# Business Dynamics of Innovative Firms

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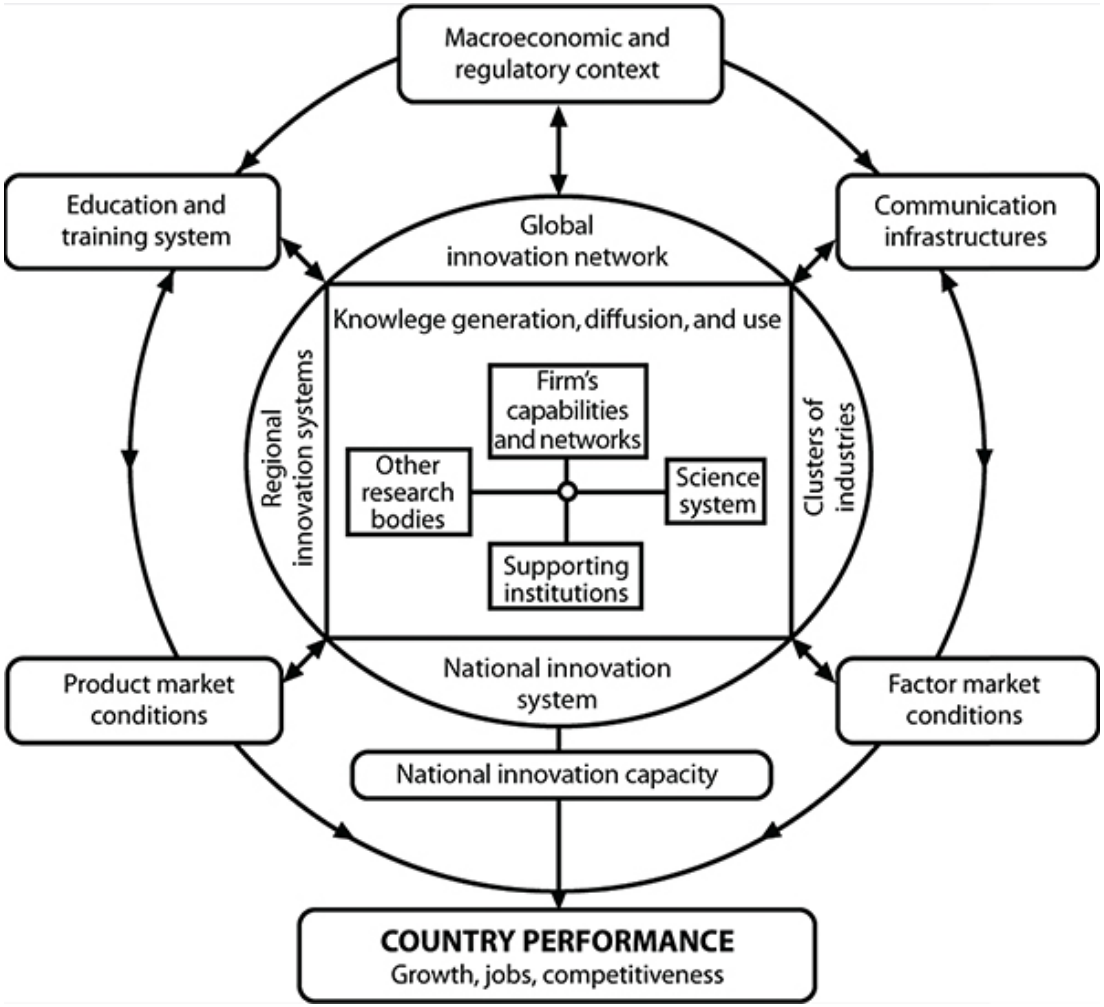
Disclaimer: Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed.

# BDS-IF Motivation

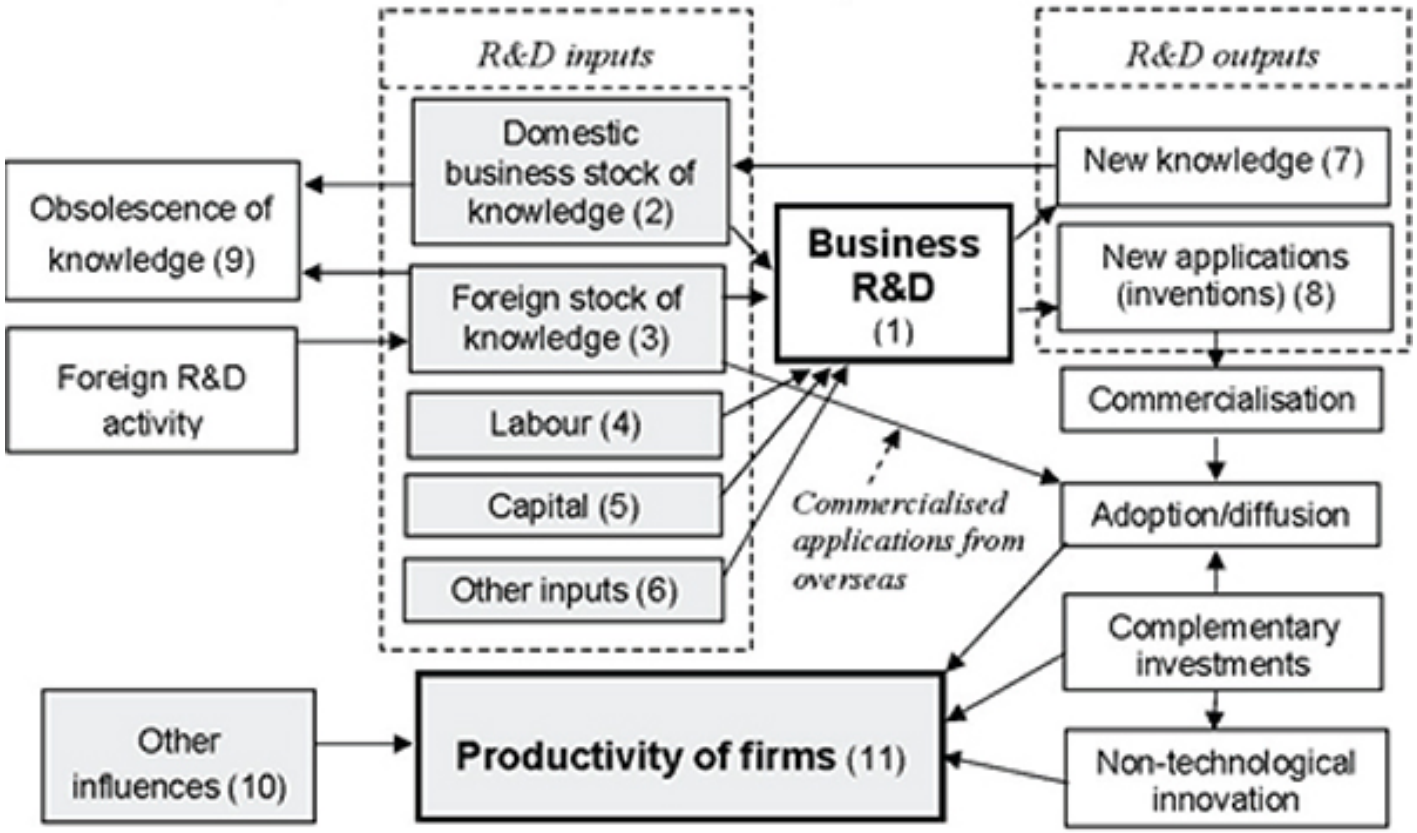
- Innovation is intimately linked to the reallocation of labor and capital
  - Decker et al. (2016, 2017), Acemoglu, Ackcigit, Bloom, and Kerr (2013), Ackcigit and Kerr (2017)
- Innovation is a very broad term, covering many different types of activities
  - Inputs vs outputs (relationship between)
  - ICT/innovation users vs producers
  - Physical capital vs human capital (knowledge production)
  - Invention vs innovation (commercialization, diffusion)
  - Direct vs indirect impacts (spillovers)

# Conceptualizing Many Dimensions of Innovation



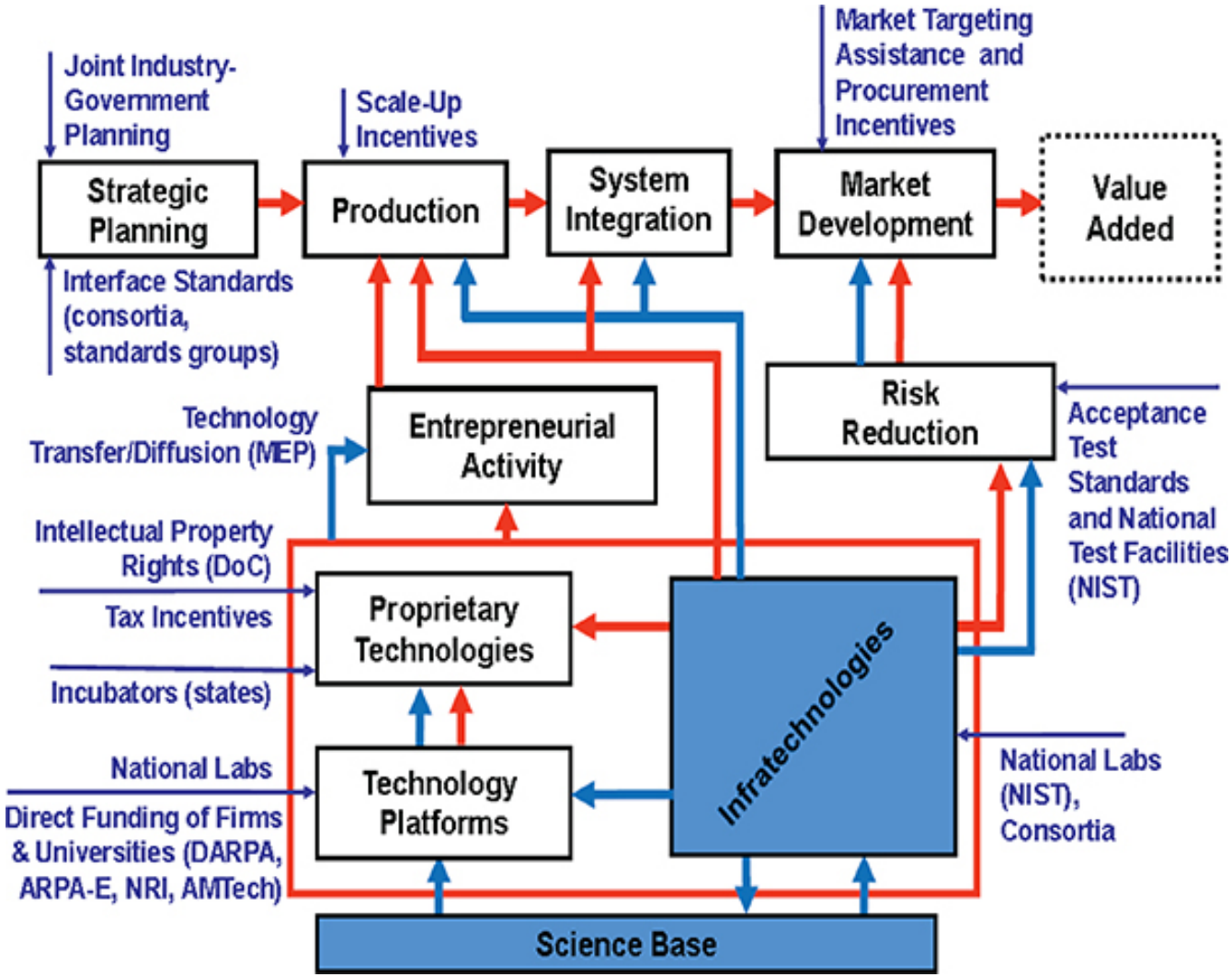

Source: National Science Board (2012)

# Conceptualizing Many Dimensions of Innovation




Source: Shanks and Zheng (2006)

# Conceptualizing Many Dimensions of Innovation



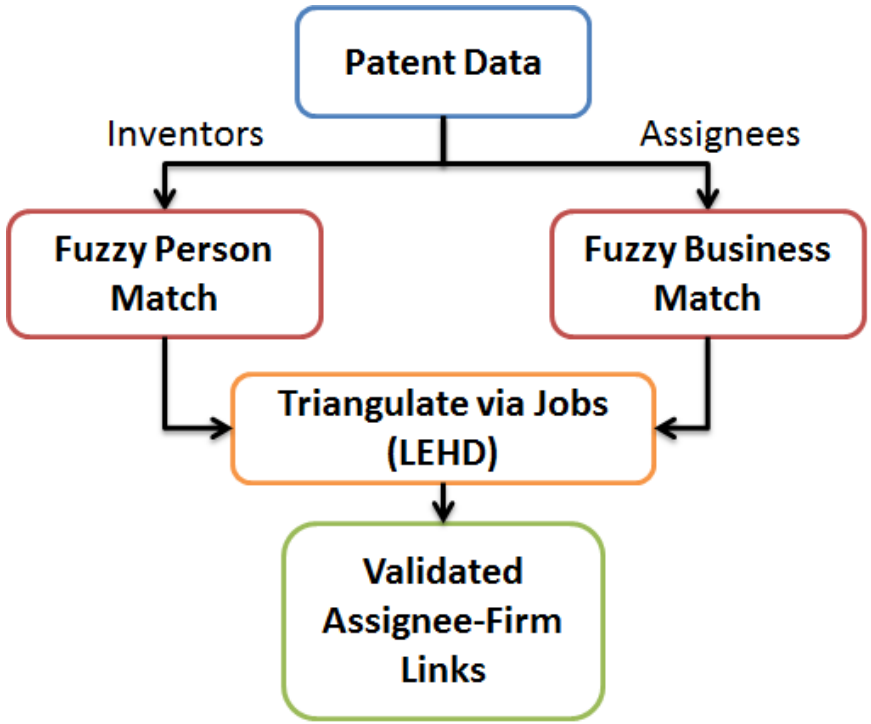

Source: Tassey (2011)

# BDS-IF Measurement Agenda

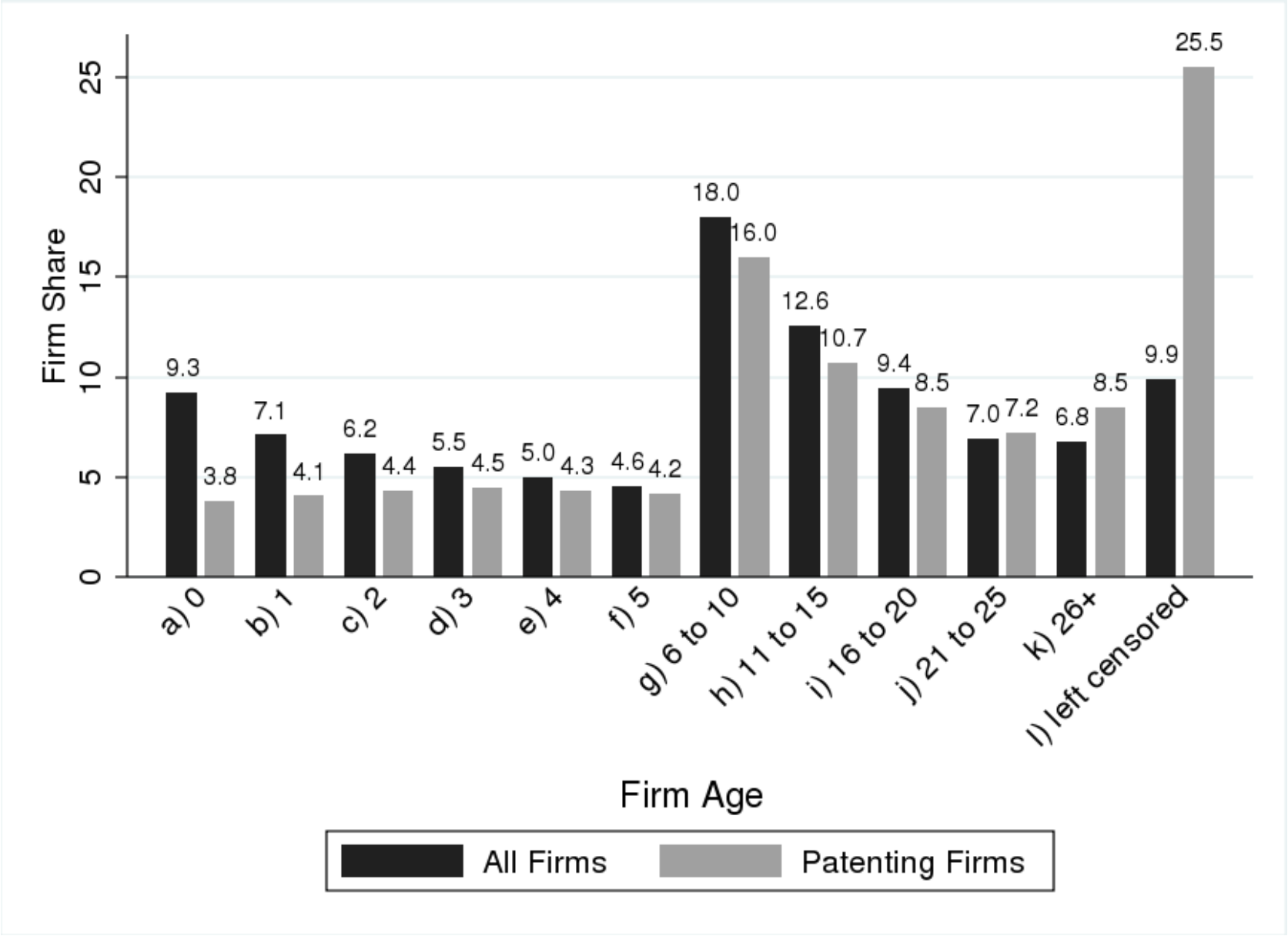
- Multidimensional approach to measuring the many facets of innovative activity
- Active components:
  - BDS-Patenting Firms (BDS-PF)
  - BDS-Trademarks (BDS-TM)
  - BDS-High Tech (BDS-HT)
- Future work:
  - Copyrights
  - R&D expenditures
  - Management practices

# Patenting Firms (BDS-PF)

- Extend/improve triangulation matching methodology in Graham et al. 2015
  - US assignee match rate $> 90\%$ (foreign $\sim 60\%$)
  - US assignee precision $\sim 92\%$ (foreign $\sim 96\%$)
- Highlights
  - Patenting firms tend to be older, larger
  - More firms are patenting in Physics and Electricity



# Characteristics in the Cross Section



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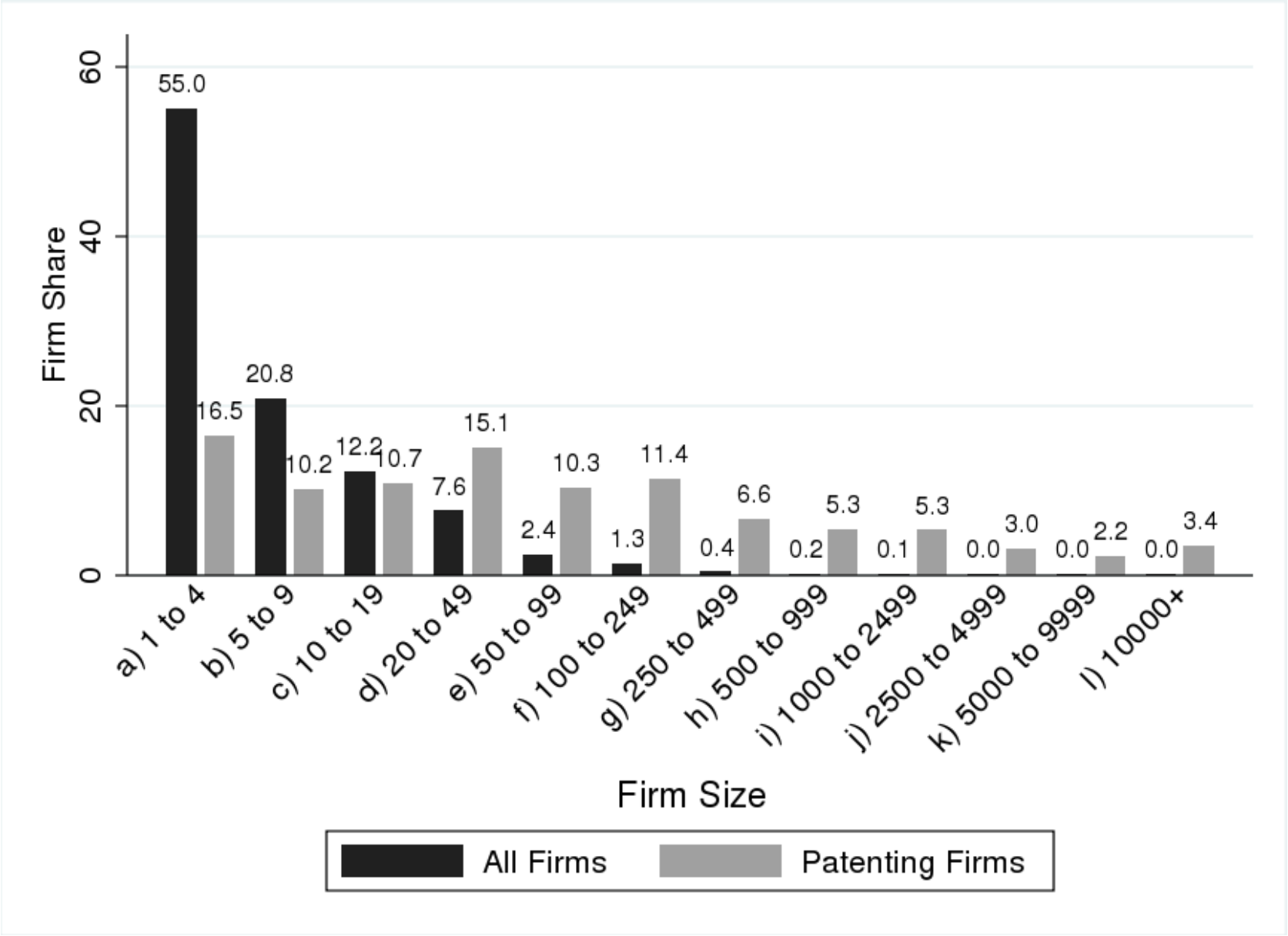
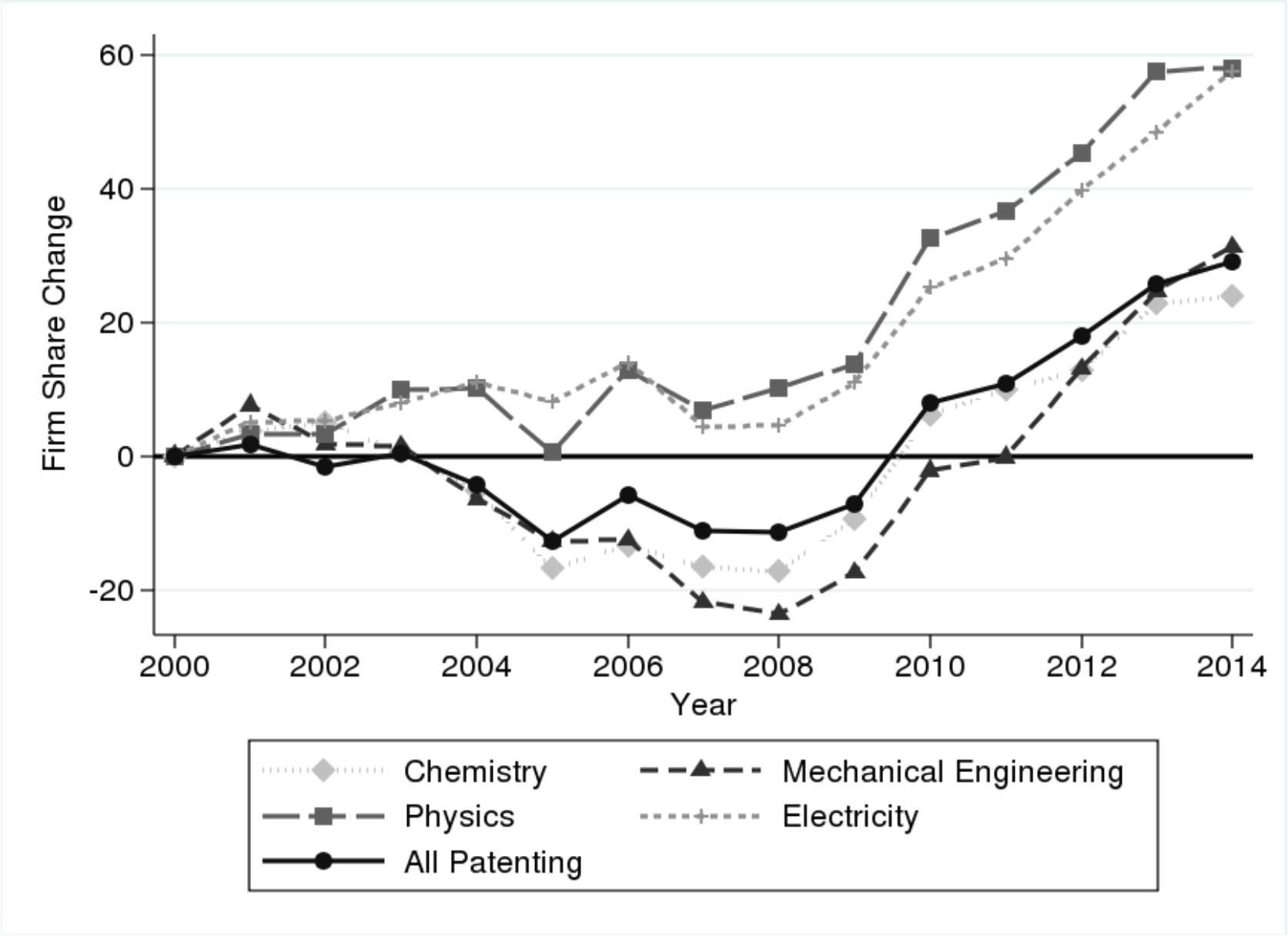
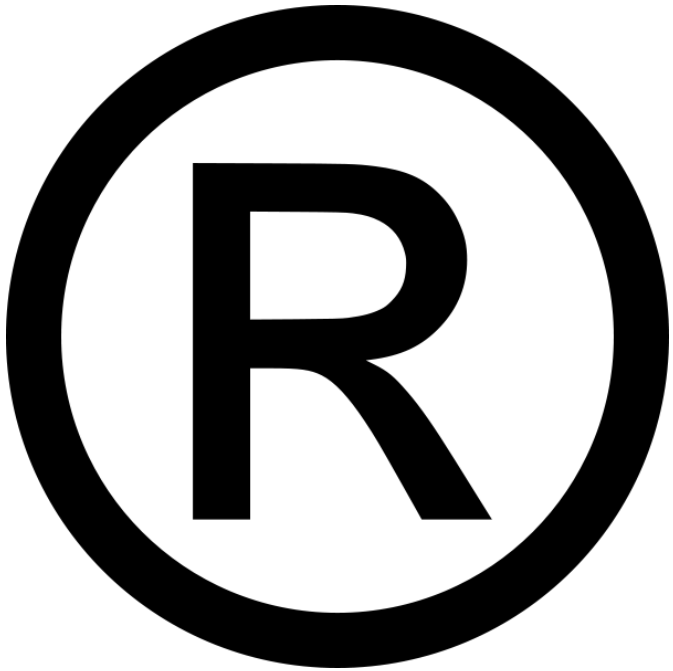


# By Technology Class

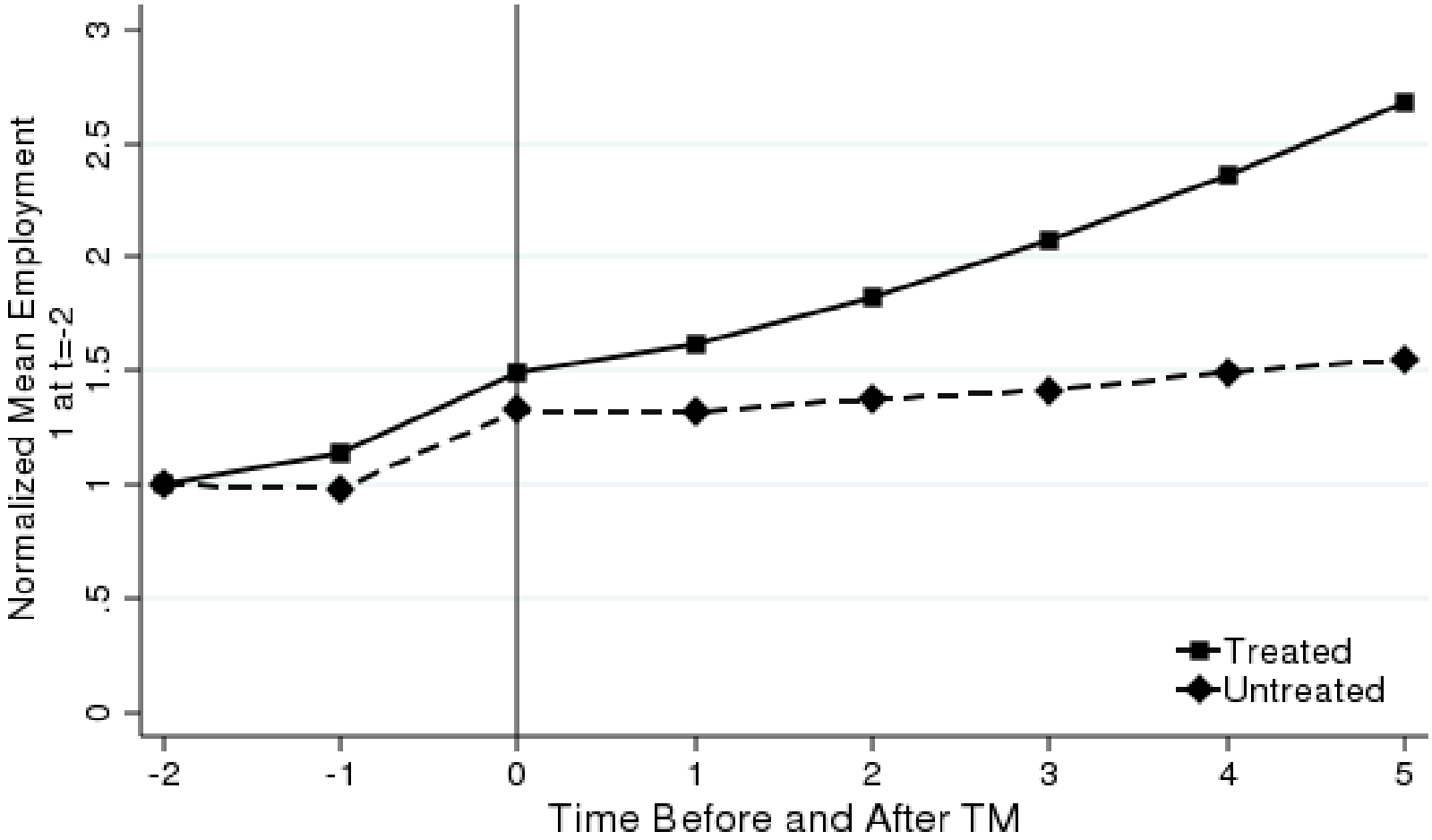


# Anatomy of Trademarking Firms

- Initial trademark-firm bridge created by Dinlersoz, Goldschlag, Myers, Zolas (2017)
- USPTO Casefile Database
  - $>$ 5 million trademarks
  - Match rate over 75% and precision of 94%
- Highlights
  - First-time trademarking associated with employment growth
  - Good number of firms *only* trademark (no patents or R&D)
  - Almost half of trademarking firms in BRDIS also patent

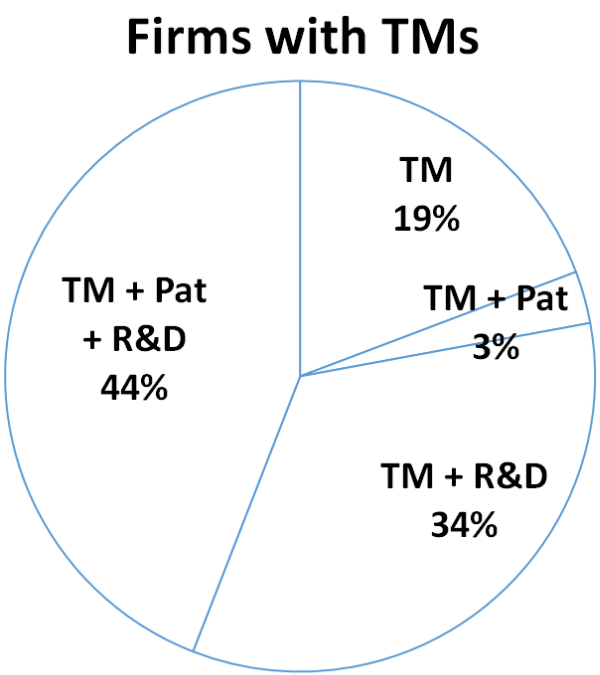


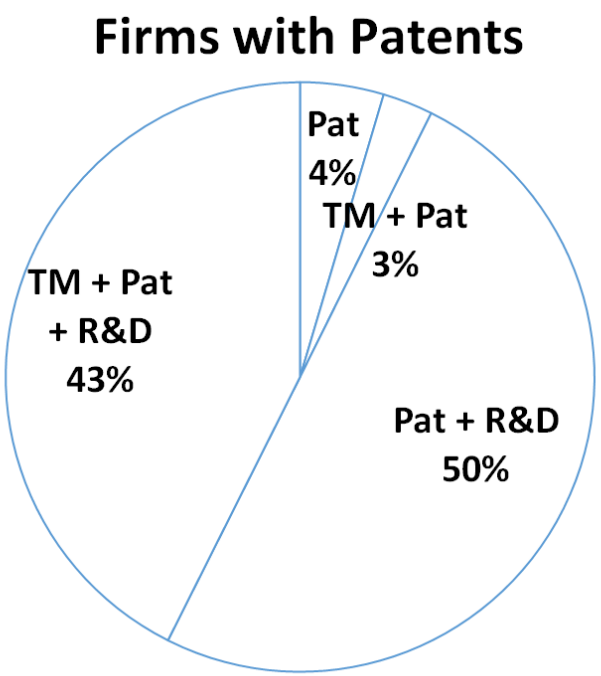
# Impacts of First-Time Trademarking

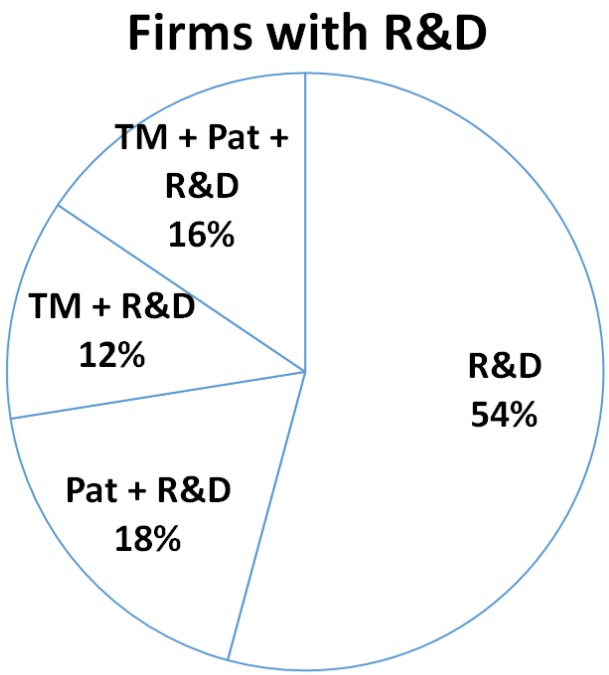



Source: DGMZ (2017)

# Coincidence of Innovative Activities (BRDIS Sample)



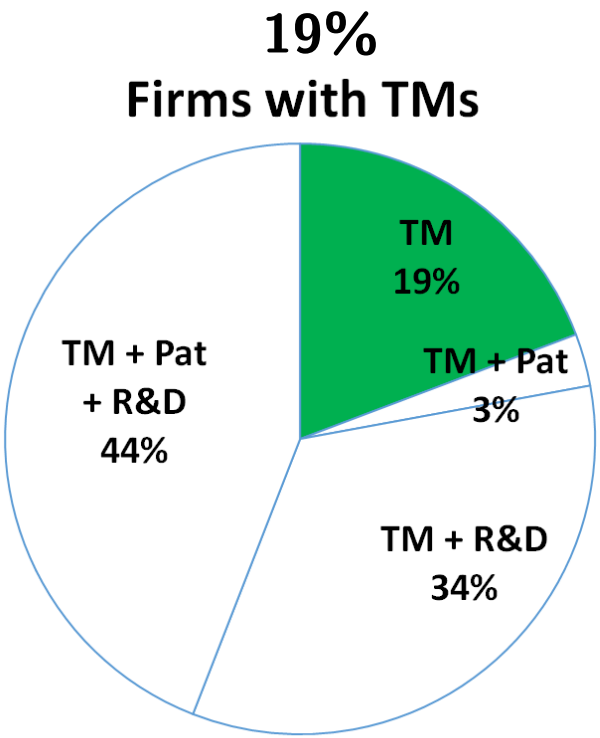



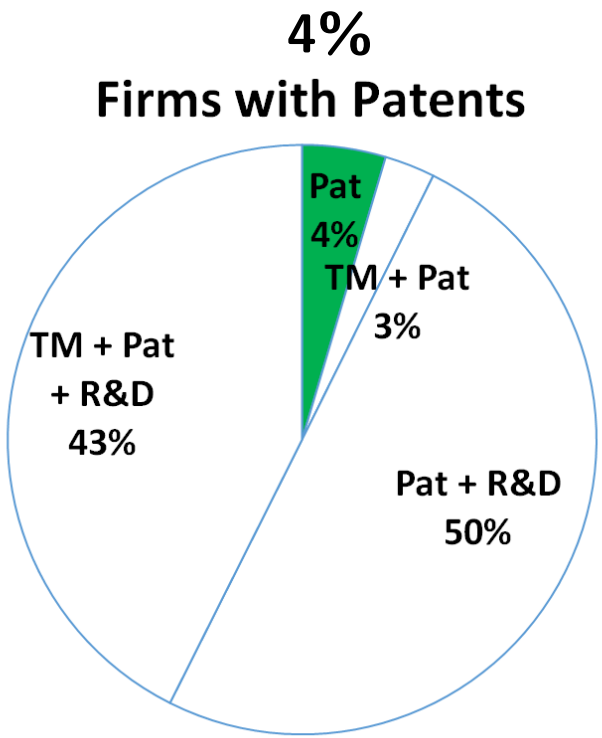



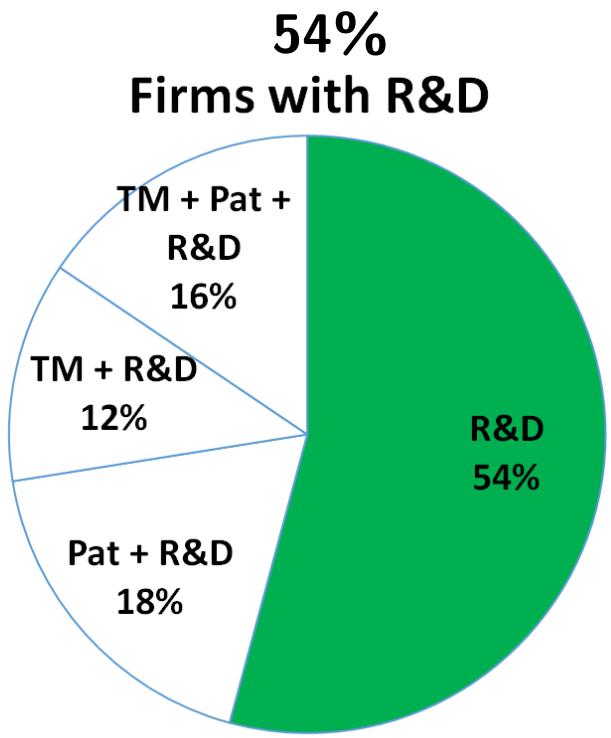

Source: DGMZ (2017)

# Coincidence of Innovative Activities (BRDIS Sample)

*Only one activity*



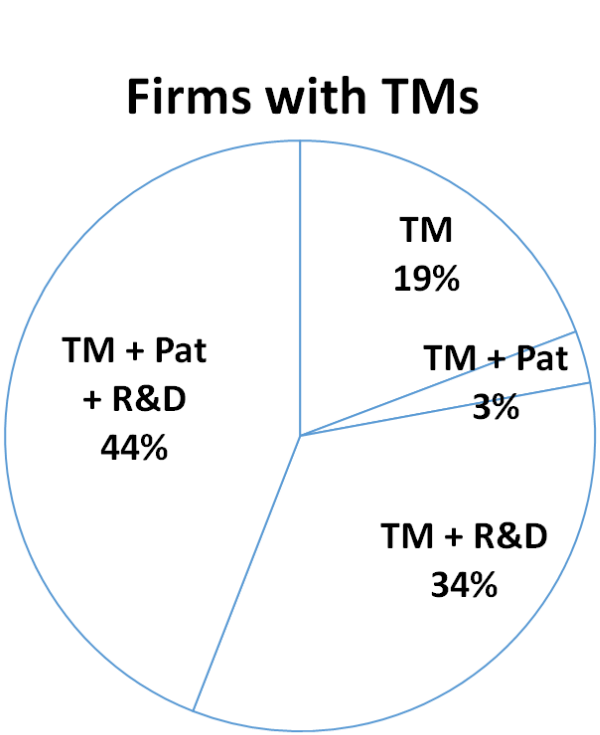



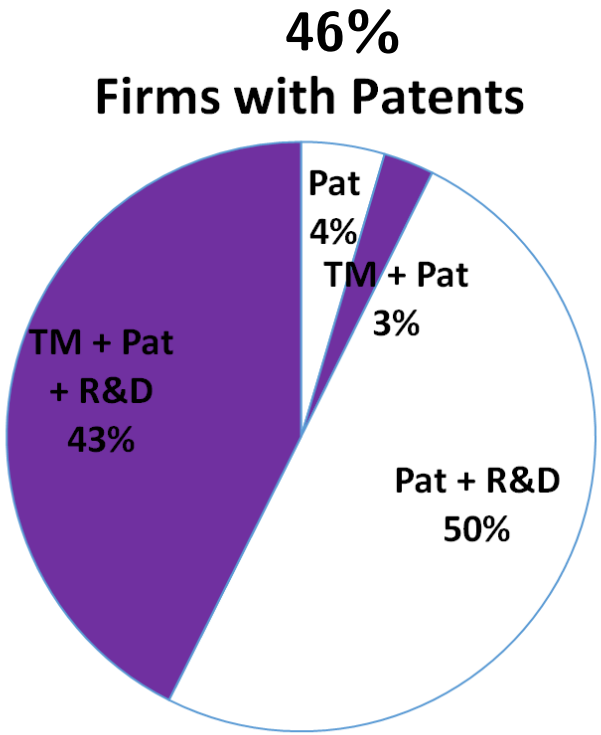



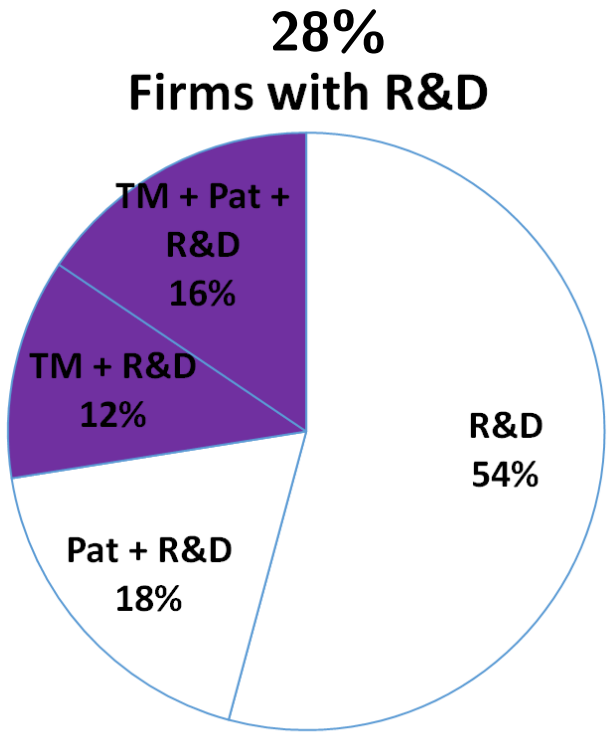

Source: DGMZ (2017)

# Coincidence of Innovative Activities (BRDIS Sample)

*Also trademarking*



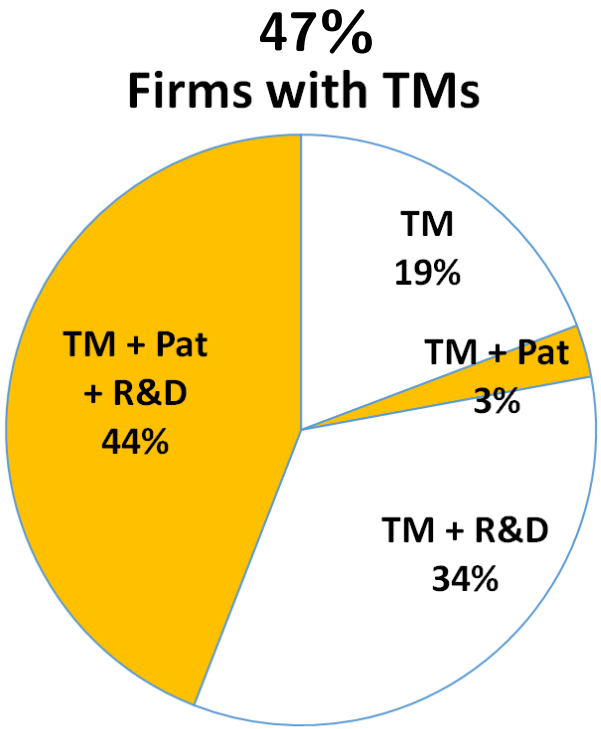



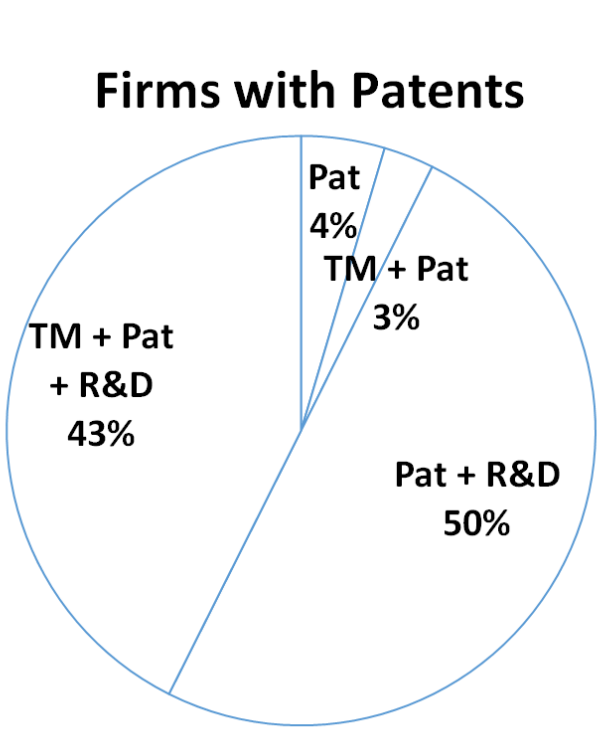



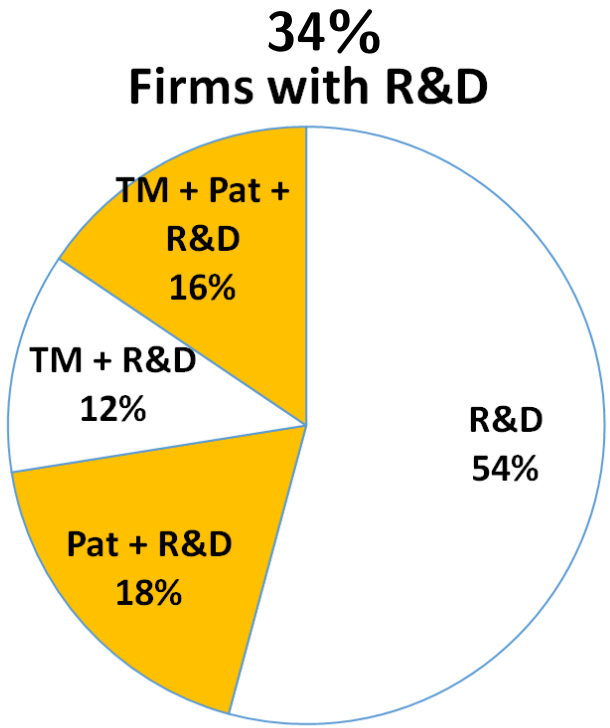

Source: DGMZ (2017)

# Coincidence of Innovative Activities (BRDIS Sample)

*Also patenting*



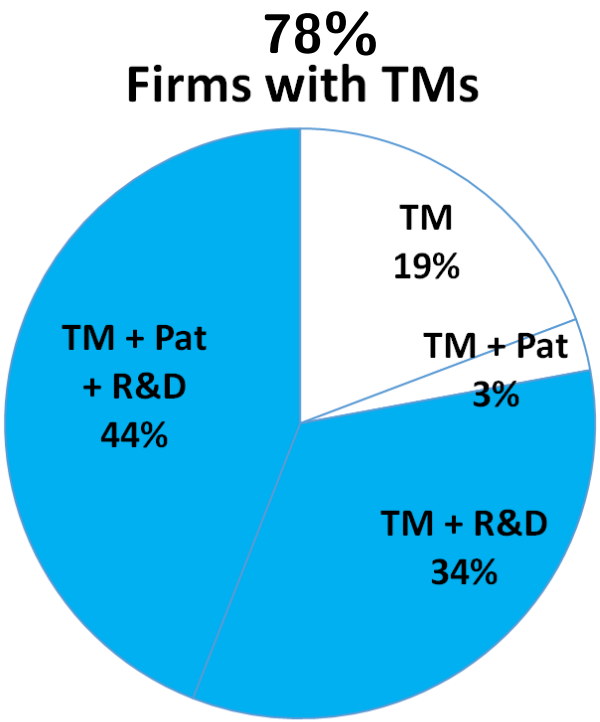



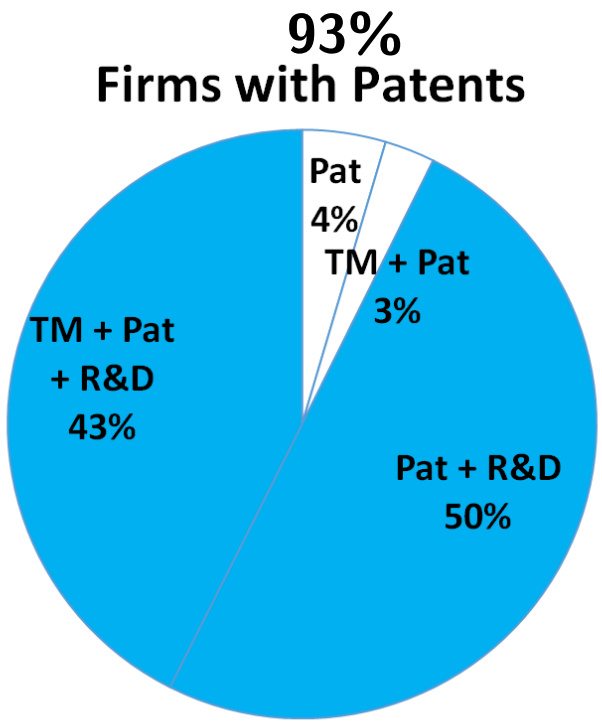



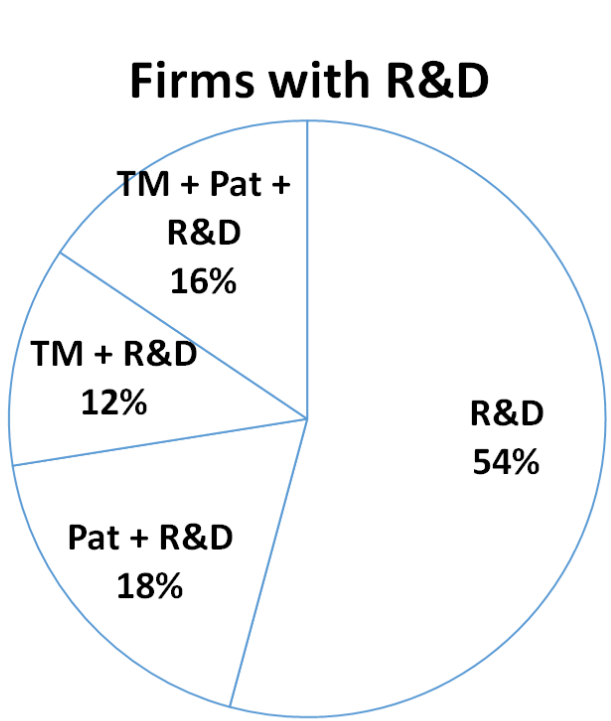

Source: DGMZ (2017)

# Coincidence of Innovative Activities (BRDIS Sample)

*Also R&D*



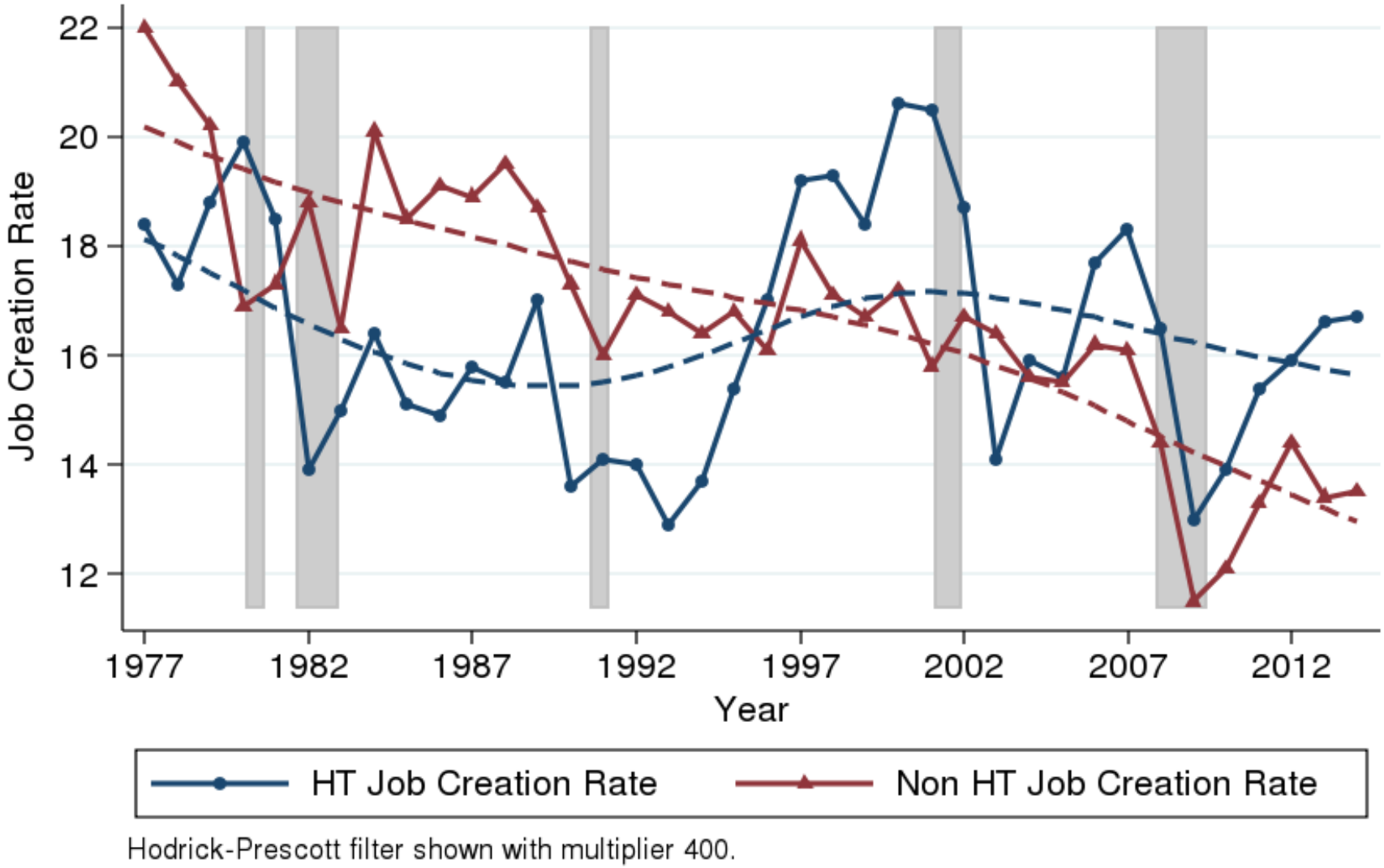




Source: DGMZ (2017)

# What is High Tech?

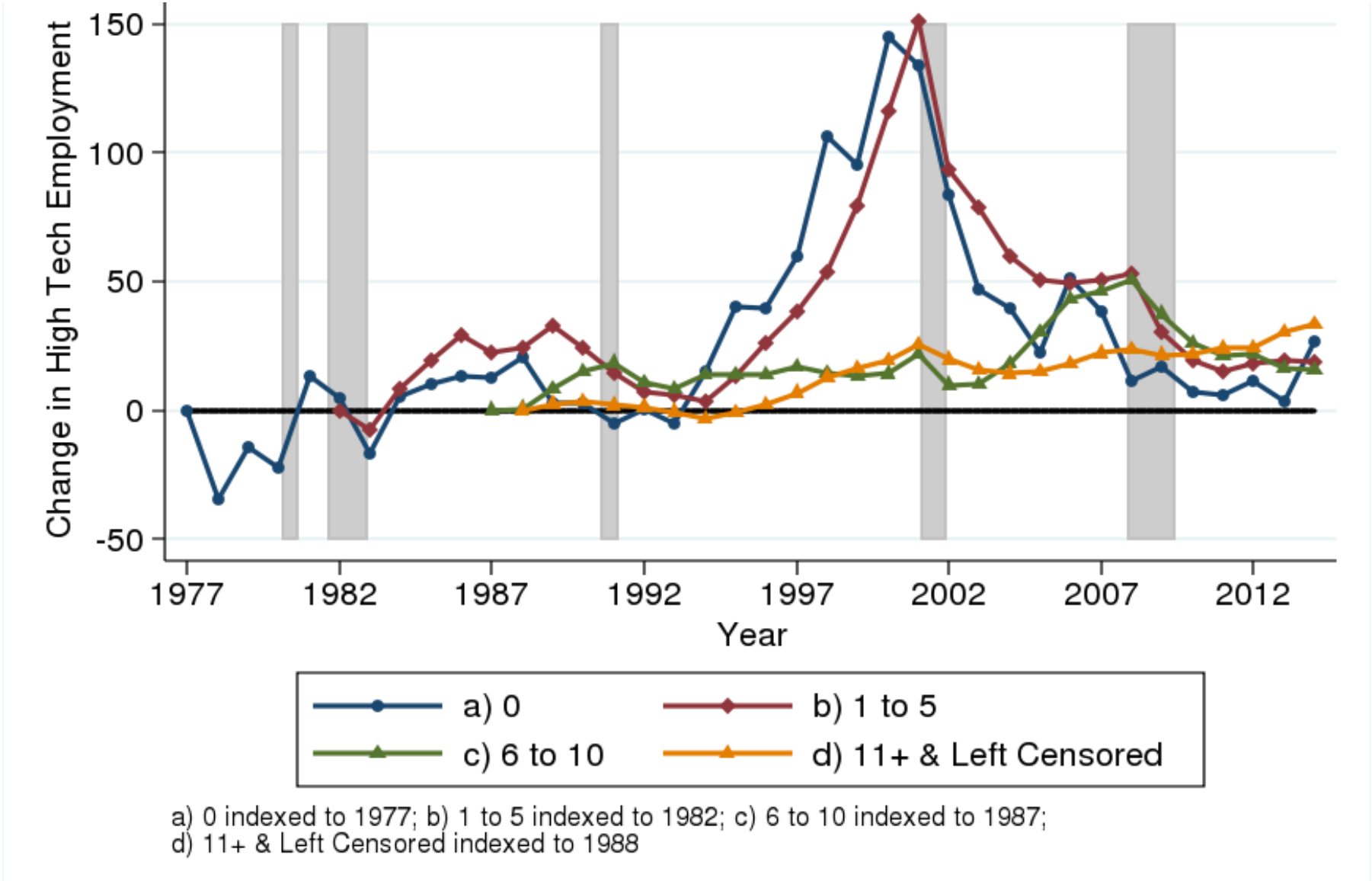
- Goldschlag and Miranda (2016) update Hecker (2005)
- Concentration of STEM employment
- 15 4-digit 2007 NAICS industries, mining, manuf, information, and professional services
- Highlights
  - 4% of firms, 6% of employment
  - Boom-bust in the 1990s, early 2000s
  - Boom driven by young firm activity

# High Tech Job Creation




Source: Goldschlag and Miranda (2016)

# High Tech Young Firm Activity in the 1990s




Source: Goldschlag and Miranda (2016)

thank you