



Access to intellectual property for innovation: Evidence on problems and coping strategies from German firms

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ARTICLE INFO

Article history:

Received 14 December 2010

Received in revised form

14 September 2012

Accepted 14 September 2012

Available online 12 October 2012

JEL classification:

O34

O31

Keywords:

Access to intellectual property

Patents

Innovation

ABSTRACT

Transaction costs and contracting problems associated with proliferation of patents may have a negative impact on innovation. We present novel data on how frequently innovative German firms encountered problems with access to intellectual property (IP) for their innovation activities. While a small percentage of firms reported having abandoned or not started innovation projects because of IP issues, larger fractions reported having pursued their projects after modifying them. Using “coping mechanisms” such as acquisition of additional IP rights or taking legal action to limit the IP held by others was quite common. Much of the incidence of self-reported IP problems and coping activity was concentrated in firms which were larger, more R&D intensive, and had more patents than the corresponding median firm. After controlling for firm characteristics, we find that firms operating in technology areas with higher concentration of IP ownership experience a lower probability of reporting IP-related problems.

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1. Introduction

The monopoly rights represented by patents have traditionally been viewed as a short-run sacrifice of consumer surplus for the sake of long-run increases in economic growth through innovation. Recent decades have registered a sharp increase in patent applications in most OECD countries, and most policy discussions appear to presume that greater patenting activity reflects more innovation. The reality may be more complex. On the one hand, the increase in patenting may not have been driven solely by increase in innovative activity. Although technological opportunity appears to have increased significantly in areas such as software and biotechnology, leading to more innovation and thus to more patents, patenting activity may also have increased independent of the underlying rate of innovation. The institutions that grant and enforce patents have evolved over the years, lowering the costs and raising the benefits of acquiring patents, while patent applicants appear to have become more aware of the competitive value of patents, and more sophisticated and strategic in their use (Hall and Ziedonis, 2001; Reitzig et al., 2010). On the other hand, greater numbers of patents may have negative effects on innovators, particularly in the context of cumulative innovation and multiple blocking patents where the

costs associated with patents may outweigh any positive impact on R&D incentives.¹

In this paper we present empirical evidence of the impact of patenting on the activities of firms other than the patent holder, specifically the incidence of firms reporting problems with “freedom to operate” caused by lack of access to relevant intellectual property, and the extent to which the firms utilized what we term here “coping mechanisms” to mitigate these problems. Despite the importance of these potential negative effects, there is little evidence to date on their impact, particularly on the number and types of the firms affected and how they respond to these challenges. While much of the existing empirical evidence focuses on whether firms operating in fragmented IP markets incur higher costs because of higher transaction costs involved in negotiating with multiple parties over access to patented technologies, evidence on the stifling effect of patents of innovation, if any, remains at best indirect. This paper provides what is to our knowledge the first cross-industry survey evidence on the rate at which problems of access to IP are associated with consequences such as abandonment, avoidance, or modification of R&D projects, which types of firms and industries were most likely to have faced these problems,

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¹ A theoretical literature has shown that when research is sequential and builds upon previous innovations, stronger patents may discourage follow-on inventions (Merges and Nelson, 1990; Scotchmer, 1991, etc.).

and the degree to which they could mitigate the negative effects by participating in the market for intellectual property.

The data presented here on these phenomena come from the 2008 wave of the Mannheim Innovation Panel (MIP), a survey in which the respondents themselves reported the occurrence of various events in connection with the right to use intellectual property rights. These events included problems such as not starting, abandoning, modifying innovation projects because their firms did not have the rights to the relevant IP, or taking the risky course of proceeding without access to that IP. They also included coping strategies that can be viewed as attempts to deal with the problems of access to IP, such as exchanging or acquiring IP, or attempting to limit competitors' IP by participating in patent opposition proceedings, or engaging in negotiations with patent holders to avoid legal disputes.² We examine variation in these responses across different types of firms and different industrial sectors, and across markets and technologies where we are able to measure the degree of concentration of ownership of IP in the market for patents.

The results of present analysis can be described in terms of three main findings. First, it is rather rare for the median firm to stop projects or avoid them because of access to IP. Instead, many firms were engaged in such activities as acquiring additional IP rights or taking legal action to deal with or avoid problems of access to IP. Second, the incidence of self-reported IP problems and coping activity was confined mostly to firms which were larger, more R&D intensive, and had more patents than the median firm. While the larger firms had greater resources and capabilities than smaller or less experienced competitors to deploy coping mechanisms, they also experienced IP access problems more frequently. Overall, being a large, innovative firm does not per se appear to ensure protection against problems due to IP. Finally, after controlling for firm characteristics, we find that firms operating in technology areas with higher concentration of IP ownership experienced a lower probability of being confronted with problems. This finding, which is consistent with prior literature, may reflect a lower probability that negotiations break down when there are a smaller number of potential litigants.³

2. Prior literature

Much economic analysis of the patent system has focused on the effectiveness of patents as a means of appropriating returns for the innovator. Surveys of R&D performing firms⁴ have identified the patent paradox: increases in patenting across many industrial sectors and types of firms, but at the same time general agreement that (outside a few sectors) the effectiveness of patents in preventing imitation or securing returns from R&D is limited. Recent research in economics has increasingly highlighted a variety of other roles for patents beyond their direct role in excluding product market competitors from use of the patented technology. These include supporting transactions in the “market for technology” (Arora et al., 2001; Gans et al., 2002), disclosing information (Anton and Yao, 2004), signaling to investors (Haeussler et al., 2009; Hall and MacGarvie, 2010; Hsu and Ziedonis, 2008), mitigating expropriation risks (Ziedonis, 2004), or creating opportunities to extract industry-wide rents through holding up standards-setting (Rysman

² As an alternative to the wording used here, it is possible to classify problems as unilateral coping strategies and their coping strategies as bilateral coping strategies. For example, the modification of a project to adapt to the prevailing IP situation can be seen as a solution, rather than a problem.

³ See Ziedonis (2004), Noel and Schankerman (2006), and Galasso and Schankerman (2010).

⁴ These go back to Mansfield (1986) and the Levin et al. (1987) “Yale Survey”, and more recently the Cohen et al. (2000) “CMU Survey” and various rounds of the Community Innovation Surveys in EU countries.

and Simcoe, 2008)). Patents may be surprisingly valuable in these indirect roles, stimulating innovation by raising returns to innovator firms through mechanisms other than directly foreclosing competitors' access to product markets.

But it has also been increasingly argued that the patent system may now be at risk of stifling innovation (Bessen and Meurer, 2008; Federal Trade Commission, 2003; Jaffe and Lerner, 2004; Merrill et al., 2004). While much of this criticism is focused on fixable flaws in the operation of the system, such as poor quality of examination, it has also highlighted the potential for escalation of patent costs that fall outside the traditional tradeoffs between incentives for the innovator and high prices to be paid by consumers. These may include problems such as dissipative rent seeking in patent races (Reinganum, 1983), defensive investment in IP not directly related to an innovator's core business, or abandoning promising research projects when the projects run into unresolvable patent problems.

One increasingly influential line of research points to the potential of cost escalation associated with fragmentation of IP ownership. Fragmentation may increase transaction costs associated with patent thickets (or “an overlapping set of patent rights requiring that those seeking to commercialize a new technology obtain licenses from multiple patentees” Shapiro, 2001, p. 119) and create greater potential for holdup or opportunistic behavior whenever a firm tries to obtain freedom to operate in an environment where it has to negotiate with multiple rival licensors (Lemley and Shapiro, 2007; Noel and Schankerman, 2006). In extreme cases, proliferation of patents may lead to an “anti-commons” situation where too many rights lead to a gridlock among would-be innovators (Heller and Eisenberg, 1998). One issue that still needs to be understood is the extent to which problems related to fragmentation of rights can be efficiently resolved through licensing transactions. The evidence available in this regard is not only limited, but contradictory too. Some authors argue that problems such as royalty stacking can be effectively resolved through negotiations (Galasso and Schankerman, 2010; Geradin et al., 2007). However, Siebert and von Graevenitz (2006) find a negative association between licensing activity and fragmentation, and Cockburn et al. (2010) find more licensing activity but poorer innovation performance by licensees in industries with more fragmented IP ownership.⁵

Another way in which this paper contributes to the literature is in providing more evidence on the impact of firm size or patenting intensity on the incidence of IP problems. Prior work, like Lanjouw and Schankerman (2004) and Galasso et al. (2011), finds that the patents of firms with larger patent portfolios are less likely to be involved in patent litigation, conditional on the characteristics of the patents. Bessen and Meurer (2005) find that the risk of being sued increases with the size of the firm's patent portfolio and R&D intensity.⁶ In contrast to the relatively well-developed research on patent litigation, not much is known about the relationship between firm size and patent or R&D intensity, and more generally IP-induced problems, such as abandoning, not starting, or product modification.

3. Theoretical model

Consider a firm that has one or more inventions which it intends to commercialize, let it be assumed that, each of its inventions i ,

⁵ In the context of software, Cockburn and MacGarvie (2009, 2011) find a negative relationship between the number of patents in a software market and the rate at which new firms enter the market or obtain financing. However, firms that hold patents related to a market are much more likely to enter it.

⁶ Bessen and Meurer (2005) do find that larger patent portfolios reduce litigation when firms are technologically close. However, a large share of lawsuits are between firms that are technologically distant.

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