

Fasten Your Seatbelts! Can The Patent Prosecution Highway Take Your Application Down The Fast Lane?

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Motives

Globalisation of IP

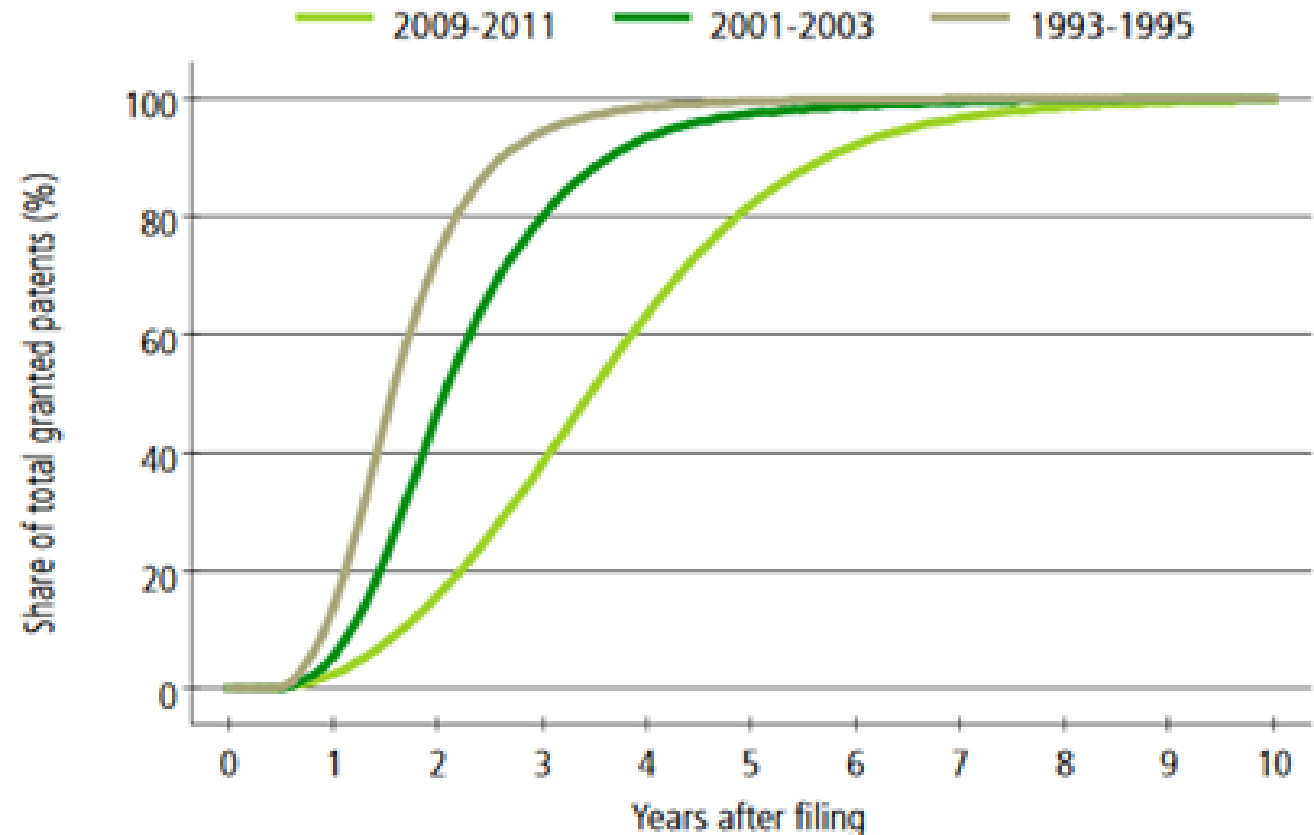
(growing size of patent family) & rising number of patent applications

= duplication

Increase in pendency

at USPTO (+others)
from 2.3 to 3.3 years
over 2000-2008.

United States of America



Sources: WIPO Statistics Database and EPO PATSTAT Database, October 2013

Motives

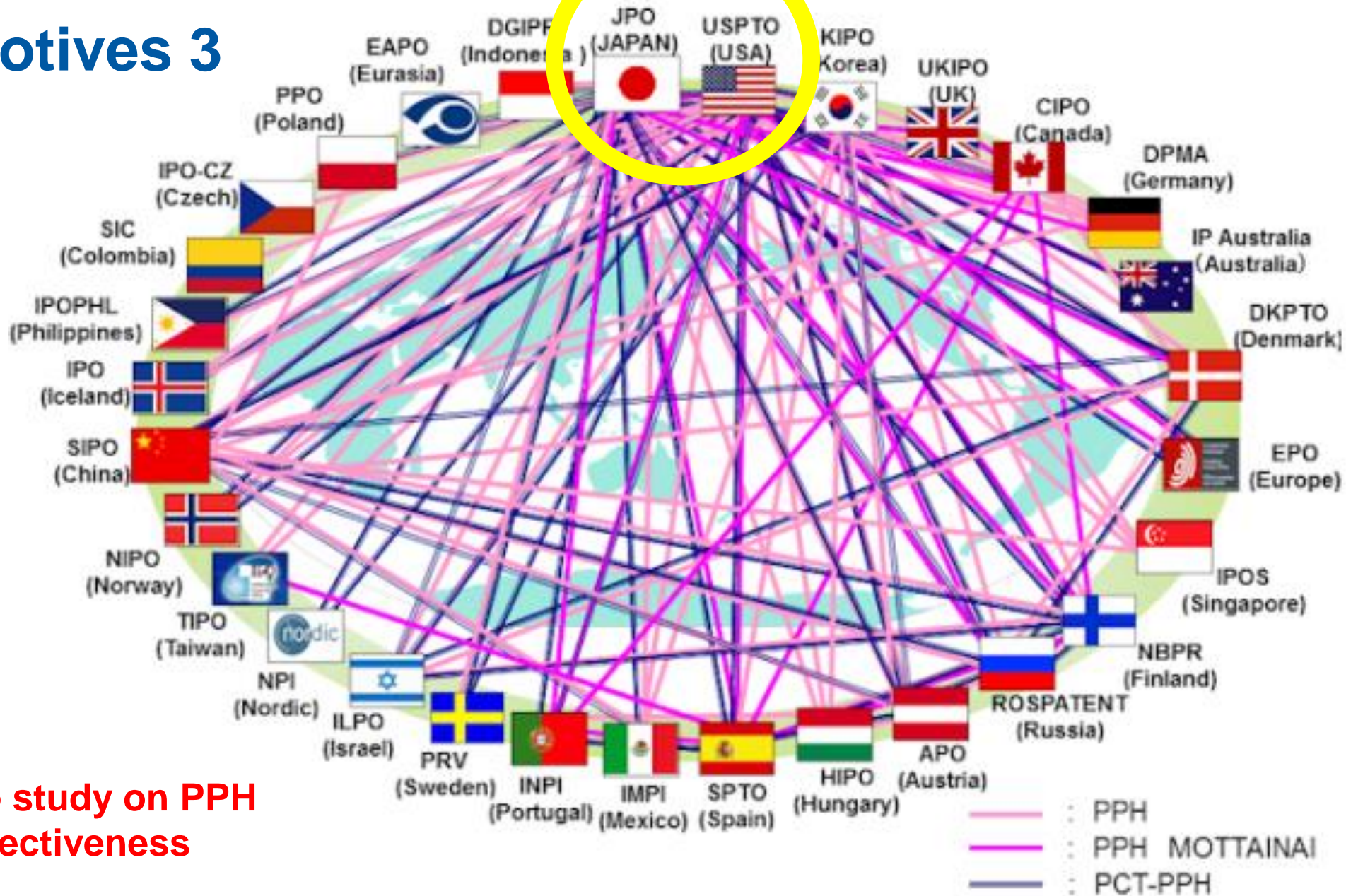
Consequences of longer pendency

↑	Increased cost of uncertainty (delay investment/commercialisation)
↓	Less incentives to innovate (esp. short life-cycle)
↓	Reduction of patent value
↓	Loss of dissemination of knowledge (search other protection)
↓	Impedes forming licensing agreements (Gans, Hsu & Stern, 2008)
↓	Reduces collaboration among same industry firms (Czarnitzki, Hussinger & Schneider, 2015)
↑	Higher cost of administering application

Motives 3

Patent Offices recognise importance of
pendency → PPH

Motives 3

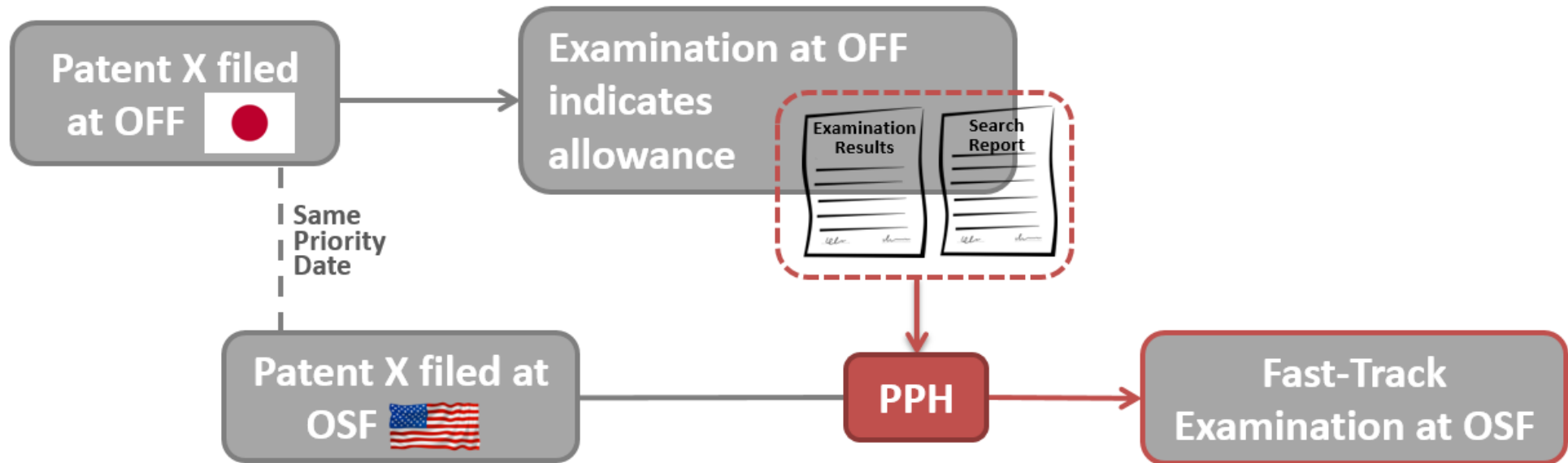


No study on PPH effectiveness

Research Question

Has the Patent
Prosecution Highway
(PPH) been effective at
reducing patent
pendency?

Policy Description



- Bilateral agreement between US & Japan 2006 to reduce pendency by sharing examination results and search report
- Effectiveness is non-trivial:
 - Applicants have to request PPH → selection bias
 - Success simply due to time-pressure at USPTO
 - Heterogeneity in office examination standards
 - Crowding-out of non-PPH applications
 - More admin: filing forms & requests, provide translations

Data

EPO
PatStat + **USPTO**
Public PAIR >> **99.9%**
merged

- PPH eligible applications (i.e. US filings with priority in Japan, where Japanese priority has been granted)
- Application years 2006-2012
- Pending apps included (right censoring), 16.2% of apps

Full Sample:

105,462 observations

all PPH eligible applications (**selection bias**)

6,561 (6.2%) entered the PPH

Reduced Sample:

7,064 observations

PPH applications

7,064 (100%) requested PPH

6,561 (92.9%) entered PPH

Descriptive Statistics Full Sample

Pendency in days

	Full Sample	PPH	Non-PPH
Overall	1,218	846	1,182
Pre-Examination	334	306	328
Examination	597	376	584
Post-Examination	310	214	293

PPH around 28% faster
Two sided t-test shows that
the difference is statistically
significant at the 1% level.

Descriptive Statistics

Full Sample: All PPH Eligible

CONTROL VARIABLES	PPH		Non-PPH	
	mean	sd	mean	sd
PCT	0.54	0.50	0.31	0.46
Small Entity	0.03	0.17	0.02	0.15
Number of Inventors	2.61	1.76	2.62	1.84
Claims	10.13	6.91	11.19	7.48
Citations	14.74	11.47	15.17	13.24
Abandoned	0.17	0.37	0.18	0.38
Issued	0.75	0.43	0.66	0.48
Computer technology	0.28	0.45	0.24	0.43
Audio-visual technology	0.25	0.43	0.18	0.38
Electrical machinery, apparatus, energy	0.11	0.32	0.12	0.32
Telecommunications	0.09	0.29	0.10	0.29
Transport	0.08	0.28	0.06	0.24
Digital communication	0.07	0.26	0.07	0.26
...				

Methodology

Tobit Regression:

$$\log PENDING_i = \beta_0 + \beta_1 PPH_i + \beta_2 PCT_i + \beta_3 PPH_i * PCT_i + X_i\gamma + \varepsilon_i$$

Variable	Description	Pre-Exam	Examination	Post-Exam
PPH	=1 if patent underwent PPH	0	-	0
PCT	=1 if patent originated from PCT	+	-	0
PPH*PCT	=1 if patent underwent PPH and originated from PCT	-	-	0
X	# claims, # citations, small entity, technological classes, year dummies			

Tobit Results

Full Sample: All PPH Eligible

PPH patents took
 around 35% less time
 to get processed -
 around 369 days

Effect largest during
 examination

PCTs take 18% longer
 in pre-examination
 stage

Dependent Variables (in logs):	(1) Total Pendency
PPH	-0.35*** (0.01)
PCT	-0.02*** (0.00)
PPH * PCT	-0.11*** (0.01)
Technological Dummies	YES
Year Dummies	YES
Constant	7.50*** (0.01)
Observations	105462
Pseudo R-squared	0.200

Standard errors in parentheses
 * p<0.05, ** p<0.01, *** p<0.001

Selection Bias

Tobit Results

Restricted Sample: PPH requested

PPH patents took around 24% less time to get processed - around 206 days

Pre- and Post-Examination Stages become near insignificant

PPH more effective than PCT

Findings become even stronger without censored observations and they are consistent with other models (OLS & Duration Analysis)

Dependent Variables (in logs):	TOBIT RESULTS			
	(1) Total Pendency	(2) Pre- Examinatio	(3) Exam- ination	(4) Post- Examination
PPH	-0.24*** (0.03)	0.04 (0.04)	-0.52*** (0.06)	0.22* (0.09)
PCT	-0.17*** (0.04)	-0.10 (0.07)	-0.40*** (0.11)	0.31* (0.16)
PPH * PCT	0.04 (0.04)	0.04 (0.07)	0.08 (0.11)	-0.12 (0.16)
Technological Dummies	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES
Constant	7.46*** (0.04)	5.65*** (0.07)	7.38*** (0.11)	4.36*** (0.15)
Observations	7064	7064	7064	7056
Pseudo R-squared	0.204	0.088	0.053	0.016

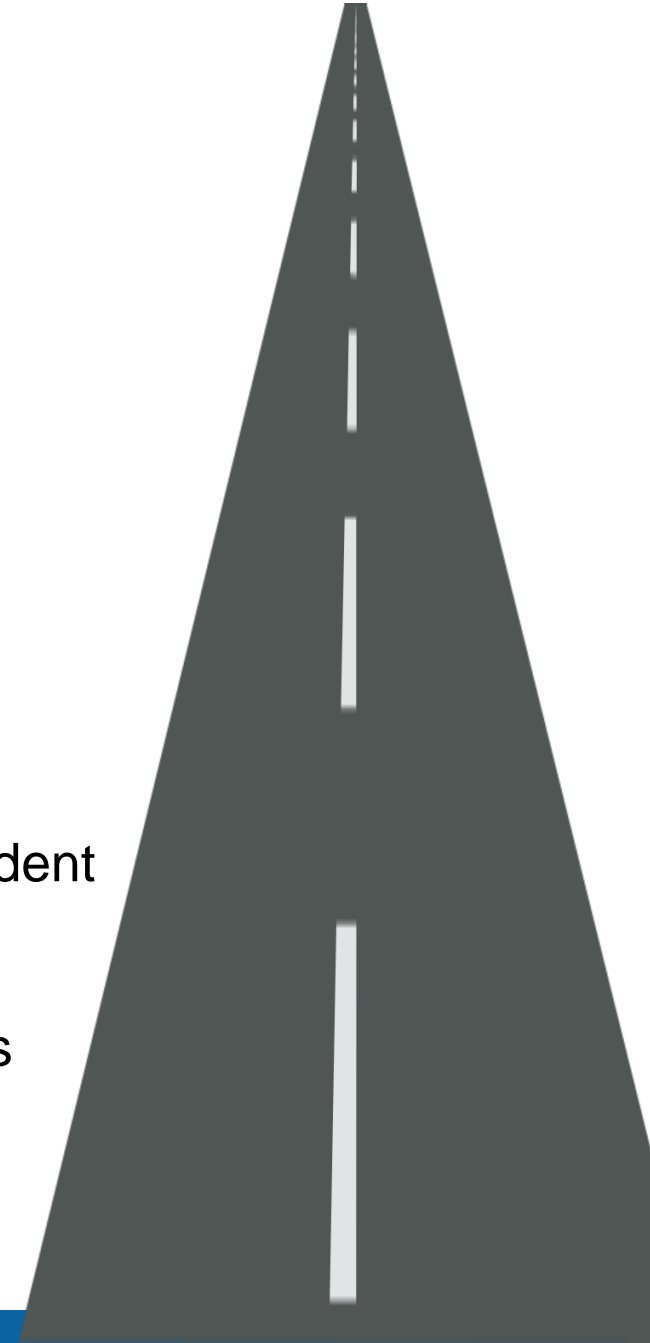
Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Conclusion

PPH can take your application down the fast lane!

- Can speed up your US patent application by 24% (around 206 days faster on average)
- PPH more effective than PCT
- Consider making PPH automatic rather than dependent on the applicants request due to slow uptake
- Que-jumping; crowding-out of non-PPH applications





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	Main Findings	Effects on „Pendency“
Gans, Hsu & Stern (2008) The Impact of Uncertain Intellectual Property Rights on the Market of Ideas: Evidence from Patent Grant Delays	The hazard rate for achieving a cooperative licensing agreement significantly increases after patent allowance.	Patent claims: + Patent classes: +*** Patent citations made: + Patent backward citation lag: +** Patent originality: + Science references: + Nonscience references: +
Czarnitzki, Hussinger & Schneider (2015) R&D Collaboration with Uncertain Intellectual Property Rights	Uncertainty in IPR (measured by longer patent pendencies) → less collaboration among firms in the same industry. Collaborations with universities, suppliers, or customers are not affected by uncertain IPR.	citation stock/patent stock (as a quality indicator for a firms' patent stock): +***
Johnson and Popp (2003) Forced out of the closet: Impact of American Inventors protection Act on timing of patent disclosure	patents that take longer to go through the application process are more significant/important inventions. The analysis also suggests that earlier disclosure should provide benefits to future inventors due to faster knowledge diffusion. Consider granted patents only.	
Johnson and Popp (2004) The time in purgatory: determinants of the grant lag for U.S. patent applications	Applications in newer, more complex technologies take significantly longer than other patent applications.	Number of citations: + Number of claims: + Number of Drawings: + Number of Sheets: -
Harhoff and Wagner (2009) The Duration of Patent Examination at the European Patent Office	Potentially valuable patents will be granted significantly earlier than less valuable ones, and a withdrawal of such patents will be delayed considerably.	Request for accelerated examination: -*** PCT application: +*** Citations received within 3 years: +*** Share of type X citations: +

Tobit Results

Full Sample

PPH patents took around 35% less time to get processed - around 369 days

Effect largest during examination

PCTs take 18% longer in pre-examination stage

Selection Bias

Dependent Variables (in logs):	TOBIT RESULTS			
	(1) Total Pendency	(2) Pre- Examination	(3) Exam- ination	(4) Post- Examination
PPH	-0.35*** (0.01)	0.01 (0.01)	-0.59*** (0.02)	-0.31*** (0.04)
PCT	-0.02*** (0.00)	0.18*** (0.01)	-0.08*** (0.01)	-0.19*** (0.02)
PPH * PCT	-0.11*** (0.01)	-0.24*** (0.02)	-0.21*** (0.02)	0.78*** (0.05)
Small Entity	-0.15*** (0.01)	0.01 (0.02)	-0.10*** (0.02)	-0.61*** (0.04)
Number of Inventors	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.02*** (0.00)
Claims	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.00 (0.00)
Citations	0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	0.02*** (0.00)
Issued	-0.34*** (0.00)	-0.08*** (0.01)	-0.52*** (0.01)	0.20*** (0.01)
Technological Dummies	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES
Constant	7.50*** (0.01)	5.66*** (0.01)	6.93*** (0.01)	5.12*** (0.03)
Observations	105462	105462	105446	104989
Pseudo R-squared	0.200	0.078	0.061	0.033

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Censored Observations

PPH

Robustness Checks

- Tobit regression results without censored observations
- Duration analysis
- Propensity Score Matching
- Regression DD

Tobit Results

2nd Sample

(1) PPH patents took around 25% less time to get processed - around 212 days

Findings consistent with other models (OLS & Duration Analysis)

Dependent Variable in logs:	(1) Total Pendency	(2) Application- Docket	(3) Docket- Decision	(4) Decision- Termination
PPH	-0.25*** (0.03)	0.03 (0.04)	-0.52*** (0.07)	0.02 (0.04)
Originates from PCT	-0.08 (0.04)	0.00 (0.07)	-0.33** (0.12)	0.10 (0.07)
Is Continuation	-0.25*** (0.02)	-0.37*** (0.03)	-0.26*** (0.04)	-0.01 (0.03)
Number of Granted Priorities	-0.01 (0.02)	-0.08** (0.03)	0.02 (0.04)	0.01 (0.03)
Small Entity	-0.25*** (0.03)	-0.19*** (0.05)	-0.28*** (0.08)	-0.10* (0.05)
Number of Inventors	-0.00 (0.00)	-0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Claims	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Citations	0.00*** (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)
Technological Class Dummies	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES
Constant	7.25***	5.55*** (0.01)	6.54*** (0.01)	5.72*** (0.01)
		113647	100563	86837
R-squared	0.262	0.093	0.086	0.054

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001