

# Return of Solow Paradox? IT, Productivity, and Employment in U.S Manufacturing

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# Main idea

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- The authors find some evidence of productivity growth in IT-intensive manufacturing industries.
- The growth is driven by declining relative output accompanied by even more rapid declines in employment.
- The previous resolutions need to be examined.

# Agenda

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- Background of Solow Paradox
- Previous Solution
- IT & Labor Productivity
- What drives  $Y/L$ ?
- Comments



# Solow Paradox

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- Slowdown in productivity growth in the United States in the 1970s and 80s
- Rapid development in the field of information technology (IT) over the same period.
- “You can see the computer age everywhere but in the productivity statistics”

# Previous Solution: Technology Discontinuity

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- All sectors are experiencing major increase in productivity.
- IT-power machines will increasingly replace workers.
- Labor's share of national income has fallen in numerous developed and developing countries.

# Regression Model

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$$\log Y_{jt} = \gamma_j + \delta_t + \sum_{t=81}^{09} \beta_t \times IT_j + e_{jt},$$

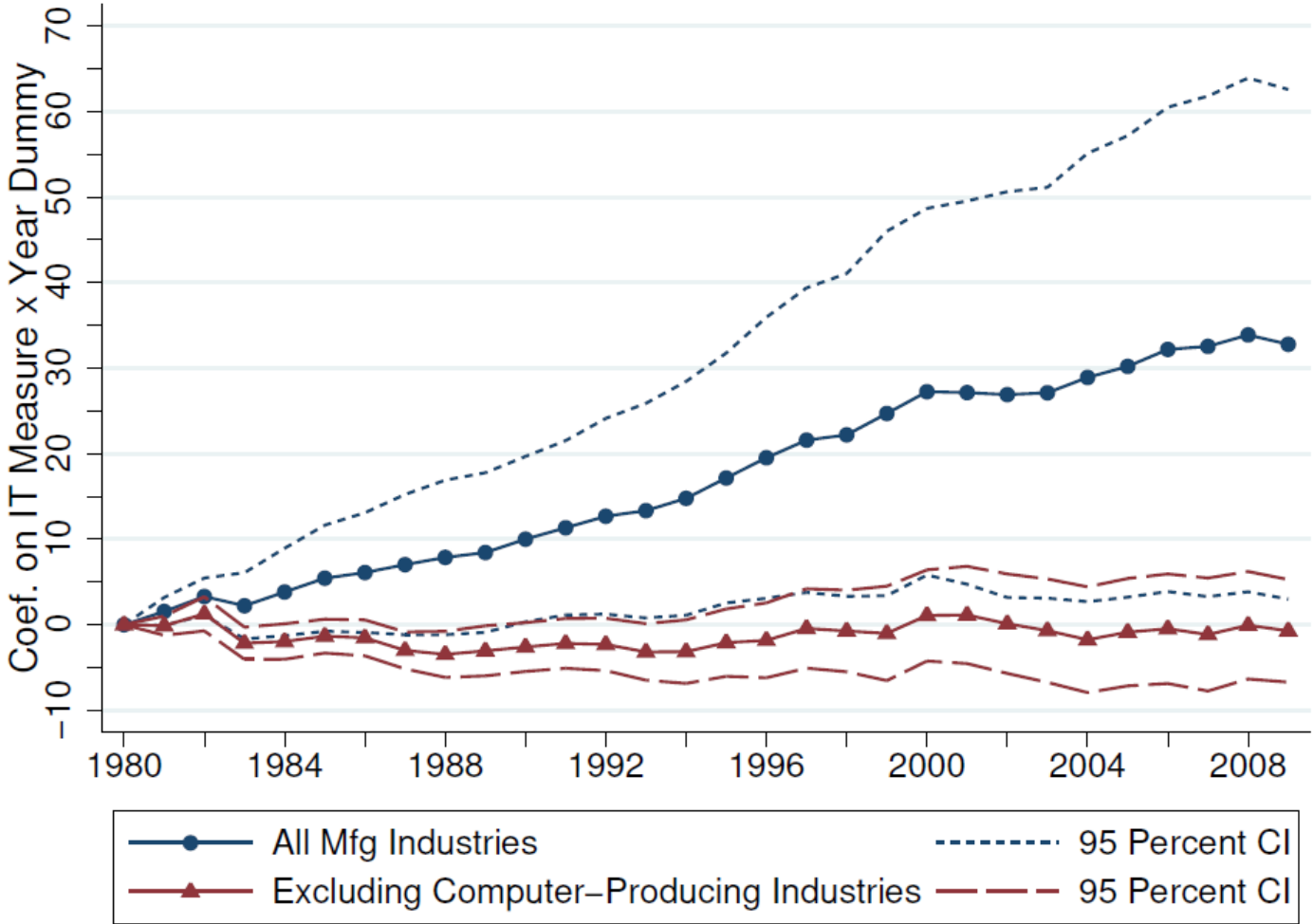
- Y is an outcome variable
- $\gamma$  is a vector of industry fixed effects
- $\delta$  is a vector of time dummies
- series {  $\beta_{81}$  ,  $\beta_{82}$  , ... ,  $\beta_{09}$  } read as the level of the coefficient on IT in each year
- subsequent year relative to 1980.
- IT is a static measure of industry IT-intensity

# Two measurement of IT Investment

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- NBER-CES Manufacturing Industry Data base, sourced from the Annual Survey of Manufacturers
- Census Bureau's Survey of Manufacturing Technology (SMT)
  - 17 advanced manufacturing technologies (SICs-34-37)

# IT Intensity and Log Real Shipment per Worker





# Potential Explanations

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The productivity gains from IT investments are taking place elsewhere

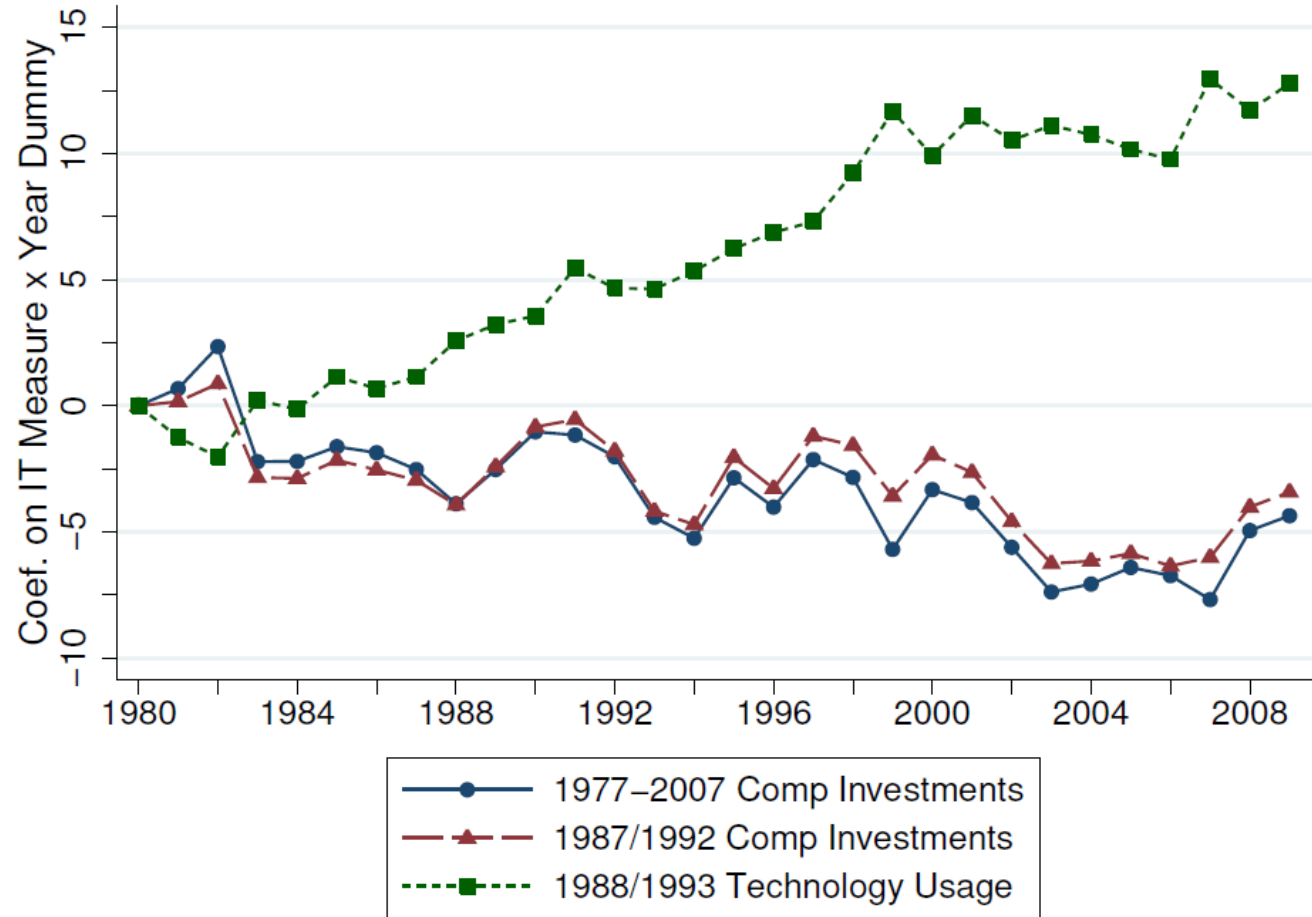
- The IT-driven productivity growth was not specific to non-manufacturing.

Measure of IT investment

- Constructed by averaging computer investment data from 1997-2077

# IT Intensity and Log Real Shipment per Worker, Cont

Computer-producing industries excluded from this analysis



# So Far...

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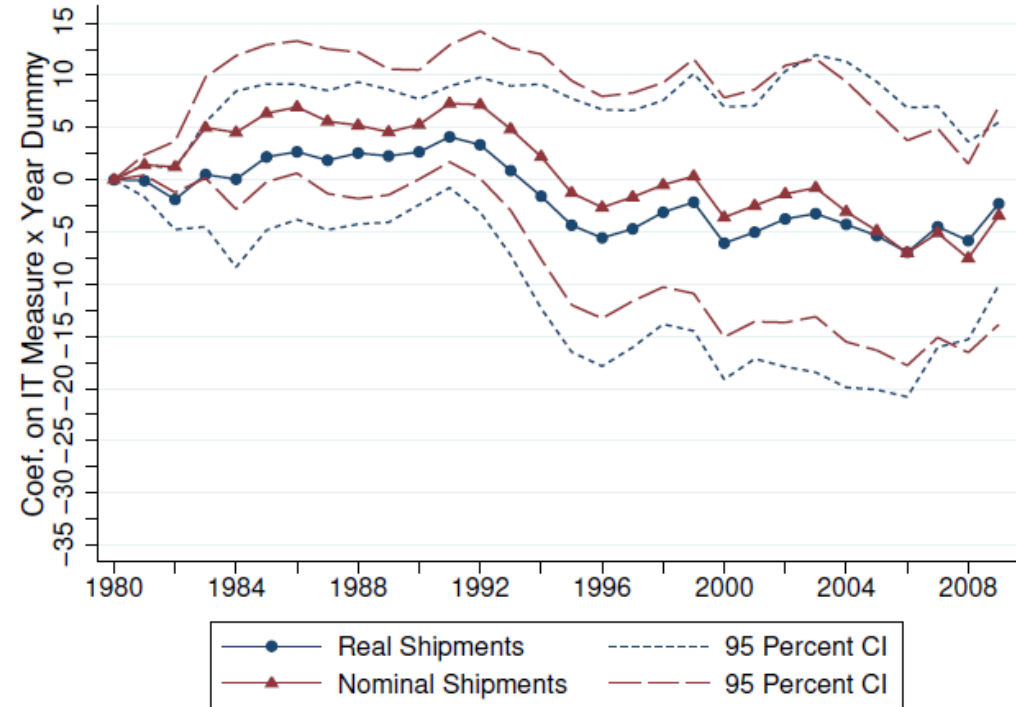
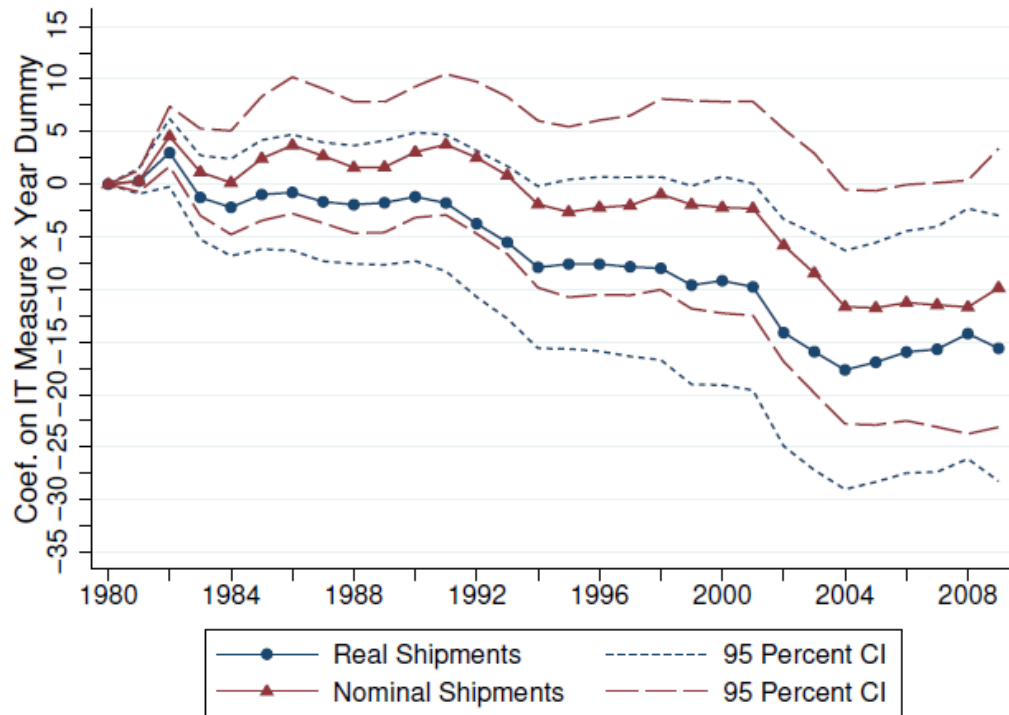
- Limited IT-driven productivity growth in computer-intensive manufacturing industries.
- Higher productivity growth in industries using advanced manufacturing technologies.
- Different measures give different results.

# What Drives Rising $Y/L$

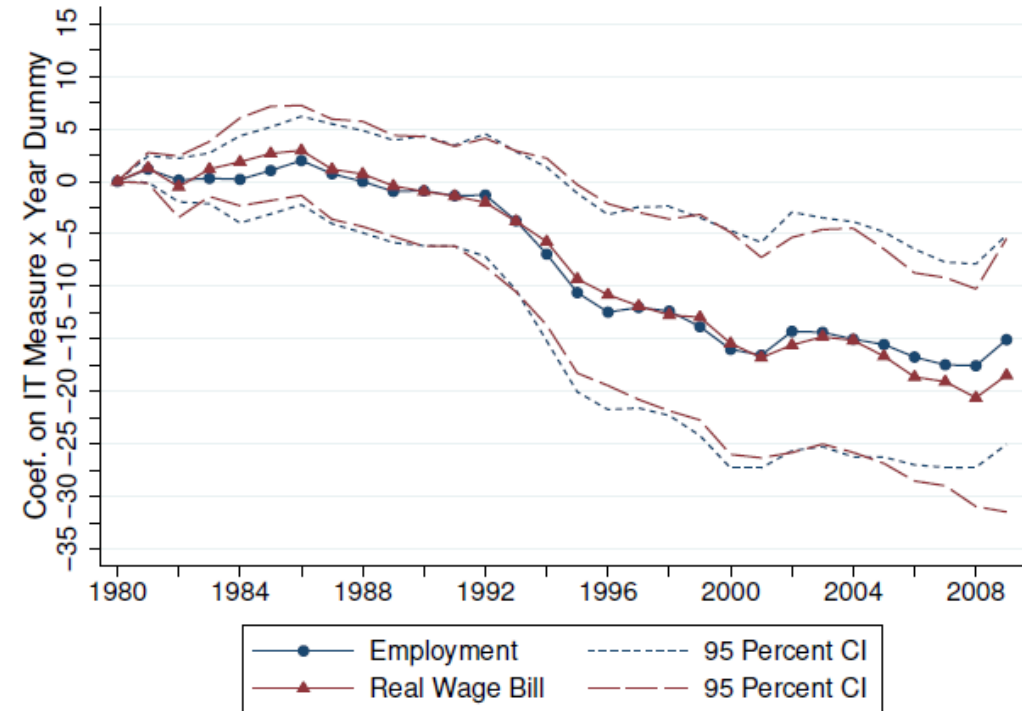
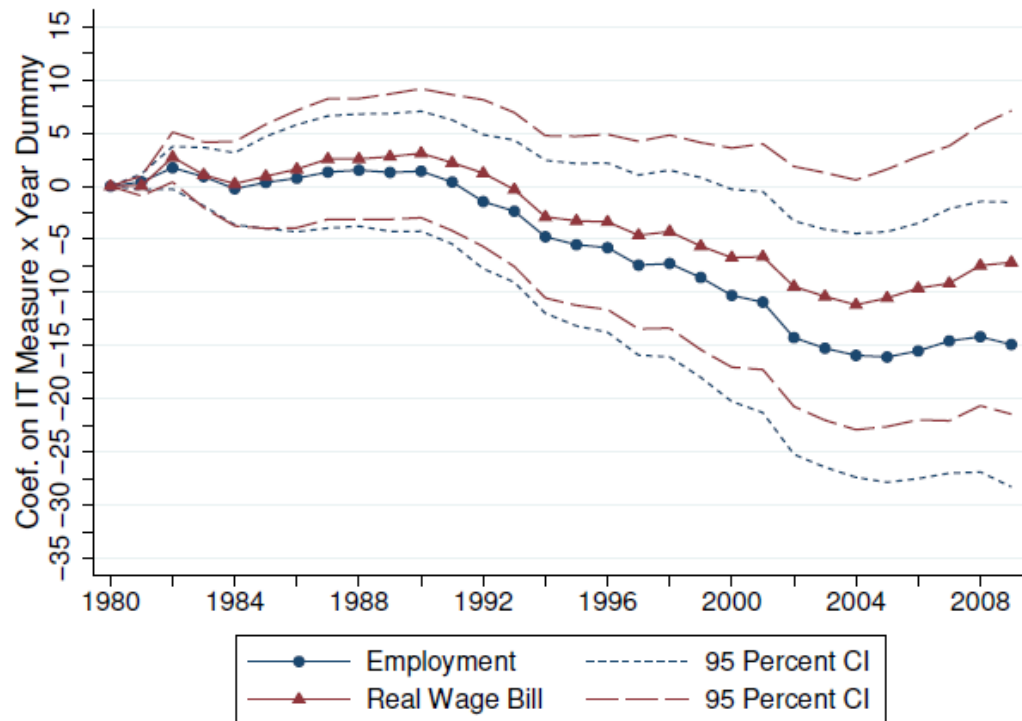
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- Industry output is rising proportionately faster than employment in it-intensive industries
- Output is rising faster?
- Employment is falling faster?

# IT Intensity and Log Real and Nominal Shipments, 1980-2009



# IT Intensity and log Employment and Real Wage Bill, 1980–2009



# Comments

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Against intuition, which I like

Lack of data

Other countries

# Questions?

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