Growth and Productivity: Can Digital Technologies Deliver?

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Session 3: Growth and Productivity

- can digital technologies deliver?
- a paradox
  - boom of digital technologies and yet productivity is slowing down
- four presentations
  1. Pat Bajari: The impact of big data on firm performance
  2. John Fernald: World productivity: 1996-2014
  3. Diego Comin: Medium-term drivers of productivity growth
  4. Peter Gal: Digital technologies and online platforms
- very interesting and thought-provoking papers
  - common theme:
    - ★ relationship between technology and productivity
  - different approaches

Big Data and Productivity

- Bajari, Chernozhukov, Hortaçsu & Suzuki (2018)
  - estimate the value of big data to firms
  - using big data from Amazon
- main results
  - positive value of data
  - but with diminishing returns
- Bajari, Chernozhukov & Schoelkopf
  - ML + big data $\longrightarrow$ more accurate quality-adjusted prices
- fascinating questions, we know so little!

Can Big Data Explain the Productivity Slowdown?

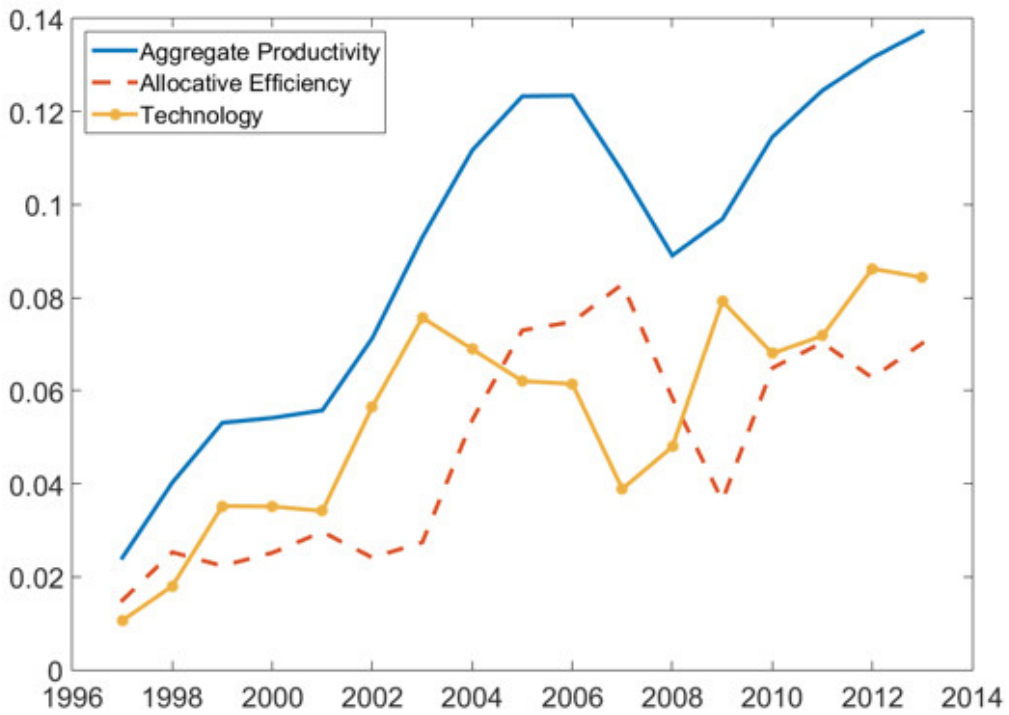
- big data may show that GDP is mismeasured
  - use big data to build better quality-adjusted prices
    - ★ important: prices and demand often positively correlated!
    - ★ Hottman, Redding & Weinstein (2016); Bonfiglioli, Crino' & Gancia (2019)
- mixed views:
  - Brynjolfsson, Rock & Syverson (2017); Syverson (2017)
- can more information be bad?
  - it's often asymmetric
  - cost of storing and processing information
  - who takes advantage of big data?
- can big data explain the rise of superstar firms?
  - Farboodi & Veldkamp (2019)

World Productivity: 1996 - 2014

- Esfahani, Fernald & Hobijn (2019)
  - productivity growth accounting with distortions
    - ★ 1996-2014, up to 36 industries and 40 countries
- key results
  - main driver of productivity growth: country-industry productivity
    - ★ slowdown in industrialized countries offset by emerging economies
  - reallocation/misallocation of labor (mostly between countries) is drag on productivity
    - ★ explains fluctuations
- begs the question
  - why a productivity slowdown in industrialized countries?

Sources of US Growth: Technology vs Misallocation

- Baqaee & Farhi (2019)
  - reallocation occurs mostly across firms within industries

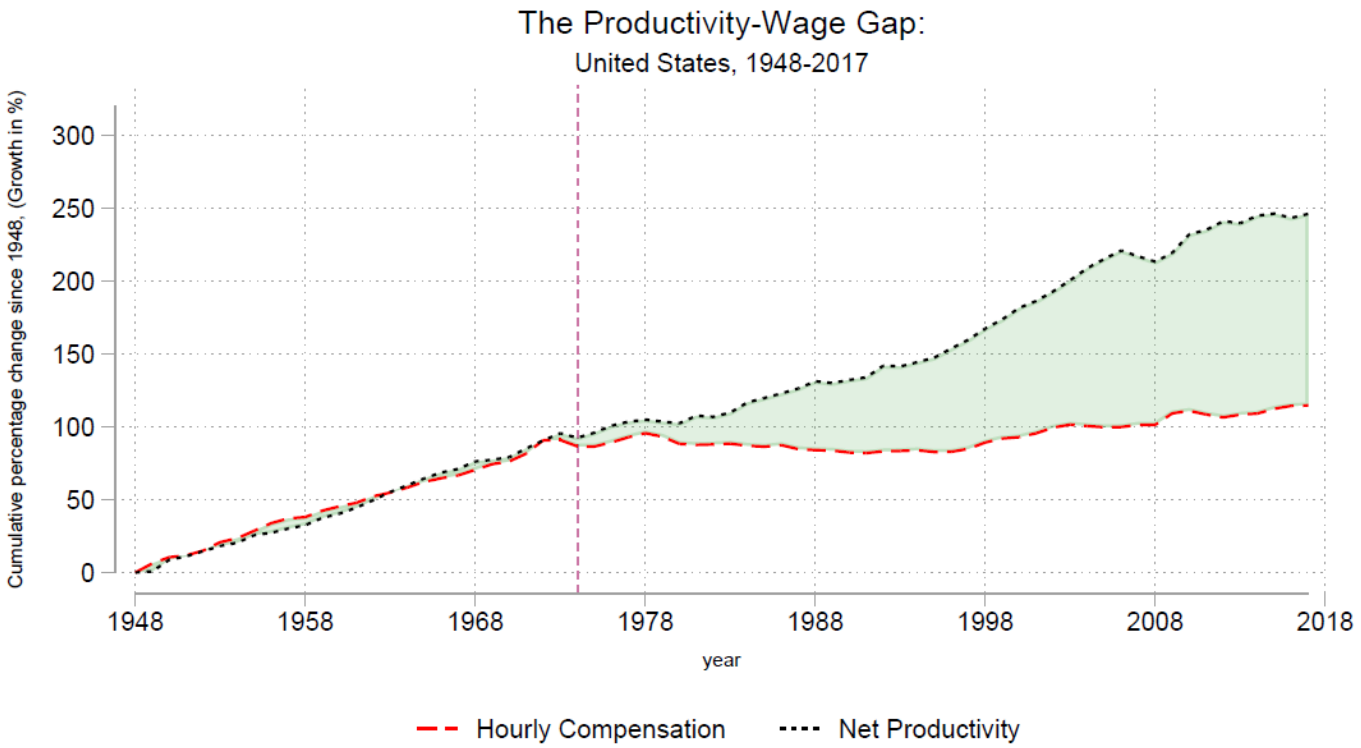


- we need to look at firms to understand economic performance
  - firm-level trade accounting: Redding & Weinstein (2018); Bonfiglioli, Crino' & Gancia (2019)

Medium-Term Drivers of Productivity Growth

- Comin (2019)
  - technology adoption responsible for productivity decline since the Great Recession
  - efficiency of R&D responsible for the pre-Great Recession slowdown
- adoption, not just innovation matters!
- differences in adoption rates may explain why firms are becoming more unequal
  - will more data narrow or amplify the gap?
- what about labor productivity?

The Great Decoupling: Productivity and Wages



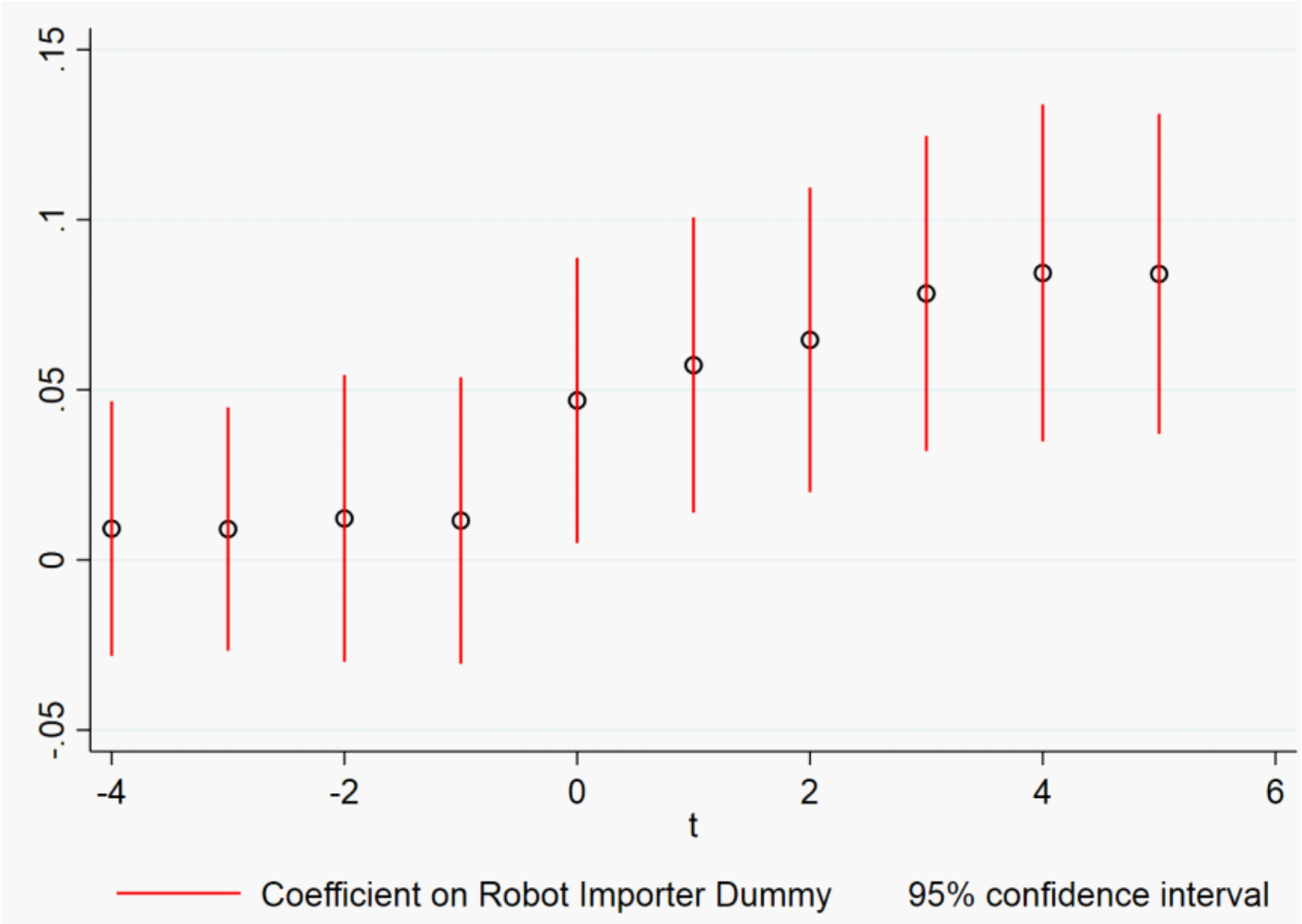
Notes: *Compensation includes wages and benefits of production/nonsupervisory workers in the private sector.*
Net productivity is growth of output of goods and services less depreciation per hour worked.
Source: EPI analysis of unpublished Total Economy Productivity data from Bureau of Labor Statistics (BLS)
Labor Productivity and Costs program, wage data from the BLS Current Employment Statistics.
Updated from Figure A in Raising America's Pay: Why It's Our Central Economic Policy Challenge (Bivens et al. 2014)

- are new technologies good for workers?

Who Benefits from New Technologies?

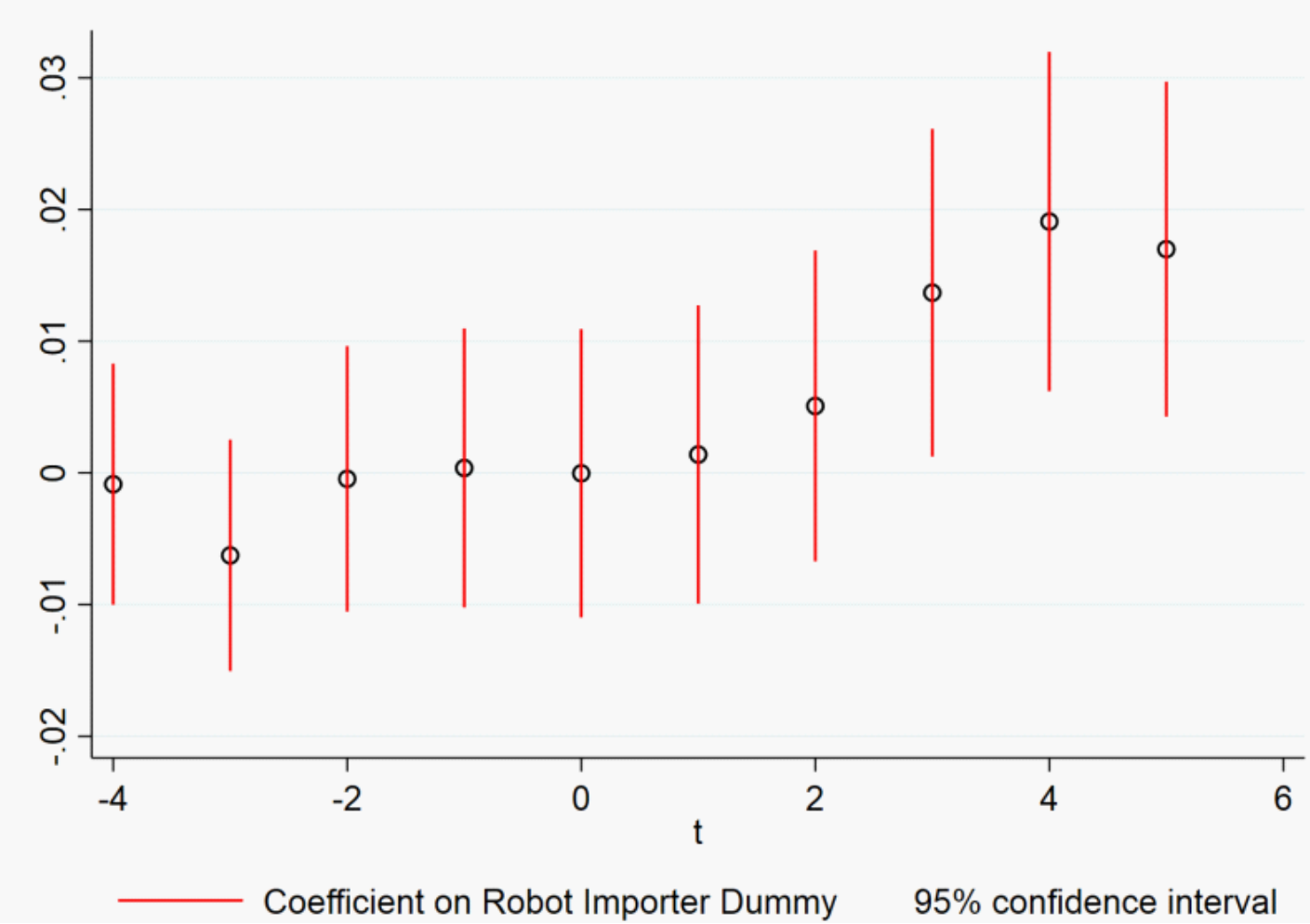
- not all technologies are equal
  - hardware, software, industrial robots
- Blanas, Gancia & Lee (2019), EU KLEMS
  - ICT capital correlates with employment *gains*
  - software capital correlates with employment *losses*
- yet, *we need to understand the micro-level adjustment*
- Bonfiglioli, Crino', Fadinger & Gancia (2019)
  - French firm-level imports of industrial robots
  - study effect on firm-level outcomes (1994-2013)

Before/After Robot Import: Firm TFP

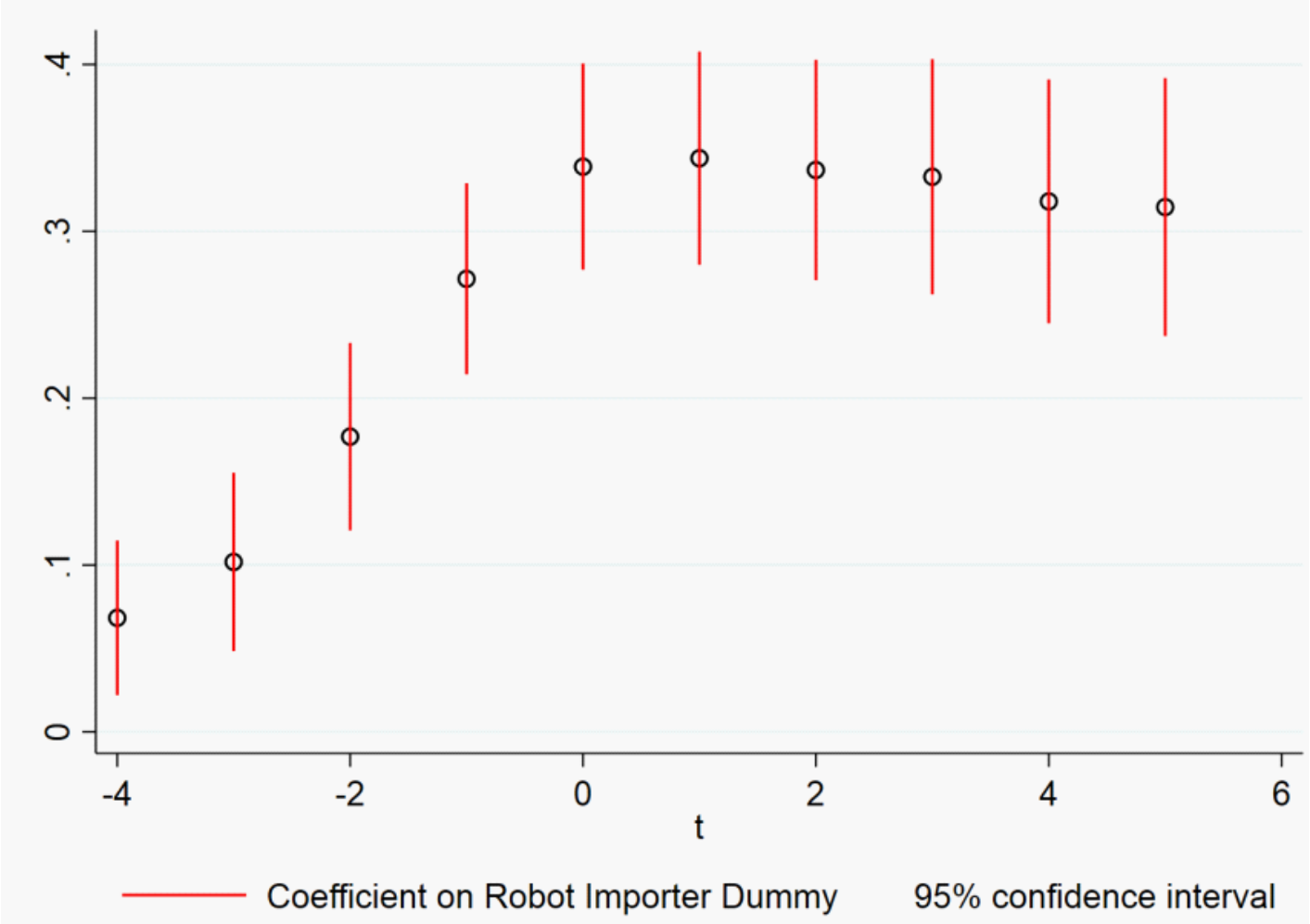


Before/After Robot Import: Firm Employment

Before/After Robot Import: NP Workers Share



Before/After Robot Import: Firm Sales



- are automating firms raising markups?

Wrapping up

- did digital technologies deliver?
- more data helps firms, but has its cost
  - needed: a quantification of net benefit, including to consumers
- growth still driven by residual productivity
  - but increasingly driven by developing countries catching up
- productivity effect of new technologies still elusive
- costs more visible
  - new technologies can displace workers, at least in the short run

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