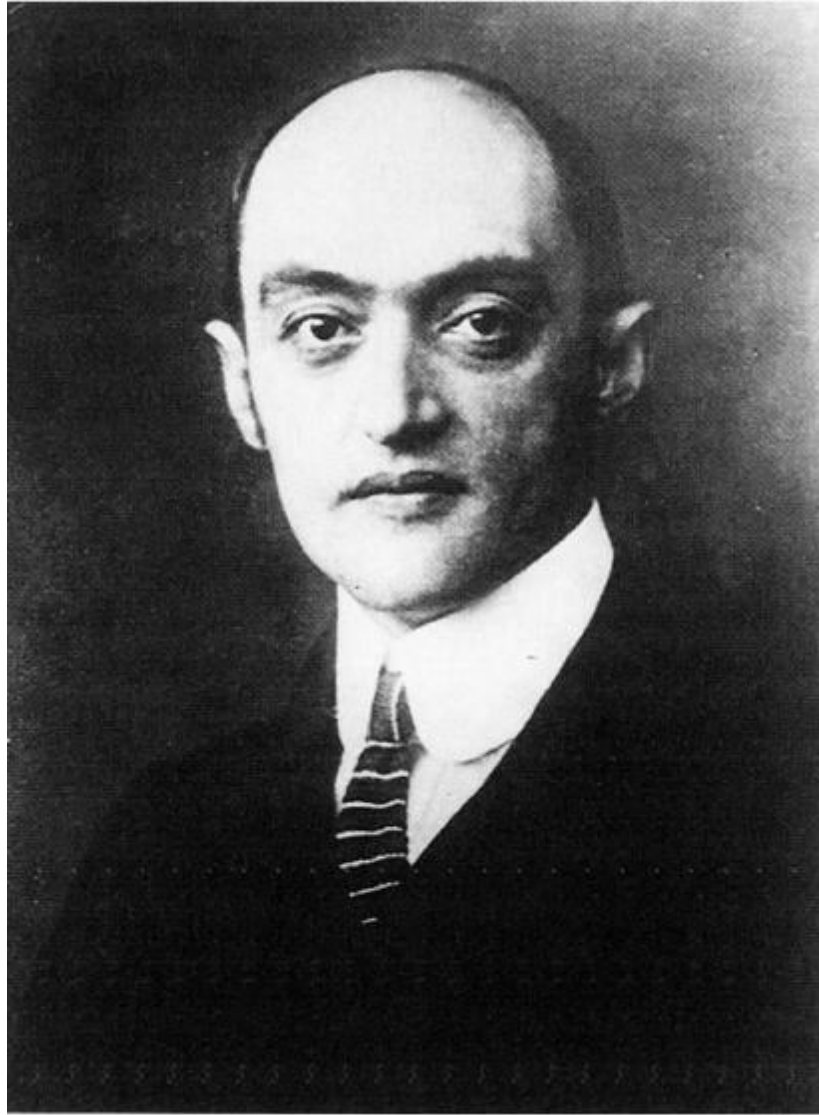


The Economics of Creative Destruction

Philippe Aghion

Nobel Lecture



CREATIVE DESTRUCTION...

- Process whereby new innovations displace old technologies
- Joseph Schumpeter in *Capitalism, Socialism and Democracy* (1942)



SCHUMPETERIAN GROWTH PARADIGM

- Long-run growth driven by cumulative process of innovation
- Innovations result from entrepreneurial activities motivated by prospect of innovation rents
- Creative destruction: new innovations displace old technologies

AT THE HEART OF THE PARADIGM

- Contradiction :
 - The innovator is motivated by prospect of monopoly rents
 - But those rents can be used *ex post* to prevent future innovations and to block new entry
- Regulating a market economy is largely about how to manage this contradiction

OUTLINE

- Aghion-Howitt (1992) in a nutshell
- Two main extensions
- Revisiting some historical enigma
- Rethinking capitalism

OUTLINE

- **Aghion-Howitt (1992) in a nutshell**
- Two main extensions
- Historical enigma
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AGHION-HOWITT MODEL (1)

- Final output produced by intermediate:

$$Y = Ay^\alpha, \quad 0 < \alpha < 1$$

- Growth results from quality-improving innovations:

$$A \rightarrow \gamma A, \quad \gamma > 1$$

- Arrival rate of innovations:

$$\lambda z$$

AGHION-HOWITT MODEL (3)

- In equilibrium:

$$z = z(\lambda, \gamma, \alpha, r)$$

- Average growth rate:

$$g = \lambda \cdot z \cdot \ln(\gamma) = g(\lambda, \gamma, \alpha, r)$$

AGHION-HOWITT MODEL (4)

Hence:

- Growth rate g is positively correlated with turnover rate λz and with quality of innovation
- Europe versus US !

OUTLINE

- Aghion-Howitt (1992) in a nutshell
- **Two main extensions**
- Historical enigma
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TWO MAIN EXTENSIONS

- **Step-by-step innovation**
- Firm dynamics

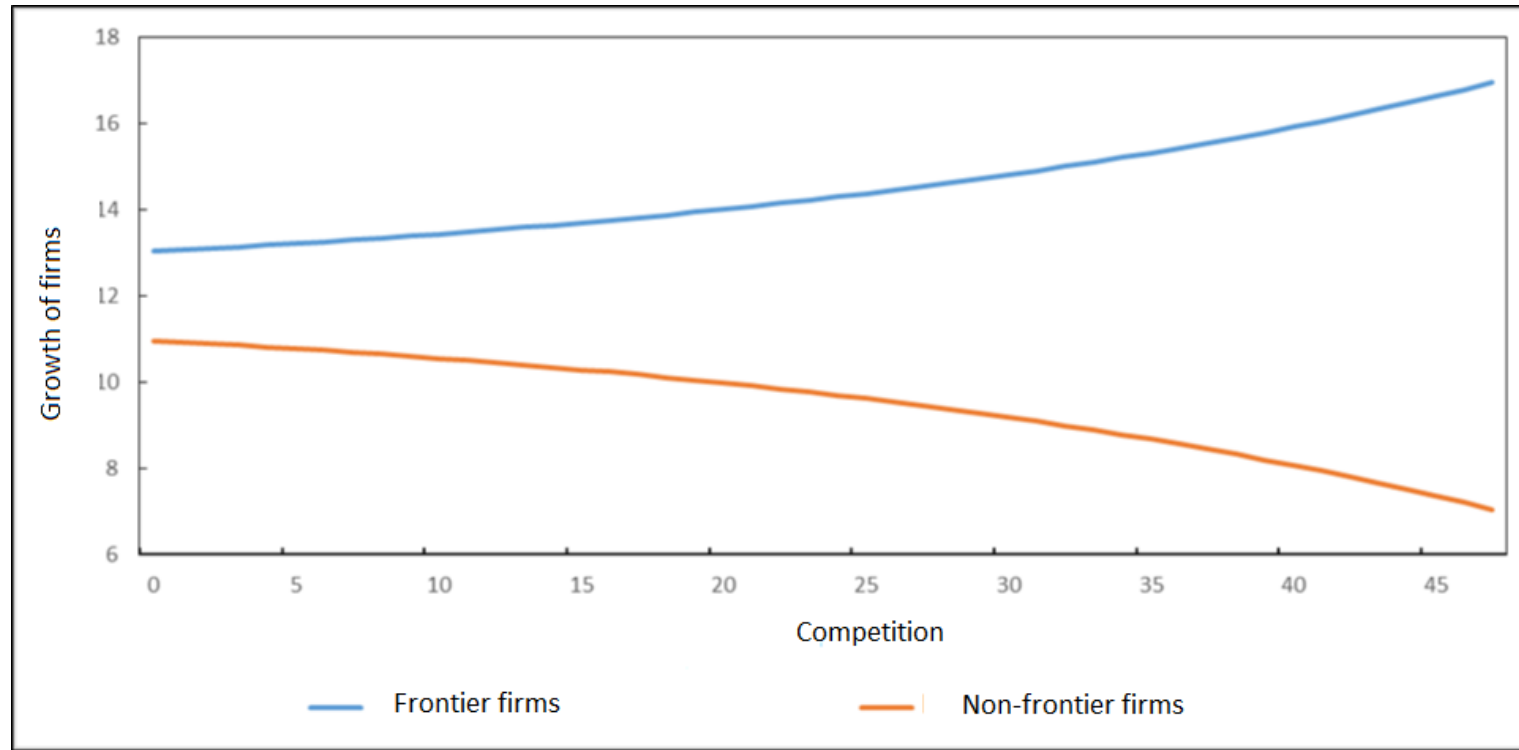
STEP-BY-STEP INNOVATION

- In basic Aghion-Howitt model, only outsiders innovate
- This removes the possibility for current incumbent firm to respond to laggard/entrant innovation
- Now assume step-by-step innovation

⇒ **escape competition effect for incumbent firms**

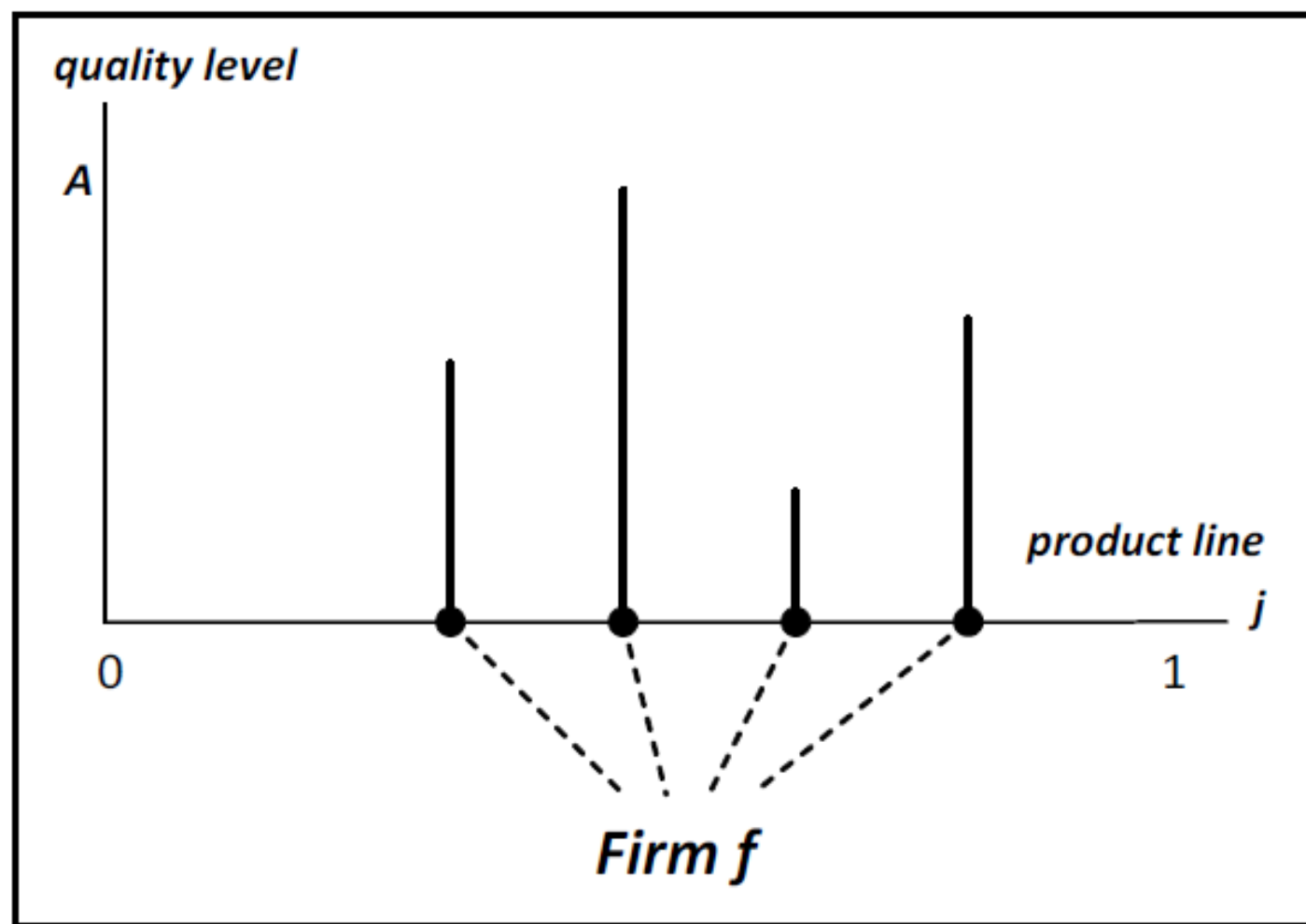
⇒ **discouragement effect for laggards/entrant firms**

COMPETITION, GROWTH AND DISTANCE TO FRONTIER

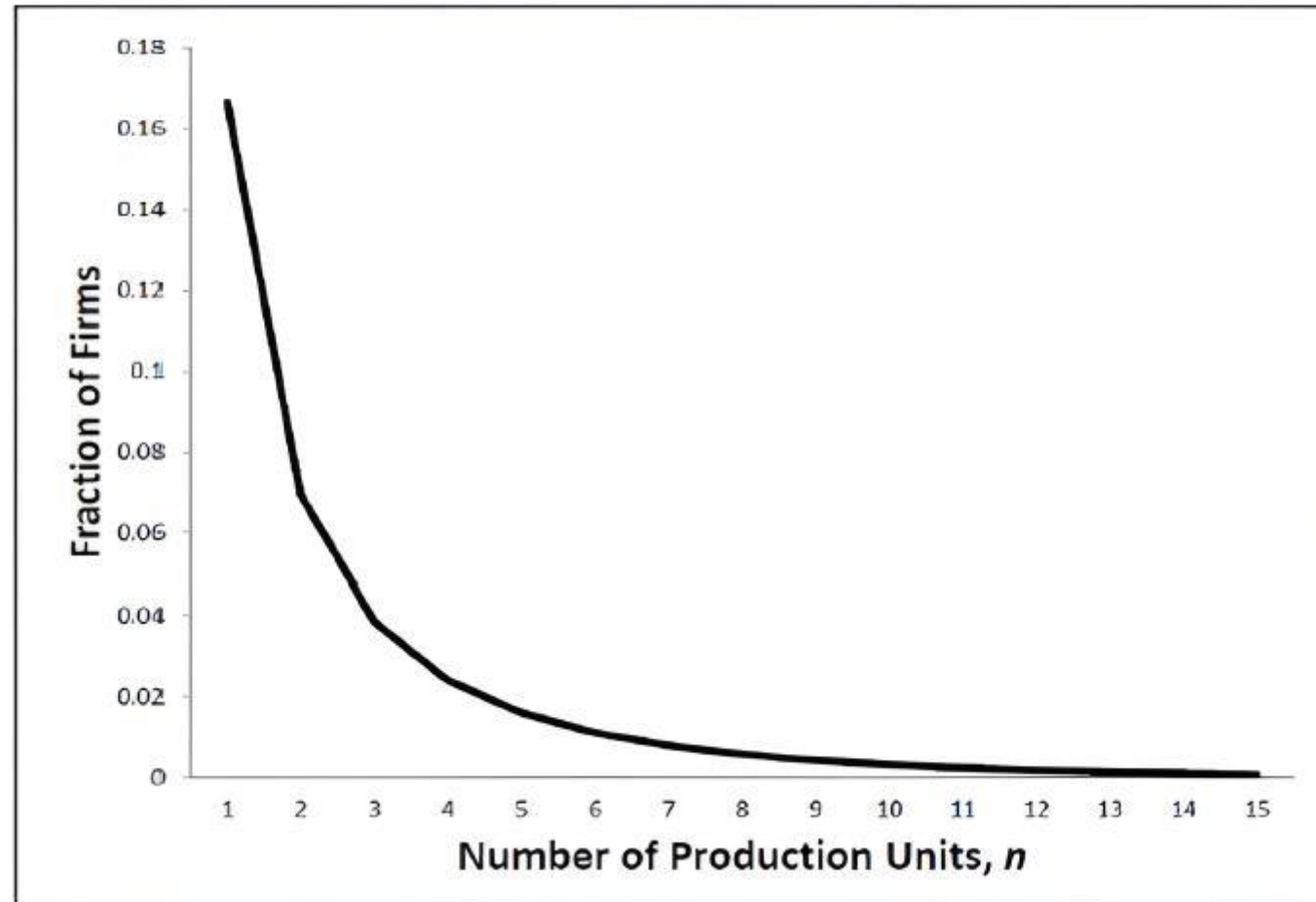


TWO MAIN EXTENSIONS

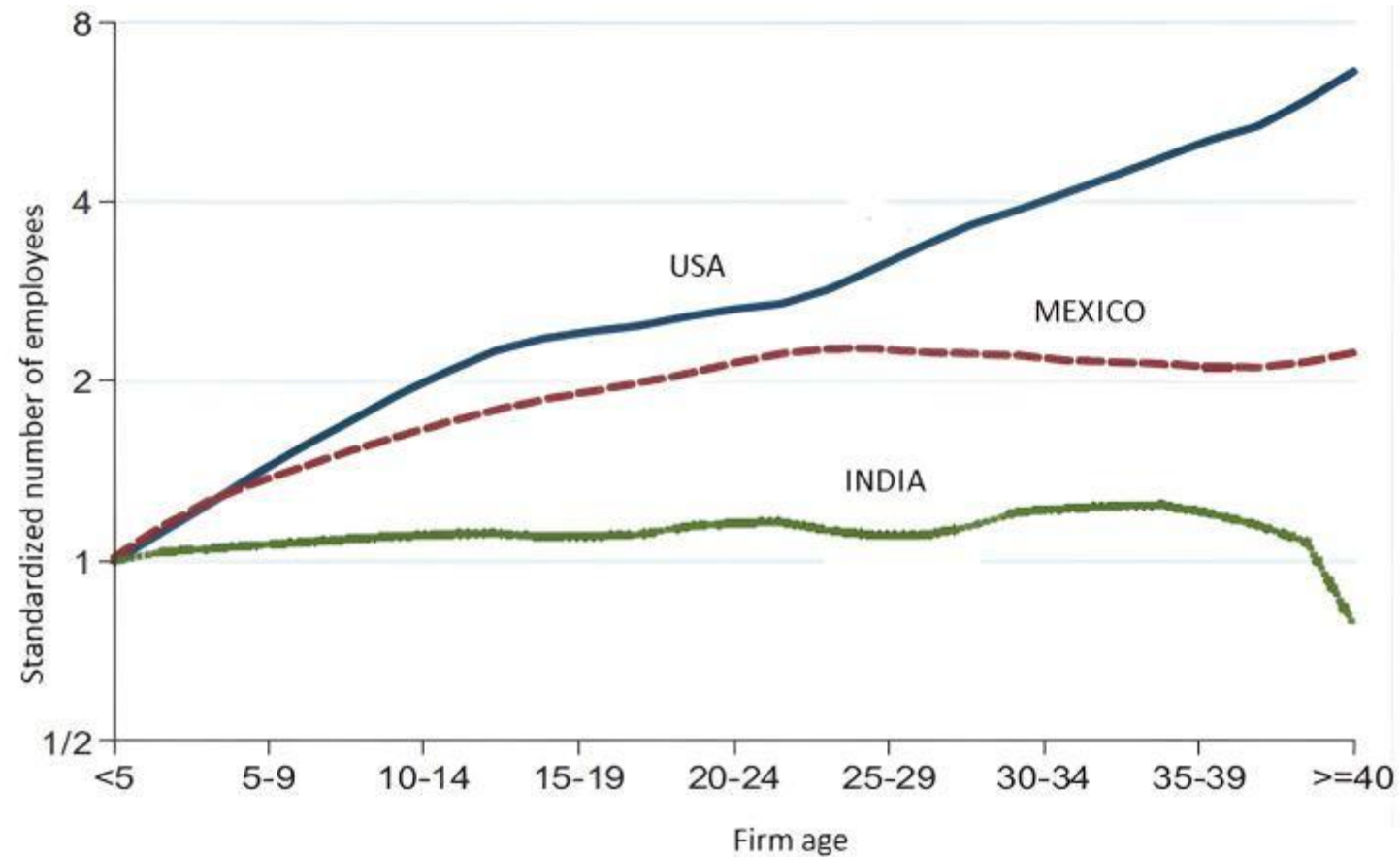
- Step-by-step innovation
- **Firm dynamics**



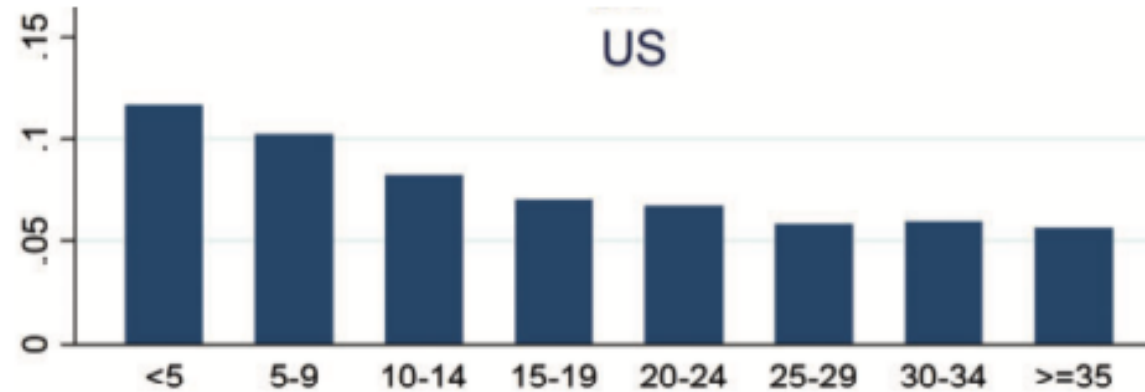
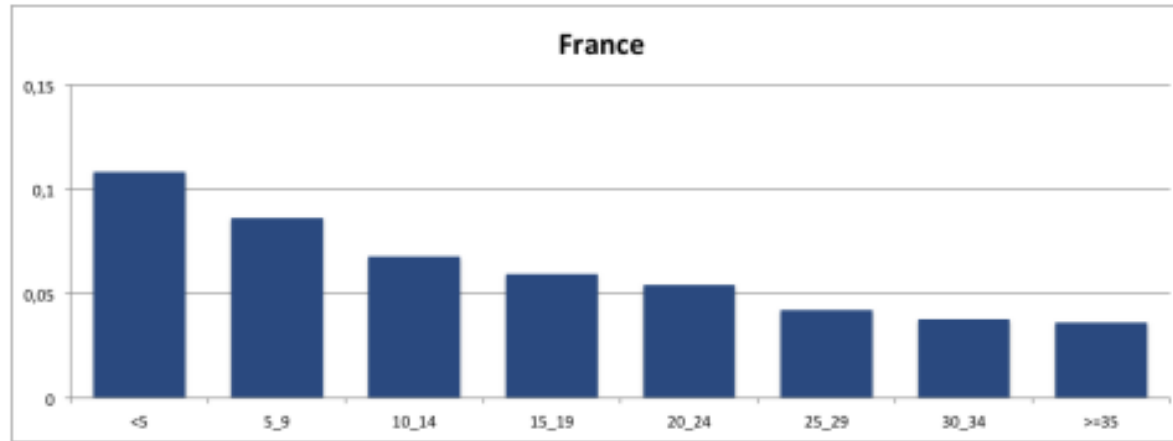
FIRM SIZE DISTRIBUTION



LINK BETWEEN THE AGE AND THE SIZE OF FIRMS



EXIT RATE BY AGE



OUTLINE

- Aghion-Howitt (1992) in a nutshell
- Two main extensions
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- Rethinking capitalism

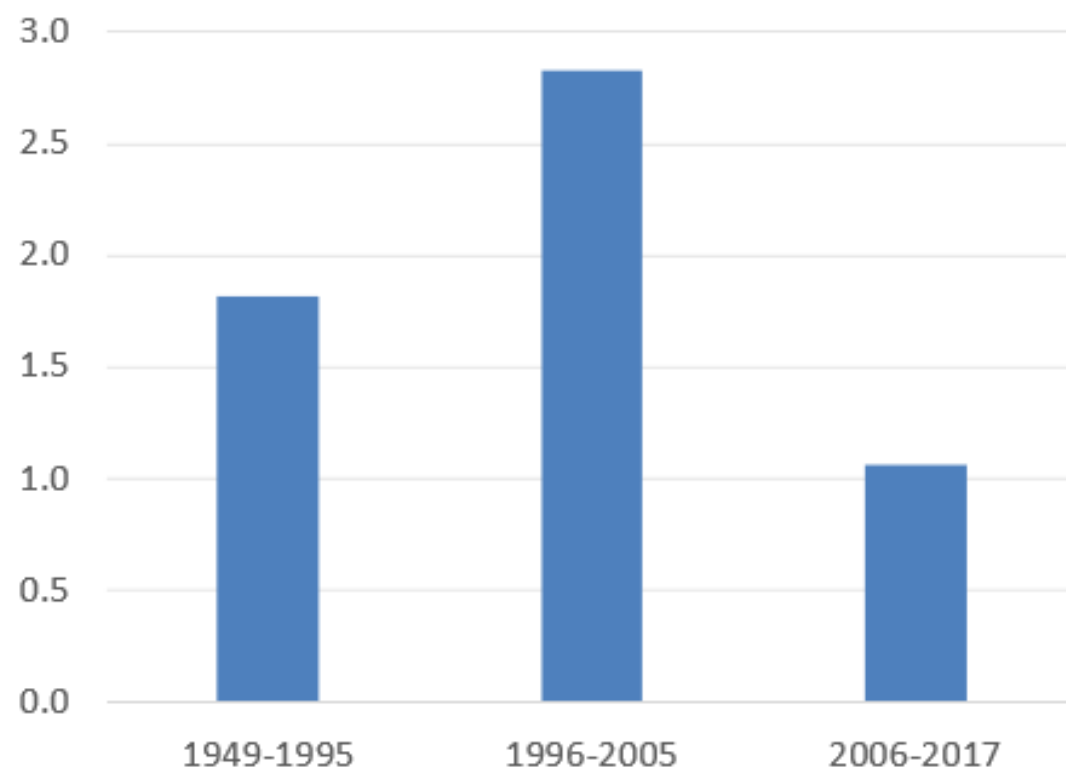
SOLVE HISTORICAL ENIGMA

- **Secular stagnation**
- Middle income trap

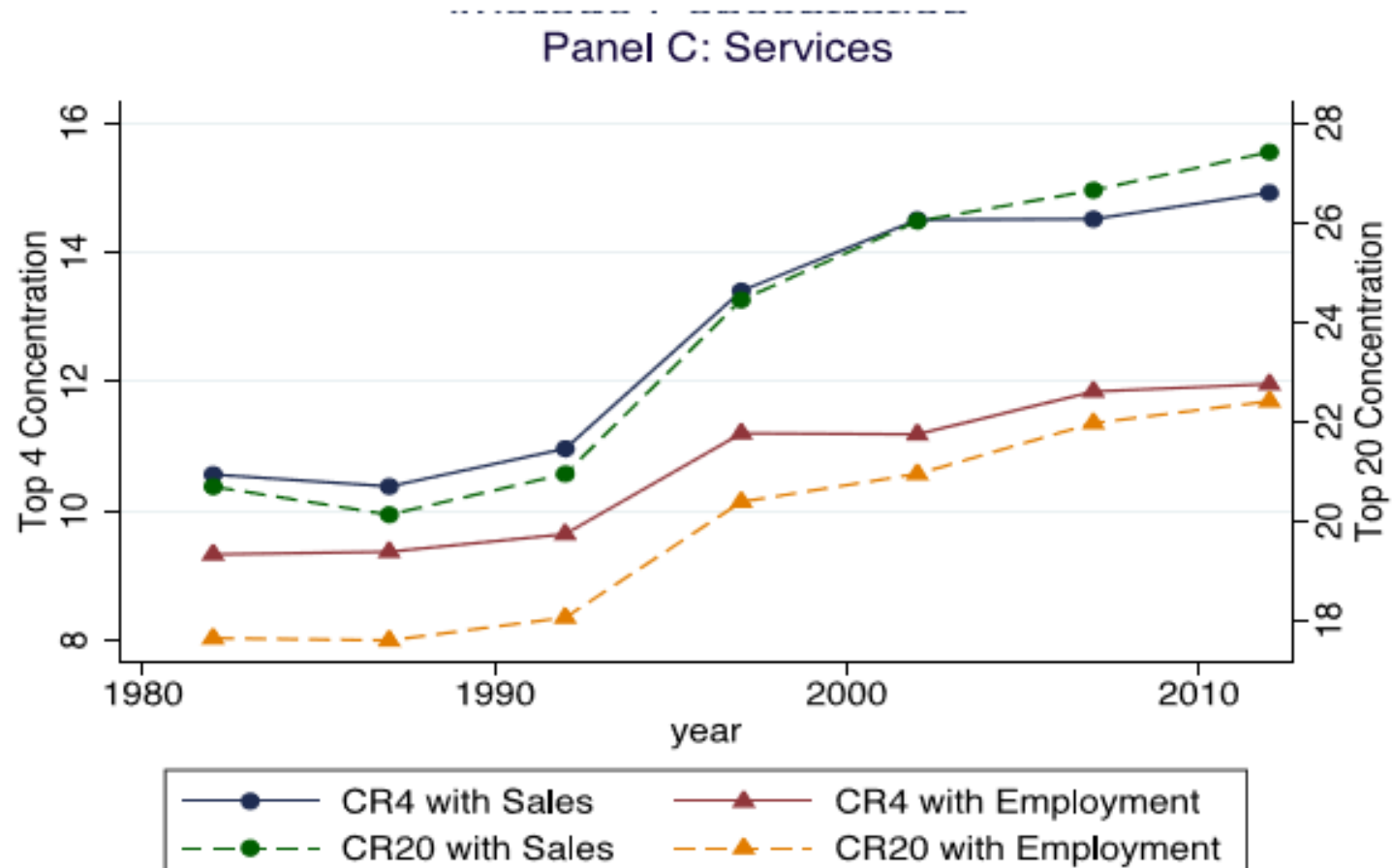
SECULAR STAGNATION

- Akcigit and Ates (2023)
- Aghion, Bergeaud, Boppart, Klenow and Li (2024)

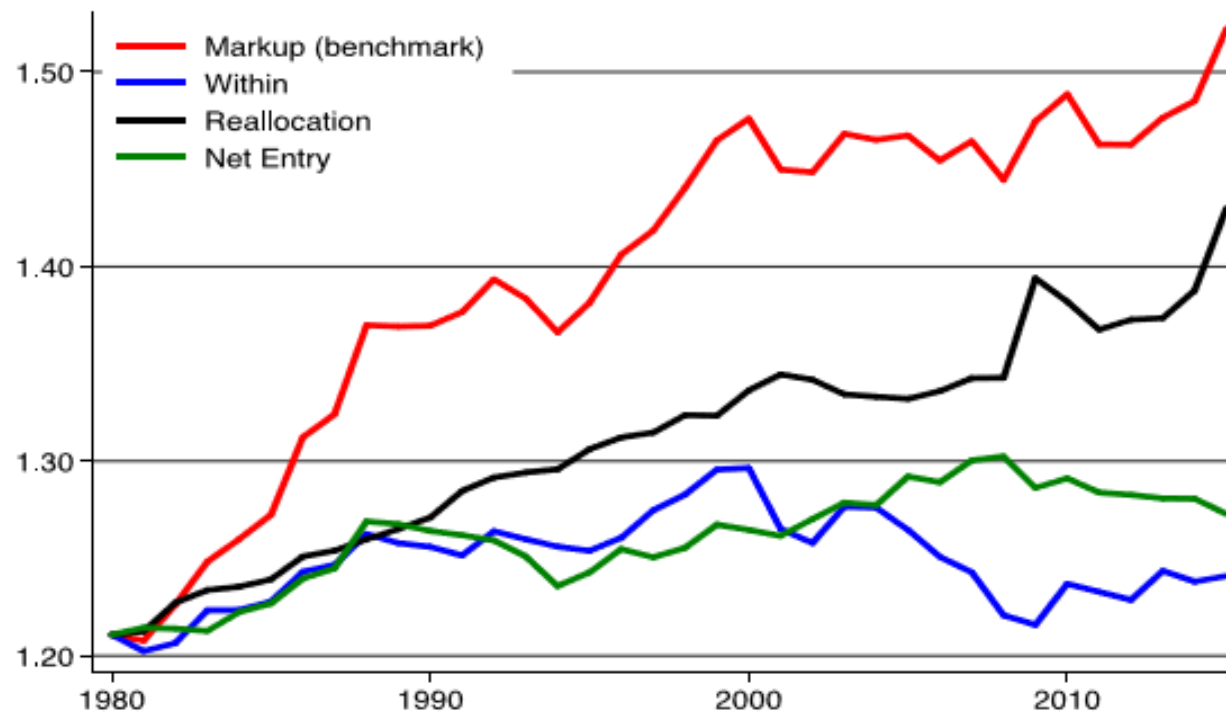
RISE AND DECLINE IN TFP GROWTH



RIISING CONCENTRATION IN SERVICES

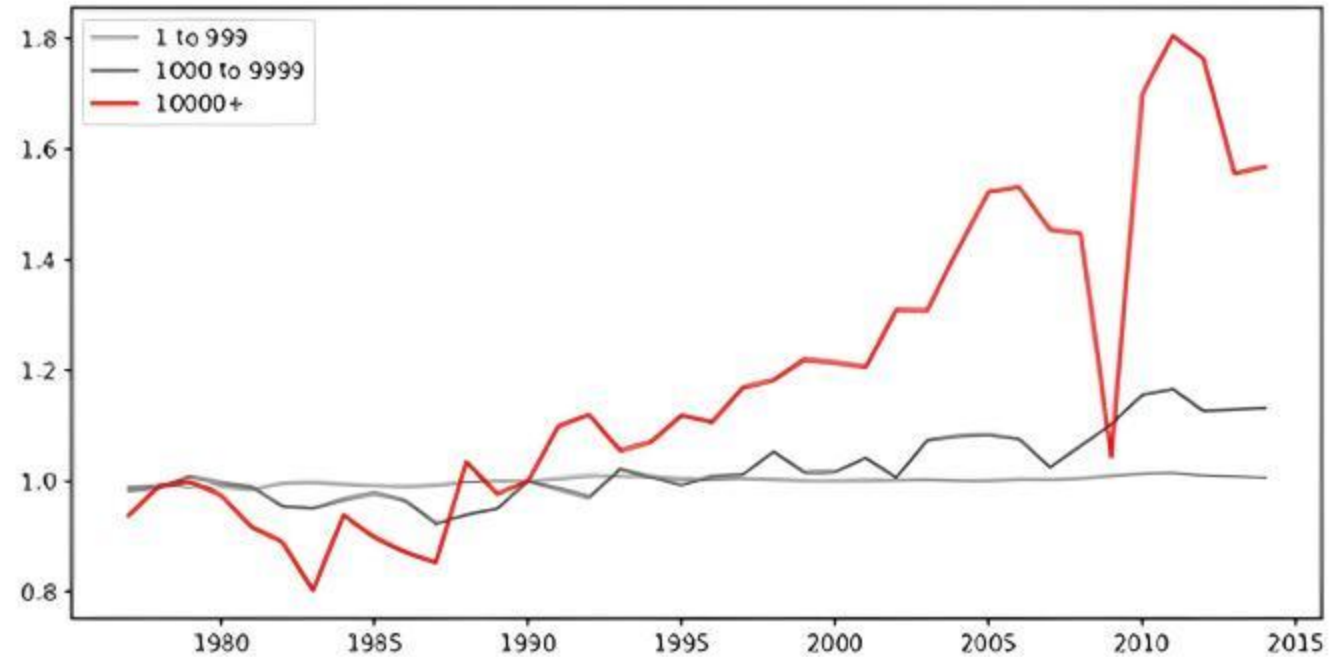


WITHIN FIRM MARKUPS



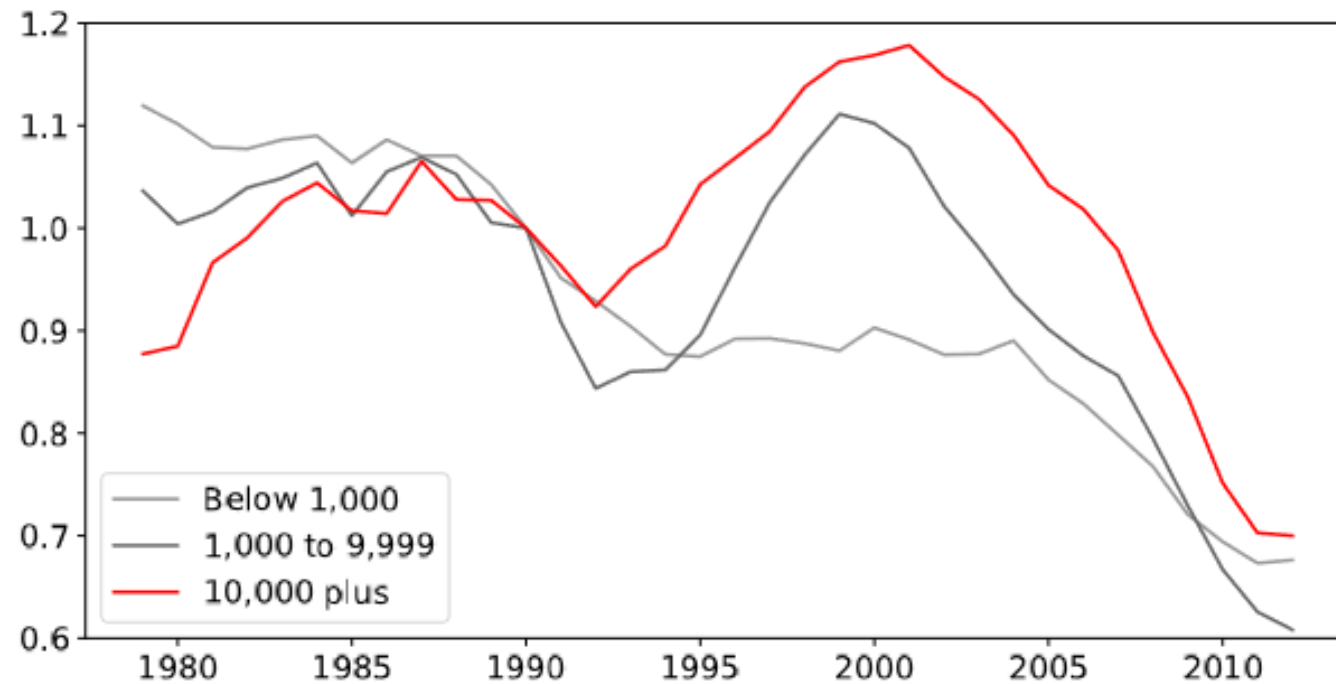
Source: De Loecker, Eeckhout and Unger (2018).

RISING ESTABLISHMENTS PER FIRM



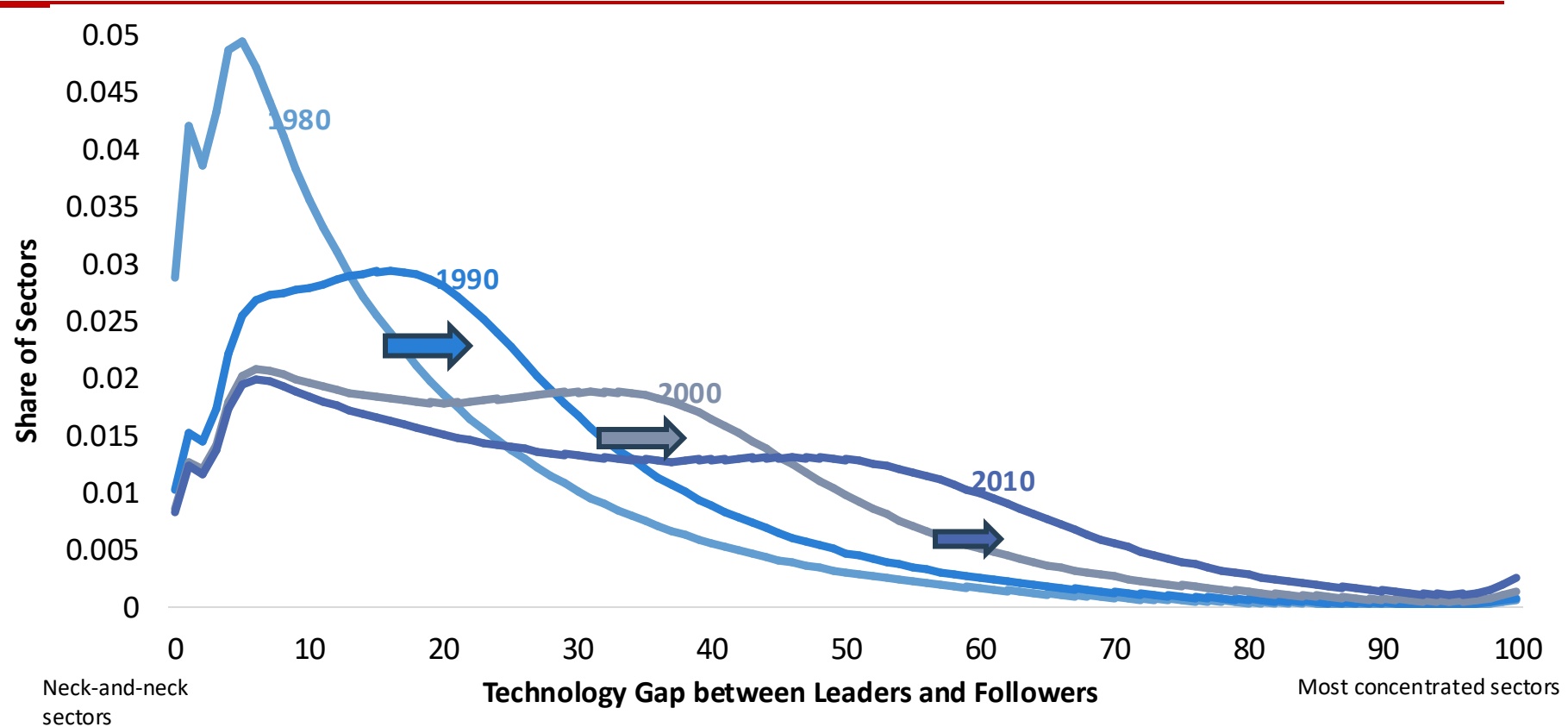
Source: U.S. Census Bureau's *Business Dynamics Statistics*

Rise and decline in employment-weighted plant entry rate

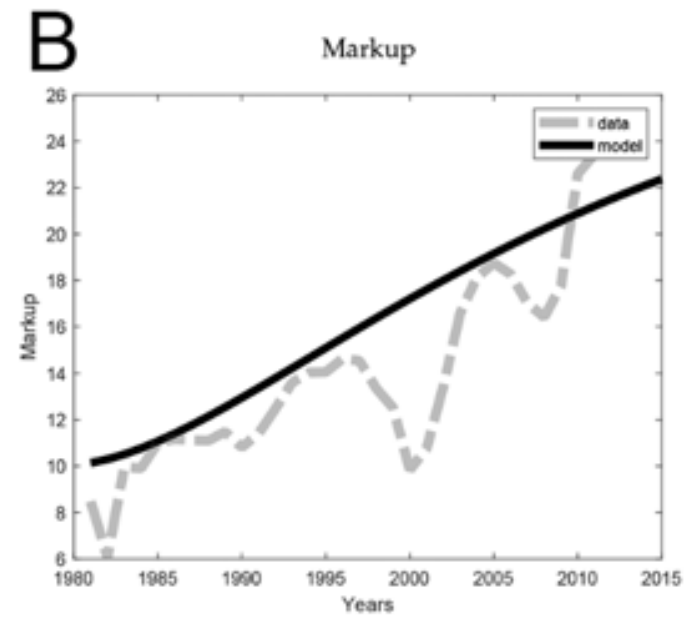
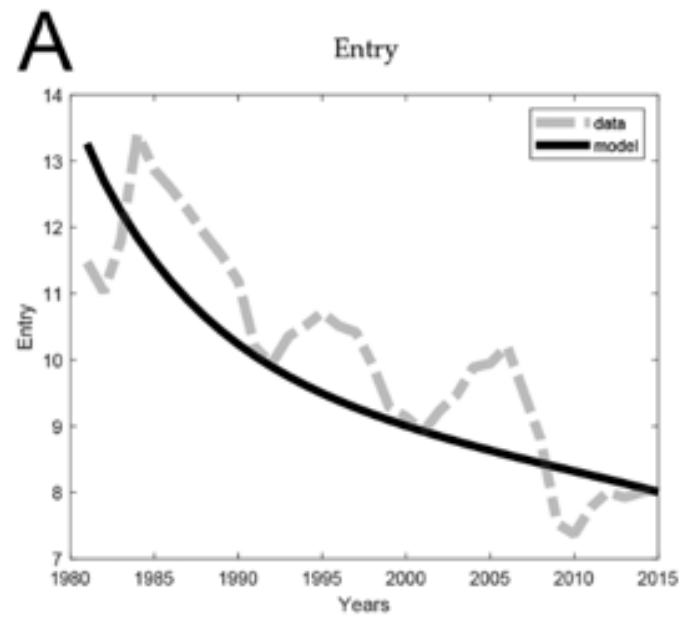


Source: U.S. Census Bureau's *Business Dynamics Statistics*. Job creation by birth over total employment by firm size bins. 5-year centered moving average.

WIDENING TECHNOLOGY GAP DISTRIBUTION AND INCREASING CONCENTRATION



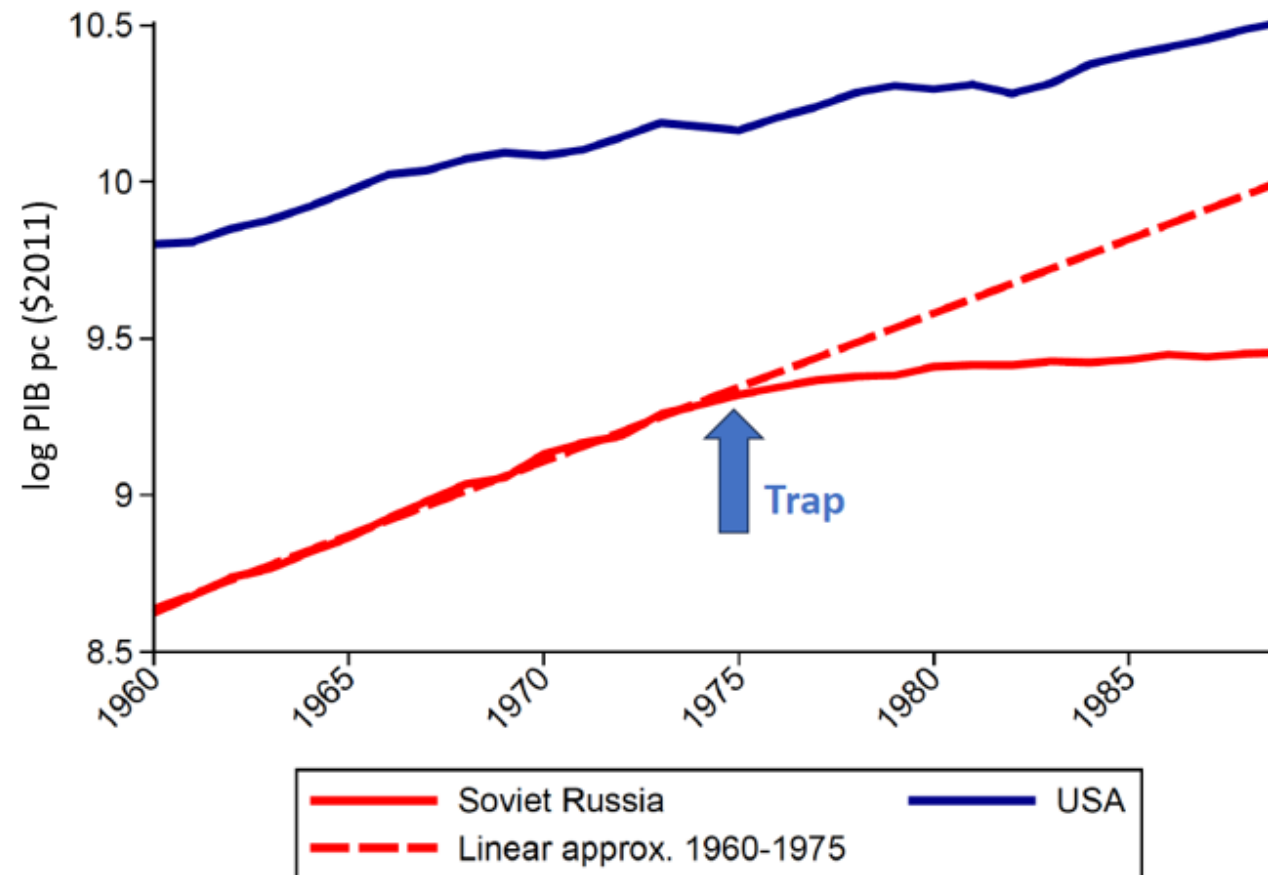
Lower diffusion cause laggards to fall further behind and help leaders become more entrenched.



SOLVE HISTORICAL ENIGMA

- Secular stagnation
- **Middle income trap**

SOVIET UNION



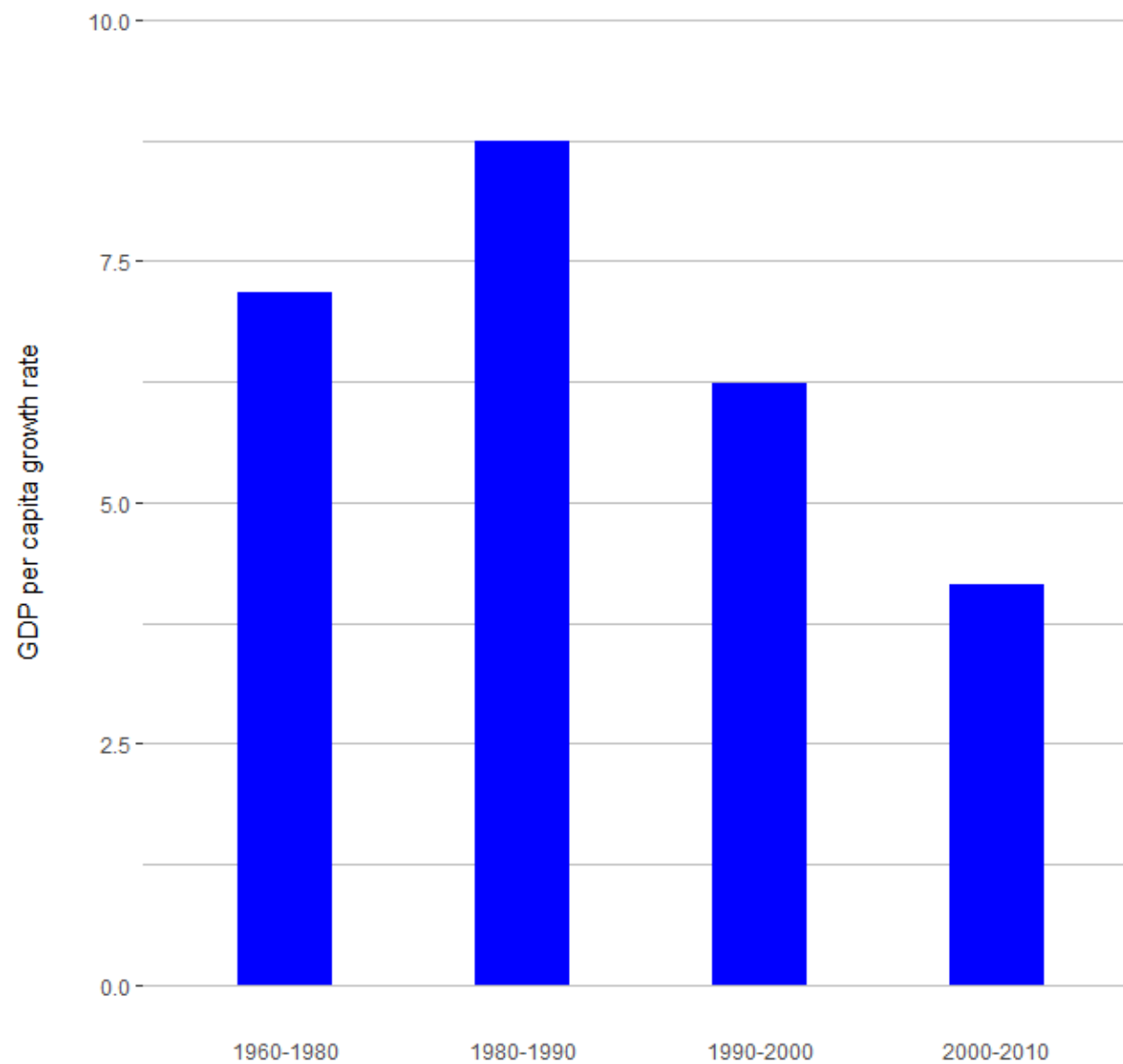
CATCHING-UP VERSUS FRONTIER INNOVATION

ACEMOGLU, AGHION, AND ZILIBOTTI (2006)

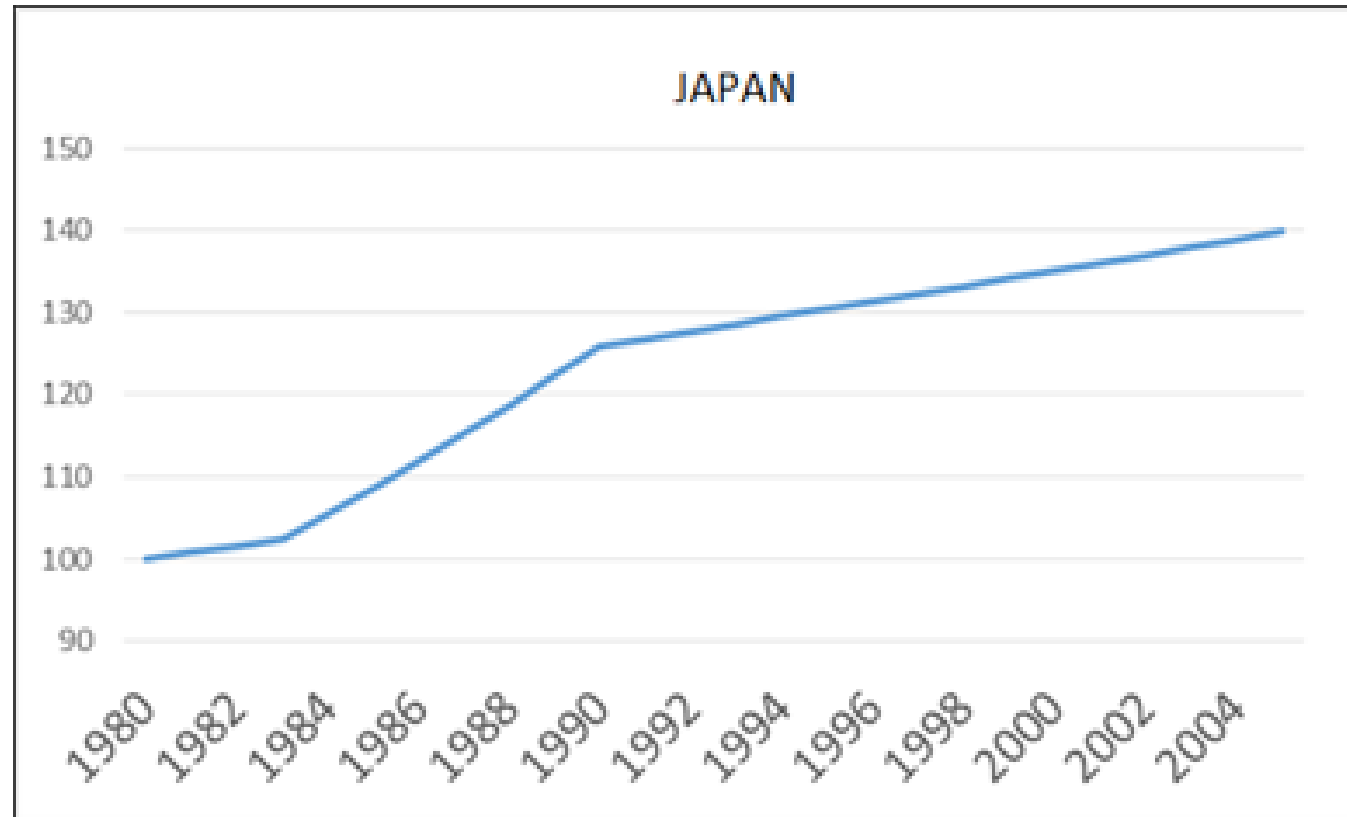
$$A_{t+1} - A_t = \mu_n(\gamma - 1)A_t + \mu_m(\bar{A}_t - A_t)$$

Policies aimed at influencing μ_n and μ_m will affect a country's growth performance differently depending upon its proximity to world technology frontier

KOREA: 1960-2010



JAPAN



EU VERSUS US

BERGEAUD

Figure: GDP per capita in the euro area since 1890.
US = 1. Source: www.longtermproductivity.com



Middle technological trap

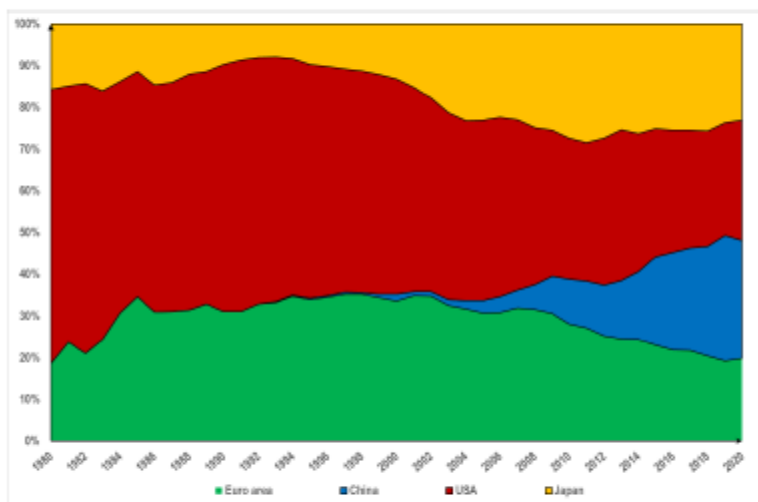


Figure: Patents filed under the PCT
(OECD)

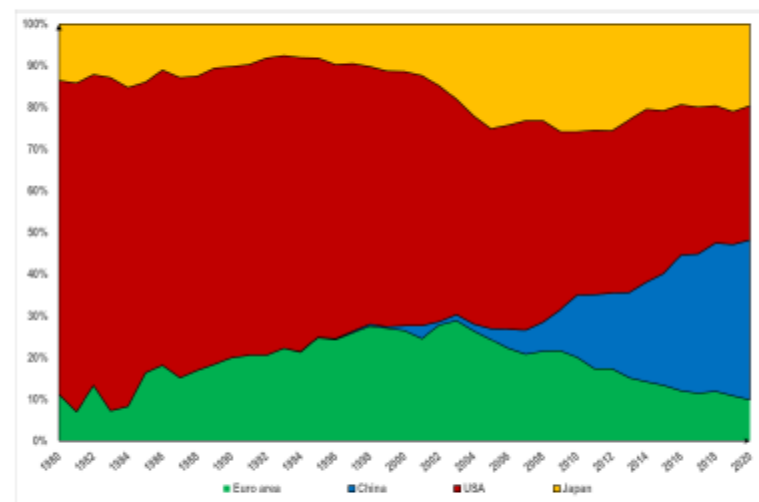
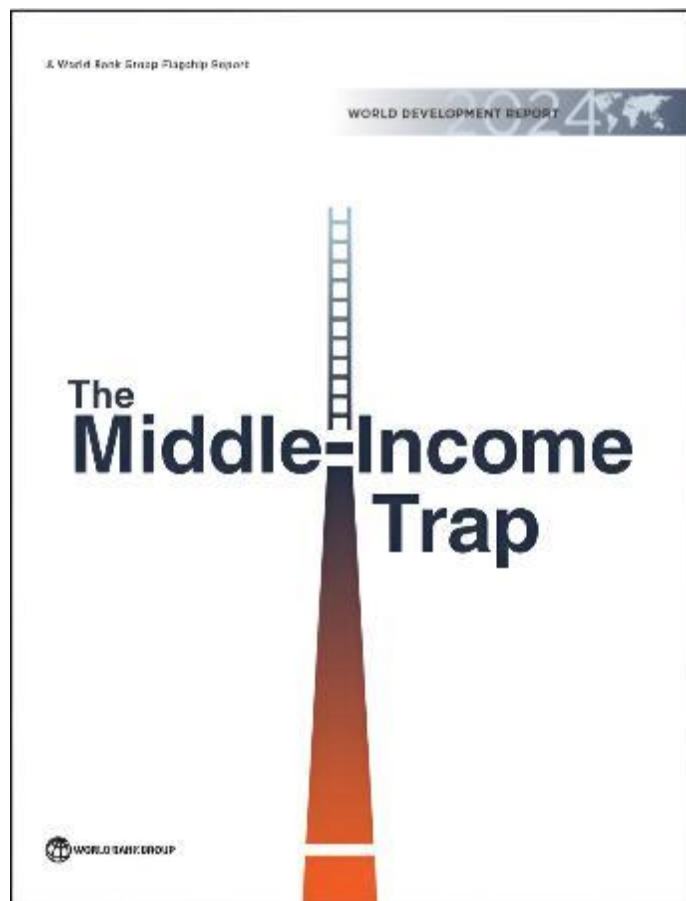
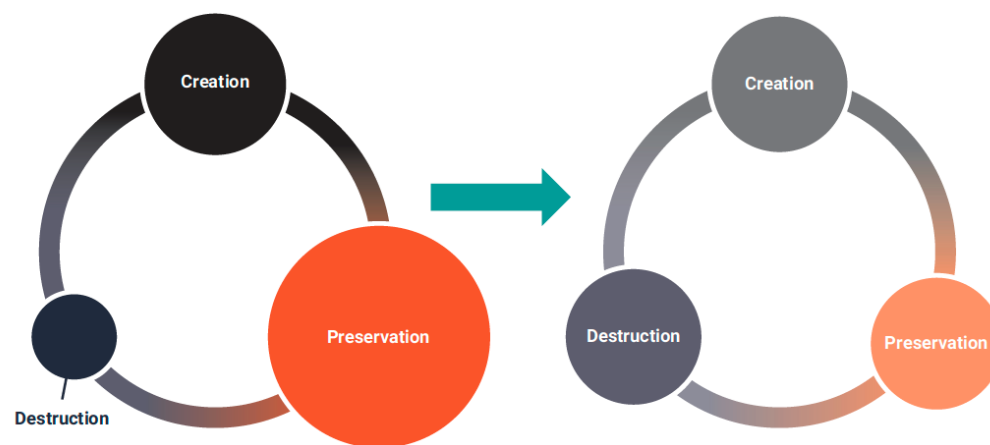


Figure: High technologies patents filed
under the PCT

WORLD DEVELOPMENT REPORT 2024 BY THE WORLD BANK



Middle Income Trap and Creative Destruction



Source: WDR 2024 team.

OUTLINE

- Aghion-Howitt (1992) in a nutshell
- Two main extensions
- Historical enigma
- **Rethinking capitalism**

RETHINKING CAPITALISM

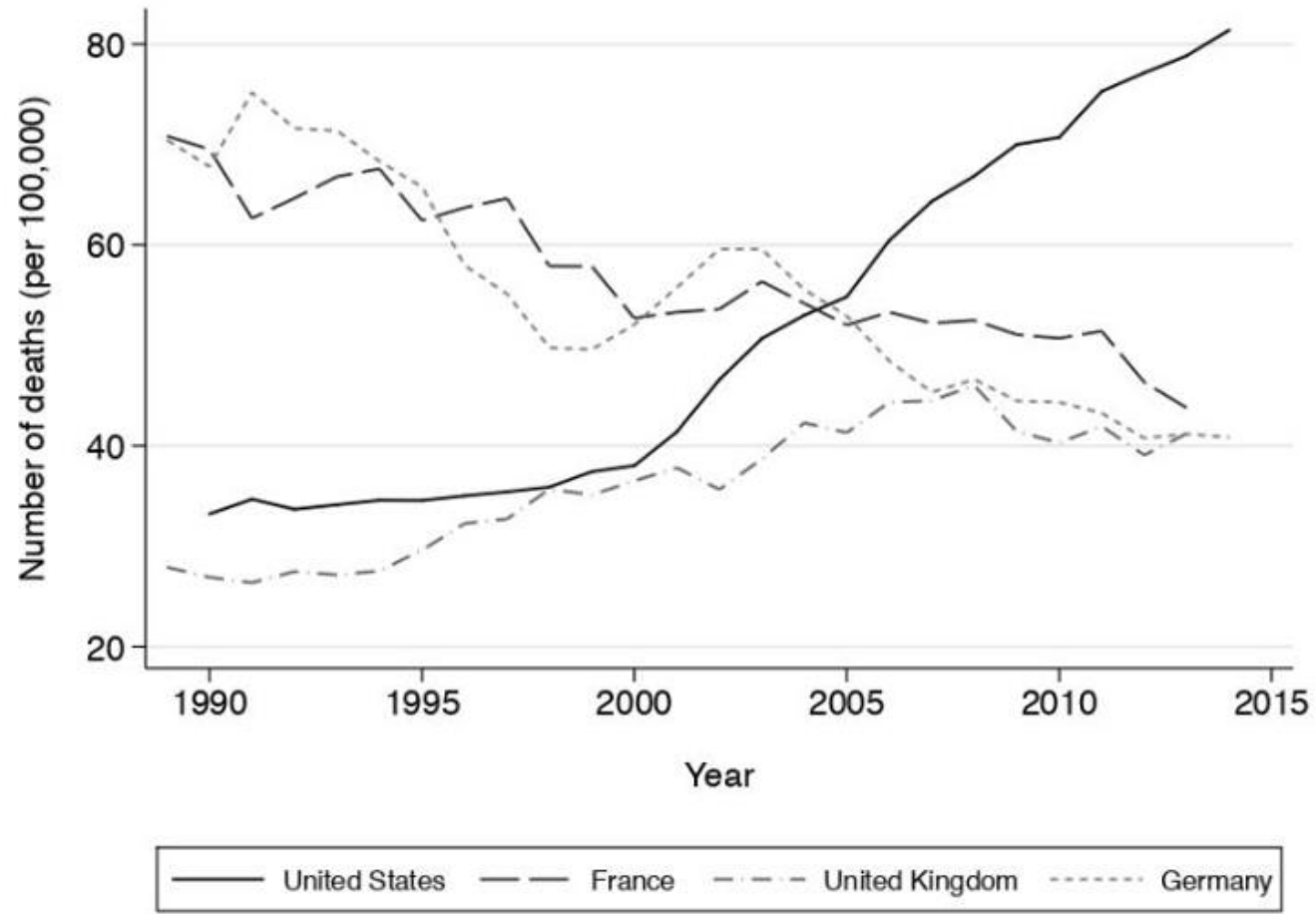
AGHION, ANTONIN, AND BUNEL (2020)

- US does poorly on inequality and social protection
- Europe does poorly on innovation

GINI AND POVERTY

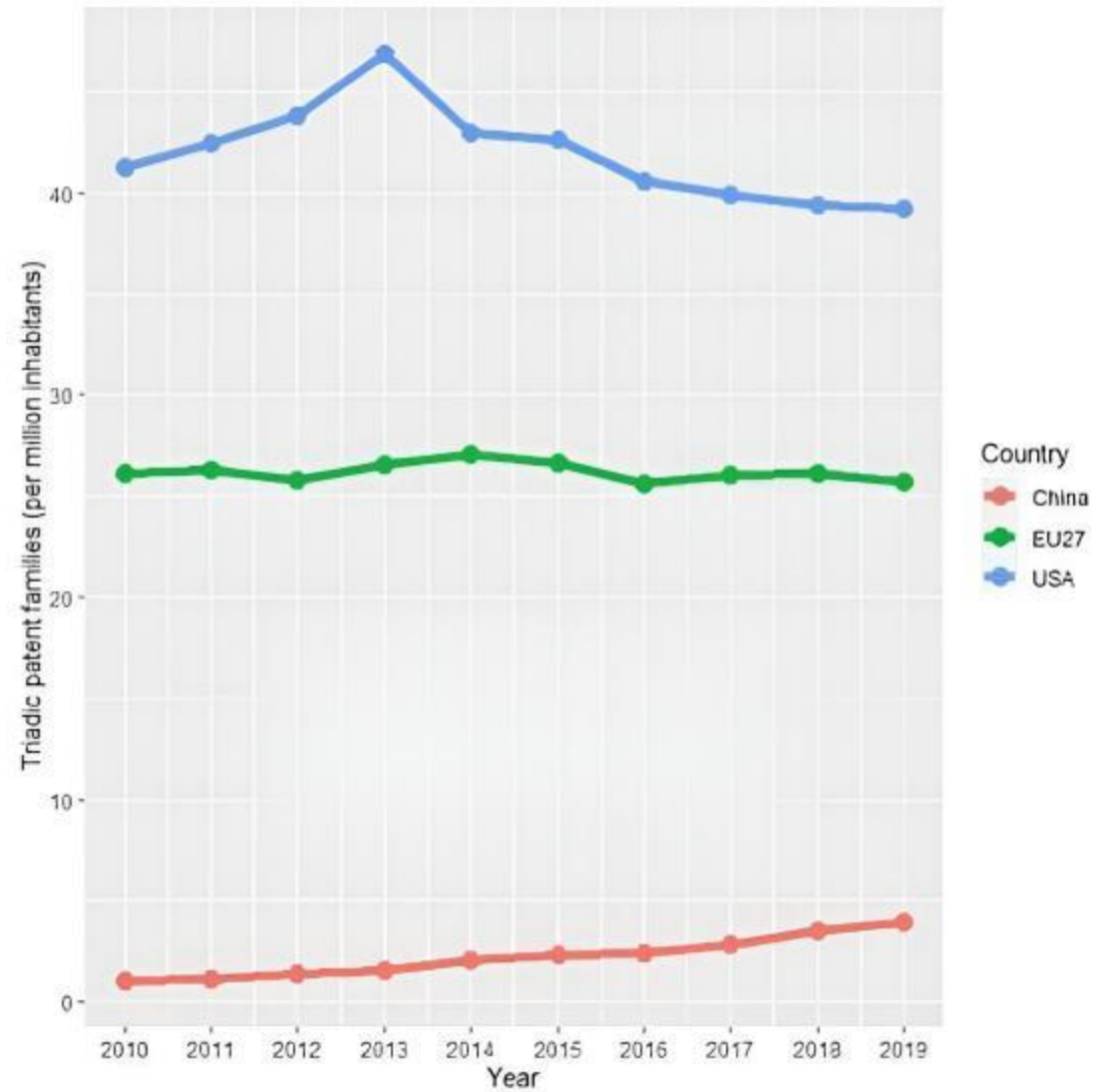
	Gini Index	Poverty Rate
United States	0.390	0.178
Germany	0.289	0.104
Sweden	0.282	0.093
Norway	0.262	0.084
France	0.292	0.081
Denmark	0.261	0.058

DEATH OF DESPAIR



Source: Case and Deaton (2017).

TRIADIC PATENTS



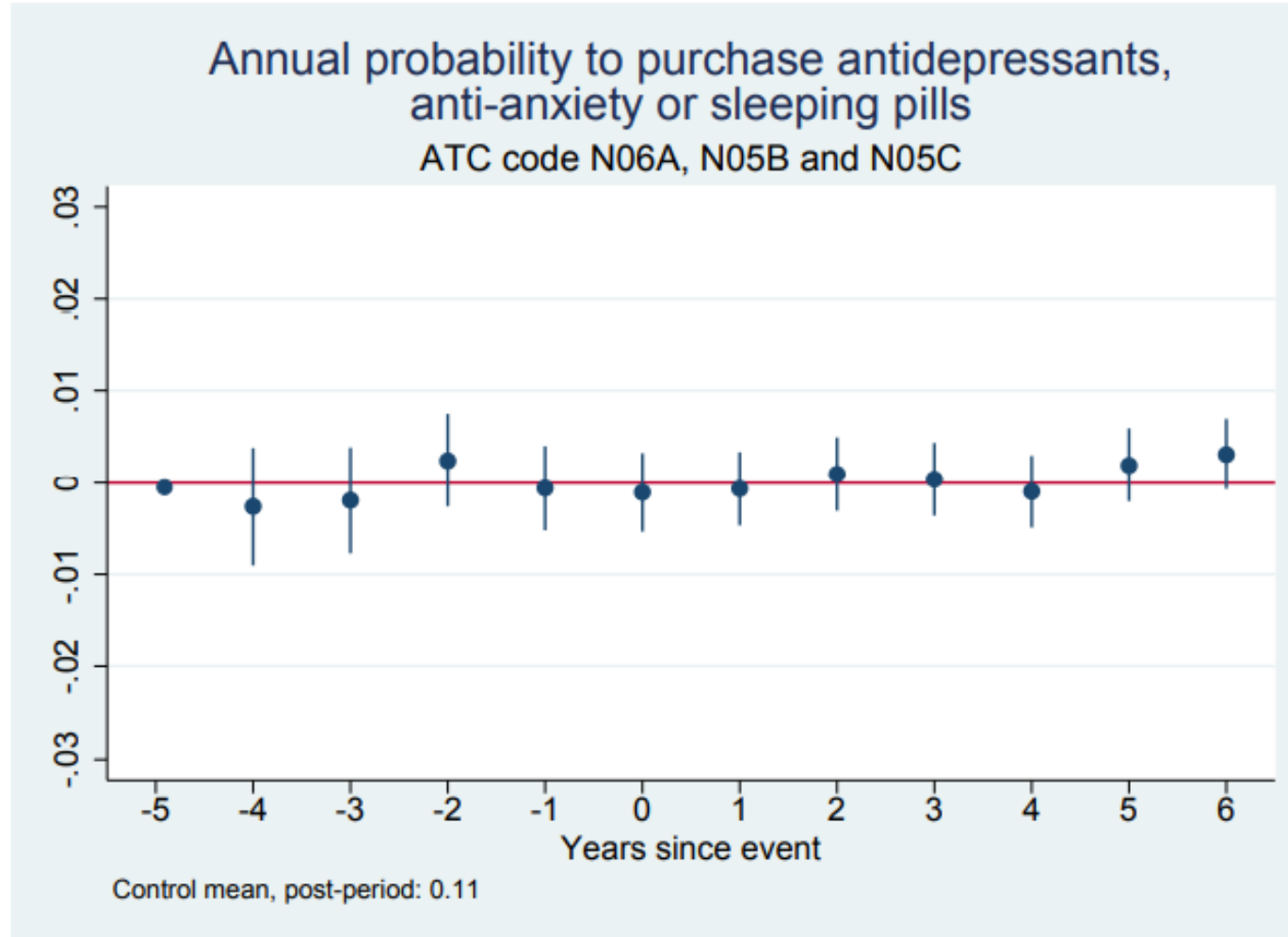
Triadic patents (per million inhabitants)

RETHINKING CAPITALISM

- Can we combine good side of American model (innovation) with good side of European model (protection)
- No trade off, rather, complementarity!!
 - Flexicurity
 - Education and lost Einsteins
 - Competition

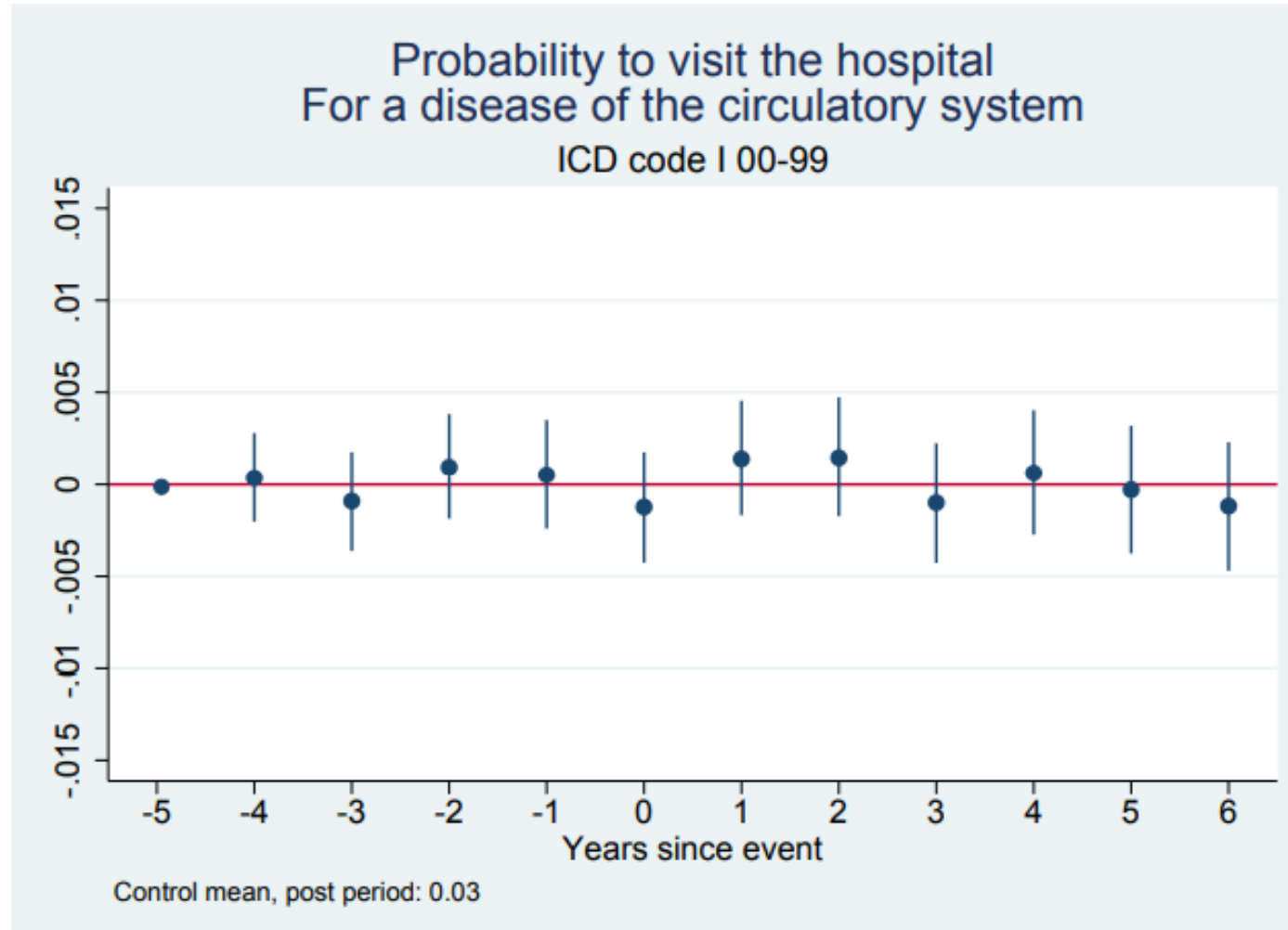
FLEXICURITY: DENMARK

Moving to health: Antidepressants and related drugs

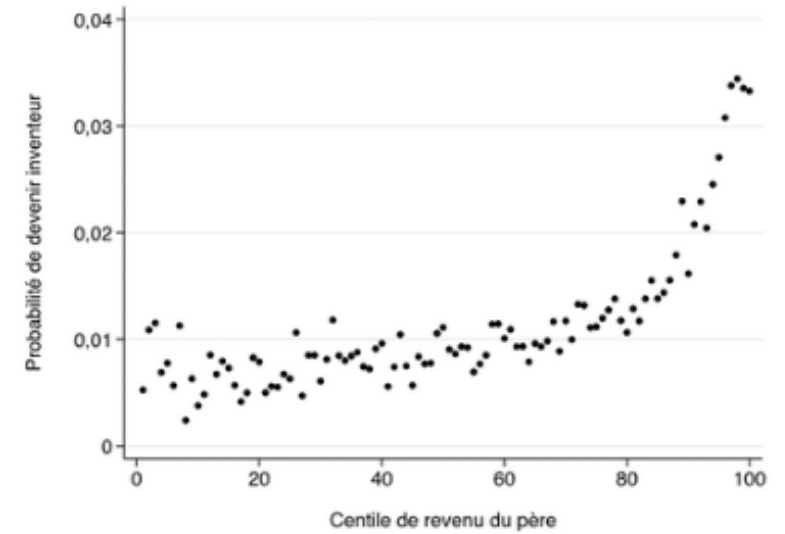
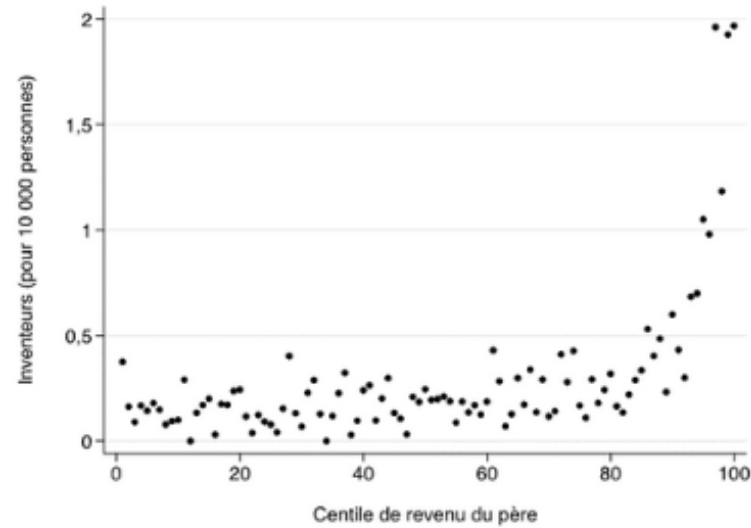
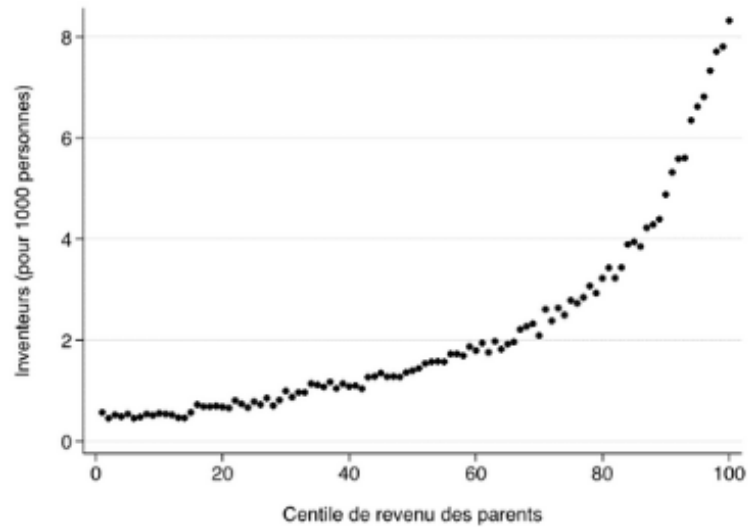


FLEXICURITY: DENMARK

Heart attacks



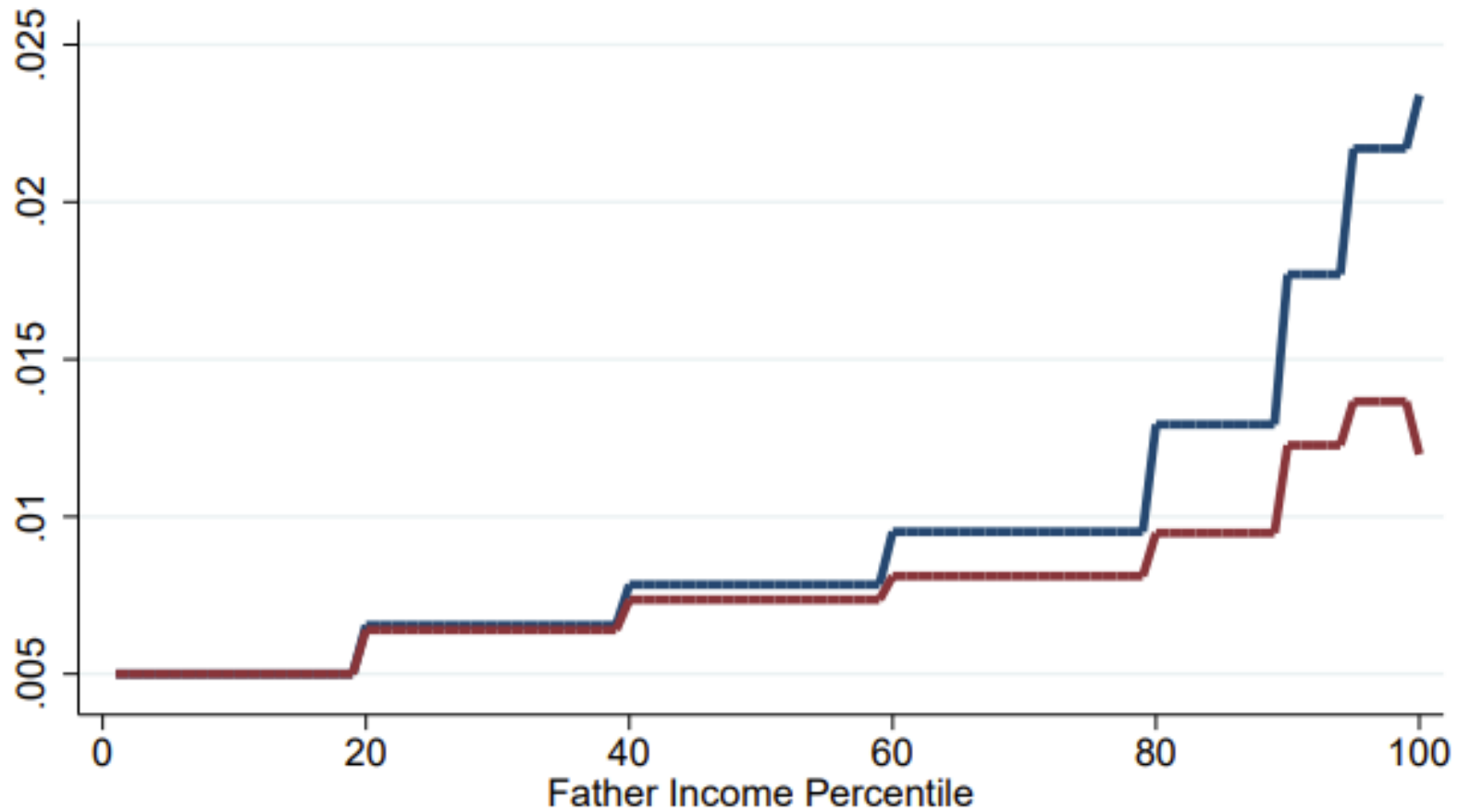
EDUCATION



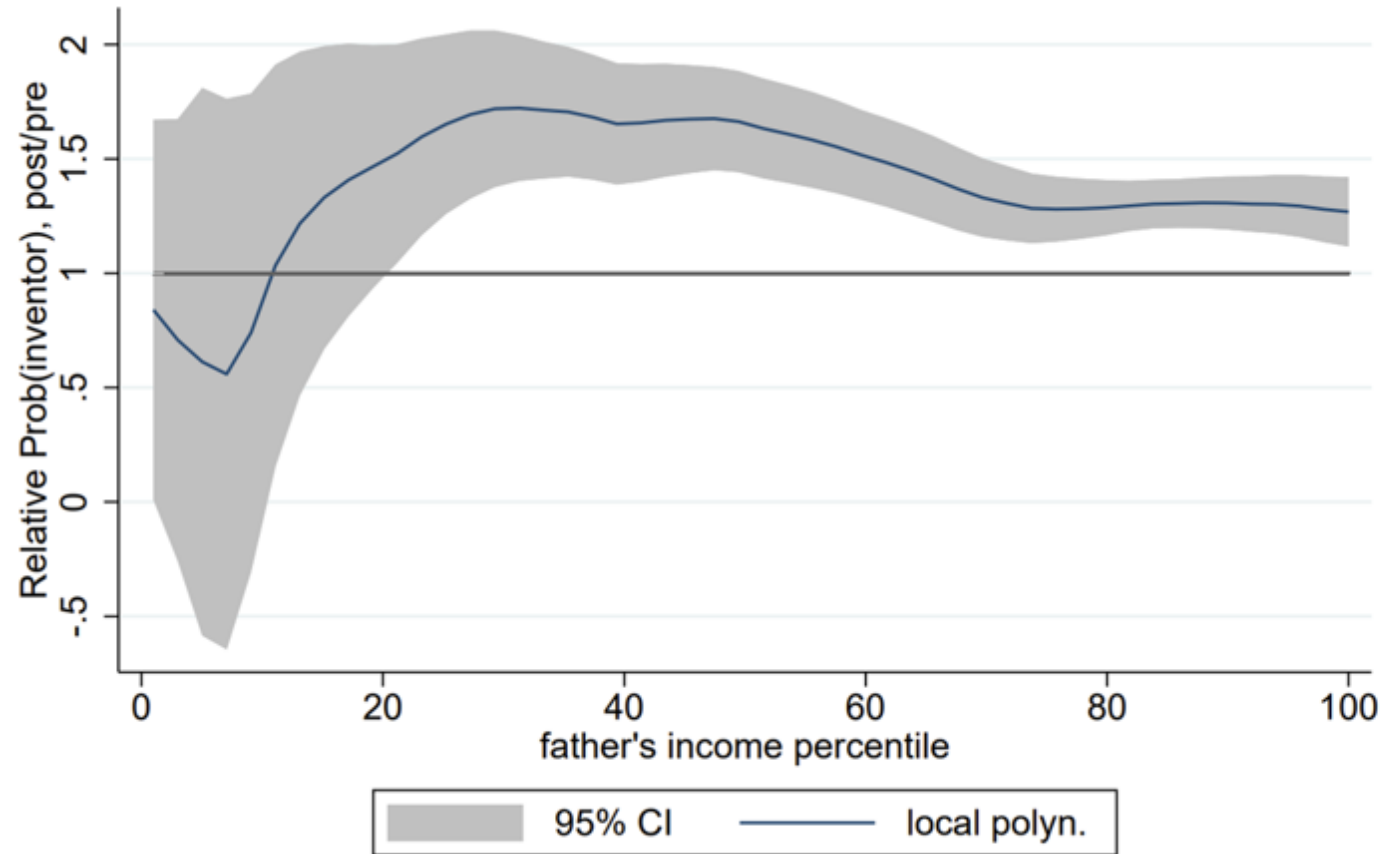
Sources: Bell, Chetty, Jaravel, Petkova and Van Reenen (2019) ; Akcigit, Grigsby and Nichols (2017) ; Aghion, Akcigit, Hyytinen and Toivanen (2017).

EDUCATION

Who Becomes an Inventor?

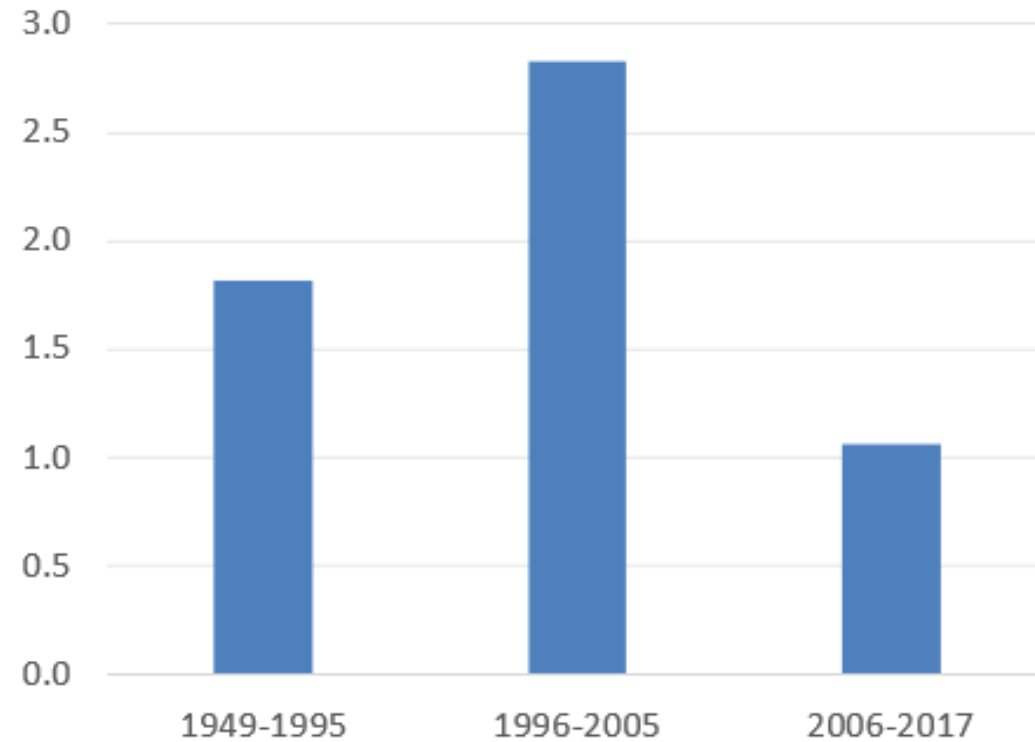


EDUCATION



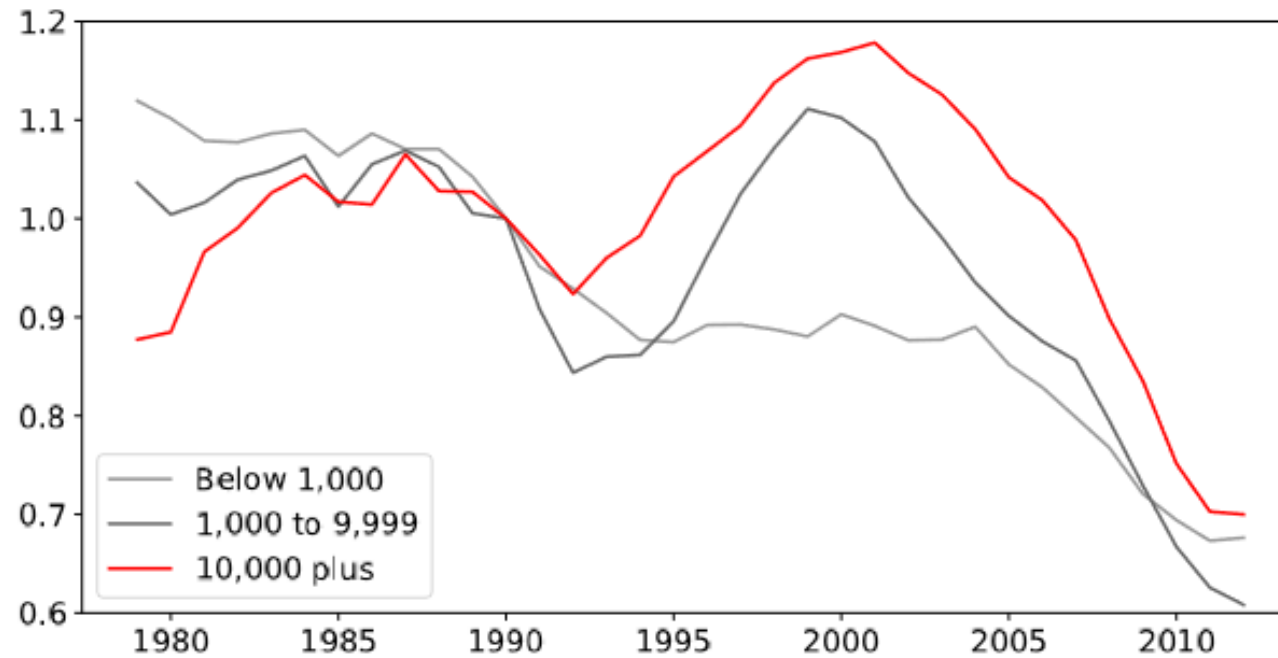
COMPETITION

RISE AND DECLINE IN TFP GROWTH



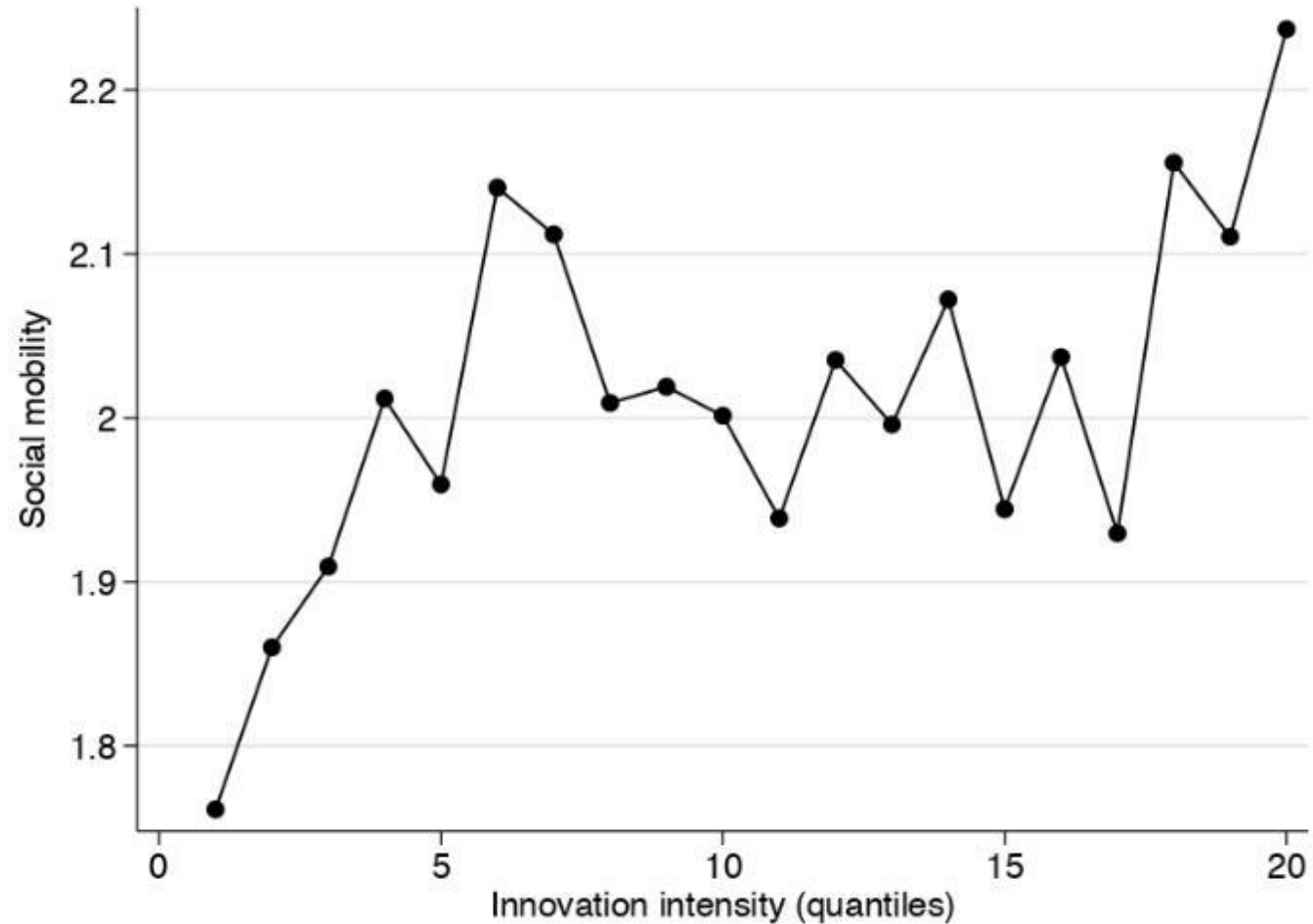
COMPETITION

Rise and decline in employment-weighted plant entry rate



Source: U.S. Census Bureau's *Business Dynamics Statistics*. Job creation by birth over total employment by firm size bins. 5-year centered moving average.

(ENTRANT) INNOVATION AND SOCIAL MOBILITY



Innovation and Social Mobility

Source: Aghion, Akcigit, Bergeaud, Blundell, Hemous (2018)

CONCLUSION (1)

- Creative destruction can deliver sustained and inclusive growth and prosperity provided appropriate policies are put in place

CONCLUSION (2)

- AI has considerable growth and employment creation potential but again appropriate policies need to be put in place

Thank you!