Motivation

Increasing Interest in the Effect of Antitrust on Innovation:
- In the US: concerns that antitrust may undermine American dominance of the high-technology sector
- Little empirical evidence about which antitrust measures are effective under which circumstances
- This paper: focus on abuse of intellectual property (IP) as an important source of market power

The Antitrust Case Against Xerox in the 1970s:
- Xerox Corporation was the monopolist in the copier market throughout the 1960s
- FTC complaint alleged monopolization by strategic abuse of the patent system
- Case was settled by consent decree in 1975 and Xerox had to license all its copier-related patents
  ⇒ How did compulsory licensing affect subsequent innovation in the copier industry?

Contributions:
- Effects of antitrust on innovation (Bresnahan, 1985; Scherer, 2005; Tom, 2001)
- Empirical analysis of one of the most important US antitrust cases in the 20th century
  • Impact on domestic vs. foreign innovation
  • Compulsory licensing and IP rights
  • Effectiveness of compulsory licensing when monopoly is based on IP
- Case against Xerox (Shoven, 1985; Scherer, 2005; Tom, 2001)
  ⇒ First empirical evidence of impact on innovation

Historical Background

The Origins of Xerox:
- 1938: dry photocopying technique (= xerography) invented
- 1946: Xerox started to commercialize novel technology
- 1959: breakthrough with release of the Xerox 914
- Xerox’s Patent-Based Monopoly in the 1960s:
  - Xerox became the only seller of “plain-paper copiers” (PPCs)
  - Required no special paper and made copying cheaper
  - Technology was patent-protected but Xerox refused to license
  - 1970: first entry into PPC market (by IBM)

FTC Complaint and 1975 Consent Decree:
- 1972: FTC alleged illegal monopolization of the PPC market
- Strategic (ab)use of the patent system viewed as main barrier to entry
- 1975: consent decree obliged Xerox to license all its domestic and foreign copier-technology patents

Effect on Cumulative Innovation

Empirical Approach:
- Patent applications as measure of innovation
- Compare patenting across similar technology classes with differential exposure to compulsory licensing
  • Panel of 2.210 six-digit CPC subclasses within 141 four-digit CPC classes
- Difference-in-Differences Model:
  \[ \text{Patents}_{c,s,t} = \beta \cdot \text{Share}_s \cdot \text{Post}_t + \alpha_c + \lambda_s + \epsilon_{c,s,t} \]
  - \( \text{Patents}_{c,s,t} \) — number of patent applications at USPTO in subclass \( s \) of class \( c \) in year \( t \)
  - \( \text{Share}_s \) — share of unexpired patents (as of 1975) in subclass that were comprehensively licensed
  - \( \text{Post}_t \) — indicator for years after 1975

Result: Increase in patenting in technologies where Xerox patents became available for licensing

Robustness Checks:
- Increase in innovation is driven by patents that (indirectly) cited Xerox
- Complementary approach: increase in citations to licensed Xerox patents relative to matched control patents
- Additional checks: results are robust to alternative model specifications (e.g., Poisson), treatment definitions, etc.

Which Firms Benefited?

Table 1: Heterogeneity by Applicant Country

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<tr>
<th>Applicant Country</th>
<th>USA</th>
<th>Non-USA</th>
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<tbody>
<tr>
<td>Shares</td>
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<tr>
<td>(Percent)</td>
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<td>Japan</td>
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<tr>
<td>Others</td>
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<tr>
<td>Mean of Outcome</td>
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<tr>
<td>Observations</td>
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| Notes: All exogenous variables include dummies and year t fixed effects. Standard errors clustered at the four-digit CPC technology class level are in parentheses. Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01.

Result: Positive innovation effect is driven by increased patenting by Japanese applicants

Japanese Focus on Smaller Desktop Copiers:
- Several Japanese copier producers (e.g., Canon, Konica, Ricoh) successfully entered the American market
- Japanese competitors started producing small, low-volume desktop copiers
- In contrast, important American entities (e.g., IBM, Kodak) competed with Xerox in high-volume segments

Evidence in Line With This Narrative:
- Japanese patents more frequently contained words in title/abstract related to smaller copiers
- Diversity of Japanese innovation increased after 1975, but no reduction in quality
- Results are consistent with Japanese competition producing a more differentiated product from existing copiers

Effect on Xerox

- Synthetically control method to estimate how much Xerox would have patented in absence of antitrust case
- Only small reduction in Xerox’s patenting after 1975

Conclusion

- Antitrust case against Xerox promoted innovation in the copier industry
  ⇒ Compulsory licensing was effective in target sector as it removed the main entry barrier
- Positive innovation effect primarily driven by Japanese competitors
  ⇒ Antitrust allowed Japanese competitors to build on Xerox’s technology
- Consumers benefited from lower prices, greater variety, higher quality

Research question: How does antitrust enforcement against patent-based monopolies affect innovation by domestic and foreign firms?