The Effects of Patent Opposotions: A Comparative Study of U.S. and European Patents

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Outline

- Introduction
- Research questions
- Brief review of prior literature
- Institutional similarities and differences
- Data and preliminary results
- Discussion
Patents: some background

- Importance of patents for securing returns to innovation long recognized (Arrow 1962).
- Surge in U.S. patenting (Kortum & Lerner 1997) accompanied by increased scholarly focus on the role of intellectual property in business strategy (Teece, 1986).
- Firms’ strategic uses of patents are complex and not well understood (Cohen et al 1997; Hall & Ziedonis 2000).
- Expansion of subject matter (e.g., increase in software and business method patenting) have raised concerns about prior art search.
Patents: enforcement and administration

- Policy issues related to the “quality” of patents, the expansion of subject matter, and the costs of enforcement have invited increasing interest.
- One current trend in the scholarship examines enforcement though contract, i.e. licensing (Arora 1995; Nickerson 1996) and another through litigation (Lanjouw & Lerner 1996; Lanjouw & Schankerman 2000; Somaya 2000).
- But this scholarship is limited in scope—both in terms of geography and procedure.
- Recent research examines “oppositions” in Europe (Harhoff & Reitzig 2000).
- Needed: an examination of cross-jurisdictional differences.
Research Questions - Overview

What are the determinants of firms' post-issue patent challenges in the United States and Europe?
What are the characteristics of similar inventions patented—and challenged—in these two jurisdictions?
Research Questions 1

- Are oppositions more likely to be filed against “important” EPO patents, as measured in terms of the citation counts to their US equivalents? Yes – see Harhoff & Reitzig.
- Is a EPO patent more likely to be challenged (in opposition) than a US patent (in either a re-examination or litigation)? Yes – for reexamination
- Are US patents that have opposed EPO equivalents significantly more likely to be subject to re-examination or litigation in the US?
Research Questions 2

- Is the outcome of an opposition more significant than a reexamination, as measured in terms of change in the number of claims or the probability of revocation?
- How do opposition outcomes compare with those of litigation?
- What can be said about the cost, speed and efficiency of the opposition system as compared to the reexamination and litigation options available in the US?
Institutional similarities: US and EU

Requirements for Utility Patent: US

- Available for “processes, machines, manufactures, or compositions of matter”
  - Novel
  - Useful
  - Non-obvious
Institutional similarities: US and EU

Requirements for Utility Patent: EU

- Patents have been available in the European Patent Office (EPO) since 1977
  - Novel (analogous to US “novel”)
  - Inventive Step (roughly analogous to US “non-obvious”)
  - Industrial Application (roughly analogous to US “useful”)

Overview of Institutional Differences: US and EU

- **United States** patent challenges
  - Reexamination post-issue (life of patent)
  - Litigation for validity or infringement

- **EU (EPO)** patent challenges
  - Post-grant opposition (within 9 mos.)
  - Litigation for validity or infringement in national courts
Validity and Infringement

**Validity questions**
- Novelty/nonobviousness/inventive step requirement
- Scope of grant
- Adequacy of specification (ambiguity, sufficiency, etc.)

**Infringement questions**
- Scope of patent claims
- Does 3rd party process/product fall within scope of patent claims?
Institutional Differences: US and EU

United States

- Secrecy throughout the period that patent application is pending (during our sample period)
- Re-examination after issue – limited to validity questions; examiners are final arbiters.
  - Administrative *ex parte* proceeding—requester role limited to application, and to
    - Right to receive notice of decision
    - Right to receive copy of patentee’s response
    - Right to file rejoinder to that response
  - Relatively large filing fee ($2,500)
  - Admissible evidence limited—prior patents and publications
  - Regulatory hurdle: “Substantial question of patentability”
  - Barrier to pursuing litigation *ex post*

- Lesson: significant limitations
Institutional Differences: US and EU

United States

- Litigation
  - Adversarial appeal to court-arbiter
  - Costly: estimates of patent suits run $1-5M, some as high as $20M in biotech.
  - Challenge contingent upon a charge by the patentee of infringement
  - Patent afforded a presumption of validity
  - Burden of proof is much more than a mere preponderance—"clear and convincing" standard
  - Judge, jury may have limited expertise
Institutional Differences: US and EU

European Patent Office (EPO)
- Publication of application 18 months after application date
- Opposition – validity only
  - Administrative adversarial proceeding initiated by any third party
  - Time limit: Must file within 9 months of patent grant
  - Patent may be challenged on any of the grounds of patentability—novelty, inventive step, industrial application
  - No limits on the kinds of evidence admissible
  - Examiners and then administrative judges (on appeal) hear challenge
  - Much lower cost than litigation, but slow.
Institutional Differences: US and EU

European Patent Office (EPO)

- Litigation – infringement
  - No EPO challenge
  - Separate litigation in each of the individual nations in which the patent was claimed
  - German example
    - Proceedings delayed if opposition proceedings
    - No jury; 3 judge panel plus a technical expert
    - Time – 18 months
    - Cost – several $100K
    - Shortcoming - no discovery
    - Loser pays costs
**Patent Application**

**EPO System**
- Invention
- Patent Application
- 18 mos Secrecy
- Publication
- Secrecy
- Rejected
- First to file

**USPTO System**
- Invention
- Patent Application
- First to invent
- Patent: Issues
- Secrecy
- Rejected
- Re-issure
- Re-examination
- Disclosure
- 2-3 years
- 20 years
- Litigation in all relevant states
- Litigation

**Other**
- 2-3 years
- 1 year
- 5/16/01
- IP Seminar, St. Peters Oxford
Re-examination and opposition rates for pharma/biotech and semiconductor/software technologies

USPTO Re-examinations by Application Year
1978-1994 for GHHM Technologies

EPO Opposition Rate
Fraction of Issued Patents Opposed
Re-examination and Opposition Lag Distribution

Lag between Application and Re-examination
USPTO 1981-2000

Lag between Application and Opposition
EPO 1978-1999

Number of cases

Number of Patents
Institutional Differences: Outcomes

- Administrative and legal process: Europe
  - Oppositions result in
    - 33% of patents are revoked in full (Merges, 1999)
    - Our pharma/biotech data confirm these
      - 25% of patents are confirmed in full
      - 40% of patents are amended
      - 34% of patents are revoked in full
  - Litigation results not known at this time
Institutional Differences: Outcomes

Administrative and legal process: US

- Re-examinations results (Stacy 1997)
  - 28% of patents are confirmed in full
  - 59% of patents are amended
  - 13% of patents are revoked in full

- Our results
  - See next slide

- Litigation
  - Invalidation rates under 50%
### USPTO Re-examination Outcomes, 1980-1999

Of 3614 records, 3563 (98%) have outcome notations.

<table>
<thead>
<tr>
<th>Claims</th>
<th>NOA*</th>
<th>Added</th>
<th>Cancelled</th>
<th>Add&amp;Cancel</th>
<th>Totals</th>
<th>Share</th>
<th>Share with any</th>
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<td>Amended</td>
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<td>42.8%</td>
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<td>--</td>
<td>1169</td>
<td>32.8%</td>
<td>32.8%</td>
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</table>

**Total noted records:** 3563

*NOA= no other action noted

Each re-exam appears only once in the above table. Numbers in the last column do not add to 100% because the shares are for any such occurrence and some re-exams yield multiple outcomes.
Preliminary data on characteristics of re-examinations

- One-third of overall cases involve patentholder as requester.
- Significant number of outcomes (nearly 15%) involve adding claims. A number of outcomes (about 7%) involve both adding, deleting claims (frequently, adding narrower claims).
- US equivalents in our pharma/biotech sample of patents that are opposed in EPO (456 total) are significantly more likely to be subject to re-examination (11/456) than patents in a “control” sample drawn from similar years and patent classes (1/456).
Preliminary data on EPO opposed patents in pharma/biotech

Outcomes of oppositions are consistent with Merges’ data for overall oppositions.

- 25% of patents are confirmed in full
- 40% of patents are amended
- 34% of patents are revoked in full
Preliminary data on characteristics of US equivalents of opposed patents

Biotech/pharma sample

- “Forward” citations within 5 years of issue are greater for US equivalents than US patents in the control sample (4.2 cites/patent within “equivalents” population, vs. 2.4 cites/patent in the control sample).

- Cites per patent that is cited also are greater for patents in the equivalents population than in the control sample (5.3 vs. 3.5).

- Claims/patent in the equivalents population are modestly greater (14.3 vs. 12.4).
# Indications of Quality and Reexaminations

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<th>Equivalents:</th>
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<td>Cites per all 456 pats:</td>
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<tr>
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<tr>
<td><strong>Claims:</strong></td>
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<td>453 records with data in each sample</td>
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<td>Reexs per 456 pats:</td>
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## Probit for Re-examination

### Probability of a Re-examination Request

Binary probit estimation (24,982 observations; 3715=1)

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<th>Coefficient estimate</th>
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<th>dProb/dx+</th>
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</table>

The excluded category is corporate-owned, with no cites, not BP or SS.

+ In the case of the dummies, this is the increase in probability for a unit change to the dummy.
Some very preliminary conclusions & next steps

- US equivalents of EPO opposed patents appear to be slightly more “important,” based on forward citations, claims per patent.
- US equivalents are somewhat more likely to be subject to re-examination (need to pull out the outcomes for these specific re-exams).
- Despite tendency for opposed patents to be somewhat more subject to re-exam, other characteristics of the re-exam process (identity of requester, outcomes) seem to differ sharply from those of oppositions.
- We are currently working on better characterization of outcomes in both US and EPO systems, adding litigation data and additional data on opposition outcomes.
- Extend this general framework to 2 other major classes (software; semiconductors).