

STRATEGIC DECISION MAKING IN DUAL PTAB AND DISTRICT COURT PROCEEDINGS

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ABSTRACT

The post-grant review proceedings set up at the U.S. Patent and Trademark Office's Patent and Trial Appeal Board (PTAB) by the America Invents Act of 2011 have transformed the relationship between Article III patent litigation and the administrative state. Not surprisingly, such dramatic change has itself yielded additional litigation possibilities: *Cuozzo Speed Technologies v. Lee*, a case addressing divergence between the manner in which the PTAB and Article III courts construe patent claims, will soon be decided by the U.S. Supreme Court.

Of the three major new PTAB proceedings, two have proven to be popular as well as controversial: *inter partes* review and covered business method review. Yet scholarly analysis of litigant behavior in these proceedings has been limited thus far to descriptive data summaries or specific policy perspectives on these types of post-grant challenges, such as their impact on the well-rehearsed patent troll debate. In this article, we present what is to our knowledge the first comprehensive empirical and analytical study of how litigants use these *inter partes* review and covered business method review proceedings relative to Article III litigation.

A major normative argument for administrative ex post review is that it should be an efficient, accessible, and accurate substitute for Article III litigation over patent validity. We assess the substitution hypothesis, using individual patents as our general unit of analysis as well as investigating patent-petitioner pairs and similar details in greater depth. Our data indicate that the "standard model" of explicit substitution—wherein a district

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court defendant subsequently brings an administrative challenge to patent validity—occurs for the majority (70%) of petitioners who bring *inter partes* review challenges. An important implication of this effect is that the PTAB should use a claim construction standard that mirrors that of the district court. With a uniform standard, PTAB claim constructions could be used by district courts in any subsequent proceedings, and the benefits of substituting administrative process for judicial process would thereby be most fully realized.

Notably, however, standard substitution is not the only use of the PTAB: particularly in the area of *inter partes* reviews, we also see a surprising percentage of cases (about 30%) where the petitioner is not the target of a prior suit on the same patent. The frequency of these nonstandard petitioners, as well as their tendency to join the same petitions as an entity that has been sued, varies by technology. Our data on nonstandard petitioners provide some insight into the extent to which patent challengers are engaging in collective action to contest the validity of patents. Depending on the details of how nonstandard petitioning and collective action are being deployed, this activity could provide a social benefit or constitute a form of harassment.

TABLE OF CONTENTS

I.	INTRODUCTION	47
II.	EX POST REVIEW OF PATENT VALIDITY	51
	A. MOTIVATIONS FOR (AND CONCERNS REGARDING) ADMINISTRATIVE REVIEW	51
	B. OPPOSITION MECHANISMS PRIOR TO THE AIA	55
	1. <i>Ex Parte</i> Reexamination	56
	2. <i>Inter partes</i> Reexamination	57
	C. ADMINISTRATIVE OPPOSITION UNDER THE AIA	58
	1. <i>Inter Partes</i> Review	59
	2. <i>Covered Business Method</i> Review	60
	3. <i>Intersection with the Courts</i>	62
III.	AGENCY OR COURT: STRATEGIC CHOICES	64
	A. LITIGANT BEHAVIOR	65
	1. <i>IPR and CBM Petitions: Descriptive Statistics</i>	66
	2. <i>Article III Litigation</i>	69
	B. AGENCY DECISIONS	78
	C. COURT DECISIONS	80
IV.	DISCUSSION	81
V.	CONCLUSION	83
	APPENDIX A: DATA	85
	A. PTAB DATA	85
	B. DISTRICT COURT DATA	87
	APPENDIX B: FIGURES	88
	APPENDIX C: TABLES	114

I. INTRODUCTION

This is the first paper in a multipart project studying the new post-grant review proceedings set up at the U.S. Patent and Trademark Office (USPTO) Patent and Trial Appeal Board (PTAB) by the America Invents Act of 2011 (AIA).¹ These new administrative trial-type proceedings represent a significant change in the relationship between the system of patent litigation in Article III courts and the administrative state. One case involving this relationship, *Cuozzo Speed Technologies, LLC v. Lee*,² is already before the U.S. Supreme Court and others are in the pipeline.

Although PTAB proceedings have proved to be quite popular, scholarly analysis of litigant behavior has thus far been limited to descriptive data summaries or specific policy perspectives on post-grant challenges, such as their impact on the well-rehearsed patent troll debate.³ This Article is the first comprehensive empirical and analytical study of how litigants use these administrative procedures relative to Article III litigation. In addition to assessing the behavior of litigants, we analyze the behavior of both the PTAB and the courts.

Under the AIA, defendants, potential defendants, and third parties now confront the question of whether and when to challenge the validity of patents by filing one or more petitions for *inter partes* review (IPR) or, if applicable, petitions for covered business method (CBM) review. IPR petitions are filed against individual patents (and claims thereof), but multiple petitions against a patent may be filed by the same or different parties, and a single petition may be filed or joined by multiple parties. Similarly, CBM petitions are filed against individual patents and claims that are directed to eligible business method-related inventions.⁴

Meanwhile, patent owners still face the question of which patents to assert, when and where to assert them, and against whom to assert them. The AIA's anti-joinder provision for Article III litigation arguably increases complexity by substantially reducing owners' ability to sue multiple defendants in a single case.⁵ Thus, patent owners wishing to sue multiple

1. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284.

2. No. 15-446.

3. *E.g.*, Brian J. Love & Shawn Ambwani, *Inter Partes Review: An Early Look at the Numbers*, 81 U. CHI. L. REV. DIALOGUE 93 (2014).

4. In ongoing work, discussed in summary below, we are looking in detail at patents that are the subject of more than one petition. We are dividing these patents into two categories: those that are challenged by the same petitioner multiple times, and those that are challenged by different petitioners. We are further subdividing the two categories by claims and grounds.

5. 35 U.S.C. § 299. *See generally* David O. Taylor, *Patent Misjoinder*, 88 N.Y.U. L. REV. 652 (2013) (discussing rationale for anti-joinder provision).

defendants on a given patent generally have to sue them individually. More importantly for our purposes, the rise of the PTAB forces patent owners to factor in the strong possibility of retaliatory or even preemptive patent validity challenges at the PTAB. As a result, two complex frameworks of resolving patent disputes now coexist: ordinary infringement litigation and declaratory judgment actions in Article III courts, along with administrative invalidation actions in the PTAB.

Multiple proceedings with many potential parties offer a number of strategic possibilities. Two examples of ongoing litigation involving certain highly asserted and highly petitioned patents provide an illustration of the complexities and the correspondingly complicated strategic questions. Although these cases are hardly representative, they do provide clear examples of the multiple, perhaps even combinatorial, strategic possibilities.

In a set of seven cases filed between July 1 and July 9, 2013, Zond, a plasma discharge technology developer, asserted a suite of patents in Massachusetts district court against nine defendants.⁶ Intel, one of the defendants, responded by filing IPR petitions on all of the asserted patents.⁷ In April 2014, Intel persuaded the Massachusetts district court to grant a stay of the litigation.⁸ Within two months of the court granting a stay to Intel, all but one of the defendants had filed IPR petitions on the same claims and the same grounds.⁹ All of the petitioning defendants received stays, and the PTAB joined them to the Intel petitions. Although Intel ultimately settled, PTAB review of the challenged patents continues, albeit with a new lead petitioner.¹⁰

6. Zond, Inc. v. Gillette Co., No. 1-13-cv-11567 (D. Mass., July 1, 2013); Zond, LLC v. Advanced Micro Devices, Inc., No. 1-13-cv-11577 (D. Mass., July 2, 2013); Zond, LLC v. Intel Corp., No. 1-13-cv-11570 (D. Mass., July 2, 2013); Zond, Inc. v. SK Hynix Inc., No. 1-13-cv-11591 (D. Mass., July 3, 2013); Zond, Inc. v. Toshiba America Elec. Components, Inc., No. 1-13-cv-11581 (D. Mass., July 3, 2013); Zond, Inc. v. Renesas Elecs. Corp., No. 1-13-cv-11625 (D. Mass., July 8, 2013); Zond, Inc. v. Fujitsu Ltd., No. 1-13-cv-11634 (D. Mass., July 9, 2013).

7. The 27 *inter partes* review petitions filed by Intel are listed in Table 1 of Appendix C.

8. Order Granting Motion to Stay Pending Inter Partes Review, Case No. 1-13-cv-11570, Paper No. 120 (D. Mass. Apr. 18, 2014).

9. The 90 *inter partes* review petitions filed by defendants are listed in Table 2 of Appendix C.

10. Joint motions to terminate proceedings, all filed simultaneously on Sept. 12, 2014, settled the Intel-initiated IPR petitions on Zond's patents. The settlement agreement between Intel and Zond that governs the termination of all these proceedings is confidential.

In another set of cases, e-Watch sued eleven firms on two digital signal transmission patents in the Eastern District of Texas.¹¹ A third-party firm filed the first PTAB petition related to those patents.¹² Subsequently, HTC, a defendant, instituted a petition, and the institution of the HTC petition triggered other petitions.¹³

A major normative argument for administrative ex post review is that it should be an efficient, accessible, and accurate substitute for Article III litigation over patent validity.¹⁴ In this paper, we assess the substitution hypothesis, using individual patents as our basic unit of analysis and also investigating patent-petitioner pairs and similar details in greater depth. Our data indicate that the “standard model” of substitution—wherein a district court defendant subsequently brings an administrative challenge to patent validity—is indeed occurring. The majority (about 70 percent) of petitioners who bring *inter partes* review challenges fit the standard model. In fact, our data indicate that both explicit substitution and potential settlement in the shadow of an IPR challenge might be occurring. This substitution effect would suggest that the PTAB should use a claim construction standard that mirrors that of district courts. With a uniform standard, PTAB claim constructions could be used by district courts in any subsequent proceedings, and the benefits of substituting administrative process for judicial process would thereby be most fully realized.

Notably, however, standard substitution is not the only use of the PTAB: particularly in the area of IPRs, we also see a surprising percentage

11. e-Watch, Inc. v. LG Elecs., Inc., No. 2-13-cv-01064 (E.D. Tex., Dec. 9, 2013); e-Watch, Inc. v. Samsung Elecs. Co., No. 2-13-cv-01062 (E.D. Tex., Dec. 9, 2013); e-Watch, Inc. v. Apple Inc., No. 2-13-cv-01061 (E.D. Tex., Dec. 9, 2013); e-Watch, Inc. v. HTC Corp., No. 2-13-cv-01063 (E.D. Tex., Dec. 9, 2013); e-Watch Inc. v. BlackBerry Ltd., No. 2-13-cv-01078 (E.D. Tex., Dec. 10, 2013); e-Watch Inc. v. Sharp Corp., No. 2-13-cv-01074 (E.D. Tex., Dec. 10, 2013); e-Watch Inc. v. ZTE Corp., No. 2-13-cv-01071 (E.D. Tex., Dec. 10, 2013); e-Watch Inc. v. Sony Corp., No. 2-13-cv-01073 (E.D. Tex., Dec. 10, 2013); e-Watch Inc. v. Nokia Corp., No. 2-13-cv-01075 (E.D. Tex., Dec. 10, 2013); e-Watch Inc. v. Huawei Tech. Co., No. 2-13-cv-01076 (E.D. Tex., Dec. 10, 2013); e-Watch Inc. v. Kyocera Commc'ns, Inc., No. 2-13-cv-01077 (E.D. Tex., Dec. 10, 2013).

12. Petition for Inter Partes Review by Iron Dome LLC, No. IPR2014-00439 (P.T.A.B. Feb. 18, 2014).

13. The twelve *inter partes review* petitions filed are listed in Table 3 of Appendix C.

14. Others (including one of us) have argued that to the extent the procedures set up by the AIA resemble formal adjudications, they could serve as a vehicle not simply for error correction but also for legal and policy development. See, e.g., Arti K. Rai, *Patent Validity Across the Executive Branch: Ex Ante Foundations for Policy Development*, 61 DUKE L.J. 1237 (2012); Melissa F. Wasserman, *The Changing Guard of Patent Law: Chevron Deference for the PTO*, 54 WM. & MARY L. REV. 1959 (2013). In this Article, however, we focus on error correction.

of cases (about 30 percent) where the petitioner is *not* the target of a prior suit on the same patent. The frequency of these nonstandard petitioners, as well as their tendency to join the same petitions as an entity that has been sued, varies by technology. Our data on nonstandard petitioners thus provide some insight into the extent patent challengers are engaging in collective action to challenge patents.

Depending on the details of how nonstandard petitioning and collective action are being deployed, this activity could provide a social benefit or constitute a form of harassment. As we discuss in Part II, many commentators have noted that challenging an invalid patent, particularly in expensive Article III litigation, represents a collective action problem. Administrative alternatives may ease the collective action problem, but they may also provide opportunities for harassing patent owners.¹⁵ As another indicator of potential harassment and delay, we also look at the frequency of serial petitioning on a given patent.

Of course, substitution of any sort (as contrasted with duplication) can occur only if administrative review is accurate and efficient, and courts generally stay any related Article III litigation pending administrative review. In the case of declaratory judgment (DJ) litigation, the AIA both bars a DJ litigant from bringing a subsequent administrative review and provides for automatic stays of any subsequent DJ actions.¹⁶ So the issue of duplication primarily arises in the context of infringement litigation brought by the patent owner. Although a full answer to the duplication issue awaits further decision making in cases currently before the PTAB and the courts, we provide some initial data on the question.

In this Article, Part II discusses the normative arguments for and against administrative *ex post* validity review as a substitute for judicial review. It reviews these arguments as they developed in earlier incarnations of administrative review and as they developed in the far more robust AIA proceedings. Part III provides the large-scale empirical data we have gathered. It discusses various indicia of a general substitution effect in the context of particular technologies and in particular district courts. We also discuss the phenomenon of nonstandard petitioners and the collective action in which they sometimes engage. Additionally, Part III presents data

15. *E.g.*, Gregory Dolin, *Dubious Patent Reform*, 56 B.C. L. REV. 881 (2015); Jay P. Kesan, *Carrots and Sticks to Create a Better Patent System*, 17 BERKELEY TECH L.J. 145, 165 (2002) (discussing the dangers of delay and harassment in post-issuance patent office proceedings); Raymond A. Mercado, *Ensuring the Integrity of Administrative Challenges to Patents: Lessons from Reexamination*, 14 COLUM. SCI. & TECH. L. REV. 558 (2013).

16. Perhaps not surprisingly, since patents became available for PTAB review, DJ actions have fallen both in absolute terms and as a percentage of case filings.

regarding multiple IPR petitions filed against the same patent. Based on these data, Part III examines agency and court decision-making in the face of strategic behavior by the parties before them. Part IV discusses our major findings, suggests directions for further research, and outlines our ongoing agenda to advance these research goals.

I. EX POST REVIEW OF PATENT VALIDITY

This Part discusses the normative arguments that have motivated administrative review of patent validity, particularly as a substitute for litigation in the federal courts. Against the backdrop of this normative framing, we then evaluate *ex parte* and *inter partes* reexamination (the latter now defunct) as well as the new ex post review procedures introduced by the AIA.

A. MOTIVATIONS FOR (AND CONCERNS REGARDING) ADMINISTRATIVE REVIEW

The initial patent examination process will inevitably produce some improper patent grants. To the extent improperly granted patents impose unnecessary costs and call into question the credibility of the patent system,¹⁷ these improper grants ought to be corrected.¹⁸ The importance of error correction remains a dominant theme in ex post patent review, especially in evaluating the success of the AIA.¹⁹ Perhaps even more

17. See generally Mark D. Janis, *Rethinking Reexamination: Toward a Viable Administrative Revocation System for U.S. Patent Law*, 11 HARV. J.L. & TECH. 1, 7–36 (1997) (considering USPTO's role in patent revocation via administrative reexamination). For purposes of this article, we need not engage the robust academic debate over the level of error the initial examination process should tolerate.

18. Ex post review as a means for correcting USPTO examination errors has been a consistent theme in institutional discussions of patent quality. See, e.g., *In re Swanson*, 540 F.3d 1368, 1375 (Fed. Cir. 2008) (“Congress intended reexaminations to provide an important ‘quality check’ on patents that would allow the government to remove defective and erroneously granted patents.”); *In re Recreative Techs. Corp.*, 83 F.3d 1394, 1396–97 (Fed. Cir. 1996) (“The reexamination statute’s purpose is to correct errors made by the government . . . and if need be to remove patents that never should have been granted.”); *Patlex Corp. v. Mossinghoff*, 758 F.2d 594, 603 (Fed. Cir. 1985) (“The legislative history of the reexamination statute makes clear that its purpose is to cure defects in administrative agency action with regard to particular patents and to remedy perceived shortcomings in the system by which patents are issued.”).

19. The degree to which the AIA ex post administrative review procedures are actually capturing and correcting *ex ante* examination errors is the focus of related large-scale empirical research relying on much of the same data as the present project. See Saurabh Vishnubhakat, David L. Schwartz & Alan C. Marco, *What Ex Post Review Has Revealed About Patents* (forthcoming).

important, however, is the recurring theme of institutional design: the USPTO's examination errors should not merely be corrected, but should be corrected outside the federal courts.

Several interrelated arguments counsel in favor of administrative review. Most obviously, Article III litigation is quite costly. The biennial economic survey of the American Intellectual Property Law Association indicates that even for the lowest-stakes category of patent lawsuits (in which less than \$1 million was at risk), median litigation costs have risen from \$650,000 in 2005 to \$700,000 in 2013.²⁰ And for the highest-stakes lawsuits (in which more than \$25 million was at risk), median litigation costs rose over the same time period from \$4.5 million to \$5.5 million.²¹

The high cost of litigation would be less problematic if these great expenditures yielded great accuracy in judicial outcomes. As standard economic accounts of procedure note, the goal of procedure is the minimization of litigation costs and error costs.²² But decisions reached in Article III litigation may not be particularly accurate.²³ Because patent law often uses science-based proxies such as "ordinary skill in the art" to tackle relevant legal and policy goals, the subject matter of patent law can be highly complex as a scientific matter.²⁴ And even if a case is not highly complex as

20. AM. INTELL. PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY 34 (2013) [hereinafter AIPLA SURVEY 2013].

21. *Id.*

22. See generally Louis Kaplow & Steven Shavell, *Accuracy in the Determination of Liability*, 37 J.L. & ECON. 1 (1994) (modeling the relationship between the design of legal rules and the likelihood of reaching accurate outcomes); Louis Kaplow & Steve Shavell, *Accuracy in the Assessment of Damages*, 39 J.L. & ECON. 191 (1996) (modeling the relationship between the design of legal rules and the likelihood of imposing accurate monetary sanctions).

23. E.g., David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223 (2008) (finding high reversal rate for district court claim construction). See generally Anup Malani & Jonathan S. Masur, *Raising the Stakes in Patent Cases*, 101 GEO. L.J. 637, 659 (2013) (offering a brief survey of scholarly proposals to improve judicial accuracy in patent adjudication).

24. For example, a patent may be challenged as being invalid because the invention that it claims was obvious under 35 U.S.C. § 103 in light of the prior technical knowledge available to those in the field at the time of invention. Whether a claimed invention is obvious is a question of law reviewed de novo on appeal. But the legal determination is based on predicate findings of fact regarding the prior art and the level of skill in the art. These findings are supposed to be reviewed deferentially on appeal. See, e.g., *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009) (concerning review from PTO patent denial); see also *Graham v. John Deere*, 383 U.S. 1, 17 (1966) (explaining factual findings made by district court are subject to clearly erroneous review). Meanwhile, the USPTO's factual findings in granting a patent are presumed correct and must be rebutted by clear and convincing evidence in the courts. *Microsoft Corp. v. i4i Ltd. P'ship*, 131 S. Ct. 2238 (2011). See generally Arti K. Rai, *Engaging Facts and Policy: A Multi-Institutional Approach*

a scientific matter, the manner in which factual findings interact with law and policy can be complex.²⁵ With the possible exception of Federal Circuit judges, judges in the federal courts tend to be generalists who may not be equipped to tackle complex questions at the intersection of law, science, and policy.²⁶ Moreover, district courts have to contend with juries, which may be even less equipped than federal judges to address complex questions of law and science.²⁷ In contrast, administrative patent judges have long been required to be “persons of competent legal knowledge and scientific ability.”²⁸

Empirical research bears out concerns about the capacity of judges to resolve patent disputes. The generalist background of most district judges has led many plaintiffs to seek out specific districts,²⁹ with the natural result being a certain amount of de facto specialization.³⁰ A few districts see a disproportionate number of patent cases, and some have reputations as “rocket dockets” for resolving them quickly.³¹ Empirical evidence suggests that, among the subset of judges who preside over patent cases regularly, increased experience may produce more efficient and accurate case

to *Patent System Reform*, 103 COLUM. L. REV. 1035, 1068–75 (2003) (discussing the technical complexity often involved in applying patent law’s fact-based standards).

25. For example, the practical probative value of factual findings toward obviousness analysis may vary by the inherent unpredictability of the given technology: whereas mechanical inventions operate in relatively predictable and well-understood ways, small technical changes may lead to dramatic and unexpected results in biochemistry. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1364 (Fed. Cir. 2007).

26. Peter Lee, *Patent Law and the Two Cultures*, 120 YALE L.J. 2, 4–6 (2010).

27. See Mark Lemley, *Why Do Juries Decide If Patent Are Valid?*, 99 VA. L. REV. 1673, 1705 (2013) (noting that as far back as the 1950s, modern technology was already “judged too complex for a jury to understand, so it made no sense to give them the patent questions” where avoidable).

28. 35 U.S.C. § 6 (requiring that “administrative patent judges shall be persons of competent legal knowledge and scientific ability”).

29. Commentators have long discussed forum shopping at both the appellate and district court level. *E.g.*, Scott Atkinson, Alan C. Marco & John H. Turner, *The Economics of a Centralized Judiciary: Uniformity, Forum Shopping, and the Federal Circuit*, 52 J.L. & ECON. 411 (2009) (forum shopping prior to the creation of the Federal Circuit); Kimberly A. Moore, *Forum Shopping in Patent Cases: Does Geographic Choice Affect Innovation?*, 79 N.C. L. REV. 889 (2001) (early discussion of forum shopping at district court level).

30. Jay P. Kesan & Gwendolyn G. Ball, *Judicial Experience and the Efficiency and Accuracy of Patent Adjudication: An Empirical Analysis of the Case for a Specialized Patent Trial Court*, 24 HARV. J.L. & TECH. 393, 447 (2011) (showing in Table III that the distribution of how many cases judges hear is highly skewed such that most judges hear fewer than ten patent cases each whereas roughly the top fifth of high-volume judges hear over three-fifths of all patent cases).

31. Saurabh Vishnubhakat, *Reconceiving the Patent Rocket Docket: An Empirical Study of Infringement Litigation 1985–2010*, 11 J. MARSHALL REV. INTELL. PROP. L. 58 (2011).

outcomes.³² Yet this private ordering toward certain districts only underscores the overall lack of expertise among district court judges.³³ Moreover, some commentators have argued that aggressive attempts to specialize in patent disputes by judges whose districts are found outside traditional technology centers lead to overly plaintiff-friendly procedures rather than accurate adjudication.³⁴

Another reason to favor low-cost administrative review, rather than high-cost Article III review, is that patent plaintiffs and defendants have asymmetric incentives. Supreme Court case law builds into the patent doctrine asymmetric incentives to litigate. Under the law's estoppel provisions, a challenger who successfully invalidates a patent provides a public good—the challenger benefits not only itself but also all other potential challengers.³⁵ By contrast, the challenger who loses is uniquely estopped from challenging the patent again.³⁶

Although the public-good-type incentive may exist in the administrative context as well³⁷ (and, indeed, exists in both pre-AIA and

32. Kesan & Ball, *supra* note 30, at 423–43.

33. This argument is particularly compelling when offered by judges themselves. *See, e.g.*, Judge James F. Holderman, *Judicial Patent Specialization: A View from the Trial Bench*, 2002 U. ILL. J.L. TECH. & POL'Y 425, 430–31 (2002); Judge James F. Holderman & Halley Guren, *The Patent Litigation Predicament in the United States*, 2007 U. ILL. J.L. TECH. & POL'Y 1, 5–6 (2007); The Hon. Ed Kinkeade, *Point-Counterpoint: Two Judges' Perspectives on Trial by Jury*, 12 TEX. WESLEYAN L. REV. 497, 498 (2006).

34. *See, e.g.*, J. Jonas Anderson, *Court Competition for Patent Cases*, 163 U. PA. L. REV. 631 (2015); Jeanne C. Fromer, *Patentography*, 85 N.Y.U. L. REV. 1444 (2010); Daniel Klerman & Greg Reilly, *Forum Selling*, 88 S. CAL. L. REV. (forthcoming 2016), <http://www.ssrn.com/abstract=2538857> [<http://perma.cc/528U-TJS8>].

35. *See* *Blonder-Tongue Labs., Inc. v. Univ. of Ill. Found.*, 402 U.S. 313, 350 (1971) (stating a patent invalidity finding creates nonmutual defensive collateral estoppel, so that a patent that is invalid as against one party is invalid as against the world); *see also* Joseph Farrell & Robert P. Merges, *Incentives to Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Patent Review Might Help*, 19 BERKELEY TECH. L.J. 943 (2004) (noting that, in addition to public good problem, disincentives to challenge may be created in certain situations involving oligopolistic competition between licensee that pay sales-based royalties to the patentee).

36. Interestingly, some practitioners have suggested that the pre-AIA tendency of so-called patent trolls to sue multiple defendants in one suit might have facilitated some collective action through informal or formal joint defense agreements. *See* Daniel Bream & Lee Cheng, *Benefits of a Coordinated Joint Defense in Patent Cases*, LAW360 (Nov. 27, 2012). Whether or not that was the case, the AIA's anti-joinder provision may limit this potential nudge towards collective action. *Id.*

37. *See* John R. Thomas, *Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties*, 2001 U. ILL. L. REV. 305 (2001). *But see* Stuart M. Benjamin & Arti K. Rai, *Who's Afraid of the APA? What the Patent System Can Learn From Administrative Law*, 95 GEO. L.J. 269, 323–27 (2007) (noting that administrative review that relied on

post-AIA *inter partes* proceedings as a consequence of the congressional decision to implement relatively strong statutory estoppel provisions), the significantly lower cost of the administrative proceeding presumably reduces its scale. In other words, although a challenger may still be reluctant to provide a public good, a public good that costs a few hundred thousand dollars is quite different from one that costs several million dollars. Moreover, the absence of a standing requirement in IPR proceedings creates possibilities for additional entities, including entities that represent groups of potential defendants in a given industry, to challenge patents.

For these reasons, a less costly, more expert, and more widely accessible institution has long been thought desirable. On the other hand, even advocates of an administrative mechanism have noted the potential for harassment of patent owners that might arise in such administrative review.³⁸ Harassment potential exists as the obvious flip side of access created by low cost and the absence of an Article III standing requirement.³⁹ Moreover, to the extent that courts do not believe that administrative review will in fact be accurate and efficient, and thus do not stay any related Article III litigation, such review may create costly duplication rather than efficiency.

B. OPPOSITION MECHANISMS PRIOR TO THE AIA

In 1980 Congress created a mechanism for USPTO *ex parte* reexamination of patent validity,⁴⁰ and in 1999 Congress created a mechanism for *inter partes* reexamination.⁴¹ These procedures have realized their error-correction and efficiency goals to varying degrees and have interacted in important ways with federal court litigation.

Chevron deference by the courts rather than estoppel against the patent challenger could substantially reduce collective action problems).

38. *E.g.*, Kesan, *supra* note 15 (noting the potential for delay and harassment in patent office proceedings); Jonathan Masur, *Patent Inflation*, 121 *YALE L.J.* 470, 522 (2011) (recognizing that “inter partes review could potentially be abused by parties interested only in delaying and harassing competitors”); Joe Matal, *A Guide to the Legislative History of the America Invents Act: Part II of II*, 21 *FED. CIR. B.J.* 539, 550 (2012) (noting that the AIA’s own statutory text directs the USPTO to penalize abuses of administrative validity challenge proceedings “such as to harass or to cause unnecessary delay or an unnecessary increase in the cost of the proceeding”).

39. That said, the challenger who loses at the administrative level may have to meet Article III standing requirements in order to appeal. *See Consumer Watchdog v. Wis. Alumni Research Found.*, 753 F.3d 1258 (Fed. Cir. 2014).

40. Bayh-Dole Act, Pub. L. No. 96-517, 94 Stat. 3015 (1980).

41. American Inventors Protection Act, Pub. L. No. 106-113, 113 Stat. 1501 (1999).

1. *Ex Parte Reexamination*

As the Federal Circuit recognized in a contemporaneous opinion, the *ex parte* reexamination system was an effort to reap

three principal benefits. First, the new procedure could settle validity disputes *more quickly and less expensively* than the often protracted litigation involved in such cases. Second, the procedure would allow courts to refer patent validity questions to the *expertise of the Patent Office*. Third, reexamination would reinforce investor confidence in the certainty of patent rights by affording the USPTO a *broader opportunity to review* doubtful patents.⁴²

The parameters of this reexamination procedure reflect its twin goals: to correct those USPTO examination errors that improperly allowed patents to issue, and to do so more cheaply, accurately, and accessibly than the federal courts could.

Cost-wise, the USPTO's *ex parte* reexamination fee has grown from \$1,500 in the early 1980s⁴³ to \$12,000 at present,⁴⁴ and attorney costs have risen to approximately \$20,000 at the mean and \$15,000 at the median.⁴⁵ Even today, the expense of *ex parte* reexamination tends to be below \$35,000—some twentyfold less costly than the lowest-stakes category of litigation.⁴⁶ Moreover, when the USPTO decides to deny a request for *ex parte* reexamination, the agency refunds most of the fee to the requester, further lowering the financial hurdle, and risk, to a patent validity challenge.⁴⁷ Consistent with its mandate to correct examination errors, *ex parte* reexamination requires a “substantial new question of patentability” as to one or more of the challenged patent claims, and this standard may be met by reargument of information that was previously before the patent examiner.⁴⁸ Access to reexamination is also unconstrained by traditional Article III standing requirements. Anyone at any time may seek

42. *See* Patlex Corp. v. Mossinghoff, 758 F.2d 594, 602 (Fed. Cir. 1985) (internal quotations and citations omitted) (emphasis added).

43. Revision of Patent Fees, 50 Fed. Reg. 31818-01 (Aug. 6, 1985), codified in various parts of 37 C.F.R. Part 1.

44. 37 C.F.R. § 1.20(c)(1).

45. *See* AIPLA SURVEY 2013, *supra* note 20, at I-112 (tabulating attorney costs reported for *ex parte* reexamination); AM. INTELL. PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY I-136 (2011); AM. INTELL. PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY I-114 (2009); AM. INTELL. PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY I-76 (2007).

46. Janis, *supra* note 17.

47. *See* 35 U.S.C. § 303(c); 37 C.F.R. § 1.26(c).

48. 35 U.S.C. § 303(a).

reexamination of a patent, including the patent owner and the USPTO itself,⁴⁹ and courts narrowly construe agreements not to challenge patent validity, in favor of access to reexamination.⁵⁰

However, for all its intended benefits, the reexamination procedure introduced in 1980 has long been criticized for its *ex parte* nature, which excludes any third-party participation beyond filing the initial request.⁵¹ According to the PTO's statistics,⁵² 29 percent of the *ex parte* reexaminations filed between July 1981 and September 2014 were filed by the patent owner itself, presumably as a potential mechanism for strengthening the patent.⁵³

2. Inter Partes Reexamination

To improve public participation in the administrative review of patent validity, in 1999 Congress created a new procedure: *inter partes* reexamination.⁵⁴ Designed to coexist with the old *ex parte* procedure, *inter partes* reexamination conferred significant rights upon third-party requestors to participate in the USPTO's review of patent validity. A requestor could comment on every substantive response by the patent owner to an examiner action and could appeal the examiner's decision to the USPTO's administrative review board.

However, *inter partes* reexamination also posed significant barriers. One was a strong estoppel provision, barring the challenger from raising in Article III litigation any issues it raised or could have raised during the *inter*

49. 35 U.S.C. §§ 302, 303(a).

50. *See, e.g.,* Joy Mfg. Co. v. Nat'l Mine Serv. Co., Inc., 810 F.2d 1127 (Fed. Cir. 1987).

51. Janis, *supra* note 17, at 6 n.12 (citing Shannon M. Casey, *The Patent Reexamination Reform Act of 1994: A New Era of Third Party Participation*, 2 J. INTELL. PROP. L. 559 (1995)); Marvin Motsenbocker, *Proposal to Change the Patent Reexamination Statute to Eliminate Unnecessary Litigation*, 27 J. MARSHALL L. REV. 887, 898 (1994); Gregor N. Neff, *Patent Reexamination—Valuable, But Flawed: Recommendations for Change*, 68 J. PAT. & TRADEMARK OFF. SOC'Y 575 (1986).

52. *See* USPTO, *Ex parte* Reexamination Filing Data—September 30, 2014, <http://www.uspto.gov/learning-and-resources/statistics/reexamination-information> [<http://perma.cc/WP77-V8T8>].

53. Certain Federal Circuit cases have indicated that patents that survive reexamination should be viewed even more deferentially by the courts than ordinary patents. *E.g.,* Gould v. Control Laser Corp., 705 F.2d 1340, 1342 (Fed. Cir. 1983) (explaining that reexamination ought to “facilitate trial of [the reexamined] issue by providing the district court with the *expert view of the PTO* (when a claim survives the reexamination proceeding)”) (emphasis added).

54. *See generally* Kenneth L. Cage & Lawrence T. Cullen, *An Overview of Inter Partes Reexamination Procedures*, 85 J. PAT. & TRADEMARK OFF. SOC'Y 931 (2003) (explaining the structural details and concerns motivating the 1999 *inter partes* reexamination procedures).

partes reexamination.⁵⁵ Even more significant was the prolonged duration of reexamination. The reexaminations themselves took an average of 39.5 months, and then had to be appealed to the Board of Patent Appeals and Interferences.⁵⁶ From its creation in 1999 through 2012, when it was subsumed under the new administrative review system established by the AIA, *inter partes* reexamination was never widely used as a means for challenging the validity of patents.⁵⁷

C. ADMINISTRATIVE OPPOSITION UNDER THE AIA

The America Invents Act of 2011⁵⁸ (AIA), which created four new procedures for reevaluating the validity of patents, significantly strengthened the U.S. system for administrative review of patent validity. One procedure, post-grant review, is just beginning its operation as it only applies to patents that issue from applications filed under the AIA's new first-inventor-to-file regime.⁵⁹ Another procedure, supplemental examination, allows patent owners themselves to provide new information that helps fortify the validity of their patents.⁶⁰ Thus far, the opportunity for robust public participation in challenging pre-existing patents has arisen in the two remaining procedures: *inter partes* review (IPR) and the transitional program for covered business method (CBM) review.

Before turning to the specifics of these proceedings, we note the AIA's desire to promote administrative review is probably clearest in the situation where the petitioner is a prior district court defendant. In the case of *inter partes* review, this "standard model" is endorsed, at least implicitly, by several features we discuss in detail below. One feature is the requirement that IPR review occur within one year of a prior district court lawsuit. The

55. 35 U.S.C. § 317(b) (2000); *see, e.g.*, M. Patricia Thayer et al., *Examining Reexamination: Not Yet an Antidote to Litigation*, 5 SEDONA CONF. J. 23, 24 (2004) (noting that estoppel makes "*inter partes* reexamination something of a double-or-nothing gamble").

56. This average included some outlier cases, but the median was a lengthy 34.1 months. *See Inter Partes Reexamination Filing Data*, USPTO, <http://www.uspto.gov/learning-and-resources/statistics/reexamination-information> [<http://perma.cc/82NT-8L67>].

57. From November 29, 1999, through the abolition of *inter partes* reexamination effective September 16, 2012, fewer than 2,000 requests were filed, and in most years the usage of *inter partes* reexamination represented only a fraction of *ex parte* reexamination. *See Reexamination Statistics*, USPTO, <http://www.uspto.gov/learning-and-resources/statistics/reexamination-information> [<http://perma.cc/82NT-8L67>].

58. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284.

59. As of October 31, 2015, only thirteen post-grant review petitions have been filed in the USPTO. *See* USPTO, PATENT REVIEW PROCESSING SYSTEM (Oct. 31, 2015) at 2, <http://www.uspto.gov/sites/default/files/documents/2015-10-31%20PTAB.pdf> [<http://perma.cc/V2N8-EJT9>].

60. 35 U.S.C. § 257.

congressional decision to include a strong estoppel provision, and thus potentially set up in the administrative context the Article III collective action problem for challengers,⁶¹ may also reflect congressional embrace of the standard model.

In the case of CBM review, Congress embraced the standard model even more fully. CBM review explicitly requires the petitioner to be “charged with infringement,” language the PTO has interpreted as requiring the petitioner to prove standing necessary to bring a declaratory judgment action in district court.⁶²

That said, in the case of IPRs, the statutory language certainly does not preclude petitioners that are outside the standard model. IPR proceedings have no standing requirement, and the AIA also provides for potential collective action by allowing joinder to existing petitions.

Thus far, the new AIA proceedings do appear substantially cheaper than district court litigation. According to the 2015 AIPLA Economic Survey, the median cost of an IPR through a PTAB hearing was \$275,000 and through appeal was \$350,000.⁶³ Although the AIPLA survey does not differentiate between IPRs based on amount of money at risk, these figures are substantially lower than the median cost of district court litigation even for the lowest stakes cases.⁶⁴

1. *Inter Partes Review*

IPR challenges are available to anyone, other than the patent owner,⁶⁵ who has not previously sought to invalidate the patent through a civil action⁶⁶ and who has not been sued more than one year earlier for infringing the patent in question.⁶⁷ An IPR petition may not be filed anonymously: the petitioner must disclose all its real parties in interest.⁶⁸ For any patent

61. *See supra* text accompanying notes 37–41.

62. 37 C.F.R. § 42.302(a) (“Charged with infringement means a real and substantial controversy regarding infringement of a covered business method patent exists such that the petitioner would have standing to bring a declaratory judgment action in Federal court.”).

63. AM. INTELL. PROP. LAW ASS’N, REPORT OF THE ECONOMIC SURVEY 38 (2015).

64. *See supra* Section I.A.

65. 35 U.S.C. § 311(a).

66. *See* 35 U.S.C. §§ 315(a)(1), (3) (providing that a counterclaim challenging the validity of a patent claim in an infringement action is not a civil action).

67. 35 U.S.C. § 315(b).

68. This disclosure is necessary because the constraints on who can petition also apply to all legal privies and real parties in interest of the would-be petitioner. *See* 35 U.S.C. §§ 315(a)(1), (b).

that issued under the old first-to-invent regime, an IPR petitioner may file a challenge immediately.⁶⁹

For a patent that issues under the new first-inventor-to-file regime, an IPR petitioner may file a challenge only after nine months from the patent's date of grant or after the termination of any post-grant review that has been instituted as to the patent, whichever is later.⁷⁰ An IPR may challenge patent claims only on the grounds that they fail to satisfy the novelty requirement⁷¹ or the nonobviousness requirement,⁷² and may only argue on the basis of prior patents or printed publications.⁷³ To decide that an IPR petition warrants institution of an IPR proceeding, the USPTO must find a "reasonable likelihood that the petitioner would prevail with respect to at least [one] of the claims challenged in the petition."⁷⁴

2. Covered Business Method Review

CBM challenges are available only to parties who have previously been sued for infringing, or charged with infringing, the patent in question.⁷⁵ Like IPR petitions, CBM review petitions may not be filed anonymously—they must disclose real parties in interest.⁷⁶ Through rulemaking, the PTO has interpreted the statutory "charged with infringement" language to mean "a real and substantial controversy regarding infringement . . . exists such that the petitioner would have standing to bring a declaratory judgment action in Federal Court."⁷⁷ Congressional creation of a standing requirement in a CBM review proceeding contrasts with the absence of such a requirement in an IPR proceeding. In general, to the extent that IPR and CBM review provisions differ (and we detail other differences below), these differences may arise because CBM review was inserted into the AIA relatively late in the day, and the members of Congress most responsible for the review saw CBM patents as categorically suspect.⁷⁸

69. 35 U.S.C. § 311(c).

70. *Id.*

71. 35 U.S.C. § 102.

72. 35 U.S.C. § 103.

73. 35 U.S.C. § 311(b).

74. 35 U.S.C. § 314(a).

75. Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18(a)(1)(B), 125 Stat. 330 (stating the prior infringement suit may be one that targeted the CBM petitioner itself or its privies or real parties in interest).

76. *See id.*

77. 37 C.F.R. § 42.302(a).

78. Senators Schumer and Kyl, who proposed a version of the CBM provision as part of a floor managers' amendment on March 1, 2011, were highly suspicious of all business method patents. In his March 2011 Senate floor testimony, Senator Schumer described

For any eligible business method patent⁷⁹ that issued under the old first-to-invent regime, a CBM petitioner may file a challenge at any time after the procedure was established on September 16, 2012.⁸⁰ For an eligible business method patent that issues under the new first-inventor-to-file regime, a CBM petitioner may file a challenge only after nine months from the patent's date of grant or after the termination of any post-grant review that has been instituted as to the patent, whichever is later.⁸¹ A CBM petition may challenge patent claims on essentially the complete range of patentability criteria, including subject-matter eligibility,⁸² novelty,⁸³ nonobviousness,⁸⁴ utility,⁸⁵ single invention,⁸⁶ enablement,⁸⁷ written

business method patents as “the bane of the patent world” and castigated the decision the Federal Circuit in *State Street Bank* to allow such patents. 157 CONG. REC. S1363 (Mar. 8, 2011) (statement of Sen. Schumer). Among many Senators on the Republican side, positions were equally strong. The Senate Republican Policy Committee's summary of § 18, introduced into the Congressional Record by Senator Kyl, stated (somewhat inaccurately):

Recent court decisions, culminating in last year Supreme Court decision in *Bilski v. Kappos*, have sharply pulled back on the patenting of business methods, emphasizing that these “inventions” are too abstract to be patentable. In the intervening years, however, PTO was obliged to issue a large number of business-method patents, many or possibly all of which are no longer valid. The Schumer proceeding offers a relatively cheap alternative to civil litigation for challenging these patents, and will reduce the burden on the courts of dealing with the backwash of invalid business-method patents.

157 CONG. REC. S1367 (Mar. 8, 2011) (statement of Sen. Kyl).

79. The AIA defines an eligible “business method” patent as: “a patent that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service, except that the term does not include patents for technological inventions.” Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18(d)(1), 125 Stat. 331. USPTO regulations further define a “technological invention” based on “whether the claimed subject matter as a whole recites a technological feature that is novel and unobvious over the prior art; and solves a technical problem using a technical solution.” 37 C.F.R. § 42.301(b).

80. CBM challenges became available one year from the enactment of the AIA, which was signed into law on September 16, 2011. Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18(a)(1), 125 Stat. 329.

81. *See* Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18(a)(1), 125 Stat. 329 (incorporating into CBM review the same standards that apply to post-grant review proceedings as codified in 35 U.S.C. §§ 321–329).

82. 35 U.S.C. § 101.

83. 35 U.S.C. § 102.

84. 35 U.S.C. § 103.

85. 35 U.S.C. § 101.

86. *See* 35 U.S.C. § 101 (allowing an inventor or discoverer to “obtain a patent”) (emphasis added).

87. 35 U.S.C. § 112(a).

description,⁸⁸ definiteness,⁸⁹ and others.⁹⁰ To decide that a CBM petition warrants institution of a CBM review, the USPTO must find that “it is more likely than not that at least [one] of the claims challenged in the petition is unpatentable,”⁹¹ or that “the petition raises a novel or unsettled legal question that is important to other patents or patent applications.”⁹²

3. *Intersection with the Courts*

Both IPR and CBM review proceedings generate estoppel effects, though not in the same way. The estoppel generated by IPR is quite strong. An IPR resulting in a final written decision precludes the petitioner⁹³ from asserting any claim in either the USPTO, the federal courts, or the International Trade Commission (ITC) that the petitioner raised, or could have raised, in the IPR proceeding.⁹⁴

By contrast, a CBM review that results in a final written decision creates full estoppel within the USPTO only—it precludes the petitioner⁹⁵ from asserting any claim in the USPTO that the petitioner raised, or could have raised, in the CBM review proceeding.⁹⁶ With respect to the courts, CBM petitioners are not estopped from invoking those invalidity grounds that they raised at the USPTO.⁹⁷

Both IPR and CBM review proceedings trigger automatic stays of co-pending declaratory judgment litigation. Just as a would-be petitioner cannot challenge a patent in an IPR if it has previously challenged that patent in a civil action,⁹⁸ if a petitioner files such a civil action *after* the IPR

88. 35 U.S.C. § 112(a).

89. 35 U.S.C. § 112(b).

90. *See* 35 U.S.C. § 321(b) (allowing challenges on any invalidity defense available under 35 U.S.C. § 282(b)(2) and § 282(b)(3), and under 35 U.S.C. § 251). Additional constraints also apply to novelty- or nonobviousness-based challenges based on pre-AIA § 102 or § 103. *See* Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18(a)(1)(C), 125 Stat. 330.

91. 35 U.S.C. § 324(a).

92. 35 U.S.C. § 324(b).

93. The same estoppel effects bind the petitioner’s privies and real parties in interest.

94. 35 U.S.C. § 315(e).

95. The same estoppel effects bind the petitioner’s privies and real parties in interest.

96. 35 U.S.C. § 325(e)(1). In general, the provisions of post-grant review, which apply to patents filed under the first-inventor-to-file system, also apply to CBM review, unless Section 18 of the AIA otherwise specifies.

97. 35 U.S.C. § 325(e)(2) generally estops the relitigation in court of arguments that were raised or could have been raised in the USPTO, but AIA § 18 provides that § 325(e)(2) does not apply to CBM proceedings—meaning that patent validity challengers are free to raise those arguments again in the courts.

98. *See* 35 U.S.C. §§ 315(a)(1), (3) and *supra* text accompanying note 66.

petition, then that civil action is automatically stayed.⁹⁹ The stay may be lifted only if the patent owner requests it, if the patent owner claims or counterclaims infringement against the petitioner, or if the petitioner dismisses its civil action.¹⁰⁰ Likewise, if a petitioner files a civil action challenging the patent after filing a CBM petition on the same patent, then that civil action must automatically be stayed.¹⁰¹ As with IPR, an automatic CBM stay may be lifted only if the patent owner requests it, if the patent owner claims or counterclaims infringement against the petitioner, or if the petitioner dismisses its civil action.¹⁰²

Meanwhile, courts still have the discretion to stay existing infringement litigation brought by a patent owner pending the outcome of an IPR or CBM review proceeding. For IPRs, where the AIA does not specify the standard for such stays, prior standards pertaining to *ex parte* and *inter partes* reexamination remain valuable, though not conclusive, precedent.¹⁰³ Drawing on the reexamination case law, courts continue to consider the familiar three factors in deciding whether to issue stays: the potential for prejudice or tactical disadvantage; the timing of the desired stay relative to that of the administrative proceeding itself; and the likelihood that resolution of the administrative proceeding may simplify the pending litigation.¹⁰⁴

Notably, the AIA specifies a four-factor test for CBM-related stays. This four-factor test encompasses three factors courts previously used in determining contested motions for stay under the old reexamination system and adds a fourth factor—“whether a stay, or the denial thereof, would reduce the burden of litigation on the parties and on the court.”¹⁰⁵ Moreover, for purposes of “ensur[ing] consistent application of established precedent,” the AIA provides for immediate interlocutory appeal of the district court’s decision regarding stays.¹⁰⁶ It also states the Federal Circuit’s standard of review on appeal from a district court decision “may be de novo.”¹⁰⁷ Using

99. 35 U.S.C. § 315(a)(2).

100. *Id.*

101. 35 U.S.C. § 325(a)(2).

102. *Id.*

103. See Matthew R. Frontz, *Staying Litigation Pending Inter Partes Review and Effects on Patent Litigation*, 24 FED. CIR. B.J. 469, 469 (2015) (“The courts have precedent in reviewing motions to stay litigation pending the reexamination procedure; however, the newly enacted statutory limitations have made this issue ripe for judicial review.”).

104. *Id.* at 473 (citing *Universal Elecs., Inc. v. Universal Remote Control, Inc.*, 943 F. Supp. 2d 1028, 1030–33 (C.D. Cal. 2013)); see also 35 U.S.C. § 311(b) and accompanying text.

105. Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18(b)(1), 125 Stat. 284.

106. Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 18(b)(2), 125 Stat. 331.

107. *Id.*

this standard, the Federal Circuit has held that district courts have limited discretion to deny CBM-related stays when all claims asserted in litigation are also under CBM review.¹⁰⁸

In general, the AIA's legislative history indicates Congress wanted both IPRs and CBM reviews to serve as a substitute for Article III litigation over patent validity. However, for those defendants who are charged with infringement of a patent that falls within the "covered business method" designation, the broader number of grounds available for challenge, less onerous estoppel provisions, and a codified stay provision likely make CBM review even more attractive than IPR.

II. AGENCY OR COURT: STRATEGIC CHOICES

To describe more fully how these doctrinal frameworks operate in practice, we offer here the largest-scale empirical study to date of ex post administrative scrutiny of patent validity. Our analysis is based on a new dataset of all IPR and CBM petitions filed in the USPTO since the creation of these procedures under the AIA, as well as data on Article III patent cases filed contemporaneously with IPR and CBM petitions, and on requests for litigation stays pending the outcome of administrative challenges to patent validity. Our findings provide a comprehensive view of ex post administrative review that assimilates the more localized findings of prior empirical studies.¹⁰⁹ We begin with the individual patent as our basic unit of analysis and further explore patent-petitioner pairs and other details. Unless otherwise specified, our time period is from September 16, 2012 through June 30, 2015.

Our analysis can be replicated using data from the DocketNavigator service, which provides free and low-cost access to coded metadata about patent cases in the U.S. federal courts as well as the PTAB.¹¹⁰ Like LexMachina¹¹¹ and other widely used patent litigation data services, DocketNavigator obtains its underlying litigation data from the federal judiciary's Public Access to Court Electronic Records (PACER) service,¹¹²

108. *VirtualAgility Inc. v. Salesforce.com, Inc.*, 759 F.3d 1307, 1309–10, 1320 (Fed. Cir. 2014).

109. *E.g.*, Love & Ambwani, *supra* note 3.

110. DOCKETNAVIGATOR, <http://home.docketnavigator.com/ourstory> [<http://perma.cc/B4AP-SB4M>].

111. LEXMACHINA, <https://lexmachina.com/what-we-do/how-it-works> [<http://perma.cc/WA5J-UEDV>].

112. PACER, <http://www.pacer.gov> [<http://perma.cc/YP39-UJZ3>]; *see* Judy L. Heier, *Researching Patent Litigation Made Easy*, RECORDER (May 13, 2013), <http://home>

which is the principal data source of many innovation studies.¹¹³ Neither PACER nor the commercial services that rely on it permit researchers to disclose significant portions of their database. Accordingly, we describe the DocketNavigator data we used with the understanding that other researchers can readily access it to replicate our study.¹¹⁴

A. LITIGANT BEHAVIOR

Like the administrative *ex post* validity challenge mechanisms that preceded the AIA, the IPR and CBM review procedures were established to provide more affordable, more expert, and more accessible adjudication than litigation. However, what would-be patent challengers regard as barriers¹¹⁵ to contesting validity, are safeguards from the perspective of patent owners. We are quite interested, therefore, in discovering whether and under what circumstances IPR and CBM reviews are serving as defensive tools for defendants previously charged in district court with infringement; as tools for preemptive attacks upon patent owners; as mechanisms for harassment and abuse; or as a mix of these functions.

In general, we show that most patents challenged in the PTAB are also challenged in Article III litigation. However, there is no clear relationship between the number of times a patent is challenged in the PTAB and the numbers of times it is asserted in district court. Additionally, while Chemical patents are disproportionately likely to be the subject of a PTAB-only challenge, Computers and Communications (CCM) patents are disproportionately *unlikely* to be challenged only in the PTAB.

.docketnavigator.com/wp-content/uploads/2013/08/The-Recorder-Article.pdf [http://perma.cc/3ERK-XS3T] (stating that DocketNavigator obtains litigation data from PACER).

113. *E.g.*, John R. Allison, Mark A. Lemley & David L. Schwartz, *Understanding the Realities of Modern Patent Litigation*, 92 TEX. L. REV. 1769, 1772 (2014) (identifying Lex Machina, which obtains and cleans original PACER information, as the data source); Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1440–41 (2009) (identifying PACER as the data source); Jay P. Kesan & Gwendolyn G. Ball, *How Are Patent Cases Resolved? An Empirical Examination of the Adjudication and Settlement of Patent Disputes*, 84 WASH. U. L. REV. 237, 266 (2006) (identifying PACER as the data source).

114. *See infra* Appendix A.

115. Such barriers include, for example, potential estoppel in the federal courts from initiating an administrative validity challenge in the USPTO. *Supra* Section I.C.3. More generally, as discussed in detail in Part II, patent challengers face a significant collective action problem. *See* Thomas, *supra* note 37, at 333 (noting that third parties to a successful validity challenge “may readily free ride from the efforts of the former patentee and the opponent, employing the teachings of the invalidated patent to practice the invention without compensation to anyone”).

We also studied behavior at the level of the individual petitioner. For both CBM reviews and IPRs, the standard substitution model describes the majority of cases. Notably, however, in the context of IPRs, the percentage of petitioners who fall outside the standard model because they have not *themselves* previously been sued on the patent in question is surprisingly substantial, on the order of 30 percent. This percentage is particularly high with respect to Drugs and Medical patents. Also notable is the extent to which petitioners that have not previously been sued join the same petitions as those that have been sued. In the case of Drugs and Medical patents, for example, petitioners that have not previously been defendants disproportionately appear to be engaged in collective action with those that are defendants.

1. *IPR and CBM Petitions: Descriptive Statistics*

a) IPR Petitions

Through the end of June 2015, petitioners have filed 3,157 petitions for *inter partes* review. As Figure 1 shows, 116 of these filings began slowly in September 2012, when the IPR procedure became available, and have risen from twenty petitions per month to roughly 140 petitions per month.

These petitions have been distributed unevenly across technology areas. The National Bureau of Economic Research (NBER) categorizes patents into six different technology areas: (1) Chemical (excluding Drugs); (2) Computers and Communications (CCM); (3) Drugs and Medical; (4) Electrical and Electronics; (5) Mechanical; and (6) Others.¹¹⁷ As Figure 2 shows, IPR petitions disaggregated by NBER's six-part category scheme have predominantly challenged CCM-related patents, which account for just over half (50.4%) of all IPR petitions. Figure 3 confirms this trend has persisted from the start, with cumulative filings in CCM-related IPR petitions rising considerably faster than those in all other technology areas.

Although IPR petitions may challenge patent claims as to either novelty or nonobviousness, nonobviousness challenges predominate across all major technology areas. As Figure 4 shows, nearly all IPR petitions include a nonobviousness challenge, whereas the proportion of IPR petitions that include a novelty challenge varies considerably by technology. The

116. Figures are presented in Appendix B

117. See generally Bronwyn H. Hall, Adam B. Jaffe & Manuel Trajtenberg, *The NBER Patent Citations Data File: Lessons, Insights and Methodological Tools* 13 (Nat'l Bureau of Econ. Research, Working Paper No. 8498, 2001), <http://www.nber.org/patents> [<http://perma.cc/NY76-VHVV>] (articulating and defining the NBER classification system and its concordance with the U.S. Patent Classification system).

preference for including nonobviousness as a basis for challenge is not surprising. While a novelty-based challenge must rest on a single reference, a nonobviousness-based challenge can presumably take advantage of the ability of PTAB judges to engage in complex reasoning that combines multiple references.¹¹⁸

b) CBM Petitions

Compared to IPR petitions, usage of the CBM procedure has been considerably smaller in scale. Through the end of May 2015, petitioners have filed 362 petitions for CBM review. As Figure 5 shows, these filings have averaged between ten and fifteen petitions per month. Moreover, because CBM proceedings are oriented by definition toward business-method-related technologies such as information and communications, it is unsurprising that an overwhelming majority (82.2%) of CBM petitions challenge Computers and Communications-related patents. Mechanical-related patents make up another 15.9% of CBM petitions, and only a negligible share of CBM petitions fall in any other category. Figure 6 illustrates these trends.

Unlike IPR petitions, CBM petitions may challenge patent claims on a fuller range of patentability requirements: in addition to novelty and nonobviousness, subject-matter eligibility, enablement, written description, and indefiniteness are available grounds. Across this range of options, however, petitioners have focused their attention primarily on subject-matter eligibility and nonobviousness. As Figure 7 shows, 68.6% of CBM petitions challenged the subject-matter eligibility of the patent in dispute, and 71.1% challenged the nonobviousness of the patent. Just under half (48.3%) challenged novelty. By contrast, challenges as to enablement, written description, and indefiniteness each arose in fewer than 20% of petitions.

As with IPR petitions, the relative preference for nonobviousness challenges over novelty challenges in CBM petitions is rational given the greater availability of combining prior art references in evaluating nonobviousness. In addition, the strong preference for subject-matter eligibility challenges is consistent with the widespread view among critics of

118. John Schroeder, *First Ever Inter Partes Review Decision Finds Claims Not Patentable*, LEXOLOGY (Nov. 25, 2013), <http://www.lexology.com/library/detail.aspx?g=d699d660-d5da-4953-af0f-a88e3d3152d2> [perma.cc/CW4C-DGK6] (noting “the general consensus that *inter partes* review may yield better results [than juries in district court litigation] when relying on complex invalidity arguments hinging on a combination of prior art references”).

business method patents that such patents are not just narrowly problematic for inadequate disclosure in the patent specification or lack clarity in the claims—problems that are more the purview of enablement, written description, and indefiniteness—but instead are outside the scope of what should be eligible for patent protection in the first place.¹¹⁹

Beyond these basic PTAB filing trends, we find that a number of patents have been targets of serial challenges spread across both multiple petitions and multiple challengers in IPR petitions. Patents in the Chemical, CCM, and Electrical areas are particularly prone to multiple petitions. As Figure 8 shows, a majority of patents in each of these fields were the subject of multiple IPR petitions: 60.6% of Chemical patents, 50.9% of CCM patents, and 58.4% of Electrical patents. Figure 9 shows how these serial challenges are distributed within technology categories, notably that the highest volume of serial challenges is in the CCM area. We are currently studying the precise nature of these serial challenges (for example, whether they are being brought by the same petitioner) to determine whether they could represent harassment and therefore are problematic from a policy perspective. The frequency of serial challenge to a patent may also be related to the number of defendants against whom the patent is asserted in court.

119. This view was held by Senators Schumer and Kyl, who proposed a version of the CBM provision as part of a floor managers' amendment on March 1, 2011. In his March 2011 Senate floor testimony, Senator Schumer described business method patents as "the bane of the patent world" and castigated the decision the Federal Circuit in *State Street Bank* to allow such patents. 157 CONG. REC. S1363 (March 8, 2011) (statement of Senator Schumer). Among many Senators on the Republican side, positions were equally strong. The Senate Republican Policy Committee's summary of § 18, introduced into the Congressional Record by Senator Kyl, stated (somewhat inaccurately):

Recent court decisions, culminating in last year Supreme Court decision in *Bilski v. Kappos*, have sharply pulled back on the patenting of business methods, emphasizing that these "inventions" are too abstract to be patentable. In the intervening years, however, PTO was obliged to issue a large number of business-method patents, many or possibly all of which are no longer valid. The Schumer proceeding offers a relatively cheap alternative to civil litigation for challenging these patents, and will reduce the burden on the courts of dealing with the backwash of invalid business-method patents.

157 CONG. REC. S1367 (Mar. 8, 2011) (statement of Sen. Kyl); *see also* eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 396–97 (2006) (Kennedy, J., concurring) (emphasizing the "nature of the patent" as a newly relevant consideration in enforcement and accusing business method patents in particular of "potential vagueness and suspect validity").

We turn next to the general question of the relationship between patent challenges at the PTAB and patent litigation in the district courts.

2. *Article III Litigation*

Contemporaneous with petitions for IPR and CBM review in the USPTO, patent litigation in the federal courts has continued apace. To investigate the interaction between these two fora, we collected data on all 24,162 patent cases filed between September 16, 2011, and June 30, 2015, in the federal district courts.¹²⁰

Many of these cases involved multiple patents-in-suit, and we observed a total of 47,764 patent assertions across these cases,¹²¹ or an average of 1.98 assertions per patent case. Figure 10 shows the trend in patent cases over this period rising from 150 case filings per month in September 2011 to an average of over 500 case filings per month by June 2015. These petitions have also been distributed unevenly across technology areas. Figure 11 shows that patent cases have predominantly involved CCM-related patents, which far outpace all other technology areas, and that this trend has persisted from the start, with cumulative filings in CCM-related patent cases rising considerably faster than in all other technology areas.¹²²

During this time, a total of 14,218 patents were either challenged in an IPR or CBM petition, asserted in litigation, or both. A subset of 11,787 patents were involved in litigation alone; 324 patents were involved in a USPTO proceeding alone; and 2,107 patents were involved in both. Accordingly, about 15.2% of litigated patents are also being challenged in the PTAB,¹²³ and about 86.7% of IPR- or CBM-challenged patents are also being litigated in the federal courts.¹²⁴

120. We chose September 16, 2011 as our starting date for district court litigation because it represents the first date on which patents asserted in litigation could become the subject of a PTAB filing. Consistent with our interest in examining the interaction between assertion by patent owners and PTAB petitions, we excluded declaratory judgment actions. In any event, as discussed in the text, the AIA essentially makes declaratory judgment actions unavailable to those who file PTAB petitions. *See supra* Part I.

121. Though the data that we collected include cases where design and plant patents were asserted (either exclusively or together with utility patents), we focus our analysis on utility patents.

122. Because district court cases can (and frequently do) involve multiple-patents in a single suit—unlike IPR or CBM petitions, which are necessarily limited to a single patent—we calculate technology trends by aggregating a technology's relative share among the patents that were asserted in each case. For example, a patent case involving three CCM patents and two Electrical patents would have been counted as 0.6 of a CCM case and 0.4 of an Electrical case.

123. This is calculated as $2107 / (2107 + 11787) = 15.2\%$.

124. This is calculated as $2107 / (2107 + 324) = 86.7\%$.

These measures suggest validity challenges in the USPTO are, indeed, connected with the threat or fact of infringement litigation, for a large majority of challenged patents are also asserted in court. Indeed, our measures may *understate* the connection between Article III litigation and assertion at the PTAB. According to Lex Machina analytics, of the patent cases filed in the U.S. district courts during the time period that we studied, 70.2% were likely settled. Moreover, three-quarters of those likely settlements occurred within 9.9 months. This pattern of likely settlement may have been prompted, at least in part, by a defendant's threat to file a challenge at the PTAB. In addition, typically only 10% of patent lawsuits reach the stage at which they would receive a claim construction ruling. This 10% figure is in line with our finding that 15.2% of litigated patents are being challenged in the PTAB. It is worth noting that a patent challenged at the PTAB would receive an early claim construction at the institution stage in the IPR/CBM process. That said, we do not imply that the same 10% of patent cases that reach the claim construction stage in district court are also the same patents that are the subject of a challenge at the PTAB.

Our data indicate that patents challenged in the PTAB are, on average, also asserted at least three times in court. As Figure 12 indicates, however, this average reflects considerable variation (as shown by the error bars representing one standard deviation of the mean). At least when the group of patents involved in IPR and CBM proceedings is considered as a whole—that is, without disaggregation by technology and district court—the relationship between the number of IPR or CBM petitions that were filed on a patent and the number of times that the patent was asserted in district court is not monotonic. Finally, of course, most patents asserted in district court are not challenged at the PTAB.

To further investigate the relationship between PTAB challenges and Article III assertions, we evaluated a series of measures constructed from the underlying data.

a) IPR and CBM Reviews with Litigation in the Offing

In light of the intended uses of IPR and CBM review as substitutes for federal court litigation, notably, in a number of cases, a given patent was challenged in a PTAB petition *before* that patent was asserted in litigation. This is a relatively rare occurrence. As of June 30, 2015, 2107 patents have been the subjects of both a PTAB challenge (either in IPR or CBM) and of district court litigation. Only fifty-eight of these patents (2.75%) were challenged in district court litigation simultaneously with or after the first PTAB challenge, rather than before.

Their small number notwithstanding, these cases arguably represent a challenge to the standard model of a PTAB challenge as a substitute for ongoing litigation. However, a relatively small variation to that standard model could encompass the case where litigation was actually imminent. In other words, in these circumstances the filing of a petition in the PTAB was similar to a declaratory judgment action. That is, indeed, what we find. Of the fifty-eight patents that were challenged in the PTAB before any litigation, forty-seven patents (81.0%) were challenged by petitioners who were subsequently named as defendants in federal court litigation over the same patents.

b) IPR and CBM Reviews with No Related Litigation

Another phenomenon that must be reconciled with the standard model is that some patents are challenged in the PTAB but have not been observed in litigation at all, either before or after the petition for IPR or CBM review. Though a PTAB validity challenge is a reasonable substitute for litigation that has already begun or is imminent, it may be a potentially counterproductive approach for anyone else:¹²⁵ particularly in the case of an IPR (where, as contrasted with the CBM review, the petitioner does not have to be charged in any way with infringement), such a challenger might simply raise unwanted attention to its potentially infringing activities. Indeed, IPRs or CBM reviews with no related litigation are a somewhat rare occurrence. As of June 30, 2015, only 324 patents (13.3% of all patents challenged in the PTAB) have been challenged in the PTAB with no related litigation observed in the federal courts. But even the existence of such a subset might be considered peculiar.

There are several potential reasons for this unexpected subset. One is statistical censoring: the PTAB challenges are simply so recent that the patent owner has not filed responsive litigation yet, but may do so in the relatively near term. Censoring, however, does not appear to explain the subset fully. Petitions on such “PTAB-only” patents have been filed from the earliest days of IPR and CBM review in September 2012. Of the 324 patents challenged in the PTAB with no related litigation, 163 (50.3%) had been challenged in petitions filed more than one year before June 30, 2015 – that is, in or before June 2014. In other words, many of the patent owners

125. For example, the filing fees for IPR are \$9,000 at the petition stage and \$14,000 at the post-institution stage. 37 C.F.R. § 42.15(a). The filing fees for CBM review are even higher: \$12,000 at the petition stage and \$18,000 at the post-institution stage. 37 C.F.R. § 42.15(b). Contemporaneous estimates of average attorney costs were over \$130,000. Olga Berson, *Challenging Patent Validity Under the AIA: Strategic and Tactical Considerations When Deciding Whether to Pursue Ex parte Reexamination or Inter Partes Review As Part of the Overall Litigation Strategy*, 2012 WL 6636452, *12 (2012).

have had ample time to bring infringement actions against the petitioners who filed for IPR or CBM review and have not yet done so. So it is still possible, but increasingly unlikely, that a patent owner who has not asserted a patent against an IPR or CBM challenger will do so now.

A second possible reason for this phenomenon is statistical selection, including technology-specific selection: where a PTAB validity challenge is sufficiently strong, and a patent owner's countervailing infringement claim against the PTAB challenger is sufficiently weak, an invalidity challenge might arise without any corresponding infringement assertion. This kind of selection effect, however, would require that both parties have information *ex ante* about the relative merits of each other's case, *i.e.*, about the boundaries and legal viability of the patent in dispute, that is both adequate and roughly symmetric. Such *ex ante* clarity may be possible for Chemical and Drugs and Medical patents, where technical nomenclature is standardized and the boundaries of the invention are amenable to delineation.¹²⁶ *Ex ante* clarity may even be possible for Electrical and Mechanical patents if the patent discloses sufficiently detailed structural information. However, patents on CCM inventions that are claimed in functional terms would be much less likely to provide enough *ex ante* clarity that a PTAB challenge would be so plainly strong, and a retaliatory infringement suit so plainly weak, as to produce an IPR or CBM review with no litigation in response.

Additionally, in at least some technology areas, the number of patents that are clearly "important" as a matter of potential litigation risk may be relatively small and easy to identify. Particularly in the context of IPRs (which can be filed even without any assertion of infringement on the part of the patentee), the high volume of CCM-related patents may make it unclear which patents are most important.

The data are consistent with technology-specific selection effects across the three subsets of (1) patents that were only challenged in the PTAB, (2) patents that were only asserted in litigation, and (3) patents that were both challenged in the PTAB and asserted in litigation as summarized in Figure 13. Comparing PTAB-only patents with district court-only patents, the technology distributions were mostly similar. In both subsets, CCM patents accounted for about a third (32.8% and 37.1%, respectively); Drugs and Medical patents about a fifth (20.6% and 19.7%, respectively); Electrical

126. Peter S. Menell & Michael J. Meurer, *Notice Failure and Notice Externalities*, 5 J. LEGAL ANALYSIS 1, 36 (2013). Indeed, in the case of certain drugs (so-called small molecule drugs), patents asserted to cover the drug are specifically on the FDA "Orange Book."

patents a little less than a seventh (13.9% and 11.3%, respectively); and Mechanical patents a little more than a tenth (11.5% and 10.1%, respectively).¹²⁷ Only Chemical patents occupied a significantly greater share of PTAB-only patents (12.5%) than of district court-only patents (4.9%).¹²⁸

The most notable difference was for patents that were both challenged in the PTAB and asserted in district court. A majority of these PTAB-and-district-court patents (54.7%) were in the CCM technology area, as compared with 32.8% of PTAB-only patents.¹²⁹ This underrepresentation of CCM patents in the PTAB-only group is consistent with the expected lower likelihood that CCM patents offer enough *ex ante* clarity and evidence of importance to produce PTAB challenges in situations where there is no federal court litigation.

Having considered the special cases of PTAB validity challenges that either precede a district court litigation or have no related litigation at all, we now turn to the standard model of PTAB validity challenge as a direct response by a defendant in prior infringement litigation.

c) CBM and IPR Challenges As Direct Self Interest

As we have discussed, a defendant that challenges a patent's validity in the USPTO *after* the patent has been asserted in litigation is the standard use of CBM and IPR petitions. The USPTO's expertise substitutes for the generalist orientation of the courts. We find that, overall, CBM and IPR petitions are in fact predominantly assertions of the petitioners' own direct interests with respect to infringement liability on the particular patent being challenged.

In the majority of cases, petitioners for CBM review have previously been defendants in federal court litigation where the same patent was asserted. Two related measures support this finding. One is the share of CBM *petitioners* (77.9%) who have previously been defendants in district court litigations involving the patents they later challenge in CBM review. The other is the share of CBM *petitions* (82.7%) in which at least one petitioner was previously a defendant as to the patent now being challenged. These results are perhaps unsurprising, as CBM petitions can only be

127. These differences were not statistically significant ($p > 0.05$ using a two-tailed test of proportions).

128. Conversely, "Other" patents occupied a greater share of district court-only patents (16.9%) than of PTAB-only patents (8.8%).

129. This difference was highly statistically significant ($p < 0.0001$ using a two-tailed test of proportions).

brought by those sued for, or charged with, infringement. Additionally, though it is not particularly meaningful to speak of technology differences among CBM petitions,¹³⁰ Figures 14a and 14b show that the finding also persists for each NBER technology category.

Similarly, in the case of IPRs, the majority (70%) of IPR petitioners have previously been defendants in district court litigations involving the patents they now challenge. The remaining 30% of cases in which petitioners are not prior defendants do, however, represent an interesting puzzle, particularly if one looks across technologies, and also at the percentage of petitions in which at least one petitioner was previously a defendant. We turn next to this puzzle.

d) IPR Challenges by Entities That Were Not Prior Defendants

As Figure 15a shows, the percentage of IPR petitioners who were not prior defendants varies substantially across technologies. Notably, because only about 48% of petitioners in the Drugs and Medical area have previously been sued, over half of all petitioners in this technology are non-standard. In some cases, generic firms may be filing even prior to being sued in order to clear the path toward eventual entry into the market. In other cases, we know from reading IPR petitions to identify petitioners that third parties have been active. One active third party is J. Kyle Bass, the principal of Hayman Capital Management and of the Coalition for Affordable Drugs, who, as of June 30, 2015, had filed at least twenty-eight petitions.¹³¹ Another is Erich Spangenberg, the chief executive of the IP Navigation Group and of nXn Partners, who is a co-petitioner on those twenty-eight petitions.¹³² Both Mr. Bass and Mr. Spangenberg have thus far focused their validity challenges entirely on Drugs and Medical-related patents.

Figures 15a and 15b also reveal substantial disparities in certain technology areas between the share of *petitioners* who were previously sued and the share of IPR *petitions* with at least one petitioner who was previously

130. This is because the availability of CBM review is defined, and limited, by technology, and as a result, CCM patents have accounted for 82.2% of all CBM Petitions, with 15.9% coming from Mechanical patents and 1.9% from Other patents. *See infra* Figure 6.

131. Joseph Walker & Rob Copeland, *New Hedge Fund Strategy: Dispute the Patent, Short the Stock*, WALL ST. J., Apr. 7, 2015, <http://www.wsj.com/articles/hedge-fund-manager-kyle-bass-challenges-jazz-pharmaceuticals-patent-1428417408> [<http://perma.cc/X26M-53QM>].

132. David Segal, *Has Patent, Will Sue: An Alert to Corporate America*, N.Y. TIMES, July 13, 2013, <http://www.nytimes.com/2013/07/14/business/has-patent-will-sue-an-alert-to-corporate-america.html> [<http://perma.cc/R2X6-8D49>].

a defendant on the challenged patent. Specifically, the petitioner vs. petition disparities are quite substantial in the categories of Drugs and Medical (48.5% vs. 70.8%), Mechanical (53.1% vs. 70.2%), and Other (65.5% vs. 82.6%). The disparities reveal that, in each of these technology areas, petitioners who are not prior defendants are joining petitions filed by prior defendants.

Arguably, this collective action is socially beneficial, as it directly addresses the general collective action problem in challenging invalid patents.¹³³ However, to the extent collective action takes the form of serial petitions that are joined later to the petition of a prior defendant, it could be seen as harassment and delay. Currently, our data do not allow us to determine exactly *when* nondefendant petitioners are joining the petitions of defendants. PTO regulations do require, however, that a joinder request be filed no later than one month after the institution date of any *inter partes* review for which joinder is requested.¹³⁴ In ongoing research, we are parsing the joinder data more finely to look at timing and how the regulations are being applied.

In this regard, it bears mention that fostering collective action is the explicit mission of organizations such as Unified Patents, which files patent validity challenges on behalf of its member companies in order to reduce their patent litigation risk.¹³⁵ We expect that, in order to be effective, such member-based organizations would likely file significant numbers of IPR petitions and focus their efforts largely on a single technology area. During the time period of our study, Unified Patents had, for example, filed at least twenty-four petitions of which seventeen (71%) are against CCM-related patents.

e) Timing Between the Courts and the USPTO

Closely related to the “non-standard” petitioner issue is the question of time lag between Article III assertion and PTAB challenge. Unless the petition includes a request for joinder, a petitioner cannot file an IPR challenge more than a year after it has been sued for infringing a particular patent.¹³⁶ As a result, administrative validity challenges filed more than one year after the last federal court lawsuit prior to a petition are likely to reflect either non-standard petitioners and/or petitioners seeking joinder to earlier petitions.

133. See *supra* text accompanying notes 36–38.

134. 37 C.F.R. § 42.122(b).

135. UNIFIED PATENTS INC., <http://www.unifiedpatents.com/faq> [<http://perma.cc/K4XC-4Y23>].

136. See 35 U.S.C. § 315(b).

To investigate these issues further, we measured the time lag between the first IPR petition on a given patent and the federal court litigation on that patent filed *most recently prior* to the first IPR petition. (By definition, the first IPR petition cannot request joinder.) As an additional frame of reference for these results, we calculated the lag between the first IPR petition on a given patent and the *earliest* observed federal court litigation on that patent. The latter measure takes a broad view of how court-agency lags are distributed and is likely to contain a small, but non-trivial, number of instances where the lag is greater than one year. The reason is that, for repeatedly-asserted patents, the first defendant sued need not be the one that mounts a validity challenge in the USPTO.

As Figure 17 shows, quite a few patents fit this latter profile: nearly a quarter of the distribution (23.4%) exceeds the one-year lag from the earliest observed federal court litigation on a given patent, reaching upwards of three years for some patents. Notably, a small share of patents, roughly 3.3%, shows a negative lag indicating the first IPR petition against the patent *preceded* the first federal court assertion of the patent¹³⁷ For these patents, administrative validity challenges are not defensive in the traditional sense, as no offensive litigation has yet been observed; rather, they are, at most, preemptive. Most IPR petitions, however, fall within the zero-to-one-year range, distributed symmetrically about a median lag of six months, with a modal spike at the one-year deadline.

Meanwhile, measuring from the *last* pre-IPR federal court lawsuit to the first IPR petition is likely to capture not only non-standard petitioners but also cases where earlier lawsuits against others have revealed useful information about the patent owner's enforcement strategy so that less time is needed to decide whether and how to prepare an IPR challenge. This is, in fact, what the data reveal in Figure 18. The majority of cases fall again within the zero-to-one-year range, but with a median lag roughly four months less than in Figure 17. A far smaller share of the distribution (11.4%) exceeds one year—presumably this 11.4% comprises non-standard petitioners only. As before, a modal spike near and at a one-year lag indicates that litigants wait for the statutory deadline.

These direct and indirect measures suggest that challenges to patent validity through *inter partes* review are primarily—though not exclusively—a defensive response to existing litigation. In most cases, a prior defendant files an administrative challenge. Other entities, acting on this revealed information, may also respond with petitions for validity review.

137. As we have discussed, these preemptively-challenged patents may reflect litigation in the offing or else no related litigation. See *supra* Sections III.A.2.a-b.

We now turn to another aspect of strategic behavior in patent litigation that has previously presented policy concerns: the tendency of patent cases to be filed disproportionately in a few judicial districts, so much so that these districts are now widely identified with patent litigation.

f) District-Specific Effects

Skewed distribution of patent litigation toward particular high-volume judicial districts and litigant forum-shopping, which not only results from this skew but also contributes to it, are well documented.¹³⁸ It is likely, then, that such leading patent courts should send commensurately greater numbers of patents into PTAB validity challenges as well. Yet in this regard, the data show a surprising effect. Of the eight leading district courts—which together account for nearly 70% of litigated patents during the observed time period—the top three courts were *overrepresented* in sending patents into PTAB validity challenges, and the remaining five were *underrepresented*.

Figure 16 depicts the fraction of *all litigated patents* that were litigated at least once in a given court and the fraction of all *IPR-challenged patents* that were litigated at least once in the same court, across the top eight districts for patent litigation. The latter fraction was significantly higher than the former for the District of Delaware (41.1% vs. 34.4%), the Eastern District of Texas (41.4% vs. 28.5%), and the Northern District of California (21.6% vs. 15.2%),¹³⁹ indicating that patents litigated in those districts were unusually likely to be challenged in *inter partes* review. The effect was reversed for the other high-volume patent districts, including the Central District of California (14.1% vs. 16.0%), the District of New Jersey (10.0% vs. 13.0%), and the Northern District of Illinois (4.8% vs. 9.6%).¹⁴⁰

The great disparity we see in the Eastern District of Texas is unsurprising—the court's strong pro-patentee reputation¹⁴¹ would be expected to drive defendants to a more strategically favorable forum. This effect is likely in spite of the apparently low likelihood of defendants either

138. See generally notes 29–34 and accompanying text.

139. These differences were highly significant ($p < 0.0001$ using a two-tailed test of proportions).

140. These differences were all significant as well ($p < 0.05$ using a two-tailed test of proportions).

141. See, e.g., Vishnubhakat, *supra* note 31, at 65 (discussing the reputation of the Eastern District of Texas for producing pro-patentee outcomes).

filing or being granted stays in the Eastern District of Texas.¹⁴² In the cases of the District of Delaware and the Northern District of California, the reasons for disproportionately high IPR filings are less clear. Defendants may be encouraged, however, by the high rate of stay grants in these districts.¹⁴³

B. AGENCY DECISIONS

When petitioned, the PTAB must decide whether to institute an IPR or CBM review on the grounds petitioned. If it decides to institute a review, the PTAB must then adjudicate the case on its merits. Decisions on institution and on the merits are interdependent in that the legal standard for instituting an IPR is whether the petitioner is reasonably likely to succeed as to at least one claim, and the legal standard for instituting a CBM review is whether the petitioner is more likely than not to prevail as to at least one claim.¹⁴⁴ Therefore, the rates of institution are particularly important because the very fact of institution is, by statutory design, a credible signal about the ultimate outcome of the validity challenge.

In the case of IPR, an early study that examined petitions filed as of March 31, 2014 found that, of those petitions that had reached an institution decision by the time of the authors' analysis in late 2014, 84.0% had been granted as to at least one challenged claim.¹⁴⁵ Our analysis, which runs through June 30, 2015, confirms this point estimate but reveals a slow and consistent decline in the institution rate. Figure 19 compares over time (1) the running total number of IPR petition filings, (2) the running total number of institution decisions, and (3) the running total number of institution decisions granting at least one challenged claim. Calculating the institution rate as (3) divided by (2) over time, Figure 20 shows that the rate has been declining and is currently 74.8%.

The earlier study also found that 74.0% of at-least-partially instituted petitions were fully instituted. Our data conflict on this point. We find that 41.2% of at-least-partially instituted decisions made on petitions filed by March 31, 2014 were fully instituted.¹⁴⁶ As of June 30, 2015, 51.4% of at-

142. *PTAB Stay Stats: 2012 to May 31, 2015*, WINSTON & STRAWN LLP, <http://www.winston.com/en/thought-leadership/winston-publishes-stats-on-ptab-stays.html> [<https://perma.cc/3W7H-Y3Q4>].

143. *Id.*

144. See 35 U.S.C. § 324(b), *supra* note 91; LEXMACHINA, *supra* note 110, and accompanying text.

145. Love & Ambwani, *supra* note 3, at 100.

146. With respect to petitions filed by March 31, 2014, we observed 851 IPR institution decisions (roughly similar to the 823 in the earlier study) and 699 decisions

least-partially instituted petitions were fully instituted, and 38.4% of petitions that received an institution decision were fully instituted. These trends are summarized in Figure 21.

In addition to general institution rates, we also disaggregate institution rates by technology area and by the grounds on which patent validity was challenged. Figure 22 shows the rates at which institutions are granted and denied across technologies for petitions arguing a lack of novelty. Petitions on Drugs and Medical-related patents have a 59.9% likelihood of being denied,¹⁴⁷ and in all other technologies, petitions are as likely as not to be instituted ($p > 0.05$). Figure 23 shows the rates at which institutions are granted and denied across technologies for petitions arguing a lack of nonobviousness. Perhaps not surprisingly, given the ability of expert judges to combine multiple references, nonobviousness petitions are more likely than not to be instituted across all technology areas. Nonobviousness challenges to Chemical patents are particularly likely to be granted, with an institution rate of 68.5%.¹⁴⁸

Meanwhile, for CBM petitions, comparing technology categories is not particularly meaningful, as the definition of covered business method patents in practice overlaps substantially with CCM-related patents. Instead, because CBM review allows the full range of legal grounds on which to challenge validity¹⁴⁹ and because petitioners themselves have availed themselves of these grounds to varying degrees,¹⁵⁰ comparing the rates at which CBM petitions have been instituted with respect to each of these grounds is more meaningful.

Figure 7 previously showed that subject-matter eligibility under § 101, novelty under § 102, and nonobviousness under § 103 were the major grounds on which CBM petitions have been filed whereas the enablement, written description, and definiteness requirements of § 112 have been employed relatively infrequently. Because CBM review arose out of categorical resistance to business methods as patent-eligible subject matter,

granting at-least-partial institution (roughly similar to the 691 in the earlier study). These small discrepancies may arise in part because we had the benefit of observing PTAB actions on petitions over a longer time horizon. Truncation does not, however, explain our disparate findings on rates of full institution.

147. The differences between respective likelihoods of grant and denial are highly significant ($p < 0.001$ using a two-tailed test of proportions).

148. The differences between respective likelihoods of grant and denial are significant ($p < 0.05$) for Mechanical-related petitions, and highly significant for all other technologies ($p < 0.005$). Comparisons use a two-tailed test of proportions.

149. See 35 U.S.C. § 315(a)(2); Frontz, *supra* note 103; *supra* note 108.

150. See *infra* Figure 7.

and inception of CBM review coincided with Supreme Court decisions substantially strengthening patent eligibility requirements, we expected that subject-matter challenges would be the most fertile ground for decisions to institute CBM petitions. We expected that the remaining grounds would be likely to garner fewer PTAB institutions, though in the particular case of nonobviousness, the higher standard imposed by the Supreme Court's 2007 decision in *KSR Int'l Co. v. Teleflex Inc.*¹⁵¹ might have an impact.

Figure 24 confirms our hypothesis that subject matter eligibility would dominate the CBM procedure. Subject matter eligibility-based CBM petitions are overwhelmingly instituted, at a rate of 70.9%.¹⁵² For all other grounds, decisions *not to institute* predominate by large margins: challenges based on novelty were denied at a rate of 59.3%; nonobviousness, 56.9%; enablement, 100%; written description, 71.7%; and definiteness, 64.7%.¹⁵³

C. COURT DECISIONS

While the USPTO evaluates and decides invalidity petitions, federal courts must decide how to manage ongoing patent infringement litigation on which these validity challenges can have considerable impact. The most frequent decision for courts is when to issue a stay. The ability of defendants to obtain litigation stays pending the outcome of validity challenges is a powerful strategic consideration in managing both the immediate cost of litigation and the eventual threat of liability. Conversely, the tendency of courts to grant such stays is a powerful strategic consideration for patent owners to enforce their rights effectively and deflect potential harassment and abuse by challengers.

Table 1. Results of Motions to Stay Pending *Inter Partes Review*

<i>Inter Partes Review</i>	Fully Denied	Denied without prejudice	Denied in part granted in part	Granted
Motion to Stay Pending <i>Inter Partes Review</i>	67	47	22	113
Renewed Motion to Stay Pending <i>Inter Partes Review</i>	2	0	2	11
Stipulated/Agreed Motion to Stay Pending <i>Inter Partes Review</i>	0	2	2	1
Sua Sponte Motion to Stay Pending <i>Inter Partes Review</i>	0	0	0	1
Subtotal	69	49	26	126
Share	25.6%	18.2%	9.63%	46.7%

151. 550 U.S. 398 (2007).

152. The difference between likelihoods of grant and denial is highly significant ($p < 0.0001$ using a two-tailed test of proportions).

153. The differences between likelihoods of grant and denial were all significant ($p < 0.05$) and in many cases highly significant ($p < 0.005$) using a two-tailed test of proportions.

Table 2. Results of Motions to Stay Pending Covered Business Method Review

CBM Review	Denied	Denied without prejudice	Denied in part granted in part	Granted
Motion to Stay Pending CBM Review	12	7	9	26
Renewed Motion to Stay Pending CBM Review	1	0	0	7
Sua Sponte Motion to Stay Pending CBM Review	0	0	0	1
Subtotal	13	7	9	34
Share	20.6%	11.1%	14.3%	54.0%

Tables 1 and 2 provide basic statistics regarding motions for stays pending IPR and CBM proceedings, as well as federal court adjudications of such motions. As the statistics indicate, full denials of motions to stay (as contrasted to the combined total of “denials without prejudice,” partial grants, and grants) are relatively rare, particularly in the context of CBM reviews.

III. DISCUSSION

Our analysis yields several “top-line” findings regarding strategic choices by parties in PTAB proceedings. Most patents challenged at the PTAB are also in Article III litigation—PTAB petitions on patents that are not being litigated by any entity in an Article III court are relatively rare. Moreover, the standard substitution model – wherein a petitioner files a patent challenge at the PTAB after it has been sued on that patent in district court is operative not only in the CBM context but also in the majority (70%) of PTAB IPR cases. The high prevalence of standard substitution has clear implications for how the PTAB should conduct claim construction. In those cases where a patent claim is upheld by the PTAB, a claim construction standard that parallels that of the district court would increase efficiency, as the district court could rely on the PTAB claim construction in any subsequent proceedings.¹⁵⁴ Our findings on substitution are thus

154. Indeed, if the claim construction standards used by the PTAB and the district court were the same, and the parties involved in the two fora were the same, the doctrine of issue preclusion might *mandate* district court reliance upon the prior PTAB claim construction. In *B&B Hardware, Inc. v. Hargis*, 135 S.Ct. 1293 (2015), the Supreme Court recently held that issue preclusion applied when the same parties were litigating in district court a “likelihood of confusion” issue that had previously been decided at the USPTO’s Trademark Trial and Appeal Board. Identical claim construction standards could also mean that if the district court had issued a claim construction prior to the PTAB, the PTAB could rely on the district court construction. As a practical matter, however, because of the time that generally elapses before district court claim construction, and because PTAB claim construction occurs at the time of the institution decision, district court claim construction is unlikely to precede claim construction by the PTAB.

directly relevant to the claim construction dispute currently being litigated at the Supreme Court in *Cuozzo Speed Technologies v. Lee*.

If there is no Article III litigation, CCM patents are *particularly* unlikely to be challenged at the PTAB. In this area of technology, district court assertion may be necessary to force parties to overcome several technology-specific barriers to a petition. These barriers may include an absence of clarity regarding the merits of a validity challenge created by lack of boundary notice, as well as informational hurdles created by the sheer volume of CCM patents.

Just as Article III litigation disproportionately accompanies PTAB petitions on CCM patents, IPR petitions in the CCM field appear to be brought largely by the same entities that are defendants in Article III litigation. Both the share of CCM petitions involving at least one prior Article III defendant (81.5%) and the share of CCM petitioners who are themselves prior defendants (76.3%) are quite high. This result suggests that non-standard petitioners are, at least thus far, playing a relatively modest role in IPR petitions brought against CCM patents. Thus, to the extent we see a substantial amount of serial petitioning in the CCM area, this is being generated by prior defendants.

The most significant role for non-standard petitioners is in the Drugs and Medical area. For Drugs and Medical-related challenges, previously sued defendants make up only a minority of petitioners (48.5%). Non-standard petitioners also appear to be engaging in significant collective action with standard petitioners. A substantial majority (70.8%) of petitions in this area contains at least one petitioner who has previously been sued. Litigation defendants in the Drugs and Medical field are clearly bringing aboard entities that have not yet been sued. In order to address policy implications (e.g., whether it is socially beneficial collective action or possible harassment), we are currently investigating the important policy question of precisely *when* these other entities are getting on board.

In addition to technology-specific effects, we see district-specific effects. To a statistically significant degree, patents litigated in the “top three” district courts—the Eastern District of Texas, the District of Delaware, and the Northern District of California—are more likely to be the subject of an IPR than patents litigated in other districts. The statistically and numerically significant results for the Eastern District of Texas are unsurprising. Whether or not judges in the Eastern District grant stays for ongoing litigation (and the available data suggest defendants are less likely to seek or be granted stays than in other districts), the Eastern District’s “pro-plaintiff” reputation makes filing a PTAB petition an obvious choice for any defendant. In the case of Delaware and the Northern District of

California, the reasons for disproportionately high IPR filings are less clear. Defendants in those districts may be encouraged, however, by the high rate of stay grants in these districts.

Agency decision-making also exhibits some interesting patterns. Perhaps because high early rates of institution spurred petitioners to challenge somewhat stronger patents, the overall institution rate has decreased over time. Agency decision-making also exhibits differential patterns across technology: specifically, IPR institution rates are significantly higher for CCM patents than for Drug and Medical patents. Meanwhile, nonobviousness represents a stronger ground for securing a favorable institution decision on an IPR than novelty. As for CBM reviews, § 101 is clearly the best route for challengers.

In current ongoing work, we are investigating both more intensively and more formally the interrelated questions of collective action and potential harassment. Specifically, we are investigating the precise nature and timing of the collective action undertaken both by petitioners that are prior defendants and those that are not prior defendants. We are also interested in whether non-defendant petitioners do in fact become defendants at a later point in time. Additionally, we are developing regression models that assess, conditional on assertion in litigation, what factors influence the likelihood and frequency of a patent being challenged at the PTAB.

IV. CONCLUSION

Our data indicate that PTAB petitions on patents that are not being litigated by *any* entity in an Article III court are relatively rare, particularly in the CCM area. Additionally, the “standard model” of prior district court defendants bringing PTAB petitions on the patents asserted against them in district court explains 70% of IPR cases and an even greater percentage of CBM cases.

Given the dominance of prior federal district court litigation involving the same parties in patents challenged through IPRs and CBMs, the PTAB’s approach to claim construction should be one upon which district courts can rely in subsequent proceedings. With identical standards, district courts will be able to reap significant efficiency gains from PTAB claim construction decisions.

That said, a significant minority of IPRs are being brought by entities that were not prior defendants in lawsuits over the patents that they are now challenging. Non-standard petitioners are particularly prevalent in the Drugs and Medical area. In ongoing research, we are examining the precise

role of these non-standard petitioners to examine whether they are engaging in beneficial collective action or in non-beneficial harassment.

Finally, at least thus far, the relative reluctance of the Eastern District of Texas to grant stays does not appear to have impeded entities' disproportionate desire to seek IPRs for patents asserted in the Eastern District. Perhaps more surprisingly, patents asserted in the Northern District of California and in the District of Delaware also see a disproportionate number of IPR petitions.

APPENDIX A: DATA

Our analysis can be replicated using data from DocketNavigator, which provides free and low-cost access to coded metadata about patent cases in the U.S. federal courts and the USPTO Patent Trial and Appeal Board.¹⁵⁵ In this Appendix, we describe the DocketNavigator data with the understanding that other researchers can readily access it to replicate our study.

A. PTAB DATA

DocketNavigator's search interface allows minimal queries that can yield large result sets. Thus, to obtain all case information on all petitions filed in the PTAB, we used only one search term: "Patent Trial and Appeal Board (PTAB)" for the "Court/Agency" field. Because the total number of PTAB cases in the DocketNavigator database recently passed 4,000 and search results are displayed one hundred at a time, the results are distributed across forty pages. Detailed party information about cases is bulk-downloadable on a page-by-page basis, i.e., each download contains detailed party information about the cases displayed on the given page of results. Similarly, detailed information about the patents involved in the cases is bulk-downloadable on a page-by-page basis as well. Both sets of case information include multiple variables:

Party Information	Patent Information
Case name	Case name
Court abbreviation	Court abbreviation
Case number	Case number
Case filing date	Case filing date
Party name	Patent
Party roles	Patent title
Firm name	Parties
Attorney name	USPTO class codes
	Cooperative patent class codes

Importantly, case-identifying variables appear in both sets of downloads, allowing them to be merged. To construct our data set, we downloaded this detailed party information as well as patent information for all PTAB petitions and merged them by PTAB case number. The

155. DOCKETNAVIGATOR, <http://www.docketnavigator.com> [<http://perma.cc/QLY4-LJT7>].

merged results yielded a comprehensive set of filing, party, and patent information for each IPR and CBM review petition at the PTAB.

In addition to petition data, DocketNavigator provides searchable data on PTAB institution decisions. As the earliest PTAB institution decisions came in December 2012, a date-based search for decisions issued on or after November 1, 2012 (or any similarly early date), returns a set of all decisions. As with petition data, these results are accessible one hundred at a time on a page-by-page basis. To this end, the “Print Friendly” feature in the search result interface generates a simple formatted table to copy directly into spreadsheet software. The institution decision data contain the following variables:

Institution Decision Information
Patent number
Case name
Case number
Substantive ground for petition
Institution decision on that ground
Relevant patent claims to which the decision pertains
Order filing date

Finally, DocketNavigator provides searchable data on final determinations by the PTAB. Searching for “Patent Trial and Appeal Board (PTAB)” in the “Court/Agency” field returns a set of all determinations. These results, too, are accessible one hundred at a time on a page-by-page basis and available in a simple formatted table through the “Print Friendly” feature in the search result interface. The final determinations data contain the following variables:

Final Determination Information
Patent number
Case name
Case filing date
Determination
Judge
Order filing date

Because this institution decision data and final determination data also contain case-identifying variables that overlap with the filing, party, and patent data, we readily merged this additional information into our data set as well.

B. DISTRICT COURT DATA

We obtained case information on patent litigations filed in the U.S. district courts with a similarly minimal search query in DocketNavigator's primary search interface: "U.S. District Courts (and all districts)" for the "Court/Agency" field. The total number of patent cases in the DocketNavigator database exceeded 55,000 results. Because IPR petitions are generally time-barred one year from the date when a would-be petitioner has been sued on the same patent in U.S. district court,¹⁵⁶ we determined that a reasonably complete set of federal patent litigation would not need to extend more than one year before the IPR mechanism became available. Therefore, we narrowed our search to cases, other than declaratory judgment cases, filed on or after September 16, 2011, one year prior to the enactment of IPR and CBM review mechanisms in the PTAB.

As with PTAB cases, detailed party and patent information about U.S. district court patent cases is bulk-downloadable on a page-by-page basis. Both sets of case information include multiple variables:

Party Information	Patent Information
Case name	Case name
Court abbreviation	Court abbreviation
Case number	Case number
Case filing date	Case filing date
Party name	Patent
Party roles	Patent title
Firm name	Parties
Attorney name	USPTO class codes
	Cooperative patent class codes

To construct our data set, we downloaded this detailed party and patent information for all relevant patent lawsuits and merged them on the case number, producing a comprehensive set of filing, party, and patent information on each patent lawsuit in the U.S. district courts.

156. 35 U.S.C. § 315(b).

APPENDIX B: FIGURES

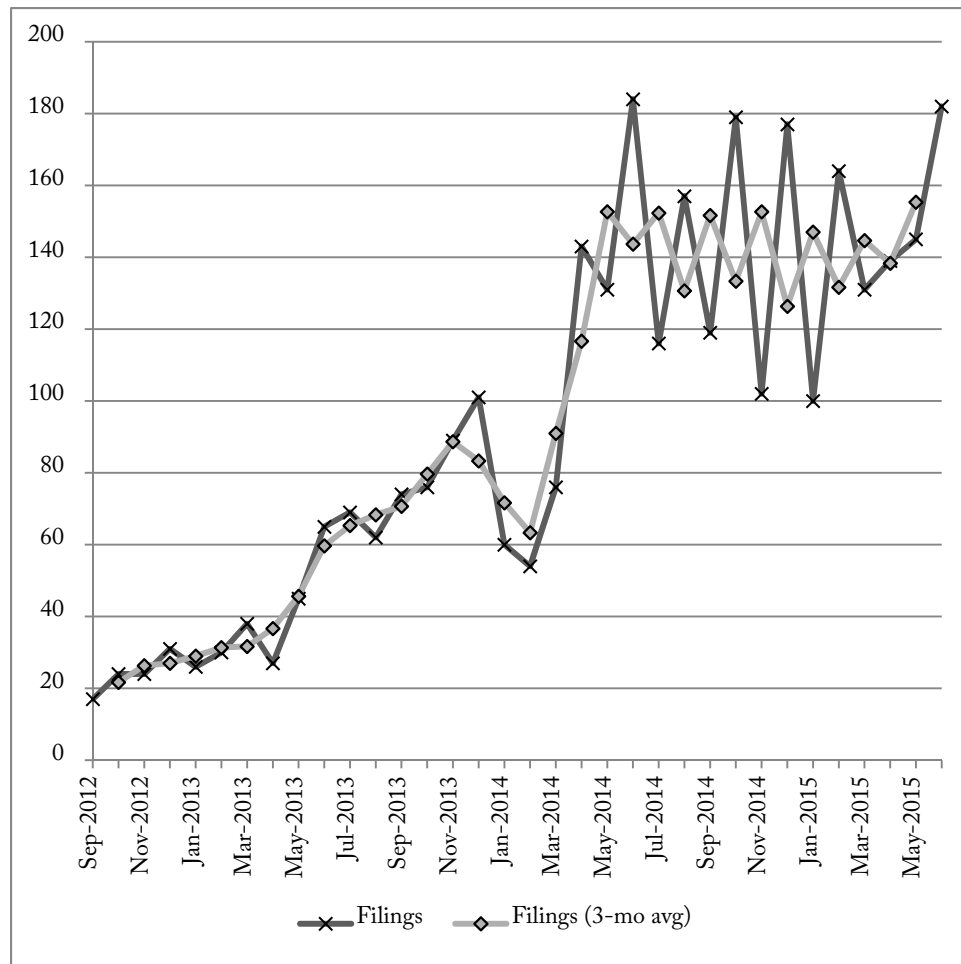


Figure 1: IPR Petition Filings by Month

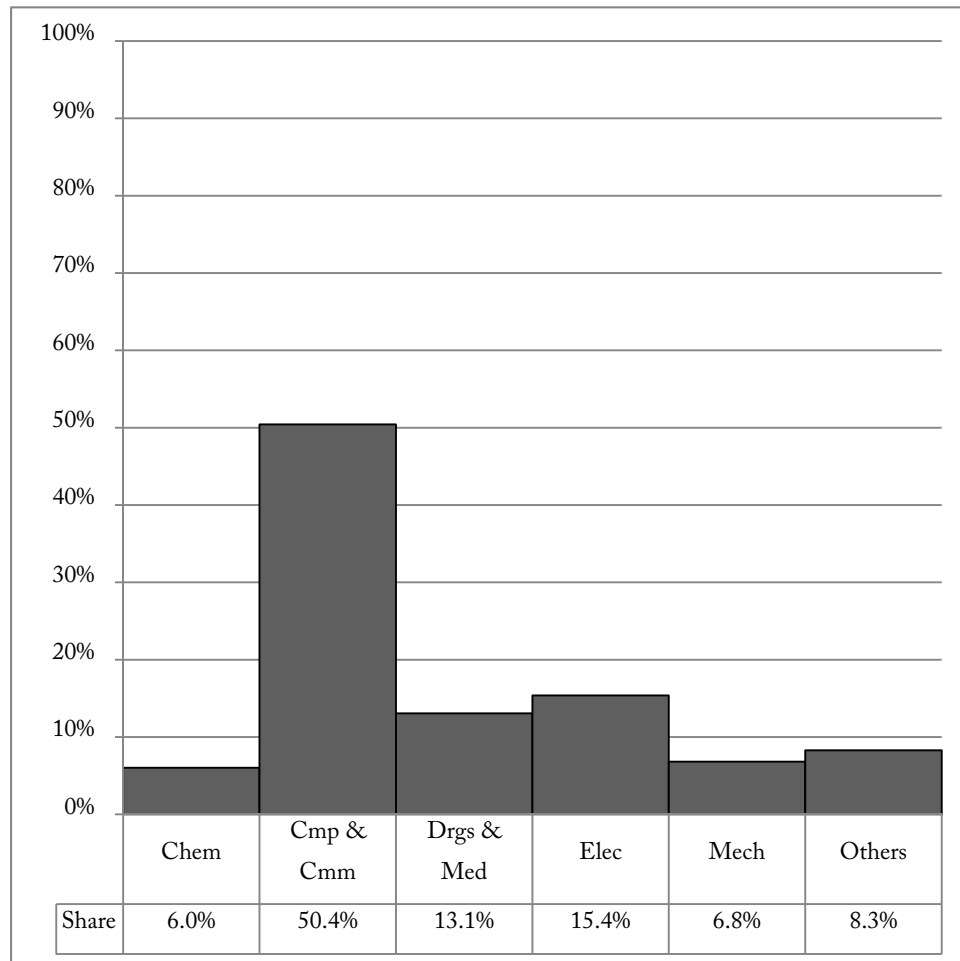


Figure 2: IPR Petition Filings Across Technology

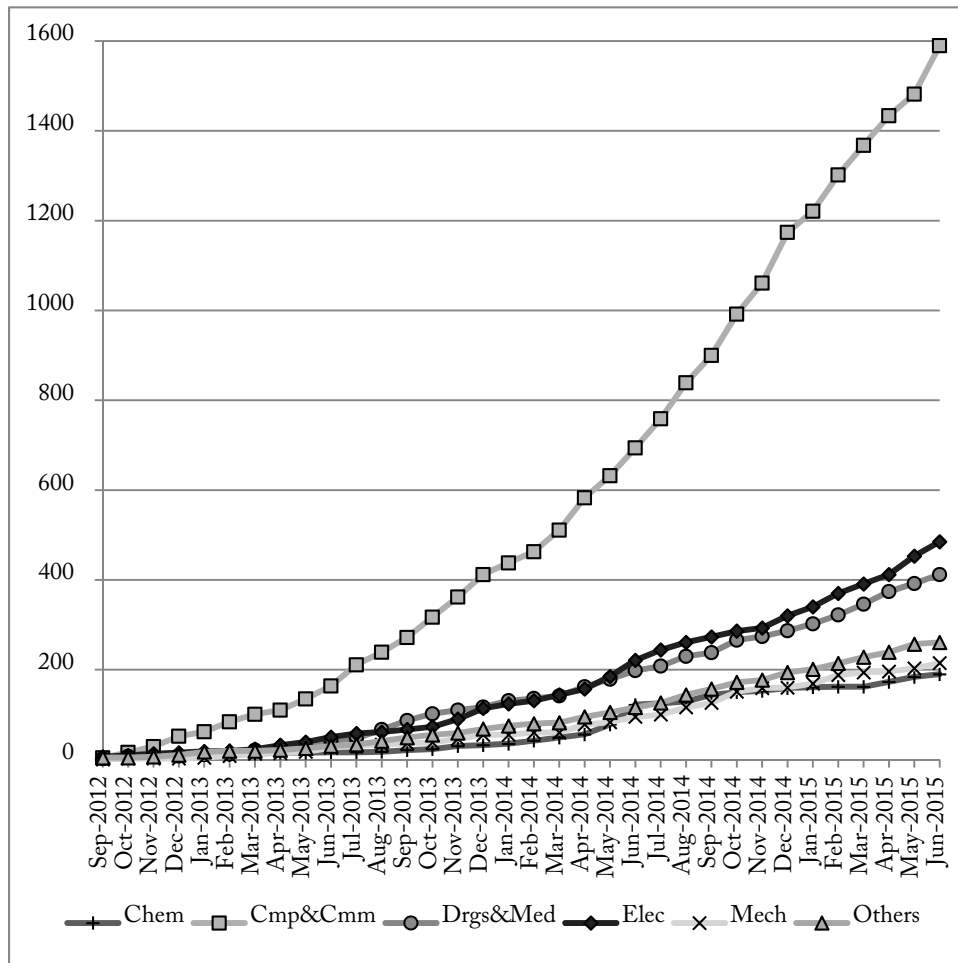


Figure 3: Cumulative IPR Petition Filings Across Technology

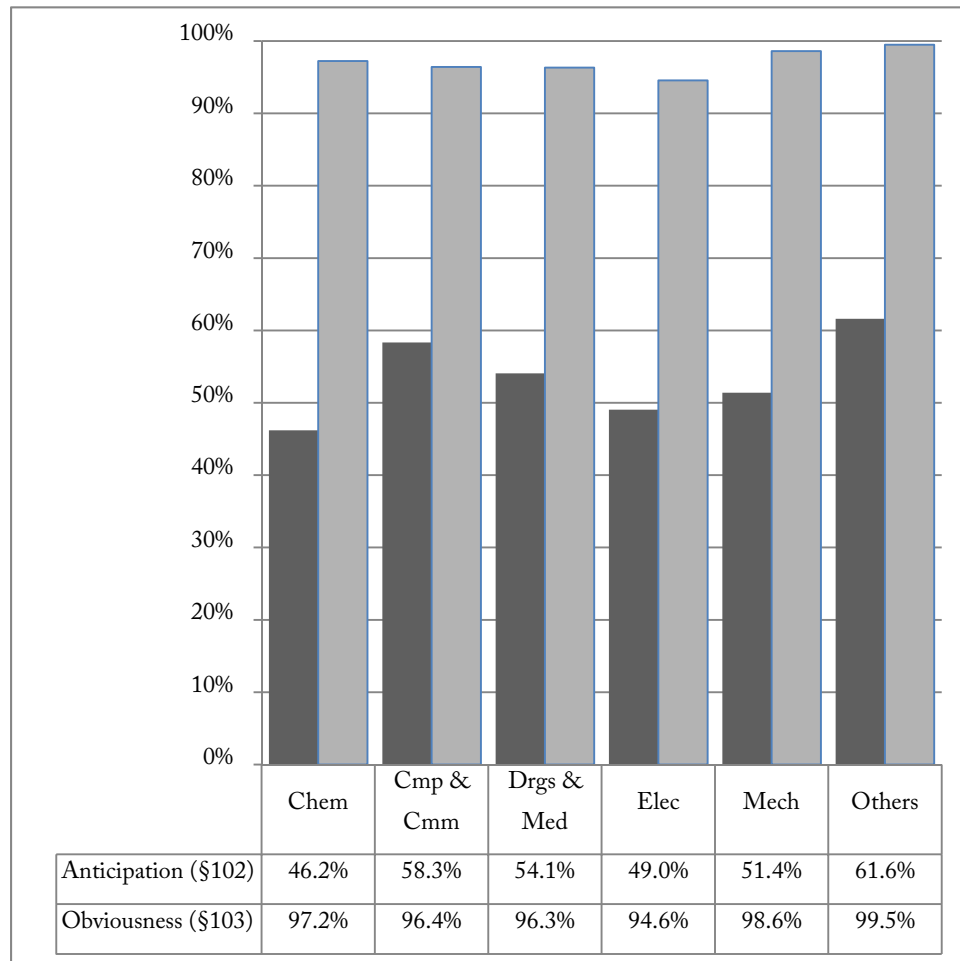


Figure 4: Proportions of IPR Petitions Containing Each Grounds for Challenge, Across Technology Area

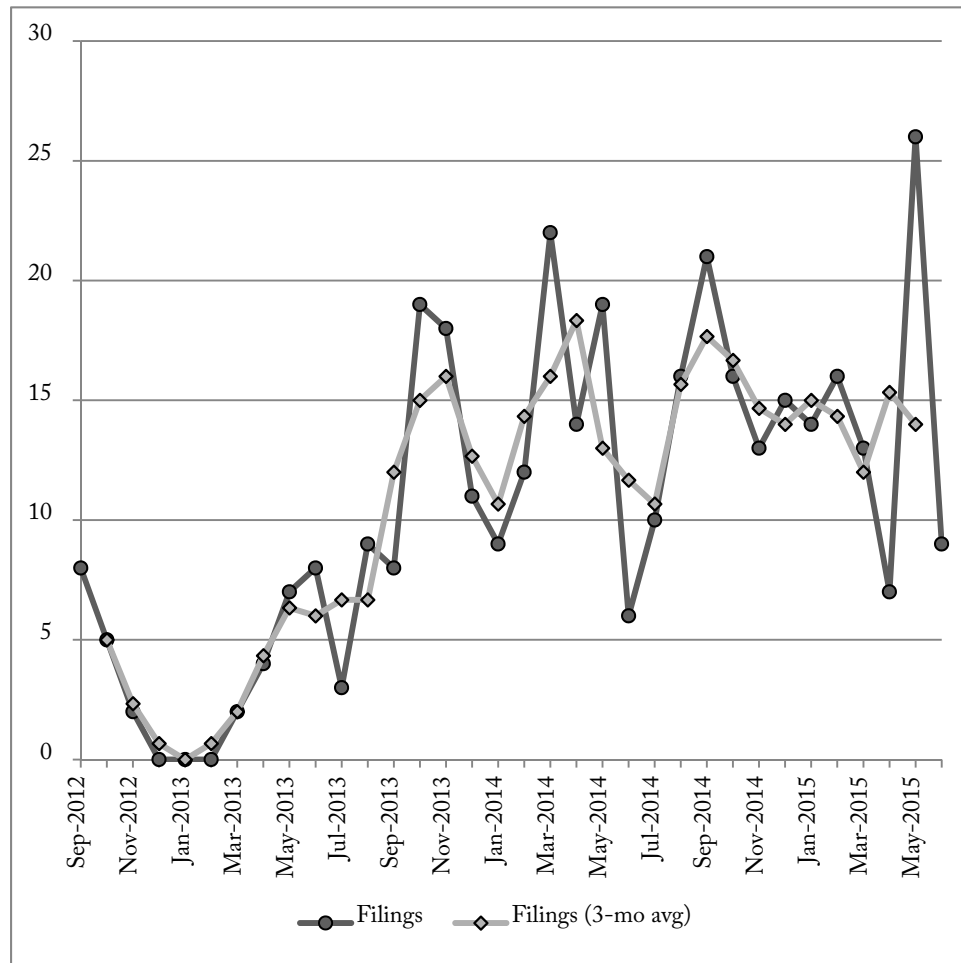


Figure 5: CBM Petition Filings by Month

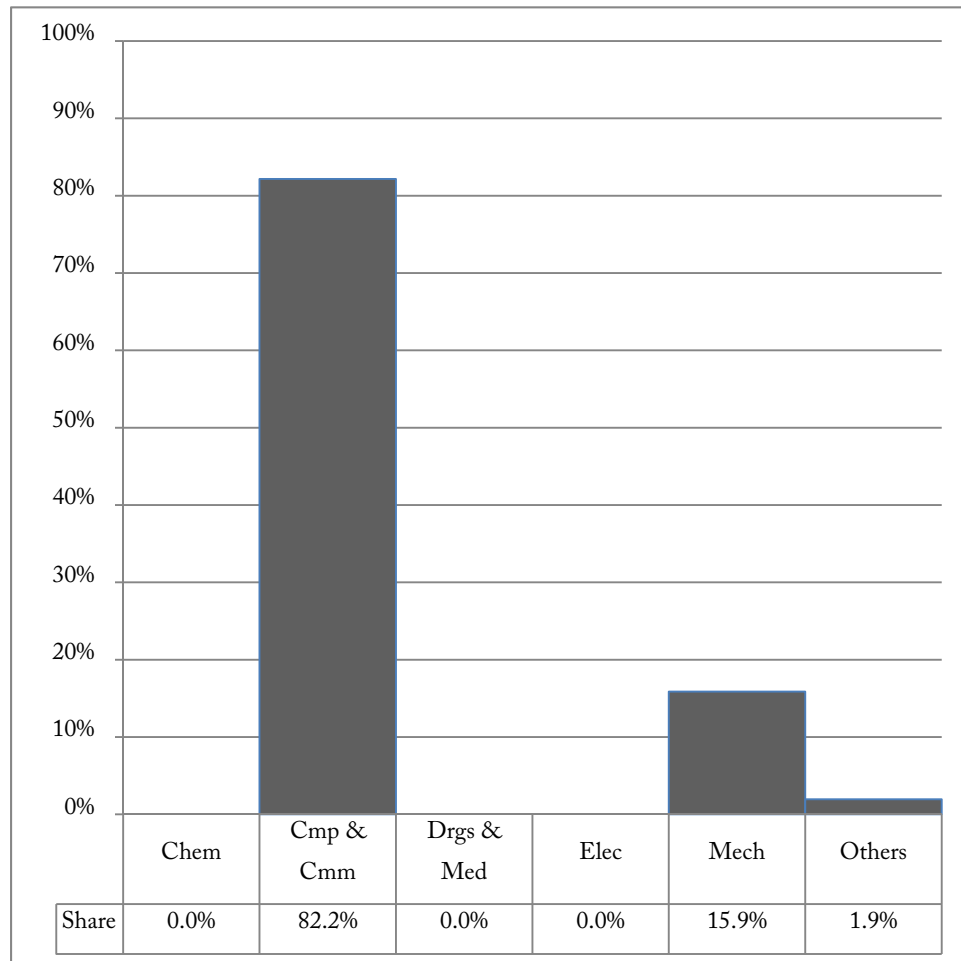


Figure 6: CBM Petition Filings Across Technology

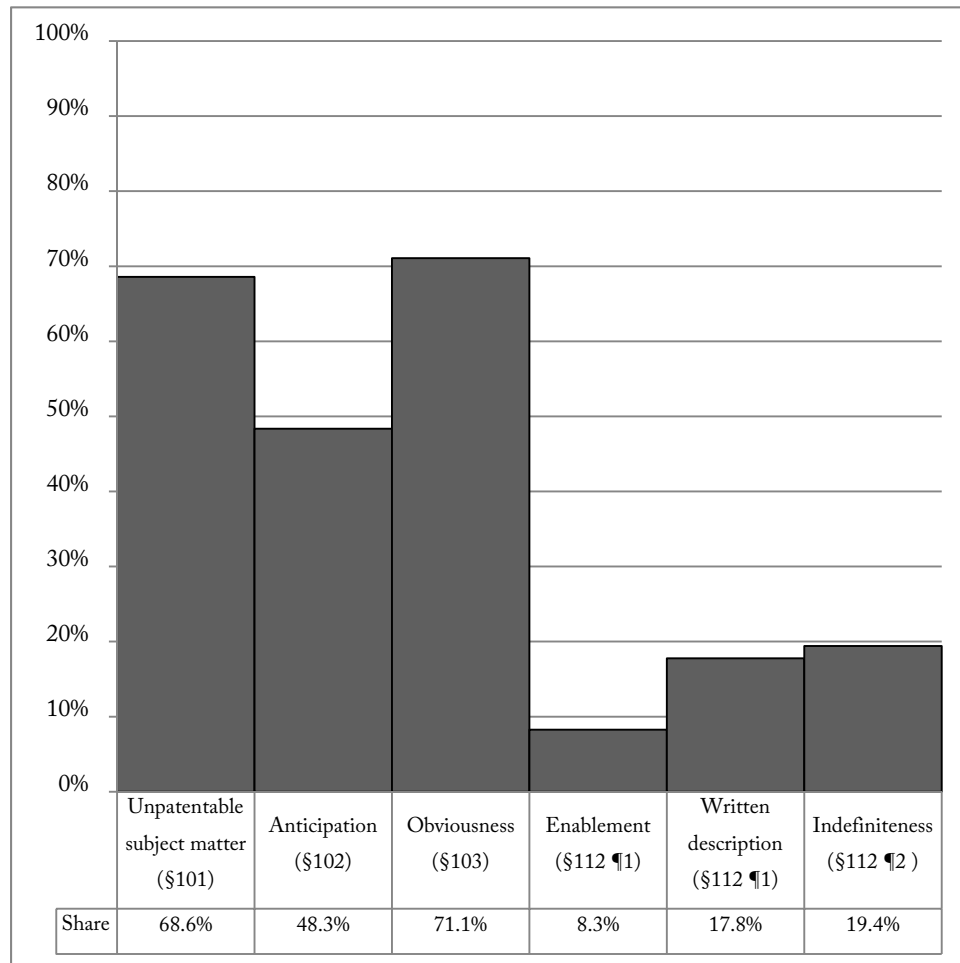


Figure 7: Proportions of CBM Petitions Containing Each Grounds for Challenge

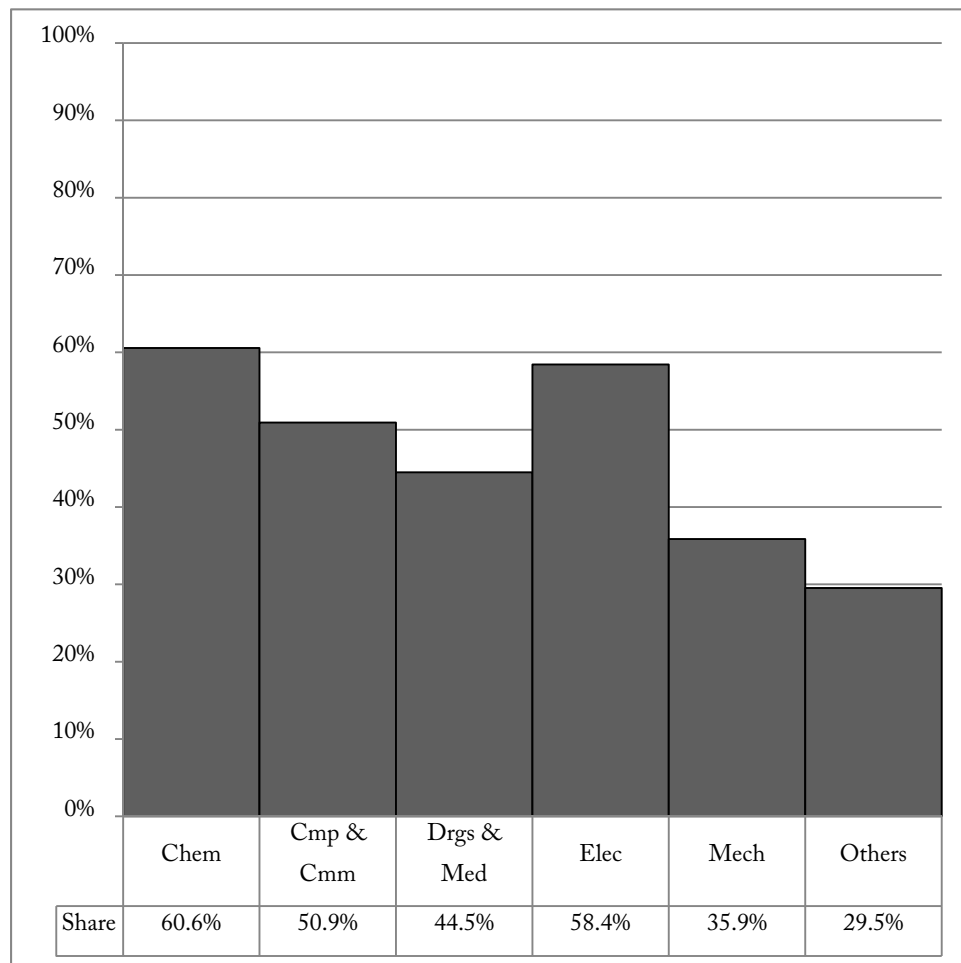


Figure 8: Share of IPR-Challenged Patents in Each Technology Area That Were the Subject of Multiple Petitions

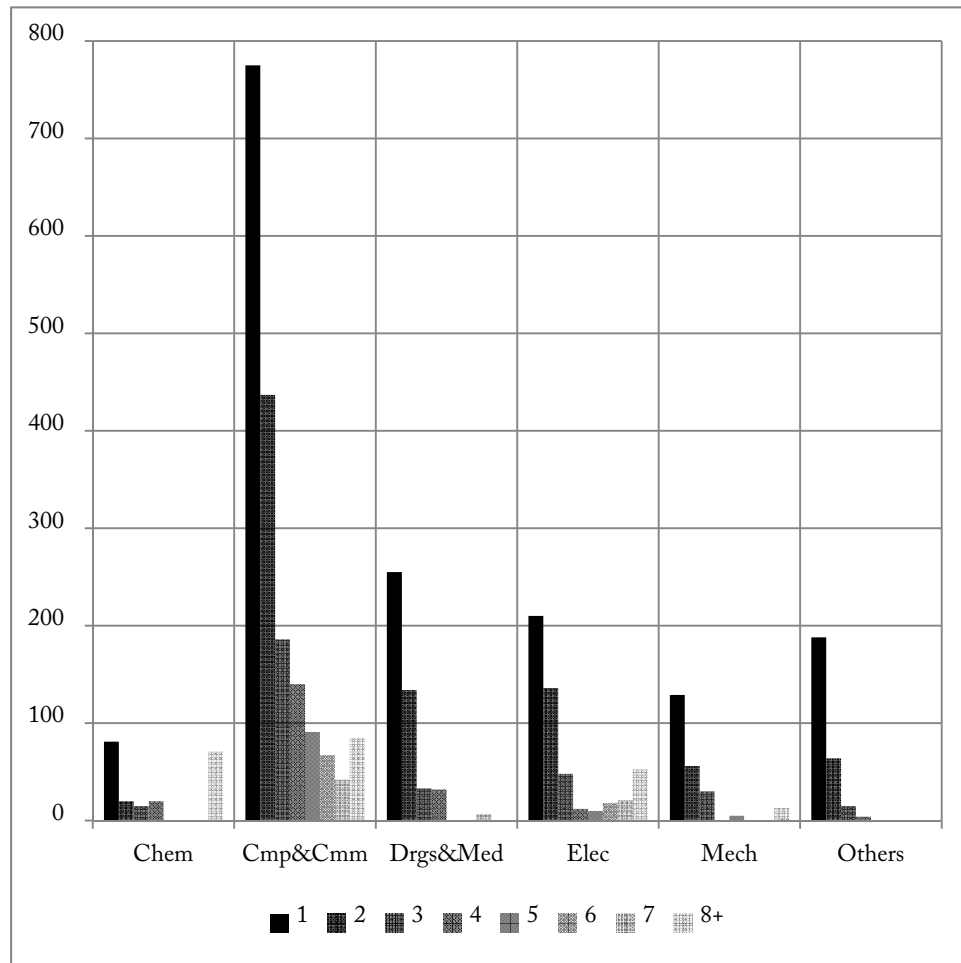


Figure 9: Number of IPR-Challenged Patents Across Technology Area, by Number of IPR Petitions

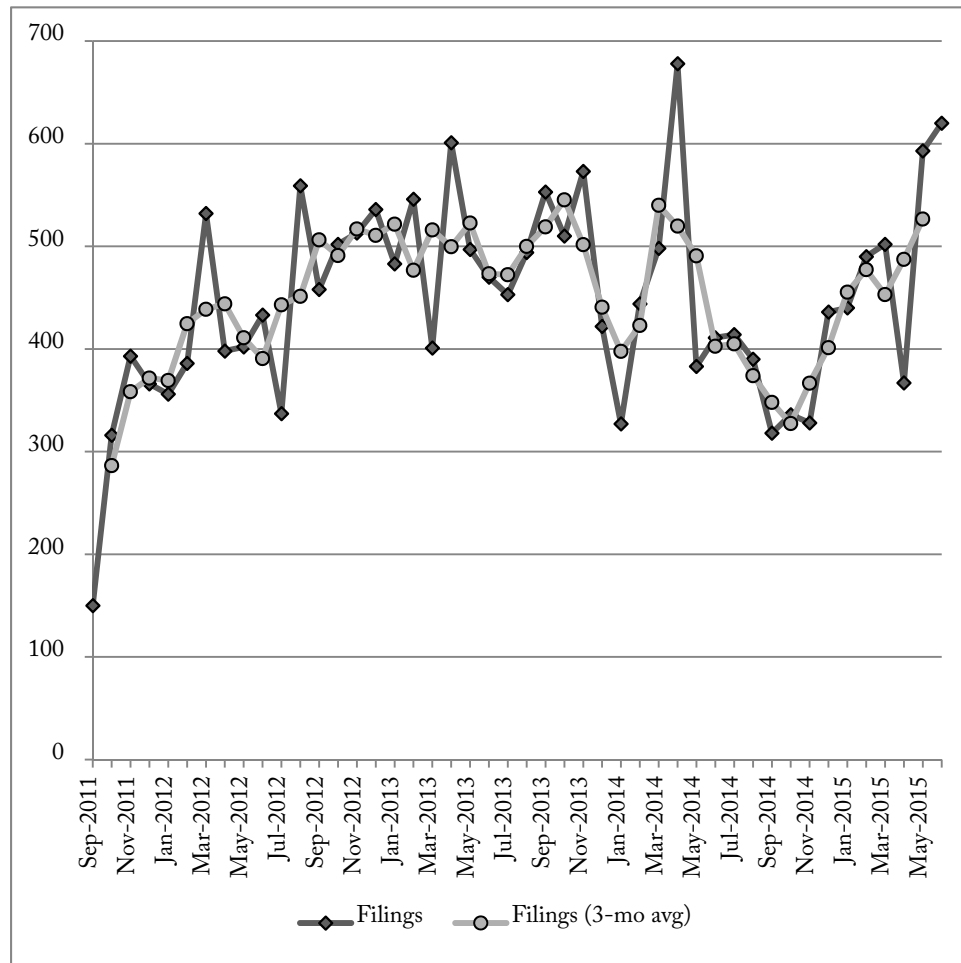


Figure 10: Patent Case Filings by Month

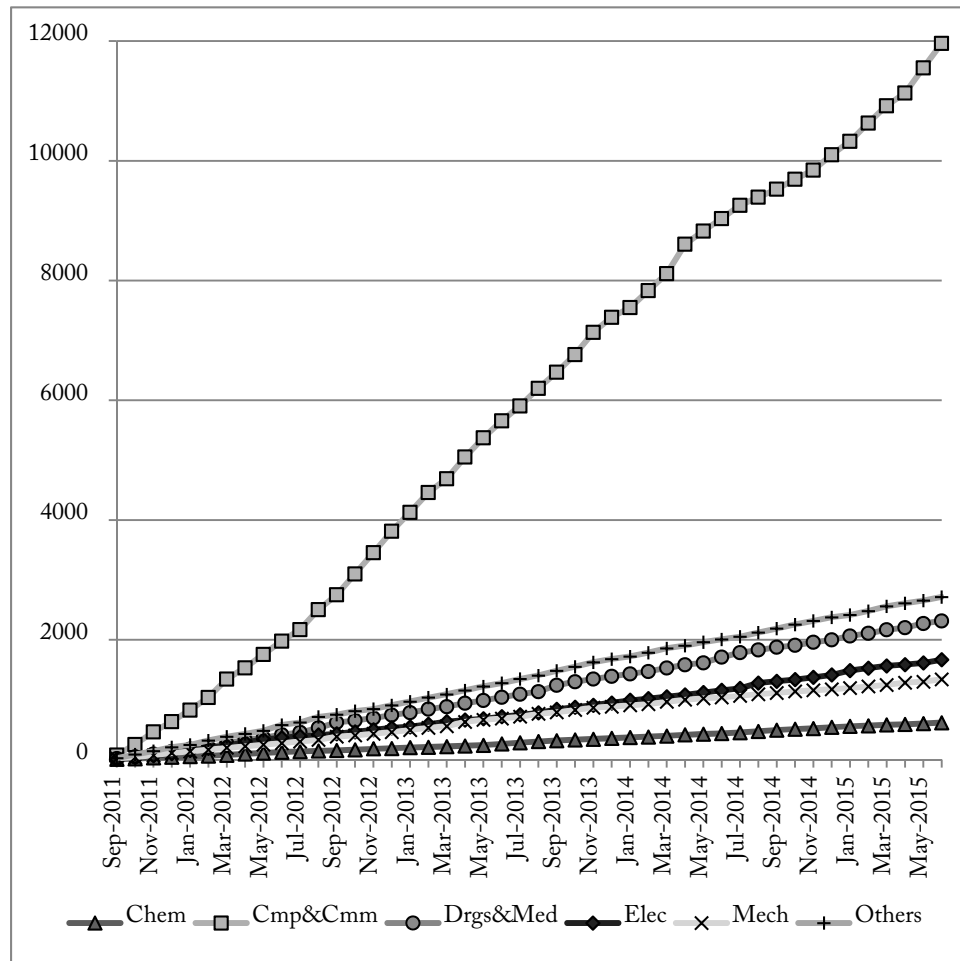


Figure 11: Cumulative Patent Case Filings Across Technology

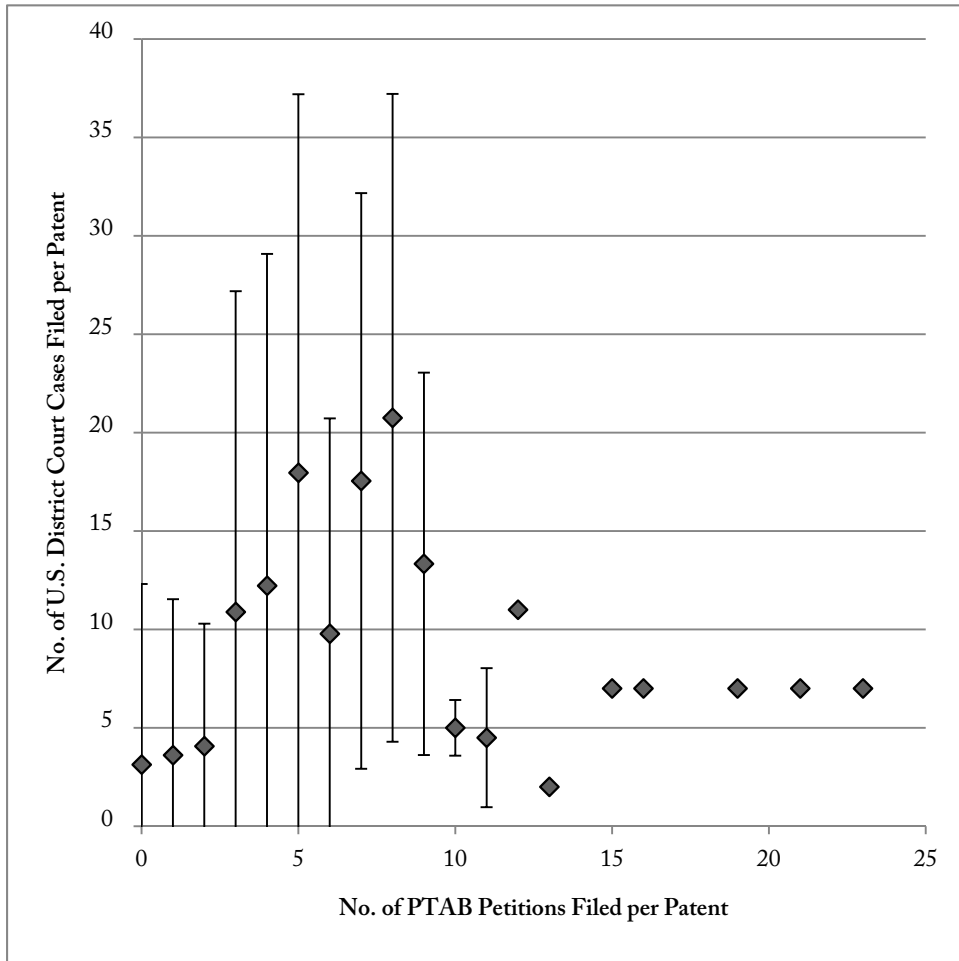


Figure 12: Average Number of Federal-Court Assertion of Patents Challenged in IPR or CBM Petitions

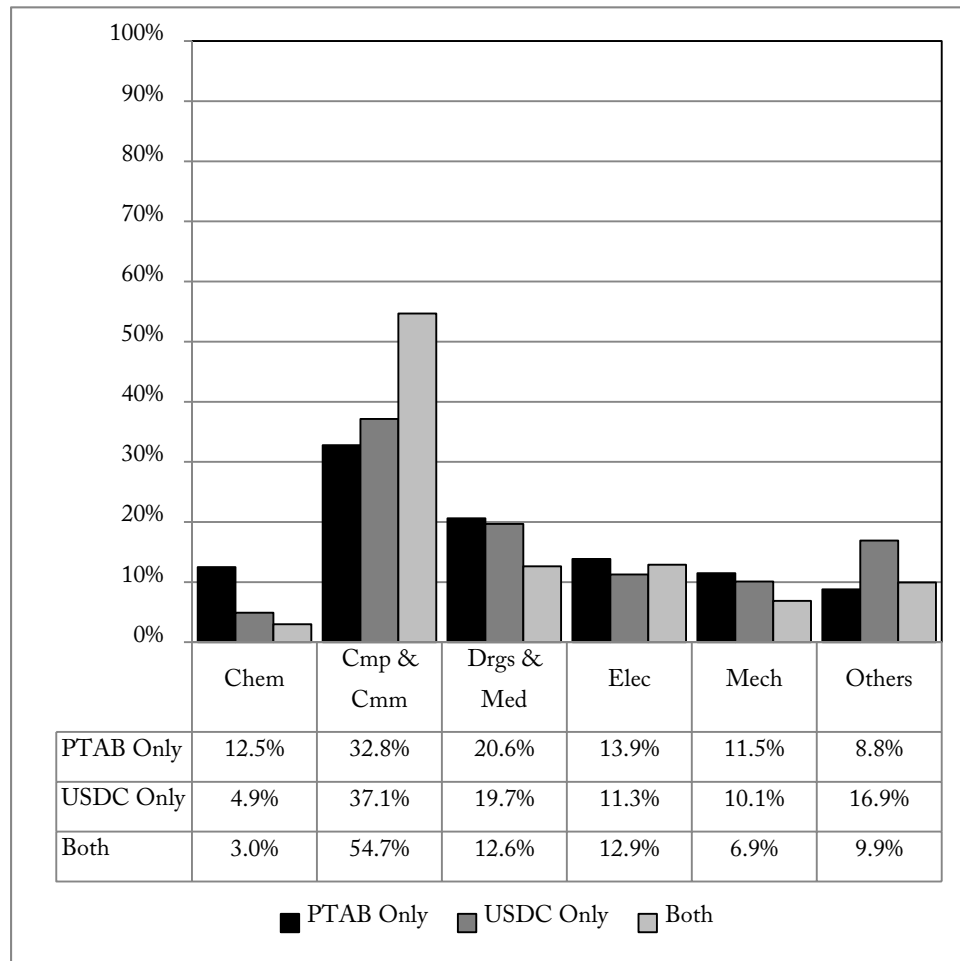


Figure 13: Technology Proportions Among PTAB-Only, Federal Court-Only, and PTAB-and-Federal Court Patents

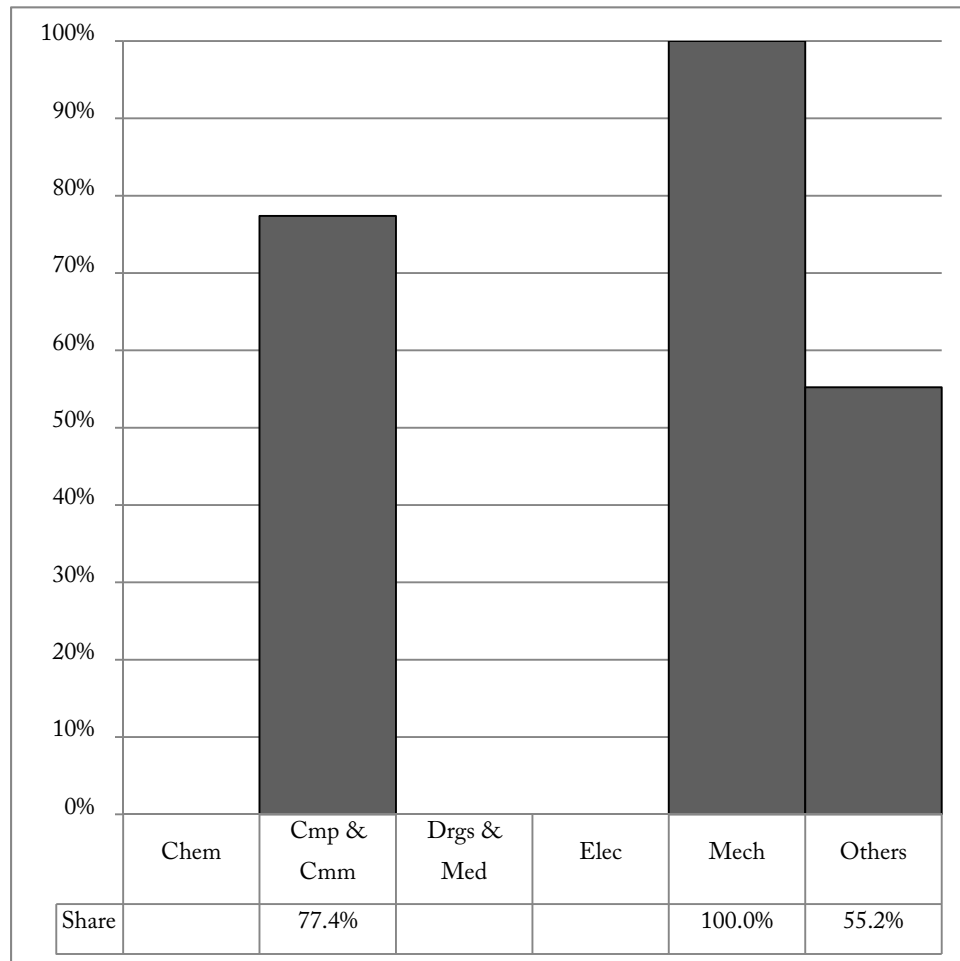


Figure 14a: Share of CBM Petitioners That Were Defendants in a Prior Suit on the Same Patent, by Technology

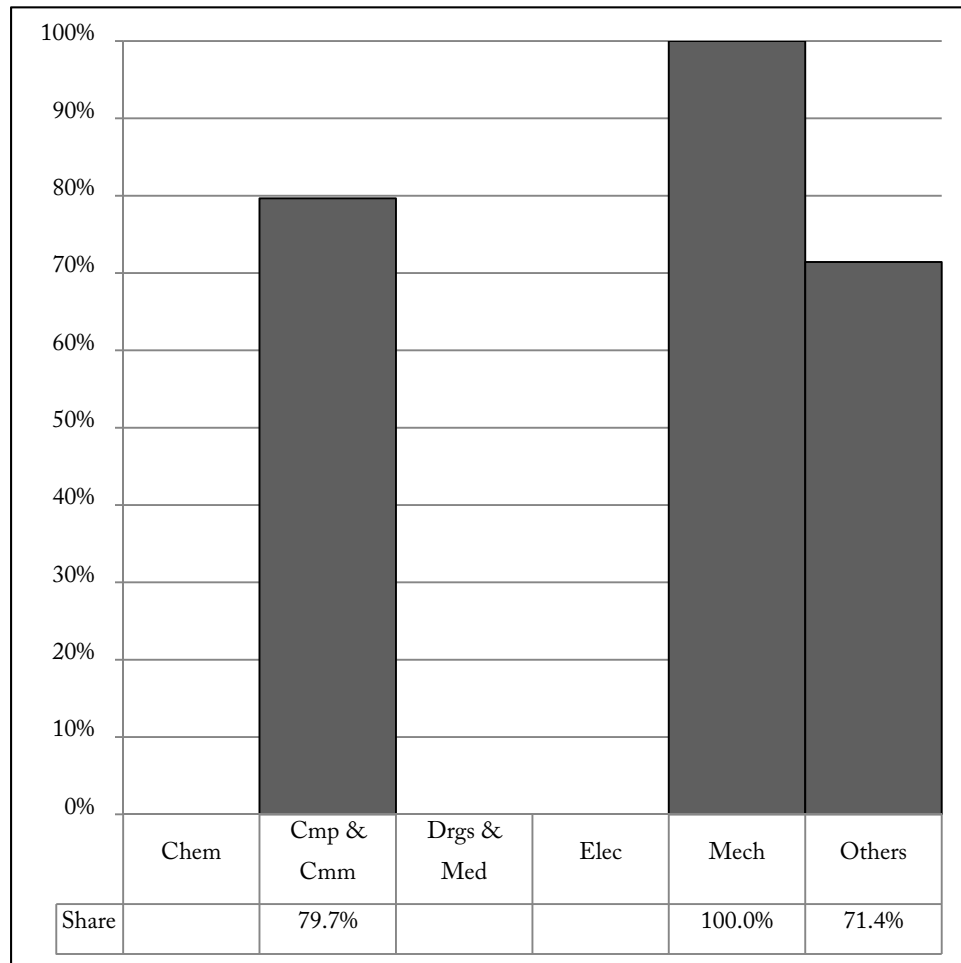


Figure 14b: Share of CBM Petitions in Which At Least One Petitioner Was a Defendant in a Prior Suit on the Same Patent, by Technology

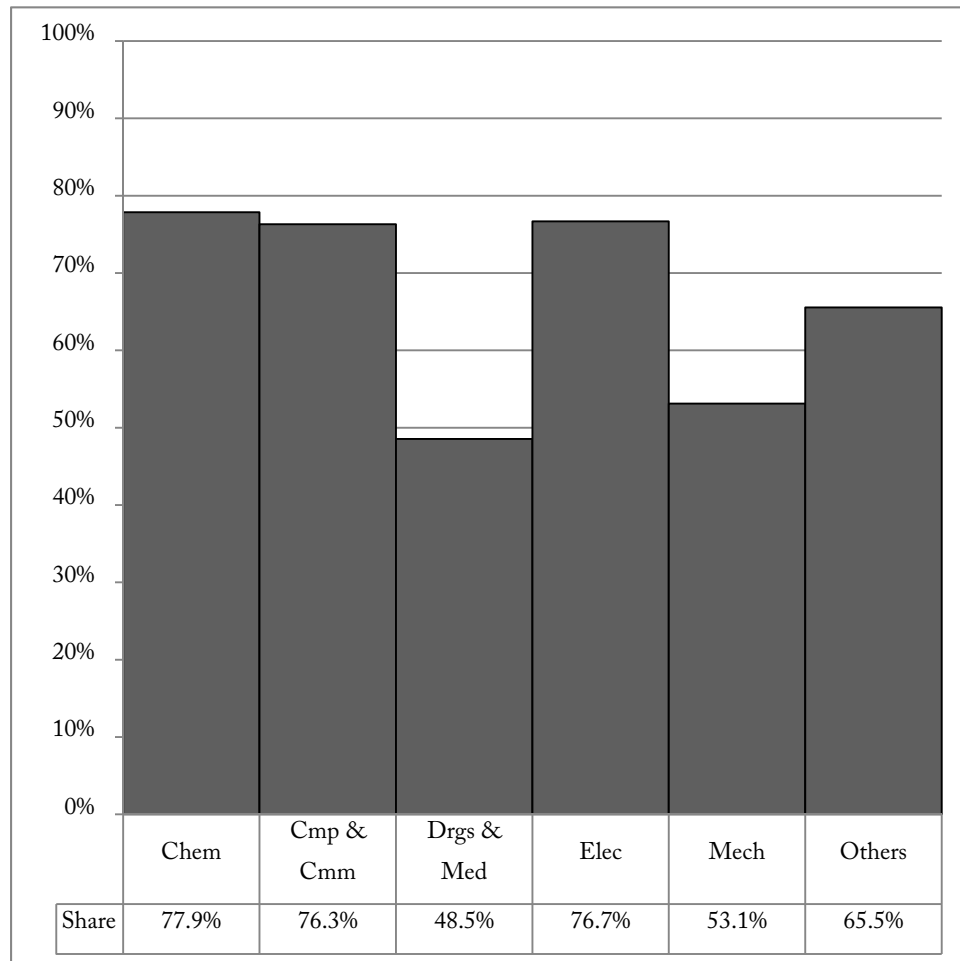


Figure 15a: Share of IPR Petitioners That Were Defendants in a Prior Suit on the Same Patent, by Technology

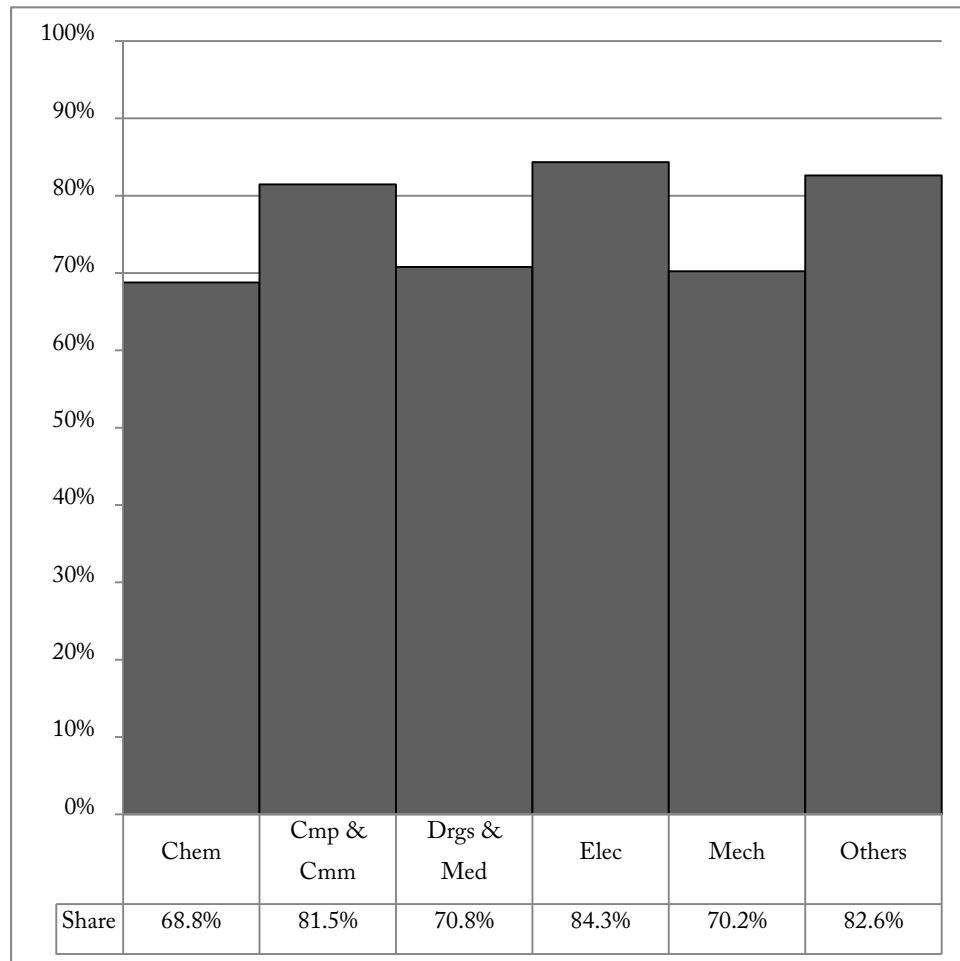


Figure 15b: Share of IPR Petitions in Which At Least One Petitioner Was a Defendant in a Prior Suit on the Same Patent, by Technology

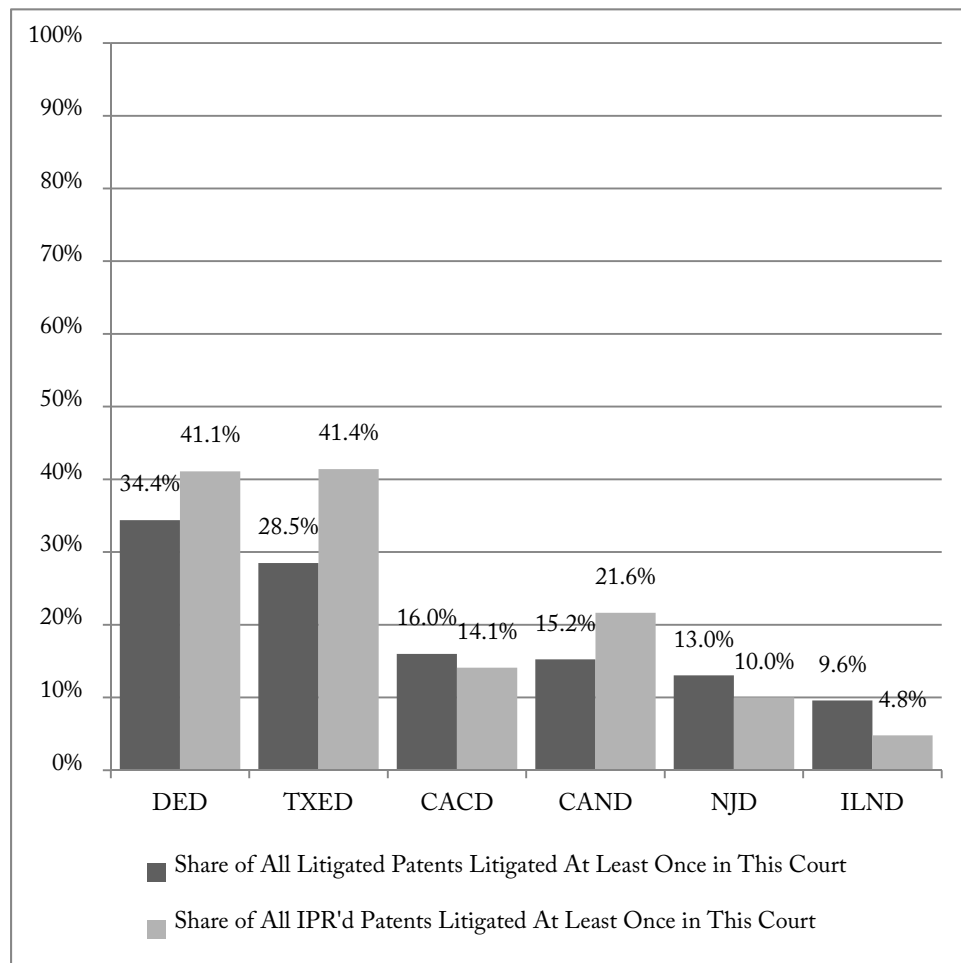


Figure 16: District-Specific Effects

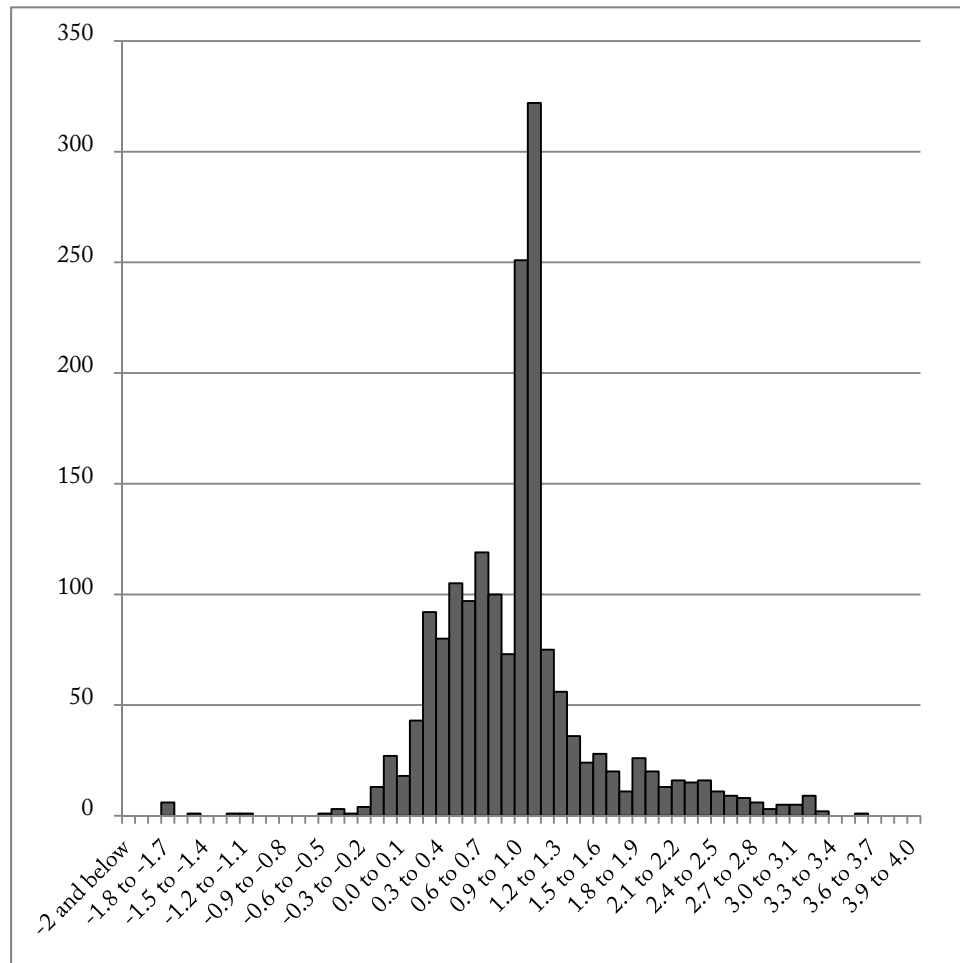


Figure 17: Distribution of Lag Between First IPR Petition and First Federal Court Litigation, in Years

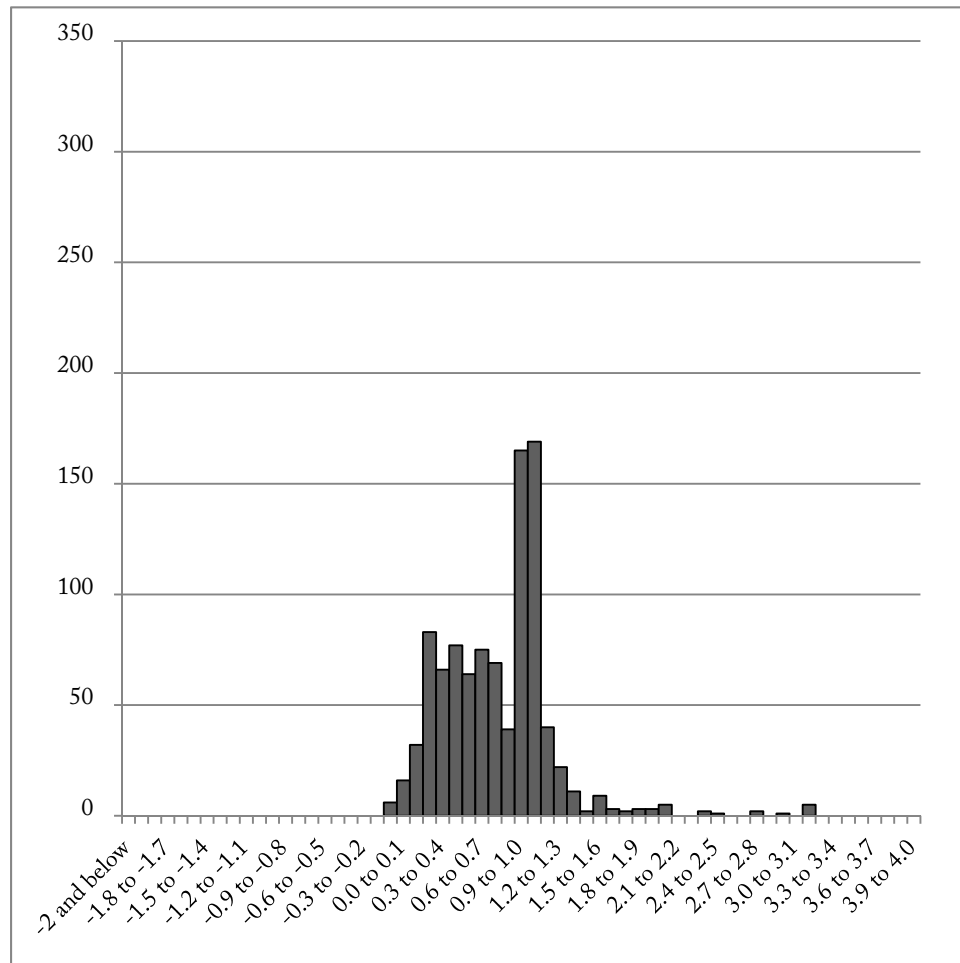


Figure 18: Distribution of Lag Between First IPR Petition and Last Federal Court Filing Prior to Petition, in Years

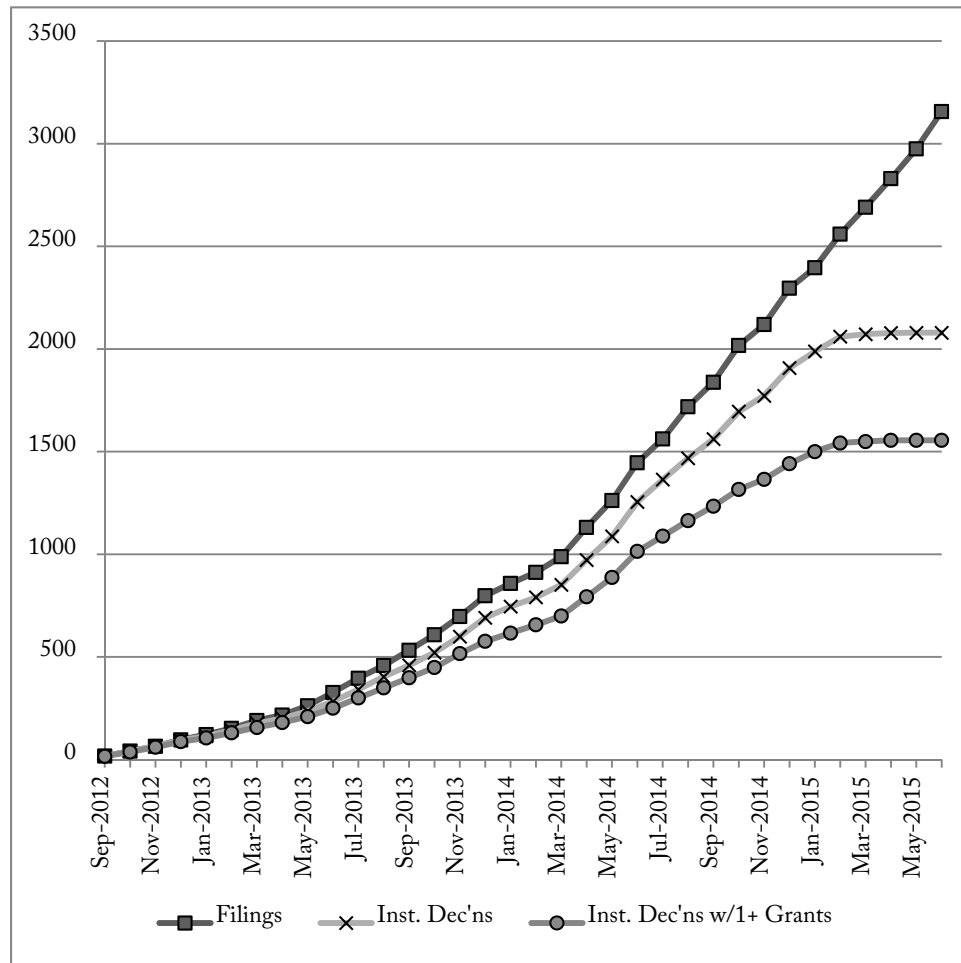


Figure 19: IPR Filings, Institution Decisions, and Institution Decisions Granting At Least One Challenged Claim

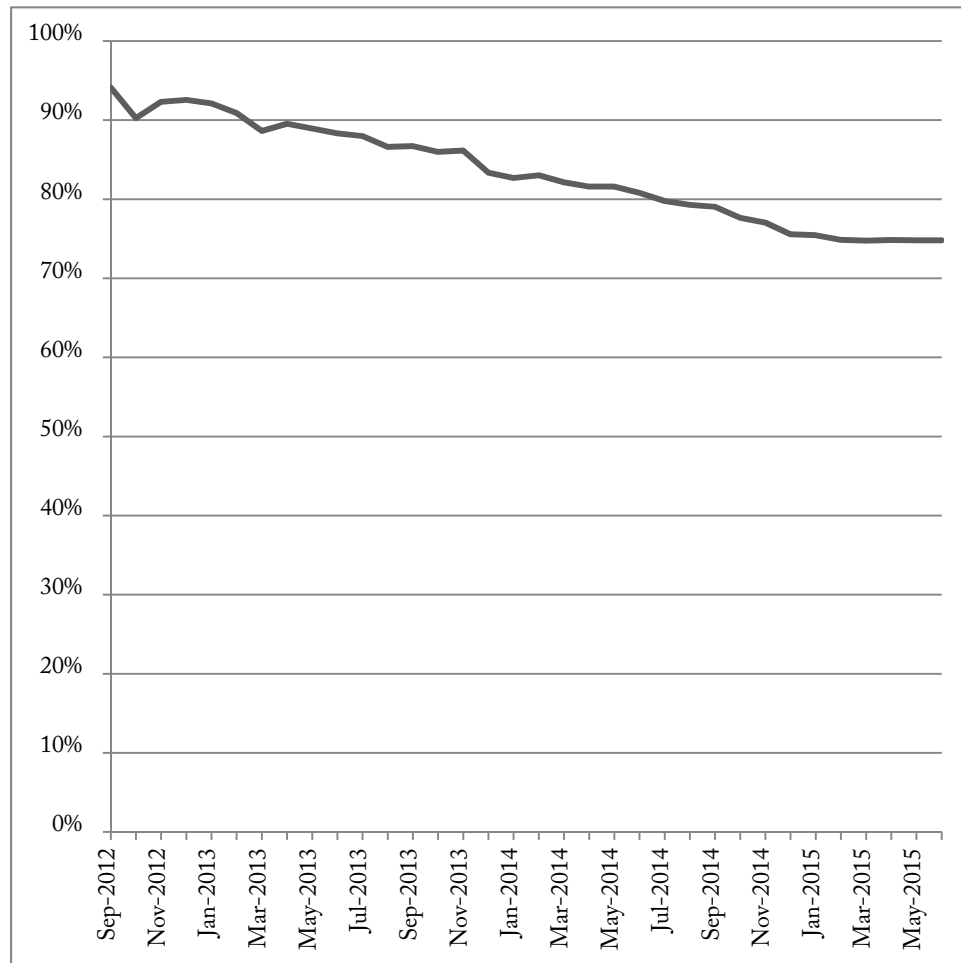


Figure 20: Rate of IPR Institution over Time, by Month

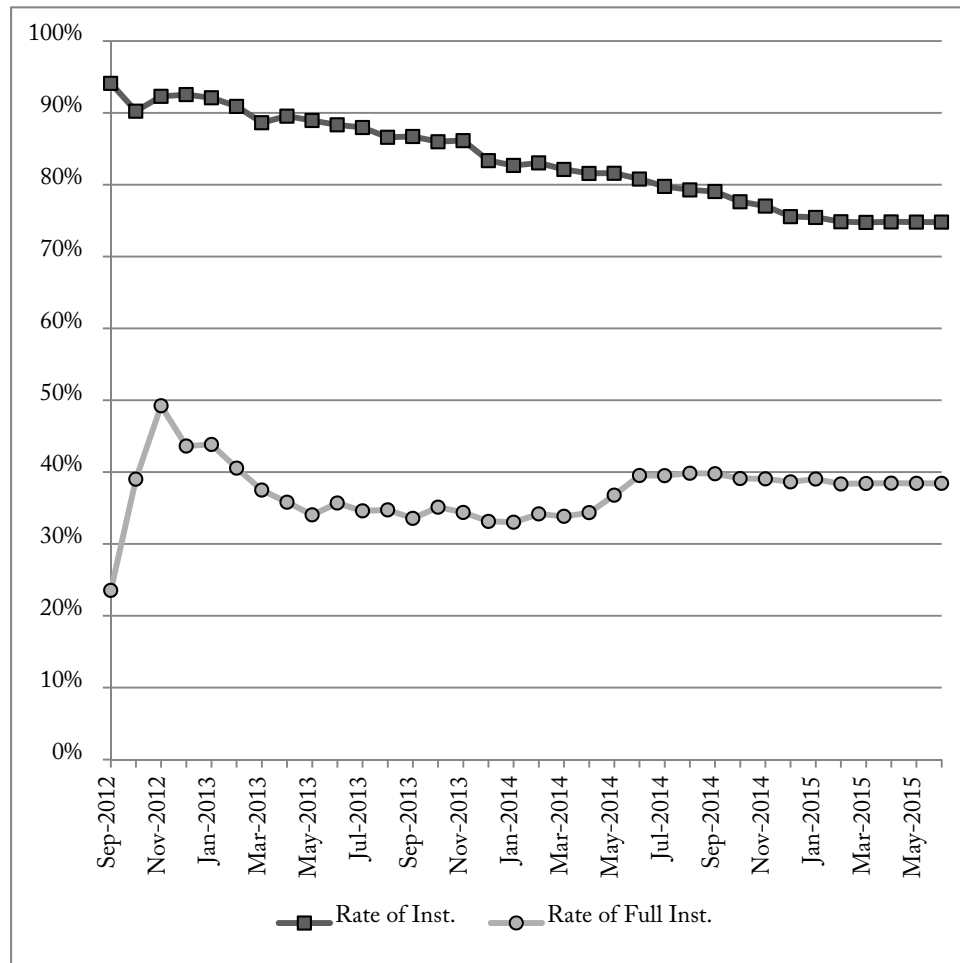


Figure 21: Rate of At-Least-Partial Institution and Full Institution of IPR Petitions over Time, By Month

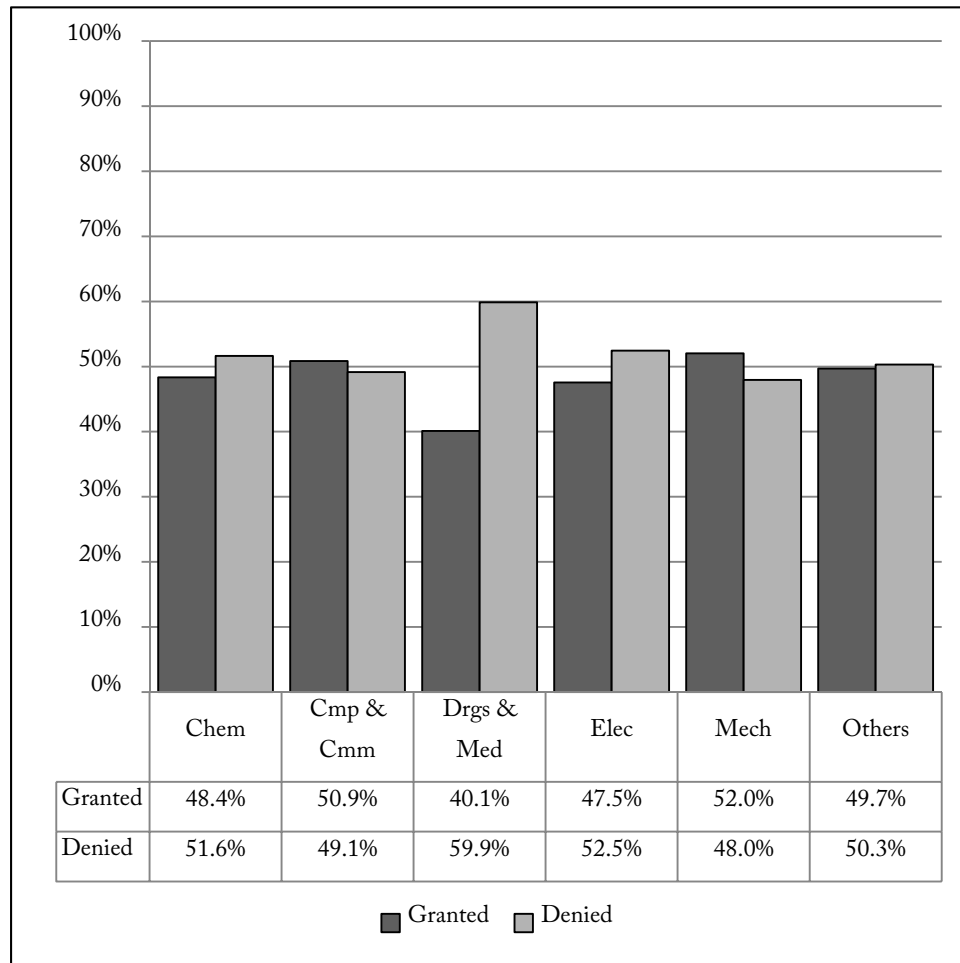


Figure 22: Institutions of IPR Petitions Based on Novelty, by Technology

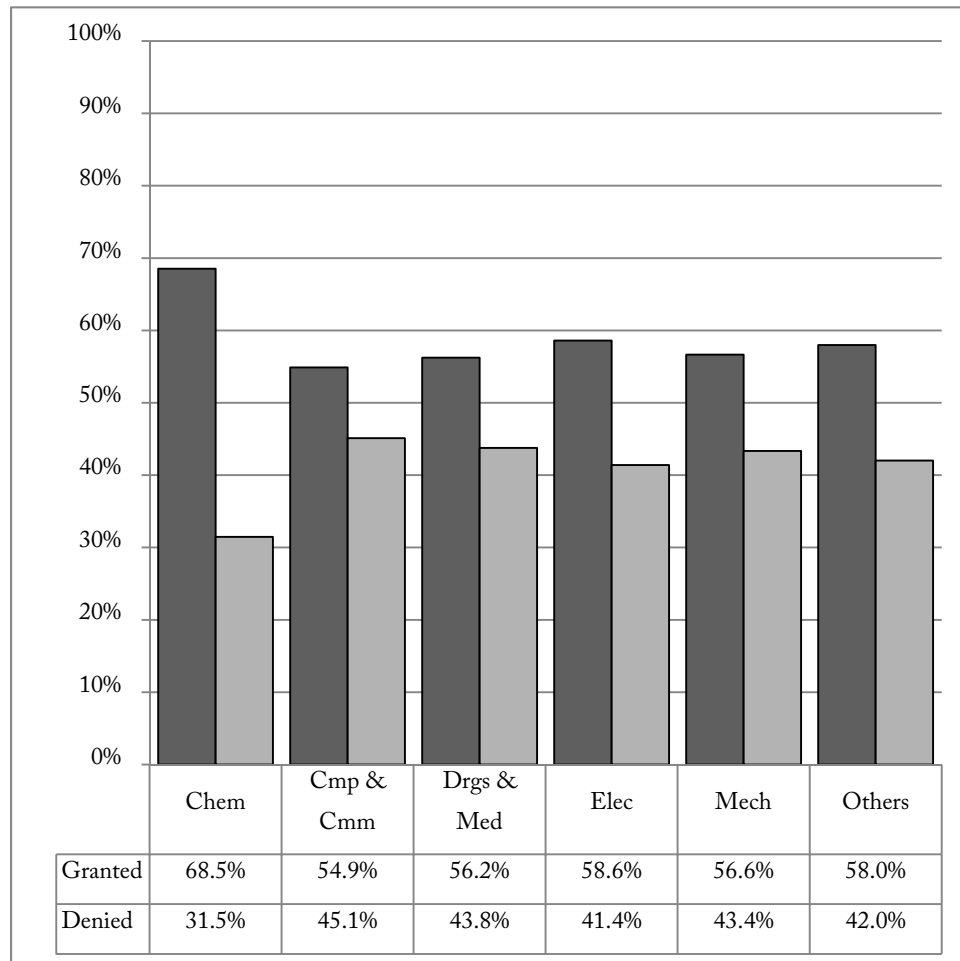


Figure 23: IPR Institutions of Petitions Based on Nonobviousness, by Technology

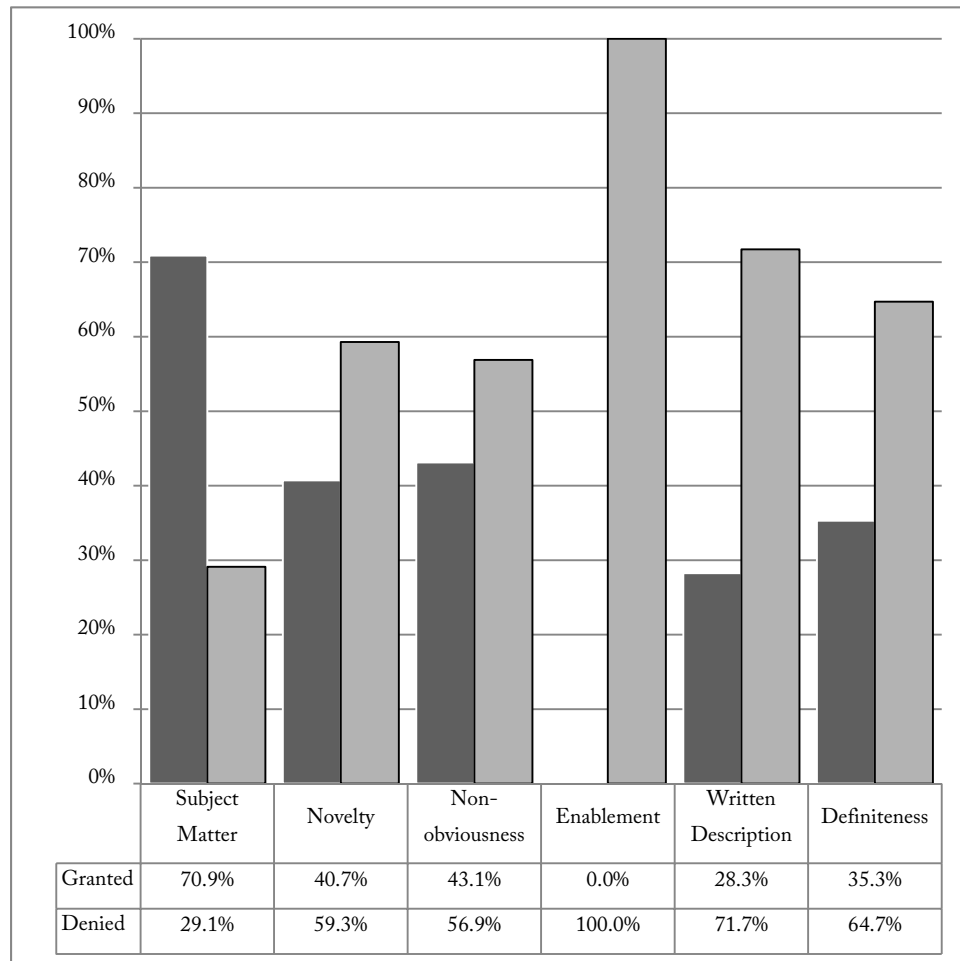


Figure 24: CBM Institutions of Petitions, by Grounds

APPENDIX C: TABLES

Table 1: *Inter Partes* petitions filed by Intel in the *Zond* cases

Petition For	IPR Number	Filing Date
Intel Corporation	IPR2014-00443	Feb. 20, 2014
Intel Corporation	IPR2014-00444	Feb. 20, 2014
Intel Corporation	IPR2014-00445	Feb. 20, 2014
Intel Corporation	IPR2014-00446	Feb. 20, 2014
Intel Corporation	IPR2014-00447	Feb. 20, 2014
Intel Corporation	IPR2014-00455	Feb. 27, 2014
Intel Corporation	IPR2014-00456	Feb. 27, 2014
Intel Corporation	IPR2014-00468	Feb. 28, 2014
Intel Corporation	IPR2014-00470	Mar. 7, 2014
Intel Corporation	IPR2014-00473	Mar. 7, 2014
Intel Corporation	IPR2014-00494	Mar. 13, 2014
Intel Corporation	IPR2014-00495	Mar. 13, 2014
Intel Corporation	IPR2014-00496	Mar. 13, 2014
Intel Corporation	IPR2014-00497	Mar. 13, 2014
Intel Corporation	IPR2014-00498	Mar. 13, 2014
Intel Corporation	IPR2014-00520	Mar. 27, 2014
Intel Corporation	IPR2014-00521	Mar. 27, 2014
Intel Corporation	IPR2014-00522	Mar. 27, 2014
Intel Corporation	IPR2014-00523	Mar. 27, 2014
Intel Corporation	IPR2014-00598	Apr. 9, 2014
Intel Corporation	IPR2014-00686	Apr. 24, 2014
Intel Corporation	IPR2014-00765	May 16, 2014
Intel Corporation	IPR2014-00820	May 27, 2014
Intel Corporation	IPR2014-00843	May 29, 2014
Intel Corporation	IPR2014-00913	Jun 6, 2014
Intel Corporation	IPR2014-00923	Jun 10, 2014
Intel Corporation	IPR2014-00945	Jun 12, 2014

Table 2: *Inter Partes* Review Petitions filed by Defendants in *Zond* cases

Petition For	IPR Number	Filing Date
Advanced Micro Devices, Inc.	IPR2014-01037	June 30, 2014
Advanced Micro Devices, Inc.	IPR2014-01075	June 30, 2014
Advanced Micro Devices, Inc.	IPR2014-01071	June 30, 2014
Advanced Micro Devices, Inc.	IPR2014-01069	June 30, 2014
Fujitsu Semiconductor Limited	IPR2014-00848	May 29, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00850	May 29, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00844	May 29, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00846	May 29, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00845	May 29, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00849	May 29, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00855	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00866	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00851	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00865	May 30, 2014

2016]

STRATEGIC DECISION MAKING

115

Petition For	IPR Number	Filing Date
Fujitsu Semiconductor Ltd.	IPR2014-00856	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00859	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00858	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00863	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00864	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00867	May 30, 2014
Fujitsu Semiconductor Ltd.	IPR2014-00918	June 09, 2014
GlobalFoundries U.S., Inc.	IPR2014-01042	June 27, 2014
GlobalFoundries U.S., Inc.	IPR2014-01059	June 27, 2014
GlobalFoundries U.S., Inc.	IPR2014-01047	June 27, 2014
GlobalFoundries U.S., Inc.	IPR2014-01083	June 30, 2014
GlobalFoundries U.S., Inc.	IPR2014-01086	June 30, 2014
GlobalFoundries U.S., Inc.	IPR2014-01076	June 30, 2014
GlobalFoundries U.S., Inc.	IPR2014-01061	June 30, 2014
GlobalFoundries U.S., Inc.	IPR2014-01087	June 30, 2014
GlobalFoundries U.S., Inc.	IPR2014-01073	June 30, 2014
GlobalFoundries U.S., Inc.	IPR2014-01088	July 01, 2014
GlobalFoundries U.S., Inc.	IPR2014-01098	July 01, 2014
GlobalFoundries U.S., Inc.	IPR2014-01099	July 01, 2014
GlobalFoundries U.S., Inc.	IPR2014-01089	July 01, 2014
GlobalFoundries U.S., Inc.	IPR2014-01100	July 01, 2014
Renesas Electronics Corp.	IPR2014-01057	June 27, 2014
Renesas Electronics Corp.	IPR2014-01046	June 27, 2014
Renesas Electronics Corp.	IPR2014-01066	June 30, 2014
Renesas Electronics Corp.	IPR2014-01063	June 30, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00805	May 23, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00782	May 19, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00781	May 19, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00800	May 22, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00799	May 22, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00803	May 22, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00802	May 22, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00807	May 23, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00808	May 23, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00819	May 27, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00821	May 27, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00818	May 27, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00828	May 28, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00829	May 28, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00827	May 28, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00861	May 30, 2014
Taiwan Semiconductor Mfg. Co.	IPR2014-00917	June 09, 2014
The Gillette Co.	IPR2014-00479	Mar. 4, 2014
The Gillette Co.	IPR2014-00477	Mar. 4, 2014
The Gillette Co.	IPR2014-00974	June 18, 2014
The Gillette Co.	IPR2014-00975	June 18, 2014
The Gillette Co.	IPR2014-00972	June 18, 2014
The Gillette Co.	IPR2014-00973	June 18, 2014
The Gillette Co.	IPR2014-00992	June 19, 2014

Petition For	IPR Number	Filing Date
The Gillette Co.	IPR2014-00986	June 19, 2014
The Gillette Co.	IPR2014-00981	June 19, 2014
The Gillette Co.	IPR2014-00991	June 19, 2014
The Gillette Co.	IPR2014-00984	June 19, 2014
The Gillette Co.	IPR2014-00990	June 19, 2014
The Gillette Co.	IPR2014-00988	June 19, 2014
The Gillette Co.	IPR2014-00985	June 19, 2014
The Gillette Co.	IPR2014-01003	June 20, 2014
The Gillette Co.	IPR2014-00996	June 20, 2014
The Gillette Co.	IPR2014-01000	June 20, 2014
The Gillette Co.	IPR2014-00995	June 20, 2014
The Gillette Co.	IPR2014-01004	June 20, 2014
The Gillette Co.	IPR2014-01012	June 23, 2014
The Gillette Co.	IPR2014-01017	June 23, 2014
The Gillette Co.	IPR2014-01016	June 23, 2014
The Gillette Co.	IPR2014-01015	June 23, 2014
The Gillette Co.	IPR2014-01019	June 23, 2014
The Gillette Co.	IPR2014-01014	June 23, 2014
The Gillette Co.	IPR2014-01013	June 23, 2014
The Gillette Co.	IPR2014-01020	June 23, 2014
The Gillette Co.	IPR2014-01022	June 23, 2014
The Gillette Co.	IPR2014-01025	June 23, 2014
Toshiba Corp.	IPR2014-01072	June 30, 2014
Toshiba Corp.	IPR2014-01070	June 23, 2014
Toshiba Corp.	IPR2014-01067	June 23, 2014
Toshiba Corp.	IPR2014-01074	June 23, 2014
Toshiba Corp.	IPR2014-01065	June 23, 2014

Table 3: *Inter Partes* Review Petitions filed by Defendants in *E-Watch v. LG Electronics*

Petition For	IPR Number	Filing Date
HTC Corp.	IPR2014-00987	June 19, 2014
Sony Mobile Comm. (USA) Inc.	IPR2015-00402	Dec. 10, 2014
LG Electronics, Inc.	IPR2015-00404	Dec. 10, 2014
Kyocera Communications, Inc.	IPR2015-00406	Dec. 10, 2014
Apple Inc.	IPR2015-00411	Dec. 11, 2014
Apple Inc.	IPR2015-00412	Dec. 11, 2014
Apple Inc.	IPR2015-00413	Dec. 11, 2014
Samsung Electronics Co.	IPR2015-00541	Jan. 7, 2015
Samsung Electronics Co.	IPR2015-00610	Jan. 23, 2015
Samsung Electronics Co.	IPR2015-00612	Jan. 23, 2015
ZTE (USA) Inc.	IPR2015-01366	June 09, 2015