

EXPERTS, GENERALISTS, LAYPEOPLE — AND THE FEDERAL  
CIRCUIT

Matthew G. Sipe\*

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I. INTRODUCTION

I CANNOT STOP WITHOUT CALLING ATTENTION TO THE EXTRAORDINARY CONDITION OF THE LAW WHICH MAKES IT POSSIBLE FOR A MAN WITHOUT ANY KNOWLEDGE OF EVEN THE RUDIMENTS OF CHEMISTRY TO PASS UPON SUCH QUESTIONS AS THESE . . . FOR ONLY A TRAINED CHEMIST IS REALLY CAPABLE OF PASSING UPON SUCH FACTS . . . HOW LONG SHALL WE CONTINUE TO BLUNDER ALONG WITHOUT THE AID OF UNPARTISAN AND AUTHORITATIVE SCIENTIFIC ASSISTANCE IN THE ADMINISTRATION OF JUSTICE, NO ONE KNOWS.

— JUDGE LEARNED HAND<sup>1</sup>

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\* Frank H. Marks Visiting Associate Professor, George Washington University Law School; J.D., Yale Law School; B.A., University of Virginia. With sincere thanks to Professors Michael Abramowicz, Jonas Anderson, Andrew Bradt, Daniel Brean, Jeanne Fromer, Dmitry Karshtedt, Mark Lemley, Sarah Rajec, Ted Sichelman, and Liza Vertinsky for their critique, inspiration, and support. A project of this scope and scale would not have been possible without the generous assistance and resources provided by the Supreme Court Fellows Program, including in particular the guidance and feedback of the Federal Judicial Center and

Who should decide a patent case? There is no shortage of anecdotal — and contradictory — answers, depending on who is asked. Jurors are either woefully unqualified<sup>2</sup> or paragons of virtue<sup>3</sup>. Judges need either more technical specialization<sup>4</sup> — or less.<sup>5</sup> And administrative tribunals are either “patent death squads”<sup>6</sup> or the only bulwark left against innovation-choking trolls<sup>7</sup>.

The patent landscape has changed radically in the past decade, particularly in terms of decision-makers. The Leahy-Smith America Invents Act (“AIA”)<sup>8</sup> expanded the U.S. Patent and Trademark Office’s authority as an administrative tribunal and greatly increased third-party participation in the patent grant (and post-grant) process.<sup>9</sup> The Patent Cases Pilot Program now funnels many patent cases to judges with enhanced patent training and experience, on top of a litigant-driven concentration among a handful of districts and a growing demand for juries.<sup>10</sup> Meanwhile, more than half of the seats on the Court of Appeals

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the Administrative Office of the U.S. Courts. Additional thanks to the members of the Judicial Conference and Supreme Court Fellows Commission who provided invaluable feedback during draft and proposal stages. Finally, I am indebted to Shayon Ghosh, Patrick Holvey, Taylor King, Guohui Pan, and Ryan Watzel for their additional assistance and ceaseless encouragement.

1. *Parke-Davis & Co. v. H.K. Mulford Co.*, 189 F. 95, 115 (S.D.N.Y. 1911).

2. *See, e.g., Judicial Panel Discussions on Science and the Law*, 25 CONN. L. REV. 1127, 1145 (1993) (statement of Judge Covello, U.S. District Judge for the District of Connecticut) (“Honest to God, I don’t see how you could try a patent matter to a jury. . . . It’s factually so complicated.”); *Case for Special Juries in Complex Civil Litigation*, 89 YALE L.J. 1155, 1155, 1158 n.18 (1980) (quoting Warren E. Burger, *The Use of Lay Jurors in Complicated Cases*, Remarks to the Conference of State Chief Justices 3–5 (Aug. 7, 1979)).

3. *See, e.g., Federal Judges, Academics, and Practitioners Consider Patent Jury Trials at Engelberg Center and Civil Jury Project Conference*, NYU L. NEWS (Oct. 18, 2016), <http://www.law.nyu.edu/news/trial-by-jury-of-patent-cases-engelberg-center-civil-jury-project-judges-practitioners> [<https://perma.cc/7VF4-HQHL>] (“[J]uries can sort out even the most complex issues when given the proper tools, and . . . almost always arrive at conclusions which are rational, fair, and . . . justified . . .”).

4. *Parke-Davis & Co.*, 189 F. at 115 (providing the opening quotation above); *see generally* Scott Brewer, *Scientific Expert Testimony and Intellectual Due Process*, 107 YALE L.J. 1535 (1998).

5. *See, e.g.,* Richard Revesz, *Specialized Courts and the Administrative Lawmaking System*, 138 U. PA. L. REV. 1111, 1146 (1990) (“[S]pecialized courts tend to [control administrative action] less effectively than generalist courts because they are more likely to exhibit systemic biases . . .”).

6. Peter Pitts, *‘Patent Death Squads’ vs. Innovation*, WALL ST. J. (June 10, 2015, 7:23 PM), <http://www.wsj.com/articles/patent-death-squads-vs-innovation-1433978591> (last visited May 10, 2019) (quoting remarks from then-Chief Judge of the Federal Circuit Randall R. Rader).

7. *See, e.g.,* Timothy Seppala, *One of the Most Profitable Patent Trolls Has Been Defanged*, ENGADGET (Mar. 26, 2016), <https://www.engadget.com/2016/03/26/uniloc-patent-troll-defeated> [<https://perma.cc/X7SE-H463>]; Kelly Knaub, *‘Anti-Troll’ Targets Notorious NPE’s Patent for PTAB Review*, LAW360 (July 27, 2016, 8:53 PM EDT), <https://www.law360.com/articles/822011> (last visited May 10, 2019).

8. *See* Leahy-Smith America Invents Act § 18, Pub. L. No. 112-29, 125 Stat. 284 (codified in scattered sections of 35 U.S.C.).

9. *See infra* Section II.A.

10. *See infra* Section II.B.

for the Federal Circuit — the sole appellate tribunal of right for these matters — have changed hands.<sup>11</sup>

Recent empirical studies of patent litigation have offered considerable insight into, for example, the significance of different areas of patented technology<sup>12</sup> or particular district courts<sup>13</sup> on case outcomes. But few have shed light on the differences between classes of adjudicators: administrative patent judges on the Patent Trial and Appeal Board (“PTAB”), district court judges of various stripes, and juries.<sup>14</sup> And no studies offer a comprehensive picture of the natural experiment currently unfolding. That is, comparable patent validity issues are decided separately by judges, juries, and administrators, but all of their decision-making is reviewed in turn by a singular, controlling entity: the Federal Circuit. Accordingly, examining and comparing the results of appeals to the Federal Circuit from each of these adjudicators offers a particularly clear window into the relationships between these entities — and into the varying effects of expertise and specialization in the patent world overall.

This Article capitalizes on the current adjudicatory structure of patent law, analyzing more than two thousand Federal Circuit cases and opinions — each hand-coded for validity findings and their disposition on appeal issue-by-issue. Though an incredibly time-intensive approach,<sup>15</sup> the result is a uniquely complete and clear dataset. A straightforward empirical analysis of the data, moreover, challenges several

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11. See *U.S. Court of Appeals for the Federal Circuit: Judges*, FED. JUD. CTR., <https://www.fjc.gov/history/courts/u.s.-court-appeals-federal-circuit-judges> [<https://perma.cc/74FH-7AE5>].

12. See, e.g., John Allison & Lisa Ouellette, *How Courts Adjudicate Patent Definiteness and Disclosure*, 65 DUKE L.J. 609, 621–25 (2016); see generally Mark Lemley et al., *Our Divided Patent System*, 82 U. CHI. L. REV. 1073 (2015).

13. See, e.g., Jack DaSilva, *Forum Shopping Under the Patent Cases Pilot Program*, 97 J. PAT. & TRADEMARK OFF. SOC’Y 630, 639–50 (2015).

14. Then-professor Kimberly Moore’s work comparing district court judge and jury-made patent findings is an excellent example in the literature, but it relies on case data now more than two decades old and excludes PTAB cases entirely. See Kimberly Moore, *Judges, Juries, and Patent Cases: An Empirical Peek Inside the Black Box*, 99 MICH. L. REV. 365, 367 (2000) (examining all patent trials from 1983 through 1999 and comparing outcomes between bench and jury trials). Likewise, Professors Saurabh Vishnubhakat, Arti Rai, and Jay Kesan offer a comprehensive litigant-centric comparison of district courts versus the PTAB, but do not address appellate results. See generally Saurabh Vishnubhakat et al., *Strategic Decision Making in Dual PTAB and District Court Proceedings*, 31 BERKELEY TECH. L.J. 45 (2016). There is, finally, a substantial body of empirical work examining the PTAB in isolation — but even that scholarship tends to ignore appellate-level inquiry in favor of trial-level statistics. See, e.g., Yasser El-Gamal et al., *The New Battlefield: One Year of Inter Partes Review Under the America Invents Act*, 42 AIPLA Q.J. 39 (2014).

15. It is also usually cost-prohibitive. PACER generally charges per-page fees for access. See *Electronic Public Access Fee Schedule*, PACER (Dec. 1, 2013), [https://www.pacer.gov/documents/epa\\_feesched.pdf](https://www.pacer.gov/documents/epa_feesched.pdf) [<https://perma.cc/M5CL-FF5U>]. To examine the orders, briefs, motions, and opinions for a dozen cases, the fees could easily add up to hundreds of dollars; for the thousands of cases analyzed herein, the fees would be astronomical. Accordingly, I reiterate my deep gratitude to the Administrative Office of the U.S. Courts, in coordination

longstanding and widespread anecdotal assumptions about patent adjudication.

In brief, the data suggests that the Federal Circuit affirms findings made by the PTAB reliably more often than findings made by district court judges — particularly when the findings involve questions of fact rather than questions of law. Whether the district court judge (or district itself) has more prior experience with patent cases appears to be irrelevant to appellate results. Whether the finding was made by a jury, on the other hand, is highly relevant, with those findings affirmed at the highest rate. Moreover, PTAB findings that *invalidate* patent claims are affirmed more often than findings that *uphold* patent claims. No similar pattern exists in district court appeals. And the underlying technological subject matter of the patent at issue does not seem to perceptibly influence results on appeal for either.

The dataset thus tells a story about the Federal Circuit and patent litigation that is more subtle than the dominant narratives have been to date. Despite a generally non-deferential relationship to the PTAB, the Federal Circuit appears to be placing greater faith in the scientific expertise of its administrative patent judges. Likewise, given the higher rate of affirmance for claim-invalidating findings from the PTAB, the “death squad” narrative seems entirely misplaced, unless one accords the Federal Circuit the same appellation.

In contrast to scientific knowledge, pure *legal* specialization (as exemplified by the patent-heavy dockets among a handful of Texas and Delaware judges) appears to only have mixed results, at best, in terms of appellate outcome. Instead, it is findings made by jurors — the ultimate laypersons and generalists — that survive most easily on appeal.

These trends suggest that the Federal Circuit has perhaps begun to internalize the longstanding anti-exceptionalist messaging from scholars and the Supreme Court.<sup>16</sup> That is, the Federal Circuit is treating the patent space more and more like other areas of law. It is normalizing its relationship with the PTAB as one with more administrative deference. It is declining to recognize an extra-legal stratification among district court judges. And it is treating jury-made findings with the same level of extraordinary respect that they are afforded in less scientific and technical areas of law. Given the nuances of the PTAB data, the Federal Circuit may *also* have internalized the policy-oriented messaging behind Congress’s most recent overhaul of patent law: bad patents need to go.<sup>17</sup>

The shape of patent litigation itself appears unlikely to change drastically in the near future. Subsequent scholarship would be well served

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with the Supreme Court Fellows program, for granting me direct, unmetered access to electronic case files — thereby enabling this unique research.

16. *See infra* notes 186–190 and accompanying text.

17. *See infra* notes 198–201 and accompanying text.

to examine comparable data in some years' time to determine the full durability of the results presented herein. They may turn out to merely reflect a transitory settling-in period after the full implementation of the AIA, but the Author suspects that they reflect an emergent status quo.

The remainder of the Article proceeds in four parts. Part II briefly outlines the recent changes to and overall trends in the patent landscape, chief among them the drastically increased role of the Patent and Trademark Office and the long-term concentration of district court litigation. Part III describes the data collection process and coding method, including particular challenges and solutions. Part IV presents various tabulations of the data, noting the most significant patterns and disparities of interest and addressing quantitative-level concerns or critiques. Finally, Part V concludes by contextualizing the empirical results among larger developments in patent law and the Federal Circuit as an institution.

## II. THE PATENT LANDSCAPE TODAY

### A. Administrative Overhaul: from the AIA to Oil States

It is difficult to overstate the magnitude of changes to the United States patent system over the past decade — starting first and foremost with the changes to its administrative apparatus: the U.S. Patent and Trademark Office (“USPTO”).

In 2011, Congress passed the AIA,<sup>18</sup> “the most significant overhaul to our patent system[] since the founding fathers.”<sup>19</sup> Though historically considered a “weak agency” due to a lack of judicial deference or policymaking authority,<sup>20</sup> the AIA markedly enhanced the USPTO’s

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18. Pub. L. No. 112-29, 125 Stat. 284 (2011).

19. See, e.g., David Kappos, USPTO Director, *Re-Inventing the US Patent System*, USPTO (Sept. 16, 2011), [http://www.uspto.gov/blog/director/entry/re\\_inventing\\_the\\_us\\_patent](http://www.uspto.gov/blog/director/entry/re_inventing_the_us_patent) [<https://perma.cc/AFA9-RE9R>].

20. See, e.g., Arti K. Rai, *Patent Validity Across the Executive Branch: Ex Ante Foundations for Policy Development*, 61 DUKE L.J. 1237, 1238–39 (2012) (recognizing that prior to the passage of the AIA, the patent debate focused on Federal Circuit decisions, not the USPTO, which lacked any substantive rulemaking power); Samiyah R. Ali, *The Great Balancing Act: The Effect of the America Invents Act on the Division of Power Between the Patent and Trademark Office and the Federal Circuit*, 69 VAND. L. REV. 217, 222–23 (2016) (finding that the lack of both a congressional delegation and Federal Circuit deference to the USPTO created the perception of a “weak administrative agency”). For examples of typical pre-AIA case law, see *Koninklijke Philips Elecs. N.V. v. Cardiac Sci. Operating Co.*, 590 F.3d 1326, 1336 (Fed. Cir. 2010) (“The PTO lacks substantive rulemaking authority.”); *Merck & Co. v. Kessler*, 80 F.3d 1543, 1549–50 (Fed. Cir. 1996) (“[T]he broadest of the USPTO’s rulemaking powers . . . does *not* grant the Commissioner the authority to issue substantive rules.”) (emphasis in original); and *Animal Legal Def. Fund v. Quigg*, 932 F.2d 920, 930 (Fed. Cir. 1991) (“The authority granted [to the USPTO] is directed to the ‘conduct of proceedings’ before the Office. A substantive declaration with regard to the Commissioner’s interpretation of the patent statutes . . . does not fall within the usual interpretation of such statutory language.”).

role in shaping patent law. Most importantly, the AIA established a battery of new adjudicative proceedings before the PTAB: post-grant review<sup>21</sup> and *inter partes* review,<sup>22</sup> wherein third parties may challenge the validity of a recently issued patent; derivation proceedings, wherein multiple parties contest ownership of a single invention;<sup>23</sup> and supplemental examinations, wherein a patent owner may seek to correct errors made during prosecution.<sup>24</sup>

Crucially, these proceedings are formal and “trial-like”<sup>25</sup> — including everything from pretrial discovery and witness testimony to cross-examination and oral argument — which bears on judicial deference for regulations or rulings resulting therefrom.<sup>26</sup> Indeed, the USPTO’s entitlement to *Skidmore* deference for its interpretation of the AIA has become increasingly accepted.<sup>27</sup> And, at a minimum, the AIA explicitly granted rulemaking power to the USPTO over the “procedures” and “standards” applied in its new proceedings.<sup>28</sup>

21. See 35 U.S.C. § 321(b) (2012).

22. See *id.* § 311.

23. See *id.* §§ 135, 146, 291.

24. See *id.* § 257(a).

25. Melissa F. Wasserman, *The Changing Guard of Patent Law: Chevron Deference for the PTO*, 54 WM. & MARY L. REV. 1959, 1983 (2013) (observing that the AIA’s legislative history reveals Congress’s intent to establish a formal adjudication process); see also Sarah Tran, *Patent Powers*, 25 HARV. J.L. & TECH. 609, 631 (2012) (noting that the AIA “give[s] the USPTO broad control over its new trial-like proceedings”).

26. *United States v. Mead Corp.*, 533 U.S. 218, 229 (2001) (“We have recognized a very good indicator of delegation meriting *Chevron* treatment in express congressional authorizations to engage in the process of rulemaking or adjudication that produces regulations or rulings . . . .”); see also Rai, *supra* note 20, at 1280 (“In fact, the executive branch could also use the postgrant-review [sic] authority conferred upon the USPTO by the AIA to go one step further. As a doctrinal matter, under current Supreme Court precedent . . . the government could ask for *Chevron* deference toward decisions made in postgrant review proceedings.”).

27. See, e.g., *Ass’n for Molecular Pathology v. U.S. Patent & Trademark Office*, 689 F.3d 1303, 1357 (Fed. Cir. 2012) (“[W]e owe deference [to the USPTO] only commensurate with ‘the thoroughness of its consideration and the validity of its reasoning.’” (quoting *Merck & Co. v. Kessler*, 80 F.3d 1543, 1550 (Fed. Cir. 1996))), *aff’d in part and rev’d in part sub nom. Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013); *Univ. of Mass. v. Kappos*, 903 F. Supp. 2d 77, 84 (D.D.C. 2012) (“[T]he PTO’s determination is not entitled to *Chevron* deference. . . . Instead, the PTO is only entitled to deference under *Skidmore* . . . .”); see generally *Skidmore v. Swift & Co.*, 323 U.S. 134, 140 (1944); Jim Rossi, *Respecting Deference: Conceptualizing Skidmore Within the Architecture of Chevron*, 42 WM. & MARY L. REV. 1105, 1125–27 (2001) (“*Christensen* clarifies that *Skidmore* deference applies to most agency interpretive and policy statements outside of adjudication and notice-and-comment rulemaking.”).

28. See, e.g., 35 U.S.C. § 135(b) (2012) (granting the USPTO authority to set forth “standards” of “sufficient evidence to prove and rebut a claim of derivation”); *id.* § 316(a)(2) (granting the USPTO authority to set forth “the standards for the showing of sufficient grounds to institute” *inter partes* review); *id.* § 362(a)(2) (granting the USPTO authority to set forth “the standards for the showing of sufficient grounds to institute” post-grant review); *id.* § 316(a)(5) (granting the PTO authority to set forth the “standards” for “discovery”); *id.* § 316(a)(9) (granting the USPTO authority to set forth “standards” for when amending a patent is proper). Courts generally recognize “standard-setting” as a form of substantive rulemaking. See, e.g., *Whitman v. Am. Trucking Ass’ns*, 531 U.S. 457, 472–77 (2001); *JEM Broad. Co. v. FCC*, 22

These proceedings have, moreover, proven quite attractive to litigants. More than 7,000 *inter partes* and post-grant review petitions have been filed since the AIA's implementation in September of 2012.<sup>29</sup> As recently as FY 2013, before these new proceedings began to generate appeals, there were fewer than 150 appeals per year from the USPTO to the Federal Circuit.<sup>30</sup> In FY 2016, there were nearly 650.<sup>31</sup> This drastic, steady increase has caused USPTO appeals, once among the smallest share of the Federal Circuit's docket, to supplant district court appeals as the leading source of cases before the Circuit.<sup>32</sup>

At the same time, there has been vocal pushback against the USPTO's expanded role. Former Chief Judge of the Federal Circuit, Randall R. Rader, once labeled the PTAB a patent "death squad,"<sup>33</sup> referring to the PTAB's high invalidation rate: nearly 70% of all final written decisions in *inter partes* review invalidate the patent-at-issue in full and a further 16% invalidate at least some patent claims.<sup>34</sup> Patent owners and academics have broadly criticized the new adjudicatory structure as generating costly litigation, reducing incentives to innovate, and increasing marketplace risk.<sup>35</sup> These critiques appear to have gained at least some traction in Congress, with a handful of senators concluding that the AIA has had "unintended consequences" and proposing legislation that would make it more difficult for the PTAB to

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F.3d 320, 327 (D.C. Cir. 1994) ("[O]ur task is to identify which substantive effects are sufficiently grave so that notice and comment are needed to safeguard the policies underlying the APA.") (internal quotation marks omitted).

29. USPTO, TRIAL STATISTICS at 3 (Nov. 2017), [https://www.uspto.gov/sites/default/files/documents/trial\\_statistics\\_nov2017.pdf](https://www.uspto.gov/sites/default/files/documents/trial_statistics_nov2017.pdf) [<https://perma.cc/SCM3-DUZ3>].

30. U.S. COURT OF APPEALS FOR THE FED. CIR., APPEALS FILED IN MAJOR ORIGINS 2008–2017 (Sept. 2017), [http://www.cafc.uscourts.gov/sites/default/files/the-court/statistics/Hist\\_Caseld\\_by\\_Major\\_Origin\\_10-year.pdf](http://www.cafc.uscourts.gov/sites/default/files/the-court/statistics/Hist_Caseld_by_Major_Origin_10-year.pdf) [<https://perma.cc/TC3F-7YJ4>].

31. *See id.*

32. In FY 2016, for example, there were approximately 550 district court appeals, which declined further to 500 in FY 2017. *See id.*

33. *See Pitt, supra* note 6. It's worth adding that even the PTAB's own Chief Judge at the time, James Smith, was inclined to agree with the assessment. Ryan Davis, *The PTAB's 'Death Squad' Label*, LAW360 (Aug. 14, 2014), <https://www.law360.com/articles/567550/ptab-s-death-squad-label-not-totally-off-base-chief-says> (last visited May 11, 2019). ("If we weren't, in part, doing some 'death squadding,' we would not be doing what the statute calls on us to do.")

34. USPTO, PATENT TRIAL AND APPEAL BD. STATISTICS 10 (Sept. 2016), [https://www.uspto.gov/sites/default/files/documents/aia\\_statistics\\_september2016A.pdf](https://www.uspto.gov/sites/default/files/documents/aia_statistics_september2016A.pdf) [<https://perma.cc/SZQ8-4K6T>].

35. *See, e.g.,* Richard Baker, *America Invents Act Cost the US Economy Over \$1 Trillion*, PATENTLYO (June 8, 2015), <https://patentlyo.com/patent/2015/06/america-invents-trillion.html> [<https://perma.cc/HTV3-KRFX>]; United Inventors Ass'n of America, *Support the Patent System Fix*, UIA (June 28, 2017), <http://www.uiausa.org/single-post/2017/06/28/Support-the-Patent-System-Fix> [<https://perma.cc/22G6-FHP3>] (advocating an end to *inter partes* and post-grant proceedings before the USPTO); Gregory Dolin, *Dubious Patent Reform*, 56 B.C. L. REV. 881, 881 (2015) ("[T]he newly created system is open to abuse . . . such abuse occurs, and . . . the costs . . . are substantial.")

invalidate challenged patents.<sup>36</sup>

On the other side, supporters of the USPTO's new patent-invalidating procedures have argued that their seemingly aggressive usage is a much-needed check on — and natural response to — a patent-granting system run amok. The rate at which the USPTO issues patents has increased dramatically in recent years, spiking from approximately 90,000 utility patents granted in 1990 to more than 300,000 by 2014.<sup>37</sup> In particular, the USPTO has issued an increasing number of software patents (now a majority of all patents granted<sup>38</sup>), which tend to be disproportionately litigation-prone.<sup>39</sup> Indeed, commentators observe that software patents are often especially imprecise and overbroad, whether due to oversight in the application process itself<sup>40</sup> or poorly defined underlying case law.<sup>41</sup>

Exacerbating matters, they argue, are patent trolls — entities that acquire and enforce patents without actually practicing them — who

36. STRONGER Patents Act of 2017, S. 1390, 115th Cong. (2017) (among other things, narrowing the claim construction standards used in PTAB proceedings and creating an explicit presumption of validity).

37. USPTO, U.S. PATENT STATISTICS CHART CALENDAR YEARS 1963–2014, [http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us\\_stat.htm](http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm); see also Gene Quinn, *The Rise of Patent Litigation in America: 1980-2012*, IPWATCHDOG (Apr. 9, 2013), <http://www.ip-watchdog.com/2013/04/09/the-rise-of-patent-litigation-inamerica-1980-2012/id=38910/> [<https://perma.cc/VPJ4-CB3S>].

38. U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-465, INTELLECTUAL PROPERTY: ASSESSING FACTORS THAT AFFECT PATENT INFRINGEMENT LITIGATION COULD HELP IMPROVE PATENT QUALITY 11–13 (2013), <http://www.gao.gov/assets/660/657103.pdf> [<https://perma.cc/E342-K7SL>].

39. *Id.* at 21–24.

40. *Id.* at 28–30 (“Language describing emerging technologies, such as software, may be inherently imprecise because these technologies are constantly evolving . . . claims in software patents sometimes define the scope of the invention by encompassing an entire function — like sending an e-mail — rather than the specific means of performing that function . . . . [S]ome patents, particularly software-related patents, *should never have been issued* because they were obvious, not novel, or lacked definiteness.”) (emphasis added).

41. See, e.g., Brian Fung, *The Supreme Court's Decision on Software Patents Still Doesn't Settle the Bigger Question*, WASH. POST: THE SWITCH (June 20, 2014), <http://www.washingtonpost.com/blogs/the-switch/wp/2014/06/20/the-supreme-courts-decision-on-software-patents-still-doesnt-settle-the-bigger-question> (last visited Feb. 15, 2019) (“[The Court] didn't do much to say what kinds of software *should* be patentable. In other words, the court decided the most basic conflict in the case, but more or less declined to offer guidance for other, future cases.”) (emphasis in original); Robert Merges, *Go Ask Alice — What Can You Patent After Alice v. CLS Bank?*, SCOTUSBLOG (June 20, 2014, 12:04 PM), <http://www.scotusblog.com/2014/06/symposium-go-ask-alice-what-can-you-patent-after-alice-v-cls-bank> [<https://perma.cc/B998-UP4S>] (“To say we did not get an answer is to miss the depth of the non-answer we did get.”).



have capitalized on this broken system, using improvidently-issued patents to threaten litigation against entire industries<sup>42</sup> and even user bases.<sup>43</sup> Supporters argue that the new USPTO proceedings are the best means to disarm trolls,<sup>44</sup> and action groups have, in fact, seized the opportunity therein.<sup>45</sup> In brief, proponents suggest that the AIA offers crucial balance that, in the long run, will greatly strengthen the United States patent system overall.

The clash between these two viewpoints culminated last term in Supreme Court litigation challenging the constitutionality of the USPTO's new AIA procedures outright: *Oil States Energy Services, LLC v. Greene's Energy Group, LLC*.<sup>46</sup> Petitioner Oil States — who lost its patent in an *inter partes* review proceeding before the USPTO — argued that patents, as “private property rights,” can only be extinguished by an Article III court, not an Article I administrative tribunal such as the PTAB.<sup>47</sup> Respondent Greene's Energy — who had challenged Oil States's patent in the first place — argued that patents are “mere public rights,” such that PTAB review and revocation present

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42. Perhaps most infamously, Personal Audio, LLC, used a patent covering a “System for Disseminating Media Content Representing Episodes in a Serialized Sequence” to claim infringement against any major podcasting media groups, including CBS, NBC, and Fox. U.S. Patent No. 8,112,504 B2 (filed Feb. 7, 2012). That patent was subsequently invalidated by the USPTO on *inter partes* review. See *Podcast ‘Patent Troll’ Faces Blow After US Ruling*, BBC (Apr. 13, 2015), <http://www.bbc.com/news/technology-32286340> [<https://perma.cc/CLP3-BBVS>]; *This American Life: When Patents Attack...Part Two!*, CHI. PUB. RADIO (May 31, 2013), <https://www.thisamericanlife.org/496/when-patents-attack-part-two> [<https://perma.cc/9MLL-BR34>]. See generally *Personal Audio, LLC v. Electronic Frontier Foundation*, 867 F.3d 1246 (Fed. Cir. 2017) (affirming the USPTO's invalidation decision).

43. See, e.g., Daniel Nazer, *Infamous Wi-Fi Patent Troll Settles for Peanuts*, ELECTRONIC FRONTIER FOUND. (Feb. 7, 2014), <https://www.eff.org/deeplinks/2014/02/infamous-wi-fi-patent-troll-settles-peanuts> [<https://perma.cc/QK95-6VBX>] (“Armed with some patents purchased from Broadcom, Innovatio sent thousands of letters targeting hotels and cafes that provide Wi-Fi for customers . . . demand[ing] as much as \$2,500 per location.”).

44. See, e.g., Josh Landau, *IPR Successes: Cleaning up Messes*, PATENTPROGRESS (Sept. 26, 2017), <https://www.patentprogress.org/2017/09/26/ipr-successes-cleaning-messes/> [<https://perma.cc/A3BV-7ZX2>] (“Using [*inter partes* review], APTWater succeeded in achieving a quick . . . settlement from the patent troll after the PTAB determined that the patents were likely invalid . . . . That money is money APTWater can spend developing new technologies for water treatment.”).

45. *Unified Challenges the Three Most Prolific Patent Trolls of 2016*, UNIFIED PATENTS LLC (July 27, 2016), <https://www.unifiedpatents.com/news/2016/7/27/unified-challenges-the-three-most-prolific-patent-trolls-of-2016> [<https://perma.cc/FJ73-ZVBL>] (“Unified . . . refuses to pay off [trolls], instead disrupting and deterring them by challenging poor-quality patents. As part of its activities, Unified has analyzed the patentability of more than a hundred patents and filed almost 50 *inter partes* reviews . . . since 2013.”); see also *supra* note 7.

46. 138 S. Ct. 1365, 1375 (2018) (contrasting a view of patents as “private property” with the “public rights doctrine”).

47. Petition for a Writ of Certiorari at 2–4, *Oil States*, 138 S. Ct. 1365 (No. 16-712).

no constitutional problem.<sup>48</sup> Despite the doctrinal nature of the litigants' core positions, the policy arguments outlined above clearly colored and informed the analysis on both sides.<sup>49</sup>

Ultimately, the Court held that post-grant invalidation by the USPTO is not unconstitutional:

Inter partes review falls squarely within the public-rights doctrine. This Court has recognized, and the parties do not dispute, that the decision to grant a patent is a matter involving public rights — specifically, the grant of a public franchise. Inter partes review is simply a reconsideration of that grant, and Congress has permissibly reserved the PTO's authority to conduct that reconsideration. Thus, the PTO can do so without violating Article III.<sup>50</sup>

Practitioners and policymakers will doubtless continue to dispute and push on the precise boundaries of the USPTO's authority. But the Court's decision in *Oil States* means that proceedings before the USPTO will retain the same general shape for some time. The analysis of the USPTO's current relationship to the Federal Circuit and district courts presented herein may therefore be fairly projected into the foreseeable future.

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48. Brief in Opposition of Certiorari at 1–3, *Oil States*, 138 S. Ct. 1365 (No. 16-712).

49. For examples from the petitioner's side, see Brief for Petitioner at 48, *Oil States*, 138 S. Ct. 1365 (No. 16-712) (referencing the PTAB's "death squadding" tendency and potential bias towards high invalidation rates); Brief of Thirty-Nine Affected Patent Owners as Amici Curiae Supporting Petitioner at 9, *Oil States*, 138 S. Ct. 1365 (No. 16-712) (citing the increased "risk" and reduced "incentive [to] innovate[e]" as a result of the PTAB's procedures); Brief of the PhRMA Owners as Amici Curiae Supporting Petitioner at 29–31, *Oil States*, 138 S. Ct. 1365 (No. 16-712) (arguing "the special need for stability" in patent rights, both to "encourage innovation" and enable downstream market coordination); Brief of University of New Mexico as Amicus Curiae in Support of Petitioner at 18, *Oil States*, 138 S. Ct. 1365 (No. 16-712) ("[U]niversity-industry projects advance scientific knowledge and innovation while providing a system for basic research . . . [Inter partes review] has hurt this process by devaluing patents and undermining the patent system."). For examples from the respondent's side, see Brief for Respondent at 20, *Oil States*, 138 S. Ct. 1365 (No. 16-712) ("Congress considered it critical that the PTO have the ability to reexamine issued patents . . . [to] keep strong patents in the system while removing illegitimate ones, thereby helping to restore confidence in the effectiveness of our patent system.") (citation omitted); Brief of USGMC as Amicus Curiae Supporting Respondents at 3-4, 21, *Oil States*, 138 S. Ct. 1365 (No. 16-712) (referencing the need to stop "patent troll" litigation); Brief of Amicus Curiae Dell, Inc. et al. as Amici Curiae Supporting Respondents at 17-21, *Oil States*, 138 S. Ct. 1365 (No. 16-712) (referencing patent trolls, as well as "wasteful litigation costs" generally); Brief of Askeladden LLC as Amici Curiae Supporting Respondents at 9-12, *Oil States*, 138 S. Ct. 1365 (No. 16-712) (referencing patent trolls, as well as the "low quality" of many granted patents).

50. *Oil States*, 138 S. Ct. at 1373 (emphasis in original).

*B. District Court Changes: Concentration, Pilots, and the Pursuit of Juries*

In parallel to the USPTO, federal district courts have undergone their own transformation. Specifically, three trends have changed the face of Article III patent adjudication over the past decade: the concentration of patent litigation among a handful of districts, the Patent Pilot Judge Program, and the increasing reliance on juries.

First, the distribution of patent suit filings across the country has shifted dramatically in recent years. In 2001, the top three patent litigation districts at that time — the Central and Northern Districts of California as well as the Northern District of Illinois — received less than 22% of all patent cases in the country.<sup>51</sup> By 2016, the top three districts — now the Eastern District of Texas, the District of Delaware, and the Central District of California — accounted for more than 58%.<sup>52</sup> The Eastern District of Texas *alone* received 44%.<sup>53</sup>

Whereas the Central District of California's longstanding preeminence is largely seen as a by-product of its tech sector proximity, the sharp rise of the Eastern District of Texas and the District of Delaware is commonly critiqued as the product of forum shopping for favorable procedural and administrative rules.<sup>54</sup> In these two districts, deadlines are accelerated, discovery is broad, defendant joinder is easy, and stays are exceptionally rare — even if the underlying patent's validity is simultaneously under scrutiny at the USPTO.<sup>55</sup> To wit:

The preeminence of the Eastern District of Texas and the District of Delaware as venues for patent litigation makes no sense according to most economic indicators; it cannot be explained in terms of fundamentals, such as economic activity, economic growth or the size of the local population . . . The Eastern District of Texas has gone to great lengths to bend almost every

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51. Kimberly A. Moore, *Forum Shopping in Patent Cases: Does Geographic Choice Affect Innovation*, 79 N.C. L. REV. 889, 903 (2001).

52. LEX MACHINA, <http://law.lexmachina.com> [<https://perma.cc/N9PU-YNRM>] (searching for case type "patent" and cases filed between Jan. 1, 2015 to Dec. 31, 2015).

53. *Id.*

54. *See, e.g.*, J. Jonas Anderson, *Court Competition for Patent Cases*, 163 U. PA. L. REV. 631 (2015).

55. *See id.* at 666–77; Daniel Klerman & Greg Reilly, *Forum Selling*, 89 S. CAL. L. REV. 263–65 (2016).

procedural aspect of patent litigation in favor of plaintiffs. The District of Delaware has gone down the same path, but not quite as far.<sup>56</sup>

Raw data suggests that this plaintiff-friendly explanation has at least some truth to it; using 1997–2016 data, the Eastern District of Texas had the highest plaintiff success rate of any district in the country, with the District of Delaware only a few spots behind.<sup>57</sup>

Pushback against this concentration has been considerable, ranging from criticism in popular media<sup>58</sup> to attempts at legislative reform<sup>59</sup> to Supreme Court litigation. In 2017, the Supreme Court heard *TC Heartland LLC v. Kraft Foods Group Brands LLC*,<sup>60</sup> a direct challenge to the governing interpretation of the patent venue statute<sup>61</sup> that had enabled plaintiffs such considerable freedom in forum selection in the first place. Under *VE Holding Corp. v. Johnson Gas Appliance Co.*, the Federal Circuit had held that venue was proper in patent suits against corporate defendants in “any judicial district in which [the] defendant is subject to the court’s personal jurisdiction.”<sup>62</sup> In a unanimous opinion, the Supreme Court rejected the Federal Circuit’s broad interpretation, holding that venue is proper against a corporate defendant only where it: (1) is incorporated; or (2) “has a regular and established place of business.”<sup>63</sup> When subsequently applying *TC Heartland*, the Federal Circuit held that a “regular and established place of business” specifically requires “physical” presence in the district — not “merely . . . a virtual space or . . . electronic communications.”<sup>64</sup>

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56. Matthew Sag, *IP Litigation in U.S. District Courts: 1994 to 2014*, 101 IOWA L. REV. 1065, 1095–96 (2016).

57. PRICEWATERHOUSECOOPERS, 2017 PATENT LITIGATION STUDY: CHANGE ON THE HORIZON? 22 (2017), [http://www.ipwatchdog.com/wp-content/uploads/2017/05/2017-Patent-Litigation-Study\\_PwC.pdf](http://www.ipwatchdog.com/wp-content/uploads/2017/05/2017-Patent-Litigation-Study_PwC.pdf) [<https://perma.cc/6MEV-HP4E>].

58. See, e.g., *This American Life: When Patents Attack!*, CHI. PUB. RADIO (July 22, 2011), <https://www.thisamericanlife.org/441/when-patents-attack> [<https://perma.cc/22R7-UK7K>] (“Why would a company rent an office in a tiny town in East Texas . . . and leave it completely empty for a year? The answer involves . . . a war waging right now, all across the software and tech industries.”); Joe Nocera, *The Town That Trolls Built*, BLOOMBERG: OPINION (May 25, 2017, 2:41 PM), <https://www.bloomberg.com/view/articles/2017-05-25/the-texas-town-that-patent-trolls-built-j34rlmjc> (last visited May 11, 2019); Adam Liptak, *Supreme Court Considers Why Patent Trolls Love Texas*, N.Y. TIMES (Mar. 27, 2017), <https://www.nytimes.com/2017/03/27/business/supreme-court-patent-trolls-tc-heartland-kraft.html> [<https://perma.cc/935E-JD87>].

59. See Venue Equity and Non-Uniformity Elimination Act of 2016, S. 2733, 114th Cong. (2016).

60. 137 S. Ct. 1514 (2017).

61. 28 U.S.C. § 1400(b) (2012).

62. 917 F.2d 1574, 1584 (Fed. Cir. 1990) (discussing history of Congress’s 1988 amendments to the general venue statute, 28 U.S.C. § 1391 (1988)).

63. *TC Heartland*, 137 S. Ct. at 1519.

64. *In re Cray Inc.*, 871 F.3d 1355, 1362 (Fed. Cir. 2017).

This doctrinal arc represents a considerable narrowing of patent venue choice — but *not* a significant reversal in concentration. Indeed, immediately after *TC Heartland*, early statistics indicated that patent case filings decreased sharply in the Eastern District of Texas,<sup>65</sup> that shortfall, however, was largely offset by a commensurate increase in the District of Delaware.<sup>66</sup> More than a year later, that pattern has held steady. For the six-month period preceding *TC Heartland*, the top five districts had a combined share of 61% of patent case filings; for the six-month period preceding this writing, that same combined share was 60%.<sup>67</sup> In other words, it appears that the forum-shopping stopped by *TC Heartland* was occurring predominantly between districts that were already patent heavy; it was not pulling litigation away from the rest of the country. Regardless of which particular districts become the locus for patent litigation moving forward, concentration itself thus appears to be here to stay.

Second, within certain districts, the Patent Pilot Program<sup>68</sup> has funneled patent cases to increasingly patent-experienced judges. Started in 2011, the ten-year program has allowed the judges in thirteen districts<sup>69</sup> to transfer any patent cases they are randomly assigned to the designated pilot judges in their district instead.<sup>70</sup> The intent behind the program is “to encourage enhancement of expertise in patent cases among district court judges” by offering the designated judges greater exposure to and familiarity with patent cases.<sup>71</sup> Mid-pilot data from the Administrative Office of the U.S. Courts confirms that designated judges have indeed been receiving substantially more patent cases due to their

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65. See, e.g., Owen Byrd, *Patent Litigation Trends in the Three Months After TC Heartland*, LEX MACHINA (Oct. 18, 2017), <https://lexmachina.com/patent-litigation-trends-in-the-three-months-after-t-c-heartland/> [<https://perma.cc/W5UH-8LBU>].

66. See *id.* (finding that the *sum* share of patent filings in the Eastern District of Texas and the District of Delaware decreased by only seven percentage points in the first three months after *TC Heartland*). This is somewhat unsurprising, given the dominance of Delaware as a place of incorporation. *Why Businesses Choose Delaware*, DELAWARE.GOV, <https://corplaw.delaware.gov/why-businesses-choose-delaware/> [<https://perma.cc/WXJ6-S82A>] (“Indeed, more than 60 percent of the Fortune 500 companies are incorporated in Delaware.”).

67. LEX MACHINA, <http://law.lexmachina.com> [<https://perma.cc/N9PU-YNRM>] (searching for case type “patent,” then comparing between cases filed between Dec. 22, 2016 and May 22, 2017, and cases filed between Oct. 1, 2018 and Apr. 1, 2019).

68. Patent Cases Pilot Program, Pub. L. No. 111-349, 124 Stat. 3674 (2011).

69. Participating districts include the Central District of California, the Northern District of California, the Southern District of California, the Northern District of Illinois, the District of Maryland, the District of New Jersey, the District of Nevada, the Eastern District of New York, the Southern District of New York, the Western District of Pennsylvania, the Western District of Tennessee, the Eastern District of Texas, and the Northern District of Texas. MARGARET S. WILLIAMS, REBECCA EYRE, & JOE CECIL, FED. JUDICIAL CTR., PATENT PILOT PROGRAM: FIVE-YEAR REPORT 1–3 (April 2016), [https://www.fjc.gov/sites/default/files/2016/Patent%20Pilot%20Program%20Five-Year%20Report%20\(2016\).pdf](https://www.fjc.gov/sites/default/files/2016/Patent%20Pilot%20Program%20Five-Year%20Report%20(2016).pdf) [<https://perma.cc/B3SZ-TATG>].

70. See *id.* at 2.

71. Patent Cases Pilot Program, Pub. L. No. 111-349, 124 Stat. 3674 (2011) (codified at 28 U.S.C. § 137 (2012)).

participation; hundreds of patent cases have been transferred in most of the selected districts, and more than 3,000 have been transferred in the first five years of the program overall.<sup>72</sup> This same preliminary data indicates that patent cases assigned to designated judges are terminated more quickly, cautiously suggesting gains in efficiency.<sup>73</sup>

Third, regardless of forum, the use of juries in patent infringement suits has been steadily increasing. Situated in the larger historical context of patent law, this is a somewhat novel phenomenon — especially with regards to patent *validity* challenges — due to the former separation of courts of law and courts of equity:

And because peripheral claiming came into its own with the 1870 [Patent] Act, validity as we understand the term today became a real issue in patent litigation for the first time in these decades. But because under the 1870 Act a patentee who wanted both an injunction and damages had to proceed in a court of equity, virtually none of the patent cases decided in this period were tried to a jury. Indeed, the dominance of equity in patent litigation was so complete that by 1940 . . . only 2.5% of patent suits were tried to a jury . . .<sup>74</sup>

But after the merger of law and equity in United States courts,<sup>75</sup> jury use in patent cases began to slowly tick upward. In the 1940s and 1950s, approximately 3.4% of patent cases were tried to a jury.<sup>76</sup> By the late 1970s, that figure tripled to 10%,<sup>77</sup> and by the late 1990s, it tripled again to 32%.<sup>78</sup> In the past two decades, the trend has only accelerated; juries today decide approximately 80% of patent trials.<sup>79</sup>

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72. WILLIAMS ET AL., *supra* note 69, at 10–12.

73. *Id.* at 22–23 (“On average, cases before designated judges take less time than those before nondesignated judges, and the differences are statistically significant.”).

74. Mark A. Lemley, *Why Do Juries Decide if Patents Are Valid?*, 99 VA. L. REV. 1673, 1703–04 (2013) (citing Gary M. Ropski, *Constitutional and Procedural Aspects of the Use of Juries in Patent Litigation*, 58 J. PAT. OFF. SOC’Y 609, 673 (1976)).

75. See FED. R. CIV. P. 2 (effective Sept. 16, 1938).

76. Lemley, *supra* note 74, at 1706.

77. See HERBERT F. SCHWARTZ, FED. JUDICIAL CTR., *PATENT LAW AND PRACTICE* 130 (2d ed. 1995); see also Mark A. Lemley et al., *Rush to Judgment? Trial Length and Outcomes in Patent Cases*, 41 AIPLA Q.J. 169, 174 n.2 (2013).

78. PRICEWATERHOUSECOOPERS, *supra* note 57, at 6 (excluding infringement suits relating to Abbreviated New Drug Applications for outlier reasons).

79. See *id.*; see also Lemley, *supra* note 74, at 1706.

Patent infringement is an exclusively civil offense,<sup>80</sup> unlike copyright<sup>81</sup> or trademark,<sup>82</sup> such that at least one of the parties must affirmatively request a jury if they wish to avoid a bench trial.<sup>83</sup> In practice, it is predominantly patentee-plaintiffs that are responsible for the surge in jury use.<sup>84</sup> Juries are seen as disproportionately plaintiff-friendly in patent cases, and justifiably so: jury use is consistently associated with higher damage awards and increased plaintiff win rates overall.<sup>85</sup> This has led to some pushback against jury use, whether grounded in the unique features of patent law<sup>86</sup> or arising from a more generalized suspicion of Seventh Amendment jury rights applying in complex cases.<sup>87</sup> Indeed, the Federal Circuit's landmark opinion over twenty years prior in *Markman v. Westview Instruments* — holding that judges, not juries,

80. See, e.g., OFFICE OF LEGAL EDUC., EXEC. OFFICE FOR U.S. ATTORNEYS, PROSECUTING INTELLECTUAL PROPERTY CRIMES 8 (4th ed. 2013), [https://www.justice.gov/sites/default/files/criminal-ccips/legacy/2015/03/26/prosecuting\\_ip\\_crimes\\_manual\\_2013.pdf](https://www.justice.gov/sites/default/files/criminal-ccips/legacy/2015/03/26/prosecuting_ip_crimes_manual_2013.pdf) [<https://perma.cc/L8CE-3L4D>] (“[T]here are no criminal — only civil — penalties for committing patent infringement.”); Jacob S. Sherkow, *Patent Infringement as Criminal Conduct*, 19 MICH. TELECOMM. & TECH. L. REV. 1, 2 n.6 (“[N]othing in the patent statute provides criminal penalties for any violation of its provisions.”) (citing 35 U.S.C. §§ 281–297 (2012)).

81. See 17 U.S.C. § 506(a) (2012); 18 U.S.C. § 2319 (2012).

82. See 18 U.S.C. § 2320 (2012 & Supp. IV 2016).

83. FED. R. CIV. P. 38(b).

84. See, e.g., Kimberly A. Moore, *Jury Demands: Who’s Asking?*, 17 BERKELEY TECH. L.J. 847, 855 (2002) (“[P]laintiffs demanded a jury significantly more often than did defendants; plaintiffs demanded a jury in 71% of all cases.”); Richard A. Posner, *Why There Are Too Many Patents in America*, ATLANTIC (July 12, 2012), <https://www.theatlantic.com/business/archive/2012/07/why-there-are-too-many-patents-in-america/259725/> [<https://perma.cc/62GP-RLGT>] (“[P]atent plaintiffs tend to request trial by jury because they believe that jurors tend to favor patentees . . .”).

85. See PRICEWATERHOUSECOOPERS, *supra* note 78, at 6; Kimberly A. Moore, *Populism and Patents*, 82 N.Y.U. L. REV. 69, 107 (2007); Lemley, *supra* note 74, at 174–85; Andrei Iancu & Jay Chung, *Real Reasons the Eastern District of Texas Draws Patent Cases — Beyond Lore and Anecdote*, 14 SMU SCI. & TECH. L. REV. 299, 305 (2011) (finding a nationwide patentee win rate in jury trials of 68%).

86. See *Judicial Panel Discussions*, *supra* note 2; Lemley, *supra* note 74, at 1675–76 (critiquing jury use in patent cases as, among other things, ahistorical); Arti K. Rai, *Specialized Trial Courts: Concentrating Expertise on Fact*, 17 BERKELEY TECH. L.J. 877, 889 (2002) (“Indeed, a significant analytical and empirical literature . . . suggests that lay persons, confronted with competing expert accounts of a scientific or technological dispute, are unlikely to make considered judgments.”). Moreover, arguments along these lines have been made by patent litigants themselves for at least a half-century. See, e.g., *Tights, Inc. v. Stanley*, 441 F.2d 336, 340 (4th Cir. 1971) (“The briefs filed in opposition . . . argue strongly that patent cases are too complicated and difficult for a jury to deal with.”).

87. See, e.g., James Oldman, *On the Question of a Complexity Exception to the Seventh Amendment Guarantee of Trial by Jury*, 71 OHIO ST. L.J. 1031, 1051–53 (2010); Frank M. Loo, *A Rationale for an Exception to the Seventh Amendment Right to a Jury Trial*: In re Japanese Electronic Products Antitrust Litigation, 30 CLEV. ST. L. REV. 647, 654–55 (1981); see generally Patrick Devlin, *Jury Trial of Complex Cases: English Practice at the Time of the Seventh Amendment*, 80 COLUM. L. REV. 43 (1980). There are indications of at least some skepticism from the Supreme Court itself. See, e.g., *Ross v. Bernard*, 396 U.S. 531, 538 n.10 (1970) (stating that the jury triability of an issue “is determined by considering, first, the pre-merger [of equity and law] custom with reference to such questions; second, the remedy sought; and, third, the practical abilities and limitations of juries”) (emphasis added).

have “the power and obligation to construe as a matter of law the meaning of language used in the patent claim[s]”<sup>88</sup> — was interpreted at the time as a partial embrace of such suspicion:

Today’s decision also threatens to do indirectly what we have declined to do directly, that is, create a ‘complexity exception’ to the Seventh Amendment for patent cases . . . But there is simply no reason to believe that judges are any more qualified than juries to resolve the complex technical issues often present in patent cases . . . We have consistently stressed that the same rules apply to patent cases as apply to all other civil disputes.<sup>89</sup>

Nevertheless, the vast majority of patent issues are still permitted to be submitted to juries, and, as indicated above, quite often are.

These three trends are, to some extent, intertwined and overlapping. By design, many of the patent-heavy districts are also participants in the Patent Pilot Program.<sup>90</sup> This has led to a double concentration: patent cases are preferentially filed in certain districts, and then preferentially (re)assigned to the dockets of certain judges. Chief Judge Rodney Gilstrap of the Eastern District of Texas, a Pilot judge, is perhaps the apotheosis of this overlap; from 2013 to 2018, Judge Gilstrap had more than 5,300 patent cases cross his docket, nearly outpacing the next four patent-heaviest judges combined.<sup>91</sup> Likewise, part of the reason why plaintiffs have congregated around certain districts appears to be the comparative ease of reaching a jury trial under their local rules.<sup>92</sup> Despite some critique and resistance to these trends, the shape of district court patent litigation appears unlikely to change particularly soon.

88. 52 F.3d 967, 979 (Fed. Cir. 1995), *aff’d*, 515 U.S. 1192 (1995).

89. *Id.* at 993 (Mayer, J., concurring in the judgment).

90. Pub. L. No. 111-349, § 1(b)(2)(A), 124 Stat. 3674, 3675 (2011) (stating that the pilot districts shall be selected from among those with either “the largest number of patent and plant variety protection cases” or specialized “local rules for patent and plant variety protection cases”).

91. Those judges are, in order, Judge Robert Schroeder (Eastern District of Texas, 1,921 patent cases), Chief Judge Leonard Stark (District of Delaware, 1,216 patent cases), Judge Richard Andrews (District of Delaware, 1,131 patent cases, and Judge Gregory Sleet (District of Delaware, 1,088 patent cases). LEX MACHINA, <http://law.lexmachina.com> [https://perma.cc/N9PU-YNRM] (searching for case type “patent” and cases filed between Jan. 1, 2013 to Jan. 1, 2018).

92. *See, e.g.*, Brian J. Love & James Yoon, *Predictably Expensive: A Critical Look at Patent Litigation in the Eastern District of Texas*, 20 STAN. TECH. L. REV. 1, 18 (2017) (“[B]ecause East Texas patent cases are both unlikely to be transferred out of the district and unlikely to be completely resolved by summary judgment, they are . . . disproportionately likely to go to trial.”); Sag, *supra* note 56, at 1100 (noting the reduced availability of summary judgment in the District of Delaware and Eastern District of Texas, and comparatively greater reliance on “jury verdict[s]”); Anderson, *supra* note 54, at 674–75.



Hence, as with the USPTO, the analysis that follows will offer a useful picture of patent adjudication for the foreseeable future and should ideally help inform efforts at reform or modification thereof.

### III. METHODOLOGY

#### A. Data Source

This study covers all patent appeals docketed at the Federal Circuit between October 1, 2014, and September 30, 2016 (i.e., FY 2015 and FY 2016), using Public Access to Court Electronic Records (“PACER”) as the document source. This time period offers current, relevant data — particularly on post-AIA proceedings before the PTAB — while still ensuring that the overwhelming majority of cases have already reached final appellate resolution. The direct use of PACER, moreover, allows for capture of cases that have no decision available on Westlaw, Lexis, or other secondary databases.

Of the 3,006 appeals filed at the Federal Circuit during this period, 2,274 were appeals from district courts, the PTAB, or the ITC.<sup>93</sup> The Author read and annotated the materials for each of those cases — direct review of the appellate docket, briefs, orders, and opinions as necessary — to most accurately determine the substantive issues raised and final outcomes thereof. Those issues and outcomes were, in turn, converted into data points, and compiled into a database on which statistical operations could be performed.

As other scholars have noted, this type of hand-coding is an extremely time-intensive task,<sup>94</sup> but offers significant advantages over commercially available or machine-generated datasets. On the commercial side, WestLaw’s *Lex Machina*<sup>95</sup> platform is perhaps the most robust source available for empirics of patent cases — but does not, as of this writing, track appellate outcomes in any accessible or manipulable way. On the machine-generated side, docket-level data, like that found in PACER, may be mined directly, and to great effect in certain broad applications.<sup>96</sup> But using such surface-level data here would

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93. See U.S. COURT OF APPEALS FOR THE FED. CIRCUIT, YEAR-TO-DATE ACTIVITY (Sept. 30, 2016), [http://www.ca9.uscourts.gov/sites/default/files/the-court/statistics/revYTD\\_Activity\\_9.30.16.pdf](http://www.ca9.uscourts.gov/sites/default/files/the-court/statistics/revYTD_Activity_9.30.16.pdf) [<https://perma.cc/4VHE-CVGX>]; U.S. COURT OF APPEALS FOR THE FED. CIRCUIT, YEAR-TO-DATE ACTIVITY (Sept. 30, 2015), [http://www.ca9.uscourts.gov/sites/default/files/the-court/statistics/ytd\\_activity\\_9\\_30\\_15.pdf](http://www.ca9.uscourts.gov/sites/default/files/the-court/statistics/ytd_activity_9_30_15.pdf) [<https://perma.cc/HA87-YKGX>].

94. Lemley et al., *supra* note 12, at 1081 (“Coding of outcomes, especially in patent cases, is notoriously difficult and time consuming, requiring deep knowledge of patent law and litigation as well as the motivation to devote long hours to the task.”).

95. LEX MACHINA, <http://law.lexmachina.com> [<https://perma.cc/N9PU-YNRM>].

96. See, e.g., Theodore Eisenberg & Martin T. Wells, *Trial Outcomes and Demographics: Is There a Bronx Effect?*, 80 TEX. L. REV. 1839, 1843–45 (2002); Jason Scott Johnston & Joel Waldfogel, *Does Repeat Play Elicit Cooperation? Evidence from Federal Civil Litigation*, 31

eliminate the ability to distinguish appellate outcomes issue-by-issue,<sup>97</sup> and erroneously count irrelevant cases.<sup>98</sup> Even otherwise comprehensive academic databases, such as the Federal Circuit Data Project,<sup>99</sup> feature the same drawback; each case is treated as a single unit, rather than a bundle of discrete claim sets and issues. The hand-coding method presented below hence offers a uniquely direct and accurate picture of Federal Circuit decision-making.

### *B. Coding Procedure*

This study uses a claim-case combination as the unit of analysis for coding. That is, for each case, the Author recorded the validity issues that were actually reviewed on appeal — as indexed by the set of affected patent claims. This approach attempts to best simulate the reality of decision-making: if the Federal Circuit and litigants treated a given set of claims as all rising or falling together on appeal, then so does the dataset.

The following excerpt offers an illustrative example of briefing before the Federal Circuit at its most straightforward:

The district court ruled the “in response to” term recited in claims 1 and 23 to be indefinite. However, the district court failed to perform the analysis required by *Nautilus* and this Court’s opinions. The record establishes that the ‘445 patent’s specification informs a person of skill in the art as to the scope of the invention recited in claims 1 and 23, including the “in response to” term. *Nautilus* therefore requires reversal of the district court’s ruling.

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J. LEGAL STUD. 39, 46–47 (2002). *But see, e.g.*, Christina L. Boyd & David A. Hoffman, *The Use and Unreliability of Federal Nature of Suit Codes*, 2017 MICH. ST. L. REV. 997, 1024–25 (2017) (finding high variance among PACER data labeling the underlying cause of action).

97. PACER docket data for Federal Circuit cases typically indicates the final outcome, e.g., “affirmed in part and reversed in part,” but offers no way to tell which outcome applies to which findings made below (or whether certain findings were addressed at all on their merits, rather than mooted).

98. Consider, for example, *Orenshteyn v. Citrix Systems, Inc.*, 609 F. App’x 654 (Fed. Cir. 2015) (summary affirmance). The appeal is labeled as “Patent Infringement” on PACER due to its cause of action below, but the only issue actually challenged by appellants was the district court’s award of sanctions pursuant to 28 U.S.C. § 1927 (2012). *See* Brief of Appellant at 17–20, *Orenshteyn v. Citrix Systems, Inc.*, 609 F. App’x 654 (Fed. Cir. 2015) (No. 15-1056).

99. *The Federal Circuit Data Project*, UNIV. OF IOWA, <https://empirical.law.uiowa.edu/compendium-federal-circuit-decisions> [<https://perma.cc/Q783-NCP4>].

The district court also ruled that the “hook inserted” term in claim 22 is indefinite because it omitted a word. Here, the intrinsic evidence in the specification clarifies the “hook inserted” term’s scope. Therefore, even without correcting the omission, the term meets the definiteness requirement. The record therefore establishes that the “hook inserted” term satisfies the *Nautilus* standard.<sup>100</sup>

Hence, this particular case provided two data points: one regarding the definiteness of claims {1, 23} and one regarding the definiteness of claim {22}.

Where a set of claims was rejected or upheld on multiple grounds by the trial forum, only the grounds that were actually reviewed by the Federal Circuit were included in the analysis. For example, in one case, the patent owner appealed the PTAB’s determinations that the claim set {17, 18} was anticipated as well as obvious.<sup>101</sup> On appeal, the Federal Circuit affirmed on the basis of anticipation alone.<sup>102</sup> Therefore, that case provided only one data point — the anticipation of {17, 18} — with the explicitly unaddressed obviousness finding not included in the analysis.

For cases with written opinions, this method of coding was entirely straightforward and required almost no subjective interpretation of the case materials. More challenging, however, was the Federal Circuit’s use of summary affirmances under Rule 36.<sup>103</sup> Because Rule 36 affirmances do not explain the specific basis for affirming, some subjective coding decisions were required to avoid double-counting.

For example, in *Enovsys LLC v. AT&T Mobility LLC*, the patent owner appealed the district court’s determinations that patent claims {1, 11, 13} were anticipated as well as obvious.<sup>104</sup> For the ultimate judgment below to stand, only one basis needed to be affirmed; claims {1, 11, 13} remain invalidated either way. To count this case as *two* “affirm” data points would therefore tend to depart from the realities of appellate review; the Federal Circuit does not, as a rule, engage in such

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100. Opening Brief of Plaintiff-Appellant at 17–18, *Trusted Knight Corp. v. Int’l Bus. Machs. Corp.*, 681 F. App’x 898 (Fed. Cir. 2016) (No. 16-1510).

101. See Brief of Appellant at 22–23, *Schoeller-Bleckmann Oilfield Equip. AG v. Church-ill Drilling Tools US, Inc.*, 664 F. App’x 949 (Fed. Cir. 2016) (No. 16-1494).

102. See *Schoeller-Bleckmann Oilfield Equip. AG*, 664 F. App’x at 953 (“We need not and do not address the Board’s conclusions that . . . Bourgoyne rendered obvious claims 17 and 18.”).

103. FED. CIR. R. 36 (stating that “[t]he court may enter a judgment of affirmance without opinion, citing this rule, when . . . an opinion would have no precedential value” and the decision below presents no error requiring reversal, vacatur, or remand).

104. See Corrected Brief for Appellant *Enovsys LLC* at 6, 48–54, *Enovsys LLC v. AT&T Mobility LLC*, 678 F. App’x 1025 (Fed. Cir. 2016) (No. 16-1691, -1767).

redundant analyses.<sup>105</sup> In such ambiguous circumstances, the Author selected the basis for affirming with the most deferential standard of review — in this example, anticipation — in an effort to select the “narrowest” basis for affirmance.<sup>106</sup> Using written opinions as a guideline, this type of selection appears to reflect actual Federal Circuit practice.<sup>107</sup>

It should be emphasized, however, that this challenge was only present in a minority of Rule 36 cases. More often, the set structure of claim bundles disputed on appeal made coding a matter of straightforward, if somewhat time consuming, set logic application. In *In re Clouding Corp.*,<sup>108</sup> for example, the patent owner appealed the following separate determinations made by the PTAB: (1) claims {1–24} of the patent at issue were anticipated by International Pub. No. WO 99/12098; and (2) claims {1–3, 6, 7, 13, 15, 16} were anticipated by U.S. Patent No. 5,778,389 (filed May 23, 1996).<sup>109</sup> The Federal Circuit affirmed under Rule 36, but the reasoning may nevertheless be parsed cleanly for quantitative purposes as follows. Because claim 4 (among others) only appears in set (1) (i.e., it was not otherwise independently challenged on appeal), the finding for that set must have been reviewed and affirmed on appeal for the judgment below to stand. Moving one step further, because set (2) is a proper subset of set (1), one can assume as a matter of judicial economy that the Federal Circuit would not superfluously review that issue as well — all the claims in set (2) are already handled by (1). So, altogether, the dataset includes *In re Clouding Corp.* as exactly one data point — an anticipation affirmance.

This tracks the Federal Circuit’s actual approach, as demonstrated through the cases that do feature written opinions. For example:

[T]he Board’s final decision found claims 1–12, 14, 15, and 17–29 anticipated by U.S. Patent No. 6,496,867 to Beser (“Beser”), claims 1, 2, 7–9, 12–17, 19–21, and 24–29 anticipated by U.S. Patent No.

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105. See, e.g., *Duke University v. Biomarin Pharm. Inc.*, 685 F. App’x 967, 976 (Fed. Cir. 2017) (“Because addressing Duke’s arguments relating to whether van Bree anticipates claims 1 and 20 resolves this appeal, . . . we need not address Duke’s arguments relating to the Board’s conclusion that claims 1 and 20 were [also] unpatentable as obvious.”).

106. It is worth noting that this issue only applied in the *invalidity* context. If the PTAB, for example, found a given set of claims both not anticipated and not obvious, then a Rule 36 judgment would necessarily be affirming both findings. Otherwise, the end result — patent validity — would not stand.

107. See, e.g., *MPHJ Tech. Invs., LLC v. Ricoh Americas Corp.*, 847 F.3d 1363, 1370–71 (Fed. Cir. 2017); *TVIIM, LLC v. McAfee, Inc.*, 851 F.3d 1356, 1364 (Fed. Cir. 2017); *Schoeller-Bleckmann Oilfield Equip. AG*, 664 F. App’x at 953; *Prolitec, Inc. v. Scentair Techs., Inc.*, 807 F.3d 1353, 1362 (Fed. Cir. 2015). There are instances of the Federal Circuit taking the opposite approach, but they are considerably rarer. See, e.g., *In re Anderson*, 662 F. App’x 958, 965 (Fed. Cir. 2016).

108. 628 F. App’x 766 (Fed. Cir. 2016).

109. See Appellant’s Brief at 2, *In re Clouding Corp.*, 628 F. App’x at 766 (No. 15-1615).

6,131,121 to Mattaway (“Mattaway”), and claims 1-15, 18–23, and 28–29 anticipated by U.S. Patent No. 6,557,037 to Provino (“Provino”).

...

After full review of the record and careful consideration, we find no error in the Board’s claims constructions or findings with respect to the Mattaway and Provino references, which together cover all claims of the . . . patent. *We do not, therefore, need to reach the merits of the Board’s decision with respect to Besser.*<sup>110</sup>

This method — combined with the litigants’ own tendency to narrow the grounds of appeal to a handful of issues — rendered even complex Rule 36 cases easily codable.

After excluding cases in which there was no dispute on appeal as to patent validity (for example, cases where only the award of damages was appealed) and cases where patent validity was disputed, but wholly unaddressed by the Federal Circuit (for example, cases where a jurisdictional defect was dispositive), there were 1,087 claim-case data points for empirical analysis.<sup>111</sup> In relevant part, each claim-case data point included ten characteristics, ranging from case demographics to substantive merits.<sup>112</sup>

Before turning to the results, a brief explanation is warranted regarding patent technology class in particular. For each patent, the Author began with the USPTO’s own internal class designation.<sup>113</sup> For example, Patent No. 7,647,460, entitled “Method and apparatus for implementing a remote mirroring data facility without employing a dedicated leased line to form the link between two remotely disposed storage devices,” is labeled by the USPTO as within class number 711: “Electrical computers and digital data processing systems

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110. *VirnetX Inc. v. Apple, Inc.*, 671 F. App’x 789, 789-90 (Fed. Cir. 2016) (emphasis added).

111. As of this writing, only three lead cases from the relevant time period remain unresolved, and hence are not included in the analysis: Docket Nos. 16-1919, 16-2222, and 16-2231.

112. In full: (1) case number, date, and Federal Circuit panel; (2) precedential status of the opinion; (3) patent number(s) and claim(s) in dispute; (4) patent technology class; (5) specific tribunal below (e.g., Eastern District of Texas, PTAB, etc.); (6) for district courts, the particular judge; (7) validity finding(s) by the tribunal below (e.g., non-obvious, ineligible subject matter, etc.); (8) context of finding below (e.g., summary judgment, *inter partes* review, etc.); (9) whether any predicate claim constructions were modified on appeal; and (10) disposition of the finding on appeal (e.g., affirmed, vacated, etc.).

113. See USPTO, *US Classes by Number with Title*, <https://www.uspto.gov/web/patents/classification/selectnumwithtitle.htm> [<https://perma.cc/HZL7-GGUP>].

(memory).”<sup>114</sup> In turn, those class designations were condensed and simplified into six supercategories<sup>115</sup> for more sensible quantitative use: (1) chemical; (2) computers and communications; (3) drugs and medical; (4) electrical and electronics; (5) mechanical; and (6) not otherwise classified.<sup>116</sup> The aforementioned 711 class, for example, corresponds to the “computers and communications” supercategory, so the ’460 patent was so designated.

The dataset thus offers a fairly robust picture of patent validity decision-making from the perspective of the Federal Circuit, while attempting to maintain mechanical objectivity in all aspects of coding to the maximum extent feasible. Part IV analyzes the results in detail, with the theoretical and doctrinal implications reserved until Part V.

#### IV. ANALYSIS

Sections IV.A and IV.B begin by briefly examining cross-tabulations of the PTAB and district court data separately, noting disparities, distinctions, and outliers that arise and justifying refinements to the data accordingly. Section IV.C then compares the two subsets side by side, including regressions on the refined data. Section IV.D addresses possible concerns and critiques with the techniques herein, in particular the possibility of bias or error in coding and litigant-driven selection effects.

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114. U.S. Patent No. 7,647,460 (filed Sept. 23, 1997).

115. This study uses the same supercategory conversion system as Professors Bronwyn Hall, Adam Jaffe, and Manuel Trajtenberg in their scholarship for the National Bureau of Economic Research. See Bronwyn H. Hall et al., *The NBER Patent Citations Data File: Lessons, Insights, and Methodological Tools* 13 (Nat’l Bureau of Econ. Research, Working Paper No. 8498, 2001). Although their supercategory system is not necessarily unique, it is in particularly common use. See, e.g., Vishnubhakat, *supra* note 14, at 66; Gregory Nemet & Evan Johnson, *Do Important Inventions Benefit from Knowledge Originating in Other Technological Domains?*, 41 RES. POL’Y 190, 192 (2012); Alberto Galasso & Mark Schankerman, *Patent and Cumulative Innovation: Causal Evidence from the Courts*, 130 Q.J. ECON. 317, 332 (2014); Shawn P. Miller, *Where’s the Innovation: An Analysis of the Quantity and Quality of Anticipated and Obvious Patents*, 18 VA. J.L. & TECH. 1, 23 n.59 (2013) (using the HJT system, among others).

116. Hall et al., *supra* note 115, at 13.

## A. PTAB Data

Starting with the highest level of generality, the raw results on appeal for patent validity findings made by the PTAB are presented below:

Table 1: Disposition of PTAB Validity Findings on Appeal (Unadjusted)

Affirm Rate	Reverse Rate	Vacate and/or Remand Rate	Observations
83.5%	6.6%	9.9%	771

Immediately, one sees the greater tendency for the Federal Circuit to vacate and remand instead of outright reversing the PTAB's findings. On further examination, it becomes clear that this is driven in substantial part by the limitations of appellate review with respect to Article I tribunals (such as the PTAB) as contrasted with Article III courts. That is, per *SEC v. Chenery Corp.* and its progeny, "an administrative order cannot be upheld unless the grounds upon which the agency acted in exercising its powers were those upon which its actions can be sustained."<sup>117</sup> Put differently, on appeal from a district court, if the "decision below is correct, it must be affirmed, although the lower court relied upon a wrong ground or gave a wrong reason,"<sup>118</sup> but if an agency finding "is not sustainable on the administrative record made, then the . . . decision must be vacated and the matter remanded . . . for further consideration."<sup>119</sup>

The Federal Circuit has carried this doctrine through to its review of PTAB decisions, highlighting in particular the need for adequate "explanation" from PTAB decision-makers.<sup>120</sup>

The following case, coded for the data set, provides an example of the doctrine in action:

Our precedent demands more than what the Board's opinion provided here . . . [T]he Board must provide rationale for its findings to facilitate our review . . .

117. *SEC v. Chenery Corp.*, 318 U.S. 80, 95 (1943). See generally Kevin M. Stack, *The Constitutional Foundations of Chenery*, 116 *YALE L.J.* 952 (2007) (sketching the doctrine's background, evolution, and significance).

118. *Helvering v. Gowran*, 302 U.S. 238, 245 (1937). See also Jerry L. Mashaw, *Small Things like Reasons Are Put in a Jar: Reason and Legitimacy in the Administrative State*, 70 *FORDHAM L. REV.* 17, 19–26 (2001) (contrasting judicial review of agency action and judicial decision-making).

119. *Camp v. Pitts*, 411 U.S. 138, 143 (1973).

120. *In re Nuvasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016) (citing *Chenery*, 318 U.S. at 94; *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983)).

On remand, the Board must provide additional fact findings and explanations for its findings relating to the anticipation and obviousness determinations as to claims 1–3, 5, 7–10, and 12–14 of the '960 patent. We take no position on whether the prior art, taken as a whole, anticipates or renders obvious the disputed claims.<sup>121</sup>

Because PTAB findings that fail to satisfy these requirements are vacated and remanded,<sup>122</sup> whereas comparable district court findings would not be, those twenty-six PTAB data points are hereafter pulled from the set to maximize comparability with district court outcomes later on.

Even under a particularly strict interpretive standard — only counting opinions that explicitly invoke the “explanation” or “rationale” requirement by name and citation — this accounts for a substantial portion of the PTAB’s vacatur and remands, leading to the following refinement:

Table 2: Disposition of PTAB Validity Findings (Partially Adjusted)

Affirm Rate	Reverse Rate	Vacate and/or Remand Rate	Observations
86.4%	6.9%	6.7%	745

Mathematically, this relies only on the assumption that those vacatur and remands would have otherwise been affirmances and reversals at the same rate as the PTAB’s other findings. Their removal thus facilitates a better comparison to the district court results without any meaningful loss of clarity.

Going deeper, it’s possible to distinguish between the affirmance rates for different kinds of validity issues — anticipation, obviousness, and so on. Because the standards of review for these issues are not identical, this offers an explanation for some of the variation in results on appeal. Specifically, subject-matter eligibility is a question of law reviewed *de novo*,<sup>123</sup> as is indefiniteness.<sup>124</sup> “[U]ltimate determinations of obviousness” are likewise questions of law, reviewed “*de novo*” —

121. *Google Inc. v. Intellectual Ventures II LLC*, 701 F. App’x 946, 955 (Fed. Cir. 2017).

122. *In re Hodges*, 882 F.3d 1107, 1117 (Fed. Cir. 2018) (“The Board has failed to explain its reasoning . . . . When faced with similarly deficient factual findings, ‘we have consistently vacated and remanded for further proceedings.’”) (quoting *In re Van Os*, 844 F.3d 1359, 1362 (Fed. Cir. 2017)).

123. *In re Ferguson*, 558 F.3d 1359, 1363 (Fed. Cir. 2009) (quoting *In re Bilski*, 545 F.3d 943, 951 (Fed. Cir. 2008) (en banc), *aff’d sub nom. Bilski v. Kappos*, 561 U.S. 592 (2010)).

124. *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1377 (Fed. Cir. 2015) (citing *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014)).



but crucial “underlying factual findings” made by the PTAB are “review[ed] for substantial evidence.”<sup>125</sup> Enablement has a similar, mixed standard of review.<sup>126</sup> Anticipation, on the other hand, is simply “a question of fact reviewed for substantial evidence.”<sup>127</sup> Likewise, “[w]hether a claimed invention is supported by an adequate written description . . . is a question of fact,” reviewed for substantial evidence.<sup>128</sup> Doctrinally, “[s]ubstantial evidence review asks ‘whether a reasonable fact finder could have arrived at the agency’s decision’” through a holistic analysis of the entire record below, “taking into account evidence that both justifies and detracts from an agency’s decision.”<sup>129</sup>

Differentiating between these categories yields the following results:

Table 3: Disposition of PTAB Validity Findings by Issue (Partially Adjusted)

Validity Issue	Question Type	Affirm Rate	Reverse Rate	Vacate and/or Remand Rate	Observations
Subject-Matter Eligibility	Law	90.0%	6.7%	3.3%	30
Definiteness	Law	66.7%	0%	33.3%	3
Obviousness	Mixed Law/Fact	87.5%	5.5%	7.0%	456
Enablement	Mixed Law/Fact	100%	0%	0%	5
Anticipation	Fact	84.0%	9.5%	6.5%	231
Written Description	Fact	85%	10%	5%	20

125. *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1364 (Fed. Cir. 2015) (“[T]he scope and content of the prior art, the differences between the prior art and the claimed invention, the level of ordinary skill in the art, the presence or absence of a motivation to combine or modify with a reasonable expectation of success, and objective indicia of non-obviousness.”).

126. *In re Morsa*, 713 F.3d 104, 109 (Fed. Cir. 2013) (“Enablement is a question of law based on underlying factual findings.”).

127. *Id.* (citing *In re Gleave*, 560 F.3d 1331, 1334–35 (Fed. Cir. 2009)); see also *Kenametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015) (“Anticipation . . . is a question of fact . . . [which] [w]e review . . . for substantial evidence . . .”).

128. *In re Owens*, 710 F.3d 1362, 1366 (Fed. Cir. 2013) (citing *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc)).

129. *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1366 (Fed. Cir. 2016) (quoting *In re Gartside*, 203 F.3d 1305, 1312 (Fed. Cir. 2000)).

One quickly observes the overwhelming dominance of obviousness and anticipation findings. To avoid reading too much into the small samples in certain categories — and to better facilitate comparisons — the table below collapses the results into question type alone:

Table 4: Disposition of PTAB Validity Findings by Question Type (Partially Adjusted)

Question Type	Affirm Rate	Reverse Rate	Vacate and/or Remand Rate	Observations
Law	87.9%	6.1%	6.1%	33
Mixed Law/Fact	87.6%	5.4%	7.0%	461
Fact	84.1%	9.6%	6.4%	251

The result is surprising, at least at face value. The more deferential the nominal standard of review, the *lower* the affirmance rate, particularly when comparing against questions of fact. Two details can, at least in part, explain these results. First and foremost: the PTAB’s review of subject-matter eligibility is relatively circumscribed. Section 101 challenges are not available in *inter partes* reexam, *ex parte* reexam, or *inter partes* review. Rather, the bulk of subject-matter eligibility PTAB determinations in this data set come from “covered business method”<sup>130</sup> (CBM) challenges. These are patents that specifically “claim[] 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” — not “technological” inventions.<sup>131</sup> This may preclude the PTAB from receiving more difficult and varied subject-matter eligibility cases. That being said, the effect this has on the PTAB’s *overall* affirmance rate as calculated at the outset is truly negligible — less than one-tenth of a percentage point — due to the very small number of such data points in the set.

Second: regardless of the particular validity issue, there are often predicate claim constructions in dispute with their own standards of review. Construction refers to the process of interpreting the scope and meaning of a patent’s claims, a distinct and explicit process in patent disputes that may proceed term-by-term. For example:

130. See Leahy-Smith America Invents Act § 18, Pub. L. No. 112-29, 125 Stat. 284.

131. *Id.*; see generally *Versata Development Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1310–11 (Fed. Cir. 2015) (explaining the history and structure of CBM patents and CBM review).

The parties dispute the construction of the term “pharmaceutically acceptable” as used in claims 1–5 of the ’467 Patent, claims 1–4 of the ’976 Patent, and claim 10 of the ’427 Patent. “Pharmaceutically acceptable” is used to modify both the claimed dutasteride solvates as well as the claimed carriers of the dutasteride . . . GSK argues that the specification expressly defines “pharmaceutically acceptable” as “not deleterious to the recipient thereof when administered as a pharmaceutical.” Defendants argue that “suitable for use in a finished drug product to be administered to a patient” is consistent with the ordinary meaning of the term and that ordinary meaning applies here.<sup>132</sup>

Naturally, this construction process plays a “critical role in nearly every patent case” and is “central to the evaluation of . . . validity.”<sup>133</sup> Where there is “no dispute . . . about findings or evidence of facts *extrinsic* to the patent” — in other words, when interpretation relies only on the text, prosecution history, and prior art of the patent itself — claim construction is solely a matter of law, and the Federal Circuit “conduct[s] a *de novo* review of the Board’s . . . interpretation of the claim language.”<sup>134</sup> Where extrinsic evidence is in dispute, any “subsidary fact findings” by the PTAB are, again, “review[ed] for substantial evidence.”<sup>135</sup>

When the Federal Circuit leaves claim constructions undisturbed, it is reasonable to primarily examine the actual validity issue appealed. But, if the Federal Circuit alters a claim construction on appeal, it is no longer reviewing the PTAB’s validity findings, in truth. The Federal Circuit either vacates and remands for new validity findings under the new construction or uses the existing record below to make its own.<sup>136</sup>

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132. *GlaxoSmithKline LLC v. Anchen Pharmaceuticals, Inc.*, 2012 WL 5594540, at \*4 (D. Del. Nov. 15, 2012); *see generally* *Markman v. Westview Instruments Inc.*, 517 U.S. 370 (1996) (establishing the modern claim construction process).

133. Peter S. Menell et al., *Patent Claim Construction: A Modern Synthesis and Structured Framework*, 25 *BERKELEY TECH. L.J.* 711, 714 (2010).

134. *Straight Path IP Grp., Inc. v. Sipnet EU S.R.O.*, 806 F.3d 1356, 1360 (Fed. Cir. 2015) (emphasis added); *see also* *Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005) (outlining the distinction between extrinsic and intrinsic evidence). Extrinsic evidence is typically inventor testimony, expert declarations, and documentary evidence such as dictionaries, technical manuals, and scientific treatises. *See* Menell et al., *supra* note 133, at 721.

135. *PPC Broadband, Inc. v. Corning Optical Commc’ns RF, LLC*, 815 F.3d 747, 751 (Fed. Cir. 2016).

136. In this data set, the Federal Circuit modified trial-level claim constructions in 54 of the 1,087 data points. Just over half (55.6%) of such instances led to some form of remand. The remainder were either affirmed or reversed outright. The latter practice has been criticized. *See, e.g.*, *Homeland Housewares, LLC v. Whirlpool Corp.*, 865 F.3d 1372, 1379 (Fed. Cir. 2017) (Newman, J., dissenting) (“My colleagues’ *de novo* findings are contrary to the record, overstep our appellate role, and are incorrect in fact and law.”); *see* Rai, *Specialized*

Hence, removing data points where the claims were incorrectly construed further hones the focus of the analysis on trial-level decision-making. Only examining cases with accurate claim construction will further aid in maximizing comparability between the PTAB and district court results. Until 2018, the PTAB and district courts used different standards for claim construction, depending on the type of proceeding,<sup>137</sup> and this adjustment minimizes the effect of that difference on the ultimate appellate results.

The following table thus reflects the PTAB data after removing data points where an underlying claim construction was modified by the Federal Circuit:

Table 5: Disposition of PTAB Validity Findings by Question Type

Question Type	Affirm Rate	Reverse Rate	Vacate and/or Remand Rate	Observations
Law	87.9%	6.1%	6.1%	33
Mixed Law/Fact	91.2%	4.8%	4.1%	441
Fact	91.7%	4.8%	3.5%	229

Here, one sees a more sensible result when comparing between categories — mixed or purely fact-based validity findings are affirmed more often than those with de novo standards of review. The difference between mixed and purely factual findings is marginal.

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*Trial Courts*, *supra* note 86, at 883–85 (suggesting that an aversion to remand after modifying claim construction demonstrates a lack of deference from the Federal Circuit to the tribunal below).

137. Before 2018, post-grant procedures before the PTAB relied on the “broadest reasonable interpretation” standard for claim construction, the same standard used in patent prosecution. 37 C.F.R. § 42.100(b) (2017); *see also* *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2136 (2016) (affirming the PTAB’s use of broadest reasonable claim construction in post-grant procedures); *cf. In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004) (“During examination, ‘claims . . . are to be given their broadest reasonable interpretation consistent with the specification . . . .’”) (quoting *In re Bond*, 910 F.2d 831, 833 (Fed. Cir. 1990)). District courts, on the other hand, apply the *Phillips* standard of claim construction: unless otherwise compelled by the patent’s specification, its prosecution history, or particularly compelling extrinsic evidence, claim language is given its ordinary and customary meaning (from the perspective of a person of ordinary skill in the art). *See, e.g., Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1217–18 (Fed. Cir. 2014) (citing *Phillips v. AWH Corp.*, 415 F.3d 1301, 1312–13, 1315–17 (Fed. Cir. 2005) (en banc)). After a rule change on October 3, 2018, the PTAB now uses the same claim construction standard as district courts in its post-grant procedures. Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,358 (Oct. 11, 2018) (to be codified at 37 C.F.R. § 42.100).

Next, the table below examines the makeup of the PTAB data in terms of underlying patent technology class:

Table 6: Disposition of PTAB Validity Findings by Technology Class

Technology Class	Affirm Rate	Percentage of Cases	Observations
(1) Chemical	90.6%	7.5%	53
(2) Computers & Communications	91.2%	48.4%	340
(3) Drugs & Medical	87.8%	12.8%	90
(4) Electrical & Electronics	91.9%	10.5%	74
(5) Mechanical	89.7%	11.1%	78
(6) Other	97.1%	9.7%	68

Unsurprisingly, cases involving computer and communications technology compose the lion's share of PTAB validity findings reviewed by the Federal Circuit. In terms of results on appeal, the standard deviation between technological categories is quite insubstantial: only 1.4 percentage points (excluding the catchall "Other"). Put differently, there does not appear to be any particularly strong pattern or outlier that would skew the PTAB's overall affirmance rate.

Finally, it's possible to examine the different types of proceedings that take place before the PTAB. In addition to the new *inter partes* and CBM reviews authorized by the AIA, this dataset includes appeals from the more longstanding *inter partes* and *ex parte* reexaminations,<sup>138</sup> interference proceedings, and patent applications:

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138. *Ex parte* reexamination, created in 1980, was the first mechanism for challenging the validity of issued patents before the PTO itself — by way of petition. See 35 U.S.C. §§ 301–307 (2018); see generally Raymond A. Mercado, *Ensuring the Integrity of Administrative Challenges to Patents: Lessons from Reexamination*, 14 COLUM. SCI. & TECH. L. REV. 558, 561–68 (2013); Mark D. Janis, *Rethinking Reexamination: Toward a Viable Administrative Revocation System for U.S. Patent Law*, 11 HARV. J.L. & TECH. 1 (1997). In 1999, Congress added an *inter partes* option, allowing the challenger to participate in the reexamination directly, including briefing and appeal. See 35 U.S.C. §§ 311–318 (2012). The AIA replaced *inter partes* reexamination with post-grant and *inter partes* review, which are more formal, trial-like, and robust. See *supra* notes 22–28 and accompanying text.

Table 7: Disposition of PTAB Validity Findings by Proceeding Type

Proceeding Type	Affirm Rate	Percentage of Cases	Observations
Application	90.1%	10.1%	71
<i>Inter Partes</i> Reexam	95.0%	19.8%	139
<i>Ex Parte</i> Reexam	91.7%	3.4%	24
Interference	85.0%	2.8%	20
<i>Pre-AIA Combined</i>	92.5%	36.1%	254
<i>Inter Partes</i> Review	90.8%	59.0%	415
CBM Review	85.3%	4.8%	34
<i>Post-AIA Combined</i>	90.4%	63.9%	449

Note that appellate standards of review do not inherently differ between these proceedings. Factfinding in an *ex parte* reexamination, for example, is reviewed for “substantial evidence,”<sup>139</sup> just as in *inter partes*<sup>140</sup> or CBM review.<sup>141</sup> With that equal footing in mind, there does not appear to be a particularly strong affirmance pattern between these categories; post-AIA proceedings are affirmed at rough parity with the more established or eliminated PTAB proceedings.<sup>142</sup> Accordingly, there is no distinction made between proceeding types in the direct comparison to district court appeals in Section IV.C. First, however, a comparable examination of the district court data itself is required.

139. See, e.g., *In re Man Machine Interface Techs. LLC*, 822 F.3d 1282, 1285 (Fed. Cir. 2016).

140. See, e.g., *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

141. See, e.g., *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1337, 1341 (Fed. Cir. 2016).

142. Mathematically, comparing the post-AIA and pre-AIA affirmance rates directly yields a chi-square statistic of 0.89, and a p-value of 0.35 — further supporting the lack of a meaningful pattern.

## B. District Court Data

As with the PTAB, the overall raw affirmance rate for validity findings made by the district courts provides a starting point:

Table 8: Disposition of District Court Validity Findings on Appeal (Unadjusted)

Affirm Rate	Reverse Rate	Vacate and/or Remand Rate	Observations
83.5%	12.3%	4.1%	316

Although a full comparison with the PTAB results is reserved until the end, one can immediately see the much lower tendency for the Federal Circuit to vacate and remand district court findings involving validity, due to the lack of *Chenery*-type constraints.

The district courts' overall rate does, however, conceal one critical distinction of its own: jury-made findings. It is worth emphasizing that, even in highly technical patent cases, jury factfinding is a "black box" afforded an extraordinary level of deference on appellate review.<sup>143</sup> Indeed, although jury fact-finding on questions of patent validity is quite rare — only forty-one instances in this data set<sup>144</sup> — those findings were affirmed at a rate notably higher than the remainder of the district court data (90.2%). Though the effect on overall rate is small, to obtain a more accurate picture of district court *judge* findings, those data points are hereafter removed from the analysis. Likewise, as with the PTAB, cases in which the Federal Circuit modified the court's predicate claim constructions below are hereinafter removed as well.

As explained in earlier sections, due to a combination of the Patent Pilot Program and venue rules, patent litigation is highly concentrated among a handful of districts and judges. Conversely, this has caused a relative dearth of patent cases elsewhere. Nevertheless, the data shows relative consistency across the country in terms of appellate outcomes — whether viewed by judge or district. Starting with districts, over the past five years, the Eastern District of Texas, the District of Delaware, the Central and Northern Districts of California, and the District of New Jersey collectively represented 72% of all district court

143. See, e.g., Moore, *Judges, Juries, and Patent Cases*, *supra* note 14, at 367–69 (examining all patent trials from 1983 through 1999 and comparing outcomes between bench and jury trials).

144. These instances were defined strictly, only including jury verdicts actually dispositive on the given issue (40), and one advisory verdict to which the district court judge explicitly deferred.

patent litigation in the country.<sup>145</sup> Separating out the appeals from those top-five districts yields the following results:

Table 9: Disposition of District Court Validity Findings by District Type

District Type	Affirm Rate	Percentage of Cases	Observations
Patent-Heavy Districts	86.3%	49.6%	131
Standard Districts	83.5%	50.4%	133

Turning to the judges, only twenty-five district court judges in the country saw more than one hundred patent cases on their docket during that same five-year period. Separating these more experienced judges out from the rest of the set, one sees a different pattern:

Table 10: Disposition of District Court Validity Findings by Judge Type

Judge Type	Affirm Rate	Percentage of Cases	Observations
Patent-Heavy District Court Judges	82.2%	38.3%	101
Standard District Court Judges	86.5%	61.7%	163

That is, patent-heavy *districts* fare marginally better in terms of appellate outcomes, whereas patent-heavy *judges* fare marginally worse. Neither pattern is particularly strong — only a few percentage points<sup>146</sup> — and indeed, using both metrics simultaneously results in a mere one percentage-point differential<sup>147</sup>:

145. LEX MACHINA, <http://law.lexmachina.com> [<https://perma.cc/N9PU-YNRM>] (searching for case type “patent” and cases filed between Jan. 1, 2014 to Jan. 1, 2019).

146. Neither the district- nor judge-level analyses yield significant chi-square statistics. Comparing the affirmance rates for patent-heavy districts to standard ones results in a chi-square value of 0.40, corresponding to a p-value of 0.53. Comparing the affirmance rates for patent-heavy judges to standard ones results in a chi-square value of 0.90, corresponding to a p-value of 0.34.

147. Again, the chi-square statistic from comparing these categories — less than 0.01 — strongly suggests the lack of a meaningful pattern, corresponding to a p-value of 0.98.



Table 11: Disposition of District Court Validity Findings by Judge and District Type

Judge/District Type	Affirm Rate	Data Share	Observations
Patent-Heavy Judges or Districts	84.9%	52.7%	139
Standard Judges and Districts	84.8%	47.4%	125

This lack of meaningful variation comports with the data available thus far from the Federal Judicial Center’s own review of the Patent Pilot Program.<sup>148</sup> Accordingly, the data from all district court judges are hereinafter combined, with the understanding that the system may be fairly viewed as a whole for the time being.

Next, it is again possible to distinguish between the affirmance rates for different kinds of validity issues. In contrast to the PTAB, factual findings made by district court judges are reviewed for “clear error” rather than substantial evidence.<sup>149</sup> Doctrinally, this is a less forgiving standard of review than substantial evidence;<sup>150</sup> nevertheless, it still requires affirmance unless, “despite some supporting evidence, [the court of appeals is] left with the definite and firm conviction that a mistake has been made.”<sup>151</sup> Otherwise, review of validity issues is governed by the same nominal law-versus-fact breakdown as the PTAB, including *de novo* review of questions of law:<sup>152</sup>

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148. WILLIAMS ET AL., *supra* note 69, at 32, 36 (finding “that appeals of pilot cases are no more or less common than appeals of nonpilot cases,” and that “pilot cases and nonpilot cases are ‘correct’” — as measured by results on appeal — “at approximately the same rate”).

149. *See, e.g.*, *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 838 (2015) (“This factual determination, like all other factual determinations, must be reviewed for clear error.”) (citing *Pullman-Standard v. Swint*, 456 U.S. 273, 287 (1982)).

150. *See infra* text accompanying notes 167–169.

151. *Impax Labs. Inc. v. Lannett Holdings Inc.*, 893 F.3d 1372, 1378 (Fed. Cir. 2018) (citing *United States v. U.S. Gypsum Co.*, 333 U.S. 364, 395 (1948)).

152. There was, additionally, a single case that involved a finding of prior conception — a “question of law . . . based upon underlying factual determinations.” *Price v. Symsek*, 988 F.2d 1187, 1190 (Fed. Cir. 1993). That case was affirmed. There were no data points involving enablement.

Table 12: Disposition of District Court Validity Findings by Issue

Validity Issue	Question Type	Affirm Rate	Reverse Rate	Vacate and/or Remand Rate	Observations
Subject-Matter Eligibility	Law	89.9%	8.6%	1.4%	139
Definiteness	Law	81.0%	19.0%	0%	42
Obviousness	Mixed Law/Fact	87.0%	10.9%	2.2%	46
Anticipation	Fact	60.0%	20.0%	20.0%	25
Written Description	Fact	81.8%	18.2%	0%	11

Findings involving at least some questions of law clearly dominate the analysis, particularly subject-matter eligibility. As with the PTAB data, to avoid reading too much into the small samples in certain categories, the results are collapsed into question type alone:

Table 13: Disposition of District Court Validity Findings by Question Type

Question Type	Affirm Rate	Reverse Rate	Vacate and/or Remand Rate	Observations
Law	87.9%	11.1%	1.1%	181
Mixed Law/Fact	87.2%	10.6%	2.1%	47
Fact	66.7%	19.4%	13.9%	36

One sees that the counterintuitive pattern from earlier has appeared again: the more deferential the nominal standard of review, the *lower* the affirmance rate. Here, however, the pattern persists even after the refinements to the data. That is, mixed and purely law-based findings from the district courts are affirmed reliably more often than fact-based findings. That gap, moreover, is clearly and predominantly driven by routine affirmance of subject-matter eligibility findings.

Finally, the results by underlying patent technology class are presented below:<sup>153</sup>

Table 14: Disposition of District Court Validity Findings by Technology Class

<b>Technology Class</b>	<b>Affirm Rate</b>	<b>Percentage of Cases</b>	<b>Observations</b>
(1) Chemical	85.7%	5.3%	14
(2) Computers & Communications	85.7%	53.2%	140
(3) Drugs & Medical	81.8%	20.9%	55
(4) Electrical & Electronics	88.2%	6.5%	17
(5) Mechanical	79.0%	7.2%	19
(6) Other	88.9%	6.8%	18

Subdivided this finely, the number of observations in some categories becomes rather small and easy to over-interpret. Nevertheless, two patterns may be fairly noted. First, cases involving computers and communications technology again form the bulk of validity findings that are reviewed by the Federal Circuit. Second, the difference in affirmance rates is still quite small, suggesting a lack of meaningful variation between technology classes for purposes of this analysis. With all this in mind, a more direct comparison between the two trial-level fora follows.

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153. There were two design patent cases involved in the data set, which could not properly be categorized using the HJT (utility patent) typology. Each yielded a single data point. The first, *Yao-Hung Huang v. Marklyn Group, Inc.*, 636 F. App'x 795 (Fed. Cir. 2016), was a Rule 36 affirmance of the district court's finding of anticipation. The second, *3form, Inc. v. Lumicor, Inc.*, 678 F. App'x 1002 (Fed. Cir. 2017), affirmed the district court's finding of obviousness in a full opinion.

*C. Drawing Comparisons*

Recombining the data, it's worth reiterating the refinements from the preceding sections to maximize comparability: *Chenery*-type non-affirmances are removed for the PTAB, jury findings are removed for the district courts, and instances where claim constructions were modified on appeal are removed for both. This yields the following overall results:

Table 15: Disposition of Validity Findings by Trial-Level Forum

<b>Trial-Level Forum</b>	<b>Affirm Rate</b>	<b>Reverse Rate</b>	<b>Vacate and/or Remand Rate</b>	<b>Observations</b>
PTAB	91.2%	4.8%	4.0%	703
District Court	84.9%	12.1%	3.0%	264

Three tendencies emerge from this picture: (1) the PTAB is affirmed notably more often than district courts on validity issues;<sup>154</sup> (2) district court decisions tend to be reversed outright, rather than vacated or remanded; and (3) PTAB decisions, on the other hand, experience both types of non-affirmance in roughly equal measure.

Naturally, this broad view overlooks the aforementioned distinction in standards of review. Tabulating the data in that fashion reveals further nuance:

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154. Comparing the affirm vs. non-affirm rates between the PTAB and district courts directly yields a chi-square statistic of 8.16, corresponding to a highly significant p-value of 0.0043.

Table 16: Disposition of Validity Findings by Question Type and Trial-Level Forum

Question Type	Trial-Level Forum	Affirm Rate	Non-Affirm Rate	Observations
Law	PTAB	87.9% (29)	12.1% (4)	214 Fisher's Exact Test: p=1.00
	District Courts	87.9% (159)	12.2% (22)	
Mixed Law/Fact	PTAB	91.2% (402)	8.8% (39)	488 Fisher's Exact Test: p=0.42
	District Courts	87.2% (41)	12.8% (6)	
Fact	PTAB	91.7% (210)	8.3% (19)	265 Fisher's Exact Test: p=0.0002
	District Courts	66.7% (24)	33.3% (12)	

One sees that the district courts' findings of law are actually affirmed at parity with the PTAB; the divergence in overall affirmance rates is driven almost entirely by the more fact-based categories.<sup>155</sup> This dovetails somewhat with the district courts' backwards relationship between standards of review and actual affirmance rate, displayed again above.

As noted in the preceding sections, cases involving computers and communications technology dominate the dataset. Cases involving drugs and medical technologies are the second most common, though by a higher margin in district courts than at the PTAB. Across categories, one sees that affirmance rates are relatively steady, with the PTAB holding a unilateral advantage:

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155. As indicated in the table, Fisher's exact test demonstrates that the difference between the affirmance rate of the PTAB and district courts is only statistically significant within the category of findings of fact. Fisher's exact test, rather than chi-squared, is used here due to the relatively small sample sizes per category.

Table 17: Disposition of Validity Findings by Technology Class and Trial-Level Forum

Technology Class	Trial-Level Forum	Affirm Rate	Non-Affirm Rate	Observations
(1) Chemical	PTAB	90.6% (48)	9.4% (5)	67 Fisher's Exact Test: p=0.6304
	District Courts	85.7% (12)	14.3% (2)	
(2) Computers & Communications	PTAB	91.2% (310)	8.8% (30)	480 Chi-Squared Test: p=0.075
	District Courts	85.7% (120)	14.3% (20)	
(3) Drugs & Medical	PTAB	87.8% (79)	12.2% (11)	145 Chi-squared Test: p=0.3225
	District Courts	81.8% (45)	18.2% (10)	
(4) Electrical & Electronics	PTAB	91.9% (68)	8.1% (6)	91 Fisher's Exact Test: p=0.64
	District Courts	88.2% (15)	11.8% (2)	
(5) Mechanical	PTAB	89.7% (70)	10.3% (8)	97 Fisher's Exact Test: p=0.2429
	District Courts	79.0% (15)	21.1% (4)	
(6) Other	PTAB	97.1% (66)	2.9% (2)	86 Fisher's Exact Test: p=0.1917
	District Courts	88.9% (16)	11.1% (2)	

The PTAB's affirmance rate is higher in every single technology category. Although the affirmance gap ranges from as little as 3.7% (electrical and electronics) to as much as 10.7% (mechanical), it is difficult to read much into these granular distinctions given the small number of district court observations per category. Suffice to say, no single area of technological subject matter is responsible for the PTAB's overall edge in terms of appellate outcomes.

Finally, one additional trend became clear when directly comparing fora: the disposition of claim-*invalidating* findings versus claim-*upholding* findings.

Table 18: Disposition of Validity Findings by Question Type, Trial-Level Forum, and Claim Disposition

Question Type	Tribunal Below	Affirm Rate (Claim-Invalidating)	Affirm Rate (Claim-Upholding)	Invalid-Upheld Affirmance Gap	Observations
Overall	PTAB	93.2% (551)	80.4% (90)	+12.8%	703 Chi-Squared Test: p<0.0001
	District Courts	84.6% (170)	85.7% (54)	-1.1%	264 Chi-Squared Test: p=0.8261
Law	PTAB	93.6% (29)	0.0% (0)	+93.6%	33 Fisher's Exact Test: p=0.0114
	District Courts	88.7% (141)	81.8% (18)	+6.9%	181 Fisher's Exact Test: p=0.3155
Mixed	PTAB	92.6% (349)	82.8% (53)	+9.8%	441 Chi-Squared Test: p=0.011
	District Courts	77.3% (17)	96.0% (24)	-18.7%	47 Fisher's Exact Test: p=0.0848
Fact	PTAB	94.5% (173)	80.4% (37)	+14.1%	229 Fisher's Exact Test: p=0.0048
	District Courts	60.0% (12)	75.0% (12)	-15.0%	36 Fisher's Exact Test: p=0.4815

There is a distinct affirmance gap — approximately thirteen percentage points — favoring PTAB findings that invalidate patent claims over PTAB findings that uphold them. This gap does not exist between comparable district court appeals; to wit, there is a marginal gap in the reverse direction for district court findings overall. The additional tabulations for each tribunal must be interpreted delicately, particularly with respect to the outright magnitude of affirmance rates, given the low number of observations per cell. Nevertheless, for the PTAB, one sees that the invalid-upheld gap is not driven by a particular category of findings; it persists across the board at a statistically significant level, regardless of question type. For district courts, on the other hand, the gap varies in magnitude and direction — and does not rise to the level of statistical significance within or across categories.

Before turning to a more theoretical contextualization of these trends, a basic logistic regression model<sup>156</sup> is presented below to examine the relative importance of different factors on appellate outcome. Recall that the dataset used to produce the model is not a *sample*, but rather the actual *population* of Federal Circuit decision-making for FY 2015–2016. That is, the numbers below reflect the actual degree of variation and relative mathematical importance in the years surveyed — not an “estimate” in the traditional statistical sense of attempting to extrapolate from a sample:

Table 19: Logistic Regression Models of Appellate Affirmance

Variables	Unadjusted Model			Adjusted Model		
	Odds-Ratio	95% CI	P-Trend	Odds-Ratio	95% CI	P-Trend
Tribunal Below						
District Court	1.00	Referent		1.00	Referent	
PTAB	1.85	1.21–2.83	0.0047	1.85	1.01–3.39	0.0462
Question of Law						
No	1.00	Referent		1.00	Referent	
Yes	0.81	0.51–1.30	0.3880	1.12	0.54–2.32	0.7613

156. Because the dependent variable in this analysis is binary (“affirmed” or “not”), logistic regression offers a more accurate picture of the underlying data than typical linear regression models would. *Cf.* FRED C. PAMPEL, LOGISTIC REGRESSION: A PRIMER 17 (2000); SCOTT MENARD, LOGISTIC REGRESSION: FROM INTRODUCTORY TO ADVANCED CONCEPTS AND APPLICATIONS 1–2 (2010).



Variables	Unadjusted Model			Adjusted Model		
	Odds-Ratio	95% CI	P-Trend	Odds-Ratio	95% CI	P-Trend
Question of Fact						
No	1.00	Referent		1.00	Referent	
Yes	0.85	0.54–1.33	0.4748	0.84	0.51–1.38	0.4826
Disposition of Claim						
Invali-dated	1.00	Referent		1.00	Referent	
Upheld	0.46	0.29–0.72	0.0008	0.52	0.32–0.85	0.0091
Case Year						
FY2016	1.00	Referent		1.00	Referent	
FY2015	0.55	0.37–0.84	0.0057	0.57	0.37–0.87	0.0093
HJT-Chemical						
No	1.00	Referent		1.00	Referent	
Yes	1.01	0.45–2.28	0.9780	0.46	0.13–1.69	0.2435
HJT-Computer & Communications						
No	1.00	Referent		1.00	Referent	
Yes	1.03	0.68–1.55	0.8949	0.40	0.14–1.16	0.0922
HJT-Drug & Medical						
No	1.00	Referent		1.00	Referent	
Yes	0.65	0.39–1.08	0.0965	0.37	0.12–1.15	0.0854
HJT-Elections & Electronic						
No	1.00	Referent		1.00	Referent	
Yes	1.25	0.59–2.66	0.5674	0.46	0.13–1.61	0.2228
HJT-Mechanical						
No	1.00	Referent		1.00	Referent	
Yes	0.82	0.43–1.55	0.5382	0.31	0.09–1.00	0.0504

The unadjusted model evaluates each individual factor's influence on the likelihood of being affirmed, without considering other factors. For example, if considered alone, PTAB findings are 1.85 times more

likely than district court findings to be affirmed. The 95% confidence interval for this 1.85 figure is, in turn, (1.21, 2.83), with a Wald Chi-Square p-value of 0.0047.

The adjusted model, on the other hand, evaluates all factors' simultaneous influences on the likelihood of being affirmed: the tribunal below, the question type, the disposition of the underlying claim, the case year, and the patent-at-issue's technology class. For example, with all factors considered, PTAB findings are *still* 1.85 times more likely to be affirmed than district court findings. But the 95% confidence interval grows slightly to (1.01, 3.39), with a corresponding Wald Chi-Square p-value of 0.0462 — thus remaining statistically significant.

Overall then, observe the continued importance of the trial-level tribunal for appellate outcomes, even after controlling for as many salient case characteristics as feasible. This strongly suggests that something about the PTAB itself, as compared to district courts, is increasing its affirmance rate on appeal.

The remaining variables behave as one would expect based on the tabulations and cross-sections presented *supra*. Questions of law have a positive influence on affirmance rate; questions of fact have the opposite effect. Neither, however, appears statistically significant — this is likely driven by the district courts' outsized share of law findings and strong standard-of-review pattern on the one hand, and the PTAB's outsize share of factual findings and comparatively weak pattern on the other. The differences between the technology categories are again quite low, reinforcing the lack of a meaningful appellate affirmance pattern thereof. Finally, upholding the claim below has a highly significant negative influence on appellate result.

The strongest and most meaningful results of Part IV's analysis may be accordingly summarized as follows. First, the Federal Circuit affirms findings from the PTAB reliably more often than district courts (though less often than juries). This is particularly true when the findings are wholly or partially factual, as opposed to pure questions of law. Second, PTAB findings that invalidate patent claims are affirmed substantially more often than findings that uphold patent claims; no similar pattern exists for district court findings. Third, the underlying technological subject matter of the patent at issue does not appear to perceptibly influence results on appeal.

In Part V, these quantitative results are contextualized as part of larger trends in patent jurisprudence. But first, Section IV.D addresses the most likely concerns a reader may have with the quantitative method presented thus far: subjectivity and selection effects.

*D. Critiques and Concerns*

The act of grouping certain claims as rising and falling together necessarily introduced a small degree of subjective decision-making into the coding process. Accordingly, robust intercoder reliability tests<sup>157</sup> were performed to ensure that there was no systemic bias or error in the Author's own procedure. Three other researchers — all former Federal Circuit law clerks — were collectively assigned a random 15% sample of the cases in this data set to independently re-code. Agreement with the master dataset overall, measured as a raw percentage of matching data cells, exceeded 99%. Agreement remained above 99% even when restricted to the more substantive data cells: the holding below, the result on appeal, and whether a claim construction was modified on appeal. As expected, divergence was at its highest with respect to claim-grouping decisions themselves, but the other researchers' decisions still matched the master dataset more than 95% of the time. Altogether, these results indicate that no pervasive errors have skewed the results, such that the data presented above is an accurate quantitative representation of the cases coded.

Separate from accuracy, a reasonable critique of the data presented thus far would be the possibility of selection effects as explaining some, or all, of the patterns above. This critique has essentially two dimensions to it: (1) the decision litigants make in choosing between trial fora; and (2) the decision litigants make in whether or not to appeal. To the extent the PTAB receives a meaningfully different proportion of patent validity challenges than the district courts — or a meaningfully different subset of the PTAB's cases actually progress to an appeal at the Federal Circuit — it could impact this data.

Observe at the outset, however, that many forum-selection or appeal-decision differences would not themselves affect the overall *affirmance* rate for a given tribunal, which is the chief concern of this analysis. For example, imagine that the district courts receive a disproportionate share of litigation where the patent-at-issue is genuinely valid, whereas the PTAB receives a disproportionately invalid share. If the goal were to directly compare the patent invalidation rate between tribunals, this phenomenon would clearly dominate the results. But it would not contribute to a PTAB affirmance advantage *on appeal*, unless one assumes that valid-patent cases are intrinsically more complex or difficult to adjudicate than invalid-patent cases. Likewise, imagine

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157. Intercoder reliability refers to the extent to which independent coders identically evaluate the same materials. See generally Matthew Lombard et al., *Practical Resources for Assessing and Reporting Intercoder Reliability in Content Analysis Research Projects* (June 1, 2010), [http://matthewlombard.com/reliability/index\\_print.html](http://matthewlombard.com/reliability/index_print.html) [https://perma.cc/97QP-UYL6].

that litigants are more likely to file an appeal in cases involving computer and communications technology than cases involving electrical and electronic inventions. Even if the district courts seem to receive an outside portion of the former (and the PTAB, the latter),<sup>158</sup> affirmance rates will only be affected if it is more difficult, on average, to reach the correct result (or, strictly speaking, the result that the Federal Circuit considers correct) in one over the other.

In other words, the principal concern for purposes of this analysis is whether the PTAB receives a disproportionately *easy* share of cases, roughly speaking. The remainder of this section presents several quantitative indices and overall heuristics that suggest such a difference is unlikely to exist at a level high enough to influence the results of this analysis.

First, consider how the PTAB's share of patent validity challenges has changed over time. The years surveyed in this study, FY 2015 and FY 2016, represent a paradigm shift at the Federal Circuit.<sup>159</sup>

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158. *See supra* Table 17.

159. U.S. COURT OF APPEALS FOR THE FED. CIR., CASELOAD BY MAJOR ORIGIN 2008-2017, [http://www.cafc.uscourts.gov/sites/default/files/the-court/statistics/Hist\\_Caseld\\_by\\_Major\\_Origin\\_10-year.pdf](http://www.cafc.uscourts.gov/sites/default/files/the-court/statistics/Hist_Caseld_by_Major_Origin_10-year.pdf) [<https://perma.cc/5PC7-9JR3>].

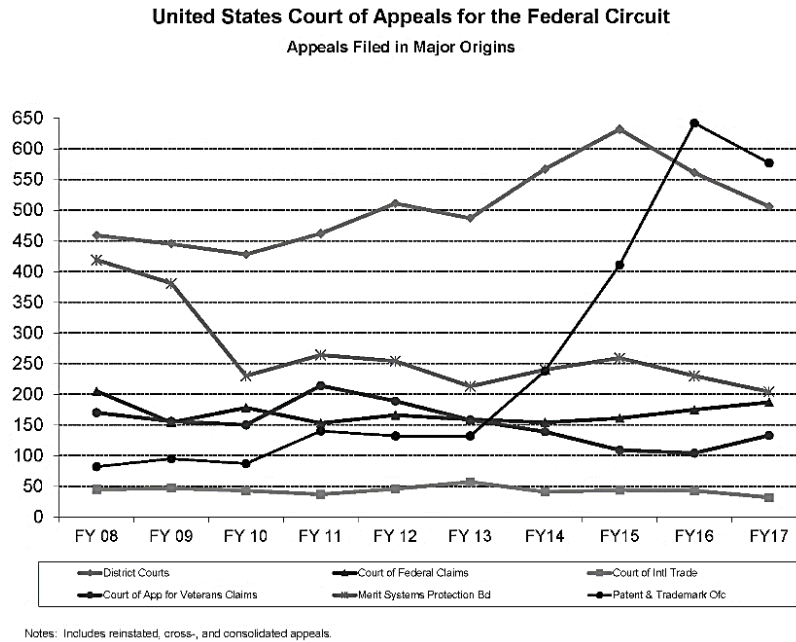


Figure 1: Appeals Filed in Major Origins

As shown in the chart above, appeals from the PTAB to the Federal Circuit have surged upward, surpassing appeals from district courts for the first time in FY 2016. With this dataset, it is possible to compare the results on appeal for each tribunal, before and after that shift:

Table 20: Disposition of Validity Findings by Trial-Level Forum and Year

Trial-Level Forum	FY 2015 Affirm Rate	FY 2016 Affirm Rate	Observations
PTAB	88.8% (276)	93.0% (365)	703 Chi-Squared Test: p=0.0426
District Courts	81.6% (115)	88.3% (109)	264 Chi-Squared Test: p=0.1106

Both tribunals saw a marked increase in affirmance in FY 2016 compared to FY 2015, and a slight convergence in their overall affirmance gap. This renders the “easier cases” hypothesis somewhat suspect; as the PTAB siphons away more and more cases from district

courts, one would expect the affirmance gap between the two to be far less stable. Put differently: there are only so many “easy cases” out there, yet the PTAB continues to outperform as its share grows. For this same reason, if selection effects were at play, one might expect the year variable to meaningfully impact affirmance rate in the more complete regression analysis. Instead, it was among the weakest overall, after controlling for other factors — and the trial-level tribunal remains quite significant even after its inclusion.

Second, consider the Federal Circuit’s varying use of dissents. If nothing else, a dissenting opinion on appeal suggests that reasonable minds may have differed on an issue’s appropriate resolution. Or, in other words, the issue was not so clear-cut and simple as to necessarily command unanimity. The rate of dissents on appeal between the PTAB and district courts’ validity decisions are compared below.<sup>160</sup>

Table 21: Dissent Rate by Trial-Level Forum

Trial-Level Forum	Dissent Rate	Observations
PTAB	5.0% (35)	703
District Courts	6.9% (18)	264

One indeed observes a difference, but quite marginal — less than two percentage points.<sup>161</sup> To put this in terms of raw numbers, just four or five fewer dissents in district court appeals — over two full fiscal years — would equalize the data. The lack of a stronger pattern here again undercuts the “easier cases” suggestion.

Third, consider what happens if the PTAB data is arranged not by pre- or post-AIA procedures<sup>162</sup> but instead by which procedures actually do put the PTAB in direct competition with district courts. *Inter partes* review, both types of reexamination, and CBM review all serve to invalidate imprudently-granted patents, a function that is also fulfilled by district courts’ declaratory judgment power or as an affirmative defense in infringement litigation. Patent applications and

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160. Dissents were coded strictly and narrowly. That is, if a Federal Circuit judge dissented, but on an issue other than the relevant validity finding itself (for example, arguing that the tribunal below lacked jurisdiction), then it was not counted as a “dissent” for these purposes.

161. In particular, comparing the dissent vs. non-dissent rate between the two tribunals directly yields a chi-square statistic of 1.25, corresponding to a p-value of 0.2629, suggesting a lack of statistical significance.

162. See *supra* Table 7.

interference proceedings, on the other hand, have no such analog or substitute.

Table 22: Disposition of PTAB Validity Findings by Proceeding Type

<b>Proceeding Type</b>	<b>Affirm Rate</b>	<b>Percentage of Cases</b>	<b>Observations</b>
<i>Inter Partes</i> Review	90.8% (377)	59.0%	415
<i>Inter Partes</i> Reexam	95.0% (132)	19.8%	139
<i>Ex Partes</i> Reexam	91.7% (22)	3.4%	24
CBM Review	85.3% (29)	4.8%	34
<i>Forum-Choice Combined</i>	91.5% (560)	87.0%	612
Application	90.1% (64)	10.1%	71
Interference	85.0% (17)	2.8%	20
<i>No Choice Combined</i>	89.0% (81)	12.9%	91

One sees that the affirmance rate is slightly lower for proceedings with no other choice of forum, but just barely.<sup>163</sup> And indeed, when comparing the most meaningful and representative subcategories directly — *inter partes* reviews and patent applications — the difference is even more marginal. Altogether, it seems considerably unlikely that the PTAB's overall affirmance advantage is solely the result of it receiving easier cases compared to district courts.

Setting quantitative indices aside, it's worth emphasizing the unlikelihood of selection effects as a matter of heuristics. First, recall that district courts adjudicate infringement as well as validity disputes — typically as part of the same case — whereas the PTAB can only adjudicate validity. In cases where the district court did address infringement and validity, the losing party has a much stronger incentive to appeal. If the plaintiff-patentee lost, a victory on appeal means not only the revitalization of its patent, but also potentially infringement remedies. If the defendant-infringer lost, a victory on appeal means not only

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163. Comparing the affirm vs. non-affirm rate between the forum-choice and no-choice categories directly yields a chi-square statistic of 0.61, corresponding to a p-value of 0.4341, suggesting a lack of statistical significance.

avoiding past damages, but also *carte blanche* to openly infringe the (now-dead) patent moving forward. Compounding matters, fee-shifting may also be on the line in district court proceedings, whereas it is generally unavailable in PTAB disputes.<sup>164</sup> Altogether then, one would expect parties to be more likely to appeal marginal district court cases rather than marginal PTAB cases — the potential reward (or averted loss) is higher. These cases, in turn, would artificially *inflate* the district court affirmance rate on appeal; the Federal Circuit would be receiving disproportionately non-meritorious appeals from district courts.

Moreover, observe that PTAB litigation is, by design, far cheaper and faster than district court litigation.<sup>165</sup> On average then, one might expect the parties that reach final judgment in district court to have deeper pockets and more long-term strategies, and thus be more able to bear the time and costs of challenging the judgment on subsequent appeal. Again, all else being equal, this should drive the district courts' affirmance rate *up*, if anything; these litigants can afford to appeal more broadly. Put differently, poorer litigants — or those facing significant time pressures — are occasionally forced to leave even meritorious appeals on the table.

Accordingly, the results outlined in Section IV.C likely reflect meaningful patterns in validity appeals and are not merely an artifact of coding bias or underlying selection effects. Part V proceeds to fit these patterns into a larger picture of contemporary patent law.

## V. MAKING SENSE OF THE DATA: ANTI-EXCEPTIONALISM AND CONTEXT-SPECIFIC DEFERENCE

Because the dataset at the heart of this analysis is based on appeals, there is a fundamental question that needs to be examined: are the differences in appellate outcome the result of qualitatively different adjudication below or the consequence of unevenly applied deference on review? By teasing the two apart, it's possible to see a glimpse of the Federal Circuit's evolving relationships — and perhaps a more nuanced role for specialization and expertise in the patent sphere overall.

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164. Recovery of fees generated in PTAB disputes is effectively limited to circumstances where there is parallel district court litigation, and the district court applies its own fee-shifting power broadly under 35 U.S.C. § 285 (2012). *See generally*, Megan M. La Belle, *Fee Shifting for PTAB Proceedings*, 34 *TEX. INTELL. PROP. L.J.* 367 (2016) (examining the use of § 285 to shift PTAB fees, and noting the lack of direct fee-shifting power for the PTAB itself).

165. *See, e.g.*, AM. INTELL. PROP. L. ASS'N, 2015 REPORT OF THE ECONOMIC SURVEY at 37–38 (2015) (finding the median cost of all IPRs to be \$275,000, compared to \$600,000 for district court patent litigation with less than \$1 million at risk, and up to \$5 million in costs for cases with more than \$25 million at risk); *IPRs: Reality Amid the Pyrotechnics*, RATIONALPATENT (July 2, 2015), <https://www.rpxcorp.com/2015/07/02/iprs-reality-amid-the-pyrotechnics/> (last visited May 11, 2019).



As a matter of first principles, recall that factual findings made by the PTAB are subject to the “substantial evidence” standard of review, whereas district court judge findings are subject to “clear error” review.<sup>166</sup> The latter standard is, nominally, a less forgiving one.<sup>167</sup> Hence, this difference likely plays at least some role in explaining the affirmance gap between the PTAB and district courts, particularly since the gap tends to grow as the findings at issue become more based in fact. Compelling scholarship, however, suggests that the intrinsic difference between the two standards of review is marginal elsewhere in the law as a matter of practice.<sup>168</sup> To wit, when addressing the Federal Circuit’s standards of review vis-à-vis the USPTO, the Supreme Court itself opined:

The [substantial evidence] standard, as we have said, is somewhat less strict than the [clear error] standard. But the difference is a subtle one — so fine that (apart from the present case) we have failed to uncover a single instance in which a reviewing court conceded that use of one standard rather than the other would in fact have produced a different outcome . . . The difficulty of finding such a case may in part reflect the basic similarity of the reviewing task, which requires judges to apply logic and experience to an evidentiary record, whether that record was made in a court or by an agency. It may in part reflect the difficulty of attempting to capture in a form of words intangible factors such as the judicial confidence in the fairness of the factfinding process.<sup>169</sup>

It seems highly unlikely that the words “substantial evidence” versus “clear error” are, therefore, sufficiently compelling as to create a difference in appellate outcomes. Put differently, even if the *stated* deference regime is influencing these results, the strength of that regime is

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166. See *supra* notes 149–150 and accompanying text.

167. See, e.g., *In re Gartside*, 203 F.3d 1305, 1312 (Fed. Cir. 2000); *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 477 (1951).

168. See, e.g., Amanda Peters, *The Meaning, Measure, and Misuse of Standards of Review*, 13 LEWIS & CLARK L. REV. 233, 245–46 (2009) (“The problem with this [substantial evidence] standard . . . is that there is effectively no difference between it and the clearly erroneous standard of review.”); Paul R. Verkuil, *An Outcomes Analysis of Scope of Review Standards*, 44 WM. & MARY L. REV. 679, 689 n.36 (2002) (“‘Clearly erroneous’ is distinguished from ‘substantial evidence’ in theory although the two standards are often equated in practice.”).

169. *Dickinson v. Zurko*, 527 U.S. 150, 162–63 (1999).

ultimately predicated on the relationship of judicial confidence that motivates its application by the Federal Circuit in the first place. An examination of that relationship is therefore appropriate.

Reading the case law more broadly suggests that judicial confidence in the PTAB has, to say the least, not been particularly high. On the contrary, the Federal Circuit's relationship with the PTAB to date appears almost universally exacting. To start, major Federal Circuit decisions have generally served to cabin the USPTO's authority, not expand it. For example, the Federal Circuit has emphatically rejected the application of *Chevron* deference to the USPTO's interpretation of substantive patent law<sup>170</sup> and, occasionally, even the rules governing its own administrative proceedings.<sup>171</sup> The other administrative apparatuses in the Federal Circuit's purview receive, by stark contrast, full-throated deference<sup>172</sup> — including, in at least one instance, the *Trademark* Trial and Appeal Board within the USPTO.<sup>173</sup> Indeed, at least a handful of Federal Circuit judges have expressed support for equalizing the PTAB and district court standards of review outright:

Merck now urges this court to sit en banc to decide whether application of a more searching standard of review — clear error — is required for appeals from inter partes review proceedings . . . under the [AIA] . . . I agree that application of the substantial evidence standard of review is seemingly inconsistent with the purpose and content of the AIA. This court is bound by binding Supreme Court precedent . . . and

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170. See, e.g., *Belkin Int'l, Inc. v. Kappos*, 696 F.3d 1379, 1381 (Fed. Cir. 2012) (stating that the Board's interpretation of underlying patent statutes is "review[ed] de novo"); *Merck & Co., Inc. v. Kessler*, 80 F.3d 1543, 1549–50 (Fed. Cir. 1996); *Glaxo Operations UK Ltd. v. Quigg*, 894 F.2d 392, 398 (Fed. Cir. 1990). See *Tran*, *supra* note 25, at 616 ("The Federal Circuit . . . has assumed exclusive responsibility for making substantive interpretations of the Patent Act . . ."); Sapna Kumar, *Expert Court, Expert Agency*, 44 U.C. DAVIS L. REV. 1547, 1550 (2011).

171. See, e.g., *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1296 (Fed. Cir. 2017) (en banc) (rejecting *Chevron* deference for the USPTO's interpretation of 35 U.S.C. § 316(e) (2012), governing the assignment of burdens of proof in inter partes review proceedings); *Biogen MA, Inc. v. Japanese Found. for Cancer Res.*, 785 F.3d 648, 657 (Fed. Cir. 2015) (rejecting *Chevron* deference for the USPTO's interpretation of AIA § 3(n)(1), governing the effective date of the AIA's new procedures).

172. See, e.g., *Keener v. United States*, 551 F.3d 1358, 1363 (Fed. Cir. 2009) (granting *Chevron* deference to the Treasury's interpretation of the Internal Revenue Code); *Patterson v. Dep't of the Interior*, 424 F.3d 1151, 1159 (Fed. Cir. 2005) (granting *Chevron* deference to the Office of Personnel Management); *Tunik v. Merit Sys. Prot. Bd.*, 407 F.3d 1326, 1336 (Fed. Cir. 2005) (granting *Chevron* deference to the Merit Systems Protection Board).

173. See *Eastman Kodak Co. v. Bell & Howell Document Mgmt. Prods. Co.*, 994 F.2d 1569, 1571 (Fed. Cir. 1993) (applying *Chevron* deference to the TTAB's interpretation of substantive provisions of the Lanham Act). *But see* Melissa F. Wasserman, *What Administrative Law Can Teach the Trademark System*, 93 WASH. U. L. REV. 1511, 1543 (2016) ("[T]he *Eastman Kodak* opinion has had a limited impact on the Federal Circuit's jurisprudence.").

this court's own . . . to apply the substantial evidence standard of review to factual findings by the Board, however. Because Congress failed to expressly change the standard of review employed by this court in reviewing Board decisions when it created . . . the AIA, we are not free to do so now.<sup>174</sup>

The Federal Circuit as a whole has likewise tended to maximize reviewability of PTAB proceedings,<sup>175</sup> while narrowing their territory,<sup>176</sup> preclusive effect,<sup>177</sup> and even cost-recovering capabilities.<sup>178</sup>

In more routine cases, as noted in Part III, the Federal Circuit often rejects — sharply — the PTAB's final written decisions as insufficiently rigorous or unclear:

The Board's procedural obligations are not satisfied merely because a particular fact might be found somewhere amidst the evidence submitted by the parties . . . [However, w]e will not decide whether the Board violated [appellant]'s procedural rights. To make that decision, we would need to be able to determine what evidence the Board relied on to support its implicit factual findings, how the Board interpreted that evidence, and what inferences the Board drew from it. The Board's opinion does not sufficiently permit such determinations.<sup>179</sup>

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174. *Merck & Cie v. Gnosis S.P.A.*, 820 F.3d 432, 433 (Fed. Cir. 2016) (O'Malley, J., concurring in denial of rehearing en banc) (joined by Judges Wallach and Stoll); *see also id.* at 438 (Newman, J., dissenting in denial of rehearing en banc) (“With these substantive consequences, it is not reasonable to infer the legislative intent to apply highly deferential review to issues traditionally subjected to appellate review for . . . clear error.”).

175. *See, e.g., Wi-Fi One, LLC v. Broadcom Corp.*, 878 F.3d 1364, 1367 (Fed. Cir. 2018) (en banc) (holding that initial time-bar determinations in *inter partes* reviews are appealable, despite general bar on appealing the PTAB's decision to institute review); *Versata Dev. Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1320 (Fed. Cir. 2015) (holding that the initial eligibility determination for CBM review is appealable, despite same bar); *see generally* 35 U.S.C. §§ 314(d), 315(b), 324(e) (2012).

176. *See, e.g., Secure Access, LLC v. PNC Bank Nat'l Ass'n*, 848 F.3d 1370, 1373 (Fed. Cir. 2017) (holding that the PTAB had adopted an impermissibly broad definition of which patents are eligible for CBM review), *cert. granted*, 138 S. Ct. 1982 (2018); *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 1376, 1379 (Fed. Cir. 2016).

177. *See, e.g., Shaw Indus. Grp., Inc. v. Automated Creel Sys., Inc.*, 817 F.3d 1293, 1299–300 (Fed. Cir. 2016) (holding that estoppel does not apply to invalidity challenges rejected by the PTAB at the institution stage).

178. *See, e.g., Nantkwest, Inc. v. Iancu*, 898 F.3d 1177, 1180 (Fed. Cir. 2018) (en banc) (holding that 35 U.S.C. § 145 (2012), which entitles the USPTO to collect “[a]ll the expenses” of defending against administrative challenges in district court, does not include attorneys fees).

179. *Rovalma, S.A. v. Bohler-Edelstahl GmbH & Co. KG*, 856 F.3d 1019, 1029–30 (Fed. Cir. 2017).

This tension between the Federal Circuit and the PTAB is highlighted even further by the timbre of Circuit judges writing more freely in dissent:

The current practice of assigning the same PTAB panel to both institute and conduct an *inter partes* review is not only contrary to the statute, but has the taint of prejudice . . . It is our judicial obligation to ensure agency compliance with statutory text and purpose. The departure by the PTO is not only contrary to the statute, but has devastating consequences for the public confidence in post-grant proceedings and the patent system as a whole. The nation's economic health depends on public confidence in an unbiased and balanced patent system.<sup>180</sup>

Or, of course, in public statements off the bench.<sup>181</sup>

In summation, the Federal Circuit does not appear to be affording the PTAB especially lenient consideration. And the nominal deference regime does not otherwise appear sufficiently strong to force a differential in the face of resistance or, at best, equivocation. Accordingly, it seems highly likely that the PTAB's affirmance advantage over the district courts relates — at least in some part — to substantively different decision-making. The PTAB's affirmance advantage does grow considerably as the findings at issue become more fact-based, but this tracks the nature of the PTAB itself. Administrative patent judges are required by statute to possess “competent . . . scientific ability,”<sup>182</sup> and in practice “[a]ll of [them] have specialized technical degrees . . . and experience”<sup>183</sup> that are brought to bear on their specific case assignments.<sup>184</sup> Federal district court judges, despite many virtues, generally

180. *Ethicon Endo-Surgery, Inc. v. Covidien LP*, 826 F.3d 1366, 1368–69 (Fed. Cir. 2016) (Newman, J., dissenting); see also *VirmetX Inc. v. Apple Inc.*, 665 F. App'x 880, 890 (Fed. Cir. 2016) (O'Malley, J., dissenting) (“[The PTAB] appears to have simply ‘substituted its own expertise for record evidence.’ . . . Allowing the Board to continue this practice . . . would only exacerbate the trend towards a ‘haze of so-called expertise’ that this court and the Supreme Court have admonished against.”).

181. See, e.g., Pitts, *supra* note 6 (quoting then-Chief Judge of the Federal Circuit Randall Rader, referring to PTAB panels as “death squads killing property rights”).

182. 35 U.S.C. § 6 (2012).

183. Gene Quinn, *PTAB Chief Judge Defends APJs*, IPWATCHDOG (Mar. 8, 2018), <http://www.ipwatchdog.com/2018/03/08/ptab-chief-judge-defends-apjs/id=94528/> [<https://perma.cc/FCP6-TYZV>] (statement by PTAB Chief Judge David Ruschke).

184. See, e.g., Brief Amicus Curiae of the Patent Trial and Appeal Board Bar Ass'n in Support of Neither Party at 6, *Oil States Energy Servs., LLC v. Greene's Energy Grp., LLC*, 138 S. Ct. 1365 (2018) (No. 16-712) (“These judges have special technical and legal expertise, and at least one of them typically has a technical background and work experience related to the subject matter of the patent in question.”); USPTO, ORGANIZATIONAL STRUCTURE AND ADMINISTRATION OF THE PATENT TRIAL AND APPEAL BOARD 2, <https://www.uspto.gov/>

do not have any background in the sciences at all,<sup>185</sup> let alone one relevant to the particular patent cases on their dockets. Despite the fairly widespread criticism of PTAB decision-making and post-grant procedures, the most straightforward conclusion is that its structure of expertise has, on the margins, aided decision-making on the thorny scientific questions endemic to patent disputes.

But the data suggests that expertise (and deference informed by that expertise) is not the only dynamic in play. Recall the stark gap in the PTAB's claim-invalidating affirmance rate compared to its claim-upholding affirmance rate.<sup>186</sup> Do the PTAB's administrative patent judges only leverage their scientific expertise when striking down junk patents, and then set it aside when reviewing solid ones? Likewise, consider the relative *insignificance* of technology categories: the PTAB showed generally steady affirmance rates between categories<sup>187</sup> and maintained its edge over district courts across the board.<sup>188</sup> All else being equal, one might expect the PTAB's expertise to be more salient in adjudicating, say, the merits of chemical or electrical patents instead of purely mechanically-oriented ones.<sup>189</sup> On the flip side, why aren't the de facto specialized district courts and judges reaping similar benefits? And why, of all adjudicators, do *layperson juries* perform the best on appeal?

These additional patterns suggest that the Federal Circuit may be internalizing message streams that it has been receiving for some time. First and foremost, a message from the Supreme Court: patent exceptionalism needs to be reined in. Scholars generally fit the Supreme Court's frequent reversals<sup>190</sup> of Federal Circuit law into a pattern of anti-exceptionalism.<sup>191</sup> That is, the Supreme Court is instructing the

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sites/default/files/documents/Organizational%20Structure%20of%20the%20Board%20May%2012%202015.pdf [https://perma.cc/9BRK-8987] (“The Vice Chief Judges each manage a division consisting of judges and patent attorneys. Currently, there are six sections in each division . . . Each section covers a broad technical focus . . .”).

185. Though a rough measure, the Federal Judicial Center indicates that, of 1305 sitting federal judges, only 16% (209) possess a minimum of an undergraduate science degree (B.S., B.S.E., B.S.E.E., B.Sc., A.S., A.A.S.). *Biographical Directory of Article III Federal Judges, 1789–Present*, FED. JUDICIAL CTR., <https://www.fjc.gov/history/judges> [https://perma.cc/M7HV-KWJP]. See generally Charlie Stiernberg, *Science, Patent Law, and Epistemic Legitimacy*, 27 HARV. J.L. & TECH. 279, 299 (2013) (noting “the lack of technically trained judges” as “measurabl[y] impact[ing] the patent system”); Peter Lee, *Patent Law and the Two Cultures*, 120 YALE L.J. 2, 6–7 (2010).

186. See *supra* Table 18.

187. See *supra* Table 6.

188. See *supra* Table 17.

189. To wit, the PTAB's advantage over district courts is actually *higher* in the mechanical category as compared to chemical or electrical patent cases. See *id.*

190. See, e.g., Roy E. Hofer & Joshua H. James, *Supreme Court Reversal Rates for Federal Circuit Cases*, 6 LANDSLIDE 40 (2014) (finding an 83.3% reversal rate, the highest of all thirteen circuits, for the 1999–2008 period).

191. See, e.g., Tejas N. Narechania, *Certiorari, Universality, and a Patent Puzzle*, 116 MICH. L. REV. 1345, 1349 (2018) (finding “[in]consistency across substantive fields of law”

Federal Circuit to treat patent law, broadly speaking, more like any other species of law where possible.<sup>192</sup> The Federal Circuit’s historically non-deferential relationship to the PTAB — “act[ing] like the head of an agency reining in wayward administrative law judges”<sup>193</sup> — has been, in its own way, a form of exceptionalism.<sup>194</sup> The data presented herein suggest that perhaps we are experiencing the first cautious steps towards anti-exceptionalism instead: a degree of cautious deference, applied narrowly to the expertise-driven factual findings of the PTAB.

Layperson jurors, of course, not only lack relevant technological subject matter expertise — they lack experience with the entire legal system, let alone patent law. And indeed, in previous years, the Federal Circuit was criticized for seemingly having too little faith in jurors’ abilities.<sup>195</sup> Nevertheless, the data presented herein suggest that their

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to be a substantial factor in granting cert on Federal Circuit cases); Peter Lee, *The Supreme Assimilation of Patent Law*, 114 MICH. L. REV. 1413, 1453–56 (2016); Robin Feldman, *Ending Patent Exceptionalism and Structuring the Rule of Reason: The Supreme Court Opens the Door for Both*, 15 MINN. J.L. SCI. & TECH. 61 (2014). This trend in Supreme Court jurisprudence is, in many ways, not necessarily unique to patent law either. See, e.g., Cynthia Estlund, *Are Unions a Constitutional Anomaly?*, 114 MICH. L. REV. 169 (2015) (regarding anti-exceptionalism in labor law); Abigail R. Moncrieff, *Understanding the Failure of Health-Care Exceptionalism in the Supreme Court’s Obamacare Decision*, 142 CHEST 559 (2012) (regarding anti-exceptionalism in health care law); Kristin E. Hickman, *Agency-Specific Precedents: Rational Ignorance or Deliberate Strategy?*, 89 TEX. L. REV. 89, 108–10 (2010) (regarding anti-exceptionalism in tax law).

192. See, e.g., *Octane Fitness, LLC v. Icon Health & Fitness*, 134 S. Ct. 1749, 1755–58 (2014) (rejecting the Federal Circuit’s specialized test for determining “exceptional” cases under fee-award provisions in favor of “ordinary meaning” and the “general ‘American rule’”); *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118, 132–37 (2007) (rejecting the Federal Circuit’s patent-specific test for “actual controversy” under the Declaratory Judgment Act in favor of generalist precedent); *eBay Inc. v. MercExchange, LLC*, 547 U.S. 388, 393–94 (2006) (rejecting the Federal Circuit’s “general rule . . . [of] issu[ing] permanent injunctions against patent infringement,” mandating use of the more typical four-factor test instead); *Independent Ink, Inc. v. Illinois Tool Works Inc.*, 547 U.S. 28, 40–42 (2006) (rejecting the Federal Circuit’s rule presuming “market power” in antitrust tying cases involving patented products).

193. Sapna Kumar, *The Accidental Agency?*, 65 FLA. L. REV. 229, 232 (2013).

194. See, e.g., Christopher J. Walker, *Chevron Deference and Patent Exceptionalism*, 65 DUKE L.J. ONLINE 149, 157 (2016); Stuart Minor Benjamin & Arti K. Rai, *Administrative Power in the Era of Patent Stare Decisis*, 65 DUKE L.J. 1563, 1563 (2016) (“PTAB decisionmaking could be structured in a manner that should, under conventional administrative law principles, merit *Chevron* deference. In all likelihood, the chief roadblock to *Chevron* is not formal administrative law, but specific challenges within the patent regime.”).

195. For previous scholarly works criticizing the Federal Circuit for appearing to lack appropriate deference to juries, see William C. Rooklidge & Matthew F. Weil, *Judicial Hyperactivity: The Federal Circuit’s Discomfort with its Appellate Role*, 15 BERKELEY TECH. L.J. 725, 739–40 (2000); Ted D. Lee & Michelle Evans, *The Charade: Trying a Patent Case to All “Three” Juries*, 8 TEX. INTELL. PROP. L.J. 1, 14 (1999); Gregory D. Leibold, *In Juries We Do Not Trust: Appellate Review of Patent-Infringement Litigation*, 67 U. COLO. L. REV. 623, 625–26 (1996); Arti K. Rai, *Engaging Facts and Policy: A Multi-Institutional Approach to Patent System Reform*, 103 COLUM. L. REV. 1035, 1056 (2003). Indeed, the jury affirmation rate presented in this article — 92.3% — is a notable increase compared to previous empirical

findings now hold a distinct edge on appeal.<sup>196</sup> This too is arguably a form of emergent anti-exceptionalism; despite the unique intricacies and complexities of patent cases, the Federal Circuit is treating jury-made findings with the same level of extra care and deference that they are afforded in other areas of law.<sup>197</sup> Whatever the merits of a patent exception to the Seventh Amendment jury guarantee based on perceived case complexity,<sup>198</sup> the Federal Circuit does not appear so persuaded.

Turning to the district courts generally, recall the considerable similarity in appellate results between patent-heavy and more typical judges and districts.<sup>199</sup> On the one hand, these adjudicators by definition have greater expertise and familiarity with patent law than their colleagues. On the other hand, unlike in the administrative law space, there is no legal framework for actually recognizing that cultivated expertise.<sup>200</sup> A judge is a judge is a judge. The lack of special deference afforded to these heavy-hitter judges is thus potentially anti-exceptionalism at work again. That is, the Federal Circuit is resisting the tendency to create a patent-specific stratification of district courts and judges. Instead, it is internalizing more general legal principles that tend to reject notions of inter-judge variation.

A second message stream comes from Congress instead: bad patents need to be culled. Despite ex post grumblings and halting attempts at modification,<sup>201</sup> the AIA remains the most recent comprehensive legislative intervention in the patent space. And the driving mission of that intervention — at least with respect to post-grant proceedings — was perhaps as unambiguous as congressional intent can be:

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studies. *See, e.g.,* Moore, *Judges, Juries, and Patent Cases*, *supra* note 14, at 397 (finding a jury affirmance rate of 78%, based on 1983–1999 data).

196. *See supra* note 143 and accompanying text.

197. *See, e.g.,* Kevin Casey et al., *Standards of Appellate Review in the Federal Circuit: Substance and Semantics*, 11 *FED. CIR. B.J.* 279, 307–08 (2002) (“The foundation for jury trials in civil litigation is, of course, the Seventh Amendment to the Constitution. Appellate challenges to jury findings rarely succeed, because the Seventh Amendment proscribes review of such findings even more than [Federal Rules of Civil Procedure] 52 restricts review of trial court findings of fact.”); Edward H. Cooper, *Civil Rule 50(A): Rationing and Rationalizing the Resources of Appellate Review*, 63 *NOTRE DAME L. REV.* 645, 650 (1988) (“Judge findings are accorded somewhat less deference than jury findings, at least in common comparisons of the clear error standard with directed verdict standards.”). *But see* Kevin M. Clermont & Theodore Eisenberg, 3 *AM. L. & ECON. REV.* 125 (2001) (finding that jury deference is not equally leveraged across all fields of law).

198. *See supra* notes 84–89 and accompanying text.

199. *See supra* Tables 9, 10, 11.

200. *See generally* Michael Goodman, *What’s So Special About Patent Law?*, 26 *FORDHAM INTELL. PROP. MEDIA & ENT. L.J.* 797, 800 (2016) (“Some proposals focus on the development of legal — rather than technical — expertise, thereby running up against the Court’s recent declarations about the lack of need for specialization of that type.”).

201. *See supra* notes 33–36 and accompanying text.

Congress has not enacted comprehensive patent law reform in nearly 60 years. The object of the patent law today must remain true to the constitutional command, but its form needs to change, both to correct flaws in the system that have become unbearable, and to accommodate changes in the economy and the litigation practices in the patent realm . . . The decisions reflect a growing sense that *questionable patents are too easily obtained and are too difficult to challenge* . . . [T]he Committee’s attention [is] on the value of . . . improving patent quality and providing a more efficient system for challenging *patents that should not have issued* . . .<sup>202</sup>

This idea — that low-quality patents are choking American innovation — pervades the AIA’s legislative history and context.<sup>203</sup> Given the Federal Circuit’s near-exclusive dominion over patent law, in addition to its more agency-like stance, it may have naturally internalized this idea as well.<sup>204</sup> In the Circuit’s own words: “Congress . . . saw powerful reasons to utilize the experience of the PTO for an important public purpose — to correct the agency’s own errors in issuing patents in the first place.”<sup>205</sup> Accordingly, there may be a form of context-mediated deference at play: when the PTAB determines that a patent needs

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202. H.R. REP. NO. 112-98, Part 1, at 38–40 (2011) (emphases added).

203. See, e.g., 153 CONG. REC. H23,941 (2007) (“The rapid pace of innovation and increasingly complex patent filings have strained the Patent and Trademark Office and patent claims of questionable validity have been granted.”); Press Release, Office of the Press Sec’y, Executive Actions: Answering the President’s Call to Strengthen Our Patent System and Foster Innovation (Feb. 20, 2014) <https://obamawhitehouse.archives.gov/the-press-office/2014/02/20/fact-sheet-executive-actions-answering-president-s-call-strengthen-our-p> [<https://perma.cc/46JT-AN4K>] (“The United States Patent and Trademark Office (USPTO) has now successfully implemented [the AIA], enabling many reforms that are leading to higher patent quality, including post-grant patent review proceedings at the USPTO . . .”). Joe Matal’s two-part guide to the legislative history of the AIA is an exquisitely comprehensive resource from an insider’s perspective, and links the creation of specific provisions directly to the need to combat patent trolls. See Joe Matal, *A Guide to the Legislative History of the America Invents Act: Part II of II*, 21 FED. CIR. B.J. 539, 592 (2012) (“Section 299 should put an end to a practice that had become a favorite tactic of patent trolls: suing a large number of unrelated patent defendants in a single action.”). At the time of authorship, Joe Matal was the Judiciary Committee Counsel to Senator Jon Kyl, one of the principal architects of the AIA. Until January 2019, Joe Matal was the Acting Deputy General Counsel and Solicitor for the USPTO. *About Us*, USPTO, <https://www.uspto.gov/about-us/executive-biographies/joseph-matal> [<https://perma.cc/5CLF-WHD9>].

204. To wit, half of the currently active judges on the Federal Circuit were either appointed contemporaneously with the AIA’s passage and implementation, or shortly thereafter: Judges Jimmie Reyna, Evan Wallach, Richard Taranto, Raymond Chen, Todd Hughes, and Kara Stoll. See *Judges*, U.S. COURT OF APPEALS FOR THE FED. CIR., <http://www.cafc.uscourts.gov/judges> [<https://perma.cc/N3C7-HB6W>].

205. *MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1290 (Fed. Cir. 2015).



to go, it is channeling those legislative intentions, and the Federal Circuit is hence less inclined on the margins to reverse course. District courts, on the other hand, were left untouched by the AIA — creating no comparable pull, and no comparable differential.

Patent practitioners and policymakers may have their own, less abstract, takeaways from the overall empirical analysis presented herein. The fears of litigation concentration appear overblown in some respects, given marginal inter-district and inter-judge variation. Instead, the increased reliance on juries — enabled in part by certain districts and judges more than others — may be far more salient. From a procedural standpoint, if jury findings are being affirmed solely due to black-box deference, there may come a point where effective appellate review is essentially circumvented. From an outcome-focused standpoint, one may rightly question whether deference to juries — even now — is merely papering over weaker decision-making. Meanwhile, on the administrative side, the PTAB does not appear to be misbehaving at all on substantive issues. Rather, it is operating well within the bounds articulated to it by the Federal Circuit. Again, however, sharper critics may question whether the Federal Circuit is articulating the correct bounds in the first place, particularly given the constraints and messaging — real or perceived — that it faces from the Supreme Court and Congress.

## VI. CONCLUSION

After coding and analyzing two full years of Federal Circuit decision-making, the results paint a surprising picture of its relationship to the PTAB, to district courts, and to juries. The PTAB's expertise — whether putative or real — is cautiously rewarded by a high affirmance rate advantage on fact-specific issues. District court specialization, on the other hand, seems to carry little weight in any category. Instead, it is layperson juries that appear to garner the most appellate respect. What unifies these trends is, perhaps, an embrace by the Federal Circuit of the anti-exceptionalist messaging from academia and the Supreme Court. Simultaneously, the Federal Circuit may be internalizing more policy-oriented messaging from Congress, expressing a particular willingness to affirm the PTAB when it thins the patent herd. A reexamination of comparable data in the future would shed light on the durability of these patterns. Absent changes to the underlying shape of the patent landscape, however, one might expect them to continue for some time.