

# Antitrust and (Foreign) Innovation: Evidence from the Xerox Case

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## Motivation and Research Question

Competition authorities in many countries have tightened their antitrust policy in recent years. In the US, this has raised concerns that stricter antitrust enforcement against domestic incumbents could undermine the American dominance of the high-technology sector, as it may particularly help foreign competitors to catch up. For example, a comment in *The Wall Street Journal* warned that ‘[a]ntitrust action against leading U.S. tech companies would shrink American dominance of the world’s fastest-growing industry’.<sup>1</sup> This is an important policy concern, since promoting innovation is increasingly becoming a key objective of antitrust policy, especially in high-technology industries (Gilbert, 2022).

In this paper, I intend to investigate how antitrust enforcement against patent-based monopolies affects innovation by domestic and foreign firms. Patents – and intellectual property (IP) more broadly – are an important source of market power. On the one hand, this is the intended effect of patents. They incentivize innovation by granting patentees the right to exclude others from using the patented invention. On the other hand, this market power can be abused if patentees engage in exclusionary practices. For example, dominant firms may strategically use their patents to block entry by refusing to license their technology to potential competitors.<sup>2</sup> This can give rise to a conflict between patent and antitrust laws, which may warrant intervention by antitrust authorities (e.g., Carrier, 2002). However, there is still little evidence about the impact of antitrust enforcement against incumbents that strategically (ab)use their IP.

## The Antitrust Case Against Xerox

To fill this gap, I will study the antitrust case against Xerox in the early 1970s. Xerox was the monopolist in the market for plain-paper copiers in the US throughout the 1960s. The American company, which had developed and commercialised a novel copier technology that is still widely used today, held more than 2,000 patents. It strictly refused to grant licenses to potential competitors and used patent infringement suits to block entry by competitors who developed their own patented technologies. In 1972, the Federal Trade Commission (FTC) charged Xerox with monopolization of the copier market through strategic abuse of the patent system. The case was settled by a consent decree in 1975 and Xerox was ordered to license all its domestic and foreign copier-related patents to any third parties at reasonable rates (FTC, 1975).

The case against Xerox is particularly well suited for addressing my research question. It ‘defined what may have been a peak in antitrust prosecution directed toward patent-based monopolies’ (Scherer, 2005, p. 300). Therefore, it was one of the most important American antitrust cases in the 20th century. The FTC’s intervention was widely perceived as success and

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<sup>1</sup>See ‘The Misguided Antitrust Attack on Big Tech’ in *The Wall Street Journal* (<https://www.wsj.com/articles/the-misguided-antitrust-attack-on-big-tech-11600125182>).

<sup>2</sup>For example, *The Economist* notes that ‘patents should spur bursts of innovation; instead, they are used to lock in incumbents’ advantages’ (see <https://www.economist.com/leaders/2015/08/08/time-to-fix-patents>).

triggered a transition to competition in the market for plain-paper copiers (Bresnahan, 1985; Tom, 2001). As many of the entrants were foreign firms, the case allows me to study the impact of antitrust enforcement on both domestic and foreign innovation.

### **Data and Empirical Approach**

I will use data on patent applications to empirically measure innovation. These data come from the Worldwide Patent Statistical Database (PATSTAT) of the European Patent Office. Patents are well-suited for my empirical approach for several reasons. First, patent data are consistently available throughout the relevant period. Second, patent protection played an important role in the copier industry, which alleviates the potential concern that not all inventions may be patented. Finally, as patents are assigned to hierarchical technology classes, I can compare patenting across different technologies within the same field.

To empirically estimate the effect of the antitrust case on innovation, I will employ a difference-in-differences strategy across technology classes (e.g., Moser and Voena, 2012). My main approach uses a continuous treatment variable that exploits variation in the share of patents in a six-digit technology class (based on the Cooperative Patent Classification) that were subject to compulsory licensing. Specifically, I will compare the annual number of US patent applications by applicants other than Xerox across differentially affected six-digit classes *within* the same four-digit class, controlling for a range of fixed effects.

This empirical approach allows for several useful extensions. For example, I can split the number of patent applications by applicant characteristics (e.g., country, size) to investigate which firms benefited from gaining access to Xerox's technology. Moreover, I can use patent citations to measure direct follow-on innovation to Xerox's patents, since firms had to cite any prior art irrespective of the licensing order.

### **Preliminary Results**

Preliminary results indicate that antitrust enforcement against Xerox had an overall positive effect on subsequent innovation by other firms in the copier industry. There was a disproportionate increase in patenting in technologies with a greater exposure to compulsory licensing of Xerox's patents. My preliminary estimates suggest that the antitrust case led to an additional 160 patent applications per year. This represents an economically meaningful increase in patenting in relevant technologies by around 1.4%. Event-study analyses illustrate that these estimates are not driven by any differences in pre-trends across groups.

Interestingly, the preliminary results also show that the main beneficiaries of increased access to Xerox's technology were competitors from Japan. In my main approach, when splitting the number of patent applications by applicant country, the positive effect of compulsory licensing is almost entirely driven by Japanese firms. In contrast, the estimated effect on patenting by US applicants is quantitatively small and statistically indistinguishable from zero. The estimates further indicate that there was great heterogeneity in the effect of the antitrust case

even among Japanese applicants. Only established firms increased their patenting, whereas small firms and start-ups did not benefit from access to Xerox's technology. Moreover, the positive innovation effect seems to be driven by Japanese firms with prior patenting experience in copier technologies – that is, (potential) competitors to Xerox in the copier market.

### **Mechanism and Next Steps**

The finding that Japanese rivals increased their innovation following the antitrust case is in line with historical narratives about the development of the copier industry. Scherer (2005) notes that several Japanese copier producers (e.g., Canon, Konica, Ricoh) successfully entered the American market after 1975 and became important competitors to Xerox. Japanese entrants strategically focused on the lower end of the copier market. That is, they produced machines that were cheaper, smaller, and designed for lower volumes than existing plain-paper copiers. This business model was different from that of most American copier producers and is considered one of the key reasons for the Japanese success (e.g., Jacobson and Hillkirk, 1986).

In the next step, I intend to empirically analyse the mechanism underlying the positive effect on innovation by Japanese competitors. Thus, I attempt to address the question of why Japanese firms were more successful in building on Xerox's technology than their American counterparts. To this end, I will study not only the intensity, but also the direction, quality, and diversity of innovation. Moreover, I plan to conduct a textual analysis of the patents to assess whether the Japanese entrants' shift towards smaller copiers explains the increase in innovation, as suggested by the historical narratives.

### **Contributions and Related Literature**

My planned research will contribute to the literature on the effect of antitrust on innovation by estimating the differential impact of antitrust intervention on innovation by domestic and foreign firms. While most of the literature on antitrust and innovation is theoretical (e.g., Segal and Whinston, 2007; Federico et al., 2020), there has been an increasing number of empirical contributions in recent years (e.g., Watzinger et al., 2020; Cunningham et al., 2021). I plan to further add to these studies by providing the first empirical evidence on the impact of the Xerox case – one of the most important US antitrust cases in the 20th century.

Most closely related to my paper, Watzinger et al. (2020) empirically study the innovation effect of the antitrust case against Bell in the 1950s, which also involved compulsory licensing. Although the two cases bear certain similarities, there were important differences in the market structure of the target industry. Bell was a vertically integrated monopolist that could continue to foreclose its rivals even after the loss of most of its IP. In contrast, Xerox's monopoly was primarily based on the strategic use of its patent portfolio such that compulsory licensing removed the main barrier to entry. Accordingly, Watzinger et al. (2020) find no effect of compulsory licensing of Bell's patents in the target industry. My preliminary estimates, conversely, reveal the largest increase in patenting among firms whose prior experience overlaps with Xerox's

technology. Therefore, my research is complementary to Watzinger et al. (2020) by showing that compulsory licensing can be an effective antitrust remedy *within* the target industry if it removes the main entry barrier.

My paper will also complement prior studies on compulsory licensing and the protection of IP rights (e.g., Moser and Voena, 2012; Galasso and Schankerman, 2015). Compulsory licensing is a frequently used remedy in competition cases (Delrahim, 2004). I intend to contribute to the literature by studying the effectiveness of compulsory licensing in the specific case where the targeted monopoly is based on patents. My preliminary estimates suggest that Xerox's patents exerted a blocking effect on follow-on innovation by other firms. This effect is consistent with a rent dissipation theory (Arora and Fosfuri, 2003). That is, Xerox likely refused to grant licenses to its competitors, because it feared that revenues from licensing would be lower than the loss in profits due to increased product market competition.

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