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Venue One Year After *TC Heartland*: An Early Empirical Assessment of the Major Changes in Patent Filing

Shawn P. Miller

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**VENUE ONE YEAR AFTER *TC HEARTLAND*:
AN EARLY EMPIRICAL ASSESSMENT OF THE MAJOR
CHANGES IN PATENT FILING**

*Shawn P. Miller**

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ABSTRACT

In its May 2017 decision in TC Heartland LLC v. Kraft Foods Group Brands LLC, the Supreme Court reined in the Federal Circuit’s permissive venue standard, which had fueled the rise of the Eastern District of Texas as the busiest patent trial court in the nation and the preferred filing location of patent assertion entities (PAEs), derisively

known as patent trolls. While the new limits of permissible venue in patent cases continue to be demarcated in the lower courts, sufficient time has passed since *TC Heartland* to begin to investigate the impact of the decision across a number of dimensions. Accordingly, in this study I examine changes in the volume of cases filed nationally and in leading districts by comparing the numbers one year before versus one year after the decision. Further, I separately study changes in the location, volume, and distribution of PAE and practicing entity litigation. Finally, I examine how plaintiff adherence to the new venue standard in *TC Heartland* has changed defendant connections to the districts where they are sued. As others have predicted, I find evidence that the largest shift in patent litigation has been from the Eastern District of Texas to the District of Delaware. Specifically, 72 percent more patent cases were filed in the District of Delaware and 68 percent fewer cases were filed in the Eastern District of Texas the year after *TC Heartland* compared with the year before the decision and the decline in filings in the Eastern District of Texas is entirely attributable to PAEs. Further, changes in filing trends before and after *TC Heartland* indicate that between 320 and 780 fewer PAE lawsuits were filed the year after than would have been the case had the Supreme Court not restricted venue. Had these cases been filed, they would have comprised between fourteen and thirty-three percent of PAE filings for the year. Closer defendant connections to the courts where cases were filed post-*TC Heartland* suggest not only that PAEs perceived significant benefits from filing in the Eastern District of Texas and other pro-plaintiff venues, but also that many PAEs believe they are less likely to succeed on defendants' home turf. Comparing the year before with the year after *TC Heartland*, the share of PAE suits filed in the court containing a defendant's principal place of business jumped from nine to thirty-two percent and the share filed where a defendant is incorporated spiked from ten to forty-eight percent.

I. INTRODUCTION

The Supreme Court's 2017 decision in *TC Heartland LLC v. Kraft Foods Group Brands LLC* ended nearly three decades of permissive venue in patent litigation.¹ During the period, patent owners could sue

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companies with a national business presence in almost any district court.² This wide latitude for plaintiffs' choice of where to sue opened the door to rampant forum shopping—the selection of the court believed to be most favorable to one's own side.³ Over time many patent owners took advantage, with Colleen Chien and Michael Risch estimating that 58 percent of patent lawsuits filed in 2015 were in a district that would be considered an improper venue under the more restrictive rule subsequently adopted in *TC Heartland*.⁴

The court of choice for many plaintiffs during the period of permissive patent venue, but especially for patent assertion entities (PAEs), became the Eastern District of Texas.⁵ During the year before *TC Heartland* was decided, 38 percent of all patent cases filed in the United States were filed in the Eastern District of Texas.⁶ Further, in recent years, PAEs brought over 90 percent of the patent lawsuits in the Eastern District of Texas.⁷ PAEs, also known as “patent trolls,” are firms whose primary business is monetizing patents rather than developing and selling products and services.⁸ While litigation in the Eastern District of Texas was on the rise, PAE litigation also rose nationally. From 2009 until the *TC Heartland* decision, PAE litigation consistently accounted for between 40 and 50 percent of all U.S. patent disputes.⁹

Conference, PatCon8, the IP Scholars' Conference, and The University of Akron School of Law faculty workshop for comments.

1. 137 U.S. 1514, 1520 (2017).
2. Ofer Eldar & Neel U. Sukhatme, *Will Delaware Be Different? An Empirical Study of TC Heartland and the Shift to Defendant Choice of Venue*, 104 CORNELL L. REV. 101, 111 (2018).
3. Colleen V. Chien & Michael Risch, *Recalibrating Patent Venue*, 77 MD. L. REV. 47, 49 (2018).
4. *Id.* at 48.
5. Eldar & Sukhatme, *supra* note 2, at 113. See Yan Leychikis, *Of Fire Ants and Claim Construction: An Empirical Study of the Meteoric Rise of the Eastern District of Texas as a Preeminent Forum for Patent Litigation*, 9 YALE J.L. & TECH. 193, 204 (2007).
6. See *infra* Table 1.
7. Brian J. Love & James C. Yoon, *Predictably Expensive: A Critical Look at Patent Litigation in the Eastern District of Texas*, 20 STAN. TECH. L. REV. 1, 12 (2017).
8. See Miller et al., *Who's Suing Us? Decoding Patent Plaintiffs Since 2000 with the Stanford NPE Litigation Dataset*, 21 STAN. TECH. L. REV. 234, 238 (2018) (defining PAEs as “an entity that owns patents but does not create or sell products or services” and further “that exists to assert patents against other actors”); Colleen V. Chien, *From Arms Race to Marketplace: The Complex Patent Ecosystem and Its Implications for the Patent System*, 62 HASTINGS L.J. 297, 300 (2010) (defining PAEs as entities that use patents primarily to gain licensing fees rather than to commercialize or transfer technology).
9. Miller et al., *supra* note 8, at 262. The share of patent disputes attributable to PAEs more than doubled between 2000 and 2009, from about 15 % on average between 2000 and 2005 to 40 % in 2009. *Id.* at 261–62.

Complaints against patent trolls, or PAEs, have been pervasive and a motivation for much recent patent reform, including calls to restrict venue.¹⁰ Patents are meant to encourage innovation by granting inventors the exclusive right to their new technologies for a limited period of time.¹¹ Critics argue that for a variety of reasons PAE enforcement activity, including litigation, harms rather than fosters innovation.¹² One dominant story runs that most PAEs acquire and assert patents of questionable validity or uncertain scope against producers that have independently invented and already commercialized the technology allegedly covered by the patents.¹³ Because of the high cost of determining validity or infringement in patent litigation, these PAEs successfully induce their targets to settle for relatively “small amounts of money rather than pay millions to their lawyers.”¹⁴ PAEs in the business of seeking nuisance value settlements benefit from permissive venue because they have maximum freedom to select districts that are more plaintiff friendly, more expensive for defendants, and thus more likely to incentivize early defendant settlement. For many reasons, the Eastern District of Texas appears to have developed into the perfect district for this rent-seeking business model.¹⁵

In this paper I investigate how *TC Heartland* has changed the patent landscape during the first year after the decision. Because they have been the focus of forum shopping critics,¹⁶ I pay particular attention to the

10. See e.g., Brief of *Amici Curiae* 61 Professors of Law & Economics in Support of Petitioner at 9, *TC Heartland LLC v. Kraft Foods Grp. Brands LLC*, 137 U.S. 1514 (2017), (No. 16-341) (arguing that “[t]he rise of the troll business model exacerbates [the problems of forum shopping] in patent litigation, creating a particularly urgent need for the Court to decide this case.”).

11. Mark Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117, 2121 (2013).

12. Miller et al., *supra* note 8, at 238.

13. James Bessen & Michael J. Meurer, *Lessons for Patent Policy from Empirical Research on Patent Litigation*, 9 LEWIS & CLARK L. REV. 1, 14–18 (2005).

14. Lemley & Melamed, *supra* note 11, at 2126. See also Federal Trade Commission, Patent Assertion Entity Activity: An FTC Study, (Oct. 2016), <https://www.ftc.gov/reports/patent-assertion-entity-activity-ftc-study> [<https://perma.cc/J2SF-858N>] (finding that litigating PAEs sign licenses that are “less than . . . the lower bound of early stage litigation costs,” a finding “consistent with nuisance litigation” rather than the likelihood of their infringement.)

15. See, e.g., J. Jonas Anderson, *Court Competition for Patent Cases*, 163 U. PA. L. REV. 631, 653 (2015) (arguing that “[t]he speed, large damage awards, outstanding win-rates, likelihood of getting to trial, and plaintiff-friendly local rules suddenly made the Eastern District the venue of choice for patent plaintiffs” during the mid-2000s); Daniel Klerman & Greg Reilly, *Forum Selling*, 89 S. CAL. L. REV. 241, 245 (2016) (arguing that the Eastern District of Texas engaged in “forum selling” by adopting rules attractive to patent plaintiffs).

16. Brief of *Amici Curiae* 56 Professors of Law and Economics in Support of Petition for Writ of Certiorari at 8–9, *TC Heartland LLC v. Kraft Foods Grp. Brands LLC*, 137 U.S. 1514 (2017), (No. 16-341).

effects *TC Heartland* has had on PAEs and the Eastern District of Texas. Along the way, I also reveal changes in filing in other major patent litigation fora and by two other categories of patent owners—pharmaceutical and non-pharmaceutical practicing entities. I consider these separately because pharmaceutical patent litigation, even more than PAE litigation, has been concentrated in only a couple of districts—Delaware and New Jersey.¹⁷ Finally, for these three types of patent plaintiffs, I investigate how defendant connections to the venue selected changed from the year before to the year after *TC Heartland* as patent plaintiffs quickly adapted to meet the new venue standard.

Regarding changes in the patent landscape generally, I find that ten of the fourteen districts with the largest patent dockets saw filings increase or decrease by at least 20 percent during the year after *TC Heartland* as compared with the year before the decision. Nationally, patent infringement filings were down 12 percent from the year prior to the decision. While the evidence suggests that *TC Heartland* affected all types of plaintiffs and many districts, the impact was far greater on PAEs, the Eastern District of Texas, and the District of Delaware.

Concerning the Eastern District of Texas and PAE litigation, I find a shift in PAE—and only PAE—filings from the Eastern District of Texas to several districts that either include the principal place of business or are located in the state of incorporation of many firms. Delaware, the most popular state of incorporation for corporate patent defendants, saw nearly a 200 percent increase in PAE lawsuits the year after *TC Heartland*.¹⁸ The Northern District of California, home of many of the high technology targets of PAEs, experienced a 250 percent increase in PAE litigation. However, the number of PAE lawsuits filed in Delaware post-*TC Heartland* was over four times that of the Northern District of California and the increase in litigation in the latter district to 7 percent of national filings was much smaller than predicted by other scholars.¹⁹

By contrast, there were over 70 percent fewer PAE lawsuits filed in the Eastern District of Texas the year after *TC Heartland* compared with the year before. In total, over 1,100 fewer suits were filed in the Eastern District of Texas. My analysis suggests that while roughly half of the cases

17. Pharmaceutical Patent Litigation Filings Have Risen Significantly Since 2014, According to Lex Machina's 2015 Hatch-Waxman/ANDA Report, LEX MACHINA (Apr. 26, 2016), <https://lexmachina.com/media/press/pharmaceuticalpatent-litigation-filings-risen-since-2014/> [<https://perma.cc/A3A8-4MTS>].

18. See *infra* Table 2.

19. Chien & Risch, *supra* note 3, at 93 (predicting that 13 percent of patent lawsuits in 2015 would have been filed in the Northern District of California under the rule of *TC Heartland*).

that would have been filed there were probably filed elsewhere, between 300 and 780 PAE lawsuits—roughly between 14 and 33 percent of the national PAE total pre-*TC Heartland*—were not filed during the year after because of the decision.

Concerning how *TC Heartland* changed defendant connections to the venue chosen by patent plaintiffs, I find that nationally the share of cases filed where a defendant is incorporated rose from sixteen to nearly 50 percent of all lawsuits. Similarly, the share of cases filed in the district containing a defendant's principal place of business rose from under 14 percent during the year before *TC Heartland* to over 36 percent the year after. Among PAE lawsuits, the share filed where a defendant is incorporated increased from 10.5 to 48.5 percent of cases and the share filed in a defendant's principal place of business increased from 9.2 to 32.3 percent.

During the year before *TC Heartland*, non-pharmaceutical practicing entities filed a greater share of cases where a defendant is incorporated or maintains its principal place of business (18.4 and 18.9 percent, respectively). However, *TC Heartland* also dramatically increased these shares to 44.8 percent and 45.8 percent, respectively. Thus, post-*TC Heartland*, a similar share of PAE and non-pharmaceutical practicing entity cases have been filed where a defendant is incorporated but practicing entities have filed a greater share where a defendant maintains its principle place of business.

Perhaps surprising, *TC Heartland* appears to have had the least impact on pharmaceutical practicing entities. The share filed where a defendant is incorporated increased from 48.1 percent to 57.3 percent and the share where a defendant maintains its principal place of business increased from 20.4 to 33.3 percent. Somewhat surprising, almost exactly the same large shares of Abbreviated New Drug Application (ANDA) suits were filed in Delaware and New Jersey the year before as were filed the year after the decision and there was an increase in ANDA litigation during the year after *TC Heartland*.

Part II of the paper discusses the changing law of patent venue and the literature on forum selection in patent cases. Part III describes the data and the methodology that I employ in the paper and Part IV reports my findings. Prior to the Conclusion, Part V discusses the implications.

II. PATENT VENUE LAW AND FORUM SELECTION

A. *Venue in Patent Litigation*

In this section, I briefly describe the modern development of patent venue law, which has been characterized as oscillating between broader and narrower interpretations of the statutory rule.²⁰ Since 1897,²¹ the United States has had both a general venue statute²² and a separate patent venue statute.²³ Historically, the patent venue statute has been interpreted as the “sole and exclusive provision controlling venue in patent infringement actions” and not supplemented by the general venue statute.²⁴

Since Congress amended the patent venue rule in 1948, the statute has specified that venue is proper in “the judicial district where the defendant resides, or where the defendant has committed acts of infringement and has a regular and established place of business.”²⁵ The main change in the 1948 amendment was to substitute “is an inhabitant” from the prior statute with “resides.”²⁶ The term “resides,” like the earlier “inhabits,” was probably intended to mean place of incorporation.²⁷ However, later adoption of a broader, explicit definition of “resides” in the general venue statute that included any district where a corporate defendant could be found suggested that the meaning of “resides” in the special patent rule might also have been modified.²⁸ In its 1957 *Fourco Glass Co. v. Transmirra Prods. Corp.* decision, the Supreme Court rejected that possibility and held that the term “resides” in the patent venue statute, Section 1400(b), continued to mean a corporate defendant’s state of incorporation.²⁹

20. See Chien & Risch, *supra* note 3, at 5458 (discussing of the development of patent venue law in the United States).

21. The first patent venue statute was created by Act of Mar. 3, 1897, ch. 395, § 1, 29 Stat. 695, 695 (patent suits shall only be filed “in the district of which the defendant is an inhabitant, or in any district in which the defendant, whether a person, partnership, or corporation, shall have committed acts of infringement and have a regular and established place of business”).

22. 28 U.S.C. § 1391(c) (2011).

23. 28 U.S.C. § 1400(b) (1999).

24. *Fourco Glass Co. v. Transmirra Prods. Corp.*, 353 U.S. 222, 229 (1957).

25. 28 U.S.C. § 1400(b) (1999).

26. Act of Mar. 3, 1897, ch. 395, § 1, 29 Stat. 695, 695 (placing jurisdiction over a patent suit “in the district of which the defendant is an inhabitant, or in any district in which the defendant, whether a person, partnership, or corporation, shall have committed acts of infringement and have a regular and established place of business”).

27. See Chien & Risch, *supra* note 3, at 57.

28. *Id.*

29. *Fourco Glass*, 353 U.S. at 229.

Thirty years later in 1988, Congress again changed the definition of “resides” for corporate defendants in the general venue statute, this time to include “any judicial district in which it is subject to personal jurisdiction at the time the action is filed.”³⁰ Despite the Supreme Court’s determination in *Fourco Glass* that the patent and general venue statutes are distinct, in *VE Holding Corp. v. Johnson Gas Appliance Co.*, the Federal Circuit held that the 1988 legislative modification also applied to “resides” in the patent statute.³¹ This opinion commenced nearly thirty years of patent owners being able to sue in “any district where there would be personal jurisdiction over the corporate defendant.”³²

Importantly, during this period of permissive patent venue, the Federal Circuit also interpreted personal jurisdiction expansively, ensuring that jurisdiction likewise did not serve as much of a limit on where most patent lawsuits could be filed.³³ In *Beverly Hills Fan Co. v. Royal Sovereign Corp.*, it held that jurisdiction is proper if the products or services accused of infringing are sold in the forum state, whether those sales are made directly by the alleged infringer or through established distributors.³⁴ Because most corporations accused of patent infringement sell nationwide, almost any district has had personal jurisdiction over most patent infringement defendants.³⁵

This state of near unfettered choice on where patent owners could file their lawsuits ended in 2017 with *TC Heartland*. There, the Supreme Court ruled the Federal Circuit had been wrong to apply the 1988 amendment to Section 1391(c) of the general venue statute to the meaning of “resides” in the patent venue statute.³⁶ Thus, it held that *Fourco Glass Co.* continues to provide the correct interpretation of patent venue.³⁷ The result of *TC Heartland* is that venue is now only permissible in a patent infringement lawsuit against a corporate defendant in its state of incorporation, or where the defendant has committed acts of infringement and possesses a regular and established places of business.³⁸ Again, this

30. Judicial Improvements and Access to Justice Act, Pub. L. No. 100702, 102 Stat. 4669 (1988) (amending 28 U.S.C. § 1391(c)).

31. 917 F.2d 1574, 1578 (Fed. Cir. 1990).

32. *Id.* at 1583.

33. Klerman & Reilly, *supra* note 15, at 248.

34. 21 F.3d 1558, 1565–69 (Fed. Cir. 1990).

35. See Megan M. La Belle, *Patent Litigation, Personal Jurisdiction, and the Public Good*, 18 GEO. MASON L. REV. 43, 70 (2010).

36. Not all legal scholars agree with the Supreme Court that the Federal Circuit got it wrong in *VE Holding Corp.* See, e.g., Paul R. Gugliuzza & Megan M. La Belle, *The Patently Unexceptional Venue Statute*, 66 AM. U. L. REV. 1027, 1049–53 (2017).

37. *TC Heartland LLC v. Kraft Foods Grp. Brands LLC*, 137 U.S. 1514, 1516–17 (2017).

38. *Id.*

represents a dramatic restriction in patent plaintiffs' choice after thirty years of venue being proper in any federal district court with personal jurisdiction over defendants.³⁹

During the two years since *TC Heartland* was decided, the Federal Circuit has resolved several questions unanswered by the Supreme Court's holding and has done so in ways that limit plaintiffs' choice of venue. In *In Re: Cray Inc.*, the Federal Circuit fleshed out the requirements for a corporate defendant's presence in a district to constitute a "regular and established" place of business as required for proper venue in a district other than its place of incorporation.⁴⁰ These requirements include that the defendant must maintain a "physical, geographical location" in the district.⁴¹

Further, in *In Re: BigCommerce, Inc.*, the Federal Circuit resolved the open question of where a defendant "resides" when it is incorporated in a state with multiple judicial districts.⁴² It held that the answer depends on whether or not the corporate defendant maintains its principal place of business in the state.⁴³ If it does, then the defendant resides only in the district containing its principal place of business.⁴⁴ If its principal place of business is outside its state of incorporation, then the defendant is deemed to reside "in the district in which its registered office, as recorded in its corporate filings, is located."⁴⁵ In either case, defendants incorporated in a state with multiple districts only reside in one of the federal districts in that state.⁴⁶

B. *Choice of Forum in Patent Litigation*

Turning to prior work on forum selection and forum shopping in patent cases, then law professor and now Federal Circuit Judge Kimberly Moore conducted the first empirical investigation of what motivates patent plaintiffs' choice of venue.⁴⁷ She measured how district courts varied by speed of case completion, the procedural stage reached before

39. *VE Holding Corp. v. Johnson Gas Appliance Co.*, 917 F.2d 1574, 1578 (Fed. Cir. 1990).

40. 871 F.3d 1355 (Fed. Cir. 2017).

41. *Id.* at 1362.

42. 890 F.3d 978 (Fed. Cir. 2018).

43. *Id.* at 985.

44. *Id.*

45. *Id.*

46. *Id.*

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

termination, the method of resolution (e.g., by motion, trial, transfer, or settlement), and plaintiff win rates.⁴⁸

Judge Moore argued that there are many reasons why a party may believe that a particular court is preferable, including:

[T]he knowledge, background, and experience of the judges; the judges' previous experience with high technology or patent matters; the characteristics, predispositions, and biases of potential jurors; the attorney's familiarity with the district and the judges in the district; the local rules of the district court; the practices of the judges in the district regarding whether they conduct Markman hearings; at what point in the litigation the claims will be construed; the type of evidence the judges will consider in construing the claims; the court's docket and its speed in resolving cases; the reputation of the parties in the district; and, of course, traditional factors, such as the convenience for the parties, witnesses and attorneys.⁴⁹

All of the reasons Judge Moore provides for why plaintiffs will prefer particular jurisdictions seem plausible. Interestingly, she downplayed the role of convenience, arguing that "[i]n this age of national and international commerce, however, convenience of the parties, witnesses, and location of evidence is becoming less significant in the parties' calculus than other considerations, particularly characteristics of the court such as speed, familiarity with technology, and familiarity with patent cases."⁵⁰

Moore probably discounted convenience factors in part because she found that, with permissive venue, forum shopping was widespread during the 1990s, even before the rise of the Eastern District of Texas.⁵¹ She found that the most popular districts, including the Eastern District of Virginia, resolved cases quicker and with more frequent termination by settlement.⁵² She argued that these differences are likely due to procedural differences that tend to result in outcomes plaintiffs prefer.⁵³

Subsequent studies of forum selection in patent cases have elaborated on the inter-district variation in procedures that Judge Moore suggested explains much forum shopping. Undoubtedly, this focus was spurred by the quick rise of the Eastern District of Texas, which has had more pro-patentee local rules and is the home of relatively few innovators,

48. *Id.* at 892.

49. *Id.* at 899–900.

50. *Id.* at 900.

51. *Id.* at 892.

52. *Id.* at 907–16.

53. *Id.* at 919.

manufacturers, and sellers.⁵⁴ Thus, choice of forum during the period of permissive patent venue has appeared to be a national search.

Studies following Moore's approach of viewing venue selection as a national search for the district with the most pro-patentee rules and outcomes include work by Mark Lemley. Lemley identifies the best places to file a patent lawsuit based on inter-district differences in plaintiff win rates, in the percent of cases that go to trial, and in time to disposition.⁵⁵ Lemley's analysis includes every case filed and terminated between 2000 and March 17, 2010.⁵⁶ In his aggregate rankings of all the factors he considers, he finds that among the most pro-plaintiff districts are many of the most popular. For example, the Eastern District of Virginia, the District of Delaware, and the Western District of Wisconsin are all in the top five among the thirty-three districts with the busiest patent dockets.⁵⁷ The Eastern District of Texas, which by that time had risen to the fourth most popular district in terms of cases filed⁵⁸, was not among the top five, but was ranked respectably as the seventh most pro-plaintiff district.⁵⁹

As the popularity of the Eastern District of Texas continued to rise, Daniel Klerman and Greg Reilly focused on forum selling by that district and argued that its judges "consciously sought to attract patentees and have done so by departing from mainstream doctrine in a variety of procedural areas in a pro-patentee . . . way."⁶⁰ These areas include case assignment, joinder, discovery, transfer, and summary judgment.⁶¹ Further, they argue that the judges decided to attract patent cases for a variety of reasons, including a desire to help the local bar, hear interesting cases, and gain prestige.⁶² Finally, they argue that forum selling is made

54. Concerning the lack of defendant contacts with the Eastern District of Texas, Love and Yoon found that from January 2014 through June 2016 less than 8 % of cases filed there were against a defendant with corporate offices in that district. By contrast, almost two-thirds of cases filed in the Northern District of California were against a defendant with an office in the Northern District. *See Love & Yoon, supra* note 7, at 10–12.

55. Mark A. Lemley, *Where to File Your Patent Case*, 38 *AIPLA Q.J.* 401, 428 (2010).

56. *Id.* at 404.

57. *Id.* at 418–21.

58. *Id.* at 405–06, Table 2.

59. *Id.* at 418–20, Table 7.

60. Klerman & Reilly, *supra* note 15, at 250.

61. *Id.* at 241.

62. *Id.* at 270. *See also id.* at 282 (Concerning the local bar, Klerman and Reilly argue that because both Delaware and the Eastern District of Texas have relatively small and active local bars, and fewer judges than districts containing large cities, their judges may be biased towards helping local lawyers.).

possible by venue rules that give one side control over where the dispute occurs and also wide discretion on where to file.⁶³

The Supreme Court's decision in *TC Heartland* constrained plaintiffs' choice of venue and also potentially places some control over venue in the hands of defendants. Subsequently, pro-plaintiff forum selling may not be as possible in the future. Ofer Eldar and Neel Sukhatme recently made these precise points, using Delaware as their main example.⁶⁴ They argue that while Delaware has been a popular patent venue, its procedures do not appear to be excessively plaintiff friendly.⁶⁵ Further, they argue Delaware judges are unlikely to become more pro-plaintiff simply because many patent plaintiffs now have the option of filing there post-*TC Heartland*. They argue the principal deterrent is that these judges would risk Delaware-incorporated firms that are frequently targeted as infringement defendants moving to incorporate in other states.⁶⁶ Because Delaware judges have incentives to make both large corporate defendants and plaintiffs happy, Eldar and Sukhatme argue that they will continue to adopt balanced procedures.⁶⁷

Eldar and Sukhatme's rosy predictions for patent litigation in Delaware are supported by the empirical study at the center of their work. They conducted a stock market event study which found that post-*TC Heartland*, companies that are likely targets of patent trolls had positive market reactions to the decision, and that this effect was most pronounced for Delaware-incorporated firms.⁶⁸ Thus, shareholders of defendants that have been the targets of patent trolls, very frequently in the Eastern District of Texas, favorably viewed the Supreme Court's restriction of venue and the likely shift to Delaware.⁶⁹

In another recent work, Chien and Risch investigated where patent cases would have been filed in 2015 if the venue rule of *TC Heartland* was in effect that year.⁷⁰ To accomplish this, they first determined where each named defendant in their sample of nearly 939 patent infringement suits was incorporated and where they possessed regular places of business. They then compared these defendant locations considered proper venue under *TC Heartland* with the locations where they were

63. *Id.* at 308.

64. Eldar & Sukhatme, *supra* note 2, at 101.

65. *Id.* at 153.

66. *Id.* at 149–150.

67. *Id.* at 156–58.

68. *Id.* at 144.

69. *Id.*

70. Chien & Risch, *supra* note 3, at 47. *See also id.* at 78 (determining how patent infringement filings in 2015 would have been different had the VENUE Act been in effect).

actually sued and determined the percentage of cases that would have to be moved had *TC Heartland* been in effect. Finally, given a set of assumptions, they determined where defendants that would have had to sue elsewhere under *TC Heartland* likely would have sued. They did not, however, attempt to predict how many cases would not have been filed under a restricted venue rule, but instead argued that that number would be small.⁷¹

Chien and Risch found that had *TC Heartland* been in effect in 2015, 52 percent of practicing entity lawsuits and 60 percent of non-practicing entity lawsuits would have had to be filed in a different district.⁷² Overall, only 42 percent of cases could have remained where they were actually filed.⁷³ Concerning the districts most affected, they find that the 2015 share of non-practicing entity (NPE) cases filed in the Eastern District of Texas would have decreased from the actual of 65 percent to 19 percent.⁷⁴ Further, the district gaining the most cases—both practicing entity and NPE cases—would have been Delaware, with the national share of practicing entity cases filed there increasing from 10 to 19 percent and the share for NPEs increasing from 7 to 25 percent.⁷⁵ Finally, they predict that the share of NPE cases filed in the Northern District of California would have increased from 3 percent to 16 percent.⁷⁶ Chien and Risch largely avoid making normative conclusions about their results.⁷⁷ However, their study clearly predicts that *TC Heartland* would have a major impact on where patent cases are filed and that its effects would vary dramatically by patent owner type and from district to district.

With the benefit of now knowing where patent cases have been filed during the first year after *TC Heartland*, in this paper I investigate its actual impact on the patent landscape. Specifically, I compare where cases were filed during the year before *TC Heartland* to where they were filed during the year after the decision. As with Chien and Risch, I determine the differential effects of *TC Heartland* on different types of patent owners and also reveal how *TC Heartland* dramatically increases the shares of patent cases filed where defendants are incorporated or do business. Finally, with actual data before and after the decision, I am able to estimate that had *TC Heartland* not been decided on May 23, 2017, at

71. *Id.* at 79.

72. *Id.* at 89.

73. *Id.* at 90.

74. *Id.* at 91. NPEs are patent owners who do not create or sell products or services. *See, e.g.*, Miller et al., *supra* note 8, at 238 (explaining that PAEs are a subset of NPEs and defining both terms).

75. Chien, *supra* note 3, at 91.

76. *Id.* at 92.

77. *Id.* at 102.

least several hundred more PAE lawsuits would have been filed during the ensuing year than were actually filed after the restriction in venue. My results provide practitioners, scholars, and policy makers with a clear picture of the effects of restrictive venue on patent litigation in the United States.

III. DATA AND METHODOLOGY

I begin my analysis, in Section IV.A., with a high-level review of the impact of *TC Heartland* on where patent lawsuits are filed. In Section IV.B., I investigate whether district-by-district changes vary across plaintiff type, in particular, comparing practicing entities with PAEs that have been the focus of most complaints about patent forum shopping. In Section IV.C., I investigate whether *TC Heartland* had an effect on the volume of patent litigation in the United States. In Section IV.D., I investigate the impact that the decision has had on how many cases are filed in districts where defendants reside or do business.

For my analysis, I collected data on all 8,036 patent infringement lawsuits filed from May 23, 2016 through May 22, 2018—all cases one year before and one year after the Supreme Court released its *TC Heartland* decision on May 23, 2017.⁷⁸ I excluded declaratory judgment patent actions where the venue-choosing plaintiff is not asserting infringement, but rather that the defendant's patents are invalid and/or not infringed by the plaintiff.⁷⁹ For the population of cases I used, I gathered filing date, venue, case number and party names from Lex Machina's online patent litigation analytics database.⁸⁰

To investigate differences in the impact of *TC Heartland* across plaintiff types, I used the plaintiff categorizations in the newly complete Stanford NPE Litigation Database to group lawsuits contained in its 20

78. In future work it would be valuable to investigate the degree to which filing behavior changed before and after other key dates related to *TC Heartland*, particularly the date the Supreme Court granted certiorari, December 14, 2016. It is possible that many patent plaintiffs began to change where they filed suit and how they pled venue in anticipation of how the Supreme Court would rule, once they knew the Supreme Court would decide the case. My sense after reviewing hundreds of complaints for this study, however, is that plaintiff behavior changed significantly in a very narrow window around the actual decision date.

79. *VE Holding*, 917 F.2d at 1583. "It has long been held that a declaratory judgment action alleging that a patent is invalid and not infringed—the mirror image of a suit for patent infringement—is governed by the general venue statutes, not by § 1400(b)." *See* 28 U.S.C. § 2202 (Declaratory Judgment Act). *TC Heartland* did not change this interpretation of venue in declaratory judgment actions so we would not expect these cases to be effected. Nevertheless, future work should investigate where alleged patent infringers choose to file their declaratory judgment actions.

80. Legal Analytics for Patent Litigation, LEX MACHINA, [www.lexmachina.com/patent-litigation/ \[https://perma.cc/UZ3L-ZE84\]](https://perma.cc/UZ3L-ZE84).

percent random sample as brought by PAEs or practicing entities.⁸¹ Within the random sample, there are 1,576 infringement suits filed from one year before through one year after *TC Heartland* and I use these cases in my analysis in sections IV.B. through IV.D.

To determine how *TC Heartland* has changed defendants' connections to the courts where plaintiffs file suit, I collected data on the location of all defendants in each of the cases in the random sample.⁸² Specifically, I reviewed the first complaint in each case and recorded the state of incorporation, principal place of business, and regular and established place of business of each defendant, as asserted by the plaintiff in the pleading.⁸³

These three locations identify proper locations for venue under *TC Heartland*. Under §1400(b), venue is proper either where defendant resides—restricted to a defendant's place of incorporation—or where the “defendant has committed acts of infringement and has a regular and established place of business.”⁸⁴ Alleged regular and established places of business and places of incorporation correspond to the two types of proper venue under §1400(b). Concerning a defendant's principal place of business, recall that when a defendant is incorporated in a state with multiple districts and also possesses its principal place of business in that state, then the defendant is deemed to reside in the judicial district containing the principal place of business.⁸⁵ Further, a principal place of business will generally satisfy the second prong of Section 1400(b).⁸⁶ Reviewing the complaints in the random sample of cases filed post-*TC Heartland*, every complaint identified at least one of these three defendant contacts with the chosen forum.

I next determined the judicial district containing each of the defendant locations.⁸⁷ I then compared the district where the case was

81. NPE Litigation Database, Stanford Law School, [npe.law.stanford.edu \[https://perma.cc/E5FV-78VS\]](https://perma.cc/E5FV-78VS).

82. Hand-collecting this data is time consuming and I gathered defendant geographic information for 1383 of the 1576 lawsuits in the random sample. Thus, the analysis in section IV.D. is of 17.5 percent of the population. This sample size has a margin of error of plus or minus 3 percent at a 95 percent confidence level. The analysis in sections IV.B and IV.C., using the entire 20 percent random sample, has a 2.5 percent margin of error at a 95 percent confidence level.

83. In order to focus on plaintiffs' choice of forum before and after *TC Heartland*, I exclude cases from my analysis in section IV.D. that were transferred from another venue.

84. 28 U.S.C. § 1400(b) (1999).

85. *In re BigCommerce, Inc.*, 890 F.3d 978, 986 (Fed. Cir. 2018).

86. Chien & Risch, *supra* note 3, at 81.

87. To determine the home court of locations in multi-district states, I entered the city and state or the ZIP Code of the defendant in the online court locator maintained by the Administrative Office

filed to the district containing each defendant's place of incorporation, principal office, and/or regular and established place of business. Thus, for all cases I created variables indicating whether or not plaintiff filed suit in and thus selected the judicial district containing:

- Defendants' place of incorporation;
- Defendants' principal place of business; and
- Defendants' regular and established place of business where infringement is alleged to have occurred.⁸⁸

In cases with multiple defendants, I considered a case filed in these three locations if any single defendant was alleged to be so located in the district.

The literature on pharmaceutical patent litigation and the concentration of drug patent cases in just two districts—Delaware and New Jersey⁸⁹—suggests that *TC Heartland* may have had a distinct impact on this type of patent dispute. Accordingly, for each of the cases in the 20 percent random sample, I collected the primary three-digit “U.S. Patent Classification System” class assigned to it by the USPTO⁹⁰ and using this classification information I defined a set of “pharmaceutical” patent disputes.⁹¹ Using my plaintiff categorizations and this technology information in Section IV.D., I separately analyzed changes in defendant connections to selected venue for PAEs, non-pharmaceutical practicing entities, and pharmaceutical practicing entities.

Finally, to investigate the importance of the pro-plaintiff characteristics of a district to a patent plaintiff's choice of venue, I

of the U.S. Courts. Court Locator, United States Courts, <https://www.uscourts.gov/court-locator> [<https://perma.cc/8D5V-FV28>].

88. I removed all lawsuits from my analysis where either all plaintiffs or all defendants are foreign entities. Post *TC Heartland*, the Federal Circuit has held that the decision did not change the rule that infringement lawsuits against only foreign defendants may be filed in any judicial district. *In re HTC Corp.*, 889 F.3d 1349, 1360 (Fed. Cir. 2018), *cert. denied*, 139 S.Ct. 1271 (2019).

89. See *Pharmaceutical Patent Litigation Filings Have Risen Significantly Since 2014 According to Lex Machina's 2015 Hatch-Waxman/ANDA Report*, LEX MACHINA (Apr. 26, 2016) <https://lexmachina.com/media/press/pharmaceutical-patent-litigation-filings-risen-since-2014/> [<https://perma.cc/2XYA-6THW>] (reporting that among 2,249 ANDA cases filed from 2009 through 2015, 911 were filed in Delaware and 725 in New Jersey).

90. See Patent Classification, U.S. Pat. & Trademark Off., <https://www.uspto.gov/patents-application-process/patent-search/classification-standards-and-development> [<https://perma.cc/AC5R-3LW5>].

91. I define “pharmaceutical” patents as those assigned USPC 514 or 424. I also defined, but have not yet used, a set of software patent disputes as those asserting at least one patent assigned to any of the following USPCs: 341, 345, 370, 375, 380, 381, 382, 700–707, 715–717, 726, and 902. James Bessen, *A Generation of Software Patents*, 18 B.U.J. SCI. & TECH. L. 241, 251–52 (2012).

assigned Lemley’s pro-plaintiff district rankings to the district selected in each case. Lemley’s rankings aggregate several characteristics of each of the thirty-three busiest patent districts, including speed of disposition, plaintiff win rates, and percent of cases that go to trial.⁹²

IV. FINDINGS

A. *Changes in Filing After TC Heartland*

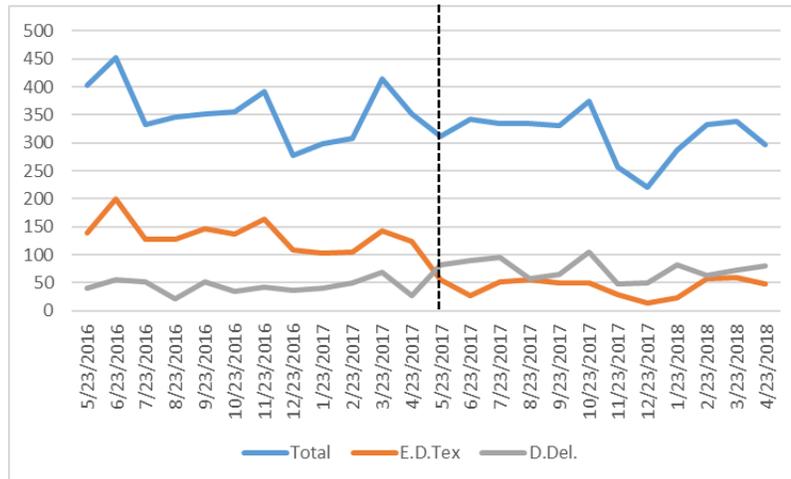
I begin the analysis by investigating how *TC Heartland* impacted district-by-district filings for all cases. Figure 1 graphs total monthly patent infringement lawsuits as well as monthly lawsuits filed in Delaware and the Eastern District of Texas from one year before through one year after *TC Heartland*. For total lawsuits, there is a mild downward trend in filings over this two-year period, which would not be surprising even in the absence of *TC Heartland* given other recent shocks to the patent system that arguably make patent litigation less profitable and more uncertain for plaintiffs.⁹³ These shocks especially include the Supreme Court’s decisions in *Alice Corp. v. CLS Bank International* and the America Invents Act’s (AIA) creation of new and now widely used post-grant administrative procedures to challenge the validity of patents.⁹⁴

92. Lemley, *supra* note 55, at 19–22.

93. The linear trend in monthly filings over the two-year period is 3.8 fewer infringement lawsuits per month. Chi-square test rejects the null hypothesis that monthly infringement lawsuits were not declining ($p = 0.009$).

94. *Alice Corp. Pty. Ltd. v. CLS Bank Intern*, 573 U.S. 208, 223 (2014) (holding that “the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention”) and the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (codified at 28 U.S.C. § 1454; 35 U.S.C. §§ 123, 257, 298–99, 321–29 (2012)). Additionally, in *Octane Fitness, LLC v. ICON Health & Fitness*, the Supreme Court lowered the standard for courts to declare a case “exceptional” under 35 U.S.C. § 285 and award attorneys fees to prevailing parties. 572 U.S. 545, 554–55 (2014) (holding that “an ‘exceptional’ case is simply one that stands out from others with respect to the substantive strength of a party’s litigating position (considering both the governing law and the facts of the case) or the unreasonable manner in which the case was litigated”).

FIGURE 1. MONTHLY PATENT INFRINGEMENT LAWSUIT FILED –
TOTAL AND SELECT DISTRICTS



NOTE—Monthly patent infringement lawsuits filed nationally (“Total”), in the Eastern District of Texas (“E.D.Tex”), and in the District of Delaware (“D.Del.”), from one year before to one year after *TC Heartland* was decided on May 22, 2017. Data from Lex Machina.

Inspection of monthly filings in the two most popular districts, however, suggests that *TC Heartland* has impacted litigation volumes in these two important districts. Filings dropped below trend in the Eastern District of Texas about one month before the Supreme Court’s decision in *TC Heartland* on May 22, 2017—identified by the vertical dashed line in Figure 1—and had not recovered a year later.⁹⁵ Delaware, by contrast and as predicted by Chien and Risch,⁹⁶ had a step up in the monthly volume of lawsuits since the decision that has persisted.⁹⁷

Table 1 reports absolute and percentage changes in filings comparing the year before *TC Heartland* to the year after. It includes national totals and district totals for fourteen courts with the busiest patent dockets over the two years. From the large swings in filings in Table 1, we can conclude that *TC Heartland* probably had an impact on case volume in many

95. From linear regression of the impact of *TC Heartland* on filings in the Eastern District of Texas, there was an average of 92 fewer lawsuits per month post-*TC Heartland*. Chi-square test rejected the null hypothesis that *TC Heartland* did not change the number of monthly filings in the Eastern District of Texas ($p = 0.000$).

96. Chien & Risch, *supra* note 3, at 92–93.

97. In a linear regression of the impact of *TC Heartland* on filings in Delaware, there has been an average of 31 more lawsuits per month post-*TC Heartland*. Chi-square test rejected the null that *TC Heartland* did not change the number of monthly filings in Delaware ($p = 0.000$).

districts.⁹⁸ Again, however, the effect appears clearest and most striking in the Eastern District of Texas, which saw a one-year decline of 68 percent (over 1,100 lawsuits), and Delaware, which had an increase of 72 percent (373 cases).

Other districts with large gains include the Central District of California (30 percent more cases the year after), the Northern District of California (113 percent more cases the year after), the District of New Jersey (30 percent more cases the year after), the Western District of Texas (56 percent more cases the year after), and the Northern District of Texas (122 percent more cases the year after). Besides the Eastern District of Texas, the Southern District of Florida, the District of Massachusetts, and the Middle District of Florida each saw fairly large percentage declines in patent filings (32, 25, and 17 percent fewer than the year before, respectively). Multivariate analysis of the impact of *TC Heartland* on case volume is beyond the scope of this first look at changes in filings after the decision. However, the dramatic year-to-year differences in many of these districts suggest that restricted venue has had an effect.

Further evidence that *TC Heartland* shifted where cases were filed is contained in the last column of Table 1, which includes Lemley's pro-plaintiff district rankings.⁹⁹ Every district that saw a decline in cases post-*TC Heartland* was ranked by Lemley among the top half of the thirty-three districts he studied. Further, two of the districts with the largest gains post-*TC Heartland*—the Northern District of California and the District of New Jersey—are among the least favorable for plaintiffs in Lemley's study. It is intuitive that plaintiffs who previously avoided districts that tended to be less pro-plaintiff would now be forced to file in them since they are home to many patent defendants. Additionally, the fact that Delaware and the Eastern District of Texas—two of the top-five most pro-plaintiff districts—continued to possess the two busiest patent dockets the year after *TC Heartland* indicates both that Lemley's rankings captured plaintiffs' preferences and that even after the decision many plaintiffs continue to be able to select favorable venue.

98. There are a host of reasons why the volume of patent litigation will vary from year to year. For example, national filing rates are influenced by macroeconomic cycles. See, e.g., Alan Marco, Shawn Miller, & Ted Sichelman, *Do Economic Downturns Dampen Patent Litigation?*, 12 J. EMPIRICAL LEGAL STUDY 481 (2015).

99. Lemley, *supra* note 55 at 22–24.

TABLE 1. TOTAL FILINGS ONE YEAR BEFORE AND AFTER *TC HEARTLAND* – BY DISTRICT

District	Total	Before	After	Δ # Cases	% Increase	L8
E.D. Tex.	2147 (27%)	1626 (38%)	521 (14%)	-1105	-68%	5
D. Del.	1416 (18%)	521 (12%)	895 (24%)	374	72%	2
C.D. Cal.	608 (7.6%)	264 (6.2%)	344 (9.2%)	80	30%	12
N.D. Cal.	400 (5.0%)	128 (3.0%)	272 (7.2%)	144	113%	25
D.N.J.	349 (4.3%)	152 (3.6%)	197 (5.2%)	45	30%	29
N.D. Ill.	399 (5.0%)	205 (4.8%)	194 (5.2%)	-11	-5%	15
S.D.N.Y.	201 (2.5%)	89 (2.1%)	112 (3.0%)	23	26%	17
S.D. Fla.	175 (2.2%)	104 (2.4%)	71 (1.9%)	-33	-32%	5
D. Mass.	168 (2.1%)	96 (2.2%)	72 (1.9%)	-24	-25%	14
W.D. Tex.	133 (1.7%)	52 (1.2%)	81 (2.2%)	29	56%	10
S.D. Cal.	131 (1.6%)	69 (1.6%)	62 (1.6%)	-7	-10%	16
M.D. Fla.	130 (1.6%)	71 (1.7%)	59 (1.6%)	-12	-17%	1
N.D. Tex.	116 (1.4%)	36 (0.8%)	80 (2.1%)	44	122%	4
N.D. Ga.	80 (1.0%)	40 (0.9%)	40 (1.1%)	0	0%	28
Total	8036 (100%)	4279 (100%)	3757 (100%)	-522	-12%	

NOTE—Population of 8,036 patent infringement lawsuits filed between May 23, 2016 and May 22, 2018. Data from Lex Machina and Stanford NPE Litigation Database. “L8” indicates outcome adjusted pro-plaintiff ranking of district (with “1” the most pro-plaintiff) according to Lemley (2010).

Further suggesting that the district-by-district changes in Figure 1 were in large part due to *TC Heartland* and not background trends or other shocks, is that the numbers closely track Chien and Risch’s predictions of where cases would have been filed in 2015 had *TC Heartland*’s decision been in effect that year. Table 2 contains the actual and predicted shares of cases in each of the five busiest districts, as reported by Chien and Risch. Comparing their numbers with the actual shares for these districts one year before and one year after *TC Heartland* that are reported in Table 1, we see that Chien and Risch’s predicted 2015 shares are almost identical to the actual shares during the year after *TC Heartland* for three

of the five districts—the Eastern District of Texas, the District of Delaware, and the District of New Jersey. Perhaps surprisingly, the actual post-*TC Heartland* national share for the Central District of California is 50 percent larger than that predicted by Chien and Risch (9.1 versus 6.1 percent). In the next section where I review changes by plaintiff type, we will see that the Central District of California was unique among the districts with the largest patent dockets in that it has seen an increase in practicing entity but not PAE filings during the year after *TC Heartland*.

The Northern District of California is the district with a post-*TC Heartland* litigation share farthest from Chien and Risch's predicted percentage. In fact, its predicted share is nearly twice that of the actual (13 versus 7.2 percent). Chien and Risch also found that the industry most targeted by NPEs is high technology.¹⁰⁰ Of course the Northern District of California is the center of this industry so plaintiffs suing technology defendants there are likely doing so in their targets' backyard. These facts, along with the low pro-plaintiff score of the Northern District of California, suggest many PAEs continue to avoid filing suit in this particular district. I will explore this further in the next section. The key point is that the direction of the predicted change in share in each of these five districts is consistent with the actual changes during the year after *TC Heartland*. Since Chien and Risch's predicted changes were based on the actual defendant locations that constrain plaintiffs under *TC Heartland*, this consistency indicates that restricted venue has impacted filing location.

TABLE 2. 2015 ACTUAL AND PREDICTED MOST POPULAR DISTRICTS

District	2015 Actual	2015 with <i>TC Heartland</i>
E.D. Tex.	44%	14.7%
D. Del.	9%	23.8%
C.D. Cal.	5%	6.1%
N.D. Cal.	4%	13.0%
D.N.J.	5%	5.3%

NOTE—From Chien & Risch (2017), table 7.

100. Chien & Risch, *supra* note 3, at 95. Similarly, Miller found that 85 percent of PAE lawsuits assert patents that cover computer and communications or electrical technology. Miller et al, *supra* note 8, at 265.

B. District-by-District Changes in Filing Due to TC Heartland – by Plaintiff Type

Research suggests that PAEs often assert with the goal of extracting quick “nuisance value” settlement from defendants.¹⁰¹ One way to increase the pressure to settle is to increase litigation costs for defendants by selecting a more expensive venue. Of course, certain local rules, including authorization of early discovery, make it more expensive to litigate in some districts. Another plausible way to drive up costs is to select a more geographically remote district that is less convenient for defendants. Both avenues may explain the appeal of the Eastern District of Texas for PAEs.

By contrast, practicing entities less interested in nuisance value settlements will have a different set of preferences, including in many cases, the desire to restrict competitors’ use of their technology. Such plaintiffs may be less interested in imposing litigation costs and more interested in selecting the most convenient court likely to entertain an injunction. For many practicing entities, that court might frequently be the district nearest its principal place of business.

Thus, there are reasons to believe that *TC Heartland* had different effects on PAEs than practicing entities, and, in this Section, I explore whether that was in fact the case. I utilize the Stanford NPE Litigation Database’s complete 20 percent random sample of cases and define practicing entity cases as any lawsuit with at least one patent asserter categorized as a Category 8 Product Company¹⁰² in the Stanford NPE Litigation Database. I define PAE suits as all cases where all patent asserters are Category 1 Acquired Patents,¹⁰³ Category 4 Corporate Heritage,¹⁰⁴ and/or Category 5 Individual-Inventor-Started Companies.¹⁰⁵

101. Lemley & Melamed, *supra* note 11, at 2170. *See also* Federal Trade Commission, *supra* note 14 (finding that litigating PAEs sign licenses that are “less than the lower bounds of early stage litigation costs,” a finding “consistent with nuisance litigation rather than the likelihood of their infringement.”)

102. Miller et al., *supra* note 8, at 245 (“Category 8 product companies manufacture products, sell products, or deliver services (unrelated to patent enforcement)”).

103. *Id.* at 244 (“Category 1 includes any NPE primarily in the business of asserting patents it has acquired from other entities”).

104. *Id.* (“Category 5 is comprised of firms primarily in the business of asserting patents, where the original inventor of the patents is the founder and/or owner of the NPE”).

105. *Id.* at 246 (“Category 4 ‘corporate heritage’ entities are firms that were successful producers for a sustained period of years but then transitioned to a PAE business model”).

In Figure 2, I graph annual patent lawsuits as well as PAE and practicing entity patent lawsuits each year from 2008 through 2018.¹⁰⁶ Around 2011, we see the large increase in PAE filings and the smaller increase in practicing entity filings caused by the AIA's amendment of the joinder rule in patent litigation.¹⁰⁷ The reason for the disparate impact of the AIA on PAE versus practicing entity filings was the practice of many PAEs and relatively few practicing entities of joining many unaffiliated alleged infringers together in a single lawsuit.¹⁰⁸

Figure 2 also reveals a crater in PAE filings in the Eastern District of Texas centered around the *Alice* decision.¹⁰⁹ During the three years leading up to *TC Heartland*, PAE suits appear to have been trending down while practicing entity litigation has been much more stable throughout the plotted eleven-year period. During the year after *TC Heartland*, PAE filings have flattened while practicing entity lawsuits have actually increased.

Zooming in, how do filings the year before *TC Heartland* compare with filings one year after? Figure 3 plots monthly lawsuits—again in the 20 percent random sample—separately for PAEs and practicing entities. From Figure 3 it appears that filings dipped for both PAEs and practicing entities one to two months before *TC Heartland*, probably in part due to uncertainty. Overall, there was a decline in PAE lawsuits over the entire two-year period, while practicing entity filings were relatively stable. In fact, over the two years centered on *TC Heartland*, the linear trend in PAE filings declined from about 200 lawsuits per month at the beginning of the period to about 120 lawsuits per month at the end of the period.¹¹⁰ By contrast, the linear trend in practicing entity lawsuits was statistically unchanged from about 145 cases a month to 155 cases per month.¹¹¹ It

106. The average percent of annual lawsuits filed in the last six months of each year during the past decade is about 60 percent. Accordingly, I estimate that 50 percent more lawsuits will be filed during the second half of 2018 than were filed during the first half for which I gathered actual filings.

107. The Leahy-Smith America Invents Act provides that joinder of accused infringers is permitted only where the claims against the defendants arise out of “the same transaction, occurrence, or series of transactions, or occurrences relating to the making, using, importing into the United States, offering for sale, or selling of the *same accused product or process* and questions of fact common to all defendants or counterclaim defendants will arise in the action.” 35 U.S.C. § 299(a)(1)-(2) (emphasis added). See Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (codified at 28 U.S.C. § 1454; 35 U.S.C. §§ 123, 257, 298–99, 321–29 (2012)). Accused infringers may *not* be joined “based solely on allegations that they each have infringed the patent or patents in suit.” 35 U.S.C. § 299(a)(2) (2011).

108. See, e.g., Miller et al., *supra* note 8, at 256.

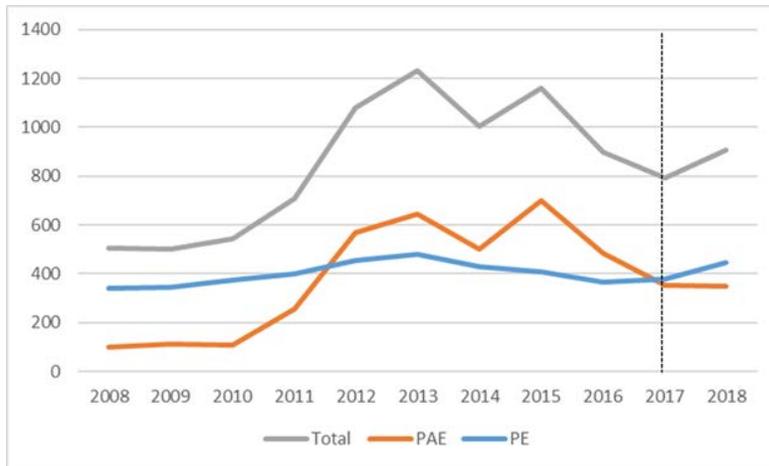
109. See *Alice Corp. Pty. Ltd. v. CLS Bank Intern*, 573 U.S. 208, 223 (2014).

110. $p = 0.006$

111. $p = 0.782$

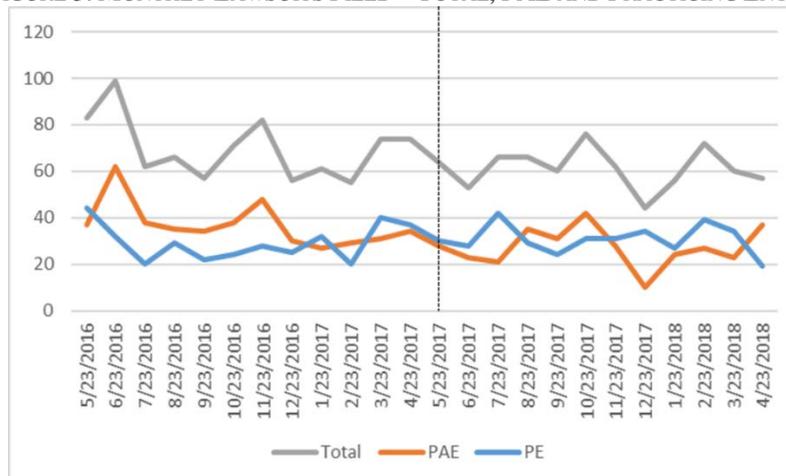
would seem that PAEs have been much more affected by the major legal changes of the last eight years, including not only the AIA and *Alice* but also *TC Heartland*.

FIGURE 2. ANNUAL LAWSUITS FILED – TOTAL, PAE AND PRACTICING ENTITY



NOTE—Stanford NPE Litigation Database random sample of 20 percent of all lawsuits filed. 2018 totals projected from actual filings during the first half of the year plus the trend over the last five years of approximately 60 percent of cases filed during the second half of the calendar year.

FIGURE 3. MONTHLY LAWSUITS FILED – TOTAL, PAE AND PRACTICING ENTITY



NOTE—Data from Stanford NPE Litigation Database random sample of 20 percent of all lawsuits filed.

What about district-by-district changes in filings broken down by PAE and practicing entity lawsuits? Table 3 reports changes in the percentage and number of cases nationally and in key districts filed by PAEs and practicing entities. Nationally, we see that in the year before *TC Heartland*, 42 percent of infringement lawsuits were practicing entity cases and 50 percent were PAE cases. In contrast, PAE suits declined from nearly 53 percent of all cases to less than 45 percent. This swapping in the percentage mix of patent litigation was largely due to the decrease in PAE suits, down 25 percent from the year before *TC Heartland*. In contrast, there were 4 percent more practicing entity lawsuits filed the year after *TC Heartland* than during the year before the decision.

Turning to the district-by-district data in Table 3, and comparing percentages with the national totals, we see that the change in filings was highly variable across key districts for practicing entities versus PAEs. In the Eastern District of Texas, the number of practicing entity lawsuits was almost unchanged the year after *TC Heartland*. In contrast, there was almost twice the loss in the number of PAE suits in the Eastern District as there was nationally (-209 versus -114 cases in the sample). The amount of PAE litigation in the Eastern District of Texas the year after *TC Heartland* was decided is a mere 28 percent of what it was the year before.

By contrast, Delaware saw a large increase in both PAE and practicing entity litigation during the year after *TC Heartland*—a 75 percent increase for practicing entities and a nearly 300 percent increase

for PAEs. Thus, with fewer venue options, both types of plaintiffs have frequently preferred Delaware to the alternatives. Similarly, the volume of both PAE and practicing entity litigation increased in the Northern District of California, although the absolute gains were only about a quarter of what they were in Delaware. Combined with my earlier discussion that fewer cases have been filed in the Northern District of California than Chien and Risch predicted, it seems likely that many plaintiffs continue to avoid that district.

Among other districts with busy patent dockets, the Central District of California was unique in that it saw a large increase in practicing entity litigation, but no change in the amount of PAE litigation. In the Northern District of Illinois, practicing entity litigation was at the same level post-*TC Heartland*, while PAE litigation declined. In New Jersey, practicing entity litigation was also stable, but PAE litigation actually increased. Finally, neither the PAE nor the practicing entity share of litigation changed substantially in Massachusetts.

TABLE 3. TOTAL FILINGS ONE YEAR BEFORE AND AFTER *TC HEARTLAND* – BY DISTRICT

Court	Group	Total	Before	After
All				
	Practicing	45.7% (721)	42.0% (353)	50.0% (368)
	PAE	49.0% (772)	52.7% (443)	44.7% (329)
	Total	1576	840	736
E.D. Tex.				
5	Practicing	8.3% (35)	5.7% (18)	16.0% (17)
	PAE	87.9% (371)	91.8% (290)	76.4% (81)
	Total	422	316	106
D. Del.				
2	Practicing	50.8% (124)	60.0% (45)	46.7% (79)
	PAE	46.7% (114)	38.7% (29)	50.3% (85)
	Total	244	75	169
N.D. Cal.				
25	Practicing	48.4% (30)	43.5% (10)	51.3% (20)
	PAE	37.1% (23)	21.7% (5)	46.2% (18)
	Total	62	23	39
C.D. Cal.				
12	Practicing	64.8% (81)	52.8% (28)	73.6% (53)
	PAE	26.4% (33)	32.1% (17)	22.2% (16)
	Total	125	53	72
N.D. Ill.				

15	Practicing	30.6% (22)	26.2% (11)	36.7% (11)
	PAE	61.1% (44)	66.7% (28)	53.3% (16)
	Total	72	42	30
D.N.J.				
29	Practicing	81.4% (70)	89.2% (33)	75.5% (37)
	PAE	15.1% (13)	10.8% (4)	18.4% (9)
	Total	86	37	49
D. Mass.				
14	Practicing	60.0% (15)	53.8% (7)	66.7% (8)
	PAE	36.0% (9)	38.5% (5)	33.3% (4)
	Total	25	13	12

NOTE—Data from Stanford NPE Litigation Database random sample of 20 percent of all lawsuits filed. Percentage of cases in a district brought by PAEs and Practicing entities do not add to 100 percent because there are other types of patent plaintiffs (e.g., universities and individual inventors). The number below each court indicates the outcome adjusted pro-plaintiff ranking of the district (with “1” the most pro-plaintiff) according to Lemley (2010).

These differences in the relative changes in practicing entity and PAE litigation among populous districts containing the headquarters of many potential corporate infringers suggests that some, including the Northern District of Illinois, have been more attractive to PAEs, such that they have been suing entities without a significant business presence in the district. Thus, while nearly 92 percent of litigation in the Eastern District of Texas was PAE litigation during the year before *TC Heartland*, the same was true of two thirds of litigation in the Northern District of Illinois. By contrast, before *TC Heartland*, PAE litigation comprised no more than 39 percent of patent cases in the remaining districts in Table 3.

In Table 4, we see that the Southern District of Florida, including Miami, was something of a miniature Eastern District of Texas before *TC Heartland*, with over 70 percent of suits brought by PAEs. Like the Eastern District of Texas, the Southern District of Florida also possesses a top-five ranking in Lemley’s list of the most plaintiff friendly districts.¹¹² Table 4 shows changes in litigation in districts neighboring these two districts that I believe reveals evidence that patent plaintiffs prefer to litigate close to home. The Middle District of Florida, the Northern District of Texas, and the Western District of Texas each saw large percent increases in PAE litigation post-*TC Heartland*. Interestingly,

112. Lemley, *supra* note 55, at 20–22.

each of these neighboring districts also earned a top-10 ranking in Lemley's compilation of plaintiff-friendly districts.¹¹³

TABLE 4. TOTAL FILINGS ONE YEAR BEFORE AND AFTER *TC HEARTLAND* – BY DISTRICT

Court	Group	Total	Before	After
S.D. Fla.	Practicing	36.8% (14)	23.5% (4)	47.6% (10)
5	PAE	55.3% (21)	70.6% (12)	42.9% (9)
		38	17	21
M.D. Fla.	Practicing	40.6% (13)	52.6% (10)	23.1% (3)
1	PAE	46.9% (15)	31.6% (6)	69.2% (9)
		32	19	13
E.D. Tex.				
5	Practicing	8.3% (35)	5.7% (18)	16.0% (17)
	PAE	87.9% (371)	91.8% (290)	76.4% (81)
		422	316	106
N.D. Tex.	Practicing	44.4% (12)	66.7% (8)	26.7% (4)
4	PAE	51.9% (14)	25.0% (3)	73.3% (11)
		27	12	15
W.D. Tex.	Practicing	36.7% (11)	66.7% (6)	23.8% (5)
10	PAE	56.7% (17)	33.3% (3)	66.7% (14)
		30	9	21

NOTE—Data from Stanford NPE Litigation Database random sample of 20 percent of all lawsuits filed. The number below each court indicates the outcome adjusted pro-plaintiff ranking of the district (with “1” the most pro-plaintiff) according to Lemley (2010).

C. Changes in the Volume of Filing Due to *TC Heartland*

Table 1 in Section IV.A. revealed that there were eleven-hundred fewer cases filed in the Eastern District of Texas during the year after *TC Heartland* compared to the year before, but nationally only about five hundred fewer lawsuits. This suggests that hundreds of plaintiffs who would have filed suit in the Eastern District of Texas after *TC Heartland* chose not to because of the new restrictions on venue. In Figure 4, generated from Lex Machina filing data going back four years before *TC Heartland*, we see that filings in the Eastern District of Texas declined by about five hundred cases two years before *TC Heartland*. This suggests

113. *Id.*

that Eastern District of Texas filings were already decreasing by about the same annual rate as the national loss one year after *TC Heartland*.

Further, there are convincing reasons why we might think that the net national loss of five hundred cases from one year before to one year after *TC Heartland* is not due to the decision but to other changes in patent law. *Alice Corp. v. CLS Bank International* was decided in June 2014 and in it the Supreme Court restricted the types of software and electronic business methods that are patentable.¹¹⁴ Many commentators suggested that the software patents often asserted by PAEs, who also make up the bulk of filers in the Eastern District of Texas, are the type most impacted by *Alice*.¹¹⁵ Accordingly, much of the post-*TC Heartland* drop in case volume in the Eastern District of Texas that is not accounted for by increases in other districts may be an ongoing *Alice* effect. Alternately or concurrently, it may be a Patent Trial and Appeal Board (“PTAB”) effect, as it is likely that post-grant review proceedings before the PTAB have had a disproportionate impact on the kinds of cases typically filed in the Eastern District of Texas.¹¹⁶

Despite the plausibility of these two recent legal changes causing continuing declines in filings in the Eastern District of Texas, there is one more change, which when considered, suggests that filings in that district did not decline much from *Alice* until *TC Heartland*. On December 1, 2015, the Judicial Conference of the United States eliminated Form 18, and one day before, on November 30, 2015, PAEs set a record by filing 196 new cases in the Eastern District of Texas, presumably to take advantage of the last day that bare-bones pleading would be acceptable.¹¹⁷ In fact, PAEs filed over 500 cases in the Eastern District of Texas during November 2015, over 300 more than the monthly average during the first

114. 573 U.S. 208, 223 (2014). (holding that “the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention.”).

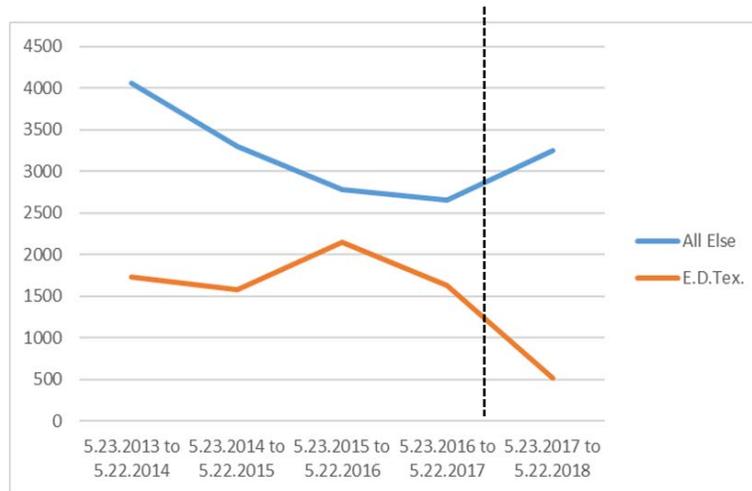
115. See Klint Finley, *Supreme Court Deals Major Blow to Patent Trolls*, WIRED (June 19, 2014), <https://www.wired.com/2014/06/supreme-court-deals-major-blow-to-patent-trolls/> [<https://perma.cc/966Q-F7QJ>]; Julie Samuels, *Patent Trolls Are Mortally Wounded*, SLATE (June 20, 2014), http://www.slate.com/articles/technology/future_tense/2014/06/alice_v_cls_bank_supreme_court_gets_software_patent_ruling_right.html [<https://perma.cc/2S8K-F8YV>] (“So now we’re living in a world where fewer bad software patents will be granted, and the patent troll arsenal will be a little lighter.”).

116. See Brian Love, Shawn P. Miller & Shawn Ambwani, *Determinants of Patent Quality: Evidence from Inter Partes Review Proceedings*, 90 U. COL. L. REV. 67, 132 & 144 (2019) (reporting that 31 percent of patents subject to an inter partes review institution decision on the merits have been PAE owned and 54 percent cover information technology).

117. See Jeff John Roberts, *Patent Lawsuits Set One-Day Record with 257 New Cases, Most Filed in Texas*, FORTUNE (December 2, 2015), <http://fortune.com/2015/12/02/patent-lawsuit-record/> [<https://perma.cc/HB4H-Y9TZ>].

10 months of that year. If Form 18 had not been eliminated, then presumably almost all of these cases would have been filed in 2016. This spike in filings has no other explanation than as a race to try to apply the older, more permissive pleading standard to the disputes these PAEs had in their pipeline. If these cases had been spread out over the following months, then most of the apparent decline in cases from two years before *TC Heartland* to one year before—roughly from late 2015 through early 2017—disappears.

FIGURE 4. ANNUAL LAWSUIT FILED – E.D. TEXAS VS. ALL OTHER DISTRICTS



NOTE— From four years before to one year after *TC Heartland* was decided on May 22, 2017. Data from Lex Machina.

With relatively stable trends in filings in the Eastern District of Texas pre-*TC Heartland*, I calculate rough estimates of the volume of litigation lost during the first year post-*TC Heartland* because of that decision. I provide such estimates through segmented linear regression analysis, investigating the statistical impact of *TC Heartland* on both total monthly and alternately monthly PAE filings comparing three years before *TC Heartland* with the first year after the opinion was published.¹¹⁸

Table 5 contains two specifications, the first for total lawsuits and the second for PAE lawsuits that are a part of the Stanford NPE Litigation Database's completed 20 percent random sample. Note first that the lack

118. For a detailed explanation of segmented regression analysis, and how it is used to measure the impact of policy changes over time, see Anita K. Wagner, S.B. Soumerai, F. Zhang & D. Ross-Degnan, *Segmented regression analysis of interrupted time series studies in medication use research*, 27 J. CLINI. PHARM. THER. 299 (2002).

of significance on the linear trend variables in both specifications means that we cannot reject the possibility that the trend in filings both before and after *TC Heartland* was absolutely flat—neither increasing nor decreasing. Regarding total lawsuits in the first specification, we interpret the coefficients on the first two variables as indicating that the mean monthly volume of lawsuits decreased from 358 right before *TC Heartland* to 330 right after the decision. This drop of 27 cases per month, with fairly flat trends both before and after *TC Heartland*, corresponds to 324 fewer cases filed nationally the year after *TC Heartland* than would have been the case had the level and trend remained as they were during the three years before the decision.¹¹⁹ However, with the small number of observations in these regressions, we cannot reject the null hypothesis that the difference between the two means just before and just after *TC Heartland* is zero ($p = 0.630$).

In section IV.B., above, I reported that the number of practicing entity lawsuits was flat from the year before to the year after *TC Heartland*. Thus, using the population of lawsuits filed, the first specification can serve as one estimate of the number of PAE lawsuits that were not filed the year after *TC Heartland* due to the decision—about 300.

Turning to the second specification, the mean monthly number of PAE lawsuits in the 20 percent sample decreased from about 40 just before to about 27 just after *TC Heartland*. This is about 65 fewer PAE lawsuits filed per month, assuming that the share of lawsuits in the population that are PAE lawsuits is the same as that in the sample. Again, assuming a flat trend in PAE filings both before and after the decision, this corresponds to 780 fewer PAE cases filed the year after *TC Heartland* than would have been had the level of lawsuits remained as it was during the three years before the decision.¹²⁰ Again, however, we cannot reject the null of no effect ($p = 0.284$).

These are rough estimates of the impact of *TC Heartland* on the volume of lawsuits filed that do not account for many other factors that could explain the apparent decline in lawsuits. Nevertheless, all the evidence suggests that at least several hundred, and perhaps over seven hundred, fewer cases were filed the year after than would have been and that most of these lawsuits were PAE lawsuits that would have been filed in the Eastern District of Texas.

119. Twenty-seven cases per month multiplied by 12 months equals 324 cases during the year post-*TC Heartland*.

120. 27 cases per month fewer in 20 percent random sample times 12 months in the year times 5 to scale the sample to the population.

TABLE 5. PIECEWISE REGRESSION OF IMPACT OF *TC HEARTLAND* ON MONTHLY FILINGS

	Total Monthly Filings	Total Monthly PAE Filings
Predicted mean just before <i>TC Heartland</i>	357.6*** (29.0)	39.9*** (6.2)
Predicted mean just after <i>TC Heartland</i>	330.3*** (48.2)	27.2*** (10.0)
Linear trend before <i>TC Heartland</i>	-1.85 (1.42)	-0.16 (0.39)
Linear trend after <i>TC Heartland</i>	-3.11 (7.43)	0.03 (1.54)
R-squared	0.16	0.13
Observations	48	48

NOTE—“Total Monthly Filings” includes the population of 17,795 patent infringement lawsuits filed from three years before through one year after *TC Heartland*. “Total Monthly PAE Filings” includes the Stanford NPE Litigation Database’s 20 percent random sample of 1,868 PAE lawsuits filed from three years before through one year after *TC Heartland*. Robust standard errors included in parenthesis. * $p < 0.10$; ** $p < 0.05$; and *** $p < 0.01$.

Supporting this conclusion, I make a third estimate by directly comparing the total number of PAE lawsuits in my sample filed the year before *TC Heartland* with that total during the year after the decision. There were 440 PAE lawsuits in my sample the year before and 330 the year after, for a decline of about 110 in the sample. Scaling up, we have 550 fewer PAE lawsuits the year after the decision, which is right between the other two estimates. The higher and lower estimates I derive from the regressions in Table 5 correspond to between 14 and 33 percent fewer PAE cases filed the year after *TC Heartland* than would have been the case had the decision not occurred. Thus, it appears that a sizeable share of PAEs (but not practicing entities) declined to litigate in the aftermath of the Supreme Court’s restriction of venue. It does remain to be seen whether many of these lawsuits will eventually be filed as plaintiffs become more comfortable with the new standard.

D. Impact of TC Heartland on the Basis for Venue

We have seen that *TC Heartland* has had a major effect on the districts where patent cases are filed, that the national and district-by-district impacts vary by patentee type, and that it is likely that at least several hundred PAE lawsuits were not filed during the year after *TC Heartland* because of the decision. How much has restricted venue changed where cases are filed in terms of the types of defendant contacts with the forum? Related, how often did patent plaintiffs file suit in a proper venue under the rule in *TC Heartland*, both before and after that decision?

In this section I investigate these questions and ultimately show that the answers to these questions shed light on my earlier findings. I first share the numbers for all cases in the random sample and then investigate how the results vary across three different types of patent plaintiffs—PAEs, non-pharmaceutical practicing entities, and pharmaceutical practicing entities. I investigate the two categories of practicing entity litigation separately because the concentration of drug patent lawsuits in two districts—Delaware and New Jersey¹²¹—suggests that pharmaceutical plaintiffs, like PAEs, strongly prefer certain districts and thus may have been more affected by *TC Heartland*.

As described in Part III, to complete this analysis I determine from the initial complaint in each of the cases in my sample whether or not venue was based on:

1. A defendant allegedly incorporated in the judicial district;
2. A defendant allegedly possessing its principal place of business in the district;
3. A defendant allegedly possessing a regular and established place of business in the district; or
4. Another justification that does not fit any of the first three categories.

The first basis is synonymous with “resides” in the first prong of Section 1400(b), as defined by the Supreme Court in *TC Heartland*. The second either identifies the correct judicial district in a multidistrict state under

121. *Pharmaceutical Patent Litigation Filings Have Risen Significantly Since 2014 According to Lex Machina’s 2015 Hatch-Waxman/ANDA Report*, LEX MACHINA (Apr. 26, 2016), <https://lexmachina.com/media/press/pharmaceuticalpatent-litigation-filings-risen-since-2014/> [<https://perma.cc/F59B-TLQD>] (reporting that among 2,249 ANDA cases filed from 2009 through 2015, 911 were filed in Delaware and 725 in New Jersey.)

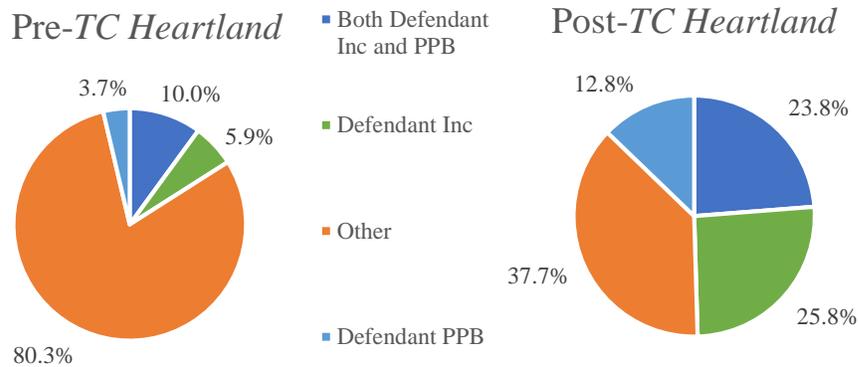
the first prong or is argued by plaintiffs to be a regular and established place of business.¹²² The third basis is the second prong of Section 1400(b). As I will report, the fourth was widely used pre-*TC Heartland* and almost always consists of plaintiffs alleging minimum contacts that meet the requirements for personal jurisdiction, as was sufficient for venue before the decision. As I report below, *TC Heartland* has dramatically changed the share of patent infringement suits filed in each of these categories of locations.

1. All Cases

Figure 5 charts the percentage of cases the year before and the year after *TC Heartland* that fit into the categories defined above. Considering all cases in the sample, we see that before *TC Heartland*, when venue was permissive, a mere 16 percent of cases were filed where a defendant is incorporated and under 14 percent of cases were filed where a defendant has its principal place of business. Ten percent of all cases were filed in districts containing both of these defendant connections.

Overall, 80 percent of all cases (568 of 707) were filed in a district containing neither a defendant's place of incorporation nor a defendant's principal place of business. About one third of these cases (212 of 568) did allege that the district contains a defendant's regular and established place of business where infringement occurred. These cases would satisfy the rule in *TC Heartland*, despite not being filed where a defendant resides. However, the remaining two thirds of these cases (356 of 568), which comprise just over one half of all cases pre-*TC Heartland* (356 of 707), alleged only that defendants possessed sufficient contacts with the district such that personal jurisdiction and thus venue under the first prong of 1400(b) were met.

122. See Chien and Risch, *supra* note 3, at 81 (stating that the principal place of business "would satisfy the second prong of Section 1400(b) in any event.").

FIGURE 5. VENUE JUSTIFICATION BEFORE AND AFTER *TC HEARTLAND*

NOTE—Pre-*TC Heartland* data includes random sample of 707 infringement suits filed before *TC Heartland* and excludes cases exclusively against foreign defendants. Post-*TC Heartland* data includes random sample of 547 infringement suits filed after *TC Heartland* and excludes cases exclusively against foreign defendants. Green indicates the percent of cases filed in a defendant's place of incorporation. Light blue indicates the percent of cases filed in a district containing a defendant's principal place of business. Dark blue indicates the percent of cases filed in a district that is both a defendant's place of incorporation and one containing a defendant's principal place of business. Orange indicates the percent of cases not in one of the other three categories.

Turning to cases filed during the year after *TC Heartland*, we see that the percent of cases filed in a defendant's place of incorporation exploded from 15.9 to 49.6 percent of all cases, with 23.8 percent of all cases containing both a defendant's principal place of business and place of incorporation. The allegations in these cases meet the new interpretation of resides in the first prong of section 1400(b). Another 12.8 percent of cases were filed in a district containing a defendant's principal place of business, but not its place of incorporation. Ninety percent of these cases (63 of 70) allege that that principal place of business constitutes a regular and established place of business (or appear to assume it does) by combining principal place of business with an allegation of acts of infringement in the district. These allegations are meant to satisfy the second prong of venue under Section 1400(b).

At 37.7 percent, the share of cases filed in a district containing neither a defendant's principal place of business nor its place of incorporation was over 50 percent less than the year before *TC Heartland*.

Further, demonstrating how quickly plaintiff attorneys adapted to the pleading standards, over 90 percent of these cases (187 of 206) allege that the district where the case was filed possesses a defendant's regular and established place of business where infringement occurred. Most of the cases lacking this language were filed shortly after *TC Heartland* and continue to use the old standard of venue being proper because the court possesses personal jurisdiction over the defendants.

Another way to slice this data is to say that post-*TC Heartland*, about one half of cases base venue on the first prong of Section 1400(b) and about one half only base venue on the second prong. By contrast, during the year before *TC Heartland*, less than 16 percent of cases were filed in a district that would be proper venue under the first prong of Section 1400(b) according to *TC Heartland*'s restricted definition of resides. Further, only about another 33 percent of cases contain allegations sufficient to meet the second prong of proper venue. This creates a ceiling of about 50 percent of all cases filed during the year before *TC Heartland* that were filed in an improper venue under the stricter venue standard. This and the dramatic change in the percent of cases filed in leading districts in Section IV.A. show the significant impact *TC Heartland* has had on where patent infringement suits can be and have been filed.

2. PAEs

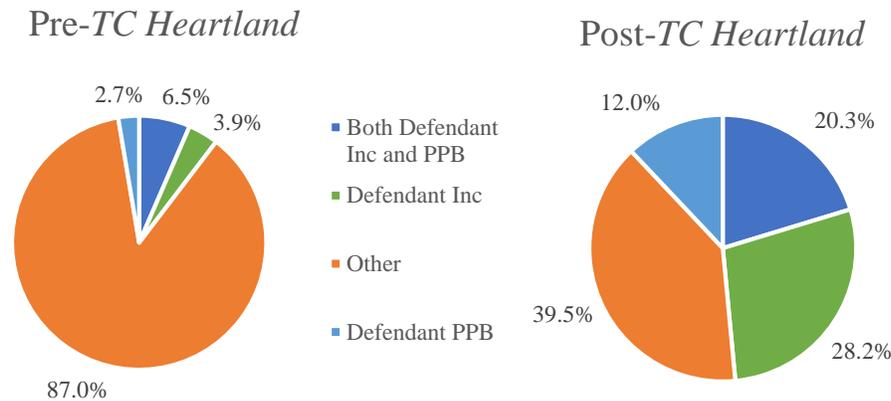
How has *TC Heartland* impacted where PAEs file their lawsuits, in terms of the defendants' ties to the geographic coverage of the district court? Figure 6 replicates Figure 5 for those lawsuits in the sample brought by PAEs. In it, we see that before *TC Heartland*, 87 percent of all cases were brought in districts neither containing a defendant's place of incorporation nor a defendant's principal place of business. This is 7 percent higher than the share for all cases. Additionally, PAEs filed a smaller share of cases in each of the remaining three categories.

Among the bulk of cases filed away from both defendant's principal place of business and place of incorporation, again about one third (116 of 361) alleged that the district contains a defendant's regular and established place of business. Thus, as many as 59 percent of cases (245 of 415) brought by PAEs before *TC Heartland* contain allegations that no longer meet the standard for proper venue. That share is about 10 percent more than for all cases indicating that PAEs did in fact take greater advantage of permissive venue.

For the year after *TC Heartland*, the shares of cases in Figure 6 are very similar to those in Figure 5, with a slightly higher percent of cases

filed in two categories: 1) Where a defendant is incorporated but does not contain its principal place of business; and 2) Where no defendant is incorporated or has its principal place of business. In almost all of the cases fitting the second category (100 of 105), plaintiffs alleged the district meets the second prong of Section 1400(b). Thus, in just under half of post-*TC Heartland* cases, PAEs rely on the first prong of Section 1400(b); in just over half they rely only on the second prong. This breakdown is essentially identical to the fifty-fifty split for all cases.

FIGURE 6. PAE VENUE JUSTIFICATION BEFORE AND AFTER *TC HEARTLAND*



NOTE— Pre-*TC Heartland* data includes random sample of 415 infringement suits filed before *TC Heartland* and excludes cases exclusively against foreign defendants. Post-*TC Heartland* data includes random sample of 266 infringement suits filed after *TC Heartland* and excludes cases exclusively against foreign defendants. Green indicates the percent of cases filed in a defendant’s place of incorporation. Light blue indicates the percent of cases filed in a district containing a defendant’s principal place of business. Dark blue indicates the percent of cases filed in a district that is both a defendant’s place of incorporation and one containing a defendant’s principal place of business. Orange indicates the percent of cases not in one of the other three categories.

Which districts are the most popular defendant places of incorporation and regular and established places of business for PAEs? In

Part IV.B., we saw that the Eastern District of Texas and Delaware remain popular choices for PAEs post-*TC Heartland*. Here we see the changing justification for venue in cases filed in these two districts.

During the year before *TC Heartland*, over 55 percent of PAE cases were filed in the Eastern District of Texas (232 of 415). By contrast, during the year after the decision, only 27 percent of PAE cases (73 of 266) were filed there. In Table 6, we see that only six PAE cases filed in the Eastern District of Texas before the decision and only five PAE cases filed the year after were against a defendant with a place of incorporation in that district. Thus, PAEs are rarely able to base venue in the Eastern District of Texas on the first prong of Section 1400(b) as defined by the Supreme Court in *TC Heartland*. Accordingly, PAEs have had to rely on the second prong and have done so in an increasing share but decreasing number of cases. Pre-*TC Heartland*, PAEs alleged that a defendant had either a regular and established place of business or its principal place of business in in the Eastern District of Texas in under half of their lawsuits (101 of 232). Post-*TC Heartland*, that share increased to a whopping 96 percent of cases (70 of 73). Thus, PAEs suing in the Eastern District of Texas post-*TC Heartland* overwhelmingly base venue on the second prong of section 1400(b). However, the dramatic decrease in PAE lawsuits in the Eastern District of Texas indicate that this type of patent plaintiff has been unable to do so in as many cases as under the old interpretation of resides.

Within the random sample, 28 percent of PAE cases filed after *TC Heartland* are filed in Delaware, compared with 5.5 percent the year before. While the 27 percent of PAE cases filed in the Eastern District post-*TC Heartland* overwhelmingly rely on the second prong of Section 1400(b), those filed in Delaware rely on defendants' corporate residence and thus the first prong of the statute. In fact, post-*TC Heartland*, 97 percent of PAE cases filed in Delaware (72 of 74) are filed against a defendant incorporated there.

TABLE 6. PAE VENUE JUSTIFICATION BEFORE AND AFTER *TC HEARTLAND*
 – EASTERN DISTRICT OF TEXAS AND DELAWARE

	Pre- <i>TC Heartland</i>	Post- <i>TC Heartland</i>
E.D. Texas		
Defendant Inc and PPB	2.2% (5)	5.5% (4)
Defendant Inc	0.4% (1)	1.4% (1)
Defendant PPB	2.6% (6)	5.5% (4)
Other (REPB)	94.8% (220)	87.7% (64)
Delaware		
Defendant Inc and PPB	0.0% (0)	1.4% (1)
Defendant Inc	56.5% (13)	95.9% (71)
Defendant PPB	0.0% (0)	0.0% (0)
Other (REPB)	43.5% (10)	2.7% (2)

NOTE—Among random sample of 415 PAE infringement suits filed one year before *TC Heartland* and 266 PAE infringement suits filed one year after *TC Heartland*. Excludes cases without a choice of venue revealed in the complaint and cases exclusively against foreign defendants.

3. Non-Pharmaceutical Practicing Entity Plaintiffs

Turning to practicing entities, I begin with non-pharmaceutical litigation. In Figure 7, we see that before *TC Heartland*, 77.8 percent of all cases were brought in districts that neither contained a defendant's place of incorporation nor a defendant's principal place of business. This is nearly 10 percent lower than the share for PAE cases. Additionally, non-pharmaceutical practicing entities filed a larger share of cases in districts alleged to contain both a defendant's place of incorporation and a principal place of business than did PAEs. Undoubtedly, one reason for this difference is that a significant share of these cases are between competitors based in the same geographic region. Within the data, such cases include: Competing skin care firms—one located in Canoga Park, California and the other in Los Angeles—litigating in the Central District

of California; and two Houston-based drilling companies litigating in the Southern District of Texas.¹²³

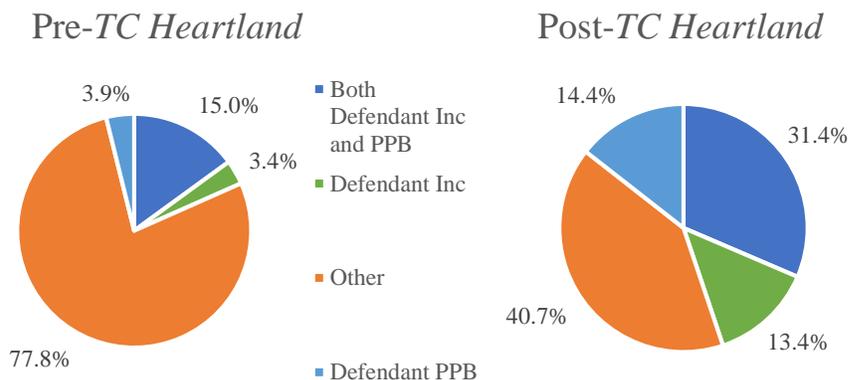
Despite the fact that practicing entities took less advantage of permissive venue pre-*TC Heartland* than PAEs, they still did so over half of the time they filed suit. Among the 77.8 percent of cases filed away from both defendants' principal place of business and place of incorporation, only 22 percent of the complaints (35 of 161) alleged that the district contained a defendant's regular and established place of business. Thus, as much as 61 percent of cases (126 of 207) brought by non-pharmaceutical practicing entities before *TC Heartland* contained allegations insufficient to meet the new standard for proper venue. Somewhat surprising, given conventional wisdom that PAEs have been the most aggressive forum shoppers, that ceiling is indistinguishable from the 59 percent share of PAEs.

For the year after *TC Heartland*, the share of cases in Figure 7 in the "Other" category is nearly identical to that of PAEs in Figure 6 (40.7 and 39.5 percent, respectively). Further, the share of cases filed where a defendant is incorporated are similar—48.5 percent for PAEs and 44.8 percent for practicing entities. The major difference is that the share of cases filed in a defendant's principal place of business is higher for practicing entities than PAEs (45.8 versus 32.3 percent). This again may be explained by litigation between competitors where both plaintiffs and defendants are based in the same state or the same metropolitan area.

While PAE lawsuits have been evenly split between reliance on the first and second prong of Section 1400(b) post-*TC Heartland*, practicing entities appear more likely to rely on the second prong as they filed just over 55 percent of cases away from defendants' place of incorporation during the year after the decision.

123. Complaint, *Belava LLC v. SkinAct et. al.*, 2:16-cv-07354-CBM-JEM (C.D. Cal. Sept. 26, 2016) and Complaint, *Baker Hughes Oilfield Operations LLC v. Bubbletight, LLC*, 4:16-cv-0152 (S.D. Tex. May 31, 2016). The cases filed after *TC Heartland* in both parties' home district include competing swimming pool products firms—one from Ventura and another from Riverside—litigating in the Central District of California and in another two Bay Area technology companies litigating in the Northern District of California. Second Amended Complaint, *Aquastar Pool Products, Inc. v. Color Match Pool Fittings, Inc. et al.*, 5:18-CV-00094-JGB-SPx (C.D. Cal. Mar. 15, 2019) and Amended Complaint, *Symantec Corporation v. Zscaler, Inc.*, No. 3:17-CV-04426-JST (N.D. Cal. Jan. 8, 2018).

FIGURE 7. NON-PHARMACEUTICAL PRACTICING ENTITY
VENUE JUSTIFICATION
ONE YEAR BEFORE VERSUS ONE YEAR AFTER *TC HEARTLAND*



NOTE— Pre-*TC Heartland* data includes random sample of 207 infringement suits filed before *TC Heartland* and excludes cases exclusively against foreign defendants. Post-*TC Heartland* data includes random sample of 194 infringement suits filed after *TC Heartland* and excludes cases exclusively against foreign defendants. Green indicates the percent of cases filed in a defendant's place of incorporation. Light blue indicates the percent of cases filed in a district containing a defendant's principal place of business. Dark blue indicates the percent of cases filed in a district that is both a defendant's place of incorporation and one containing a defendant's principal place of business. Orange indicates the percent of cases not in one of the other three categories.

4. Pharmaceutical Practicing Entity Plaintiffs

Turning to pharmaceutical practicing entity litigation, I analyze these cases separately because of the historic concentration of Abbreviated New Drug Application (ANDA) cases¹²⁴ in just two districts—Delaware and

124. Drug Price Competition and Patent Term Restoration (Hatch-Waxman) Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585. Hatch-Waxman provides, incentives for potential generic competitors to challenge drug patents before they expire. An ANDA applicant files a 'Paragraph IV' certification, under which the applicant certifies that the challenged patent is invalid or will not be infringed by the generic version. The first filer of a Paragraph IV certification receives a 180-day period of generic market exclusivity. Upon receipt of the Paragraph IV certification, the patent owner has 45 days in which to file a patent infringement suit against the ANDA filer.

New Jersey. In fact, from 2009 through 2015, 40 percent of ANDA cases were filed in Delaware and 32 percent in New Jersey.¹²⁵ But why did these districts become so popular in the first place, when many of these suits could arguably have been filed anywhere in the country before *TC Heartland*?¹²⁶

The popularity of New Jersey for pharmaceutical plaintiffs is probably due in significant part to the fact that so many drug companies are based there or at least maintain significant operations in the state. On the other hand, the popularity of Delaware is interesting because very few pharmaceutical plaintiffs or defendants are connected to the state other than through incorporation or by selling drugs there as they do in every other state. Among the 124 pharmaceutical cases that I have studied during the two-year period centered on *TC Heartland*, only one party's principal office is located in Delaware. I believe the rise of Delaware as the home of ANDA litigation has been due to a combination of factors, with the two most important being that Delaware judges rarely entertain summary judgment motions in ANDA cases¹²⁷, and that Delaware ANDA trials are bench trials that rarely lead to the award of damages.¹²⁸ Along with the fact that there are only a few judges in the District of Delaware, these local practices lead to more predictable and cheaper dispute resolution in that district.

The Eastern District of Texas is also known to prefer a trial to a summary judgment motion, with its judges expressly requiring parties in patent cases, but not other litigants, to seek permission before filing summary judgment motions and prohibiting such motions if permission is denied.¹²⁹ However, the judges of that district have also had a strong

David W. Opperbeck, *Rational Antitrust Policy and Reverse Payment Settlements in Hatch-Waxman Patent Litigation*, 98 GEORGETOWN L. J. 1303, 1307 (2010).

125. *Pharmaceutical Patent Litigation Filings Have Risen Significantly Since 2014, According to Lex Machina's 2015 Hatch-Waxman/ANDA Report*, LEX MACHINA (Apr. 26, 2016), <https://lexmachina.com/media/press/pharmaceuticalpatent-litigation-filings-risen-since-2014/>. [https://perma.cc/F59B-TLQD].

126. Eric H. Weisblatt and Claire Frezza, *Who to Sue and Where in ANDA Litigation: Personal Jurisdiction Post-Daimler*, 69 FOOD & DRUG L.J. 351, 352 (2014) (arguing that before the Supreme Court restricted personal jurisdiction in *Daimler AG v. Bauman*, 134 S.Ct. 751 (2014), "courts broadly asserted general jurisdiction over ANDA filers in ANDA cases.").

127. Katherine Rhoades, *Do Not Pass Go, Do Not Stop for Summary Judgment: The U.S. District Court for the District of Delaware's Seemingly Disjunctive Yet Efficient Procedures in Hatch-Waxman Litigation*, 14 NW. J. TECH. & INTELL. PROP. 81, 95 (2016).

128. Brian D. Coggio et al., *The Right to a Jury Trial in Actions Under the Hatch-Waxman Act*, 79 J. PAT. & TRADEMARK OFF. SOC'Y 765, 767 (1997).

129. Klerman & Reilly, *supra* note 15, at 253 (additionally arguing "Eastern District judges implicitly acknowledge that patentees are attracted to the district by the fact that they are averse to summary judgment.").

preference for jury trials.¹³⁰ Combined with its practice of allowing early discovery,¹³¹ defendants in PAE suits in the Eastern District of Texas face the prospect of more expensive and less predictable litigation. This makes the Eastern District of Texas an attractive home court for PAEs—especially those seeking nuisance value settlements.

How has *TC Heartland* impacted where pharmaceutical companies file their lawsuits, in terms of the defendants' ties to the geographic location of the district court? In Figure 8, we see that a far larger share of pharmaceutical cases filed the year before *TC Heartland* were filed where a defendant is incorporated than was the case for either PAEs or non-pharmaceutical practicing entities (48.1 percent versus 10.4 and 18.4 percent, respectively). Not surprising, in Table 7, we see that the reason is that so many pharmaceutical defendants are incorporated in Delaware. During the year before *TC Heartland*, over 40 percent of pharmaceutical cases were filed in Delaware and 78 percent of these were against defendants incorporated in that district.

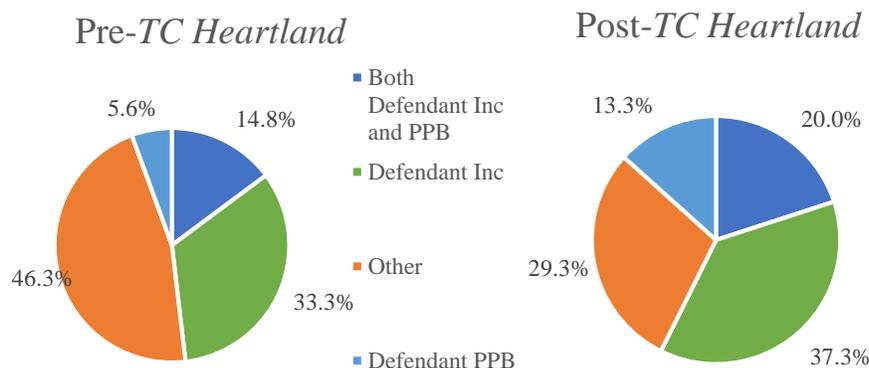
Overall, *TC Heartland* has had less of an impact on pharmaceutical litigation than the other two types of lawsuits I studied. But, in terms of defendant contacts, it has still had an effect. The share of cases filed where a defendant is incorporated increased from 48.1 percent to 57.3 percent and the share filed in a district containing a defendant's principal place of business increased from 20.4 to 33.3 percent. Additionally, while pre-*TC Heartland* pharmaceutical companies filed the smallest share of cases in a district neither containing a defendant's place of incorporation nor principal place of business (46.3 percent versus 87 percent for PAEs and 77.8 percent for other practicing entities), that share did decrease to just under 30 percent.

Among pre-*TC Heartland* cases filed away from both defendants' principal place of business and place of incorporation, again one third (8 of 24) alleged that the district contained a defendant's regular and established place of business. Thus, only 31 percent of cases (17 of 55) brought by pharmaceutical companies before *TC Heartland* contained allegations that no longer meet the standard for proper venue. This ceiling is much lower than the roughly 60 percent share for both PAEs and non-pharmaceutical practicing entities.

130. *Id.* (quoting Judge Leonard Davis' statement that Eastern District of Texas judges "believe in trial by jury.").

131. *Id.* at 269 (explaining that local rules in the Eastern District of Texas in effect require defendants to "complete their document collection and production—probably the most costly aspect of discovery—within a few months of the case filing.").

FIGURE 8. PHARMACEUTICAL PRACTICING ENTITY
VENUE JUSTIFICATION
ONE YEAR BEFORE VERSUS ONE YEAR AFTER *TC HEARTLAND*



NOTE— Pre-*TC Heartland* data includes random sample of 54 infringement suits filed before *TC Heartland* and excludes cases exclusively against foreign defendants. Post-*TC Heartland* data includes random sample of 75 infringement suits filed after *TC Heartland* and excludes cases exclusively against foreign defendants. Green indicates the percent of cases filed in a defendant's place of incorporation. Light blue indicates the percent of cases filed in a district containing a defendant's principal place of business. Dark blue indicates the percent of cases filed in a district that is both a defendant's place of incorporation and one containing a defendant's principal place of business. Orange indicates the percent of cases not in one of the other three categories.

The obvious reason is that pharmaceutical litigation had already been concentrated in the two districts where these companies—and probably both plaintiffs and defendants—are most often incorporated or maintain significant business operations. During the year before *TC Heartland*, 42.6 percent of the drug cases in my sample were filed in Delaware and 29.6 percent in New Jersey. Combined, they thus accounted for 72 percent of the drug cases in my sample. During the year after *TC Heartland*, that share actually appears to have increased slightly to 78.6 percent (with 45.3 percent in Delaware and exactly one third in New Jersey).

Concerning Delaware and referencing Table 7, both during the year before and the year after *TC Heartland*, nearly 80 percent of drug cases filed there were against firms incorporated in that state. Further, the

remaining 20 percent were not filed against defendants with principal places of business in Delaware. Thus, both before and after *TC Heartland*, only about one fifth of pharmaceutical cases filed in Delaware had to base venue on the second prong of Section 1400(b) under the Supreme Court's restricted definition of resides.

Defendant connections to New Jersey are very different and also more complex. In Table 7, we see that only 18.8 percent of New Jersey drug cases pre-*TC Heartland* include a defendant incorporated in that state and that share only slightly dropped to 16 percent after the decision. Further, in all of these cases, the defendant was not only incorporated in New Jersey but also maintained its principal place of business in that state. Thus, post-*TC Heartland* venue would likely be proper under either prong of Section 1400(b) for ANDA cases filed against New Jersey residents.

New Jersey pharmaceutical defendants overwhelmingly either maintain their principal places of business in that state or possess significant business activity there that meets the definition of a regular and established place of business. Both before and after *TC Heartland*, 100 percent of drug cases filed in New Jersey were filed against defendants alleged to have at least one of a regular and established place of business, a principal place of business, or pre-*TC Heartland* business activities sufficient to meet the requirement of personal jurisdiction. Thus, the concentration of so much of the drug industry in New Jersey, along with pharmaceutical firms' frequent incorporation in Delaware, ensures that *TC Heartland* has had much less of an impact on venue in these cases than was true of either PAEs or other types of practicing entities.

TABLE 7. PHARMACEUTICAL VENUE JUSTIFICATION BEFORE AND AFTER *TC HEARTLAND*— NEW JERSEY AND DELAWARE

	Pre- <i>TC Heartland</i>	Post- <i>TC Heartland</i>
Delaware		
Defendant Inc and PPB	0.0% (0)	5.9% (2)
Defendant Inc	78.3% (18)	73.5% (25)
Defendant PPB	0.0% (0)	0.0% (0)
Other (REPB)	21.7% (5)	20.6% (7)
New Jersey		
Defendant Inc and PPB	18.8% (3)	16.0% (4)
Defendant Inc	0.0% (0)	0.0% (0)
Defendant PPB	18.8% (3)	32.0% (8)
Other (REPB)	62.5% (10)	52.0% (13)

NOTE—Among random sample of 54 pharmaceutical practicing entity infringement suits filed one year before *TC Heartland* and 75 filed within one year after *TC Heartland*. Excludes cases without a choice of venue revealed in the complaint and cases exclusively against foreign defendants.

V. IMPLICATIONS

During the first year after *TC Heartland*, the Supreme Court's decision has had major effects on the patent litigation landscape in the United States. Most notably, the share of new cases filed in the Eastern District of Texas has declined by 70 percent, while that in Delaware has increased by about 70 percent. Further, *TC Heartland* appears to have deterred PAEs from filing several hundred lawsuits during the year after the decision. Filing trends also suggest that most of these missing cases would have been filed in the Eastern District of Texas, but their owners declined to sue when that venue was no longer an option.

Combined, my findings appear to confirm that *TC Heartland* has worked as critics of permissive venue concerned about the rise of PAEs

and the Eastern District of Texas had hoped. For example, it is hard to think of a reason to miss PAE lawsuits not filed simply because *TC Heartland* removed the Eastern District of Texas as a choice. Essentially, these plaintiffs and their attorneys made the calculus that changing venue alone eliminated the gain they expected had they been able to file in their preferred forum under permissive venue. Further, scholars reviewing the differences in case outcomes and local practice in the Eastern District of Texas have painted a convincing picture of a court that was overly pro-plaintiff. Under permissive venue and with the evidence that suing to extract nuisance value settlements is common, it is difficult not to view at least lower quality disputes filed in the Eastern District of Texas as pure rent seeking that has acted as a tax on innovators who actually commercialize products and services that consumers enjoy.

Nevertheless, there are reasons to believe that the restricted interpretation of patent venue adopted in *TC Heartland* is still not the optimal rule in terms of efficiency and fairness. We must ask if Delaware will ultimately be much better than the Eastern District of Texas. Combined, 50 percent of cases were filed in these two districts the year before *TC Heartland* and that share remained 38 percent the year after. Almost one quarter of all infringement lawsuits were filed in Delaware the year after *TC Heartland*. As my findings reveal, venue in Delaware is overwhelmingly based on defendant incorporation in that state and there is little reason to expect that Delaware will not continue to have the busiest patent docket for the foreseeable future.

There are certainly reasons to believe that Delaware will be better. Eldar and Sukhatme convincingly argue that Delaware judges face more balanced incentives than those of the Eastern District, such that they are likely to be neither overly pro-plaintiff nor pro-defendant in their local procedures and adjudications.¹³² Specifically, they argue that the pressure of the local bar will prevent judges from adopting practices that would chase away the entire influx of new cases, while fear of losing the state's dominant position in incorporations will prevent them from encouraging low quality patent suits. Thus, Eldar and Sukhatme argue that Delaware is likely to continue to compete for patent cases through an expert judiciary and well-developed case law.

However, there are also reasons to doubt this rosy picture. Delaware and the Eastern District of Texas are similar in many ways that indicate that the incentives to adopt pro-plaintiff rules and practices are stronger than the counter-incentives towards balance. For example, both districts

132. Eldar & Sukhatme, *supra* note 2, at 152–158.

have a history of forum selling to become centers of particular types of litigation.¹³³ Both have fewer judges than do districts encompassing larger population centers such that it is easier for judges in these districts to coordinate.¹³⁴ Both have hungry local bars and relatively little local industry to ensure continued growth of civil litigation through local business activity.¹³⁵ If plaintiffs do not perceive that Delaware is a better venue for their clients than all the other places where their infringement targets regularly do business, they will select another court. Thus, Delaware judges also might face irresistible incentives to make their court more patent plaintiff friendly.

Additionally, Elder and Sukhatme may overstate the risk that incorporations in Delaware will decline if its judges are too pro-plaintiff. Robert Anderson shows that it is often outside corporate counsel that steers large companies towards Delaware for bankruptcy proceedings.¹³⁶ Plausibly, counsel does so for reasons beyond selecting the best venue for their clients, including perhaps personal convenience. Corporate counsel regularly practicing in Delaware will simply tend to have more experience litigating in that court, be located closer to it, and have other clients they already serve there. These factors suggest a certain level of stickiness in specialized counsel's choice of venue that may severely diminish the threat that companies that are frequent targets of patent litigation will switch their incorporations away from Delaware.

Also noteworthy is that in Lemley's pro-plaintiff rankings, Delaware was actually ranked higher than the Eastern District of Texas during most of the 2000s.¹³⁷ This might be explained by Delaware courts being more pro-plaintiff for ANDA and other specialized types of corporate disputes. Additional research is needed to determine just how pro-plaintiff Delaware has been in patent disputes. However, the fact that Delaware has long been a popular second choice for PAEs suggests that even for critics of these plaintiffs and the Eastern District of Texas, *TC Heartland* might not have had as big of an impact on forum shopping of low quality patent disputes as we would think.

133. Klerman & Reilly, *supra* note 15, at 291–293.

134. *Id.* at 300.

135. *Id.*

136. See Robert Anderson, *The Delaware Trap: An Empirical Analysis of Incorporation Decisions*, 91 S. CAL. L. REV. 657, 662 (2017) ([T]he company's law firm, rather than the legal needs of the company itself, may drive jurisdictional choice).

137. Lemley, *supra* note 55, at 20 (Delaware ranked as the third most pro-plaintiff district and the Eastern District of Texas as the seventh most pro-plaintiff district). Lemley's rankings are based on the outcomes of all patent cases filed from the beginning of 2000 that terminated at the district court level by March 17, 2010. *Id.* at 5.

More generally, beyond Delaware, the Eastern District of Texas, and PAEs, my findings and prior research suggest it is possible that *TC Heartland* has not balanced the scales in terms of fairness but rather has replaced a pro-plaintiff rule with one that excessively favors defendants. I find that for both PAEs and non-pharmaceutical practicing entity lawsuits, the share of cases filed in a district containing a defendant's principal place of business nearly tripled the year after *TC Heartland*. While little has been written on the topic, what empirical research there is suggests that home court advantage exists and does influence case outcomes. In future work I will extend the study in this paper to investigate whether home court advantage exists in patent disputes and, if so, estimate its magnitude.

Whether the new rule is balanced or overly pro-defendant, *TC Heartland* has undoubtedly decreased litigating patent owners' expected recovery in many cases. This might be a problem for the patent system. Between Supreme Court cases like *Alice* and Congressional action creating post-grant review in the America Invents Act, we have made it more difficult to enforce patent rights during the past decade. While venue probably should not be our first choice of policy levers to obtain the right level of incentives for patent owners, the reality of *TC Heartland*'s effect may mean that assertion of patent rights should be facilitated through other mechanisms.

VI. CONCLUSION

The Supreme Court's May 2017 *TC Heartland* decision ended nearly three decades of permissive venue in patent litigation. Unfettered choice in where to file enabled the rise of the Eastern District of Texas as the busiest patent trial court in the country, accounting for nearly 40 percent of all new cases in recent years. The overwhelming majority of patent lawsuits brought in the Eastern District of Texas have been initiated by PAEs, more commonly and derisively known as "patent trolls." Concerns about the impact of PAEs on the economy along with the level of forum shopping—and forum selling in the Eastern District of Texas—spurred calls by practitioners and scholars for the Supreme Court to reign in patent venue.

In this paper I investigated how *TC Heartland* changed the patent litigation landscape during the first year after the decision. I focused the study on PAEs and the Eastern District of Texas, but along the way also revealed *TC Heartland*'s impact on practicing entities, ANDA litigants, and other busy patent fora. I found that in comparing the year before the

decision to the year after, most of the district courts with the largest patent dockets saw swings of at least 20 percent in new patent filings. The most dramatic changes were eleven hundred fewer cases filed in the Eastern District post-*TC Heartland*, nearly four hundred more cases filed in the District of Delaware, and nearly one hundred and fifty more cases in the Northern District of California—representing respectively a loss of nearly 70 percent and gains of 70 and 110 percent.

The bulk of the changes in filings in these three districts is attributable to PAEs. However, *TC Heartland* changed the proper basis for venue for all patent plaintiffs and appears to have impacted the choices available to most. Changes in where both PAEs and non-pharmaceutical practicing entity plaintiffs have filed during the year after *TC Heartland* are reflected in sharp increases in the shares of these cases filed in a defendant's place of incorporation and/or principal place of business. Due to the heavy pharmaceutical industry presence in New Jersey and Delaware, the large share of ANDA cases filed in these two districts did not change during the first year post-*TC Heartland*.

Perhaps the most surprising finding is evidence that hundreds of PAE lawsuits were not filed because of *TC Heartland*. If true, this is a strong indication that many PAEs assert weak cases and have taken advantage of excessively pro-plaintiff fora to pressure settlement. However, that inference is not definite. Evidence of continued resistance to filing in courts like the Northern District of California imply that some fora may be excessively pro-defendant. Combined with the realization that post-*TC Heartland* a much larger share of cases is filed in defendants' home court, future research will investigate whether the restriction in venue represents not a balancing of the scales but simply a shift in a rule that overly favors plaintiffs to one that overly favors defendants. If the latter is true, then patent litigation's deviation from the American tradition of plaintiff choice on where to litigate may significantly impair the value of U.S. patents.