

Empirical Examination of Telecommunication Patent Litigation

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Outline

- Previous litigation studies
- Research questions
- Data description
- Empirics

Recent empirical studies on patent litigation

Paper	Sample	Key findings
Allison et al (1998)	299 patents litigated in 239 cases between 1989 and 1996 (multiple sectors)	<ul style="list-style-type: none">• 54% of patents are held valid.• Arguments based on prior art fare better in invalidating patents.• Juries are more likely hold patent valid.
Allison et al (2009)	106 most litigated patents between 2000 & 2007	Frequently litigated patents make more claims and are associated with more forward citations received.
Love (2013)	Random sample of 1180 patents issued between March 1993 and May 1994	NPEs assert and lose at a relatively high rate. NPEs assert patents which are the end (final 3 years) of their term

Research questions

1. What features of the patent affect whether and when it is asserted in courts?

1. What factors influence the resolution path of cases?
 1. Duration
 2. Outcomes

Data

- Cases

- Patent infringement suits filed in US federal district courts (N=4522)
- Time frame: filed between 2001-2013 and terminated before 2017
- Cases which include at least one patent which is related to telecommunications sector

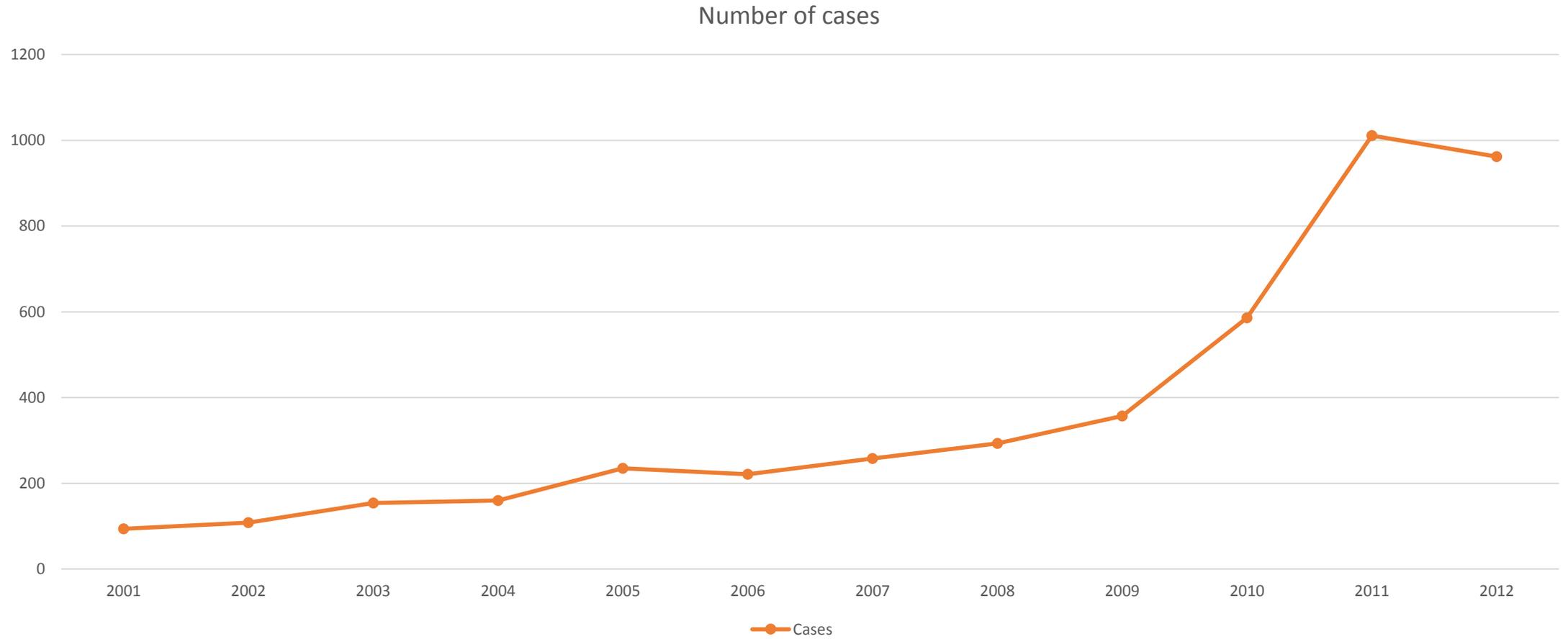
- Patents related to telecom

- Use Cooperative patent classification scheme
- H01P,H01Q,H03B,H03C,H03D,H03H,H03K,H03L,H03M,H04B,H04H,H04L, H04K,H04L,H04M,H04N
- 3202 patents

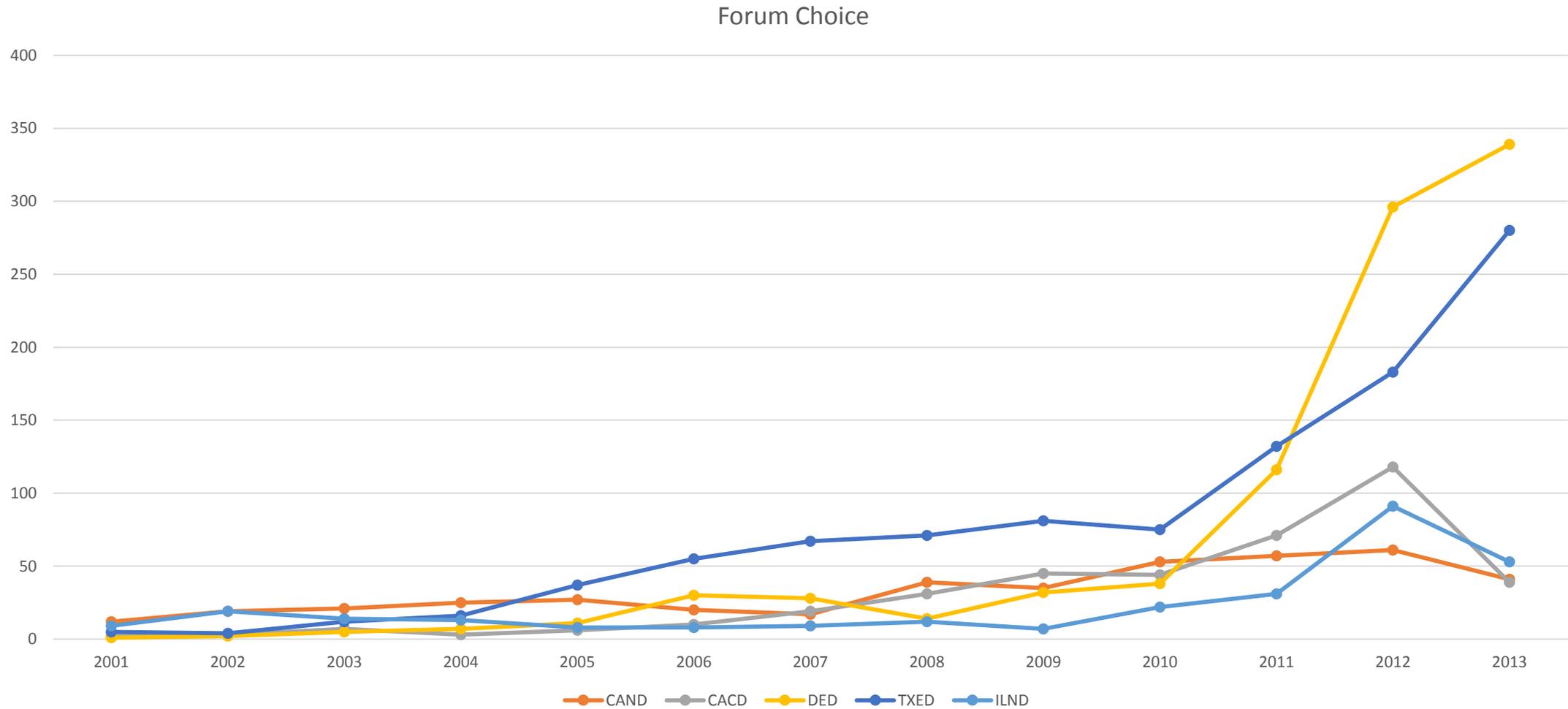
- Patents

- PATSTAT 2015
- Patents filed with the USPTO

Filings increase dramatically after 2009



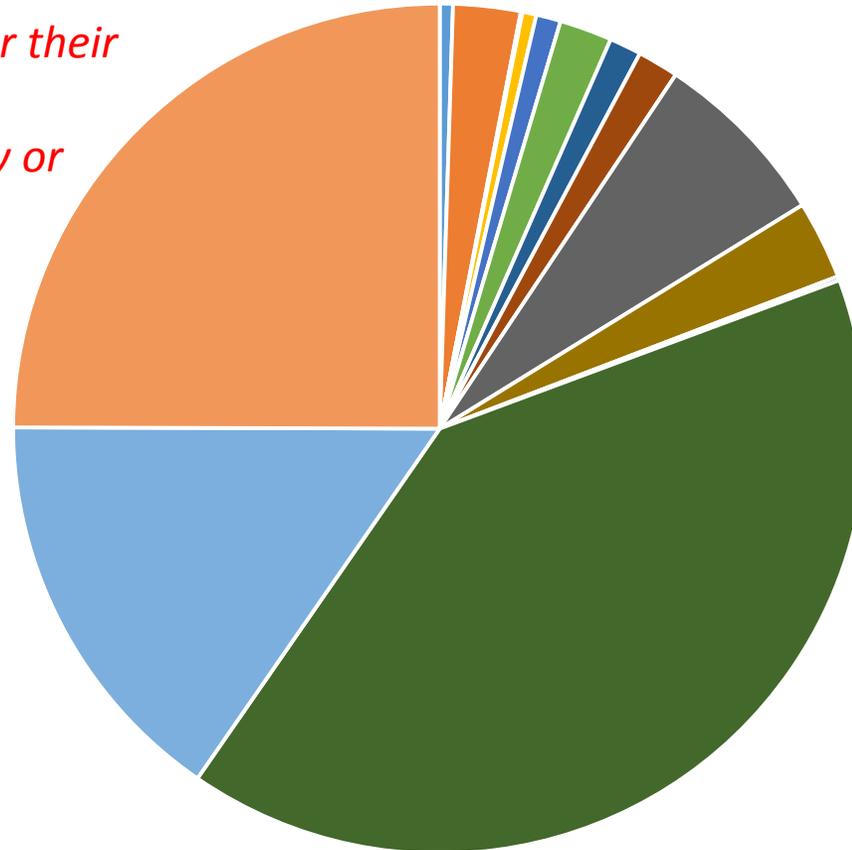
Some courts figure more prominently than others



Key technology areas with high litigation rates are...

Patents litigated by technology group

transmission of pictures or their transient or permanent reproduction either locally or remotely

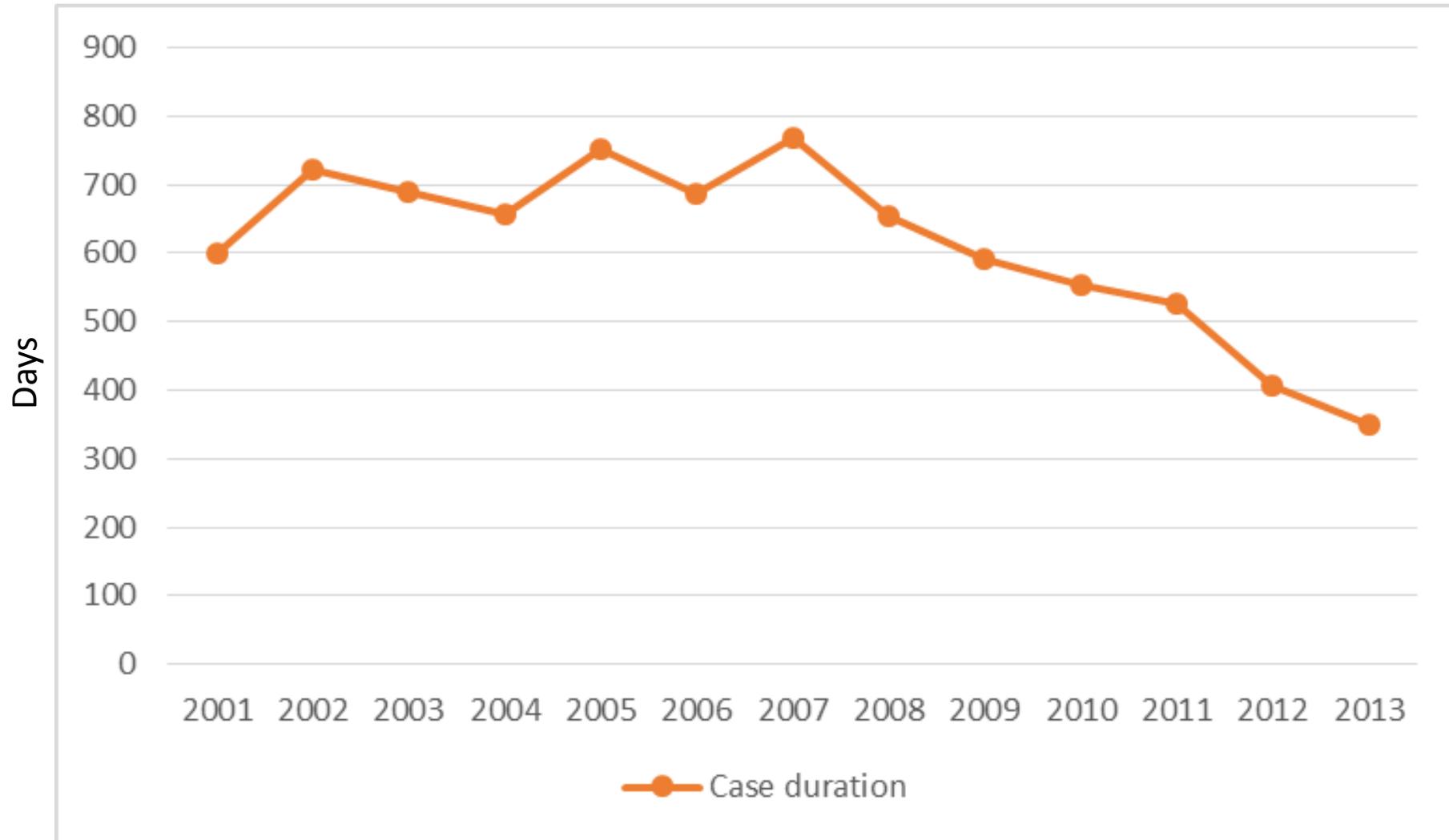


- Subscriber equipment (fixed and mobile phones), e.g. Constructional features of telephone sets, ser interfaces for telephones.*
- Telecommunication systems including subscriber equipment and exchanges*

Transmission of signals having been supplied in digital form, e.g. data transmission, telegraphic communication, or methods or arrangements for monitoring.

H01P H01Q H03B H03D H03H H03K H03L H03M H04B H04H H04K H04L H04M H04N

Average duration of case has fallen..(?)



Empirics: Litigation hazard

Analysis I

- What factors determine the “risk” of litigation during the life of a patent?
- Sample:
 - 3202 litigated patents
 - Matched set of 185283 patents
 - Matching criteria: technology class and time of patent application filing
- Empirical model:
 - Duration model with log-normal specification
 - Hazard event: First time a patent is litigated after grant

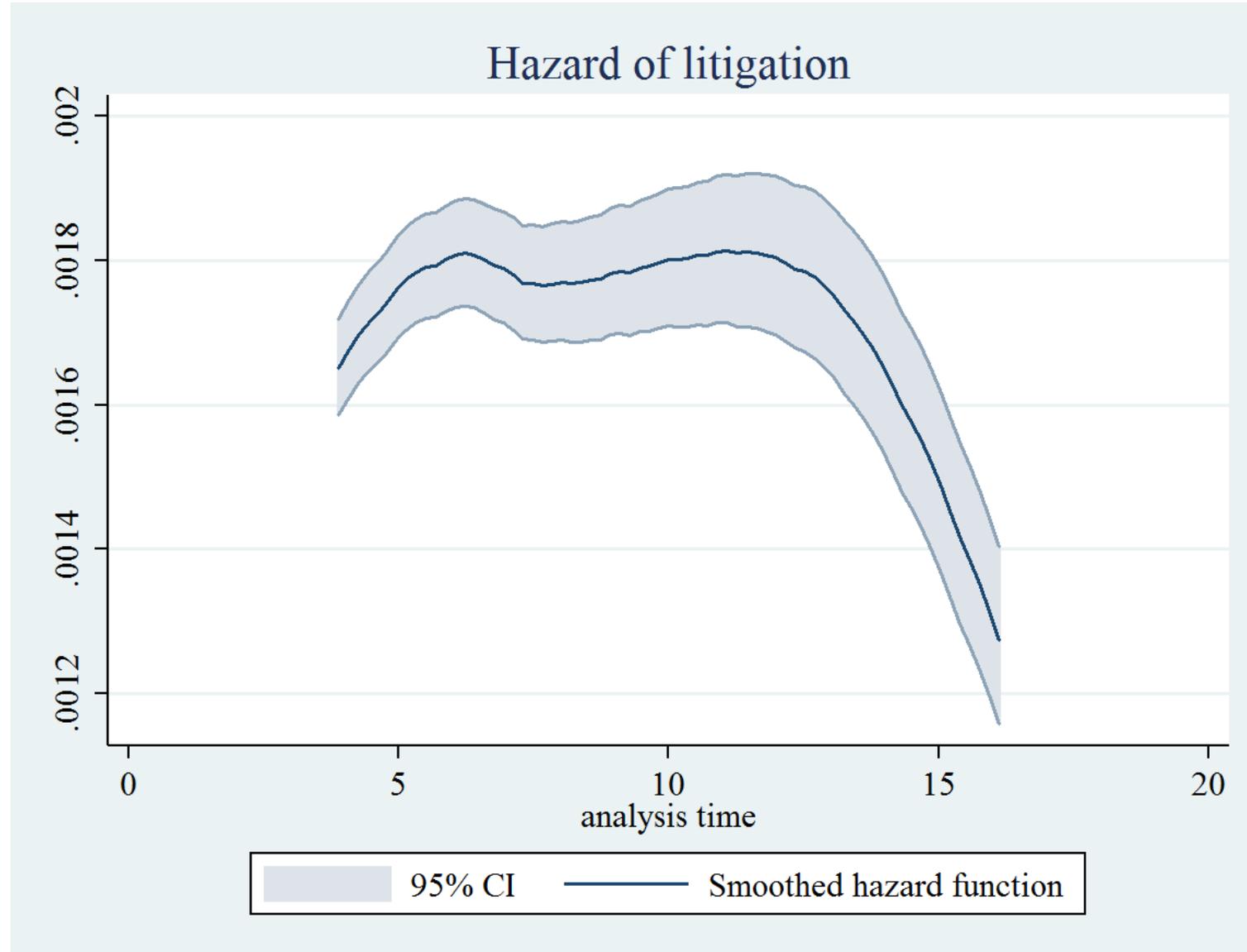
Variables linked to value also impact litigation hazard

Variable	Time to litigation
Number of (inventive) technology groups	-0.0791*** (0.00609)
Number of claims	-0.0152*** (0.00118)
Number of backward patent citations	-0.00891*** (0.00158)
Number of backward non-patent citations	-0.00312** (0.00152)
Number of backward citing technology groups	-0.0258*** (0.00510)
Number of forward citations received	-0.00976*** (0.00150)
Number of forward citing technology groups	-0.0205*** (0.00307)
International application	0.249*** (0.0919)
Number of applicants	0.0678*** (0.0225)
Number of inventors	0.0112 (0.0143)

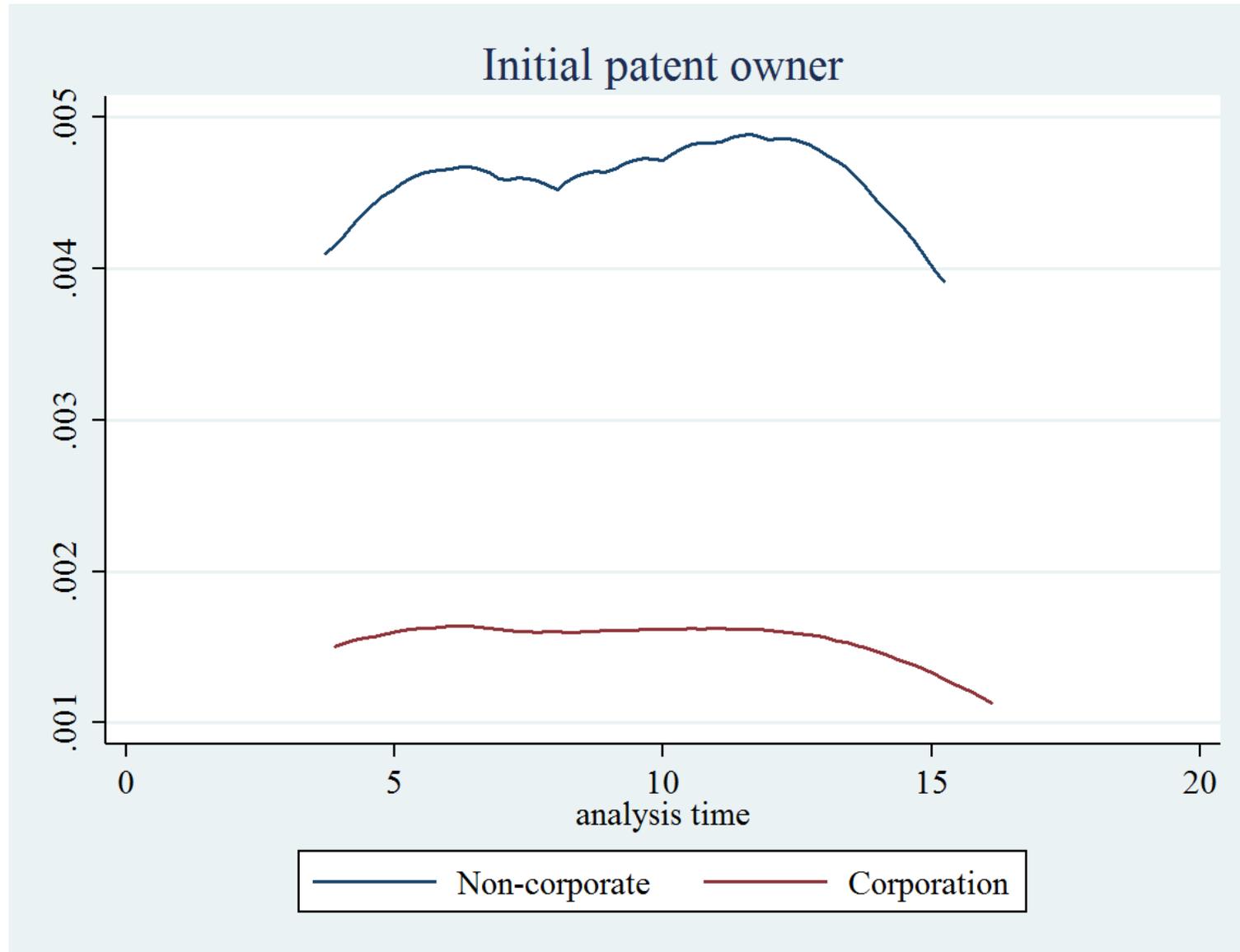
Importantly, patent life history matters

Variable	Time to litigation
Prosecuted time before issue	0.000158*** (4.03e-05)
Initially assigned to corporation	0.755*** (0.0743)
Number of patent opposition events	-1.385*** (0.247)
Number of patent claim limitation events	0.637** (0.256)
Number of times reinstatement events	-0.859*** (0.184)
Number of ownership change events	-0.0831*** (0.0127)

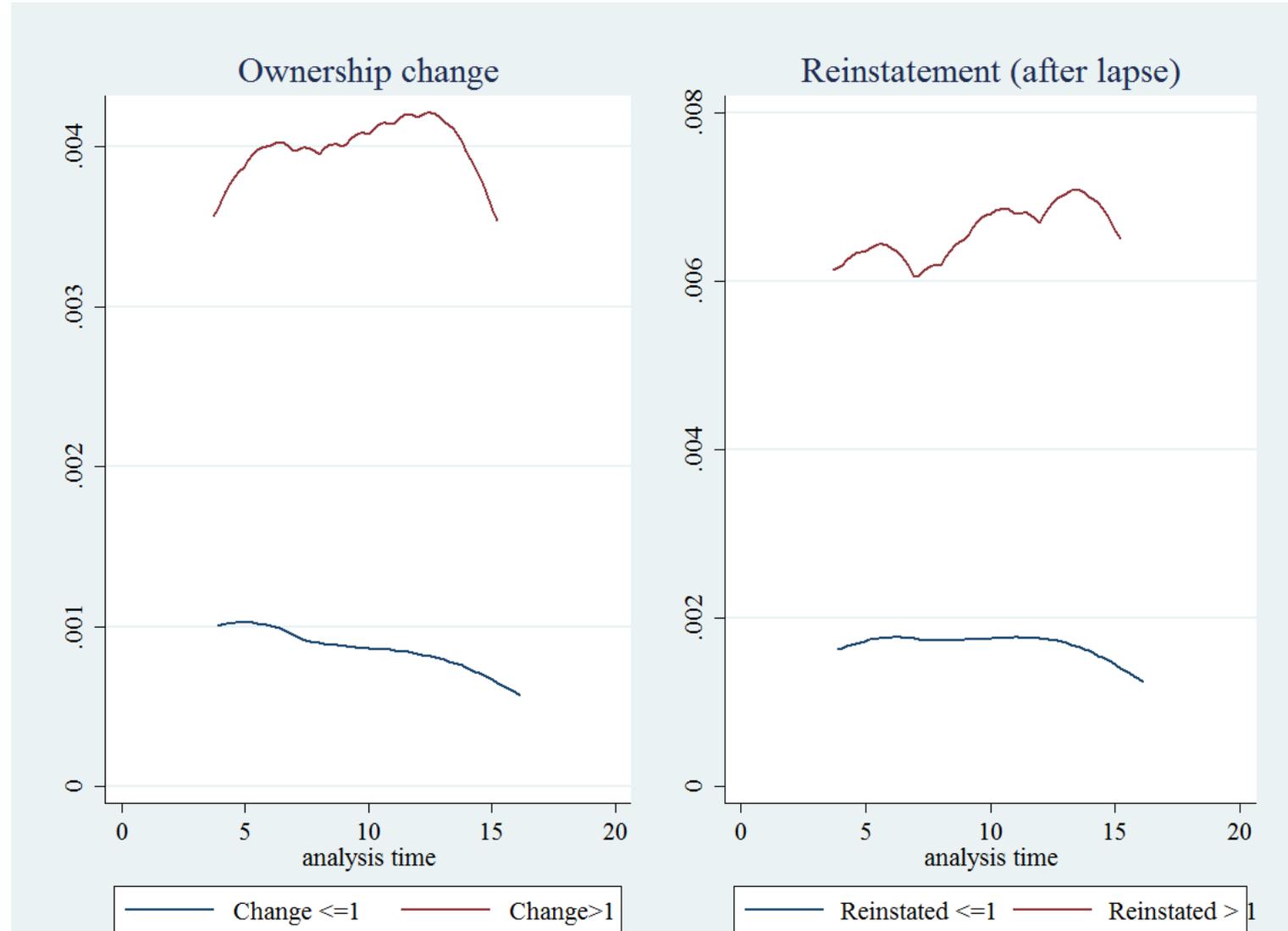
Litigation hazard is highest between 5th and 10th year post issue



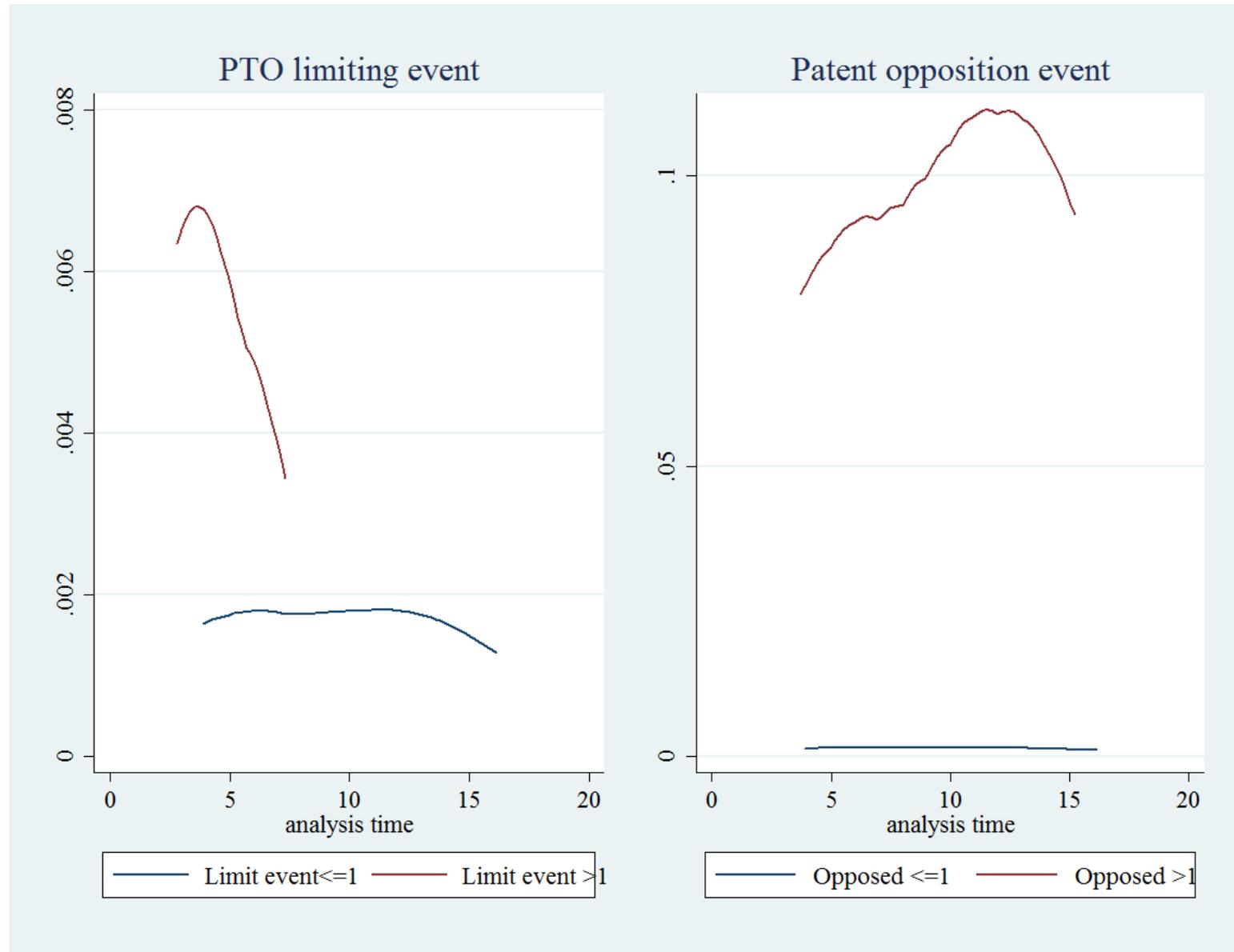
Patents owned by non-corporate entities face greater litigation hazard



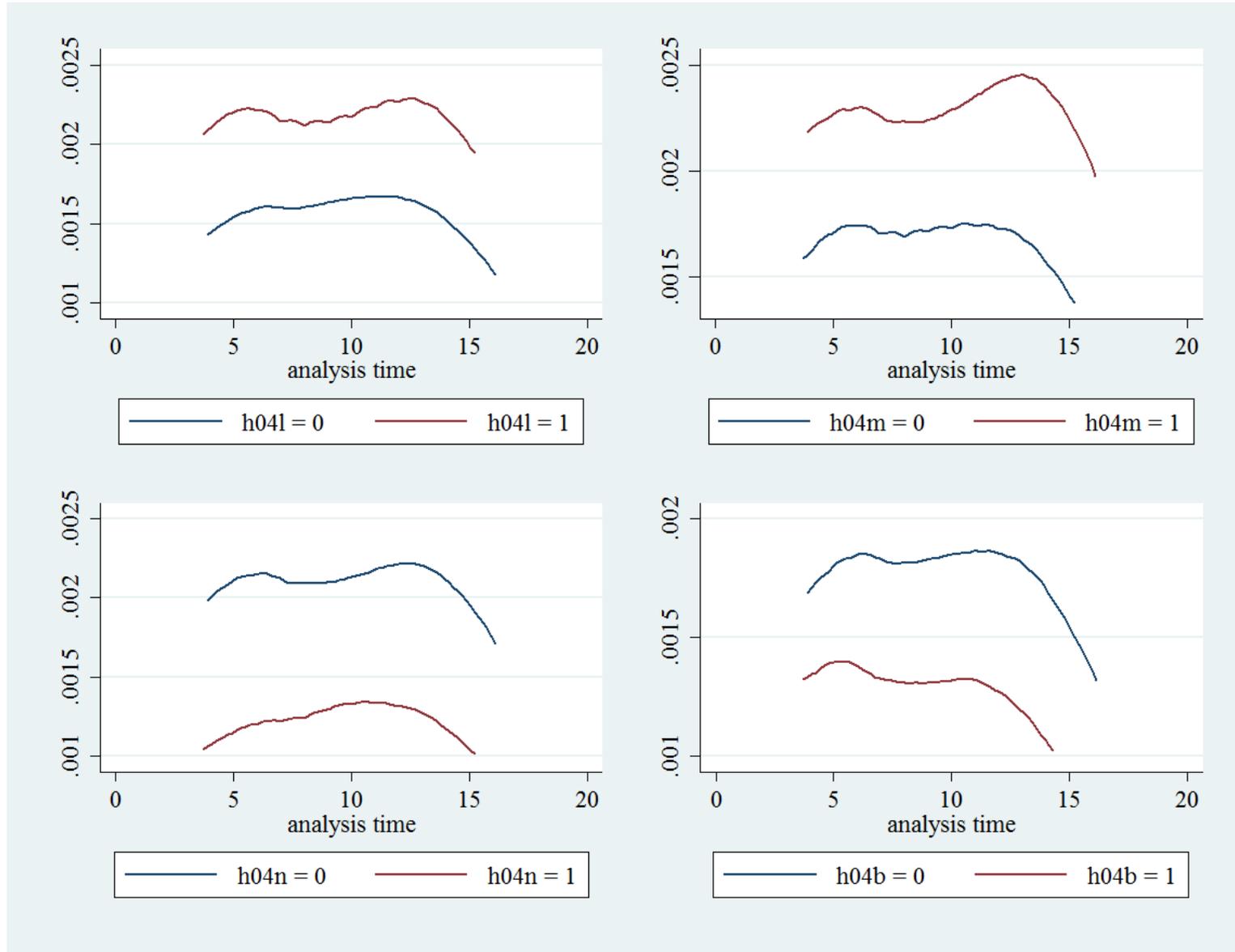
Ownership change and reinstatement increase litigation risk



PTO events are important precursors to litigation



Litigation hazard varies across technology groups



Litigation outcomes

Analysis II

- What factors determine the resolution path of litigated patents?
- Sample:
 - 10200 patent-case pairs
- Empirical model:
 - Duration of the litigation (Number of days from filing to termination)
 - Outcomes

Duration of litigation

Variables	Case duration
Number of parties	0.0120*** (0.00367)
Number of plaintiffs	0.0255 (0.0233)
Jury demand by plaintiff	0.383*** (0.0810)
Jury demand by defendant	0.571*** (0.0455)
Filed for Declaratory judgment	-0.188 (0.123)
Number of patents involved	0.00928 (0.00680)
ED of TX	-0.0152 (0.0508)
CD of CA	-0.194*** (0.0482)
ND of CA	0.0387 (0.0525)
D of DE	0.501*** (0.0577)
ND of IL	0.144 (0.0976)

Variables	Case duration
Number of inventors	0.0119 (0.00855)
Number of CPC classes	0.00108 (0.00307)
Number of claims	0.00144*** (0.000501)
Number of patent back citations	-0.00234 (0.00147)
Number of non-patent back citations	-0.000268 (0.00154)
Number of back technology groups	0.00662** (0.00333)
Number of forward citations (3 years)	-0.000510 (0.0004)
Days prosecuted before issue	4.17e-05 (2.62e-05)

Litigation outcomes – Settled versus Litigated to verdict

Variables	Litigated to verdict
Number of parties	0.0165*** (0.00436)
Number of plaintiffs	0.0179 (0.0332)
Jury demand by plaintiff	0.140 (0.0862)
Jury demand by defendant	0.780*** (0.0797)
Filed for Declaratory judgment	-0.0953 (0.269)
Number of patents involved	0.00780 (0.00984)
ED of TX	-0.0522 (0.107)
CD of CA	0.0413 (0.119)
ND of CA	0.274** (0.114)
D of DE	0.0176 (0.141)
ND of IL	-0.649*** (0.135)

Variables	Litigated to verdict
Number of applicants	0.0344* (0.0184)
Number of inventors	0.0209 (0.0184)
Number of CPC classes	-0.00636 (0.00678)
Number of claims	-0.000310 (0.000929)
Number of patent back citations	0.00133 (0.00172)
Number of non-patent back citations	0.00101 (0.00154)
Number of back technology groups	-0.00647 (0.00868)
Number of forward citations (3 years)	0.00154*** (0.000456)
Days prosecuted before issue	6.47e-05* (3.44e-05)

Litigation outcomes: Invalidation and Infringement

VARIABLES	Invalid	Infringed
Number of parties	0.00298 (0.00405)	0.00356 (0.00316)
Number of plaintiffs	-0.0103 (0.0120)	0.00100 (0.0130)
Jury demand by plaintiff	0.223** (0.112)	-0.131 (0.134)
Jury demand by defendant	0.163* (0.0925)	0.135 (0.164)
Filed for Declaratory judgment	-0.114 (0.236)	-0.552 (0.384)
Number of patents involved	-0.0420*** (0.0128)	-0.0272** (0.0110)
ED of TX	-0.106 (0.0822)	0.276* (0.146)
CD of CA	-0.286*** (0.0903)	-0.402*** (0.133)
ND of CA	0.132 (0.0821)	0.0652 (0.142)
D of DE	0.00773 (0.102)	-0.348 (0.220)
ND of IL	-0.522*** (0.121)	-1.779*** (0.157)

Variables	Invalid	Infringed
Number of applicants	0.0175 (0.0373)	-0.00257 (0.0502)
Number of inventors	-0.00417 (0.0272)	-0.0190 (0.0315)
Number of CPC classes	0.0104 (0.00887)	0.00309 (0.00910)
Number of claims	-0.000276 (0.000882)	-0.000602 (0.00150)
Number of patent back citations	-0.00652** (0.00313)	0.00218 (0.00358)
Number of non-patent back citations	-0.00572** (0.00279)	0.00471** (0.00216)
Number of back technology groups	0.0142** (0.00657)	-0.0241 (0.0153)
Number of forward citations (3 years)	-0.00302*** (0.000697)	0.00237*** (0.000785)
Days prosecuted before issue	-1.25e-05 (7.55e-05)	-7.68e-05 (7.52e-05)

Settlement effects

With settlement effect accounted for

VARIABLES	Invalid	Infringed
Number of parties	0.00298 (0.00405)	0.00356 (0.00316)
Number of plaintiffs	-0.0103 (0.0120)	0.00100 (0.0130)
Jury demand by plaintiff	0.223** (0.112)	-0.131 (0.134)
Jury demand by defendant	0.163* (0.0925)	0.135 (0.164)
Filed for Declaratory judgment	-0.114 (0.236)	-0.552 (0.384)
Number of patents involved	-0.0420*** (0.0128)	-0.0272** (0.0110)
ED of TX	-0.106 (0.0822)	0.276* (0.146)
CD of CA	-0.286*** (0.0903)	-0.402*** (0.133)
ND of CA	0.132 (0.0821)	0.0652 (0.142)
D of DE	0.00773 (0.102)	-0.348 (0.220)
ND of IL	-0.522*** (0.121)	-1.779*** (0.157)

With settlement effect accounted for

VARIABLES	Invalid	Infringed
Number of parties	0.00446* (0.00247)	0.000422 (0.00482)
Number of plaintiffs	-0.00502 (0.0210)	0.0196** (0.00920)
Jury demand by plaintiff	0.249** (0.102)	-0.263*** (0.0906)
Jury demand by defendant	0.247*** (0.0676)	0.204* (0.104)
Filed for Declaratory judgment	-0.137 (0.184)	-0.487 (0.344)
Number of patents involved	-0.0437*** (0.0141)	-0.0413*** (0.00983)
ED of TX	-0.189** (0.0877)	0.656*** (0.0883)
CD of CA	-0.287*** (0.100)	-0.141 (0.0914)
ND of CA	0.0408 (0.0906)	0.212** (0.0928)
D of DE	-0.374*** (0.0959)	-0.319*** (0.109)
ND of IL	-0.739*** (0.115)	-1.316*** (0.110)

Preliminary Conclusions

- Patent characteristics associated with value correspond strongly with litigation hazard
- Carefully prosecuted patents at the PTO are less likely to cause a litigation hazard for others
- Post-issue market for patents is a key consideration
- Important to consider selection effects when evaluating the effects of litigation fora