# Scale without Mass: Business Process Replication and Industry Dynamics

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# Purpose of the Paper

Study the impact of information technology (IT) on industry dynamics. Particularly, IT facilitates business process replication so increases both industry turbulence and concentration.

# Facts about Information Technology

- Information technology (IT) emerged in mid 1970s.
- IT has become increasingly important in US economy.
- IT investment varies greatly across firms and industries.
- IT investment affects industry practice and performance.

#### **Previous Literature**

- Previous research has studied various aspects of IT
  - Productivity and revenue gain
  - Stock market valuation
  - Skill premium and wage inequality
- Little systematic research on the competitive implications of IT investments.

### Scale without Mass

- Focuses on impacts of IT on industry competition
- Three steps
  - IT makes it easier to replicate business process (case studies).
  - Scale without mass leads to higher industry concentration and turbulence (a theoretical model).
  - IT-intensive industries were more turbulent and concentrated than non-IT-intensive industries (cross-industry regressions).
- Key Findings (1987-2004)
  - IT-intensive industries were more turbulent than non-IT-intensive industries, especially after 1996.
  - IT-intensive industries became more concentrated than non IT-intensive industries after 1996, reversing the previous trend.

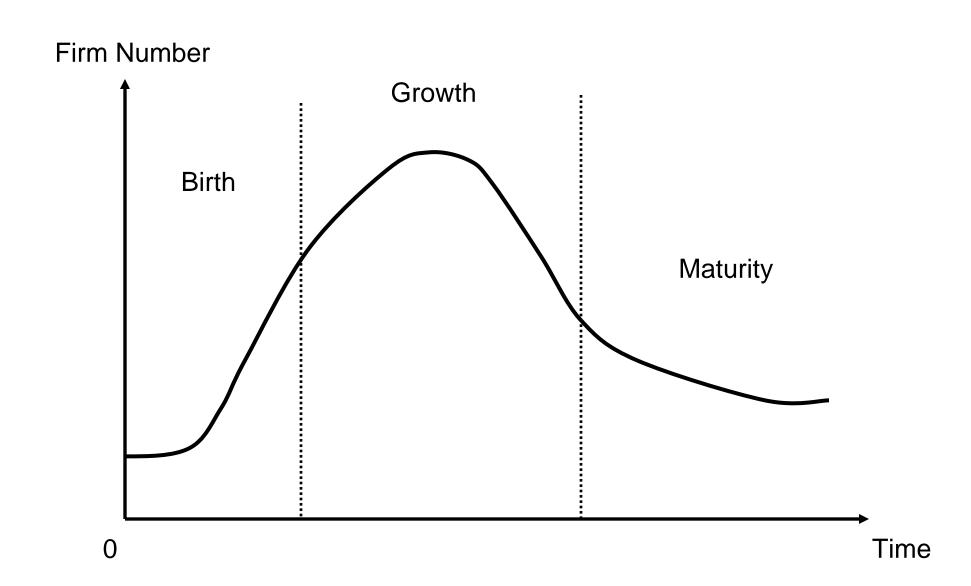
### Some Issues

- Why have some industries become more IT intensive than others, both before and after the mid 1990s?
- How would firm entry and exit affect the industry concentration and turbulence?
- What will a single industry study tell us, compared to the case studies and cross-industry regressions?

## An Alternative Perspective

- Industry Life Cycle
  - Information technology (IT) creates new products
  - IT-intensive industries tend to be new-product-intensive
  - Early life cycle of new products may explain the increasing turbulence and concentration

# Industry Life Cycle



# **Industry Life Cycle**

Birth	Growth	Maturity	
Firm number low	Firm number high	→ Firm number low	
<ul> <li>Products not standardized</li> </ul>		<ul><li>Products standardized</li></ul>	
<ul> <li>Product innovation high</li> </ul>		<ul><li>Process innovation high</li></ul>	
<ul><li>Price high</li></ul>		•Price low	
•Consumer Adoption low		<ul> <li>Consumer Adoption high</li> </ul>	
<ul><li>Profit margin high</li></ul>		<ul><li>Profit margin low</li></ul>	
<ul><li>Entry barriers low</li></ul>		<ul><li>Entry barriers high</li></ul>	
<ul><li>Market uncertainty high</li></ul>		<ul><li>Market uncertainty low</li></ul>	

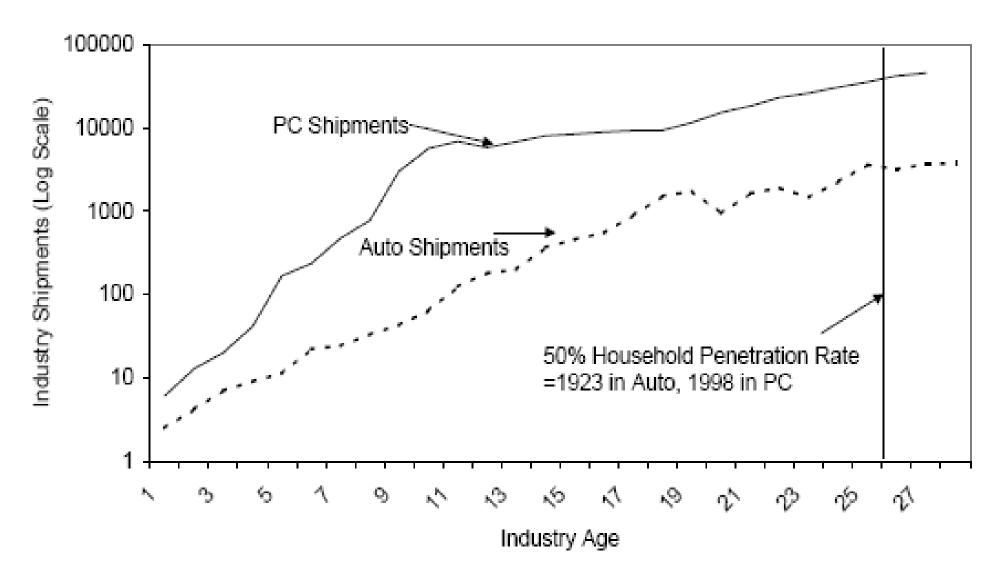


FIG. 9. Market growth, household penetration, and industry age.

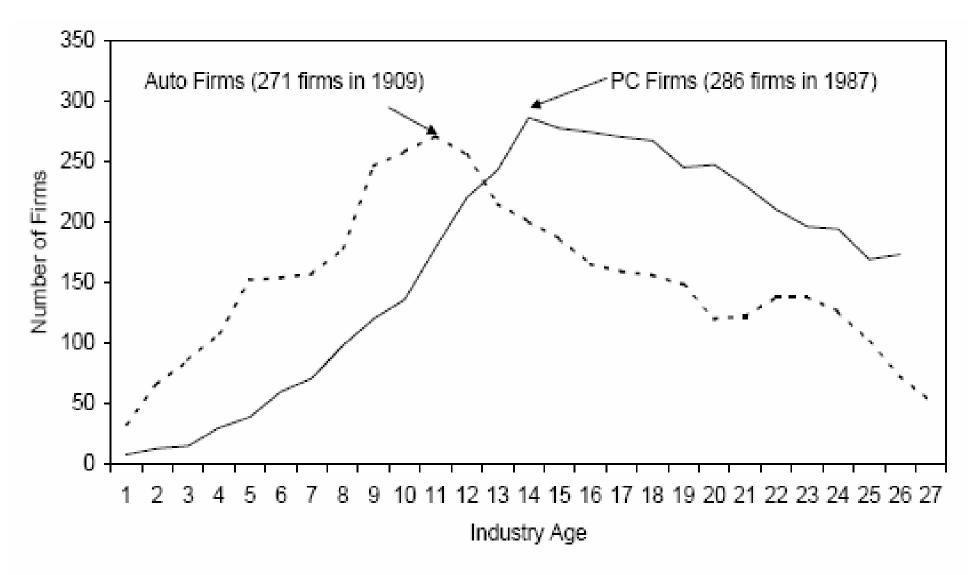


FIG. 1. Number of firms and industry age.

# **Volatility of Market Shares**

Auto		PC	PC		
1908-1918	16.3	1970-1980	1.4		
1918-1928	22.6	1980-1990	11.5		
1928-1941	17.9	1990-2000	17.9		
1848-1970	10.3	1994-2000	20.1		
1970-2000	5.6	1970-2000	10.3		

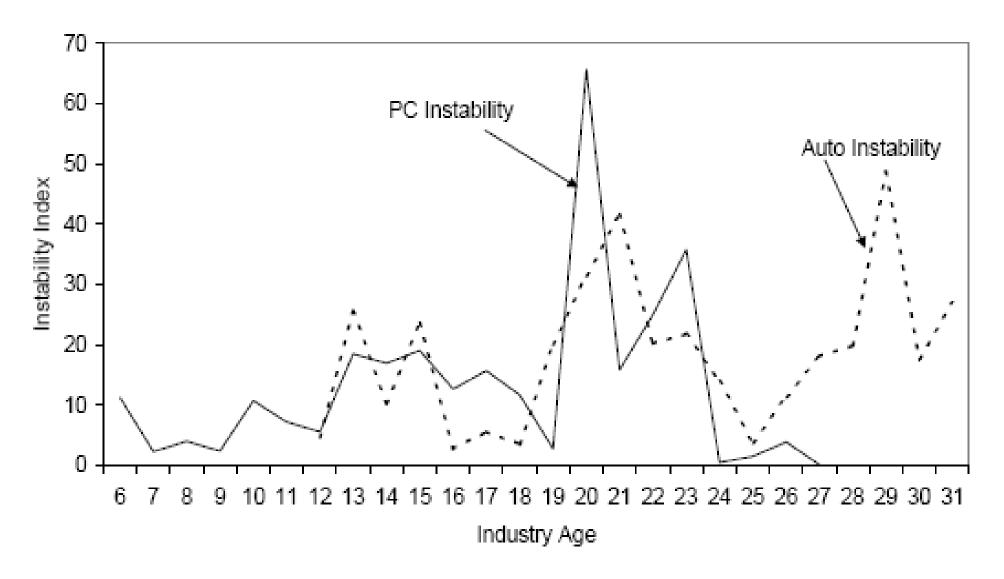


FIG. 7. Market share instability and industry age.

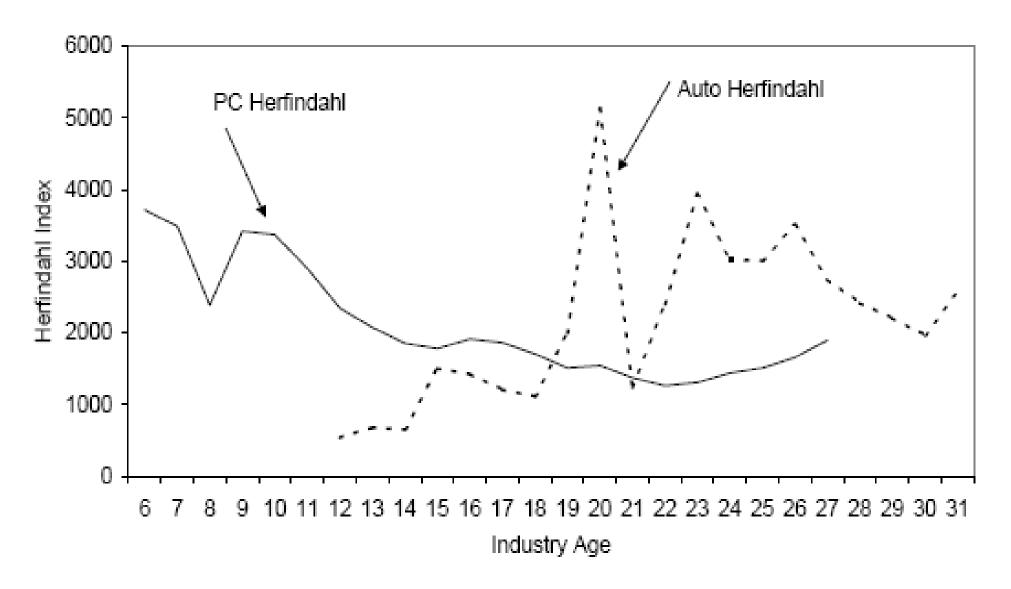


FIG. 8. Concentration and industry age.

# **Concluding Remarks**

- What explains the dynamics of IT-intensive industries?
  - Scale without Mass vs. Industry Life Cycle
  - Competing but may not excluding
  - Different predictions on turbulence
- Additional work is needed to address the endogeneity issue.