Testimony for the FTC/DOJ (Antitrust) Hearings on Competition and Intellectual Property Law in the Knowledge-Based Economy

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> "If national patent laws did not exist, it would be difficult to make a conclusive case for introducing them; but the fact that they do exist shifts the burden of proof and it is equally difficult to make a really conclusive case for abolishing them." [Edith Penrose (1951)][1]

Thank you for inviting me to speak today at these hearings. Our topic today is economic perspectives on IP, competition, and innovation. I will focus my remarks on the effects of the patent system on innovation, which is both an important question and my area of research interest. By and large, I share the usual economist's view of the patent system, which is that it is a necessary evil: with a patent grant we trade off short term exclusive (monopoly) rights to the use of an invention in return for two things: 1) an incentive to create the invention in the first place and 2) early publication of the invention rather than the use of secrecy to protect its misappropriation.

This quick summary of the economic view of the goals of the patent system already hints at the tension highlighted by the topic of this session: 1) ***competition*** may suffer when we grant a monopoly right but it will benefit if this right facilitates entry into the industry by new and innovative firms. 2) ***innovation*** will benefit from the incentive created by a patent but it may suffer if patents discourage the combining and recombining of inventions to make new products and processes. Thus the relationship between patents, competition, and innovation is guaranteed to be a complex one, and one that may vary over time and across industries. The table below summarizes the tradeoffs as we view them. My presentation focuses on the net effects that result from the tradeoffs in the first row

The Patent System Viewed by a Two-Handed Economist

Effects on:	**Benefit**	**Cost**
Innovation	creates an incentive for R&D	impedes the combination of new ideas & inventions; raises transaction costs
Competition	facilitates entry of new small firms with limited assets	creates short-term monopolies, which may become long-term in network industries

[1] I am grateful to Josh Lerner for unearthing this quotation.

Does the patent system increase innovative activity on net?

This has proved an exceedingly difficult question to answer, due to the absence of real experiments. Most researchers who investigate this topic have looked at historical eras when there were changes to the system and examined the consequences for subsequent innovative activity. Recently there have emerged a couple of studies that use mainly 19th century data (when there was substantial variation across countries in patent systems). One uses invention data from World's Fairs and Expositions and one uses patenting itself as the innovation measure.

Petra Moser, one of my graduate students at UC Berkeley, finds that inventors in countries without a patent system do not innovate more than inventors in countries with patent systems. However, inventors in countries without patent systems do tend to innovate in areas that are more easily protected with trade secrecy. Josh Lerner finds that when a country strengthens its patent system, inventors from other countries patent more in that country. However, inventors in that country do not seem to invent more – they neither patent more in their own country, nor in Great Britain (a very important market in the 19C and one with a well-functioning patent system).

Results using data from the 20th century are harder to find, but we do have some survey evidence. I am sure you have already heard from Wes Cohen and Rick Levin about the Carnegie-Mellon and Yale surveys, which demonstrate fairly clearly that patents are NOT among the important means to appropriate returns to innovation, except perhaps in pharmacueticals. Similar results have been obtained by other researchers for Europe and Japan. More important means of appropriation are usually superior sales and service, lead time, and secrecy. Patents are usually rated as important for blocking and defensive purposes.

Using a somewhat more complex economic model and this survey evidence, Arora, Ceccagnoli, and Cohen find that increasing the patent premium, which they describe as the difference in payoffs to patented and unpatented inventions, does not increase R&D much except in pharmaceuticals and biotechnology.

The most positive results are those from Park and Ginarte. In a 1997 paper using aggregate data across 60 countries for the 1960-90 period, they find that the strength of the IP system (an index based on coverage, especially whether pharmaceuticals are covered; membership in international agreements; lack of compulsory licensing and working requirements; strength of enforcement; and duration) is positively associated with R&D investment in the 30 countries with the highest median incomes (that is, G-7 and others). In the other countries, the relationship is positive but not significant.

Branstetter and Sakakibara studied the effects of expanding patent scope in Japan in 1988 (allowing multiple claims per patent as in the U.S. had the effect of increasing scope according to their interviewees). This change to the patent system had a very small effect on R&D activity in Japanese firms.

Hall and Ziedonis looked at a single industry (semiconductors) that doubled its patenting-R&D rate after the creation of the CAFC and other changes to patent legislation in 1982. Interview evidence suggested that the increase was due to the fact that inventions in this industry use technology that is covered by hundreds of patents held by a number of firms, and that firms increasingly feared litigation and preliminary injunctions if they failed to have cross-licensing agreements in place. Negotiating such agreements was greatly facilitated by having a large patent portfolio of your own, so several firms, large and small, were engaged in defensive drives to increase their patenting rate. This had little to do with encouraging innovation, and in fact looked like a tax on innovative activity.

Baldwin and his co-workers studied this question for Canada. Using firm-level survey evidence on innovation, they find that the relationship between innovation and patent use is much stronger going from innovation to patent use than from patent use to innovation. Firms that innovate take out patents; but firms and industries that make more intensive use of patents do not tend to produce more innovations.

Lanjouw and Cockburn use new survey data from India, the results of interviews with industry, government and multinational institutions, and measures of R&D activity constructed from a variety of statistical sources to determine trends in the allocation of research to products specific to developing country markets. There is some, although limited, evidence of an increase in such research in the mid- to late 1980s which appears to have leveled off in the 1990s. The full effects of TRIPS on research directed to developing country needs remains to be seen.

The conclusions from this brief survey of empirical work can be summarized as follows:

1. Introducing or strengthening a patent system (lengthening the term, broadening subject matter coverage, etc.) unambiguously results in an increase in patenting and in the strategic uses of patents.
2. It is much less clear that these changes result in an increase in innovative activity, although they may redirect such activity toward things that are patentable and/or are not subject to being kept secret within the firm.
3. If there is an increase in innovation due to patents, it is likely to be centered in the pharmaceutical and biotechnology areas, and possibly specialty chemicals.
4. The existence and strength of the patent system DOES affect the organization of industry, by allowing trade in knowledge, which facilitates the vertical disintegration of knowledge-based industries and the entry of new firms that possess only intangible assets.

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