

THE PATENT LITIGATION LANDSCAPE: RECENT RESEARCH AND DEVELOPMENTS

Introduction

Innovation serves as an important source of productivity growth. More than one half of the growth in the United States' productivity between 1948 and 2014 came from innovators and entrepreneurs, who worked to create new products or make improvements to existing products.¹ Academic research, such as [Geroski](#) (1989) and [Romer](#) (1990), has long acknowledged the importance of innovation to economic growth. In order to drive productivity growth, American inventors need the tools and incentives to experiment, innovate, and commercialize their ideas.

The patent system offers one such important tool for inventors. The U.S. Patent and Trademark Office (USPTO) grants patents to inventors of innovations that meet all the statutory requirements, including that it exhibit both "novelty and non-obviousness." Recent academic research has linked patent grants to beneficial firm-level outcomes, including productivity growth, job creation, and sales growth (Balasubramanian and Sivadasan 2011; Farre-Mensa, Hegde and Ljungqvist 2016).

After being granted a patent, the inventor has several options. The inventor may choose to: (1) commercialize the patent and be a practicing entity (PE); (2) license or sell the patent to another party that will commercialize it; or (3) sell the patent to an intermediary that has more experience in securing licensing opportunities or enforcing patent rights (Hagi and Yoffie 2013). This intermediation is sometimes performed by non-practicing entities (NPEs). As highlighted in the 2013 White House [report](#) "Patent Assertion and U.S. Innovation,"² NPEs can therefore in some cases provide

a valuable intermediation service for smaller companies and individual inventors.

It is possible that others may infringe on the patent, and the patent owner can then enforce his or her patent rights by bringing a patent infringement lawsuit. As noted in the 2013 Report, it can under certain conditions be costly to engage in patent litigation, either as a plaintiff or as a defendant. Thus, for defendants, these high costs mean that they may prefer to settle rather than fight patent litigation suits that they view as being without merit. This possibility of obtaining a settlement, without the defendant challenging the merits of the case, in turn increases the expected value of frivolous litigation, thus creating additional incentives for it to occur. On the other hand, well-financed defendants can outlast entrepreneurs with fewer resources, and thus induce plaintiffs with meritorious cases to accept settlements that are favorable to the defendants. Balancing the incentives to innovate with incentives to enforce or defend against patents appropriately is a challenge.

An analysis of recent research conducted since the 2013 Report, described in further detail below, suggests that a substantial amount of patent litigation in the United States, often with little substantive merit, often arises from certain types of NPEs called "patent assertion entities" (PAEs).³ Some of this research calls into question whether the costs imposed by PAE-initiated litigation are greater than the intermediation benefits that are provided by NPEs. Determining the extent to which those costs exceed these benefits could in turn help inform whether further changes to the patent landscape—whether from executive, judicial, or

¹ See Chapter 5 (page 208) of the 2016 *Economic Report of the President*, available: https://www.whitehouse.gov/sites/default/files/docs/ERP_2016_Chapter_5.pdf

² Original report issued June 2013 is located here: https://www.whitehouse.gov/sites/default/files/docs/patent_report.pdf. An addendum with additional citations issued March 2016 is located here:

<https://www.whitehouse.gov/sites/default/files/microsites/ostp/PatentReportAddendumMarch2016.pdf>.

³ Although much of this research has been conducted since 2013, in many cases it relies on data that predate important changes to the patent litigation landscape, including the America Invents Act and a variety of recent U.S. Supreme Court decisions.

congressional actions—would be beneficial with respect to making the patent system more efficient. The issue brief highlights the following findings:

- Annual patent grants have increased over the past 40 years;
- The overall number of patent litigation lawsuits appears to have increased over the past 40 years, though it is not clear how much the rate of litigation has increased;
- NPEs appear to be parties to an increasing proportion of patent litigation cases over the past ten years;
- Damages awarded to NPEs have been increasing, while damages for practicing entities (PEs) have been declining;
- NPEs pursue different litigation strategies than PEs; NPEs are more likely to litigate older patents, to pursue legal action in specific courts, and to target cash-rich firms;
- Patent litigation by NPEs appears to have a negative effect on innovation, though the effect on entrepreneurship is less clear, and more research is needed.

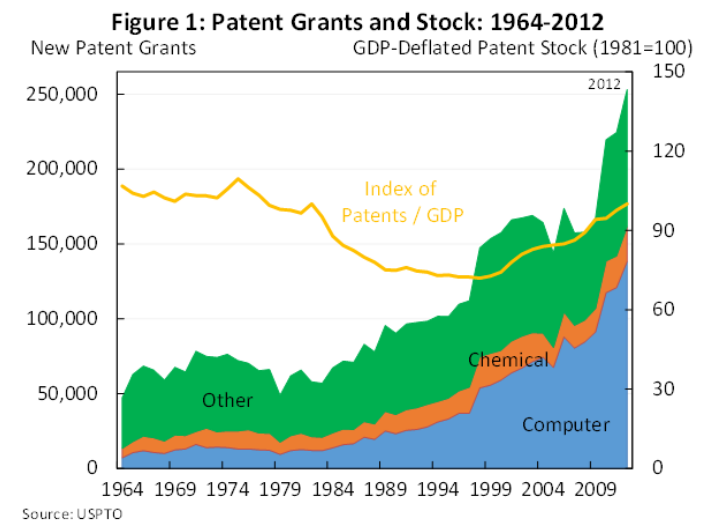
This issue brief also highlights that over the past few years, several important changes have occurred in the patent landscape due to executive and judicial actions.⁴ In particular, the U.S. Supreme Court has handed down several high-profile patent law decisions on topics such as patent-eligible subject matter and the awarding of attorney’s fees. In addition, the USPTO has implemented new post-grant review procedures established by the 2011 Leahy-Smith America Invents [Act](#) (AIA), providing a less expensive and faster way to challenge the validity of a patent. Finally, in December 2015, a change to the Federal Rules of Civil Procedure went into effect that affects pleadings. The effects of these many changes are just beginning to work their way through the patent litigation landscape, and in most cases are not yet

⁴ [Scott Morton and Shapiro](#) (2015) provide a useful overview of recent legislation and legal cases related to patent litigation.

measurable in the data. As a result, additional research on the effects of these reforms will be needed.

Patent Stock and Litigation

As indicated by Figure 1, annual patent grants have increased dramatically over the past 50 years, from approximately 50,000 to nearly 250,000 annually (left axis). The ratio of patents to GDP (right axis) appears to have decreased from a high in the 1970s to a low point in the late 1990s, before increasing again. Much of this recent growth in patenting has been in the computer sector, likely driven by the rise of the Internet, personal computers, mobile technology, and general IT infrastructure. More advanced applications of computer technology that are just beginning to come to the forefront and will likely continue to drive patent stock growth include artificial intelligence, advanced robotics, and big data analytics.

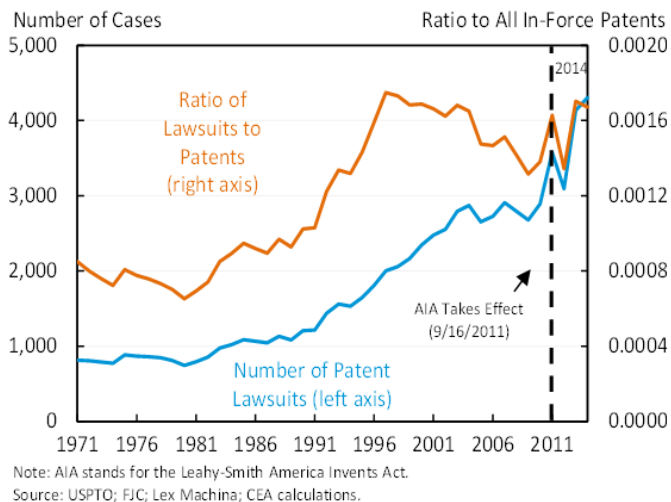


As indicated by Figure 2, the overall number of patent litigation cases (left axis) has approximately quadrupled over the past three decades. Research on the amount of patent litigation generally finds that it has increased (e.g., GAO 2013; Cohen, Gurun, and Kominers 2015; PWC 2014).

The rate of patent litigation (right axis), calculated as the ratio of the number of patent litigation cases to the number of in-force patents, increased on net from the 1970s to mid-1990s, then fell modestly from the mid-

1990s to 2010, before increasing again through 2014. Thus, trends in the rate of patent litigation depend on the time frame used. These figures are similar to rates reported by other researchers. For example, [Marco, Miller, and Sichelman](#) (2015) trace patent litigation rates from 1971 to 2009 and report similar findings for this time period.

Figure 2: Trends in Patent Litigation, 1971-2014



It is notable that some of the increase in patent litigation came immediately prior to and after the America Invents Act (AIA) took effect in 2011. The reasons for the recent increase are unclear. The increase since 2009 may have been due in part to a temporary increase in false marking cases (PWC 2013). Part of the increase may also have been due to the AIA's change in the "joinder rule" that had previously allowed multiple cases against different parties, involving a single infringed patent, to be joined into one lawsuit.⁵ The change in the joinder rule suggests that it may be useful to analyze litigation trends using other measures than the number of patent cases that were filed in a year. For example, [Cotropia, Kesan, and Schwartz](#) (2014) study lawsuits that were filed in 2010 and 2012 and show that, while the number of filed cases increased from 2010 to 2012, the number of unique patentees and number of defendants remained about the same in these two years.

Finally, research suggests that some of the time series variation in patent litigation is explained by business

cycles, with patent litigation increasing during recessions (Marco, Miller, and Sichelman 2015). While our time series does not extend further back in time, independent research suggests that longer-term structural changes matter as well. For example, the rate of patent litigation was higher in the mid-nineteenth century than it is now. [Beauchamp](#) (2015) reports that "New York City and Philadelphia ... had ten times more patent suits filed in 1850, per U.S. patent in force, than did the entire United States in 2013."

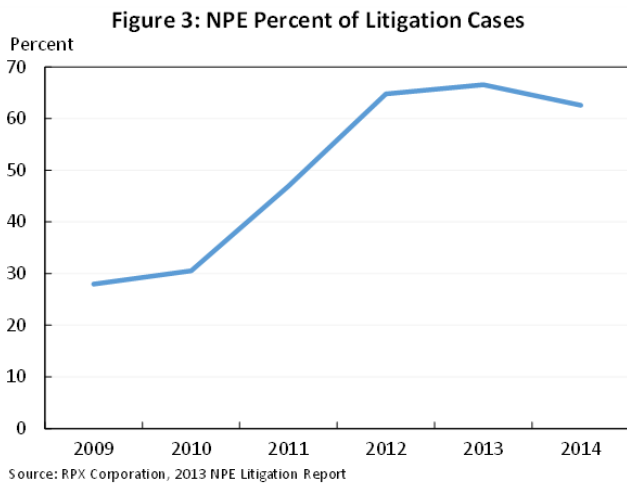
NPEs, Damages, and Litigation Strategies

Patent litigation cases are brought by both non-practicing entities (NPEs) and practicing entities (PEs). PEs are organizations that make, use, sell, offer for sale, or export, a patented product or service. NPEs are organizations that own patents but do not make or use the patented technology directly. They may (and in fact, often do) license the technology to be used by others. The NPE category includes patent assertion entities (PAEs) that assert infringement of a patent with the sole goal of generating revenues from licensing or settlements of litigation and may include individual inventors and universities who solely license patents to others (Lemley and Melamed 2013). These distinctions are not always easy to draw when categorizing plaintiffs in patent litigation. As a result, some studies do not attempt to differentiate between PAEs and other NPEs.

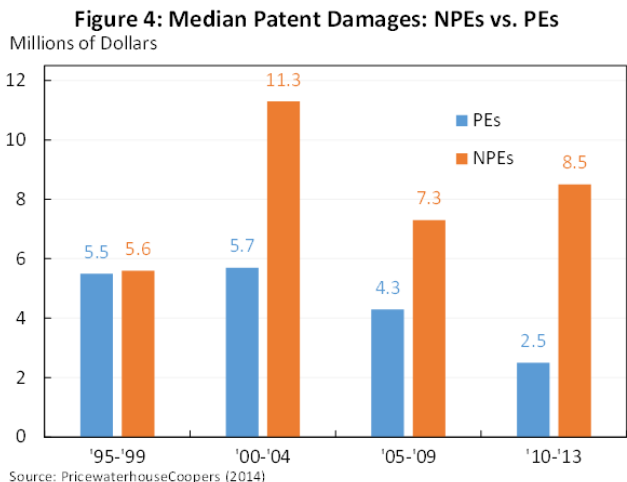
As Figure 3 illustrates, the share of patent litigation cases brought by NPEs has grown over time, from below 30 percent of all cases in 2009 to over 60 percent in 2014 (RPX 2014; RPX 2015).⁶ The majority of NPE cases are filed by PAEs, estimated to be 89 percent of all NPE cases (RPX 2015). [Cohen, Gurun, and Kominers](#) (2015) also show that the percent of cases brought by NPEs increased between 2000 and 2012. Given that the patent litigation rate has not changed appreciably over that period, this trend may represent a shift in litigation away from PEs to NPEs.

⁵ The joinder provision of AIA (35 U.S.C. § 299) imposes restrictions on the types of parties that can be joined in a single suit.

⁶ RPX is a publicly traded company (NASDAQ: RPXC) that provides patent risk management services, including insurance and market intelligence.



Median damages awarded to NPEs also appear to have increased over time and are larger than those awarded to PEs (PWC 2014). As indicated in Figure 4, the median award to PEs fell from \$4.3 million during 2000 – 2009 to \$2.5 million during 2010 – 2013, while the median award to NPEs increased from \$7.3 million during 2005 – 2009 to \$8.5 million during 2010 – 2013. According to [PWC](#) (2014), median damages awarded during 1995 – 2013 were higher for PAEs and other companies than universities and individual inventors, although PWC does not provide information on how this breakdown has changed over time. More research is needed to understand the reasons for the high damages awarded to NPEs relative to PEs, including a better understanding of any timing or selection effects. For example, it is possible that NPEs have a higher settlement rate than PEs—indeed, [Mazzeo, Ashtor, and Zyontz](#) (2013) suggest that NPEs, and PAEs in particular, may have incentives to reach settlement quickly—meaning that lawsuits brought by NPEs that make it to a court decision are a highly selected set of cases.



NPEs appear to have different litigation strategies than PEs. According to [RPX](#) (2015), NPEs were overwhelmingly likely to file suit in the Eastern District of Texas or the District of Delaware, and these two courts together accounted for 70 percent of cases filed by NPEs in 2014. As shown in Table 1, from 1995 – 2013, the Eastern District of Texas was the court with the most decisions involving NPEs, both in absolute number and in percent of decisions. This type of “forum shopping” is a notable feature of the current patent litigation environment. It is not surprising that litigants are motivated to act in this way; litigation success rates vary widely across district courts, as do damages and time to trial. The uncertainty around litigation costs and outcomes may lead defendants to settle quickly to avoid high costs or unfavorable decisions, even when the suit has little merit (Lemley and Melamed 2013).

NPEs also appear to target certain types of firms. A study by [Cohen, Gurun, and Kominers](#) (2015) finds that firms with large amounts of cash, or with a recent positive shock to their cash holdings, are more likely to be targeted by an NPE in a patent litigation suit (the authors do not differentiate between NPEs and PAEs). In contrast, they find that cash has no significant effect on the probability of being sued by a PE. The role of cash has been highlighted in other research as well. [Feldman and Frondorf](#) (2015) conduct a survey of patent-holding firms that went public between 2007 and 2012. They find that the likelihood of being accused of patent infringement—which includes both pre-suit allegations of infringement and the commencement of formal court proceedings—increased substantially after the firm completed its initial public offering.

Another litigation strategy used by some NPEs is to target older patents (Love 2013). According to [Love](#) (2013), NPEs prefer to assert their patents late in the patent term, when the purportedly infringing firms are likely to have amassed greater resources. In contrast, PEs generally enforce their patents at the beginning of the patent term when the incentives to recoup their substantial R&D costs are the highest. Even though they are NPEs, universities, and individual inventors conduct little late-term litigation, as they may share similar incentives as PEs to recoup R&D costs earlier. Cohen, Gurun, and Kominers (2015) also find that NPEs target older patents.

Table 1: District Court Patent Litigation Data, 1995-2013

District	NPE Cases Filed (2014 alone)	Decisions Involving NPEs	Total Identified Decisions	NPE Percent of Total Decisions	NPE Success Rate	Median damages (millions of dollars)	Median time-to-trial (years)
Texas Eastern	1352	50	136	37%	46%	9.1	2.21
Delaware	613	23	196	12%	35%	19.1	1.97
California Central	87	15	84	18%	33%	3.1	2.23
California Northern	83	28	149	19%	14%	8.4	2.44
New Jersey	80	6	87	7%	17%	16.6	2.71
Illinois Northern	59	33	136	24%	15%	6	3.67
Florida Middle	54	8	35	23%	63%	0.3	1.8
Florida Southern	49	13	40	33%	15%	0.4	2.5
Virginia Eastern	46	8	47	17%	25%	37.3	0.97
New York Southern	(*)	31	132	23%	13%	5.6	2.88
Massachusetts	(*)	14	77	18%	36%	4.2	3.58
Minnesota	(*)	10	48	21%	40%	1.6	2.66
Texas Southern	(*)	10	47	21%	10%	57	2.01
Texas Northern	(*)	9	35	26%	56%	3.6	2.42

Note: * indicates that RPX (2015) groups the district into its "All Others" category, which included 368 cases in 2014.
Sources: PWC (2014); RPX (2015).

According to Cohen, Gurun, and Kominers (2015), some NPEs also target firms that may have a reduced ability to defend themselves. They find that NPEs are more likely to target a firm when it has fewer lawyers and more ongoing non-IP related cases. The authors argue that the firm will be more likely to settle in such instances as it lacks the resources to defend itself, and this circumstance serves as an incentive to would-be NPE plaintiffs.

Innovation and Entrepreneurship

Patent litigation carries implications for investment in innovation. A model by Cohen, Gurun, and Kominers (2015) shows that patent litigation by NPEs can reduce infringement and incentivize innovation in some cases, but can also lead to frivolous litigation that hurts innovation, in other cases. It is therefore important to review the empirical evidence. Recent evidence seems to suggest that, on net, patent litigation by NPEs hurts innovation in some cases, though the research on how NPE litigation affects entrepreneurship is quite limited.

[Scott Morton and Shapiro](#) (2014) develop a theoretical model that they use to assess how patent litigation affects innovation. When they fit the model with existing data, the results suggest that, on net, NPE patent litigation reduces innovation (Scott Morton and Shapiro 2015). Other empirical research generally supports this finding. Cohen, Gurun, and Kominers (2015) find that firms reduce their R&D expenditure significantly after

losing to or settling with an NPE. [Smeets](#) (2014) finds that corporate R&D intensity for defendants drops following patent litigation for small firms that are involved in costly lawsuits. [Galasso and Schankerman](#) (2015) exploit the random assignment of judges to cases and find that patent invalidation results in a 50 percent decrease in future patenting by the patent-holder. However, they also find that the effect is primarily on small innovative firms; there is little effect on large, incumbent firms.

There has been comparably less research on the effects of patent litigation on entrepreneurship. [Kiebzak, Rafert, and Tucker](#) (2016) investigate the link between levels of patent litigation and venture capital (VC) investment in the United States, an indicator of levels of entrepreneurial activity. They conclude that VC investment initially increases with the number of litigated patents, but that beyond a certain threshold, further increases in litigated patents are associated with decreased VC investment. They also find some evidence that a similar relationship exists between patent litigation and small firm entry. [Chien](#) (2015) also reports that patent litigation disproportionately affects smaller companies. However, more research is needed on the link between patent litigation and entrepreneurial activity.

Recent Developments

There have been several recent executive and judicial actions that may help curtail abusive litigation going

forward. These developments concern patent eligibility, post-grant review, pleading standards, and attorney's fees.

Patent Eligibility

One such area of the patent litigation landscape that has been substantially affected in recent years by Supreme Court decisions is that of patent eligibility—that is, what sorts of ideas or technologies can or cannot be patented. Recent decisions in this domain have covered three kinds of subject matter: “abstract ideas,” “natural phenomena,” and “laws of nature.” The Supreme Court has long held that all three are ineligible for patenting, and the Court's recent decisions have clarified the application of these principles in the context of evolving technology.

With regard to abstract ideas, it ruled in 2010 in *Bilski v. Kappos* that the concept of hedging in investments is an abstract idea that is not entitled to patent protection, even when the implementation of the idea is within a computer system. The Court found similarly in 2014 in *Alice Corp. v. CLS Bank International*, holding that the institution of intermediated settlement, which can help reduce settlement risk, is an abstract idea ineligible for patent protection. Likewise, regarding so-called “laws of nature,” the Court held in 2012 in *Mayo Collaborative Service v. Prometheus Laboratories, Inc.* that knowledge of a particular set of physiological effects of a certain drug constituted a non-patentable law of nature. Its decision the following year in *Association for Molecular Pathology v. Myriad Genetics, Inc.* also found that a naturally occurring DNA segment is a product of nature and not patent eligible (importantly, however, it made a distinction with and exception for synthetic DNA that does not occur naturally). Evidence reviewed by Scott Morton and Shapiro (2015) suggests that the *Alice* decision has led to higher dismissal rates on the grounds that the patent claims cover non-patentable subject matter. More research on the effects of *Alice* and the other decisions is warranted, however.

⁷ For more information on these changes, see http://www.uspto.gov/blog/director/entry/ptab_s_quick_fixes_for and http://www.uspto.gov/sites/default/files/documents/Report_on_Implementation_of_the_AIA_September2015.pdf

Post-grant Review

In 2012, the USPTO issued rules and guidance that established a new trial procedure, called inter partes review (IPR), which is handled by the Patent Trial and Appeal Board (PTAB) rather than a federal court. This process for challenging the validity of a patent provides a quick, inexpensive alternative to district court litigation, and should help improve patent quality and ultimately reduce frivolous litigation.⁷ While it is too early to assess the effect of the new IPR procedure on patent litigation, USPTO has conducted its own research to better understand which patent characteristics are determinative of IPR petitions.⁸

Pleading Standards

Until recently, plaintiffs were able to file a suit over vague patent claims without specific allegations of infringement, and thus were able to demand the production of voluminous documentary evidence at the defendant's expense until more specificity could be required in later filings. This old way of doing business—which was based on what was known as the “Form 18” pleading requirement—was reformed a few months ago (as of December 1, 2015) as a result of actions taken by the Supreme Court and the Judicial Conference of the United States that modified the Federal Rules of Civil Procedure and Appendix of Forms. As a result of this rule change, patent asserters must satisfy the pleading standard set forth by the Supreme Court in its decisions in *Bell Atlantic Corp. v. Twombly* and *Ashcroft v. Iqbal*, under which lawsuits “must be supported by factual allegations.”⁹ As the rule change has been in effect for only a few months, it remains to be seen how this change will affect litigation empirically.

Attorney's Fees

In addition, until recently, it was relatively unlikely that a prevailing defendant in patent litigation would be able to recover attorney's fees and expenses from the plaintiff. On April 29, 2014 the U.S. Supreme Court released two

⁸ More information is available at: <http://www.uspto.gov/sites/default/files/documents/Patent%20litigation%20and%20USPTO%20trials%2020150130.pdf>

⁹ 556 U.S. 662 (2009).

decisions—*Octane Fitness, LLC v. ICON Health & Fitness, Inc.* and *Highmark v. Allcare Health*—that clarified the legal standards lower courts should apply in deciding whether to award attorney’s fees to a prevailing defendant. In both cases, the Supreme Court rejected two standards that the Court of Appeals for the Federal Circuit had previously applied when determining whether to award attorney’s fees, each of which made it more difficult for prevailing parties to recover them.¹⁰ It is too early to assess whether these practices have indeed become more widespread or have deterred baseless litigation.

Looking Ahead

These recent developments are promising in that all of them should reduce the level of frivolous patent litigation, in theory. Post-grant review and clarifications of patent eligibility both have the potential to improve patent quality, thus reducing the frequency of frivolous litigation, while new pleading standards and expanded trial court discretion in awarding attorney’s fees to prevailing parties should hinder or discourage such litigation. Despite these changes, it will take some time before their effects can be discerned from official statistics. Moreover, further research that relies on these data will then be needed in order to fully determine whether and how these changes have affected the patent litigation landscape.

Conclusion

Innovation helps drive productivity growth in the United States. Patents are an important tool that incentivize invention and creativity, allowing inventors and companies to protect their investments and support their commercialization. Legal recourse such as litigation is likewise an important tool for inventors and other patent owners to protect their patents from infringement. However, patent litigation can also be used opportunistically when the cost of litigating is higher than the cost of settlement. In other words, accused infringers may decide to settle rather than bear

the cost of fighting what they believe to be allegations without merit, and patent holders with meritorious claims (and limited resources) may decide to settle rather than bearing the costs of fully enforcing their patent rights.

In this issue brief, we use recent research to assess the state of patent litigation in the United States. The level of patent litigation has increased over time, but it is less clear that the rate of patent litigation has increased; depending on the time period used, the rate of patent litigation appears either flat or increasing. Research suggests that there has been a shift towards litigation by NPEs relative to PEs over the past decade. Those NPEs that are PAEs appear to favor specific litigation strategies, including choosing venues for their cases and targeting cash-rich firms or firms that are in vulnerable positions, among other strategies. Finally, some recent research suggests that NPEs’ litigation strategies can have a negative effect on innovation in some cases. Additional research is needed to understand the reasons for the high damages awarded to NPEs relative to PEs and the role that selection might play in these differences, if any. Additional research is also needed to understand how patent litigation affects entrepreneurship, if at all.

Many recent policy and legal changes, such as the AIA, recent court decisions, and executive actions, would appear to help curtail abusive litigation. While the effects of these many changes are still unfolding and more research is needed, the current data suggests that further reform—be it from further legislative, judicial or executive actions—may still be warranted, particularly in regard to the high concentration of litigation in certain judicial districts. Any reforms, however, should take into account the changes that have already occurred and are ongoing in the patent litigation landscape.

¹⁰ In *Octane Fitness*, the Supreme Court held that the Federal Circuit had too narrowly defined the circumstances in which a prevailing party would be eligible to recover its attorney’s fees. The Court also held that a prevailing party need not demonstrate its entitlement to attorney’s fees by “clear and convincing evidence” (as the

Federal Circuit had held) but instead must satisfy the less rigorous “preponderance of the evidence” standard. In *Highmark*, the Court rejected the application of *de novo* review by appellate courts of a district court’s decision on attorney’s fees and instead held that a district court’s fee decision is subject to abuse-of-discretion review.

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