

Information and Communication Technology and Firm Geographic Expansion

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NBER SI IT and Digitization
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Increasing ICT and Firm Geographic Span of Control

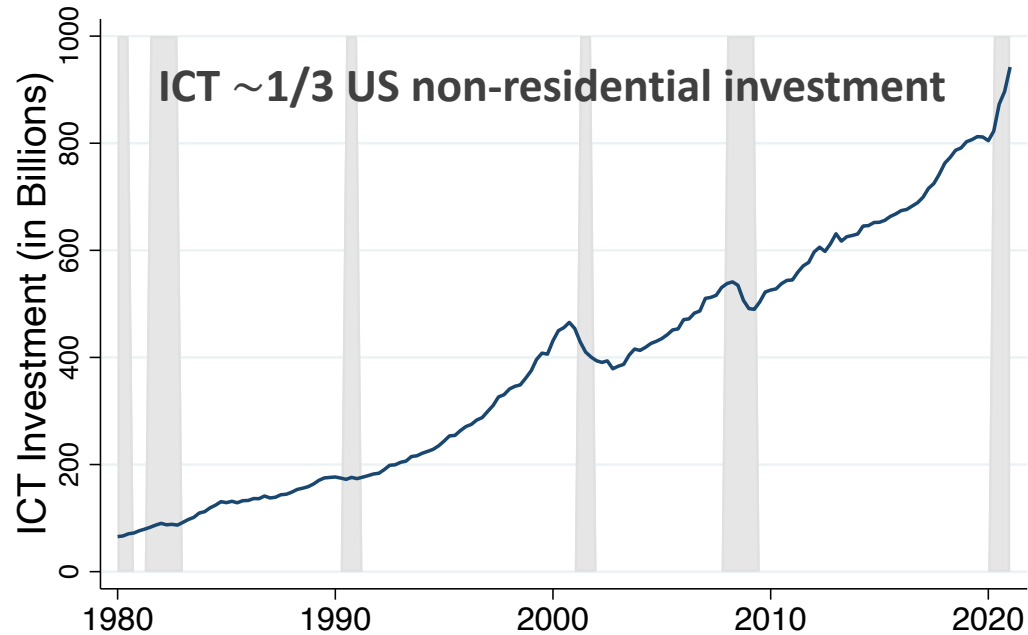


Figure: US Non-Residential Investment in ICT in 1980-2021

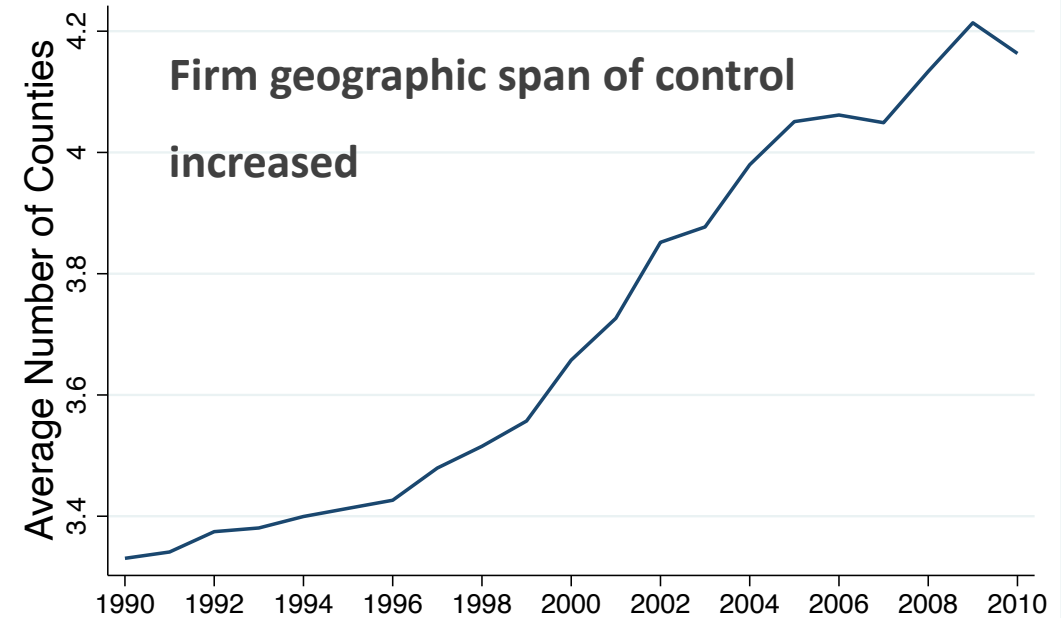


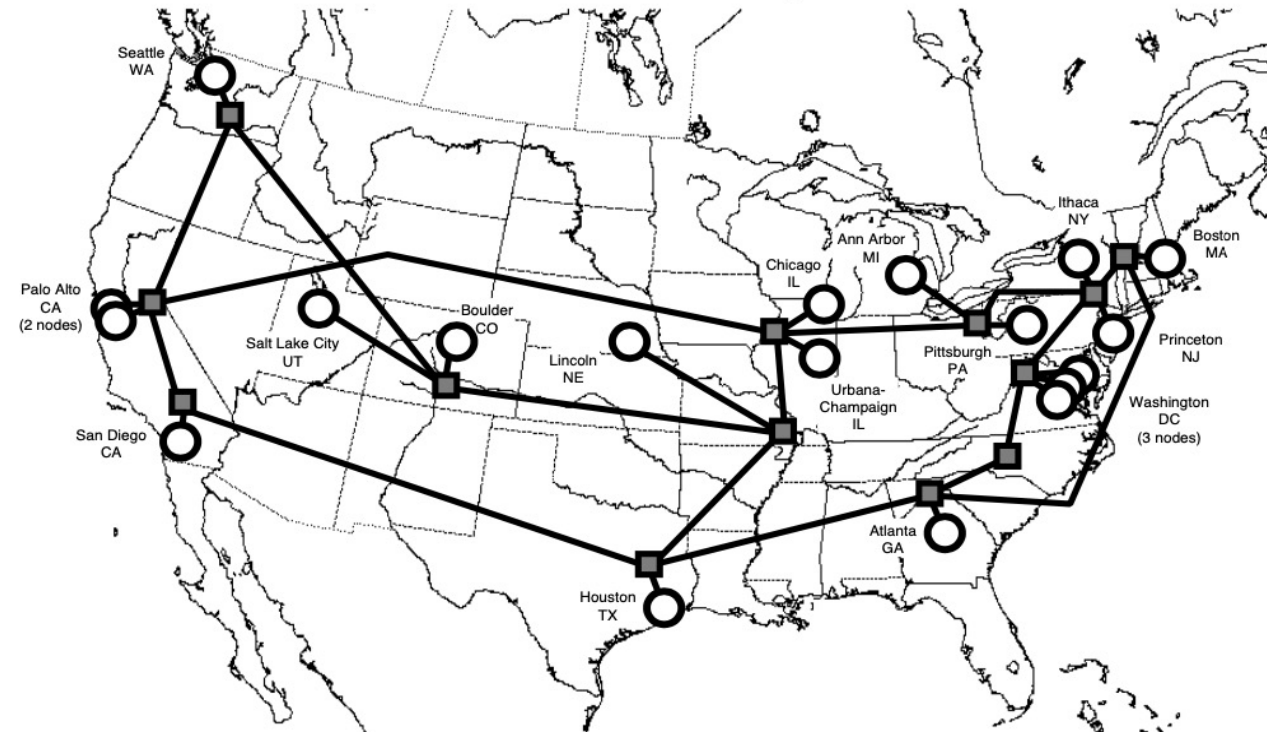
Figure: #counties per multi-unit for US manufacturers in 1990-2010

⇒ Does ICT improvement facilitate firms' geographic expansion?

- ICT reduces firm **internal communication cost**
- Internet and related applications, e.g., Intranet

The Internet Privatization in 1995

National Science Foundation Network (NSFNET)

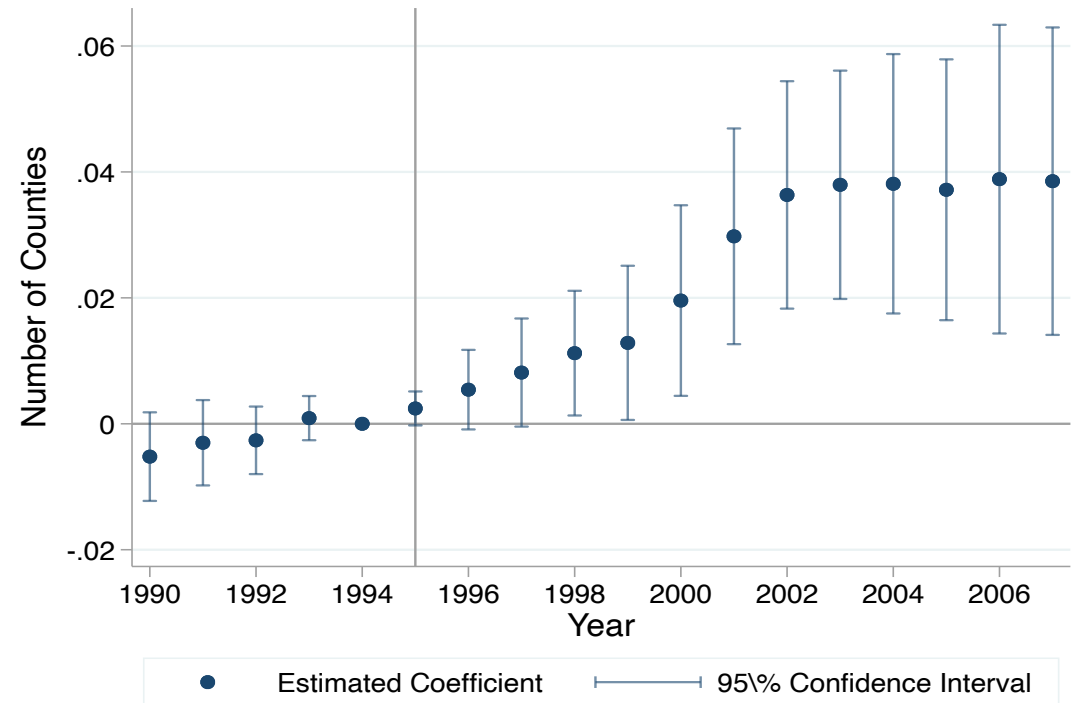


■ Difference-in-differences approach

- Firm exposure to policy: Distance to the nearest NSFNET node from headquarter

$$\#Counties_{ist} = \alpha_i + \sum_{t=1990}^{2007} \beta_t \text{DistToNode}_{is} + \delta_{ind,t} + \eta_{state,t} + \varepsilon_{ist}$$

Data: National Establishment Time Series (NETS), Manufacturing Package



- Firms located **closer** to the NSFNET nodes **expand** to more counties

Spatial Equilibrium Model with Multi-Unit Production and Endogenous ICT

- Does ICT improvement facilitate firms' geographic expansion? \Rightarrow **Yes!**
- Going one step further:
- **What are the efficiency gains from ICT improvement?**
- **How are they distributed across locations through firms' expansion?**

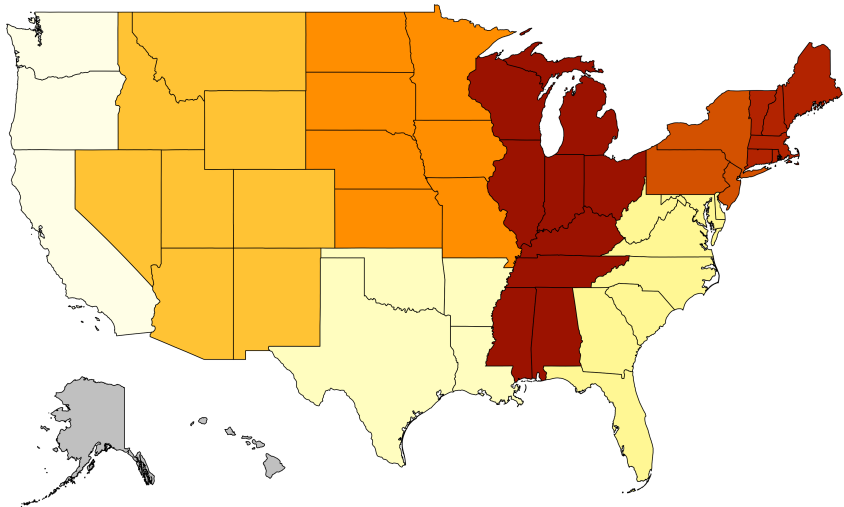
\Rightarrow **We need a model to answer these questions**

- Model with heterogeneous firms engaging in **trade, multi-unit production, endogenous ICT adoption**
- Complementarity between geographic expansion and ICT adoption
- Conduct policy counterfactuals
- **Simulate the Internet privatization** to match reduced-form estimate of geographic expansion

Simulate the Internet Privatization

What are efficiency gains from ICT?

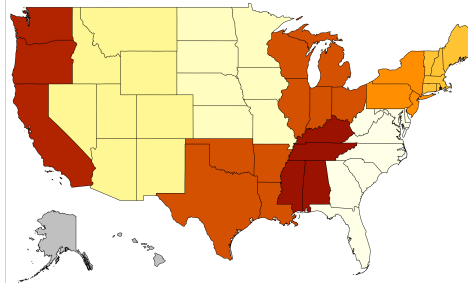
(A) %Change in Price Index



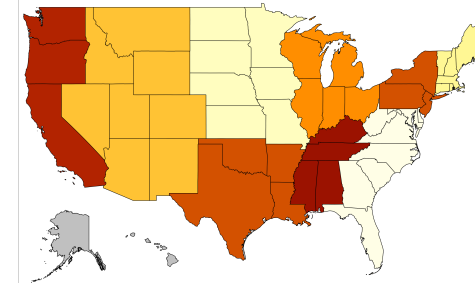
- Aggregate price index ↓ by 1.8%

How are they distributed across locations through firms' expansion?

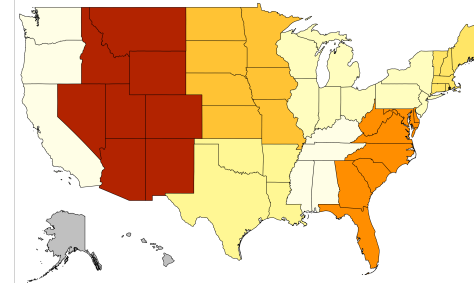
(B) %Sales by New Entrants of Outside Firms



(C) %Change in Price Index New Entrants of Outside Firms



(D) %Change in Price Index Incumbent Plants of Outside Firms



- New Entrants ~ 20% of efficiency gains
- In total, outside firms with local production ~ 60%
- Models without multi-unit production miss these forces

Geographic distribution of ICT efficiency gains follow multi-unit firm's footprints and expansion