Creative Destruction and the AI revolution

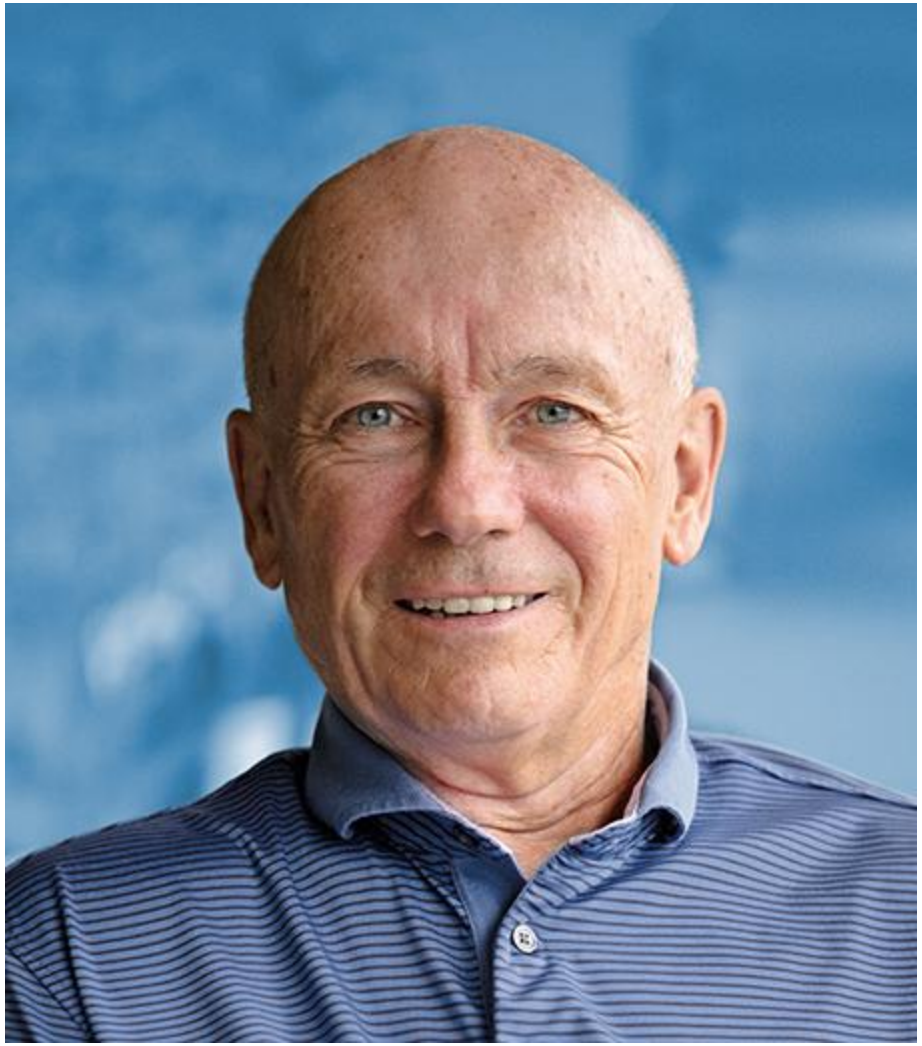
Philippe Aghion

Nobel Lecture



CREATIVE DESTRUCTION…

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



SCHUMPETERIAN GROWTH PARADIGM

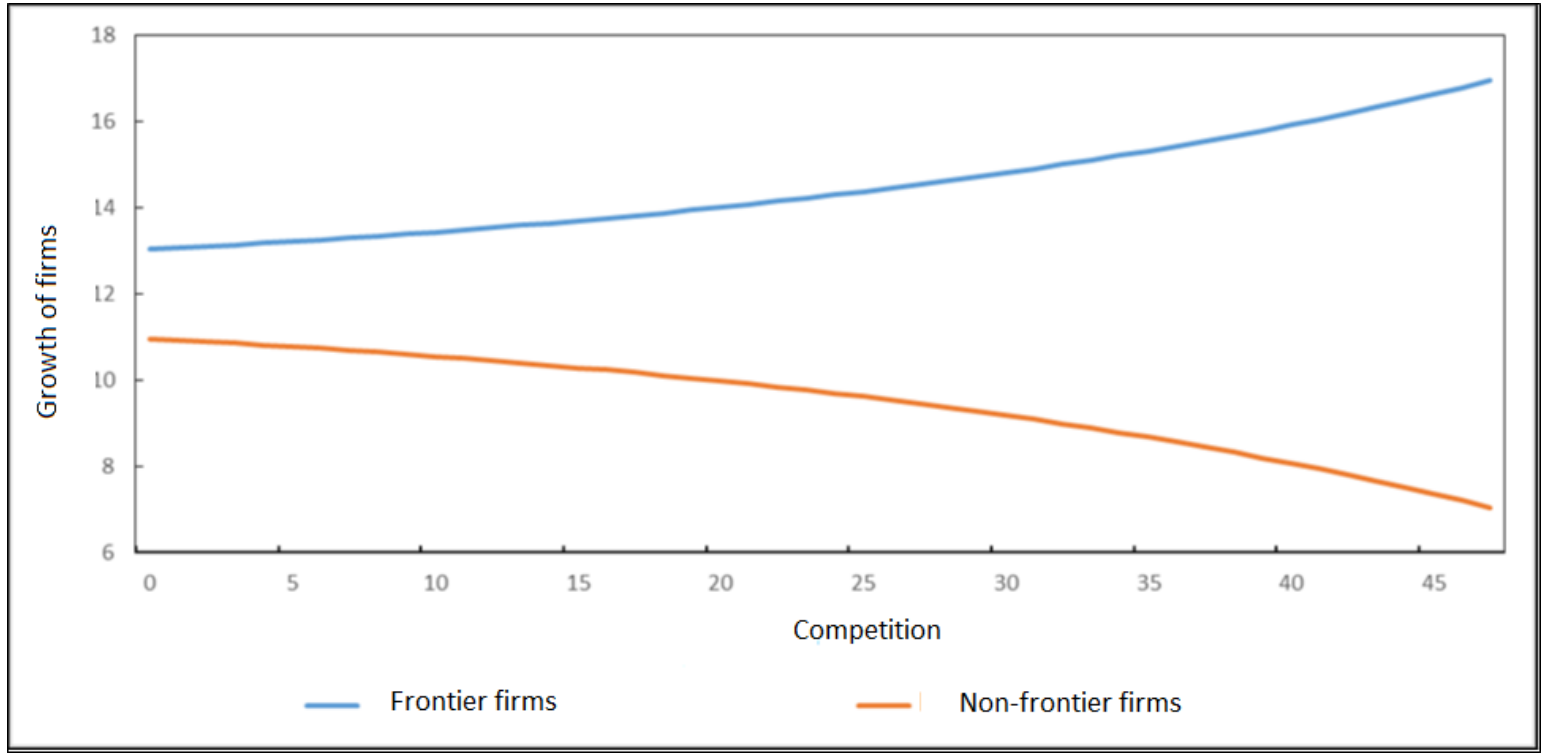
- Long-run growth driven by cumulative process of innovation
- Innovations result from entrepreneurial activities motivated by prospect of innovation rents
- Creative destruction: new innovations displace old technologies

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

COMPETITION, GROWTH AND DISTANCE TO FRONTIER



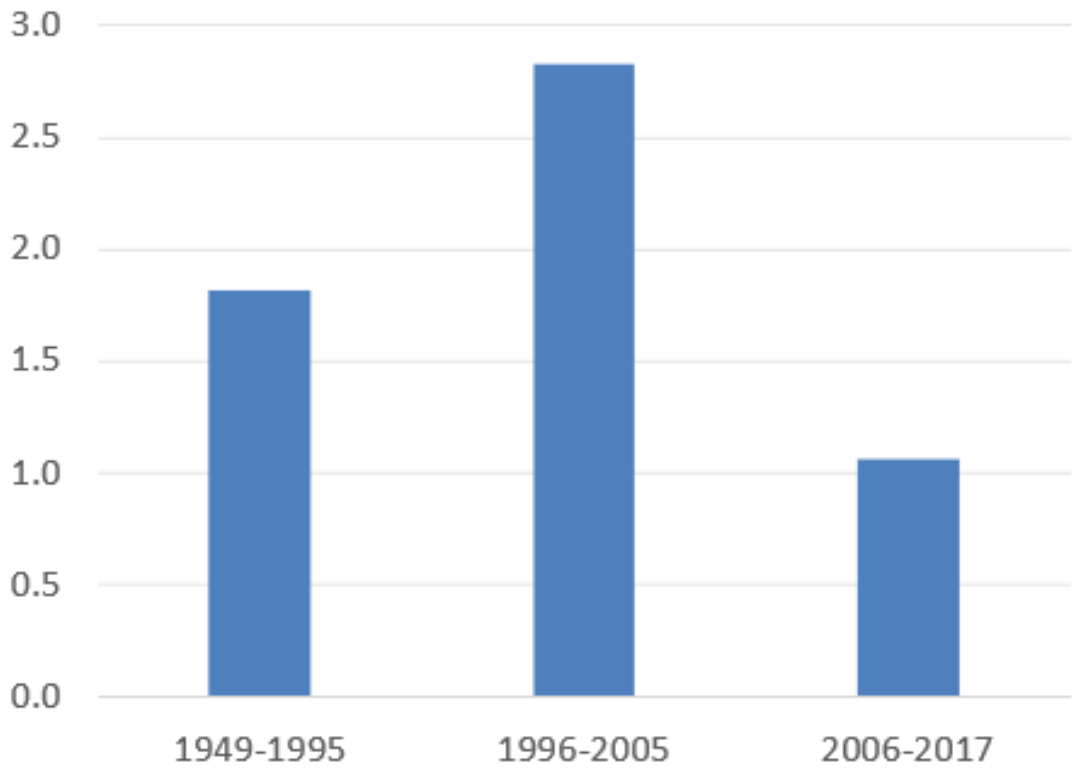
OUTLINE

- **Historical enigma**
- Rethinking capitalism

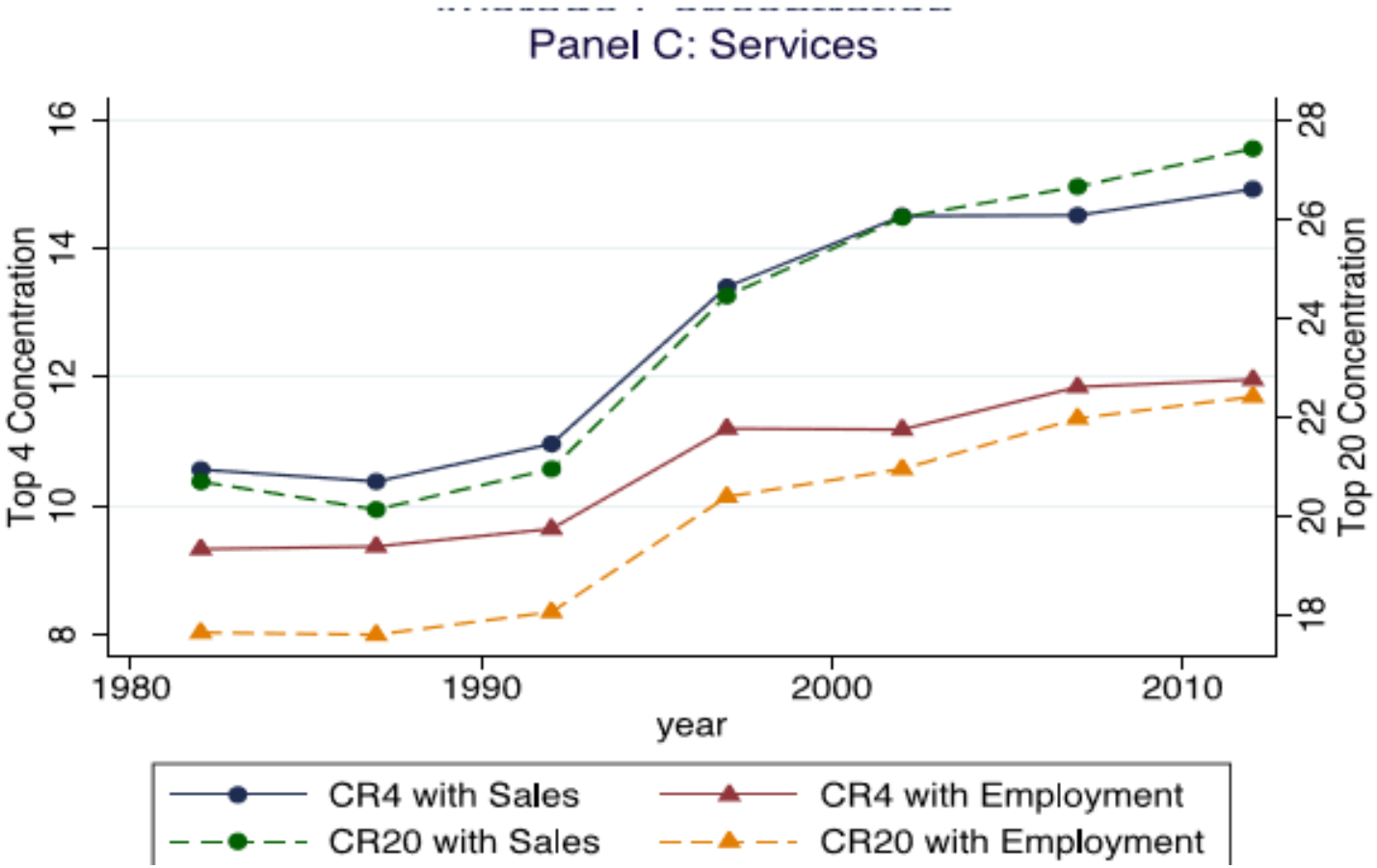
SOLVE HISTORICAL ENIGMA

- **Secular stagnation**
- Middle income trap

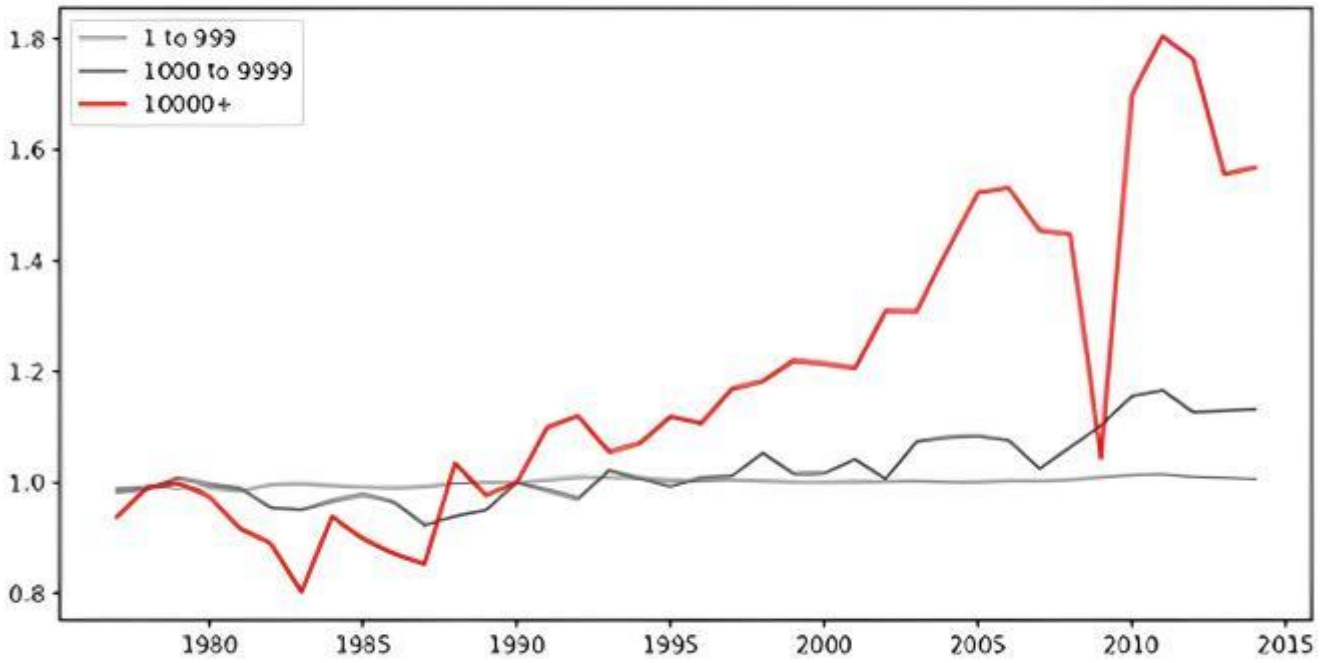
Rise and Decline in TFP Growth



Rising Concentration in Services

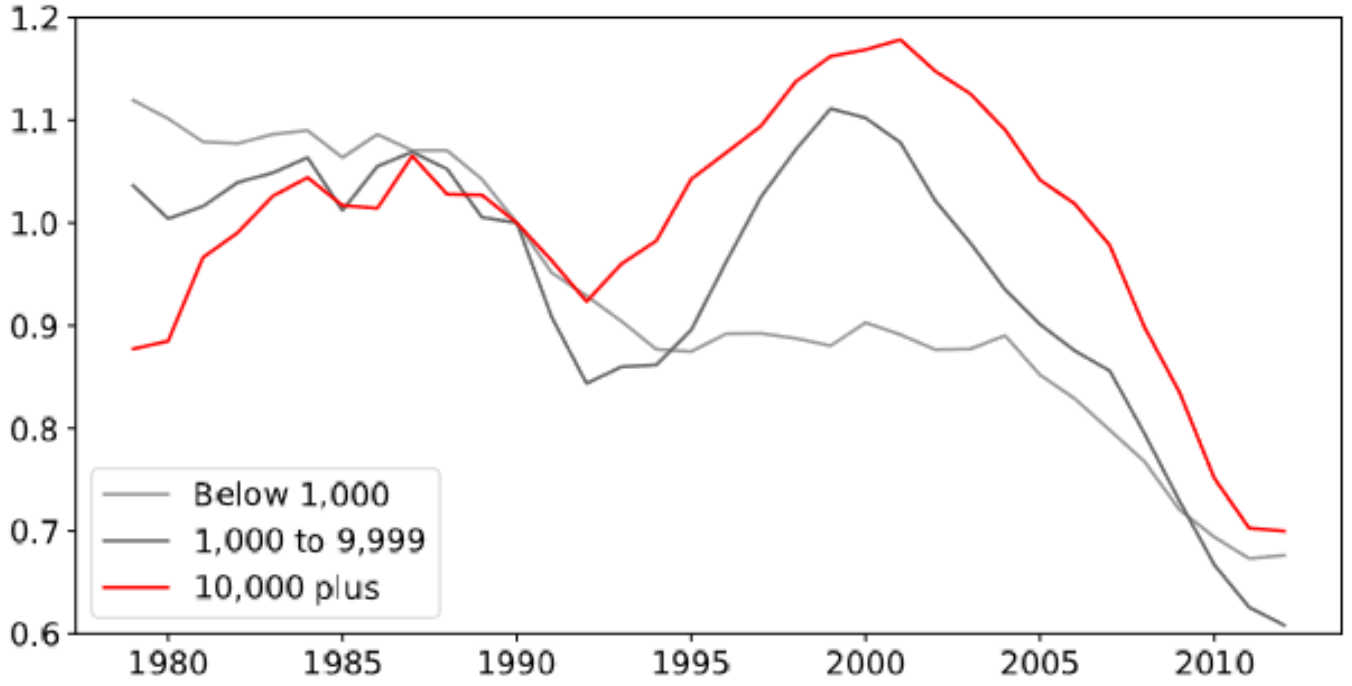


Rising Establishments per Firm



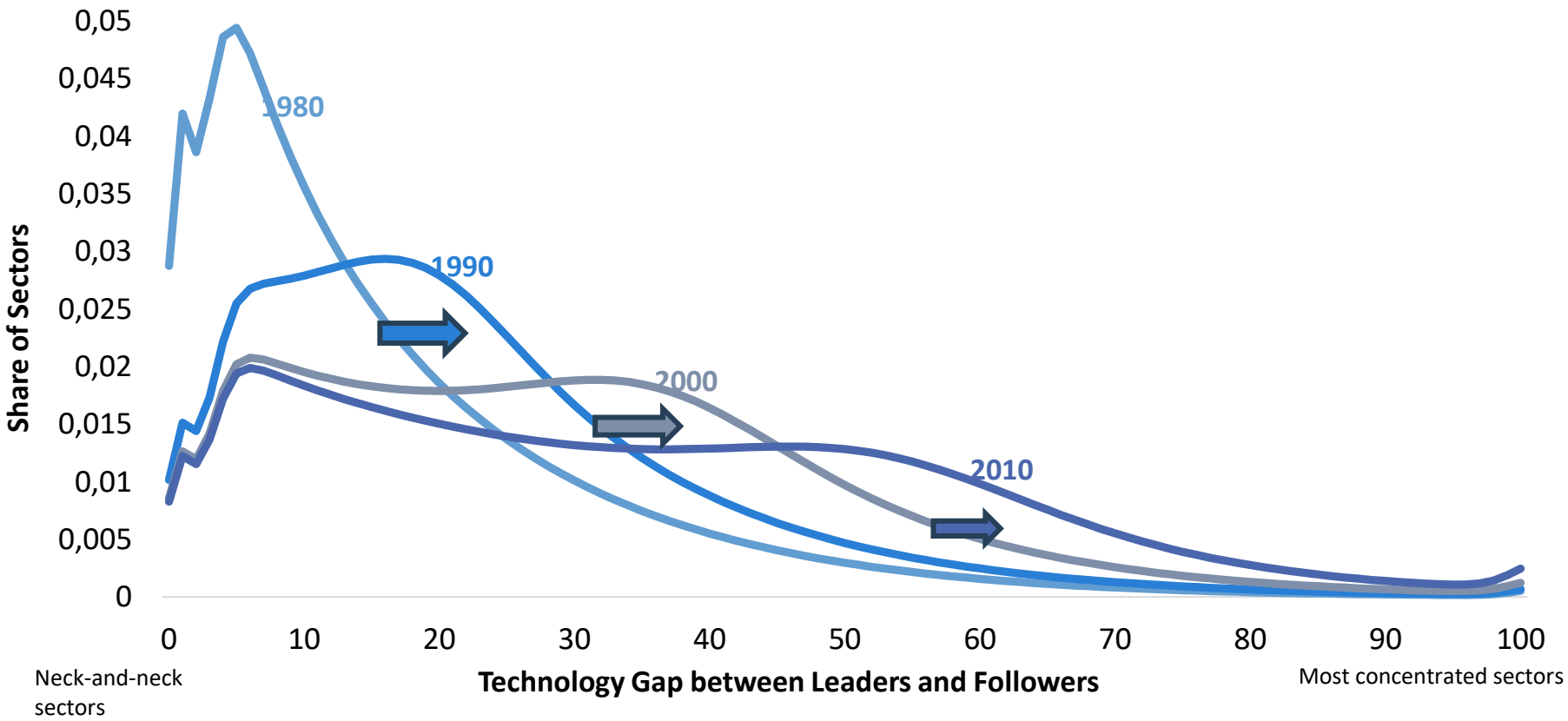
Source: U.S. Census Bureau's *Business Dynamics Statistics*

Rise and decline in employment-weighted plant entry rate

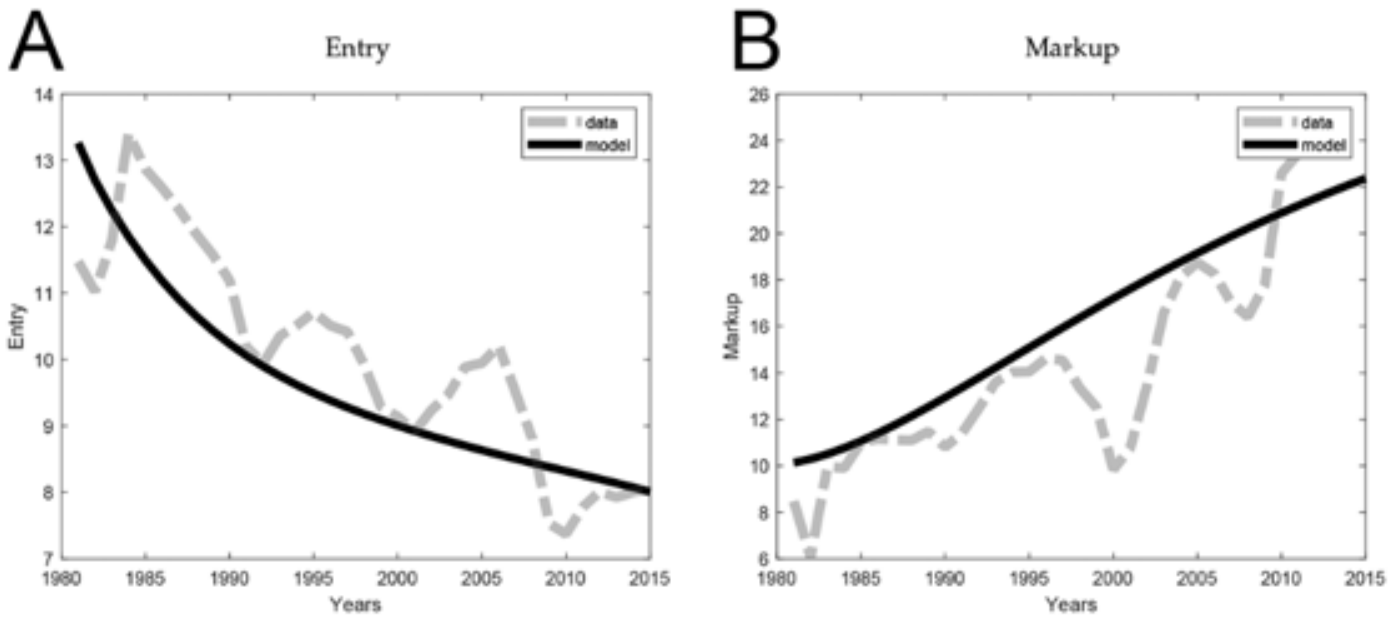


Source: U.S. Census Bureau's *Business Dynamics Statistics*. Job creation by birth over total employment by firm size bins. 5-year centered moving average.

WIDENING TECHNOLOGY GAP DISTRIBUTION AND INCREASING CONCENTRATION



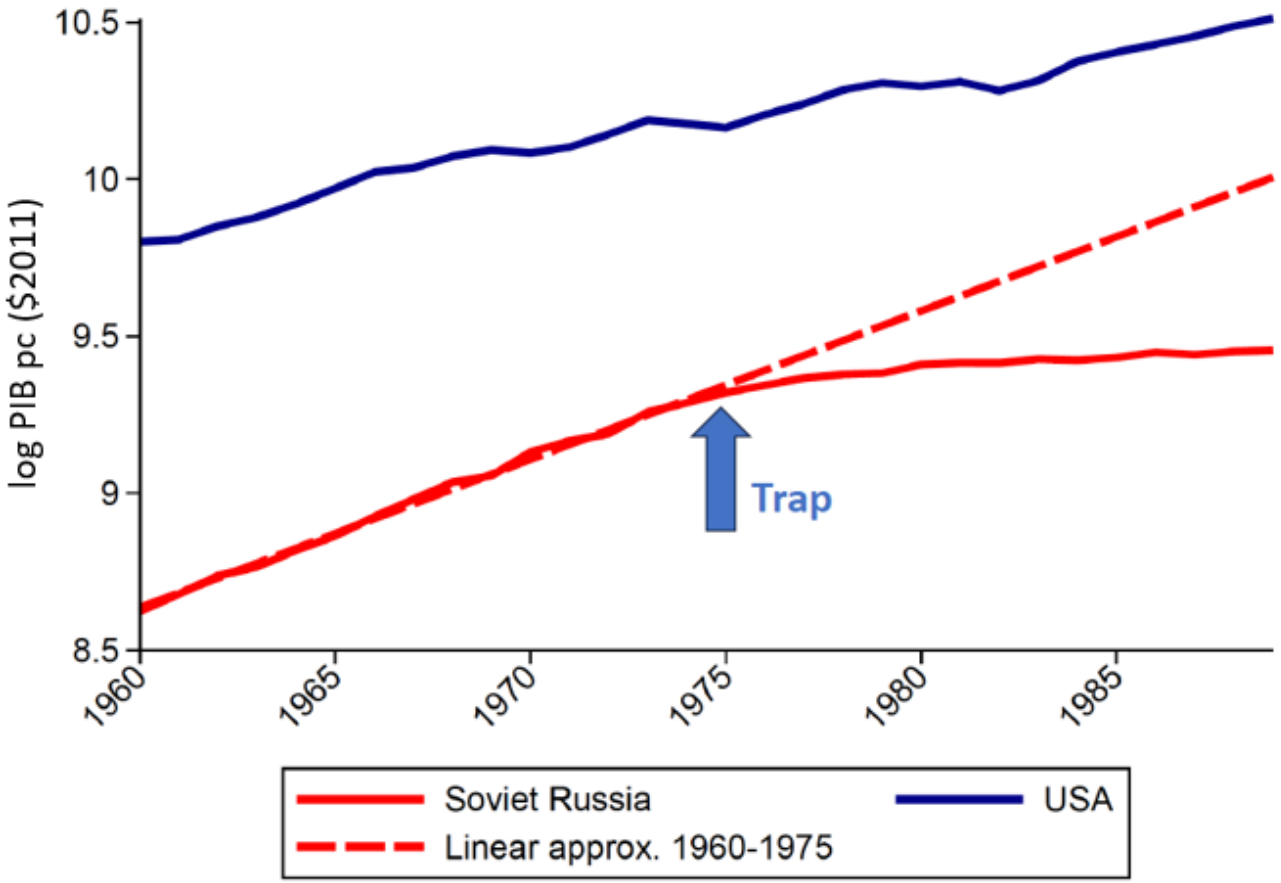
Lower diffusion cause laggards to fall further behind and help leaders become more entrenched.


A
Entry
data
model
Entry
Years
14
13
12
11
10
9
8
7
1980
1985
1990
1995
2000
2005
2010
2015
B
Markup
data
model
Markup
Years
26
24
22
20
18
16
14
12
10
8
6
1980
1985
1990
1995
2000
2005
2010
2015

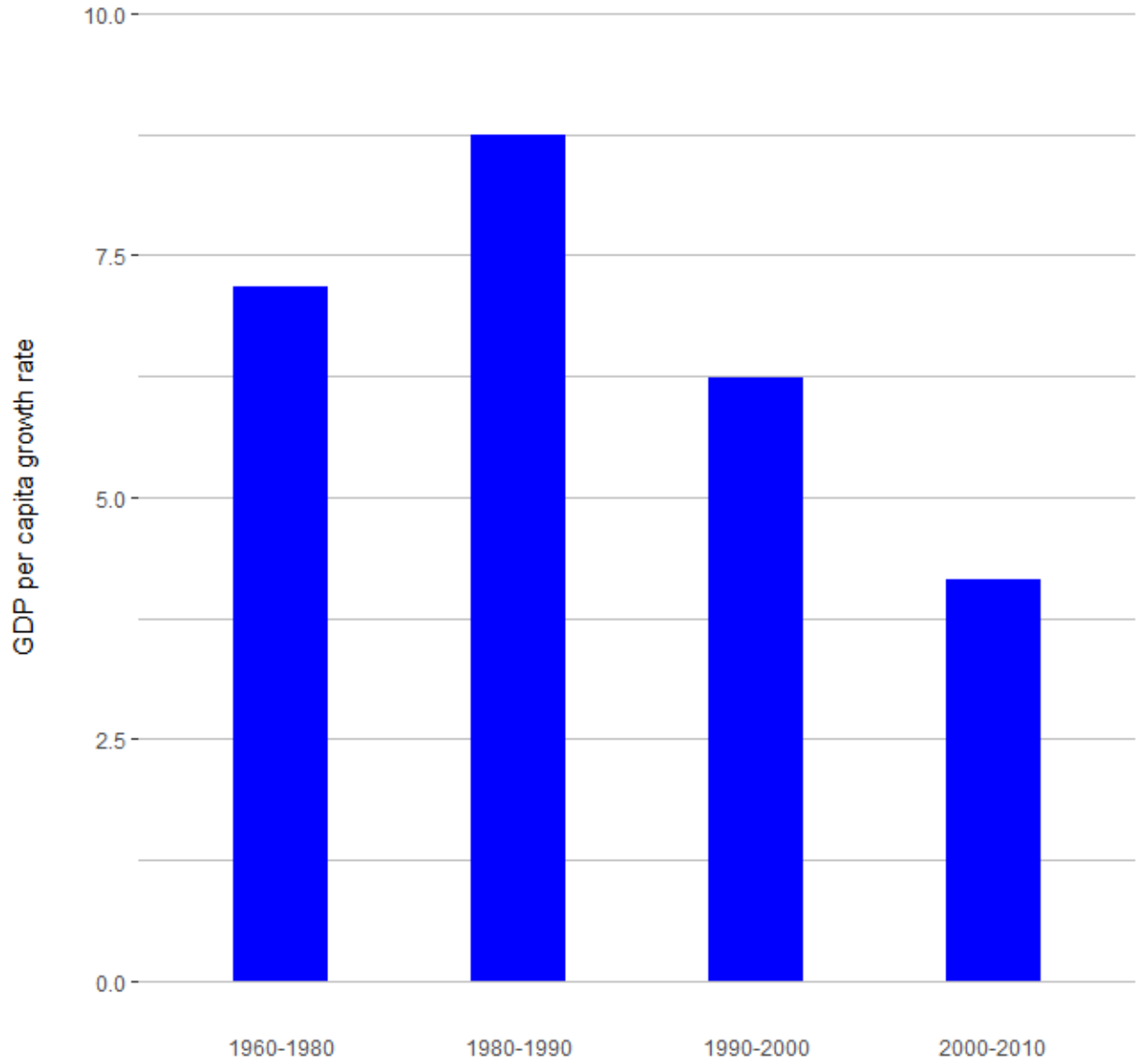
SOLVE HISTORICAL ENIGMA

- Secular stagnation
- **Middle income trap**

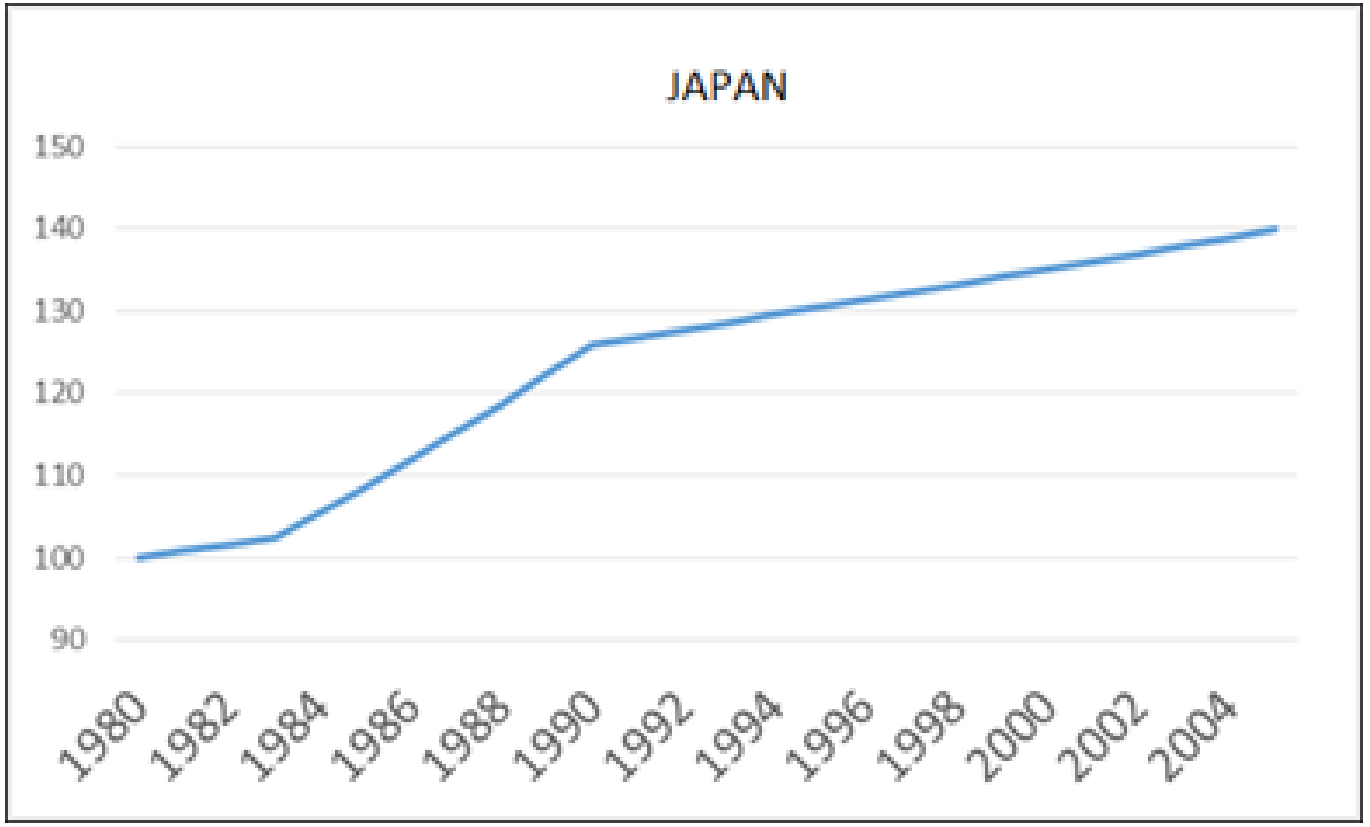
SOVIET UNION



KOREA: 1960-2010



JAPAN


JAPAN
150
140
130
120
110
100
90
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004

EU VERSUS US
BERGEAUD

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



Middle technological trap

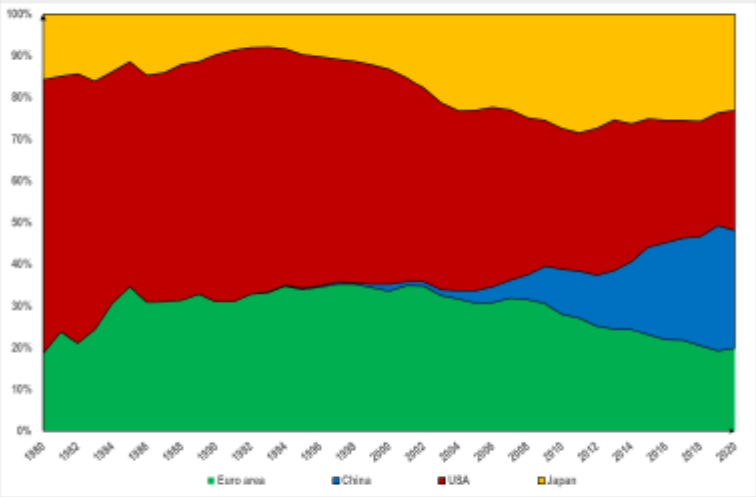


Figure: Patents filed under the PCT (OECD)

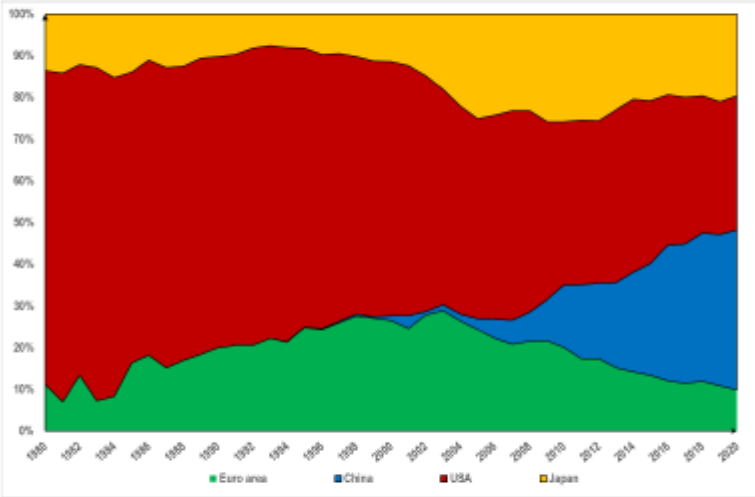


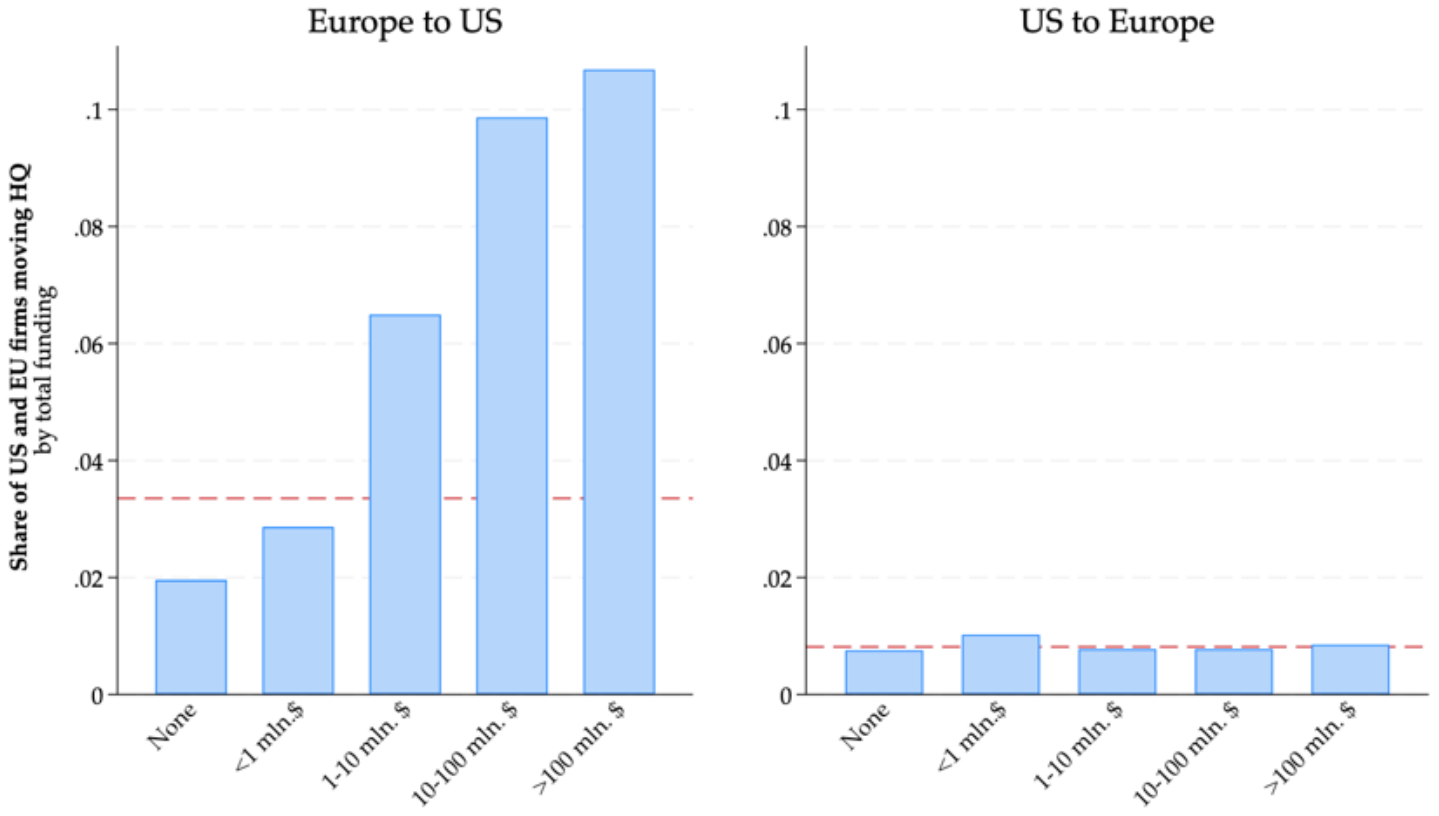
Figure: High technologies patents filed under the PCT

Five top patenting firms in US versus Europe:

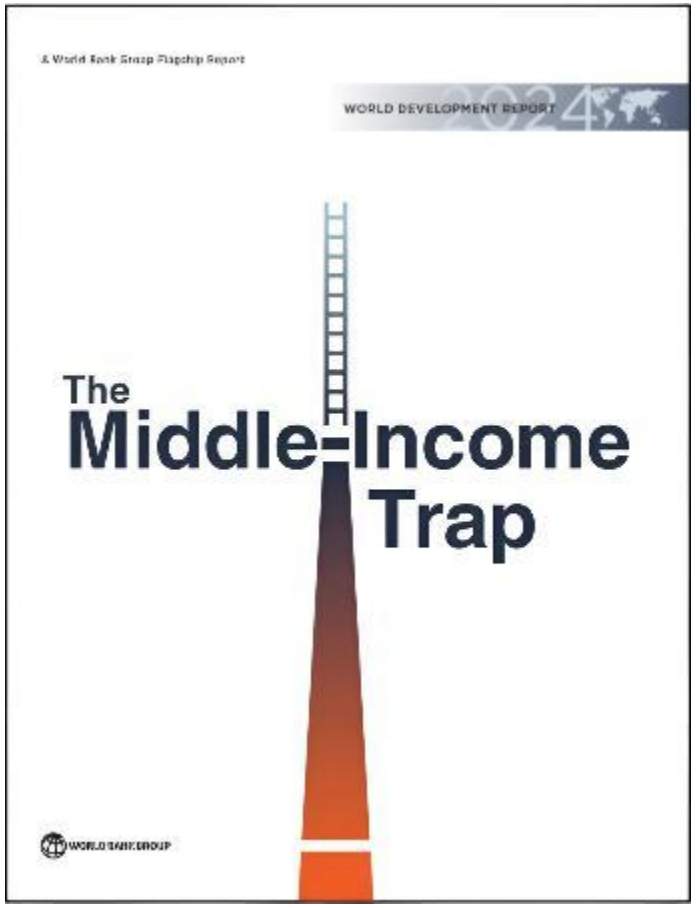
In US in 2000 : Procter & Gamble, 3M, General Electric, DuPont and Qualcomm.
In US in 2023 : Qualcomm, Microsoft, Apple, Google, IBM.

In Europe in 2000: Siemens, Bosch, Ericsson, Philips and BASF.
In Europe, in 2023 : Bosch, Ericsson, Philips, BASF and Bayer.

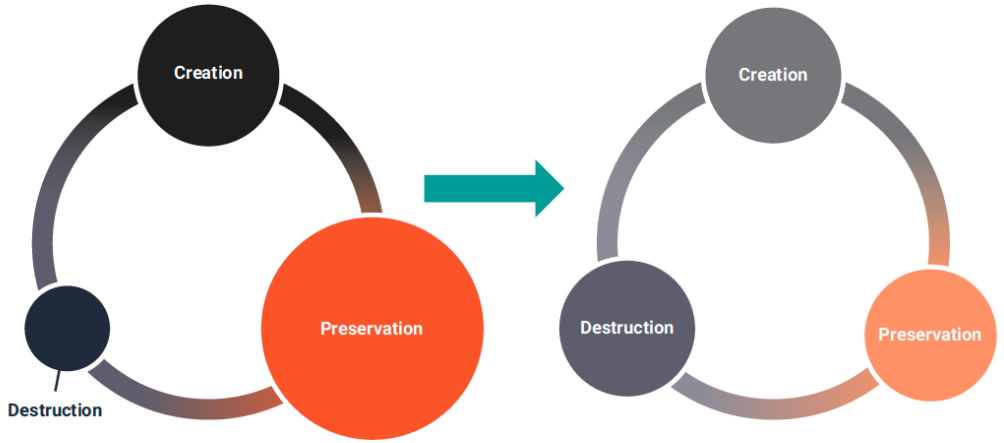
Over past 20 years, patenting and R&D investments in US moved from **mid techs toward high techs** – not in Europe!


Europe to US
US to Europe
Share of US and EU firms moving HQ
by total funding
0
.02
.04
.06
.08
.1
None
<1 mln.$
1-10 mln. $
10-100 mln. $
>100 mln. $

WORLD DEVELOPMENT REPORT 2024 BY THE WORLD BANK



Middle Income Trap and Creative Destruction



Source: WDR 2024 team.

OUTLINE

- Historical enigma
- **Rethinking capitalism**

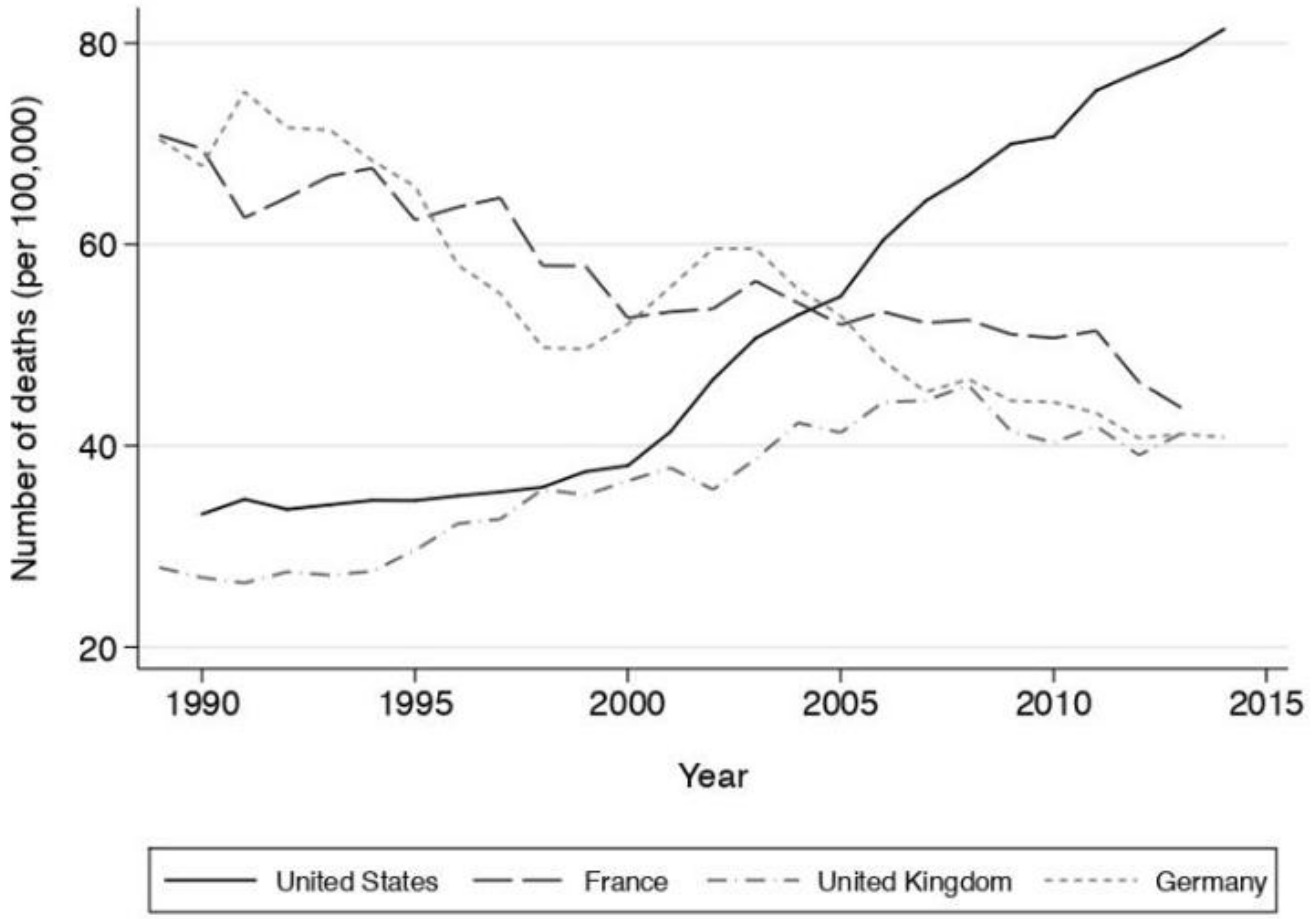
RETHINKING CAPITALISM
AGHION, ANTONIN, AND BUNEL (2020)

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

GINI AND POVERTY

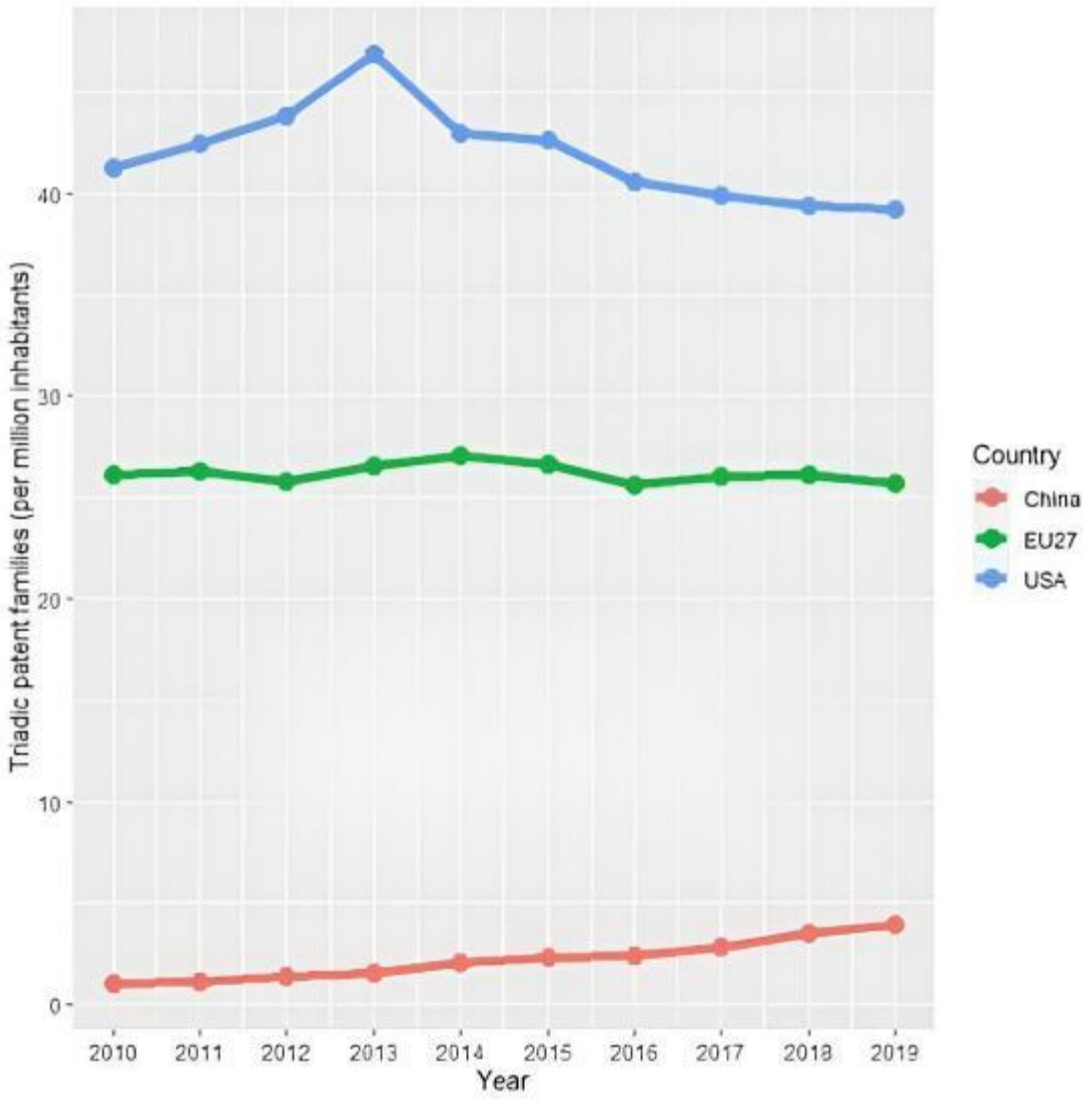
	Gini Index	Poverty Rate
United States	0.390	0.178
Germany	0.289	0.104
Sweden	0.282	0.093
Norway	0.262	0.084
France	0.292	0.081
Denmark	0.261	0.058

DEATH OF DESPAIR



Source: Case and Deaton (2017).

TRIADIC PATENTS



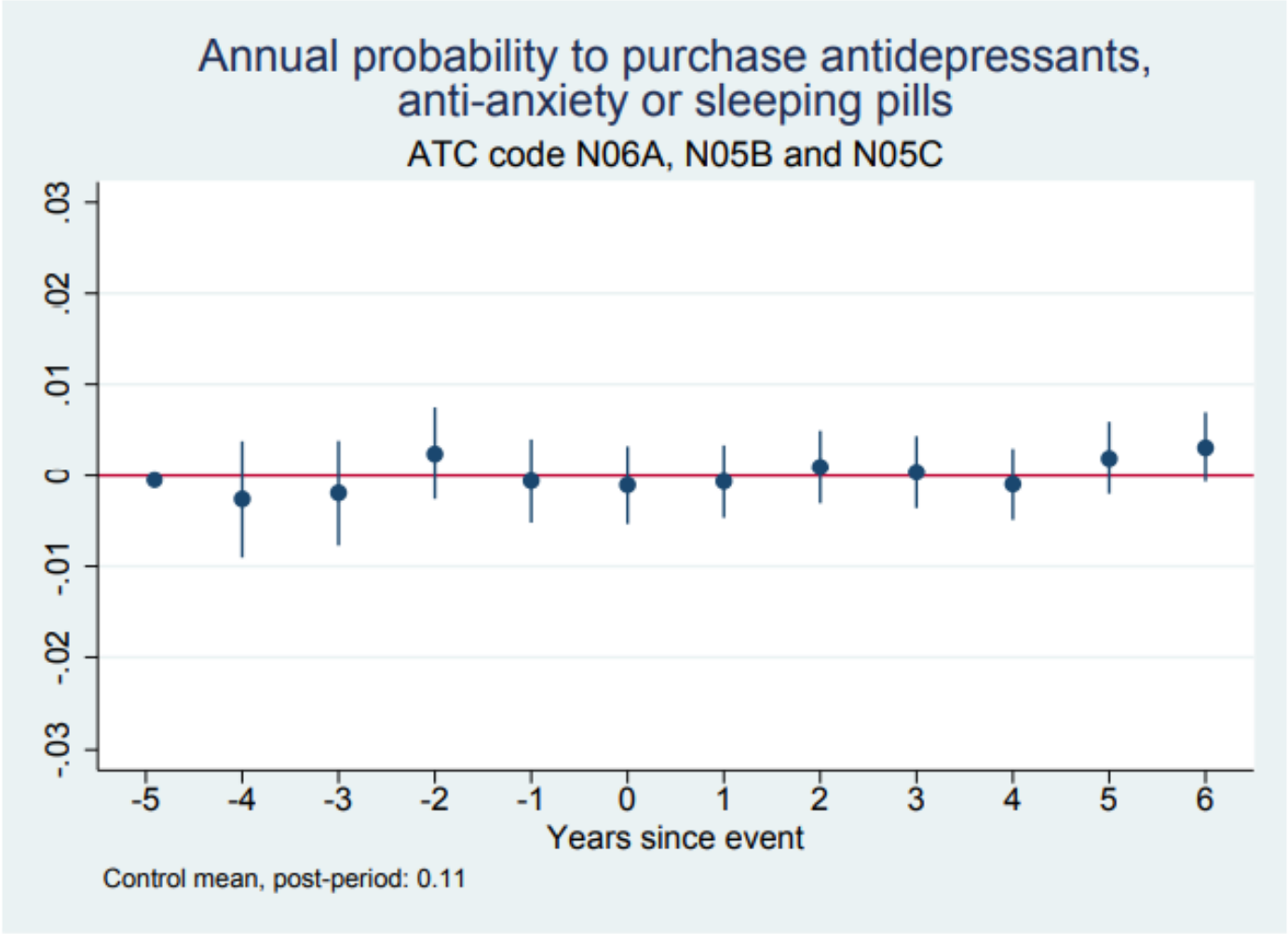
Triadic patents (per million inhabitants)

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

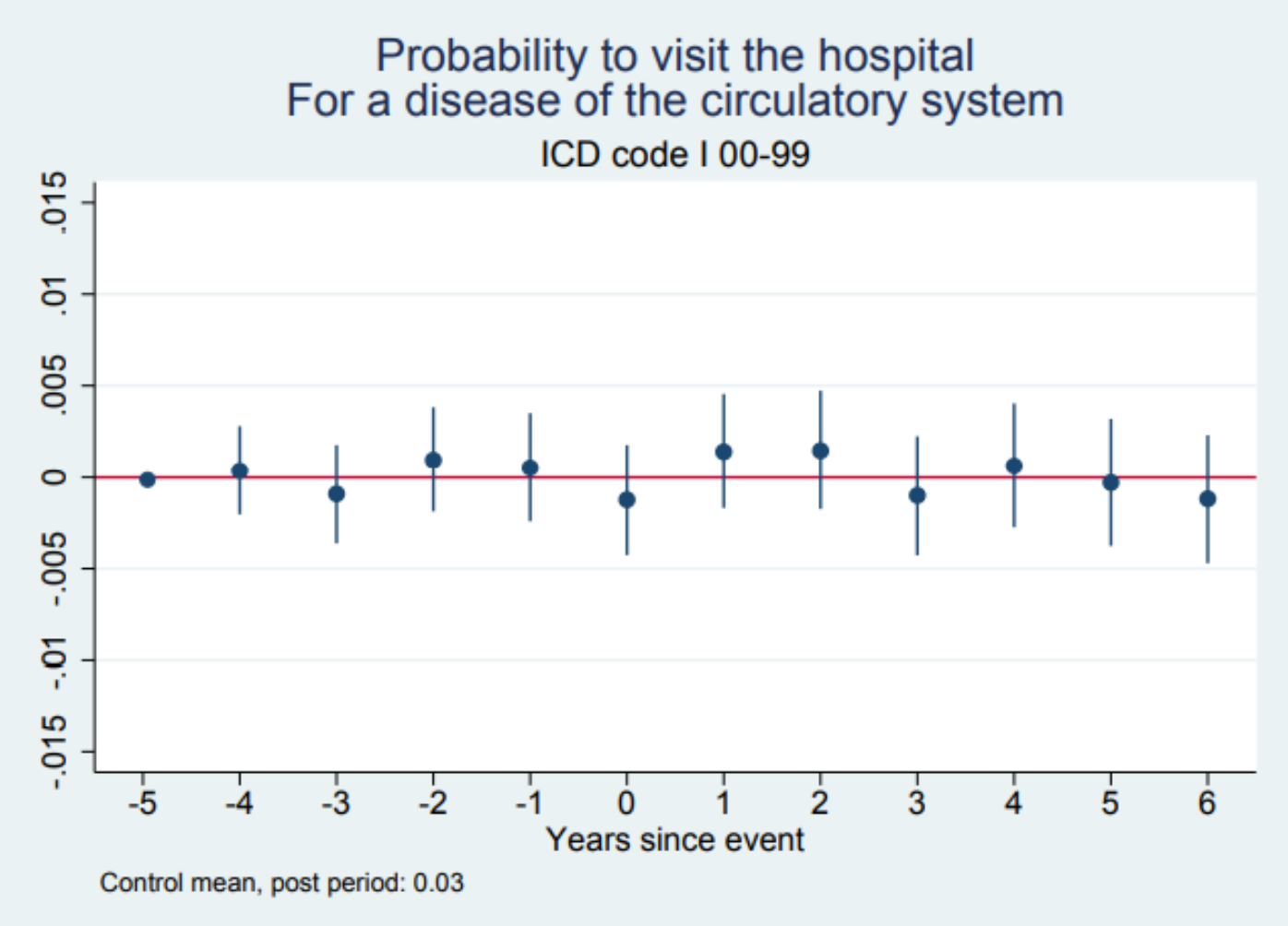
FLEXICURITY: DENMARK

Moving to health: Antidepressants and related drugs

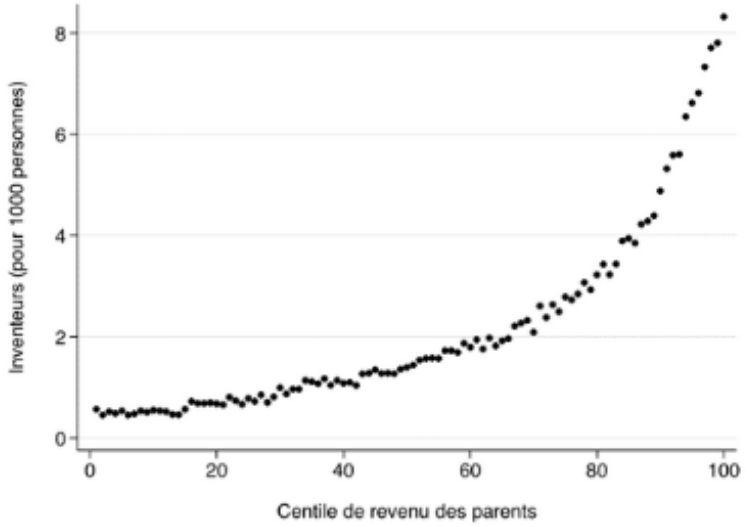


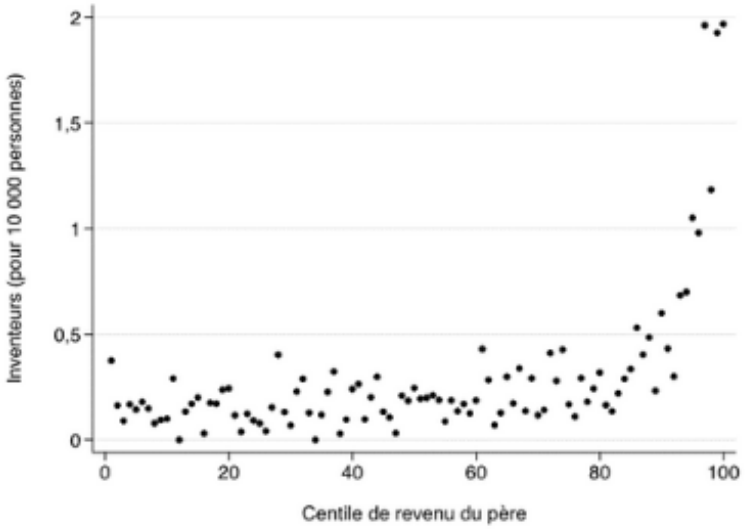
FLEXICURITY: DENMARK

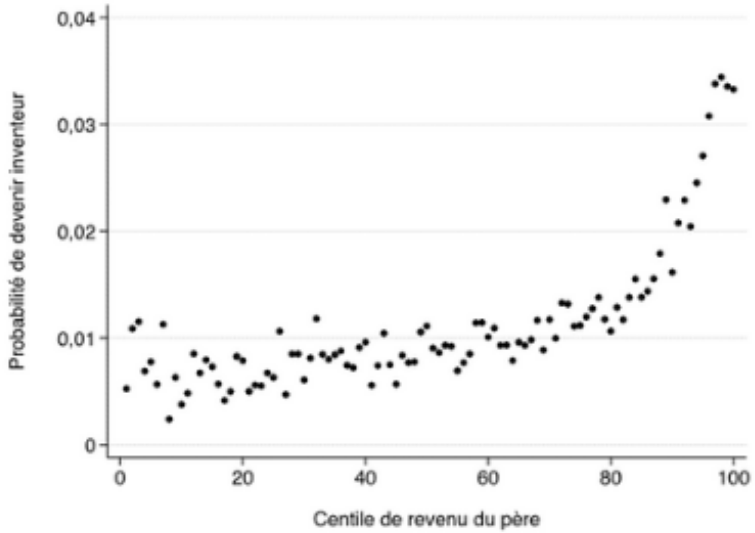
Heart attacks



EDUCATION

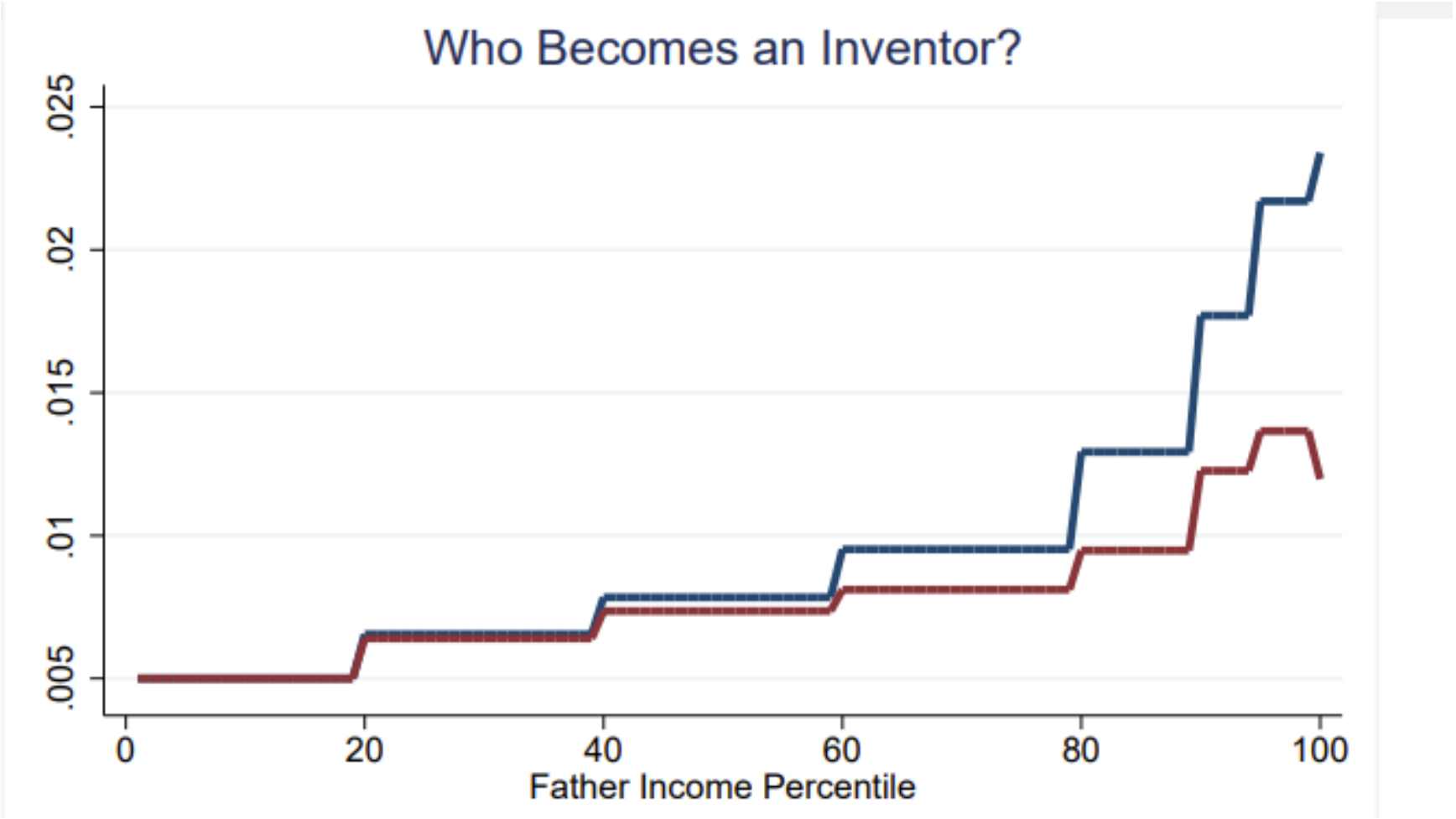




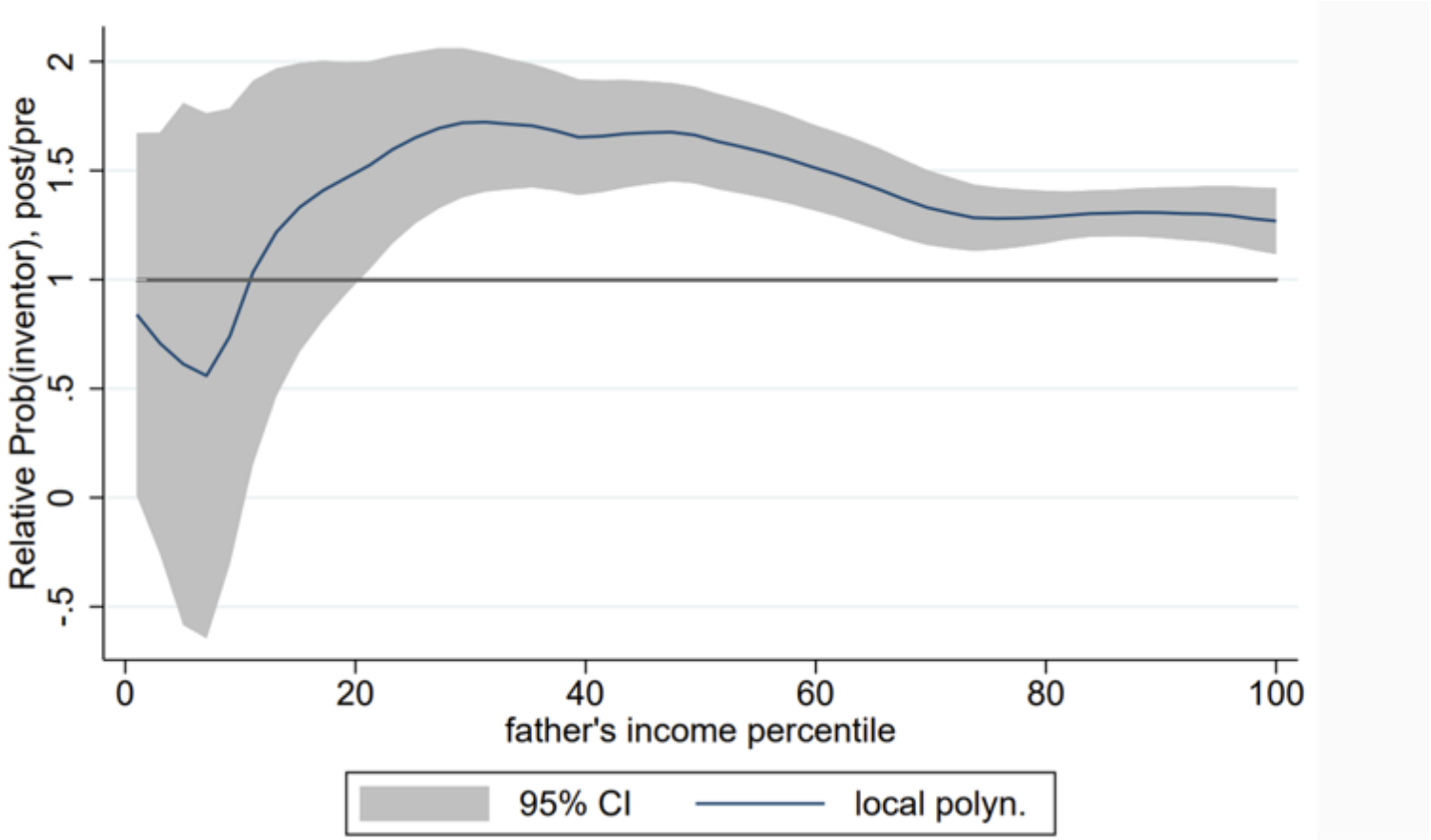


Sources: Bell, Chetty, Jaravel, Petkova and Van Reenen (2019) ; Akcigit, Grigsby and Nichols (2017) ; Aghion, Akcigit, Hyytinen and Toivanen (2017).

EDUCATION

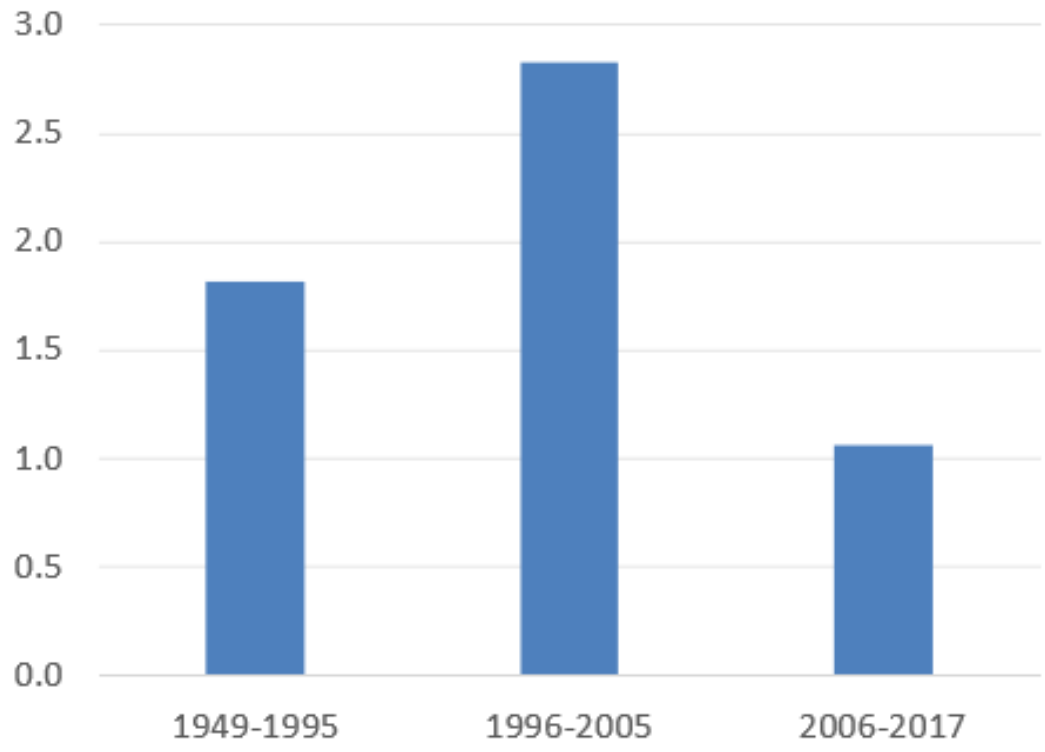

Who Becomes an Inventor?
.005
.01
.015
.02
.025
0
20
40
60
80
100
Father Income Percentile

EDUCATION


Relative Prob(inventor), post/pre
-.5
0
.5
1
1.5
2
0
20
40
60
80
100
father's income percentile
95% CI
local polyn.

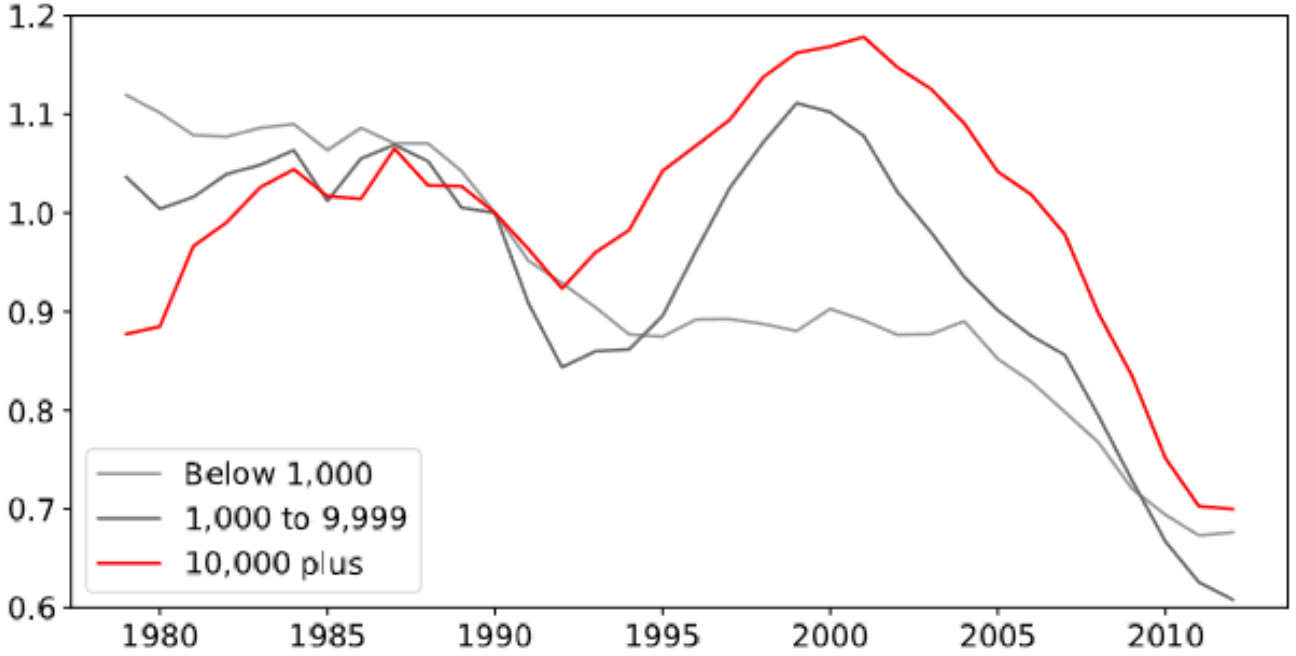
COMPETITION

Rise and Decline in TFP Growth



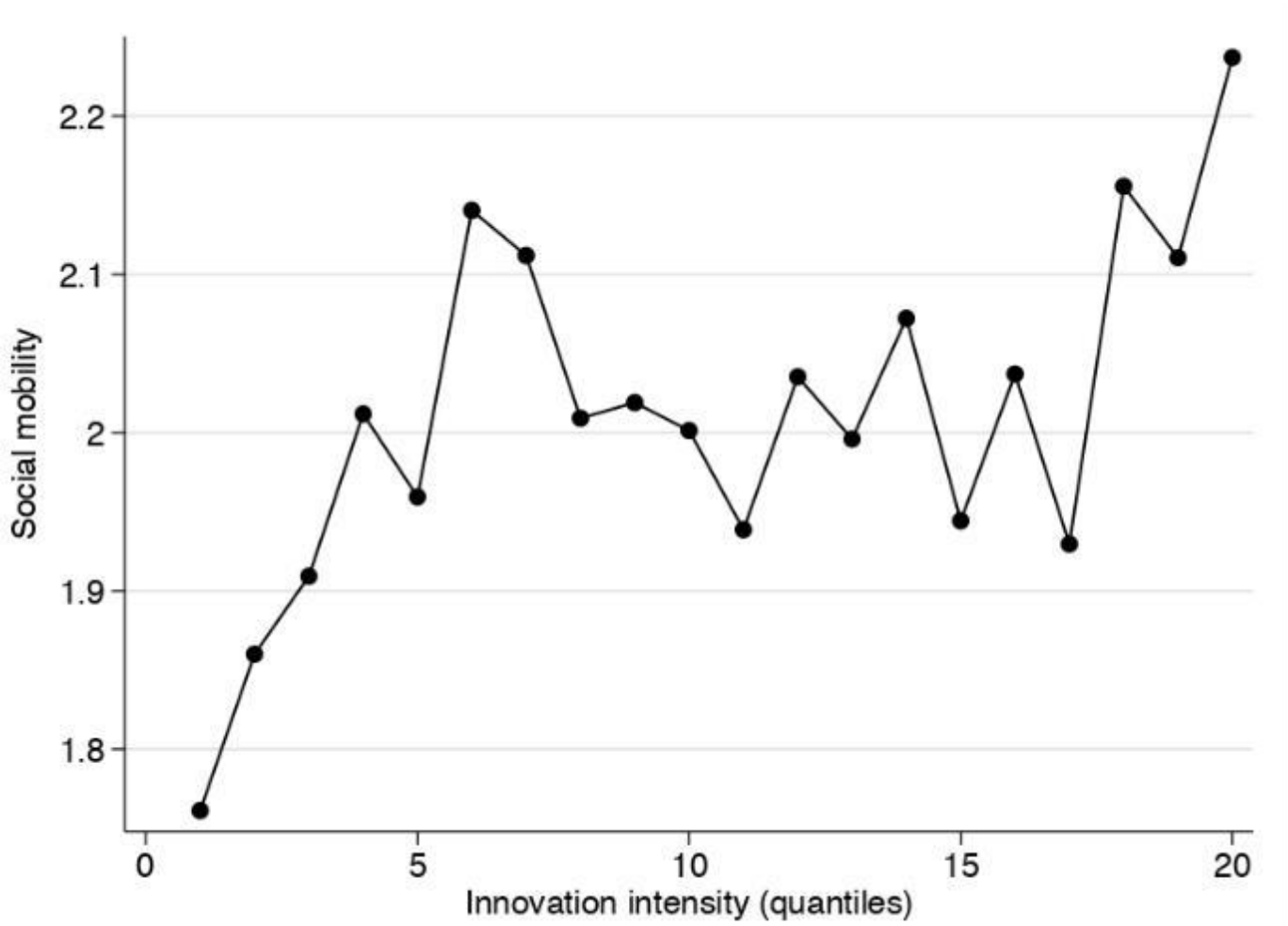
COMPETITION

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)

SHOULD WE FEAR AI?

AI AND GROWTH

AI should boost productivity growth as it automates both, the production of goods and services and the production of ideas (Aghion, Jones and Jones)

TFP GAINS OVER 10 YEARS

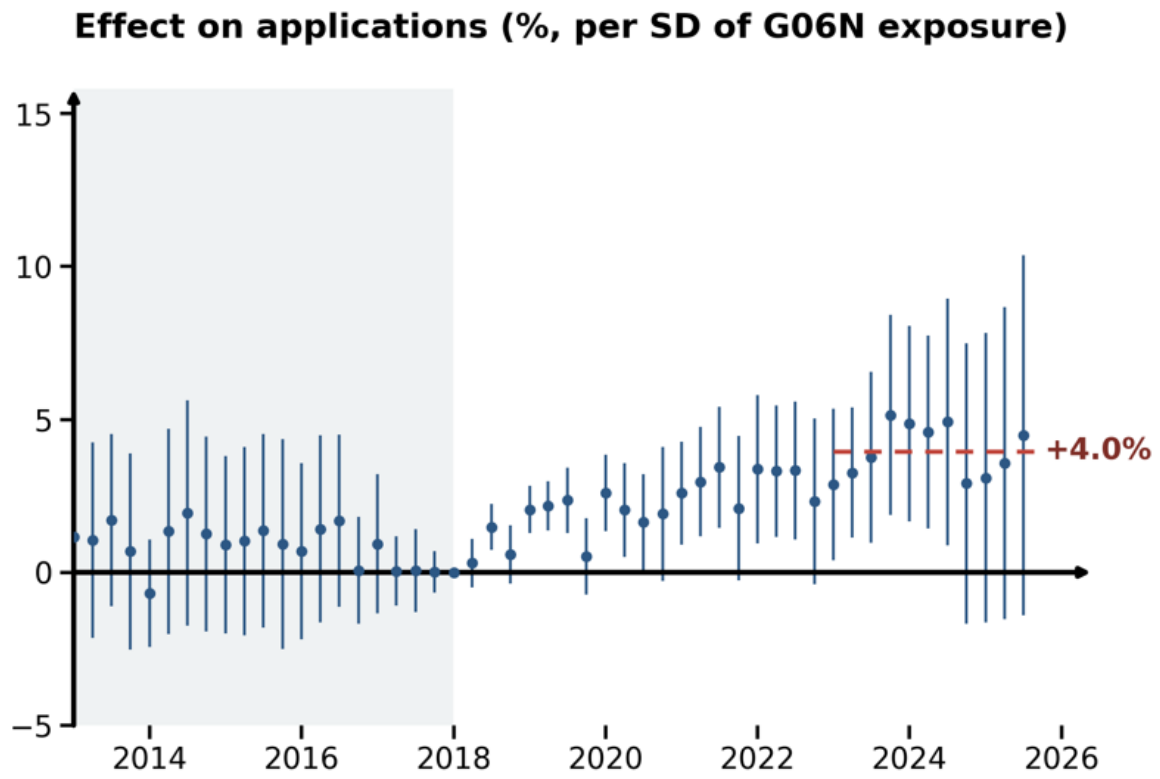
- Given the existing empirical literature, and abstracting from the ideas channel, increase in annual productivity growth should be in the interval [0.07pp; 1.24pp] over 10 years

➢ **Predicted increase in productivity growth:**
  - ➢ **Acemoglu: 0:07pp/year over 10 years**
  - ➢ **Aghion-Bunel: 0.68pp/year over 10 years**, an effect of the same order of magnitude as what the extrapolation from IT revolution would predict

AI AND GROWTH

AI should boost productivity growth as it automates both, the production of goods and services **and the production of ideas** (Aghion, Jones and Jones)

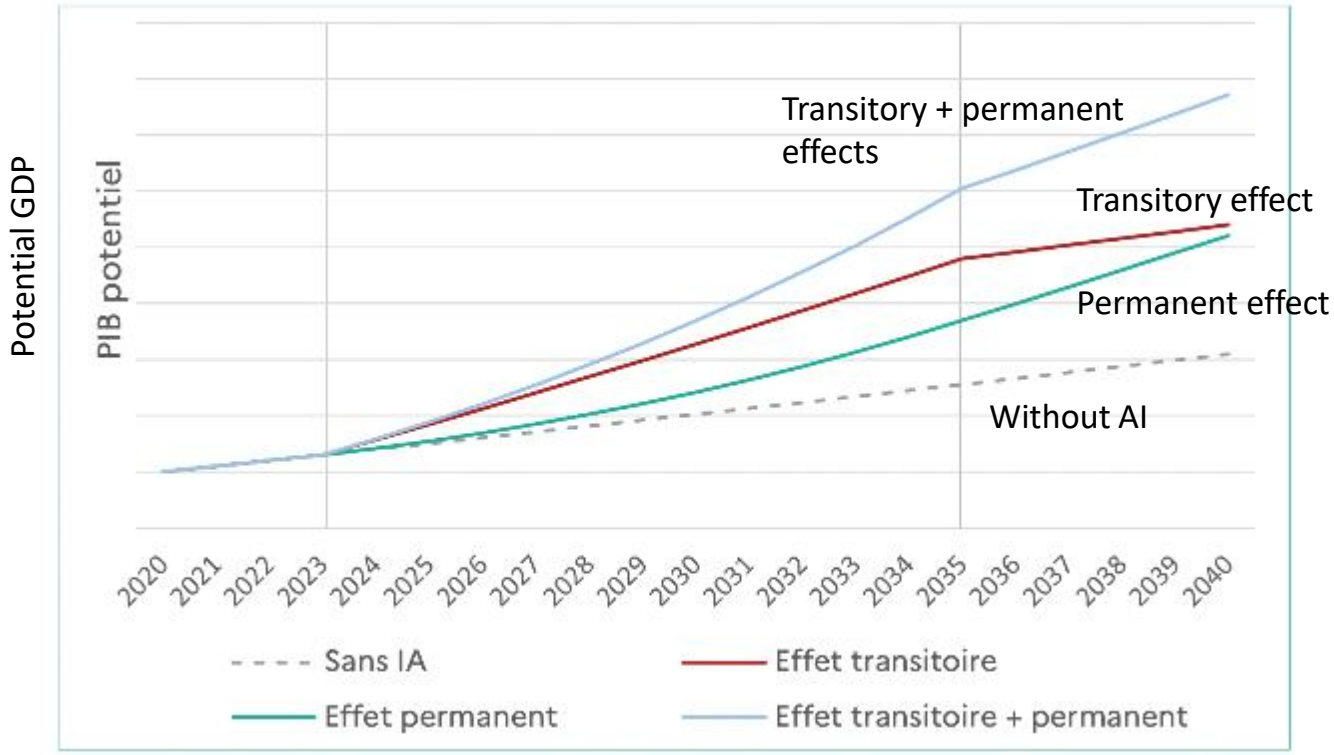
Result 1: exposure to G06N increase patenting after 2018



AI AND GROWTH

Total expected effects of AI adoption on growth

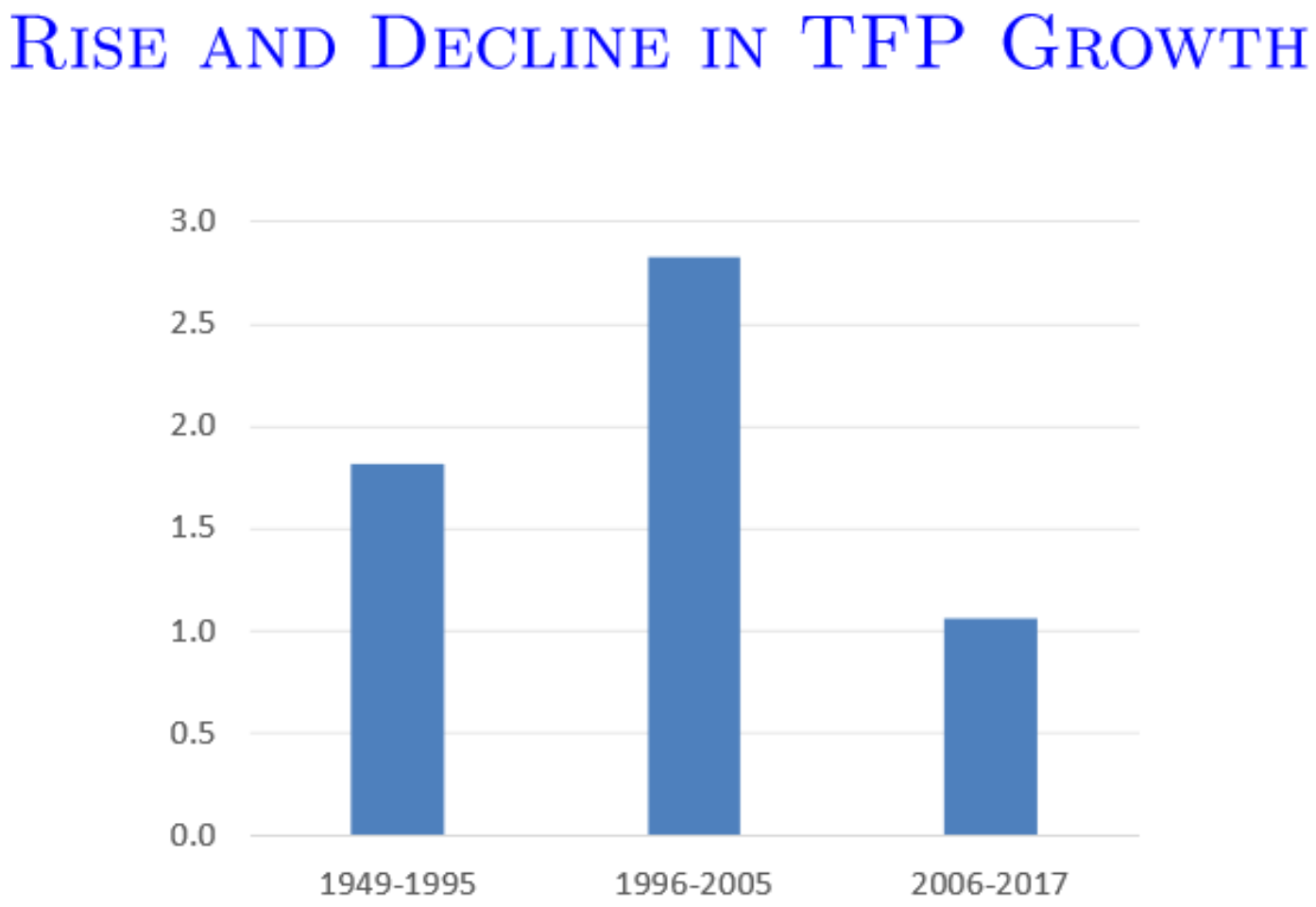
(Report of Ministry of Economics, Finance and Industrial and Digital Sovereignty)



Graphique 3 : Effets totaux attendus de l'adoption de l'IA sur la croissance.

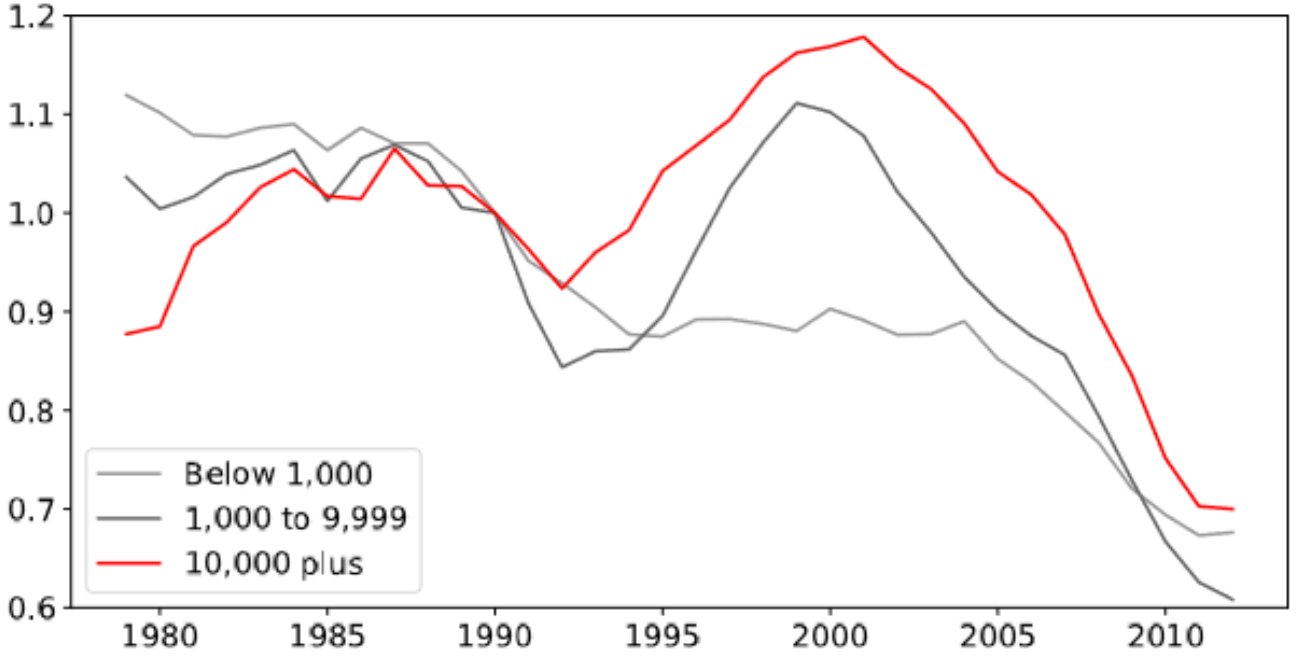
BUT LACK OF COMPETITION IS AN OBSTACLE

COMPETITION



COMPETITION

Rise and decline in employment-weighted plant entry rate

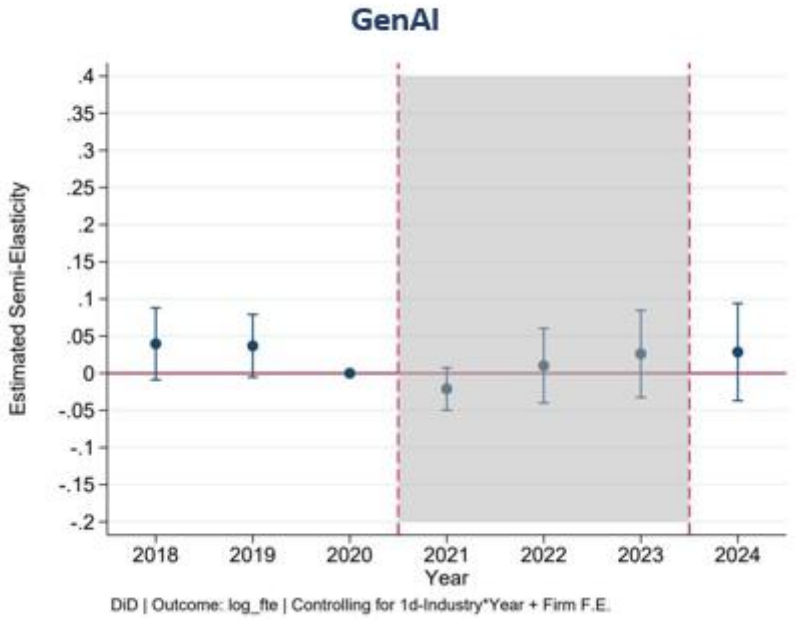


Source: U.S. Census Bureau's *Business Dynamics Statistics*. Job creation by birth over total employment by firm size bins. 5-year centered moving average.

OVERALL ON AI AND GROWTH

- AI has a high growth potential
- But inappropriate competition policy may hamper it
  - In particular the Cloud is dominated by three superstar firms: Amazon, Google, Microsoft
  - Only one big actor (GPU) on the market for graphic processes

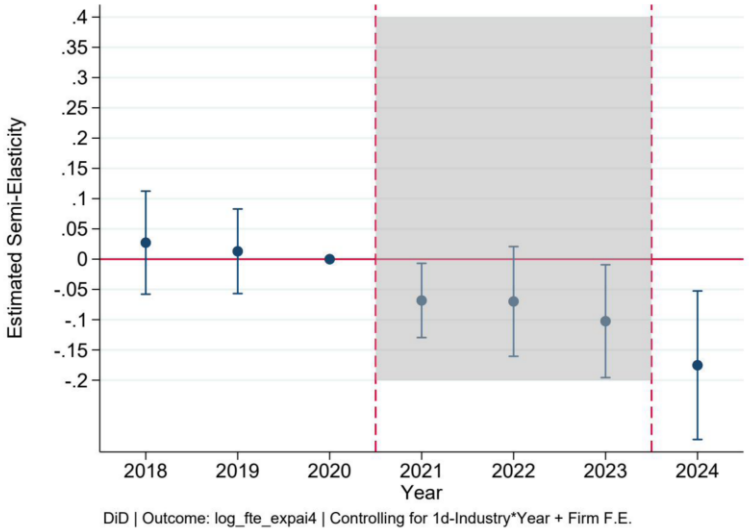
AI AND EMPLOYMENT


GenAI
Estimated Semi-Elasticity
.4
.35
.3
.25
.2
.15
.1
.05
0
-.05
-.1
-.15
-.2
2018
2019
2020
2021
2022
2023
2024
Year
DiD | Outcome: log_fte | Controlling for 1d-Industry*Year + Firm F.E.

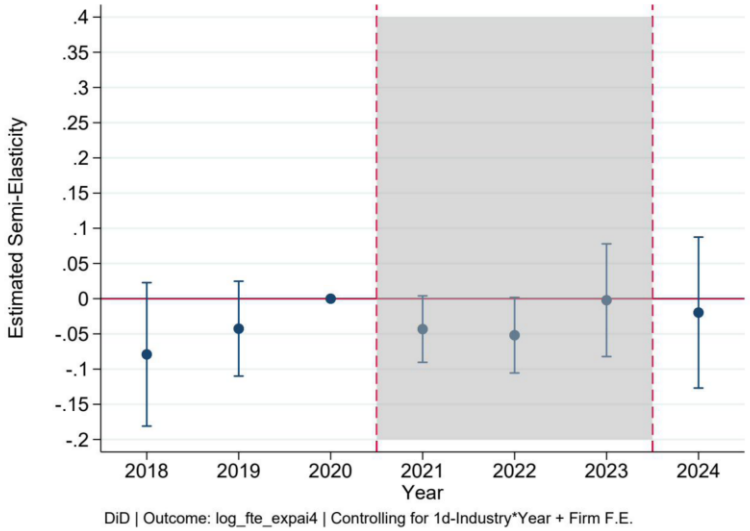
Employment exposed and substitutable – AI for administrative use

- **Exposed & substitutable jobs** (Bergeaud 2024): high automation potential (teleworkers, secretaries, accountants
- **When GenAI for administrative purposes:** negative and sizable (-17%) effect on exposed employment vs. no significant effect for Non-GenAI

GenAI: Negative (-17%) effect



Non-GenAI: No effect



AI AND EMPLOYMENT

AI will induce job destructions….

….but also job creation due to the productivity effect and the fact that IA will boost the production of new ideas…

Need for adequate education and flexicurity systems!

OVERALL ON AI

- Harnessing the growth potential of AI: Competition

- Harnessing the job creation potential of AI: education and flexsecurity

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!