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

*Dietmar Harhoff (Univ. L-M Munich)
*Bronwyn Hall (UC Berkeley)
David Mowery (UC Berkeley)
Stuart Graham (UC Berkeley)

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

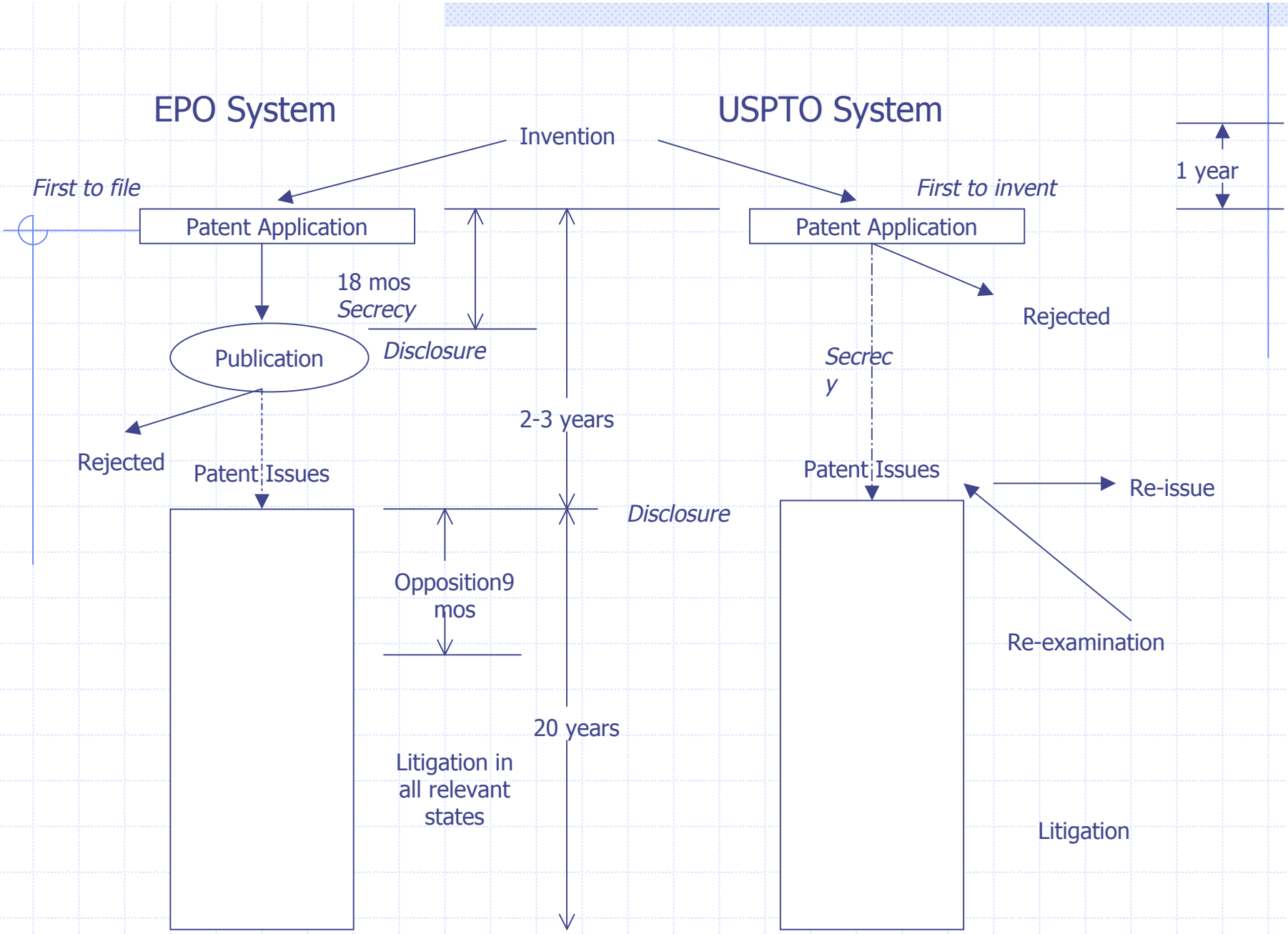
- United States
  - Litigation
    - Adversarial appeal to court-arbiter
    - Costly: estimates of patent suits run $1-5M, some as high as $20M in biotech.
    - Challenge contingent upon a charge by the patentee of infringement
    - Patent afforded a presumption of validity
    - Burden of proof is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

Institutional Differences: US and EU

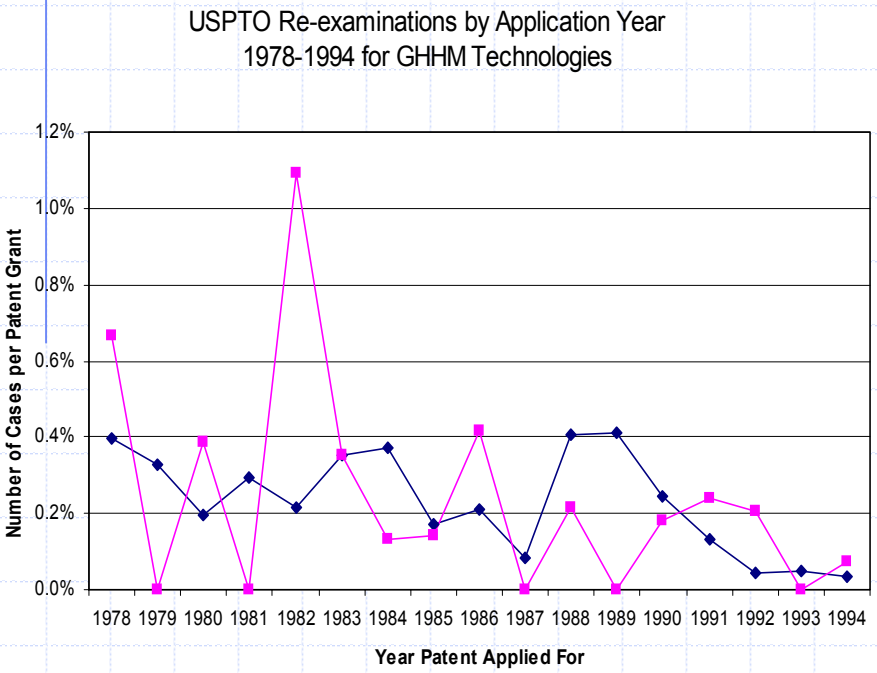
- European Patent Office (EPO)
  - Publication of application 18 months after application date
  - Opposition – validity only
    - Administrative adversarial proceeding initiated by any third party
    - Time limit: Must file within 9 months of patent grant
    - Patent may be challenged on any of the 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.

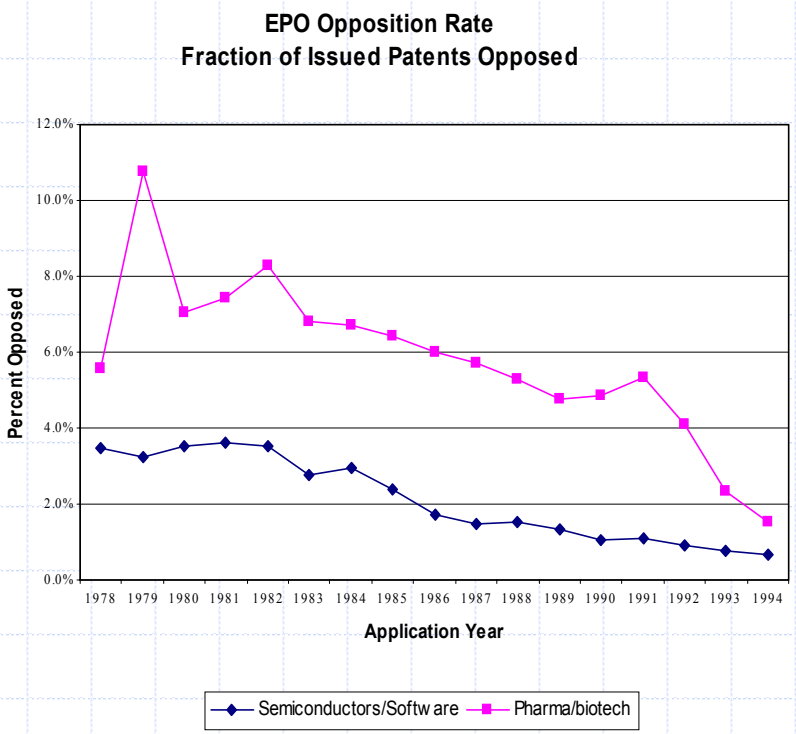
Institutional Differences: US and EU

- 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

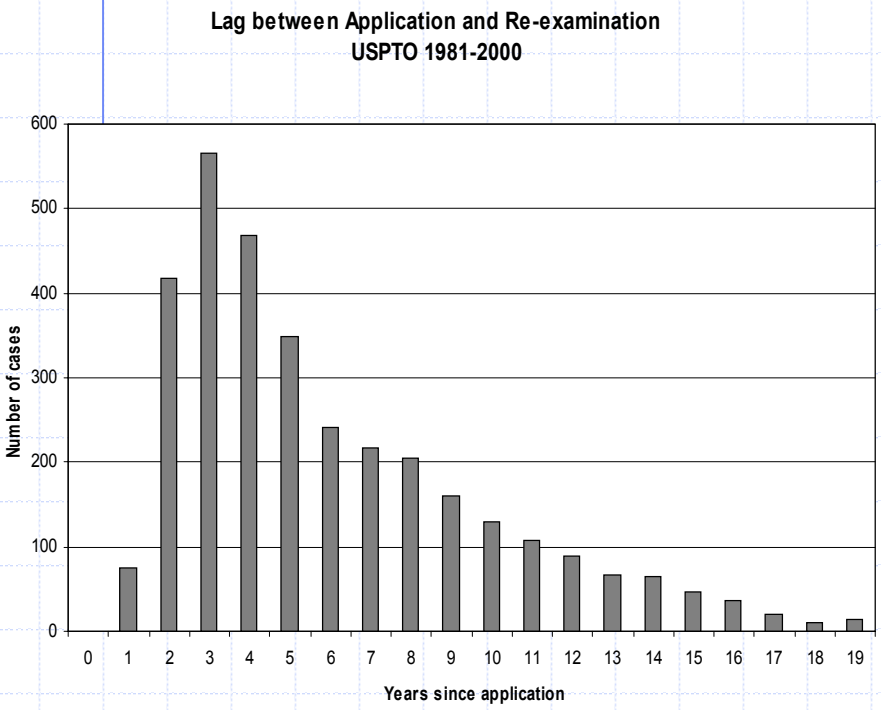

EPO System
USPTO System
Invention
First to file
First to invent
1 year
Patent Application
Patent Application
18 mos
Secrecy
Disclosure
Rejected
Publication
Secrec
y
2-3 years
Rejected
Patent Issues
Patent Issues
Re-issue
Disclosure
Opposition9
mos
Re-examination
20 years
Litigation in
all relevant
states
Litigation

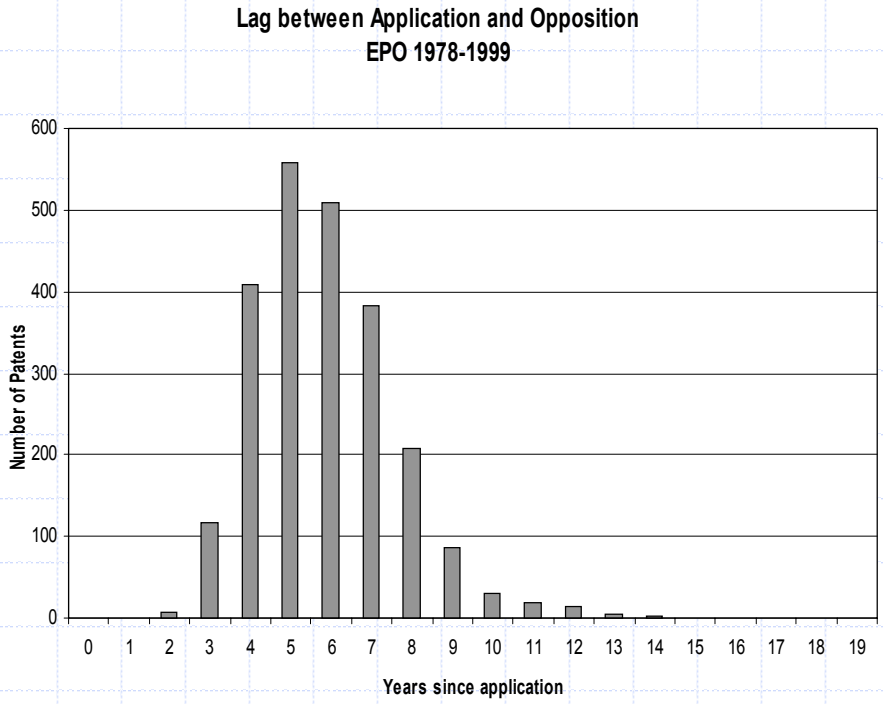
Re-examination and opposition rates for pharma/biotech and semiconductor/software technologies





Re-examination and Opposition Lag Distribution





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

Reexamination outcomes, 1980-1999							
Of 3614 records, 3563 (98%) have outcome notations							
		with					**Share**
Claims	**NOA***	**Added**	**Cancelled**	**Add&Cancel**	**Totals**	**Share**	**with any**
Added	149	--	--	--	**149**	**4.2%**	**14.1%**
Cancelled	568	152	--	--	**720**	**20.2%**	**40.5%**
Amended	678	124	645	78	**1525**	**42.8%**	**42.8%**
No change	1169	--	--	--	**1169**	**32.8%**	**32.8%**
			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

	Equivalents:		Control Sample:	
Citations:				
Tot pats:		456		456
Fwd cites:		4635		2191
w/in 5 year window:		1907		1078
pats w/ cite in 5 yrs:		362		312
Cites per all 456 pats:		4.2		2.4
Cites per pat w/ cite:		5.3		3.5
Claims:	453 records with data in each sample			
Tot clms:		6457		5617
Clm/pat:		14.3		12.4
Reexaminations:				
Reexs per 456 pats:		11		1

Probit for Re-examination

Probability of a Re-examination Request					
Binary probit estimation (24,982 observations; 3715=1)					
	Coefficient estimate	Std. Error	dProb/dx+	Std. Error	
Year of grant	-0.0132	0.0018	-0.0025	0.0003	**
Bio/pharma	0.0484	0.1112	0.0095	0.0224	
Semicond/software	-0.1970	0.0400	-0.0339	0.0062	**
#cites = 1 or 2	0.3134	0.0277	0.0635	0.0059	**
#cites = 3 to 10	0.7193	0.0285	0.1692	0.0078	**
#cites = 10 to 20	1.1771	0.0514	0.3645	0.0199	**
#cites > 20	1.7349	0.0997	0.5840	0.0348	**
Individually owned	0.1577	0.0971	0.0329	0.0220	
Government-owned	-0.4656	0.0433	-0.0741	0.0055	**
Intercept	24.7775	3.5028			
Log likelihood	-8977.86				
Chi-squared (df)	1802.2 (9)				
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).