

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.

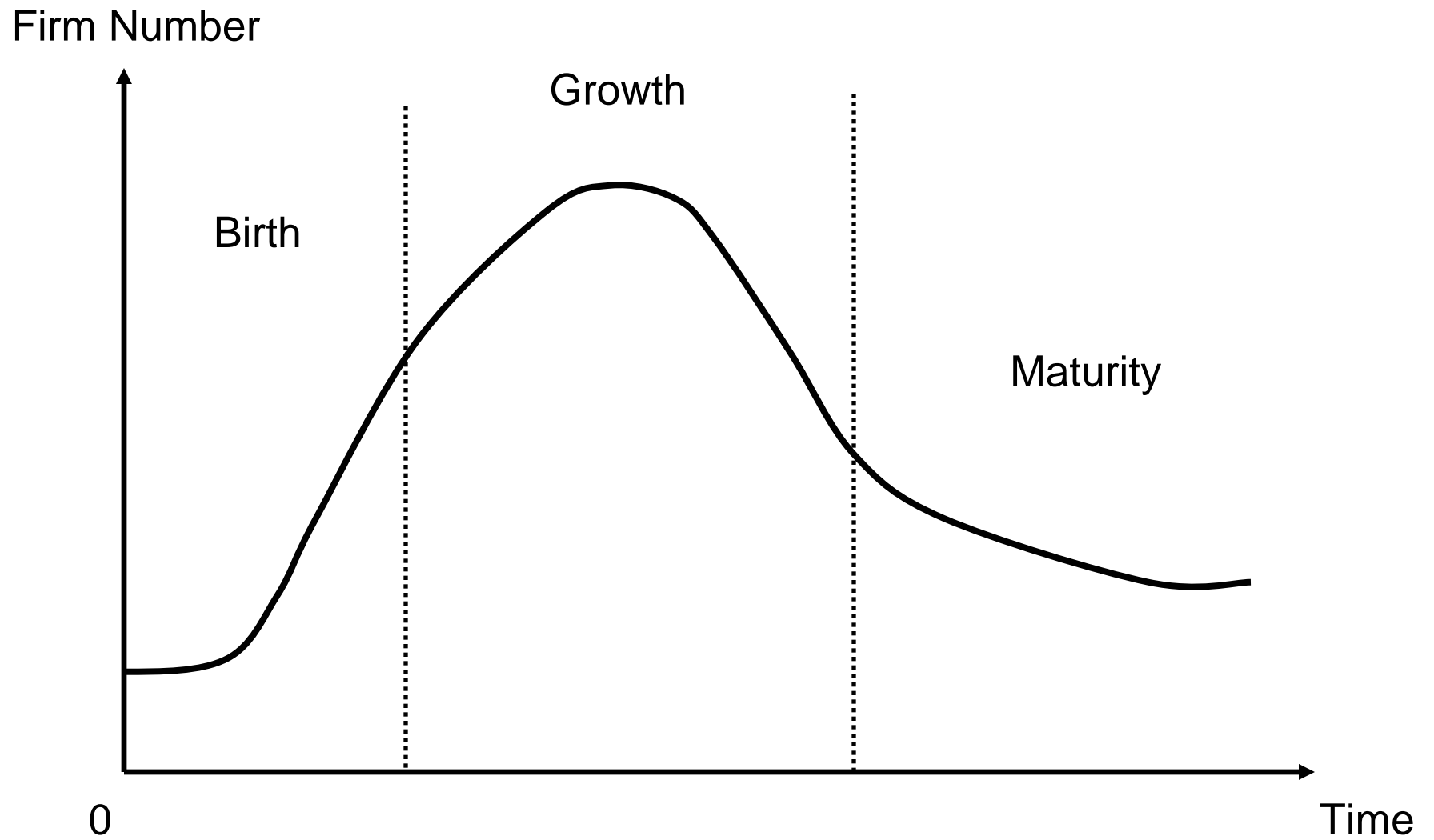
Some Issues

- 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

- Products not standardized
- Product innovation high
- Price high
- Consumer Adoption low
- Profit margin high
- Entry barriers low
- Market uncertainty high



- Products standardized
- Process innovation high
- Price low
- Consumer Adoption high
- Profit margin low
- Entry barriers high
- Market uncertainty low

Auto (1899-1929) and PC (1974-2000)

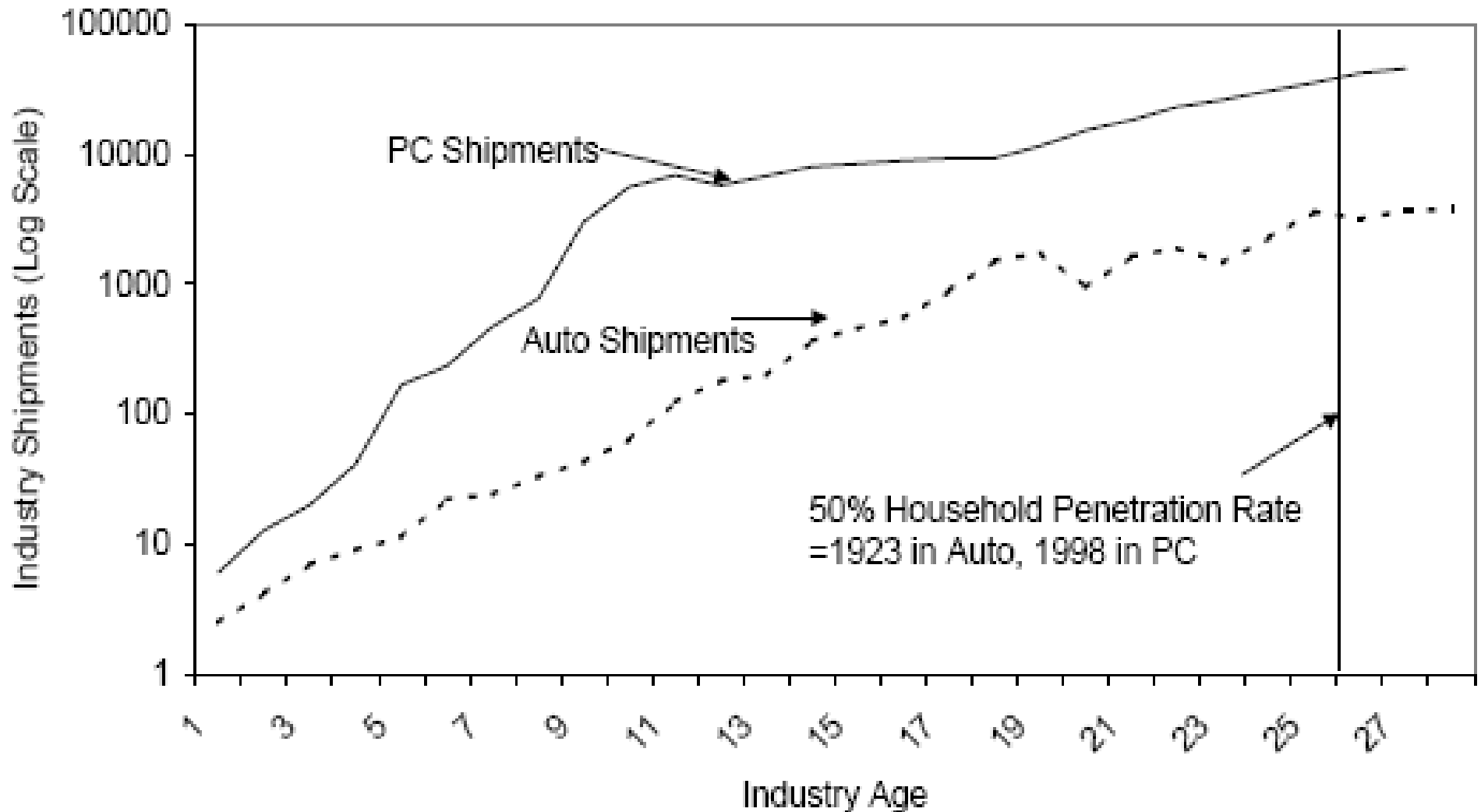


FIG. 9. Market growth, household penetration, and industry age.

Source: Mazzucato (2002)

Auto (1899-1929) and PC (1974-2000)

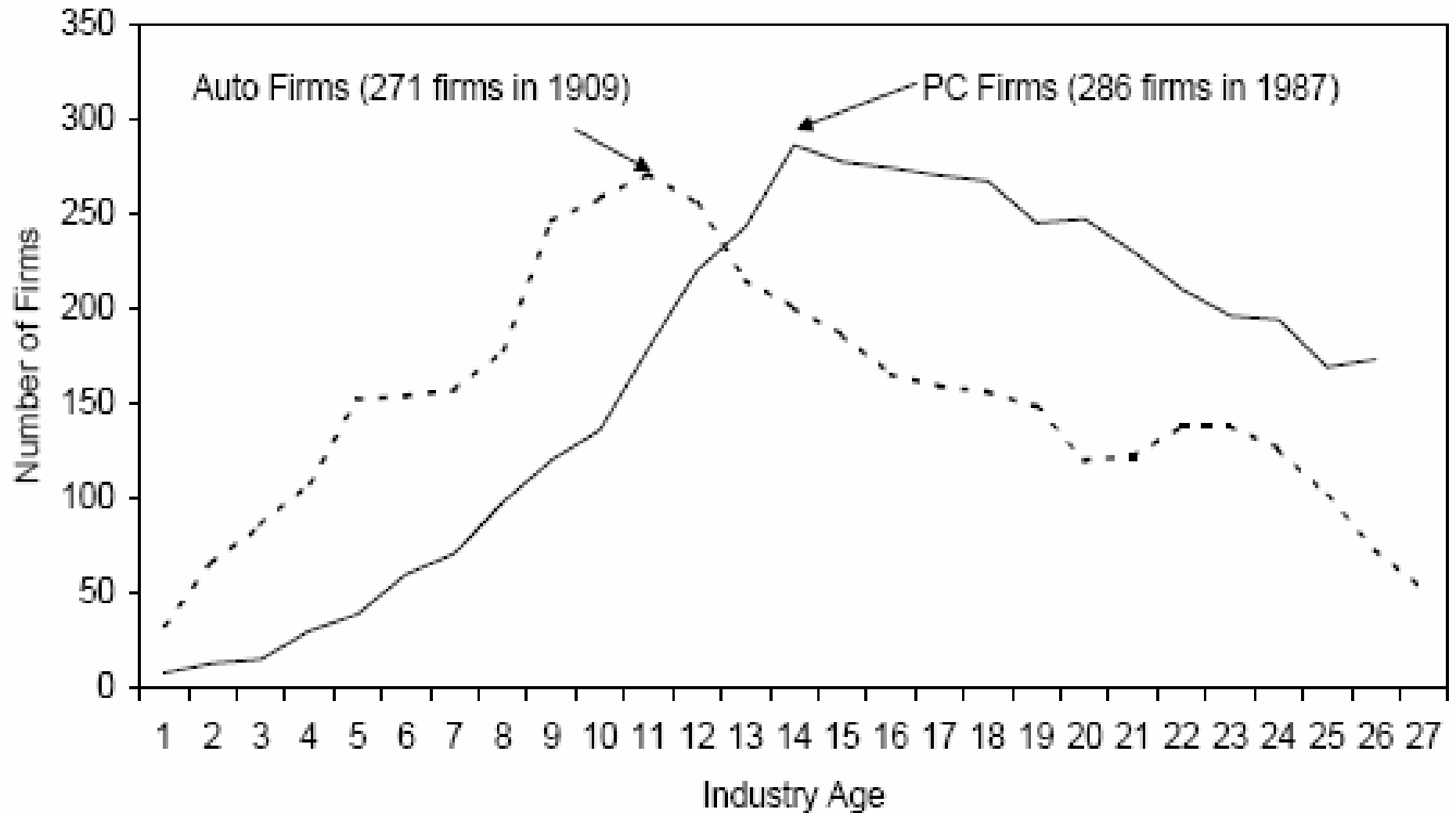


FIG. 1. Number of firms and industry age.

Source: Mazzucato (2002)

Volatility of Market Shares

Auto		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

Source: Mazzucato (2002)

Auto (1899-1929) and PC (1974-2000)

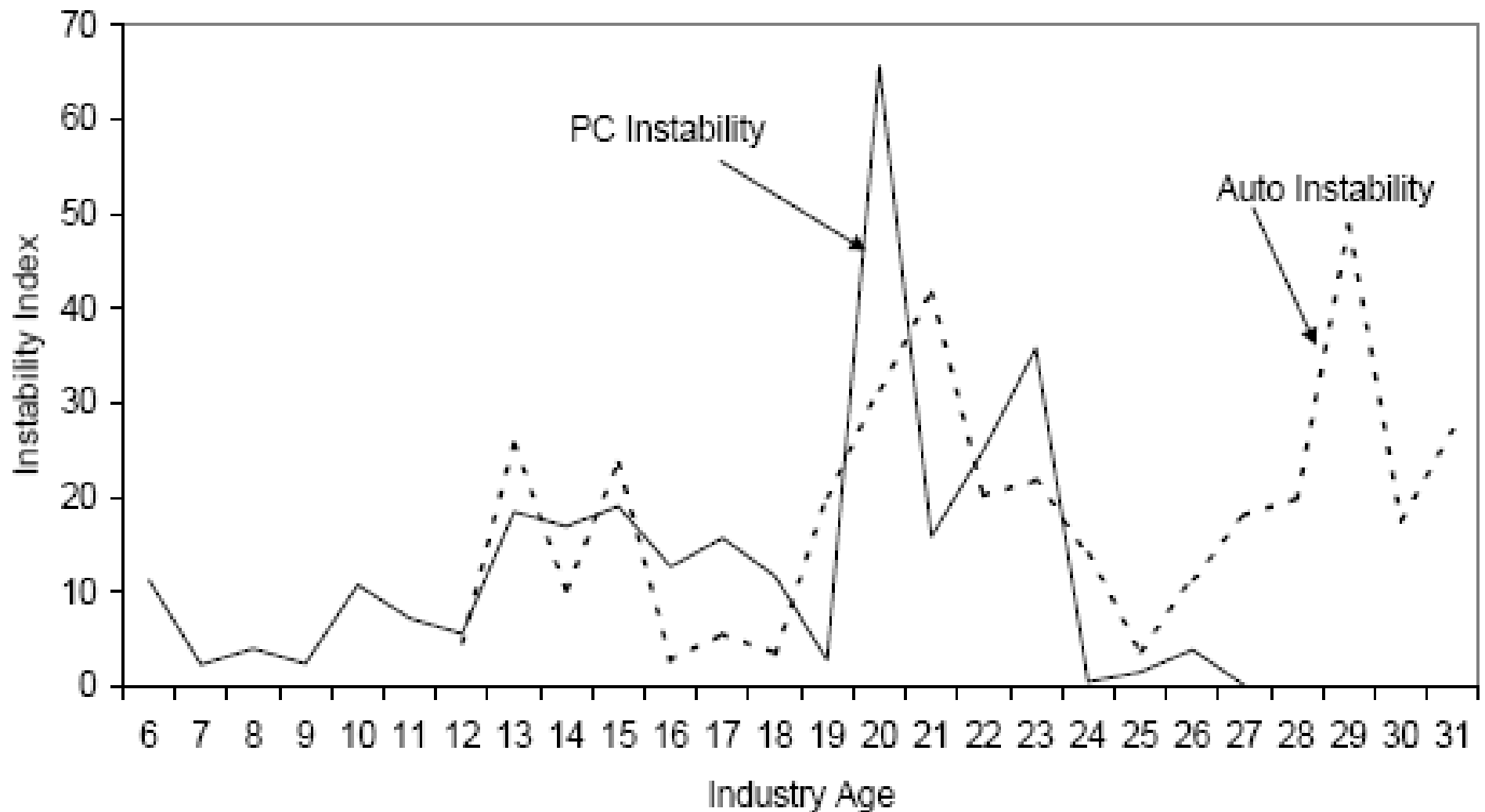


FIG. 7. Market share instability and industry age.

Source: Mazzucato (2002)

Auto (1899-1929) and PC (1974-2000)

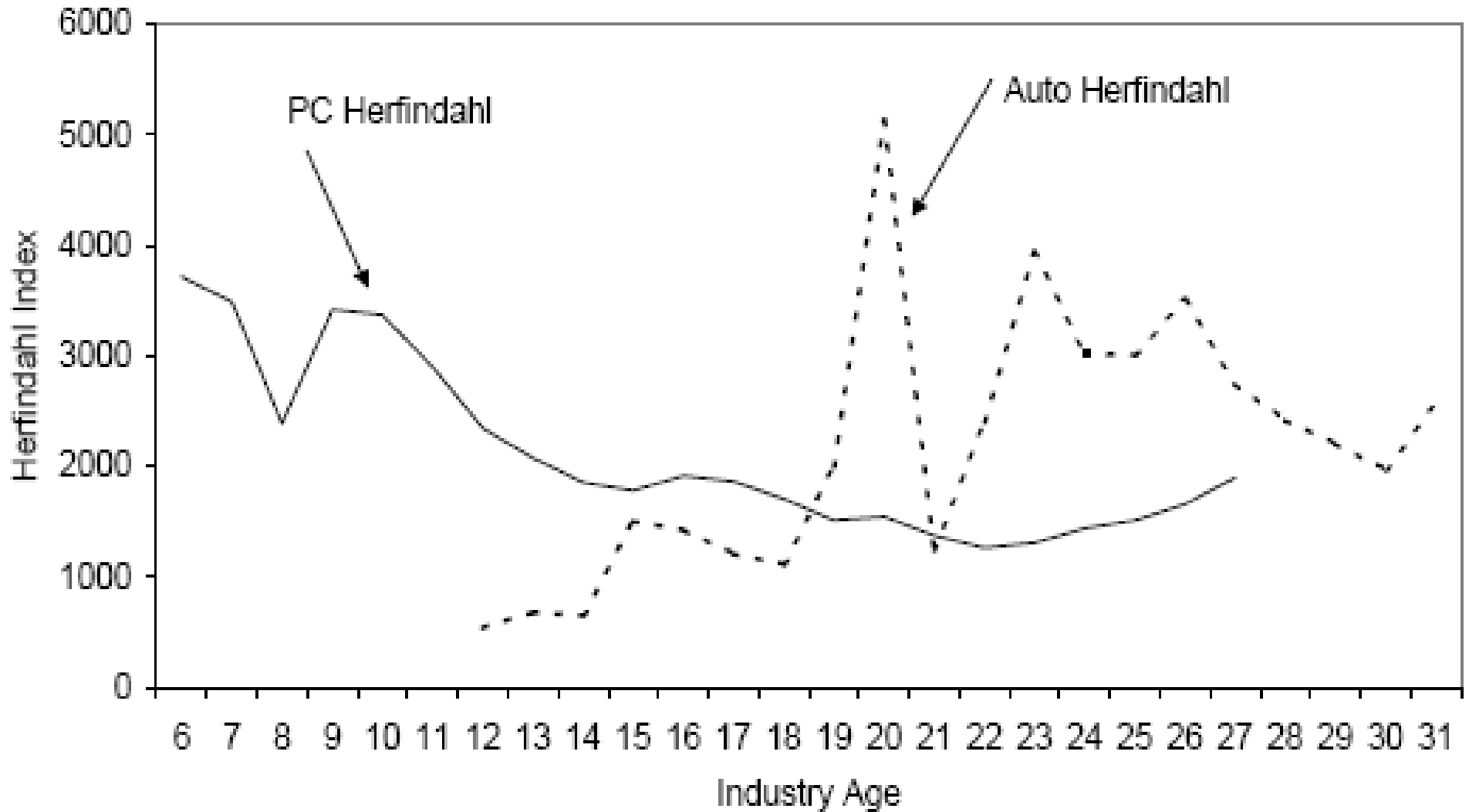


FIG. 8. Concentration and industry age.

Source: Mazzucato (2002)

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.