Exploring the Opaqueness of the Patent System - Evidence from a Natural Experiment

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The fundamental deal of the patent system: Is it flawed?

Grant of exclusion rights $\longleftrightarrow$ Disclosure of technological information

$\downarrow$

Supports competition among technologies

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Implicit assumption in most of the patent literature:

Patent system meets its function to inform third parties about what technologies are protected by the respective patents.

$\hookrightarrow$ **Is this assumption justified?**

Concerns among practitioners: Patents seem to be intransparent with respect to what they protect.

"[...] notice [function] - how well a patent informs the public of what technology is protected."

"[...] By far the most serious concerns were identified in the IT sector, where some panelists asserted that the notice function "is not well served at all".
In contrast, panelists [from] pharmaceutical and biotech sectors, indicated that the notice function "by and large" is "very well met." "

(From "The Evolving IP Marketplace", FTC report from March 2011.)

Our research question:
Is the (European) patent system intransparent?

That is:

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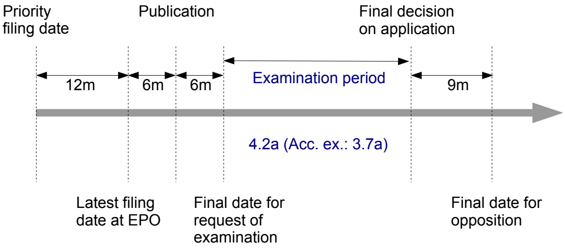
Answer via exploitation of a quasi-experiment:

- In 2001 the EPO concealed information about applicants' requests for accelerated examination.
- From changes in behavior:
  Conclusions on transparency of patent system.

The quasi-experimental setting:



Applicant can request accelerated examination.

Before 2001: Request for accelerated ex. public information.
After 2001: Request for accelerated ex. private information.

1. Introduction

2. Theory

   Model of patent application process;

   $\rightarrow$ Derivation of hypotheses about behavioural changes.

3. Empirics

   Data on acceleration and opposition frequencies;

   $\rightarrow$ Test whether hypotheses about behavioural changes are met.

4. Conclusion

Our basic theoretical framework:

Two players:

Firm A: Applies for a patent for a certain technology;
can request accelerated examination of its patent (costly).

Firm B: Active in same market as firm A;
can choose to oppose firm A's patent.
(Costly for both parties;
patent gets revoked with certain probability.)

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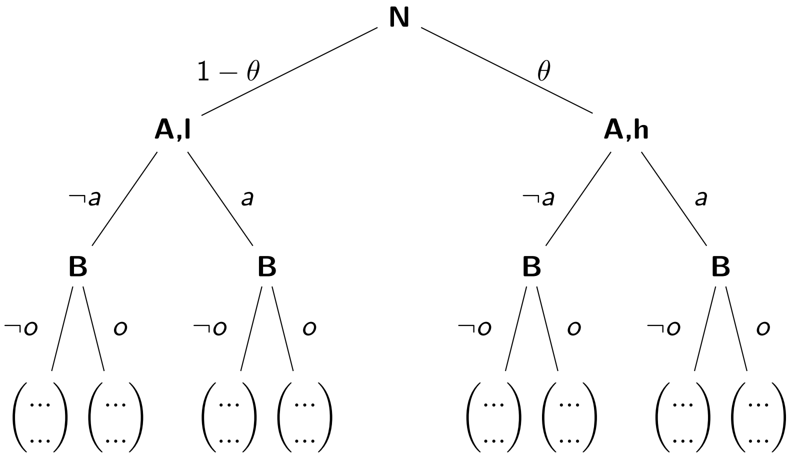
"Technological content of patent" $\xrightarrow[\textit{by}]{\textit{operationalized}}$ **"Value of patent"**

Patent value: Future stream of revenues from patented technology.

→ Firm A has a good estimate of the value of its patent.
→ In case firm B could inspect firm A's technology:
Would arrive at similar estimate.

Sketch of our model of the patent application process:

Patent value v: high or low;
Private information to A.



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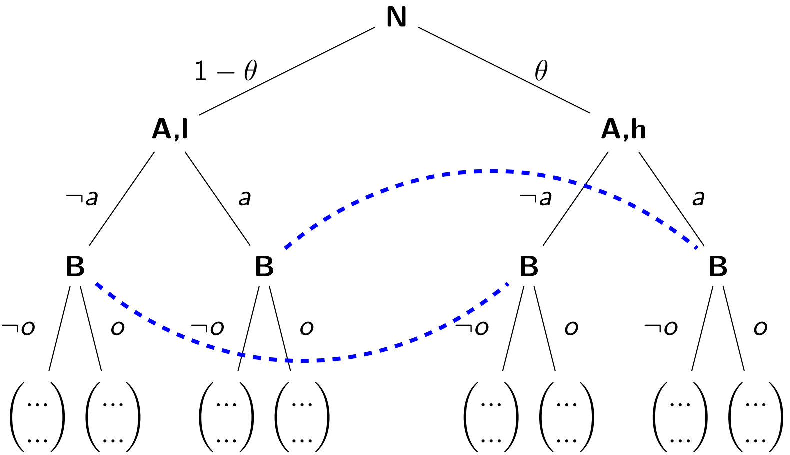
Acceleration decision:
Before 2001: Public.



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Patent value v: high or low;
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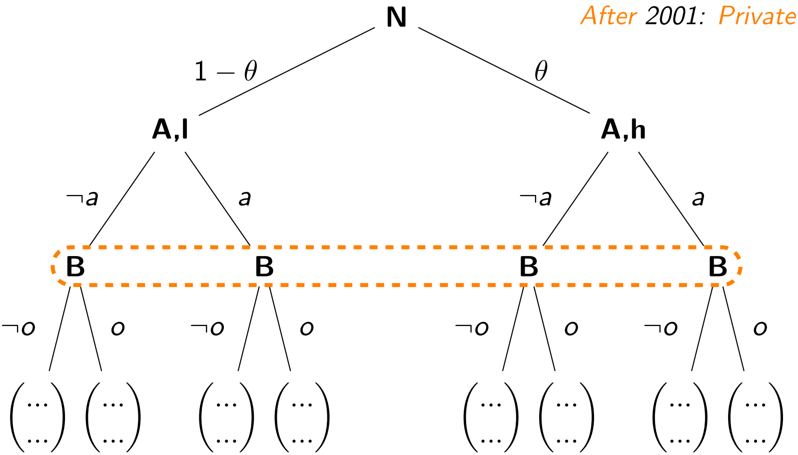

In case acceleration information gets concealed: We expect to observe changes for high-value patents.

Main parametric assumptions:

- Small share of high-value patents;
  profit from high-value patent $\gg$ profit from low-value patent.
- Acceleration costly;
  gain in profits from acceleration only for high-value patents.
- Opposition costly for both parties;
  only opposition of high-value patents worthwhile for rival.

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$\Downarrow$

- If gains from acceleration are low:
  Increase in acceleration frequency (of high-value patents).
- If gains from acceleration are high:
  Decrease in opposition frequency (of high-value patents).

1. Introduction

2. Theory

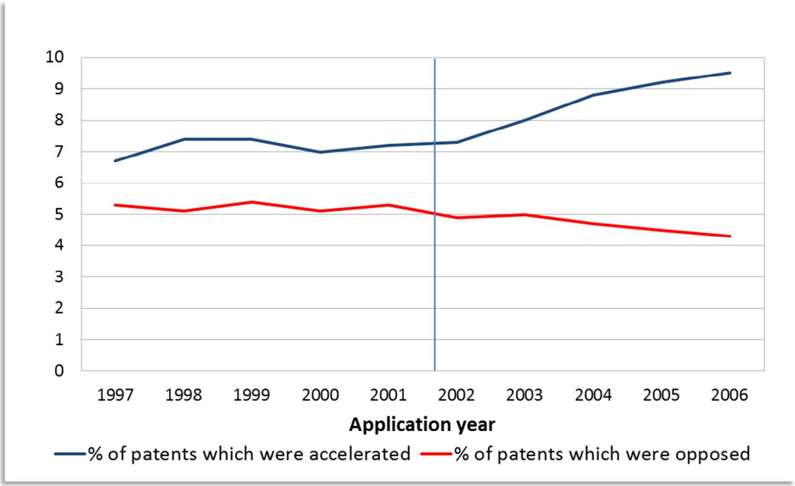
   Low gains from acceleration $\rightarrow$ Acceleration frequency $\uparrow$;
   High gains from acceleration $\rightarrow$ Opposition frequency $\downarrow$.

3. Empirics

   Data on acceleration and opposition frequencies;
   $\rightarrow$ Test whether hypotheses about behavioural changes are met.

4. Conclusion

Acceleration and opposition frequencies change after concealment of acceleration signal.



(EPASYS data. Acceleration information after 2001 not available to public.)

Difference-in-Difference estimations: Changes are *caused* by the EPO's 2001 policy change.

	Treatment Coefficients				
	Electrical Engineering	Instruments	Chemistry	Mechanical Engineering	Other Fields
Acceleration frequency	0.031***	0.002	0.003	0.019***	0.019
Opposition frequency	-0.003	-0.018**	0.007	0.004	0.011

Treatment group:	High-value patents. (Top quartile of distribution.)
Non-treatment group:	Low-value patents. (Bottom quartile of distribution.)

Value proxy: Count of country-years a patent is active in after grant.

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Matured technologies;
→ Low gains from acceleration.

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Young technologies;

→ High gains from acceleration.

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Results less robust:

→ Electr. Eng.: Also decrease in oppositions observable.

→ Chemistry: Also increase in accelerations observable.

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2. Theory

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   Data on acceleration and opposition frequencies;
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Patterns of behavioral changes in our data correspond to our theoretical predictions for the case of a (partially) intransparent patent system.

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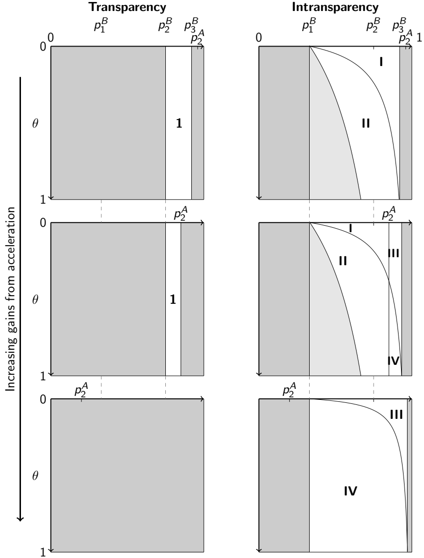
In important technological areas the European patent system seems to be intransparent in the sense that it does not meet its function to inform third parties about what technologies are protected by the respective patents.

Thank you!

Q&A

Backup



Outcomes:

1:
$(\neg a \neg o, \neg a \neg o)$
$(\ a\ \ o, \neg a \neg o)$

I:
$(\neg a \neg o, \neg a \neg o)$
$(\ a \neg o, \neg a \neg o)$

II:
$(\neg a \neg o, \neg a \neg o)$
$(\ a\ \ o, \neg a\ \ o)$

III:
$(\ a\ \ o, \neg a \neg o)$
$(\ a \neg o, \neg a \neg o)$

IV:
$(\ a\ \ o, \neg a \neg o)$
$(\ a\ \ o, \neg a\ \ o)$

Legend:

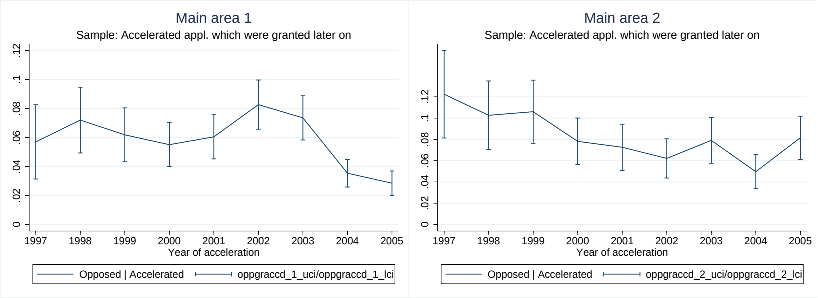
Action firm A ↓ Action firm B ↙

$(\underbrace{\ a\ \ o,}_{v=h} \underbrace{\neg a \neg o}_{v=l})$

Backup

		Pre	Post	Difference	p-Value	Change	Nbr. of Obs.
All	Acc. freq.	0.058	0.074	0.016***	0.000	0.272***	305952
	Opp. freq.	0.055	0.052	-0.003***	0.000	-0.060***	305952
Electrical Eng.	Acc. freq.	0.065	0.089	0.024***	0.000	0.364***	68980
	Opp. freq.	0.026	0.020	-0.007***	0.000	-0.252***	68980
Instruments	Acc. freq.	0.062	0.080	0.018***	0.000	0.284***	45768
	Opp. freq.	0.046	0.042	-0.004**	0.020	-0.097**	45768
Chemistry	Acc. freq.	0.059	0.063	0.005***	0.006	0.078***	81855
	Opp. freq.	0.079	0.079	-0.000	0.887	-0.003	81855
Mechanical Eng.	Acc. freq.	0.043	0.062	0.018**	0.000	0.418***	88793
	Opp. freq.	0.059	0.057	-0.002	0.173	-0.036	88793
Other Fields	Acc. freq.	0.081	0.104	0.024***	0.000	0.297***	20556
	Opp. freq.	0.054	0.055	0.001	0.809	0.014	20556

Backup


Main area 1
Sample: Accelerated appl. which were granted later on
0
.02
.04
.06
.08
.1
.12
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year of acceleration
Opposed | Accelerated
oppgraccd_1_uci/oppgraccd_1_lci
Main area 2
Sample: Accelerated appl. which were granted later on
0
.02
.04
.06
.08
.1
.12
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year of acceleration
Opposed | Accelerated
oppgraccd_2_uci/oppgraccd_2_lci