SUE FIRST, NEGOTIATE LATER

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One of the more curious features of patent law is that patents can be challenged by anyone worried about being sued. This challenge right allows potential defendants to file a declaratory relief lawsuit in their local federal district court, seeking a judgment that a patent is invalid or noninfringed. To avoid this home-court advantage, patent owners may file a patent infringement lawsuit first and, by doing so, retain the case in the patent owner's venue of choice. But there is an unfortunate side effect to such preemptive lawsuits: they escalate the dispute when the parties may want to instead settle for a license. Thus, policies that allow challenges are favored, but they are tempered by escalation caused by preemptive lawsuits. To the extent a particular challenge rule leads to more preemptive lawsuits, it might be disfavored.

This Article tests one such important challenge rule. In MedImmune v. Genentech, *the Supreme Court made it easier for a potential defendant to sue first. Whereas the prior rule required threat of immediate injury, the Supreme Court made clear that any case or controversy would allow a challenger to file a declaratory relief action. This ruling had a real practical effect, allowing recipients of letters that boiled down to "Let's discuss my patent" to file a lawsuit when they could not before.*

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This was supposed to help alleged infringers, but not everyone was convinced. Many observers at the time predicted that the new rule would lead to more preemptive infringement lawsuits filed by patent holders. They would sue first and negotiate later rather than open themselves up to a challenge by sending a demand letter. Further, most who predicted this behavior—including parties to lawsuits themselves—thought that nonpracticing entities ("NPEs") would lead the charge. Indeed, as time passed, most reports suggested that this is exactly what happened: that patent trolls uniquely were suing first and negotiating later. But to date, no study has empirically considered the effect of the MedImmune *ruling to determine who filed preemptive lawsuits. This Article tests* MedImmune*'s unintended consequences. The answer matters: lawsuits are costly, and while "quickie" settlements may be relatively inexpensive, increased incentive to file challenges and preemptive infringement suits can lead to entrenchment instead of settlement.*

Using a novel longitudinal dataset, this Article considers whether MedImmune *led to more preemptive infringement lawsuits by NPEs. It does so in three ways: first, it performs a differences-in-differences analysis to test whether case duration for the most active NPEs grew shorter after* MedImmune. *One would expect that preemptive suits would settle more quickly because they are proxies for quick-settlement cases rather than signals of drawn-out litigation. Second, it considers whether, other factors equal, the rate of short-lived case filings increased after* MedImmune. *That is, even if cases grew longer on average, the share of shorter cases should grow if there are more placeholders. Third, it considers whether plaintiffs themselves disclosed sending a demand letter prior to suing.*

It turns out that the conventional wisdom is wrong. Not only did cases not grow shorter, cases with similar characteristics grew longer after MedImmune. *Furthermore, NPEs were not the only ones who sued first and negotiated later. Instead, every type of plaintiff sent fewer demand letters—NPEs and product companies alike. If anything, the* MedImmune *experience shows that everyone likes to sue in their preferred venue. As a matter of policy, it means that efforts to dissuade filing lawsuits should be broadly targeted because all may be susceptible.*

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INTRODUCTION

One of the more curious features of patent law is that patents can be challenged in court by anyone worried about being sued.[1] This challenge right allows potential defendants to file a declaratory relief lawsuit in their preferred federal district court venue, seeking a judgment that a patent is invalid or noninfringed. Between the late 1980s and a 2017 Supreme Court ruling, to avoid this home-court advantage, patent owners could file a patent infringement lawsuit first and, by doing so, retain the case in the their venue of choice.[2] But there is an unfortunate side effect to such preemptive "placeholder" infringement lawsuits: they escalate the dispute when the parties might have otherwise been willing to settle for a license. Thus, policies that allow challenges are favored, but they are tempered by the escalation caused by preemptive lawsuits. To the extent a challenge rule leads to more preemptive lawsuits, it might be disfavored.

This Article tests one such important challenge rule. Before 2007, one could not file a declaratory relief action challenging a patent without "an explicit threat or other action by the patentee which creates a reasonable apprehension on the part of the declaratory judgment plaintiff that it will face an infringement suit."[3] In early 2007, however, the Supreme Court ruled in *MedImmune v. Genentech* that such imminent threat was not required, and, instead, that "the question in each case is whether the facts alleged, under all the circumstances, show that there is a substantial controversy, between parties having adverse legal interests, of sufficient immediacy and reality to warrant the issuance of a declaratory judgment."[4] This ruling greatly eased the ability to file declaratory relief challenges and, in fact, the number of such challenges grew.[5] Any assertion of patent rights, including an overture to license the patent, triggered declaratory relief jurisdiction.[6]

This ruling was viewed as a big win for potential accused infringers; this newfound ability to challenge patents was supposed to help stop invalid patents in

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1. *See* Lear v. Adkins, 395 U.S. 653, 670–71 (1969); Brulotte v. Thys Co., 379 U.S. 29 (1964). This is different from proceedings in the U.S. Patent & Trademark Office, which may be brought by anyone because there is no Article III justiciability requirement.

2. Choice of venue was significantly restrained by a 2017 Supreme Court ruling, but at the times at issue in this Article, patent plaintiffs could file almost anywhere. *See* TC Heartland LLC v. Kraft Foods Grp. Brands LLC, 137 S. Ct. 1514, 1517 (2017).

3. Teva Pharm. USA, Inc. v. Pfizer, Inc., 395 F.3d 1324, 1332 (Fed. Cir. 2005).

4. MedImmune, Inc. v. Genentech, Inc., 549 U.S. 118, 127 (2007) (quoting Md. Casualty Co. v. Pac. Coal & Oil Co., 312 U.S. 270, 273 (1941)).

5. David I. Levine & Charles E. Belle, *Declaratory Relief After MedImmune*, 14 LEWIS & CLARK L. REV. 491, 522 (2010). A Federal Circuit case two months later made clear that *MedImmune* applied to licensing demands. SanDisk Corp. v. STMicroelectronics, Inc., 480 F.3d 1372, 1380–81 (Fed. Cir. 2007).

6. Hewlett-Packard Co. v. Acceleron, LLC, 587 F.3d 1358 (Fed. Cir. 2009) (holding that an offer to discuss the patent, without threat of litigation or claim of infringement, was sufficient).

their tracks. Declaratory relief invalidity challenges should have exploded. But did *MedImmune* lead to the opposite result? Could an easier challenge right actually lead to more, or at least longer, patent infringement litigation by pejoratively named "patent trolls"? That's the central question of this Article.

Consider how this unintended consequence might occur. Challenges are not the only by-product of *MedImmune*. Given easier challenges, it is only logical that patentees would sue first to avoid such challenges. The result is a race to the courthouse that the patentee can only win by suing for infringement first, before sending a demand letter. An example may be useful.

Before *MedImmune*: Patentee sends a "soft" demand letter insufficient to trigger a challenge. Recipient cannot file a declaratory judgment challenge because it does not have a reasonable apprehension of a lawsuit.[7] Patentee and Recipient may negotiate and settle. If they do not, Patentee files infringement suit in its preferred venue.[8] Recipient is unhappy.

After *MedImmune* (eased standard): Patentee sends a "soft" letter. Recipient files declaratory judgment challenge in its preferred venue. Patentee is unhappy.

After *MedImmune* (predicted response): Patentee files preemptive infringement suit without sending a demand letter first. In other words, patentee sues first, and negotiates later.

Thus, the conventional wisdom was that after *MedImmune*, patent holders would be less likely to send demand letters and would instead file more preemptive infringement lawsuits to avoid declaratory relief challenges.[9]

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7. *Teva Pharm. USA, Inc.*, 395 F.3d at 1332.

8. This explains why measuring the number of suits will not answer the question posed here. Many suits may have been filed even after a demand letter was sent, and the number of lawsuits might increase or decrease for other reasons as well.

9. Kelly Casey Mullally et al., *MedImmune v. Genentech*, 4 J. BUS. & TECH. L. 59, 77 (2009) ("Maybe you just sue first; this is a litigation-encouraging ruling out of the Supreme Court in the *MedImmune* case."); Jennifer R. Saionz, *Declaratory Judgment Actions in Patent Cases: The Federal Circuit's Response to MedImmune v. Genetech*, 23 BERKELEY TECH. L.J. 161, 192 (2008) ("However, *MedImmune's* lower bar also provides an incentive for potential licensors to file suit first and ask for a settlement license later."); *America Invents Act Turns Out to Be a Law of Unintended Consequences*, GEN. PAT. CORP. (Dec. 2012), https://web.archive.org/web/20160831034638/http://www.generalpatent.com/america-invents-act-turns-out-be-law-unintended-consequences ("As a result, many patent owners are simply filing lawsuits right off the bat rather than first contacting alleged infringers, engaging in exploratory discussions or attempting to negotiate a license to specifically avoid being on the receiving end of a Declaratory Judgment."); Dennis Crouch, *Avoiding Declaratory Judgment Jurisdiction*, PATENTLY-O (Feb. 4, 2010), http://patentlyo.com/patent/2010/02/avoiding-declaratory-judgment-jurisdiction.html (stating that the number one way to avoid declaratory relief is to file first); Heather J. Kliebenstein & Daniel W. McDonald, *Recent Federal Circuit Sandisk Decision Broadly Applies Medimmune, Giving Potential Licensees New Leverage*, MERCHANT & GOULD (May 1, 2007), https://www.merchantgould.com/News-Room/White-Papers/74703/Recent-Federal-Circuit-

But the conventional wisdom did not stop there. Commentators—and even patent holders themselves—seemed to think that the "sue first, negotiate later" response was especially prevalent among sophisticated patent licensors known as nonpracticing entities ("NPEs," or, more pejoratively, "patent trolls") who did not make a product but instead only enforced patents.[10] This, too, seems logical; companies with no product to sell and whose sole business depended on licensing should be especially sensitive to patent challenges filed in nonpreferred venues.

Sandisk-Decision-Broadly-Applies-Medimmune-Giving-Potential-Licensees-New-Leverage ("This too may cause patent owners to sue first, then negotiate."); Michael Madison, *Isn't That (Patent) Special?*, MADISONIAN.NET (Jan. 10, 2007), http://madisonian.net/2007/01/10/isnt-that-patent-special/ ("[P]atent owners will be more likely to sue first and negotiate later, rather than the reverse"); Mark Morley & Brendan Gingrich, *Sue First, Negotiate Later*, MANAGING INTELL. PROP. (May 1, 2007), https://www.managingip.com/Article/1377091/United-States-Sue-first-negotiate-later.html?ArticleId=1377091.

10. *See, e.g.*, FED. TRADE COMM'N, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION 63 n.63 (2011) ("Panelists from IT companies reported that NPEs are more frequently filing an infringement suit before approaching operating companies about licensing in order to preempt a declaratory judgment suit by the operating companies."); Joe Mullin, *Spangenberg Speaks, Says Sue First, Ask Questions Later*, CORP. COUNS., May 21, 2010 (two subjects of this study prefer post-*MedImmune* strategy of preemptive lawsuits); *A Second Opinion*, GEN. PAT. CORP. (Mar. 3, 2010), http://www.generalpatent.com/2010/03/11/second-opinion.html (one of the subjects of this study discussing difficulties NPEs have in sending demand letters); J. Nicholas Gross, *Real Patent Reform (Part II): Eliminate The Easy Path To The Courthouse*, INVENTOR CHRONICLES (Jun. 3, 2014), https://jngross.wordpress.com/2014/06/03/real-patent-reform-part-ii-eliminate-the-easy-path-to-the-courthouse/ ("The current environment distorts the available models to the point where litigation is mostly attractive for NPEs, and few others."); Victor de Gyarfas, *Patent Licensing and Declaratory Judgment Actions After MedImmune* 13 (2008), https://www.foley.com/-/media/files/ insights/publications/2008/05/patent-licensing-and-declaratory-judgment-actions/files/patent-licensing-and-declaratory-judgment-actions/fileattachment/degyarfaspaper.pdf ("This strategy of suing first and asking questions later appears to have been adopted by a number of non-practicing entities . . . ."); Stephanie Kennedy, *Interview With An Inventor, Part IV*, IP TROLL TRACKER (Oct. 30, 2014), https://iptrolltracker2.wordpress.com/2014/10/30/interview-with-an-inventor-part-iv/ (*MedImmune* caused licensors to file first, eliminating pre-litigation negotiations); Brian T. Moriarty, *New Tactic for Licensing Negotiations: Sue First, Talk Later*, NEW ENGLAND IN-HOUSE (May 31, 2007), http://newenglandinhouse.com/2007/05/31/new-tactic-for-licensing-negotiations-sue-first-talk-later/ ("Given the recent [and growing surge] of patent litigation in Marshall, Texas, it appears that many patent holders are already following this tactic . . . ."); Mallun Yen, *The Impact of Patent Reform Efforts on the Patent Market*, RPX CORPORATION 64 (May 21, 2013), http://files.shareholder.com/downloads/ABEA-5XYKB4/0x0x667178/31cd9dde-78b6-46fd-b41a-a70cb89779a8/RPX%20Investor%20Day%202013%20Deck%20for%20IR%20Site%20-%20Final.pdf ("Result: NPEs filed cases without sending letter first."); Peter Zura, *Wi-LAN Experiments with the "CSIRO Approach" to Injunctions*, THE 271 PATENT BLOG (Nov. 1, 2007), http://271patent.blogspot.com/2007/11/wi-lan-experiments-with-csiro-approach.html (large patenting entity describes suing without sending demand letters after *MedImmune*).

Indeed, the full extension of this conventional wisdom is that companies stopped responding to demand letters at all. This is borne out a bit anecdotally. A Google search for "patents ignore demand letter" using the option to return only pages dated before December 31, 2009, yields no top responses about ignoring demand letters; instead, most of the search hits discuss how to respond to demand letters. The same search using the option to only return results dated after January 1, 2010, yields several articles and blog posts discussing how ignoring demands may be the best course of action. A post-*MedImmune* shift to suing first and negotiating later may have helped prompt this change, because any demand letter would likely have been preceded by a lawsuit already if the patentee was serious about enforcement. A demand without a lawsuit would mean there was never an intent to file suit.

This Article—one of the only empirical studies of patent declaratory relief—questions whether this conventional wisdom was correct. The conventional wisdom implied two testable hypotheses: first, are patent plaintiffs, in general, more likely to file preemptive infringement suits? Second, are sophisticated, repeat player patent-licensing entities—highly active NPEs—more likely than randomly selected patent litigants to file preemptive infringement suits? Throughout this Article, these groups are categorized as such: the litigious strategic licensors ("NPEs") v. the random product and service companies ("non-NPEs").

The data collected here contains two sets, roughly matched by years that litigation started. The first group contains the ten most litigious patent-licensing companies[11] from 2003–2009, beginning a few years before and ending two years after the change in law. The second group contains a random selection of patent plaintiffs.

One would expect that the patent-licensing plaintiffs would be more protective of venue, more strategic, and less concerned with reputational effects of filing preemptive suits. Indeed, studies have shown that licensing plaintiffs would be hardest hit by rules that would limit where they can file suit.[12]

The *MedImmune* change provides a natural experiment, and the best available way to consider the results of that experiment is a differences-in-differences analysis: comparing results before and after the shock.[13] Differences-in-differences measures whether the trends for a "treatment" group (here, the patent-licensing companies) changes after a shock in a way that the "control" group (here, other patent owners) does not. Thus, a differences-in-differences study should answer whether NPEs uniquely availed themselves of preemptive infringement suits. While there were other things going on in patent law at the time, such as more

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11. These were Acacia Research, Plutus IP (now IP Nav), Ronald A. Katz Licensing, Catch Curve, General Patent Corp, F&G Research, Millenium, Cygnus Systems, Papst Licensing, and Rates Technology.

12. Colleen V. Chien & Michael Risch, *Recalibrating Patent Venue*, 77 MD. L. REV. 47, 98 (2017).

13. Certiorari had been granted earlier, of course, but the outcome was not a foregone conclusion. Furthermore, the case would not have affected rights until after it issued.

difficulty in obtaining injunctions, none of these things would have such a direct effect on whether to sue first and negotiate later.

But how can we tell if they did so? In a perfect world, we could ask the parties if a demand letter was filed beforehand. This would be nearly impossible. Counting the total number of lawsuits also provides insufficient information. The total number of lawsuits grew in 2007 but dropped in 2008 and 2009; and yet, the total number of defendants sued increased substantially during this time.[14] Furthermore, many lawsuits may have been filed both before and after *MedImmune* for many reasons, such as more issued patents and less willingness to settle suits; the number of suits was already growing well before *MedImmune*.

Thus, this study chooses three proxies for the ultimate question—identifying whether a lawsuit was a preemptive infringement suit filed without sending a demand letter. The first proxy is case duration. One might expect the average duration of lawsuits after the *MedImmune* decision to go down in comparison to random patent plaintiffs, because preemptive infringement suits are, by definition, intended to simply exist until a license can be obtained.[15] As discussed below, it may have been that other constraints—such as difficulty in obtaining injunctions—would have led to quicker settlements rather than the *MedImmune* shock. But such concerns wind up being irrelevant; the results here show that durations do not become shorter. Instead, results seem consistent with an escalation effect and a general turn toward complexity of patent litigation during the same time period.[16]

A second potential proxy might be sorting cases into different duration groups;[17] even if cases grew longer generally, the share of short cases might grow, reflecting a "sue first and negotiate later" strategy. Testing found no statistical effect by *MedImmune* on the likelihood of a case lasting less than 30, 90, 180, or 365 days, nor does the data show any real trend other than a greater share of cases lasting longer than a year.

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14. Multiple defendants could be joined in a single suit during this time. U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-465, INTELLECTUAL PROPERTY: ASSESSING FACTORS THAT AFFECT PATENT INFRINGEMENT LITIGATION COULD HELP IMPROVE PATENT QUALITY 15–16 (2013); Dennis Crouch, *US Patent Litigation New Filings By Year*, PATENTLY-O (Dec. 19, 2016), https://patentlyo.com/patent/2016/12/patent-litigation-filings.html.

15. White & Case LLP, *The Risk of Sending Cease and Desist Letters Pre-filing in Patent Litigations*, LEXOLOGY (Dec. 10, 2010), https://www.lexology.com/library/detail.aspx?g=5a6dd013-8c6b-47d5-b1f4-588c7389c444 ("This approach may provide patent holders with an opportunity to engage in settlement discussions with infringers without handing them control of timing and venue since a placeholder lawsuit would already be pending.").

16. For example, in one 2006 case, the Supreme Court made it more difficult to obtain injunctions, which might embolden defendants to defend cases rather than settle. *See* eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 391 (2006).

17. Christopher A. Cotropia et al., *Heterogeneity Among Patent Plaintiffs: An Empirical Analysis of Patent Case Progression, Settlement, and Adjudication*, 15 J. EMPIRICAL LEGAL STUD. 80, 101 (2018).

A third, and most likely, proxy might be changes in how many cases involved a prior demand letter. This proxy is unaffected by other patent rule changes, and so better isolates the *MedImmune* effect. A key feature of preemptive lawsuits is that the patentee files a complaint without attempting to settle first. Instead, the strategy becomes, "sue first, negotiate later." How often plaintiffs sent demand letters prior to filing suit is the exact measure of interest. While a direct count is unavailable, a good approximation is how often patentees disclose that they sent a demand letter in their lawsuits. This is observable data, and because patentees have an incentive to disclose the existence of such letters, it is a useful proxy.[18]

The results of analysis show that the conventional wisdom is half right. As predicted, after *MedImmune*, a greater share of patent owners sued first, without alleging attempts to negotiate. But the effect was widespread: *every* patentee sued first more often. In one model, presented in this Article, among all plaintiffs that changed their behavior (about 60% of them), plaintiffs were about 20% as likely to send a demand letter after *MedImmune*.[19]

The conventional wisdom was half wrong, however, in its patent troll exceptionalism. As compared with random litigants, the litigious NPEs studied were no more likely to skip the demand letter after *MedImmune* than they were before. In other words, there was no differences-in-differences interaction effect on the litigious plaintiff group. Furthermore, a more nuanced analysis of the data showed that different types of NPEs behave differently. Companies that purchased and enforced licenses (as opposed to inventor-owned companies or failed startups) were less likely to send a demand post-*MedImmune*, but other types of NPEs showed no statistically significant changes.

These findings imply that *MedImmune* probably affected preemptive infringement litigation, but the effect was not limited to NPEs/patent trolls as so many people believe. Because the drop in demand letters did not lead to shorter cases or quicker settlements, the results also imply that case duration and quick settlements are not a good way to measure whether patentees are suing first and negotiating later, despite their use in the literature as ways to identify nuisance suits. This may be due to inclusion of multiple defendants in each case,[20] increasing defense entrenchment, increasing complexity, increasing workload for judges, or increasing numbers of patents and defendants in each case.

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18. During this time, courts did not require patent complaints to include many details; however, a bare allegation of a demand letter would aid willfulness claims even in an otherwise sparse complaint. Adam N. Steinman, *The Rise and Fall of Plausibility Pleading?*, 69 VAND. L. REV. 333 (2016). In any event, the study measures the rate of such allegations; because the pleading rules did not change, a rate change in pleading demands provides useful information. There is no reason to believe something else would have caused patentees to change their pleading practices.

19. This model included firm fixed effects; the model without fixed effects included about 40% more data points and found no significant post-*MedImmune* effect, because so many firms did not change their behavior.

20. The duration will continue until the last defendant settles, even if earlier defendants settle early.

Although the race for venue has been diminished,[21] this Article contributes to the literature in two ways. First, its findings tend to disprove anecdotal observations of not only observers, but the very participants in the patent-litigation system. The finding that all patentees, and not just patent trolls, were more likely to sue first and negotiate later provides insight into policymaking for both declaratory relief jurisdiction and for venue—especially as related to NPEs. For example, to the extent that Congress is considering whether to allow operating companies to sue on their home turf,[22] it would be important to know that operating companies were already filing preemptive infringement lawsuits to game the system. Second, the findings here show that "sue and negotiate" tactics did not lead to short lawsuits and quick settlements. The notion that quick-strike lawsuits would lead to better or faster results appears to be a pipe dream.

Part I of this Article discusses the background of preemptive litigation and *MedImmune*. Part II develops a model and hypotheses to be tested, while Part III discusses data collection and methodology used to test the hypotheses. Part IV describes the analysis of each hypothesized proxy employed to measure preemptive litigation. Part V discusses implications and concludes.

I. BACKGROUND

Efforts to obtain patent licenses through litigation are an important point of public policy debate today. There are many studies that examine litigation and licensing efforts[23] and outcomes.[24] A few studies have considered licensing through the litigation-threat process—usually called demand letters.[25] But these studies do

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21. Since the *TC Heartland* case in 2017, patent plaintiffs must now sue where the defendant is incorporated or has offices. 28 U.S.C. § 1400 (2019); TC Heartland LLC v. Kraft Foods Grp. Brands LLC, 137 S.Ct. 1514, 1517 (2017). This means that the ability to sue first in the home jurisdiction is much diminished. Further, patents may be challenged in the U.S. Patent & Trademark Office without a case or controversy, eliminating the need for filing declaratory relief challenges to preserve venue.

22. Chien & Risch, *supra* note 12, at 53.

23. Reiko Aoki & Jin-Li Hu, *Licensing vs. Litigation: The Effect of the Legal System on Incentives to Innovate*, 8 J. ECON. & MGMT. STRATEGY 133 (1999); Ronald A. Bleeker & Michael V. O'Shaughnessy, *One Year after MedImmune-The Impact on Patent Licensing & Negotiations*, 17 FED. CIR. B.J. 401 (2008); Chester S. Chuang, *Offensive Venue: The Curious Use of Declaratory Judgment to Forum Shop in Patent Litigation*, 80 GEO. WASH. L. REV. 1065 (2011); Michael Risch, *Patent Challenges and Royalty Inflation*, 85 IND. L.J. 1003 (2010) [hereinafter Risch, *Patent Challenges and Royalty Inflation*]; Liza Vertinsky, *Reconsidering Patent Licensing in the Aftermath of MedImmune*, 45 HOUS. L. REV. 1609 (2008).

24. John R. Allison et al., *Understanding the Realities of Modern Patent Litigation*, 92 TEX. L. REV. 1769 (2014); Michael Risch, *A Generation of Patent Litigation*, 52 SAN DIEGO L. REV. 67 (2015) [hereinafter Risch, *A Generation of Patent Litigation*].

25. Bharat N. Anand & Tarun Khanna, *The Structure of Licensing Contracts*, 48 J. INDUS. ECON. 103 (2000); Reiko Aoki & Jin-Li Hu, *Time Factors of Patent Litigation and Licensing*, 159 J. INST. AND THEORETICAL ECON. 280 (2003); Jay Pil Choi, *Patent Pools and Cross-Licensing in the Shadow of Patent Litigation*, 51 INT'L ECON. REV. 441 (2010); Michael J. Meurer, *The Settlement of Patent Litigation*, 20 RAND J. ECON. 77 (1989).

not consider the interplay of the right to challenge a patent's validity with the incentive to file a lawsuit.

Patent owners and alleged infringers engage in a sort of litigation dance. Owners would like to send notice to parties they believe might infringe. This notice potentially enhances damages, and it serves as an opening salvo in negotiations.[26] In response, accused infringers and licensing targets have always been allowed to challenge the validity of the patents asserted against them.[27] These challenges often come as counterclaims in a lawsuit but sometimes might be filed as a separate declaratory relief action. The declaratory relief action throws a monkey wrench into the patentees' plans because it allows the challenger to sue in its preferred venue and to act as the plaintiff in the case, which many believe can have persuasive power with the jury.

The critical question is when the invalidity-challenge action can be filed. Federal law governs when a declaratory relief action may be filed.[28] For years, the Federal Circuit Court of Appeals did not allow such lawsuits unless there was a reasonable apprehension of imminent lawsuits.[29] As a result, patent owners could send vaguely worded demand letters: "You might be interested in licensing—here is why my patent is practiced by your product." Such language did not present an imminent threat, and thus did not trigger a declaratory relief filing by the potential defendant.

But in 2007, the Supreme Court in *MedImmune* relaxed this rule, instead allowing any party who had an actual controversy to file a declaratory relief lawsuit.[30] Though *MedImmune*'s pronouncement was broad, the parties involved were already engaged in a license. A mere two months later, the Federal Circuit unsurprisingly ruled that the general pronouncement applied to all cases.[31]

After the rule change in *MedImmune*, even a soft, vague letter might trigger a declaratory relief suit filed by the recipient in a venue inconvenient to the sender.[32] Because a licensing inquiry might be taken by the recipient as a threat of lawsuit, the recipient can file a declaratory relief lawsuit seeking to invalidate the patent. The advantage of filing first is that the declaratory relief plaintiff can sue in the plaintiff's

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26. 35 U.S.C. § 287 (2014) (limiting damages in some cases where notice not given).

27. Risch, *Patent Challenges and Royalty Inflation*, *supra* note 23, at 1007.

28. Declaratory Judgment Act, 28 U.S.C. § 2201 (2019) ("In a case of actual controversy within its jurisdiction . . . upon the filing of an appropriate pleading, may declare the rights and other legal relations of any interested party seeking such declaration, whether or not further relief is or could be sought.").

29. Teva Pharm. USA, Inc. v. Pfizer, Inc., 395 F.3d 1324, 1332 (Fed. Cir. 2005).

30. MedImmune, Inc. v. Genentech, Inc., 549 U.S. 118, 132–33 (2007).

31. SanDisk Corp. v. STMicroelectronics, Inc., 480 F.3d 1372, 1380–81 (Fed. Cir. 2007).

32. As noted above, recent changes in venue law may affect this issue somewhat, as choice of venue has been narrowed. *Supra* note 21.

preferred venue and present its case first, rather than waiting to be sued in another state and present its case second, as a patent infringement defendant.[33]

To avoid a potential licensee reaching the courthouse first, a patentee would preemptively file an infringement lawsuit in its venue of choice, and *then* send a demand letter. The patentee need not even serve the lawsuit,[34] which makes it a true placeholder, not used as a sign of strength or seriousness nor even used to get the attention of the potential licensee. Though, in modern times, the conventional wisdom is that one must sue to get the attention of a potential licensee, at the time the primary benefit of such placeholders was that the patentee maintained choice of venue and could present a case first as the plaintiff if the case failed to settle.[35] There was often a long lag time between filing and service of complaints, and some complaints were never served on the defendants.

Choice of venue, for better or worse, is important to plaintiffs.[36] It is unclear why. While the concentration of different types of plaintiffs in different venues is undeniable,[37] plaintiffs don't always file in the most beneficial districts.[38] Some posit that it is procedural advantages that cause NPEs, for example, to flock to the Eastern District of Texas.[39] In this study, a plurality of NPEs filed in the Eastern District of Texas, but not the supermajority that filed there in, say, 2016.[40] The choice of actual venue is unimportant for the study of preemptive lawsuits, however. More important is whether parties undertake strategic behavior to maintain that venue for perceived advantages.

At first blush, the increased ability to challenge patents appears to have changed patentee incentives to file infringement lawsuits. Today, filing a lawsuit prior to sending a demand letter is common.[41] While it is easy to attribute this to the

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33. Jason Rantanen, *Slaying the Troll: Litigation as an Effective Strategy Against Patent Threats*, 23 SANTA CLARA COMPUTER & HIGH TECH. L.J. 159, 176 (2006).

34. FED. R. CIV. P. 4(m) (setting minimum of 90 days for plaintiff to serve complaint).

35. The general rule is that the first to file, and not the first to serve, is the primary case and will win the venue battle. Kerotest Mfg. Co. v. C-O-Two Fire Equipment Co., 342 U.S. 180, 184–85 (1952) ("It was strongly pressed upon us that the result below may encourage owners of weak patents to avoid real tests of their patents' validity by successive suits against customers in forums inconvenient for the manufacturers, or selected because of greater hospitality to patents. Such apprehension implies a lack of discipline and of disinterestedness on the part of the lower courts . . . .").

36. Chien & Risch, *supra* note 12, at 85 (showing overwhelming selection of home venue by patent plaintiffs).

37 Chris Barry et al., *2015 Patent Litigation Study: A Change in Patentee Fortunes*, PwC 16 (May 2015), http://www.pwc.com/en_US/us/forensic-services/publications/assets/2015-pwc-patent-litigation-study.pdf.

38. Mark A. Lemley, *Where to File Your Patent Case*, 38 AIPLA Q.J. 401, 410 (2010); Chien & Risch, *supra* note 12, at 60.

39. Daniel Klerman & Greg Reilly, *Forum Selling*, 89 S. CAL. L. REV. 241, 250 (2015–2016); Chien & Risch, *supra* note 12, at 60.

40. Chien & Risch, *supra* note 12, at 63.

41. Robin Feldman & Mark A. Lemley, *Do Patent Licensing Demands Mean Innovation?*, 101 IOWA L. REV. 137, 154 (2015).

relaxed jurisdictional rule, there might be other reasons to file a lawsuit without sending a demand letter. One reason may be that patent owners do not believe that anyone will negotiate with them unless a lawsuit is filed.[42] A related, though slightly different, reason may be that the patent owner wants to show seriousness about willingness to enforce the patent. Neither of these two reasons would be caused by a policy change that made it easier to challenge patents, however. Instead, these might be caused by trends over time.

But was there a reason? Did a shift to suing first and negotiating later result instead from the legal change in *MedImmune*? If so, that would be important to know for policy evaluation. Preemptive infringement suits offer few welfare-enhancing effects,[43] but have potential costs. The filing of the lawsuit, which may be discovered or even delivered to the potential licensee even if it is not officially served, may cause the parties to fight harder in litigation. This tendency for a party to dig its heels in when it might have otherwise settled is an entrenchment that might not have occurred if the parties were to settle informally using demand letters and responses.[44] If the parties refuse to settle, the lawsuit will generate costs that do not enhance social welfare.[45]

Of course, this entrenchment might occur for either of the other two reasons a patentee might file a lawsuit before sending a demand letter. However, those reasons are not necessarily within the power of public policy. Filings based on a perceived risk that the licensee will file a declaratory relief judgment first are within public policy.

The goal, then, is to determine whether filing patterns shifted due to *MedImmune*. If they did, then we would expect to see fewer, not more, declaratory relief actions following *MedImmune*.[46]

This is not to say that after *MedImmune* every potential demand letter got skipped and instead became a preemptive infringement lawsuit. There were surely

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42. Mark A. Lemley, *Ignoring Patents*, 2008 MICH. ST. L. REV. 19, 31 (2007); Michael Risch, *Licensing Acquired Patents*, 21 GEO. MASON L. REV. 979, 997 (2013); Joff Wild, *IPXI Demise Caused by a US Patent System That Offers No Incentive for Good-Faith Licensing, Says Exchange's CEO*, IAM BLOG (Apr. 7, 2015), http://www.iam-media.com/blog/Detail.aspx?g=93e8d407-b24c-4d9a-a59c-da9fe9e3f578.

43. There may be some wealth-transfer effects because the licensee must now travel, but this is usually true, because some party must travel in most cases.

44. *Cf.* Claude Crampes & Corinne Langinier, *Litigation and Settlement in Patent Infringement Cases*, 33 RAND J. ECON. 258, 263 (2002); Joseph Farrell & Robert P. Merges, *Incentives to Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Patent Review Might Help*, 19 BERKELEY TECH. L.J. 943 (2004); Joseph Scott Miller, *Building a Better Bounty: Litigation-Stage Rewards for Defeating Patents*, 19 BERKELEY TECH. L.J. 667 (2004); Choi, *supra* note 25; Rantanen, *supra* note 33.

45. *See, e.g.*, A. Mitchell Polinsky & Daniel L. Rubinfeld, *The Welfare Implications of Costly Litigation for the Level of Liability*, 17 J. LEG. STUD. 151 (1988).

46. RPX Corp, *Patent Reform and the Law of Unintended Consequences (Part II)*, RPX BLOG (Feb. 8, 2012), https://web.archive.org/web/20120327084215/http://www.rpxcorp.com/index.cfm?pageid=14&itemid=19.

benefits to not filing a lawsuit, such as friendlier and less rushed negotiations. The question is instead whether there was an increase in such preemptive filings. Additionally, there were other things happening in patent litigation at the time. Patent reform (which patentees viewed as anti-patent) was being proposed.[47] Further, the Supreme Court made it more difficult for licensing entities to obtain injunctions in *eBay Inc. v. MercExchange L.L.C.*[48] Neither of these events provided the shock that *MedImmune* did.[49] Patent reform did not occur in 2007 or for several more years.[50] No one has suggested that the proposed reform in 2007 had any effect on litigation. It is possible that *eBay* would have caused patentees to settle earlier because an injunction was unavailable in litigation, but the result may well have been the opposite: defendants were more willing to litigate if they did not fear an injunction. Given that the total amount of litigation increased after *eBay*, a confounding assumption that patentees were instead exiting litigation faster seems unlikely.

In other words, while other things were happening during this time period, there is no reason to believe that they would affect the quasi-experimental nature of *MedImmune*. Neither these, nor any other events of 2007, provided the shock that *MedImmune* did with respect to preemptive filings. At most, they would have affected the volume of litigation, not the quick-strike nature.[51] It is telling that anecdotes by plaintiffs and defendants alike attribute behavioral change to *MedImmune*. Although the Federal Circuit did not officially apply *MedImmune* to demand letters until *SanDisk* in March of 2007,[52] that case was pending in January and the outcome was expected. The results presented in this Article include cases after the *SanDisk* case, but the magnitude and significance of the results do not change if the timing is adjusted.

The conventional wisdom is certainly just that: the new *MedImmune* rule led to more preemptive litigation, all other things equal. This likelihood was discussed by many, both before and after the case.[53] The goal of this Article is to test this assertion—did the Supreme Court cause more filings of preemptive

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47. Dennis Crouch, *Patent Reform Act of 2007*, PATENTLY-O (Apr. 18, 2007), https://patentlyo.com/patent/2007/04/patent_reform_a_1.html.

48. 547 U.S. 388, 394 (2006).

49. It is possible that *Bell Atlantic Corp. v. Twombly*, 550 U.S. 544 (2007), which heightened pleading standards, may have had an effect. However, the Federal Circuit shortly made clear that patent filings need not use the heightened standards in *McZeal v. Sprint Nextel Corp.*, 501 F. 3d 1354 (2007). This rule lasted longer than the study data.

50. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284, was passed on Sept. 16, 2011.

51. Indeed, as the results that follow show, cases grew longer, not shorter, implying that *eBay* did not cause quicker settlements. *See infra* Table 2.

52. SanDisk Corp. v. STMicroelectronics, Inc., 480 F.3d 1372, 1381 (Fed. Cir. 2007).

53. Edward E. Vassallo & Swatee Jasoria, *Litigation Planning for Licensors*, MANAGING INTELL. PROP., Jul.–Aug. 2008, at 67; White & Case LLP, *The Risk of Sending Cease and Desist Letters Pre-Filing in Patent Litigations*, LEXOLOGY (Dec. 10, 2003), http://www.lexology.com/library/detail.aspx?g=5a6dd013-8c6b-47d5-b1f4-588c7389c444; RPX Corp, *supra* note 46.

infringement litigation by expanding the group of potential licensees that could file a declaratory relief lawsuit? Was this case, originally seen as a boon to defendants, partially responsible for the quickening of lawsuit filings and the massive litigation costs associated with them?

II. MODEL IDENTIFICATION AND HYPOTHESES

Determining whether *MedImmune* led to more preemptive litigation requires a model for empirical testing. How might firms behave? In a typical lawsuit before *MedImmune*, firms had three choices: (1) send a "hard" demand letter and risk declaratory challenge in a disfavored venue; (2) send a "soft" letter and maintain the choice to sue anywhere; or (3) sue first and negotiate later. After *MedImmune,* options 1 and 2 essentially merged.

How might that have affected firms with different characteristics? Aggressive licensors that make no products have more reason to file preemptive infringement suits first, before sending a demand letter. Prior to *MedImmune*, licensors would be more likely than competitors to send "soft" demand letters[54] to obtain licenses before filing suit, because their primary goal was to obtain revenue rather than to exclude competitors from making competing products.[55] Non-licensors would want to seek an injunction, an outcome unlikely to be obtained by a demand letter.[56] As a result, product companies would be more ambivalent about seeking a settlement prior to filing suit.

After *MedImmune,* however, we would expect the behavior to diverge. Aggressive licensors are no longer able to send a demand letter without risking an out-of-venue lawsuit. They would, instead, file a preemptive placeholder suit to lock in venue.[57] Thus, aggressive licensors should be more likely to file a suit first to obtain choice of venue, then send a demand letter, and finally dismiss the suit after settlement.

On the other hand, ordinary litigants face no such pressure to sue first and negotiate later. In the model, nonlicensing litigants are not seeking quick settlements and, instead, file suit expecting a drawn-out litigation seeking damages and an injunction.[58] Of course, not all litigants are seeking an injunction, but these are the expectations.

The behavior in the model is reasonable. Presumably, the aggressive patent licensors would be most likely to protect themselves and their choice of venue by

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54. That is, letters that would not have triggered the ability for a recipient to bring a declaratory relief action.

55. Michael Risch, *Framing the Patent Troll Debate*, 24 EXPERT OPINION ON THERAPEUTIC PATENTS 127, 127 (2014) (discussing various licensing strategies).

56. Christopher B. Seaman, *Permanent Injunctions in Patent Litigation After eBay: An Empirical Study*, 101 IOWA L. REV. 1949, 1990 (2016).

57. Choi, *supra* note 25, at 459 ("The analysis of the article points out, *inter alia*, the serious lack of private incentives to weed out patents of suspect value through litigation.").

58. Colleen V. Chien, *Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents*, 87 N.C.L. REV. 1571, 1584–89 (2009) (describing narratives of competitive and licensor-based litigation).

preemptively filing suit.[59] Even if the suits were nuisance suits, strategic plaintiffs would file in their preferred venue; indeed, suits filed far away in disfavored venues have the highest nuisance value. The literature is replete with the rise of the Eastern District of Texas as a venue of choice for such licensing plaintiffs, though in 2007, the concentration was not so marked—only 13% of patent cases were filed there, compared to more than 40% in 2016.[60]

Furthermore, strategic licensors would be least likely to avoid filing preemptive lawsuits on reputational grounds, because their overwhelming—if not sole—income comes from patent licensing, and not product sales.[61] In other words, we would expect more preemptive lawsuits when companies do not care what others in the marketplace think about them.

As noted in the Introduction and Part I, everybody thought this modeled description was in fact happening. Perhaps people thought direct competitors would be more likely to engage with demand letters rather than file patent challenges. Or maybe ordinary litigants would not see the same changed pressure to act strategically because monetizing patents in quick settlements was not their goal. Regardless of the reasons, there was a firm commitment to the idea that patent trolls were increasing lawsuits by suing first and negotiating later.

Based on the behavior above, a model with two firms emerges: one is a highly litigious licensor, and the other is a competitive business. Each wants to file in the preferred venue. Consider what happened to patent challenges to each of these groups over time. Figure 1 shows the use of declaratory relief cases over time. These are patent invalidity challenges filed first (or solely) as a request for declaratory judgment. Thus, the chart excludes cases where the declaratory judgment claim is brought as a counterclaim or is later filed in another federal judicial district—after the defendant has already been sued for patent infringement.

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59. Chien & Risch, *supra* note 12.

60. *Id.* at 63.

61. This Article expands on the data collected for three previous articles: Michael Risch, *Patent Troll Myths*, 42 SETON HALL L. REV. 457 (2012); Michael Risch, *The Layered Patent System*, 101 IOWA L. REV. 1535 (2016); and Risch, *A Generation of Patent Litigation*, *supra* note 24. A brief summary of the data collected follows, and the prior articles detail collection methodologies.

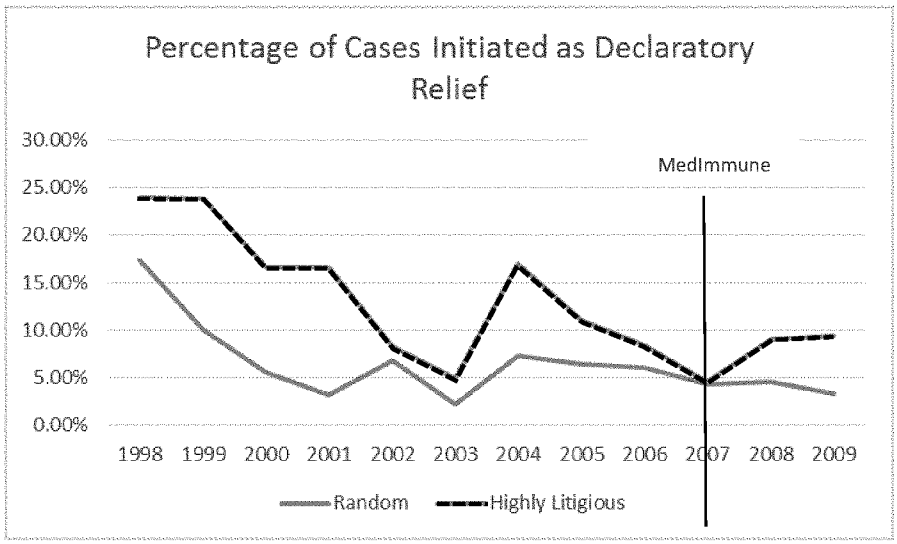

Figure 1: *Declaratory relief case filings over time as a percentage of all patent infringement cases.*

It is difficult to interpret the trends in declaratory relief filings. We would expect to see more declaratory relief cases after *MedImmune* because it was easier to file them. Even so, the share of such suits was still lower after *MedImmune* than it was at its peak before 2005. Further, the increase in declaratory relief filings may have been offset by an increase in preemptive infringement lawsuits. In other words, though after *MedImmune* it was easier to file a declaratory judgment action, patentees knowing that patent challenges were easier to file may have beat accused infringers to the punch. The resulting effect is ambiguous, and the remainder of the analysis is intended to resolve some of the ambiguity.

The preemptive infringement lawsuits might affect total litigation in two ways. Some cases might never have been filed had they been settled by a demand letter, while others might be cases that were delayed until after a demand letter was sent. There are several interactions at play: first, a longitudinal study examining growth in litigation is offset by expiration of patents. Second, determining which cases would never have been filed is extremely difficult, and so the next best alternative must be used. Third, sending a letter first may not have avoided the lawsuit; it may have simply delayed it. Fourth, "sue first, demand later" is problematic in its own right, regardless of whether it is tied to the growth of litigation. In short, the Article is not attempting to explain litigation growth caused by *MedImmune*; it is instead attempting to examine changes in behavior.

Thus, at least one thing is apparent from the chart. Before 2007, highly litigious patent owners and random patent owners faced patent challenges from potential defendants at differing rates, but the trend of changes were the same and generally decreasing. After *MedImmune*, the aggressive patent owners saw an

increase in patent challenge declaratory relief compared to the random patent owners, which implies that they were stung at least a bit by sending "soft" demand letters, leading to an incentive not to send them. This leads to some testable hypotheses.

A. Hypothesis: Shorter Duration

The first proxy is case length. In a world where participants sue first, and then negotiate, we would expect to see shorter cases because the end goal of a preemptive suit is to settle the case rather than litigate through to injunction. Others have used this as a measure of strategic licensing lawsuit activity.[62]

An increased number of placeholders should correlate with shorter cases because placeholders are those cases the plaintiff wanted to quickly settle anyway.[63]

Case length may serve as a proxy for preemptive lawsuits because quick settlements will lower average durations. A lawsuit followed by negotiations should terminate relatively quickly. On the other hand, the litigation process can be slow; it can take months to serve the complaint, exchange initial disclosures, conduct discovery, file procedural and dispositive motions, obtain claim construction, and try the case. Though litigated cases terminate at different times, the more aggressive the plaintiff is, the more likely a case will continue through these steps.[64]

If the litigious licensors were more likely to file preemptive suits after *MedImmune,* then the litigation length for that group should decrease as compared to the control group, all things being equal.

As discussed above, however, this may not always be true; it may be that placeholders also lead to entrenchment and longer litigation where a settlement might have otherwise occurred. Furthermore, the Supreme Court's 2006 *eBay* ruling making it harder to halt product sales affected the ability to extract nuisance settlements,[65] and thus may have affected the average duration of litigation. One would expect cases to be longer, because defendants are more likely to litigate rather than settle. Additionally, if there are fewer nuisance suits because they are harder to win (though the evidence points to the contrary proposition), then cases should also grow longer. Both of these are contrary to the proposition that *MedImmune* shortened litigation. The possibility that *eBay* may have instead shortened litigation is rejected in Part IV.A.

H_0: If there is no *MedImmune* effect, case durations among the strategic licensing group will remain the same as compared to other plaintiffs, otherwise they will decrease.

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62. Cotropia et al., *supra* note 17, at 100–08.

63. The methodology here corrected for competing cases by examining only initially filed infringement cases. Competing patent challenges were not counted, and if the challenge was filed first, then the responsive infringement suit was excluded.

64. Christopher A. Cotropia et al., *Progression and Workload in Civil Litigation: An Empirical Analysis of Patent Disputes* (Sept. 11, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3021903.

65. eBay Inc. v. MercExchange, LLC, 547 U.S. 388, 394 (2006).

B. Hypothesis: More Shorter Cases

Because case duration includes long cases as well as short ones, simply averaging case lengths may mask any preemptive effects. To the extent that preemptive lawsuits are precursors to quicker settlements, then in the model strategic firms should see a growing share of quick settlements post-*MedImmune*. Thus, estimating the number of short-lived cases might better test for the existence of placeholder suits and entrenchment. This encompasses two suppositions: first, we would expect the share of quick settlements among the aggressive licensors to grow with the use of more placeholders. Second, we would expect the share of long duration cases among the aggressive licensors to also grow.

H_1: If there is no *MedImmune* effect, the share of short-lived cases among the strategic licensing group will remain the same as compared to other plaintiffs, otherwise they will grow.

C. Hypothesis: Fewer Demand Letters

Of course, the most directly observable result of the model's negotiation/suit process would be more suits filed without sending a demand letter first, because after *MedImmune*, the demand letter would trigger a declaratory relief suit in an unfavored venue. One would expect that the strategic licensors would be even less likely to send such letters, because venue selection is even more important to the use of lawsuits to obtain licensing revenue.[66]

One benefit of the demand letter proxy is that it is the shock of *MedImmune* rather than some other case (primarily *eBay*) that is affecting behavior. While there is a chance that *eBay* might have a confounding effect on litigation length (a concern, but not one that's clearly applicable), there is no reason to believe that *eBay* would affect the sending of demand letters prior to litigation. Even if there were no chance of an injunction, strategic licensors would have an incentive to attempt to obtain a license if they could do so without risking a declaratory relief challenge. And even if it was the threat of injunction, rather than an actual injunction, that drove decisions, there is no reason to believe that strategic licensors would suddenly change their negotiating habits simply because the threat dwindled. This is especially true because the type of letter that did not trigger a declaratory relief challenge was soft and could not threaten injunction in any event. If anything, the pre-*eBay* injunction risk made choice of venue for obtaining an injunction even more important.

H_2: If there is no *MedImmune* effect, the share of demand letters sent before litigation among the strategic licensing group will remain the same as compared to other plaintiffs, otherwise they will decrease.

III. METHODOLOGY AND DATA COLLECTION

Data relating to litigation allows for testing whether the change in challenge rights affected litigation behavior. The collection methodology is discussed in more detail below; in summary, the study design compared the most aggressive,

66. Chien & Risch, *supra* note 12, at 66 ("The Eastern District also has a reputation for refusing to decide summary judgment motions, which is likely at least indirectly tied to win rates and settlement pressure in that district.").

sophisticated licensing patent owners with a matching set of random patent plaintiffs.

A. Summary of Cases and Patent Identification

The aggressive patent plaintiffs selected for study were the most litigious patent-licensing plaintiffs active during the period between 2003 and 2009. These licensing plaintiffs are also known as NPEs or patent trolls. Collection included every case and patent asserted by these plaintiffs, regardless of year, for a total of 352 patents in 917 cases. That is, if they were most litigious during the studied time period, then *all* of their cases were gathered, even from the time period during which they may not have been the most litigious. Summary data shows results for all years, but due to limited data availability and distance in time, all regressions were conducted on cases filed in 2001 or later.[67] In general, there were many more cases filed after 2005.

A matching control group by litigation year was selected via a hybrid, rough matching strategy. Matching by patent characteristics (such as technology or filing year) was infeasible given the numbers of patents and defendants in each case. Furthermore, the goal was not to test how litigants filed suit based on patent characteristics, but rather how patentees filed suit based on the current litigation environment. Even so, it was important to capture all the litigation of each party. Thus, the goal was to start with a proportionately random set of litigants each year, but to capture all the cases in which those litigants asserted those patents. This led to the hybrid approach—a loosely matched set.

First, 350 lawsuits were identified in the same proportion to the years that the litigious licensors filed their lawsuits. Lawsuits filed by entities engaged solely in patent licensing through litigation at the time of case filing were excluded and replaced by other random litigants. While many of the random plaintiffs filed multiple cases (some more than 100), they were not NPEs.

However, this matching was incomplete because the patents in those cases may have been asserted by the same plaintiffs in other cases. This is a problem because lawsuits involving a patent are highly correlated: patents may be asserted against many defendants over years or against many defendants on the same day. And they will remain valid until proven invalid. A complete picture of patentee behavior requires as many cases involving each patent as possible. To fill out the data set, each patent in the initial 350 control lawsuits was identified, and then *all* of the cases involving those patents were identified. This led to a total of 716 patents in 1,311 lawsuits.[68]

However, a byproduct of this methodology is that the matching is rough and exact pairs cannot be achieved, either by patent to patent or year to year. Attempting a direct, exact pair match would introduce bias. For example, some lawsuits involving a patent may have been preemptive lawsuits while others may not have been. If only one lawsuit was matched, valuable information would be

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67. The number of years before the shock does not match the number of years after. This allows for additional data points because there were more cases each year.

68. There were more than 350 patents involved because many cases included assertion of more than one patent.

missing. Thus, observing every assertion of a given patent over several years is more important to avoid selection effects than ensuring an artificial correspondence between aggressive and nonaggressive patent plaintiffs, so long as the time periods generally correspond with each other.

Thus, matching was by both patent and litigation year, which is difficult to match identically because parties may have chosen to file lawsuits at different times during a patent's life. However, the distributions of cases in the two sets are similar enough and the groups for each year are large enough such that comparisons can be made without bias. Table A1 in the Appendix shows the relative distributions of cases by year. The distribution of plaintiff types, such as product companies, licensing companies, and inventor-owned companies, in the sample was consistent with studies of all patent litigation. Though this was a longitudinal study, the appearance of plaintiff types during the period of all regressions was representative. Appendix Table A2 and the related discussion provide relevant details.

Once the cases and their patents were identified, further data about the patents, cases, and plaintiffs was collected. This included patentee type and size; patent metrics, such as claims and citations; patented technology; litigation outcomes; number of defendants sued; case duration; and outcome. Case collection stopped with cases filed on December 31, 2009. This allowed most cases to end, and also avoided changes in patent litigation practice that came during 2010 and beyond, such as the America Invents Act ("AIA"), which required plaintiffs to sue each defendant separately,[69] or any new case law about where suits may be filed.[70]

69. 35 U.S.C. § 299 (2014).

70. TC Heartland LLC v. Kraft Foods Grp. Brands LLC, 137 S. Ct. 1514, 1521 (2017).

Table 1 shows a summary of resolutions by type. About 45% of the cases were dismissed with no detail available due to opacity in the paperwork[71] or limited docket entries. These were coded as "other" dismissals; the percentages are roughly equal for both sets. The remaining 55% were coded by type of resolution. The first column reports the percentage as a total of all cases, and the second column reports the percentage of just those resolutions that were coded. The chart's numbers add up to more than 100% because some cases may have had two resolutions, such as both a validity and an infringement ruling on the merits.

	Random			*Litigious*		
Cases	1311			916		
	N	% Total	% Resolved	N	% Total	% Resolved
"Other" Dismissal	576	43.94%		407	44.43%	
Resolution Coded	735	56.06%	100%	509	55.57%	100%
Settled	274	20.90%	37.28%	242	26.42%	47.54%
Consent Judgment	239	18.23%	32.52%	67	7.31%	13.16%
Default	20	1.53%	2.72%	17	1.86%	3.34%
Injunction	287	21.89%	39.05%	16	1.75%	3.14%
Procedural	53	4.04%	7.21%	70	7.64%	13.75%
Validity Ruling	61	4.65%	8.30%	96	10.48%	18.86%
Infringe Ruling	115	8.77%	15.65%	69	7.53%	13.56%
Stayed	30	2.29%	4.08%	59	6.44%	11.59%
Open	8	0.61%	1.09%	24	2.62%	4.72%

Table 1: *Case Outcomes for all Years. Some cases have more than one resolution, so totals may add to more than 100%.*

Table 2 shows the wide variation in case lengths present in the data set by reporting the number of days to resolution. Mean duration exceeded median duration in each year, implying an unsurprising skew to longer cases.

71. For example, an unopposed motion to dismiss with no indication that it is a likely settlement.

Year	*Mean*	*Std. Dev.*	*Median*
1986	771	791	757
1987	1673	1569	666
1988	1049	1251	470
1990	251	194	165
1991	448	317	521
1992	583	277	703
1993	1219	560	1194
1994	310	267	229
1995	344	499	205
1996	436	471	230
1997	605	910	272
1998	622	748	322
1999	623	699	404
2000	622	813	302
2001	809	976	315
2002	645	729	313
2003	777	828	501
2004	707	758	431
2005	561	654	297
2006	519	561	351
2007	634	649	407
2008	601	579	432
2009	505	483	308

Table 2: *Case Duration by Year (in Days)*

The longest cases at completion of data gathering were still open and were given an arbitrary end date (the end of 2013) for calculating case length rather than dropping them from the data set.[72] Stayed cases also tend to be longer because the stay period held all activity. Consent-judgment[73] cases were typically shorter, as

72. There were nine such cases (less than 0.5%), and because the tests are primarily about short cases, there is little censoring effect by cutting off the longest cases. Instead, dropping them would artificially inflate the proportion of short cases.

73. Consent judgments occur when the parties agree to an outcome in litigation but ask the court to memorialize it in a judgment.

were procedural dismissals and default judgments. Settled cases were of varying length; some cases settled quickly while others did not.

IV. ESTIMATING PREEMPTIVE LITIGATION

This Section implements the study methodology by testing three proxies for *MedImmune's* effect on whether plaintiffs sued first and negotiated later. First, it considers whether cases grew shorter for NPEs following *MedImmune*. Second, it considers whether the share of cases ending quickly grew post-*MedImmune*. Third, it considers whether plaintiffs self-reported sending demand letters less often.

Ideally, each of these tests would have included technology/industry. However, because there were many (sometimes dozens) of patents in many cases, as well as many (sometimes hundreds) of defendants in many cases, identifying a technology category for each case was not possible.

A. Case Duration Hypothesis

The litigations initiated by the strategic licensors had a shorter mean duration than litigations initiated by random plaintiffs, which is consistent with other studies.[74] This statistic becomes more important when considering that the licensing group generally sued more defendants in a single case, which would tend to increase, rather than decrease, case duration.

Figure 2 is a chart showing relative case duration between the two groups. The chart was created by estimating predicted times, based on the number of defendants, patents, and the filing district, and then plotting those predicted times with respect to the two groups. In other words, these are durations corrected for the effects that patents, defendants, and venue have on case complexity.[75]

74. Axel Haus & Steffen Juranek, *Non-Practicing Entities: Enforcement Specialists?*, 53 INT. REV. L. & ECON. 38, 48 (2018).

75. Because the durations cut off at zero and skew toward very long durations, the chart was created using log-transformed durations. In Stata, ladder reports $X^2 = 68.2$ ($p = 0.000$) for a log transformation. A similar chart, constructed by simply dividing each duration by the number of defendants, was very similar, including the apparent uptick after 2007.

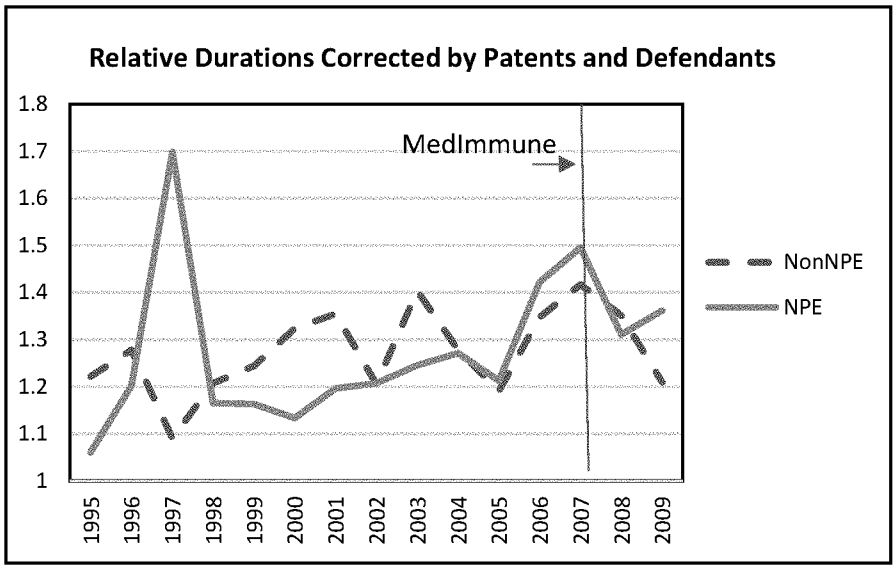

Figure 2: *Relative case duration since 1995. This chart compares case durations by entity type after correcting for predicted durations related to the case complexity.*

The graph does not bode well for a traditional differences-in-differences result—at least not the one hypothesized here. Before 2003, there appears to be no pre-shock trend that matches. As discussed below, however, the data before 2003 is a bit more spotty. Starting in 2003, the trend appears to be somewhat similar. Even assuming one accepts the pre-shock trends as sufficient to support a differences-in-differences analysis, the hypothesis would expect that post-*MedImmune* the NPE cases would grow shorter compared to the random cases due to quick settlements. Instead, the opposite appears to have occurred: the licensing group cases grew longer.

However, the question cannot be answered by the graph alone. First, it may be that average duration grew longer due to entrenchment, which would be invisible on the graph. Second, there may be other factors that might affect duration that can be isolated in a regression.

In each of the estimates, cases in which the potential infringer filed a declaratory judgment relief suit first are excluded. Also excluded are Abbreviated New Drug Approval ("ANDA") cases, in which generic drug manufacturers invite lawsuits by filing a request that the FDA approve an allegedly infringing medication. Such cases cannot be preemptive cases because the patentee was not the first to file the lawsuit. Thus, any differences-in-differences estimates must not include cases where there was—by definition—no placeholder. Any such cases are excluded throughout all the analyses in this study.

The first estimate tests for the effect of the *MedImmune* case on the treatment group, NPEs, without any other independent variables. The second estimate includes two additional variables that are highly correlated with duration: the number of patents and the number of defendants in each case. The third adds district fixed effects (and shows three of the most used districts, with the fourth as a base level). To avoid any serial correlation issues, the first two estimates were estimated using 200 bootstrap trials.[76] The addition of many districts in the third estimate left too few observations to bootstrap. However, the bootstrap standard errors were very similar to uncorrected standard errors, which implies both a lack of serial correlation and reliance on the default standard errors.[77]

76. Marianne Bertrand et al., *How Much Should We Trust Differences-in-Differences Estimates?*, 119 Q.J. ECON. 249, 251–52 (2004).

77. Interestingly, clustering *reduced* the standard errors and would have suggested rejection of the null hypothesis on the interaction term. This implies negative correlation within observations of the group, which is also inconsistent with differences-in-differences trends finding that the treatment had an effect on case duration.

	(1) Logtime	(2) Logtime	(3) Logtime
NPE=1	0.902	0.846*	0.962
	(0.0625)	(0.0612)	(0.0693)
medimmune=1	0.887	0.864*	0.897
	(0.0592)	(0.0570)	(0.0705)
NPE=1 # medimmune=1	*1.190*	*1.142*	*1.037*
	(0.141)	*(0.143)*	*(0.121)*
NumPatents		1.046***	1.037***
		(0.00684)	(0.00793)
NumDefs		1.013	1.012***
		(0.00821)	(0.00310)
Select Districts (Base = C.D. Cal.)			
D. Del.			1.464
			(0.292)
E.D. Tex.			1.196
			(0.134)
N.D. Cal.			1.701***
			(0.257)
Observations	1842	1842	1842
R^2	0.002	0.032	0.116
Rmse	1.144	1.127	1.100

Table 3: *Regression Estimate of Logged Duration since 2001. Exponentiated coefficients shown, with standard errors in parentheses. Asterisks showing p-values as:* $^{*}p < 0.05$, $^{**}p < 0.01$, *and* $^{***}p < 0.001$.

The italicized treatment term (NPExMedImmune) confirms the graphical intuition. If cases were shorter for NPEs only following *MedImmune*, this coefficient would be negative and significant. Instead, the coefficient is not statistically significant. Indeed, it is not even close. Even if one believed that there were a change, the sign is the wrong direction: the licensor cases on average grew longer, not shorter, after *MedImmune*. As a result, it is impossible to reject H_0, that case durations grew shorter for NPEs.

It is possible that some unobserved variable would both increase the explanatory power of the model and tease out any differences in case duration. For

example, while Haus & Juranek[78] find that defendant size may affect case duration, such data was unavailable in this study (some cases involved hundreds of defendants). However, there is no reason to believe that a better fit would change the outcome. In the third estimate, R^2 increases substantially, but the effect on the interaction coefficient is to bring it closer to no effect and increase its p-value to 0.75.

If case duration is a good proxy for preemptive lawsuits, then the hypothesis that *MedImmune* had no effect cannot be rejected. Furthermore, concerns about *eBay* have little relevance. Despite a confounding concern that strategic licensors could not seek lengthier cases for injunctions, case length grew longer. This may also be an artifact of case size. As the number of defendants and number of patents grow, cases grow longer (and these coefficients are statistically significant). Because plaintiffs could sue many (as many as 100 or more) defendants in one case, the case duration may sometimes reflect the longest holdout, while others may have settled very early. The data did not allow for calculation of when each defendant exited the case. Ideally, such information might better allow case duration to act as a proxy for preemptive lawsuits. However, the availability of dockets during the time frames studied does not allow for parsing of defendant exit in many of the years before 2007.

Finally, it is possible, of course, that case duration in the aggregate does not adequately identify preemptive suits. The results cannot rule out that possibility.

B. Quick Settlement Hypothesis

The following logit-regression estimates test the hypotheses that the share of quick settlements grows for strategic licensors only. Each column tests a logistic regression in which the independent variable is 1 if a case settles within a certain time period (30, 90, 180, and 365 days respectively), and 0 if it does not. It uses the same control variables as the prior regressions: number of patents asserted, number of defendants, and judicial district. The models were tested using ordinary and robust standard errors, as well as bootstrapping (without districts). The standard errors did not differ substantially under any method.[79]

78. Haus & Juranek, *supra* note 74, at 45.

79. Again, clustering had the effect of narrowing the standard errors—so much so that the interaction coefficient would have been significant with $p = 0.000$. Given the results of bootstrapping, this method is not viable with this data.

	(1) Resolve <30	(2) Resolve <90	(3) Resolve <180	(4) Resolve <365
Main				
NPE=1	1.280	1.571*	1.294	1.333*
	(0.596)	(0.326)	(0.191)	(0.183)
medimmune=1	0.994	0.854	0.996	1.329
	(0.514)	(0.223)	(0.168)	(0.200)
NPE=1 # medimmune=1	*1.330*	*1.485*	*1.162*	*0.727*
	(1.037)	*(0.512)*	*(0.285)*	*(0.165)*
NumPatents	1.098	0.950	0.923***	0.921***
	(0.0653)	(0.0285)	(0.0218)	(0.0174)
NumDefs	0.717	0.923**	0.959**	0.958***
	(0.123)	(0.0269)	(0.0142)	(0.0115)
Select Districts (Base = C.D. Cal.)				
D. Del.	1.572	1.500	0.644	0.333**
	(1.775)	(0.990)	(0.292)	(0.136)
E.D. Tex.	1	2.012*	0.666	0.532**
	(.)	(0.706)	(0.159)	(0.114)
N.D. Cal.	1	0.843	0.299**	0.386**
	(.)	(0.484)	(0.120)	(0.112)
Observations	1122	1642	1767	1801
Pseudo R^2	0.076	0.057	0.065	0.083
Chi-squared	23.54	72.17	140.6	205.8
$p > chi^2$	0.263	0.000474	7.23e-10	2.02e-18

Table 4: *Logit Estimate of Early Case Termination since 2001. Exponentiated coefficients shown, with standard errors in parentheses. Asterisks showing p-values as:* $^{*}p < 0.05$, $^{**}p < 0.01$, *and* $^{***}p < 0.001$.

The italicized interaction term (NPExMedImmune) is not significant in any of the four estimates. However, the model does provide useful information. First, it confirms that the increased duration seen by the licensing group is related, in part, by growth in the number of cases filed after 2007 lasting longer than one year (the coefficient on NPE is greater than one), as well as a higher rate of longer cases for that group regardless of year. Interestingly, the licensors had more cases of shorter duration in every time period up to a year.

Second, the regressions imply that suing more defendants and using more patents leads to fewer quick settlements (the coefficients on those variables are less than one and statistically significant). As with the first hypothesis, then, it could be that preemptive suits are masked because many defendants could settle early and

one holdout will extend the length of a case, especially where licensors sue more defendants and use more patents in a single case.

Third, filing suit in the Eastern District of Texas (where NPEs sue more often)[80] tends to lead to more quick settlements and fewer long cases (the coefficient is 2 for cases less than 90 days, but only 0.5 for cases lasting less than a year). In other words, being in that district may roughly double the share of short cases but cut the share of long cases in half. This may well be a placeholder effect, but not one due to *MedImmune*. When districts are removed from the estimation for settlements in fewer than 90 days, the coefficient shrinks, as does the significance level Whatever explanatory value the Eastern District of Texas has, it is not taking it from the interaction variable.

C. Demand Letter Hypothesis

Testing the case-duration-type hypotheses does not show any effect based on *MedImmune*, but the result is ambiguous. Either there really is no effect, or preemptive suits may lead to more entrenchment. To help determine which may be the case, the demand letter hypothesis may be the best test.

Actual sending of demand letters is unobservable, but the pleadings in the cases provide a second-best estimate because they often report whether a demand letter had been sent prior to filing a complaint. This litigation-reported activity is arguably the closest proxy for preemptive suits, but it is not perfect.

First, data was not available for every case because the records may not have been available. However, as noted below, there were fewer missing records for the most important time period: 2005–2009. Further, for all the years, missing records are likely distributed in the same proportions as those that are findable.

Second, given permissive joinder rules before the AIA, plaintiffs could sue many defendants at once.[81] Many such cases would be unlikely to include demand-letter allegations as to each of the many defendants.[82]

Third, plaintiffs are not required to disclose that they filed a case without sending a demand letter. Thus, we can only trust this as a proxy if plaintiffs accurately report sending demand letters in their complaints. There is good reason to believe that they do so, because there are strong incentives for such reporting. Showing contributory infringement requires that the defendant know of the patent,[83] so patentees will often allege sending demand letters in such cases if they have done so. Further, obtaining willful infringement treble damages requires knowledge of the patent, so defendants will also allege having sent a demand letter to preserve

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80. *See* Chien & Risch, *supra* note 12, at 61.

81. *See, e.g.*, In Re EMC Corp., 677 F.3d 1351, 1359 (Fed. Cir. 2012) (allowing joinder of many unrelated parties).

82. As a matter of practice these complaints followed a simple form, and listing several demand letters in a complaint would be unwieldy.

83. 35 U.S.C. § 271(b) (2014).

those rights.[84] Finally, demand-letter allegations can help plaintiffs show pre-filing investigation to avoid fee shifting and/or sanctions should they lose the case.[85] Not every plaintiff will allege having sent a demand letter even if they have done so. However, because there is no harm from such allegation and the plaintiff only benefits from making the allegation, there is no reason to believe that failure to make such allegation would be anything but randomly distributed.[86]

Thus, given forgiving pleading requirements, there are surely many instances of demand letters being unreported. Indeed, there were many more willfulness claims than demand-letter allegations, though such claims were almost always perfunctory. Even so, the goal is to measure changes, so firms that alleged sending demand letters and then stopped are much more important than firms that simply never alleged them in the first place. There is no reason to believe that anything other than *MedImmune* would cause a firm that used to allege sending demand letters to stop alleging them beginning in 2007.

As a result, disclosure of demand letters in court papers is a reasonable proxy for whether such demand letters were actually sent. The following table shows the data available since 2003.

	Random				*Litigious/NPE*			
Year	*Cases*	*Cases w/ Data*	*Demands*	*% w/ Demand*	*Cases*	*Cases w/ Data*	*Demands*	*% w/ Demand*
2003	136	96	7	7%	82	31	6	19%
2004	110	83	16	19%	53	36	8	22%
2005	110	68	11	16%	100	79	27	34%
2006	133	85	28	33%	131	106	46	43%
2007	183	149	39	26%	152	113	48	42%
2008	110	102	17	17%	88	66	22	33%
2009	122	118	18	15%	53	43	8	19%

Table 5: *Cases with Demands since 2003. This table shows how many cases had complaints or other documents available, and then lists how many of those complaints alleged a demand letter. Fewer cases have readable documents than outcomes, because outcomes are often available in other ways.*

Table 5 shows the general availability of data since 2003, as well as how many cases alleged that a demand letter had been sent prior to the filing of the suit. The drop-off is steep for both the random and litigious plaintiffs. Varying

84. Rachel Bandli, *Pleading Willfulness – One Year Post-Halo*, FISH LITIGATION BLOG (Jun. 28, 2017), https://www.fr.com/fish-litigation/pleading-willfulness-one-year-post-halo/ (describing cases requiring heightened pleading requirements to allege willfulness).

85. For example, FED. R. CIV. P. 11 requires pre-filing investigation.

86. Of course, patentees can sue first and use that as notice rather than a demand letter—but that reduces damages because the knowledge comes later. This behavior would fall under a sue first, negotiate later strategy.

differences-in-differences, as well as differences-in-differences-in-differences analyses will test the data.

Several logit estimations test the hypothesis. The models estimated in Table 6 examine two different models. The first (1 and 2) tests differences-in-differences between highly litigious patent plaintiffs and operating companies. The only difference between the two is that equation 2 includes plaintiff identity fixed effects, on the theory that propensity to file preemptive suits is plaintiff-specific. The second (3 and 4) tests by business model type: acquired patent enforcement, individual-owned companies, individuals, and failed startups. This estimate considers whether business type might have an effect. Most operating companies fell into the base class, but some were failed startups or inventor-owned companies. District-fixed effects were unnecessary here, because the decision whether to send a demand letter is independent of venue. As with equation 2, equation 4 includes plaintiff-fixed effects. All coefficients are reported as odds ratios.

	(1) Demand	(2) Demand	(3) Demand	(4) Demand
Demand				
NPE=1	3.291	3.291		
	(3.496)	(0.216)		
medimmune=1	0.188***	0.932	0.250**	1.049
	(0.0852)	(0.183)	(0.118)	(0.218)
NPE=1 # medimmune=1	*2.041*	*1.073*		
	(1.155)	*(0.316)*		
Base=8 Product Co.				
PfType=1 Licensor			0.463	2.150***
			(0.556)	(0.494)
PfType=5 Indiv. Co.			0.207	0.809
			(0.246)	(0.198)
PfType=9 Individual			18.02	2.647
			(27.66)	(1.390)
PfType=12 IP Sub. of Product Co.			5.96e-13	1.018
			(1.01e-09)	(0.704)
PfType=1 # medimmune=1			*1.401*	*0.404**
			(0.822)	*(0.149)*
PfType=5 # medimmune=1			*1*	*2.118*
			(.)	*(0.832)*
PfType=9 # medimmune=1			*1*	*0.999*
			(.)	*(0.832)*
PfType=12 # medimmune=1			*1.278*	*0.446*
			(1.833)	*(0.463)*
NumPatents	1.217*	1.242***	1.214*	1.247***
	(0.0987)	(0.0323)	(0.100)	(0.0332)
NumDefs	1.013	0.999	1.015	0.998
	(0.0153)	(0.00779)	(0.0152)	(0.00817)
Owner Fixed Effects	Included	Excluded	Included	Excluded
Observations	604	1164	580	1160

Table 6: *Estimating Propensity to Send a Demand Letter since 2001. Exponentiated coefficients are listed in models (1), (2), (3), and (4), with standard errors shown in parenthesis. Asterisks denote p-values, with *p < 0.05, **p < 0.01, and ***p <0.001. Model explanations are as follows: NPE=1 codes for litigious status; medimmune=1 codes for post-MedImmune; and accordingly, NPE=1, medimmune=1 codes for highly litigious plaintiff cases filed after MedImmune. For Base=8 Product Co. models, PfType 1=1 Licensor codes for companies that purchased patents to license; PfType=5 Indiv. Co. codes for companies formed by individual inventors; PfType=9 Individual codes for individual inventors; and PfType=12 IP Sub. of Product Co. codes for subsidiaries of product companies dedicated to IP licensing.*

These estimates are consistent with the findings for other proxies. None of the interactions (NPExMedImmune) are statistically significant, whether fixed effects are included or not. Thus, the hypothesis that highly litigious plaintiffs would respond to expanded declaratory relief the same as operating companies in filing more preemptive lawsuits cannot be rejected.

Perhaps, however, there is no interaction because *every* patent plaintiff filed preemptive lawsuits after *MedImmune*. Estimates 1 and 3 imply as much: statistically significant coefficients on the post-*MedImmune* dummy imply that all plaintiffs were 80% less likely to send a demand letter after *MedImmune* issued.[87] These results remained unchanged with the interaction removed, as well as with plaintiff type removed. The significance and magnitude were robust among all specifications.

Interestingly, though, all explanatory value was stripped when owner-fixed effects were removed from the model. The sample size also increased dramatically, as many plaintiffs with zero variation were eliminated by fixed effects. A possible interpretation is that those plaintiffs that changed their behavior did so by sending fewer demand letters prior to filing suit, but that in about 40% of the cases, *MedImmune* did not affect plaintiff pleading behavior at all. They may have never sent (or alleged sending) demand letters in the first place. Another explanation, of course, is that the firms that did not change their pleading behavior did change their actual behavior (in either direction), but the fixed-effects model can't capture it.

There is one possible exception. In the model without fixed effects, companies that acquire patents and then sue (Type 1 Licensors, the most prototypical "patent troll"—patent assertion entities) were generally more than twice as likely to send demand letters than product companies; after *MedImmune,* those same plaintiffs were 40% as likely than product companies to sue without sending a demand letter first.[88] The robustness of this finding is difficult to assess given the very different results with fixed effects included in the model. Then again, if these firms were the precise ones that changed their behavior, then it makes sense that the change would register in a model that isolated them.

Finally, it seems clear that the more patents asserted in a case, the less likely a preemptive suit will be filed. This finding has been consistent among all three hypotheses. Here, demand letters were about 20% more likely for each patent in every version of the model. This runs counter to a narrative that *MedImmune* caused more placeholder lawsuits, because highly litigious plaintiffs are more likely to assert multiple patents.

D. Robustness and Limitations

The notion of a robustness check, given the results based on a failure to reject a hypothesis, seems a tad odd. Nonetheless, standard robustness checks can serve two purposes. First, they can give a sense about why expected behavior might not have materialized. Second, they can provide guidance about whether the

87. Medimmune = 1

88. PfType = 1, and the interaction PfType = 1 # medimmune = 1

expected behavior can be rejected in favor of the null hypothesis; that is, perhaps the hypotheses should be switched, and we can reject the conventional wisdom of preemptive suits after *MedImmune*.[89] The standard errors support a 95% confidence interval in either direction.

As a first check, both the duration and the quick settlement models were estimated with year fixed effects, with and without district effects. The results are reported in the Appendix at Table A3. The results show a pretty clear pattern of no pattern. The number of quick settlements goes up and down annually, leading to lack of a solid trend that would be helpful in a differences-in-differences analysis. The year-to-year variation also explains why clustering was unhelpful; the negative correlation from year to year caused errors to cancel each other out. The same demand-letter proxy models were estimated with year fixed effects in unreported regressions. The results were similar.

A second potential check was to lag the interaction time to account for dissemination of the new rule or the effect of other changes in the system. Adjusting the interaction date earlier (for anticipation of the court ruling) or later (for adjustment delays following the ruling) by one or two quarters did not change the results.

A third potential check tests for exogeneity of the treatment variables. This is a concern in litigation studies because the treatment variables may be collinear with other effects that also have an effect on the dependent variable, here case durations or sending demand letters. Table A4 in the Appendix reports the results of three regressions that balance the covariates used for each of the proxies. The procedure involved estimating the independent variables using the exogenous variables, and then using those estimates to predict the dependent variables. Then the same differences-in-differences model is used to estimate the predicted dependent variables. Ideally, the covariates in these balancing regressions should be close to zero, because the treatments should have no effect on the other independent variables, such as the number of cases and patents.

That said, the nature of litigation is such that all of the relevant variables will never be fully exogenous. Here, part of the treatment is the plaintiff's business model, and that business model affects the number of patents, the number of defendants, and the district court. Thus, as Table A4 shows, the coefficients are not all zero. For example, with respect to duration, NPEs tend to have an effect on durations predicted by the number of patents and defendants. This is hardly surprising because NPEs generally sue more defendants using more patents. The duration effects of *MedImmune* are close to zero, which tends to support that it was an exogenous shock. With respect to sending demand letters, the treatment effects are generally close to zero, though the likelihood of sending demand letters predicted by patents and defendants decreased after *MedImmune*.

There are obvious limitations to the approach taken here. While there are many data points (cases filed), there are few plaintiffs, at least among the most aggressive licensors. Other plaintiffs that are not highly litigious might behave

89. Carlisle Rainey, *Arguing for a Negligible Effect*, 58 AM. J. POLI. SCI. 1083, 1090 (2014) (describing use of robustness checks for negligible results).

differently, though there is no reason to believe that they changed their behavior after *MedImmune*, but these plaintiffs did not.

V. IMPLICATIONS AND CONCLUSION

Based on these results, it appears unlikely that *MedImmune* had a substantial effect on declaratory judgment or preemptive complaint practice for NPEs only. However, a select group of plaintiffs was prone to sue first and negotiate later.

The *MedImmune* decision was issued in 2007. As Figure 1 shows, there is no clear pattern to declaratory judgment actions. While the aggressive licensing group saw more declaratory judgment cases after *MedImmune*, that trend was coming before *MedImmune*. Declaratory judgment rates were much higher in the 1990s and as late as 2004, so parties knew how to file for declaratory relief even without the Supreme Court's blessing. Filing rates likely dropped as the Federal Circuit made it harder to file such cases in 2005,[90] making it seem like there were more preemptive suits two years later.

But more telling are the regression results or, rather, the lack thereof. Despite seeing an increase in declaratory judgement cases, the licensing plaintiffs as a whole do not appear to have specially countered with more preemptive suits in response. If *MedImmune* caused more preemptive suits, then one would expect to see shorter litigation post-*MedImmune* or perhaps a larger share of short-lived cases. Neither happened. At the very least, the null hypothesis cannot be rejected. If anything, case length changed post-*MedImmune*, but cases lasted longer, not shorter. While cases were longer after *MedImmune*, a larger share of cases settled within 30, 90, or 180 days—though the results were not statistically significant and there was substantial variation from year to year. It is more likely that 2007 was a turning point year for litigation complexity.

That said, however, it appears that—for the group of plaintiffs that changed their behavior—patentees were much less likely to send a demand letter first. But this group (a) was generalized, and not related to the NPEs that the conventional wisdom predicted, and (b) represented only 60% of the cases.

It is unclear why *MedImmune* did not increase preemptive litigations among NPEs as everyone seems to think. There are a few possible explanations.

First, the litigious group might well be misspecified. That is, perhaps it is wrong to think that aggressive licensors would be more likely to file preemptive infringement suits than random plaintiffs. This is contrary to the conventional wisdom that these litigants are simply filing nuisance suits to protect their home venue,[91] and is therefore unlikely to be the reason for no effects. As a matter of theory, this group is different from other plaintiffs because its members desire a settlement; three of the studied plaintiffs were on record as moving to this strategy. As such, these NPEs should have been more likely to send "soft" demand letters

90. Teva Pharm. USA, Inc. v. Pfizer, Inc., 395 F.3d 1324 (Fed. Cir. 2005).

91. The entire set of nearly 1,000 cases filed by the litigious group led to a single trial damages verdict in the plaintiff's favor.

(which were differentially affected by *MedImmune*) and more likely to act strategically. But there are other reasons that the lack of results cannot be blamed on misspecification. For one, random litigants *also* filed preemptive suits, so perhaps they are not so different from NPEs in desiring home venue.[92]

Second, NPEs are heterogeneous. Some acquired their patents while others developed them in-house. The parties that admitted to acting strategically all acquired patents for licensing and enforcement. One model showed that this group was less likely to send demand letters after *MedImmune*. Other NPEs, such as inventor-owned companies, did not use this strategy, and may have confounded the results.

Third, the proxies for preemptive litigation may simply be wrong or unavailable given the available data. Case duration seems problematic due to outliers and other effects, but the share of quickly settled suits seems like it should be as good a proxy as any to measure whether a suit was preemptive. A more nuanced model might have considered suits filed in specific districts favored by the licensors, like the Eastern District of Texas, but even that district only accounted for less than 15% of lawsuits during the time period studied.

It is more likely that measuring case length is not a complete way to measure preemptive lawsuits where multiple defendants are lumped into one case. Many defendants might settle quickly, but the case will appear longer so long as one defendant does not settle. A two-way table of short cases (lasting less than 180 days) versus demand letters shows as much:

92. *Accord,* Chien & Risch, *supra* note 12 (finding that all types of plaintiffs sued in their home venue).

<180 Days	*No Demand*	*Demand*	*Total*
Less	744	245	989
More	251	105	356
Total	995	350	1,345

Table 7: *Two-way Table of Case Length and Demand Letter Allegations. This table tabulates the number of cases lasting fewer or more than 180 days, and the number of cases alleging a demand letter.*

If failing to send a demand letter were a sign of a quick settlement grab, we would expect to see much more, rather than fewer, cases resolving within shorter time periods when there was no demand. Instead, the two distributions do not appear to be correlated;[93] if they are at all, it is in the opposite direction. Furthermore, multi-defendant lawsuits can skew the results. A demand letter sent to 20 defendants might lead to one declaratory relief patent challenge, followed by a single lawsuit filed by the plaintiff against the 19 other defendants. There is no symmetry in case length or counts because the 19-plaintiff case may last a very long time for some but a short time for others.

Even assuming quick settlement were a reasonable proxy, perhaps the parties (in either group) did not file complaints in lieu of demand letters expecting quick settlements; instead, the filings were just like any other decision to file suit.

Fourth, and related, it is possible that there were more preemptive suits, especially as firms began to ignore demand letters. But given other changes in the law, the lawsuit filing led to entrenchment by defendants (and thus longer lasting cases). This would explain an increase in both the number of cases filed and the duration of those cases. Of course, it is possible that cases simply grew more complex over time, though the year fixed effects model does not support that assumption.

Fifth, and finally, there may simply have been no increase in preemptive litigation. Those not ready to undertake litigation may have sent even more vague demand letters rather than filing a preemptive suit.[94] Or, as the demand letter data

93. Both X^2 and Fisher's Exact tests imply different distributions at a confidence level of $p < 0.1$.

94. For example, one blog post describes recent efforts to force demand letters to include more details, because demand letters had become so vague. *Unintended Consequences of Patent Troll Legislation*, IP NAV (Mar. 18, 2014),

shows, there may have been a widespread decrease in demand letters. This would make it more difficult for demand-letter recipients to file a declaratory judgment action. If these explanations hold true, then patent reform that forces patent holders to include more detail in their demand letters may lead to more filings of full-blown, rather than preemptive, litigation. This would be an unintended consequence of trying to force more disclosure in demand letters.

VI. APPENDIX

	Random					*Litigious*				
Year	*Cases*	*% Total*	*Mean Δs*	*StdDev Δs*	*Median Δs*	*Cases*	*% Total*	*Mean Δs*	*StdDev Δs*	*Median Δs*
<1995	47	3.58%	1.28	0.74	1	23	2.51%	2.09	1.76	1
1995	12	0.91%	1.92	1.24	1.5	12	1.31%	2.75	3.93	1.5
1996	7	0.53%	1.14	0.38	1	9	0.98%	1.11	0.33	1
1997	16	1.22%	1.31	0.60	1	15	1.64%	1.73	1.58	1
1998	24	1.83%	1.25	0.61	1	25	2.73%	1.92	1.53	1
1999	50	3.81%	2.38	5.97	1	42	4.58%	1.62	1.68	1
2000	73	5.56%	2.03	1.80	2	24	2.62%	2.63	2.55	1
2001	61	4.65%	2.46	2.92	2	36	3.93%	2.31	2.10	2
2002	119	9.06%	2.06	2.70	1	72	7.85%	1.88	2.19	1
2003	136	10.36%	2.11	2.80	1	82	8.94%	1.63	1.14	1
2004	110	8.38%	2.06	2.51	1	52	5.67%	2.46	2.88	1
2005	110	8.38%	3.67	5.56	1	100	10.91%	2.02	2.92	1
2006	133	10.14%	2.53	3.09	1	131	14.29%	4.16	6.60	1
2007	181	13.81%	5.38	21.69	2	153	16.68%	5.71	11.16	2
2008	111	8.45%	1.98	1.82	2	88	9.60%	4.49	9.06	1
2009	121	9.22%	2.06	3.19	1131	53	5.78%	5.75	9.99	1
Grand Total	1311	100.00%	2.67	8.65	1	917	100.00%	3.38	6.75	1

Table A1: *Distribution of Cases by Plaintiff Type and Year, Including Mean and Median Number of Defendants per Case.*

https://web.archive.org/web/20170428171907/http://www.ipnav.com/blog/unintended-consequences-of-patent-troll-legislation/.

Category	*Random*	*CKS2010*	*BK2002*	*Litigious*	*CKS2010*
1 Licensing entity				53.38%	67.17%
2 University	0.00%	0.92%	1.42%		
3 Failed Startup	0.23%	0.21%			
5 Inventor-Owned Company	1.45%	2.94%		41.70%	19.78%
8 Product or Service Co.	92.16%	86.00%	84.86%		
9 Individual	4.35%	6.37%	13.72%		9.15%
10 Undetermined	0.15%	0.19%			
12 IP Licensing Arm of Product Co.	1.68%	1.25%		4.91%	3.90%

Table A2: *Distribution by Plaintiff Type, Compared to All Plaintiffs. The plaintiff types are listed in accordance with the Lemley/Myhrvold categorization of patent owners.*[95] *Plaintiff types in each group in this study are presented with similar categories for the population of all patent plaintiffs in 2010, a year later, denoted as CKS2010.*[96] *It also includes a rough breakdown of patent plaintiffs for all litigation from 2000 and 2002—designated BK2002.*[97]

As compared to the population of plaintiffs in 2010, this study slightly oversamples product companies and undersamples individual plaintiffs and inventor-owned companies. This is an acceptable tradeoff given the nature of the natural experiment: comparing licensing plaintiffs to "ordinary" ones that are less likely to file strategically.

Among the NPE samples, this study undersamples licensing companies and oversamples inventor-owned companies. The difference is primarily explained by two factors. First, about 5% of the 2010 NPE cases were filed by ArrivalStar, which is likely an inventor-owned company,[98] but are coded by Cotropia, Kesan, and Schwartz as a licensing entity. Second, it may reflect a historical change away from individual firms to licensing entities, given that the plaintiffs studied here were active from 1985 to 2009. For example, when limited to just 2008 and 2009, the cases in this study were 68% in Category 1 (licensing) and 24% in Category 5

95. John R. Allison, Mark A. Lemley & Joshua Walker, *Extreme Value or Trolls on Top - The Characteristics of the Most-Litigated Patents*, 158 U. PA. L. REV. 1, 4, 10 (2009).

96. Christopher A. Cotropia et al., *Unpacking Patent Assertion Entities (PAEs)*, 99 MINN. L. REV. 649 (2014); Christopher A. Cotropia et al., *2010 Patent Holder and Litigation Dataset* (Oct. 28, 2013), http://npedata.com/.

97. Gwendolyn G. Ball & Jay P. Kesan, *Transaction Costs and Trolls: Strategic Behavior by Individual Inventors, Small Firms and Entrepreneurs in Patent Litigation* (Ill. Pub. L. Res. Paper No. 08-21, U. Ill. L. & Econ. Res. Paper No. LE09-005, 2009). The 2000 and 2002 counts are not as granular, such that individuals and individual-owned companies are not distinguished from small companies, nor were any NPEs other than licensing entities tracked.

98. Paul Brinkman, *Delray Beach Inventor Files Hundreds of Patent Suits Nationwide*, SO. FLA. BUS. J. (Jan. 25, 2013), http://www.bizjournals.com/southflorida/print-edition/2013/01/25/delray-beach-inventor-files-hundreds.html.

(inventor-owned), which is much closer to the 2010 distribution for the entire population. Of course, there is also likely to be some random variation from year to year. As compared with 2000 and 2002, this study undersamples individuals; this is not surprising in longitudinal data, as individuals have been a decreasing proportion of plaintiffs over time. In the aggregate, these comparisons imply that the longitudinal data here proportionately reflects changing demographics over time.

	(1) Resolved <90	(2) Resolved <90
NPE=1	1.185 (0.681)	0.999 (0.604)
yearfiled=1994	0.850 (0.691)	1.261 (1.207)
yearfiled=1995	0.872 (0.953)	0.739 (0.907)
yearfiled=1996	4.703 (4.893)	4.423 (4.537)
yearfiled=1997	1.343 (1.127)	1.560 (1.335)
yearfiled=1998	0.455 (0.492)	0.709 (0.814)
yearfiled=1999	1.099 (0.627)	1.136 (0.651)
yearfiled=2000	0.433 (0.291)	0.611 (0.422)
yearfiled=2001	1.314 (0.677)	2.112 (1.157)
yearfiled=2002	1.073 (0.478)	1.225 (0.596)
yearfiled=2003	0.906 (0.401)	1.148 (0.571)
yearfiled=2004	0.918 (0.436)	1.507 (0.789)
yearfiled=2005	0.674	0.570

	(0.342)	(0.330)
yearfiled=2006	0.418	0.574
	(0.233)	(0.328)
yearfiled=2007	0.706	0.828
	(0.333)	(0.416)
yearfiled=2008	0.606	0.674
	(0.341)	(0.441)
yearfiled=2009	1	1
	(.)	(.)
yearfiled=1994 # NPE=1	1.790	1.154
	(2.540)	(1.883)
yearfiled=1995 # NPE=1	2.088	2.348
	(2.994)	(3.762)
yearfiled=1996 # NPE=1	1	1
	(.)	(.)
yearfiled=1997 # NPE=1	1	1
	(.)	(.)
yearfiled=1998 # NPE=1	2.853	1.562
	(3.824)	(2.215)
yearfiled=1999 # NPE=1	1.519	1.346
	(1.319)	(1.193)
yearfiled=2000 # NPE=1	4.889	3.371
	(4.881)	(3.440)
yearfiled=2001 # NPE=1	0.621	0.380
	(0.579)	(0.367)
yearfiled=2002 # NPE=1	0.903	1.058
	(0.688)	(0.835)
yearfiled=2003 # NPE=1	1.488	1.439
	(1.073)	(1.128)
yearfiled=2004 # NPE=1	1.050	0.658
	(0.863)	(0.567)
yearfiled=2005 # NPE=1	2.187	3.226

	(1.650)	(2.647)
yearfiled=2006 # NPE=1	4.173	4.288
	(3.241)	(3.429)
yearfiled=2007 # NPE=1	4.132*	5.623*
	(2.915)	(4.264)
yearfiled=2008 # NPE=1	1.117	0.995
	(0.952)	(0.908)
yearfiled=2009 # NPE=1	1	1
	(.)	(.)
NumPatents	0.931*	0.924**
	(0.0273)	(0.0281)
NumDefs	0.917**	0.922**
	(0.0300)	(0.0279)
Select Districts (C.D. Cal. Base)		
D. Del.		1.245
		(0.869)
E.D. Tex.		1.358
		(0.526)
N.D. Cal.		0.770
		(0.459)
Observations	1806	1611
Pseudo R^2	0.054	0.090
Chi-squared	59.17	97.09
$p > chi^2$	0.00169	0.00376

Table A3: *Year Fixed Effects. The above table shows estimations of the 90-day quick settlements model with year fixed effects, with and without district effects. Exponentiated coefficients shown, with standard errors in parentheses. Asterisks showing p-values as:* $^{*}p < 0.05$, $^{**}p < 0.01$, *and* $^{***}p < 0.001$.

	(1) plogtime	(2) pResL90	(3) pDemand
NPE=1	-0.0781***	0.0183***	
	(0.0219)	(0.00377)	
medimmune=1	-0.0239	0.00332	-0.111***
	(0.0264)	(0.00463)	(0.0258)
NPE=1 # medimmune=1	0.138***	-0.00812	
	(0.0394)	(0.00677)	
PfType=1			0.0444
			(0.0256)
PfType=5			-0.328***
			(0.0324)
PfType=9			0.154
			(0.146)
PfType=12			0.0178
			(0.0642)
PfType=1 # medimmune=1			-0.0948*
			(0.0368)
PfType=5 # medimmune=1			0
			(.)
PfType=9 # medimmune=1			0
			(.)
PfType=12 # medimmune=1			-0.128
			(0.0841)
Constant	5.829***	0.120***	0.346***
	(0.0140)	(0.00252)	(0.0177)
Observations	1842	1642	580
$p > chi^2$	0.000245	0.00000661	3.16e-31

Table A4: *Balancing Covariates. Exponentiated coefficients shown, with standard errors in parentheses. Asterisks showing p-values as: $^{*}p < 0.05$, $^{**}p < 0.01$, and $^{***}p < 0.001$.*

The above table shows three regressions corresponding to the three different proxies. In each, the dependent variable was estimated against the non-treatment variables (that is, everything other than NPE, MedImmune, and PfType).

Using the estimates, the fitted/predicted results were then used as dependent variables with the original differences-in-differences treatment.