

EC2212 Industrial Growth and Competition

Lecture 4

Patterns of Industry Evolution are
in part Determined by Technology

Definition of an Industry

- Different ways to define an industry
- Standard industrial classification (SIC)
 - Categories chosen by government
 - Used to analyze census data on firms
 - SIC codes are hierarchical
 - Data commonly at 2- or 4-digit levels
 - Firms in SIC class usually not competitors
 - So competitive dynamics are hidden

SIC Code Hierarchy

- Major groups:
 - 01-09 Agriculture, forestry, fishing
 - 20-39 Manufacturing
 - 60-67 Finance, insurance, real estate
- 2-digit groups:
 - 20 Food and kindred products
 - 37 Transportation equipment
- 4-digit groups:
 - 3711 Motore vehicles & passenger car bodies
 - 3724 Aircraft engines & engine parts

Competitive Industry Definition

- Firms compete: produce “same” product
- Product variants substitutable for most customers
- Example: automobiles
 - Sports cars, small cars, 8-seaters — fairly substitutable
 - Motorcycles, trucks, buses — serve quite different needs
- Could define as, e.g., substitutability $\geq 20\%$
- In practice, guesstimate given market knowledge

Alternative Industry Definitions

- Industries defined by:
 - Substitutability (for competition analysis)
 - Price identical for all buyers (for market analysis)
 - Oligopolies if present could influence prices (for antitrust analysis)
 - Economies of scope in technology of product or production (for diversification analysis)
- This course: mainly substitutability

Patterns of Industry Evolution

- Traits that evolve: supply and demand
- Focus on supply side
- Typology of industries
 - Classify industries by evolutionary type?
 - Shakeout & concentration in some industries; some early entrants dominate
 - Non-shakeout in other industries; sometimes market leaders are replaced
 - Technology: what role does it play?

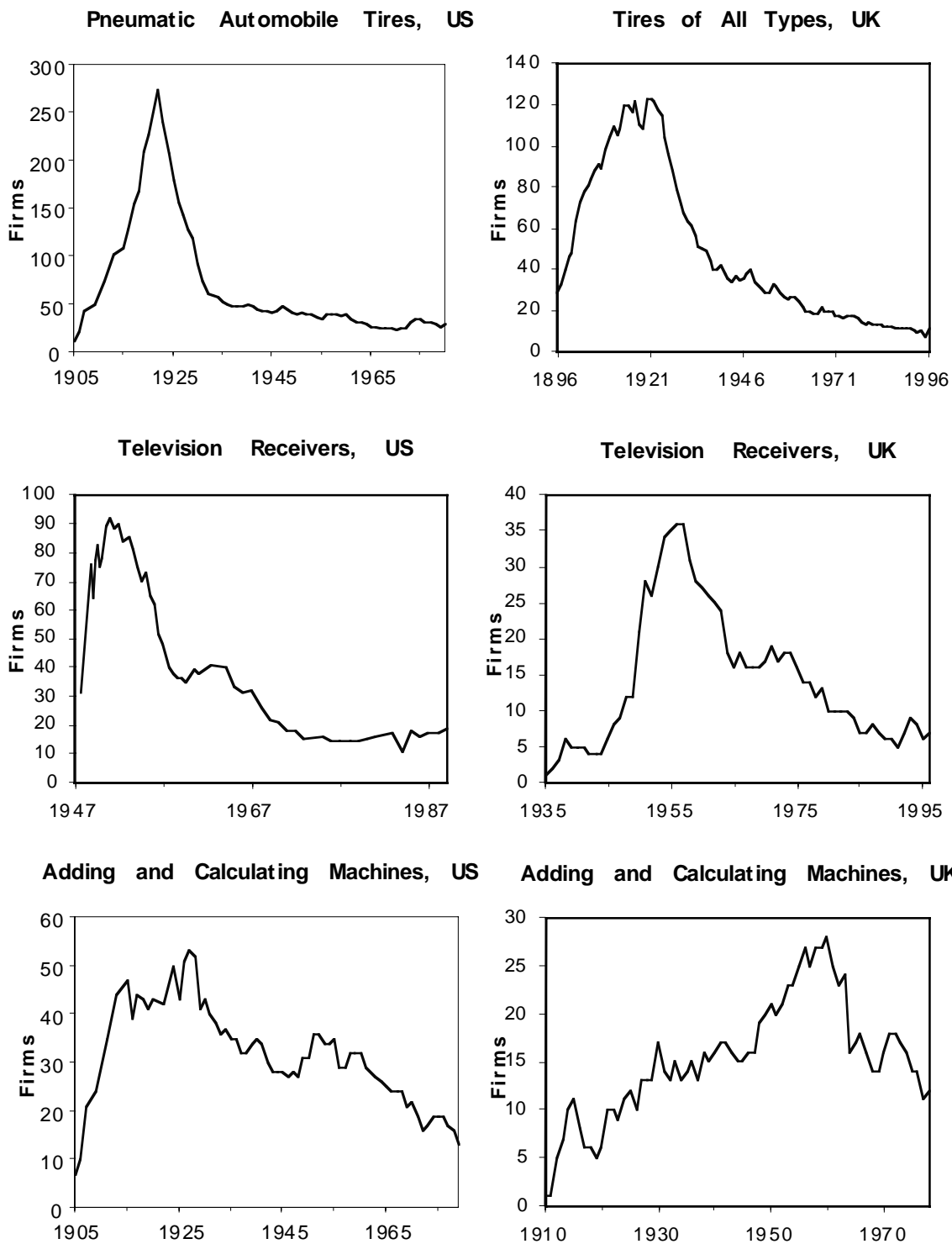
Supply and Demand Traits

- Supply-side
 - Firms in the industry: entry, exit
 - Technology of product and production
 - Firm growth, market share, concentration
- Demand-side
 - Number of customers & individual demand
 - Tendency to stick with a brand; switching costs
 - Spread of information and fads

Shakeout in Some Industries

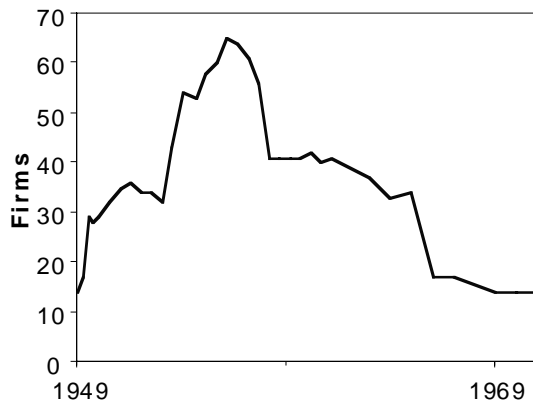
- Gort & Klepper (1982), Klepper & Graddy (1990)
 - 47 new products
 - First several decades or more of market
 - Initial rise in number of producers
 - Then in most products a shakeout of producers
 - Despite continued growth in output
- Greater shakeout with more technological change (Agarwal, 1998)
- Some early entrants dominate through technology (Klepper & Simons, 1997, ...)

Number of Manufacturers versus Time of Various US and UK Products

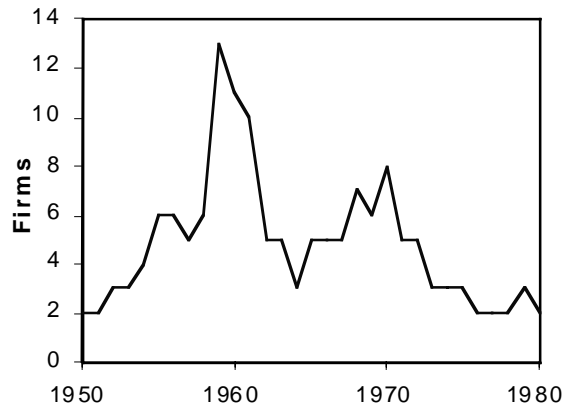


Number of Manufacturers versus Time of Various US and UK Products

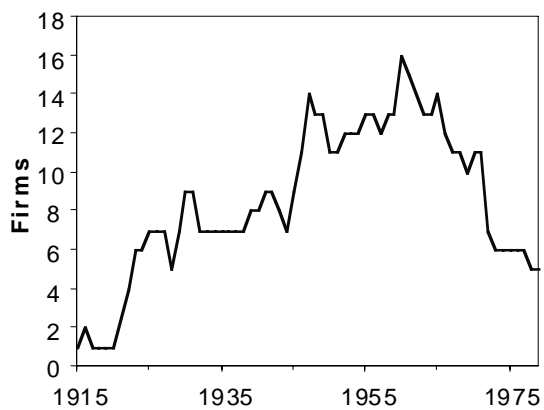
TV Picture Tubes, US



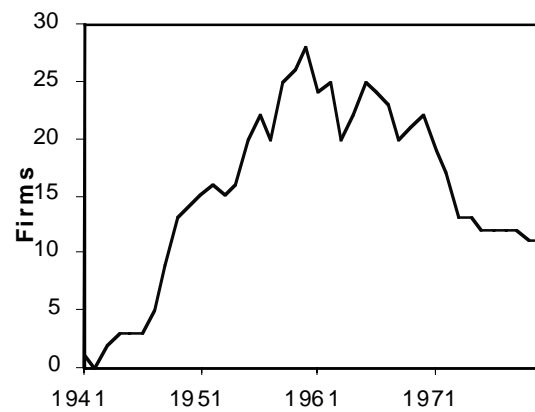
Cathode Ray Tubes, UK



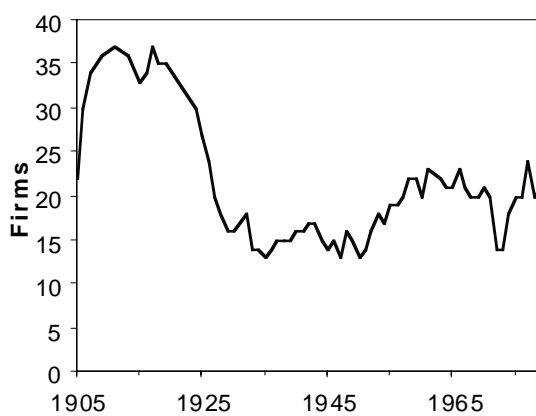
Electric Blankets, US



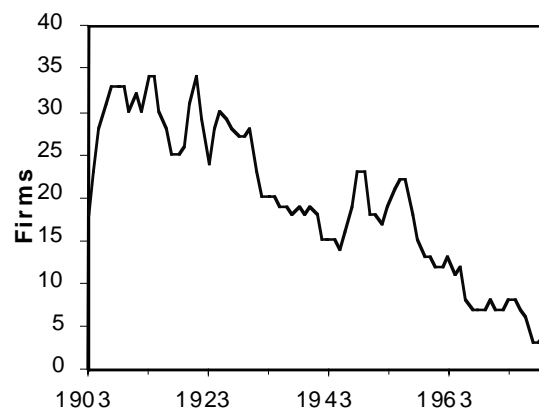
Electric Blankets, UK



Typewriters, US

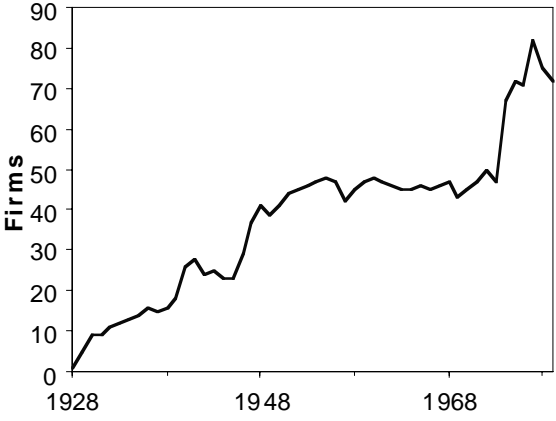


Typewriters, UK

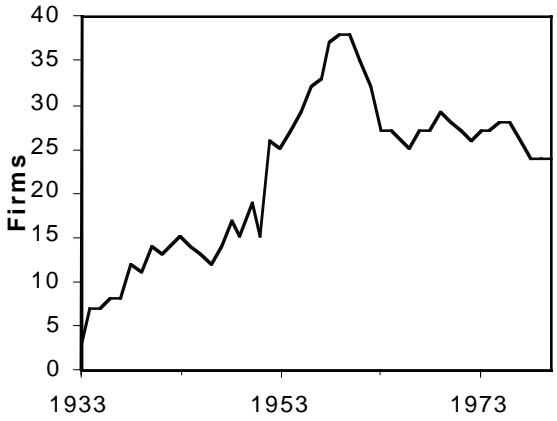


Number of Manufacturers versus Time of Various US and UK Products

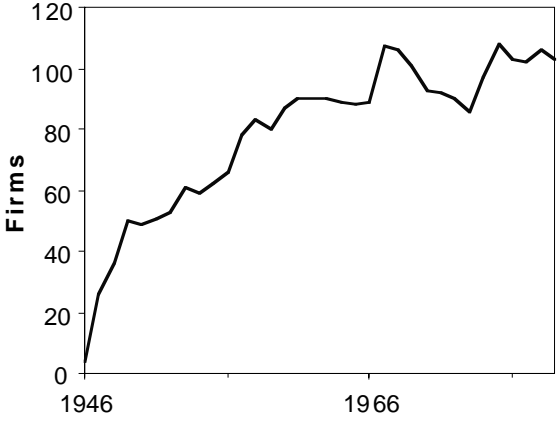
Zippers, US



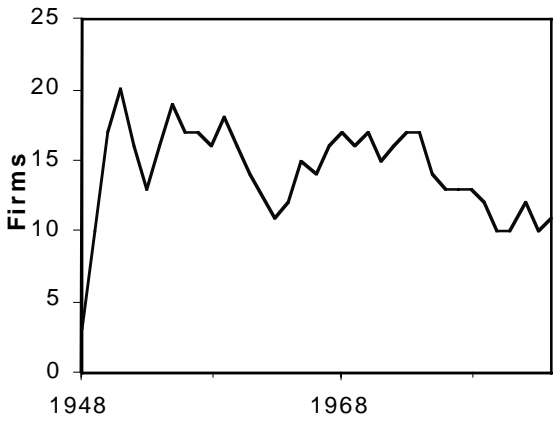
Zippers, UK



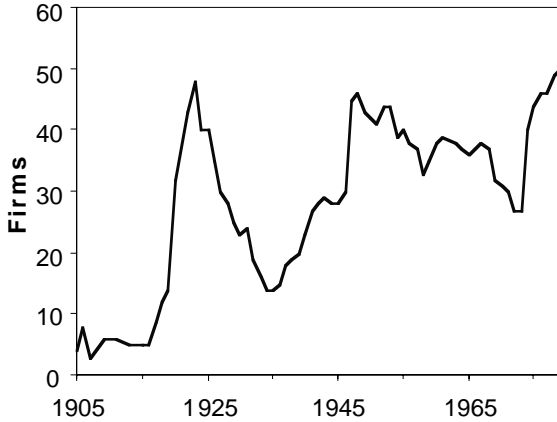
Ball-Point Pens, US



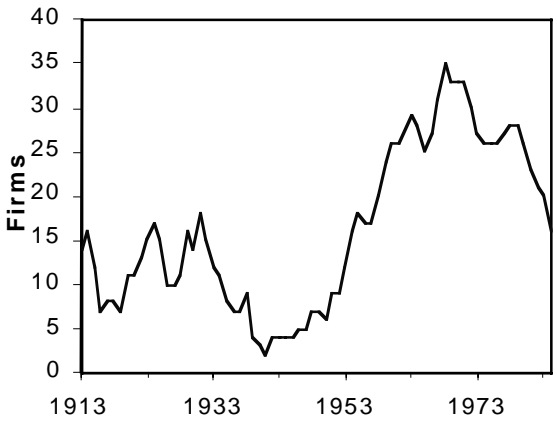
Ball-Point Pens, UK



Phonograph Records, US



Phonograph Records, UK



No Shakeout in Some Industries

- Number of firms may fall none or little
 - Ball-point pens in the US
 - Zippers in the US
- No early-mover advantage, unlike in shakeouts
- In other cases, late-mover advantages
 - Mechanical to electronic calculators

The Role of Technology

- Technology is a powerful competitive force
- If (1) large firms have most R&D incentive, and (2) technology fits firms' abilities, then: technology reinforces the leading firms
- If (1) R&D matters little to competition, or (2) new firms better at relevant R&D, then: leading firms have no advantage

A Validity Check

- Do technology and market traits really determine industry evolution?
- Or are outcomes just random?
- If just random, should often differ across countries
- Simons (2002) compares 18 products in US & UK
- Degree and time of shakeout very similar
- Common process at work in both nations
- Not just random

You Have Learned

- Technology, other market traits, affect industry evolution
- Types of industry evolution:
 - Market leadership turnover: aided by disruptive technology
 - Continued entry & exit possible: technology leadership is unimportant
 - Shakeout: market leaders use technology to dominate, non-disruptive technology
 - Market niches protect firms