

Patents, Competition, and Innovation

Bronwyn H. Hall
UC Berkeley, NBER,
and IFS London
August 2003

Central theme

- Patents can either encourage or discourage innovation
- Patents can either facilitate or inhibit competition
- The extent to which the benefits of patents exceed their costs is a function of the “quality” of the average patent.

Overview of talk

- What are the benefits and costs for competition and innovation?
- Empirical evidence on patent system effectiveness for innovation
- Patent system and entry/competition
- The role of patent “quality”

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The economics of the patent system

Effects on:	Benefits	Costs
Innovation	creates an incentive for research and new product/process development encourages the disclosure of inventions	impedes the combination of new ideas & inventions raises transaction costs for follow-on innovation provides an opportunity for rent-seeking
Competition	facilitates the entry of new (small) firms with a limited asset base or difficulties obtaining finance	creates short-term monopolies, which may become long-term in network industries may be used to maintain a cartel

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Does the patent system increase innovative activity?

- 19th century evidence
 - *Moser* – invention and patent systems across countries
 - Stronger patent system has no effect on innovation level, but changes its focus (away from innovation that can be protected with trade secrecy).
 - *Lerner* – patenting and patent systems across countries – strengthened patent system:
 - increase in patenting by foreigners in response to strengthened patent system, but
 - no increase by firms within the country or in Great Britain (that is, no increase in innovation *per se*)

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Does the patent system increase innovative activity?

- 20th century
 - *Cohen et al/Levin et al* – patents not important for securing returns to innovation (except in pharmaceuticals, specialty chemicals).
 - *Hall & Ziedonis* – CAFC, etc (1982) caused increased patenting in semiconductor industry, due to litigation fears and needs for patent portfolios for cross-licensing
 - *Baldwin et al* – Canadian innovation survey. Innovation causes patenting, but patenting does not seem to increase innovation.
 - *Branstetter & Sakakibara* – increasing patent scope in Japan (1988) did not increase R&D

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Does the patent system increase innovative activity?

- *Park and Ginarte* – 60 countries, 1960-90. Strength of IPR (including whether pharmaceuticals covered) positively related to R&D in developed countries.
- *Arora, Ceccagnoli, and Cohen* – increasing the “patent premium” did not increase R&D except in pharma/biotech.
- *Bessen & Maskin* – software industry developed without strong patent rights (although recent changes in software and internet industry may reflect the rise of patents)
- *Lanjouw & Cockburn* – has direction of pharma research shifted towards developing country diseases in anticipation of TRIPS? – possibly, but change has not lasted – awaits future evidence

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CAFC 82 and the sources of U.S. patent growth

- Through 1994, growth in U.S. patent applications largely due to
 - U.S. corporations
 - Most technologies, esp. ICT, and pharmaceuticals
 - *BUT*, only one industrial sector

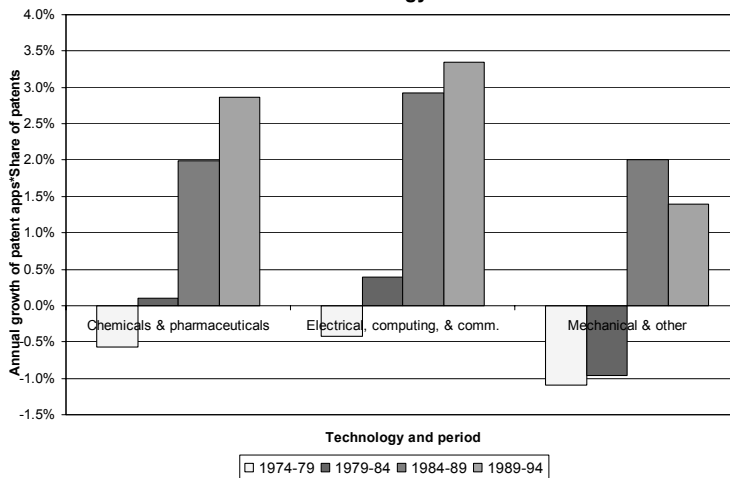
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Accounting for growth by tech class

Accounting for U.S. Inventor Patent Application Growth
Broad Technology Class



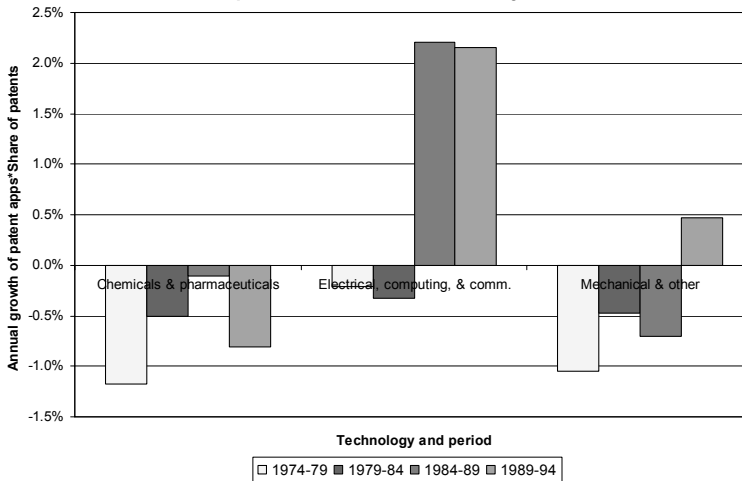
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Accounting for growth by industry

Accounting for U.S. Inventor Patent Application Growth
Compustat Firms - Broad Industry Class



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Patents, entry, and competition

- Encouragement effect
 - New innovative firms have few assets other than ideas – secure property rights to ideas help them obtain VC
 - Hall and Ziedonis on semiconductor design firms
 - Arora, Fosfuri, Gambardella on markets for technology

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Patents, entry, and competition

- Discouragement effect
 - Lerner – in biotechnology small firms avoid areas where large firms patent heavily
 - Royalty-free cross licensing requires patent portfolio for participation – may facilitate cartels
 - Litigation a major distraction for entrepreneurs
 - “patent trolls”

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Conclusions (1)

- Introducing or strengthening a patent system
 - *does* increase patenting and the strategic uses of patents
 - *does not* result in an increase in innovative activity broadly
- But
 - it redirects innovation toward things that are patentable and away from those protected by secrecy
 - it may increase innovation in pharmaceutical and biotechnology areas, and possibly specialty chemicals.

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Conclusions (2)

- The existence and strength of the patent system *does* affect the organization of industry
 - Allows trade in disembodied knowledge
 - Facilitates the vertical disintegration of knowledge-based industries
 - Enables the entry of new firms that possess only intangible assets

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Patent quality

- High quality patents
 - Satisfy statutory requirements:
 - Novel
 - Non-obvious
 - Useful
 - Provide sufficient disclosure
 - Are valid with certainty (including certainty about scope)

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Consequences of low quality

- Investment in innovation and commercialization slowed by uncertainty
- Some areas of research avoided by small and new firms (Lerner 1995)
- Slows advance in cumulative technologies (increases level of fragmentation of rights)
- Clogs the process in patent offices, especially as others increase patenting in response – reduces quality further
 - Evidence – read some patents

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Patent quality and benefit/cost

- Benefits per patent tend to increase with patent quality (more novelty, less obvious, better disclosure, etc.)
- Costs remain about the same per patent, but some congestion costs as patents proliferate
- Conclusion: more is not better

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Penrose and Machlup on the existence of the patent system

- "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), *The Economics of the International Patent System*, Baltimore: John Hopkins University Press.]
- "If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it."
 - [Fritz Machlup (1958), *An Economic Review of the Patent System*, Study No.15 of Comm. on Judiciary, Subcomm. on Patents, Trademarks, and Copyrights, 85th Cong., 2d Sess.]

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