

Unpacking Patent Assertion Entities (PAEs)

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Summary

Today, a certain type of patent litigant—the non-practicing entity (“NPE”), also known as a patent assertion entity (“PAE”), patent monetization entity (“PME”), or simply patent troll—is the target of much public debate, if not venom. The debate centers around which patent plaintiffs should be considered to be “patent trolls” and whether they are acting opportunistically to their benefit but to the detriment of the patent system.

The government appears swayed that PAE participation is largely or entirely negative. In December 2013, with very little debate, the House of Representatives passed a sweeping bill aimed at “stopping patent troll lawsuits.” The Senate is poised to consider this bill in early 2014. The legislative action followed comments on the topic by the President of the United States. Indeed, the President’s Council of Economic Advisers asserted in a June 2013 report (“Executive Office Report”) that there has been an explosion of PAE litigation from 2010 until 2012. But is the factual assertion by the Executive Office Report an accurate characterization of total PAE litigation activity? We find that it is not. Is the more general prevailing view on PAEs correct? We believe that the fundamental barrier to understanding the current debate is the lack of granular and transparent data on PAE litigation behavior.

Accordingly, we personally hand-coded all 7,500+ patent holder litigants from calendar years 2010 and 2012, and we are releasing this data to the public. In our coding, we drill down and finely classify the nature of the litigants, beyond the simple PAE or non-PAE definitions. Releasing this data to the public that unpacks the definition of PAE can provide better illumination to policy makers, researchers, and others interested in the patent litigation system.

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The data reveals the following findings.

- Consistent with the Executive Office report, the *raw* number of patent lawsuits filed by non-operating companies substantially increased from 2010 to 2012. However, the Executive office Report does not consider an important change to patent litigation made by the America Invents Act (AIA). The AIA, adopted in 2011, changed the joinder rules relating to patent litigation by prohibiting patent holders from including multiple, unrelated defendants in a single lawsuit based on commonly-asserted patent(s). Instead, after the AIA, patent holders must file separate lawsuits against each unrelated defendant.
- Contrary to the assertions in the Executive Office Report, we do *not* find an explosion in PAE litigation between 2010 and 2012. After considering the total number of patent litigants, we found almost no difference between 2010 and 2012. In other words, the “explosion” of PAE litigation between 2010 and 2012 is simply a mirage. Rather than solely focusing on the raw number of lawsuits as the Executive Office Report did, a more appropriate inquiry should focus on the *total number of patent litigants*, both patent holders and accused infringers, *in order to gauge more accurately the actual number of patent disputes between parties*. This is necessary because of the AIA’s change to the joinder rules described above.
- Based on the lack of significant changes in patent litigation patterns found in our work, recent outcries about adverse impacts of PAEs and calls for urgently needed patent system reforms seem exaggerated. Assessments of the scope of patent litigation problems created by PAEs (if any exist) and the types of reforms that may be needed to address such problems should be based on concrete data confirming harmful impacts from PAEs to avoid attempted reforms that are ineffective in reducing harmful practices while risking unforeseen impacts on legitimate patent rights and enforcement.

To permit others to evaluate our coding and to use the data for other studies, we have made the data set available at <http://www.npedata.com>.

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In the last decade, the landscape of patent litigation has radically shifted. Entities that do not manufacture products have become important players in the patent litigation system. This is a change from years ago, when patent litigation was dominated by lawsuits between competitors.¹ In this earlier period, there were complaints that the cost of patent litigation prohibited most small patent owners from enforcing their rights against large entities. Today, companies that manufacture products embodying their patents urge that patent plaintiffs that do not manufacture products are fundamentally different. This is mostly an asymmetric stakes argument. In a patent lawsuit, when both plaintiffs and defendants are manufacturers, defendants can cross-license patents or hit back at plaintiffs with their own patent infringement lawsuit, a strategy that is unavailable with a non-manufacturing plaintiff. As a result, non-manufacturing plaintiffs in the patent system are seen as opportunistic actors who sue manufacturing companies for money.

¹ 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 (2009).

The recent entrants, often-called non-practicing entities (“NPEs”), patent assertion entities (“PAEs”),² patent monetization entities (“PMEs”),³ or simply patent trolls, come in many shapes and sizes. They run the gamut from universities to failed startups to individual inventors to companies formed by venture capitalists to exploit the inventions of others.⁴ From the perspective of a patent as a economic instrument designed to provide rewards for inventors, it is important to carefully separate these specific categories of PAEs. There is little economic support for the proposition that individual inventors and university personnel should not benefit from the patent system. Similarly, start-up companies that subsequently fail to commercialize their patented technologies also urge that they should be allowed to monetize their patents through litigation when other companies deploy the start-up’s patented technologies in their products. Other entities in the patent system who help individuals, universities and failed start-ups monetize their patents also urge that they are important intermediaries bringing resources to inventors to help them monetize their patents. We recognize that there are various names that people use to refer to these entities.⁵ In this article, we refer to all of these entities as PAEs, except when referring to the studies of others who call them by a different name.

Most recently, there has been a ferocious backlash in many quarters against PAEs. Several academics have argued forcefully that PAEs are bad, that their conduct is costly, and that they are socially harmful to the economy. The President of the United States has even joined in the fray. In response to a question about “patent trolls,” President Obama recently stated “They don't actually produce anything themselves....They are essentially trying to leverage and hijack somebody else's idea and see if they can extort some money out of them.”⁶ To counter patent trolls, the President and his economic team issued an executive order including some legislative recommendations to make litigation more difficult for patent holders.⁷ Academics have contended that PAEs cost the economy tens of billions of dollars, based upon a confidential survey of defendants.⁸ The press trumpeted another study that patent trolls filed 62% of patent

² Colleen V. Chien, *From Arms Race to Marketplace: The New Complex Patent Ecosystem and its Implications for the Patent System*, 62 HASTINGS L.J. 297 (2010).

³ Sara Jeruss, Robin Feldman, & Joshua Walker, *The America Invents Act 500: Effects of Patent Monetization Entities on US Litigation*, 11 DUKE L. & TECH. REV. 357 (2012) [hereinafter Feldman – AIA 500].

⁴ Some studies have attempted to classify parties using a dozen entity status categories. See, e.g., *Extreme Value or Trolls on Top: The Characteristics of the Most Litigated Patents*, 158 U. PA. L. REV. 1 (2009).

⁵ Some refer to all or some NPEs as ‘trolls.’ For instance, some believe troll refers to a case brought by an NPE which is meritless. Others believe troll refers to a case brought by an NPE for a nuisance value settlement. Others believe that all cases brought by an NPE are troll cases, regardless of the merits. While the terms PME and PAE are meant to exclude university patent litigation, it is less clear whether individual inventor lawsuits are included. For an empirical project such as ours, the definition of an NPE is key.

⁶ <http://www.whitehouse.gov/blog/2013/06/04/taking-patent-trolls-protect-american-innovation>.

⁷ Executive Office of the President, *Patent Assertion and U.S. Innovation* (June 2013) (hereinafter “Executive Office Report”).

⁸ James Bessen & Michael Meurer, *The Direct Costs of NPEs*, 99 CORNELL L. REV. (forthcoming 2014); for a critique of the methods used in that study, see David L. Schwartz & Jay P. Kesan, *Analyzing the Role of Non-Practicing Entities in the Patent System*, 99 CORNELL L. REV. (forthcoming 2014).

lawsuits in 2012, a huge increase from the 29% filed in 2010.⁹ RPX, Inc. and Patent Freedom, two companies whose business includes providing subscriptions for businesses facing PAE assertions, each have reported summaries of their proprietary data on PAEs.¹⁰

While the rhetoric in these studies is often sharp and clear, the same cannot also be said for the disclosures of the underlying data. The studies merely provide summary data to the public, and often do not differentiate among the various types of PAEs. Instead, the studies broadly classify companies as either PAEs or not PAEs (or sometimes, trolls or non-trolls). Importantly, nearly all of the data upon which these studies are premised are confidential, and thus are not available for peer review or for use in other studies.¹¹ This includes the data used in the Executive Office Report. In late August, 2013, the General Accounting Office (“GAO”) released its long-awaited report on NPEs.¹² That report, while appearing quite balanced and thoughtful, does not provide the public with the underlying data used in its analysis. The GAO analyzed data from patent lawsuits initiated between 2007 and 2011, which means that it lacked meaningful data after the effective date of the America Invents Act in late 2011.¹³ The GAO report also did not disclose its underlying data. Because the underlying data is never released, other researchers cannot often determine which entities were classified as PAEs or NPEs, what revenue numbers were associated with these entities, and other information necessary to fully evaluate the claims. This information is critical to verify, as a policy matter, whether PAEs are engaging in strategic and opportunistic behavior that does not benefit anyone except them.¹⁴

⁹ http://news.cnet.com/8301-1023_3-57558384-93/patent-trolls-now-behind-most-patent-infringement-lawsuits/ (“About 62 percent of all patent lawsuits filed this year up to December 1 were brought by patent assertion entities (PAEs), which are created to extract licensing fees from other companies rather than make products based on the patents”); Colleen Chien, *Patent Trolls by the Numbers* (available at <http://www.patentlyo.com/patent/2013/03/chien-patent-trolls.html>).

¹⁰ RPX Corporation, RPX 2012 NPE Activity Report (available at <http://www.rpxcorp.com/siteFiles/SiteManager/0BF995E82CFF591EE80EFE8AC69259E7.pdf>). Patent Freedom’s publicly available website contains summary data on NPE assertions. *See, e.g.*, <https://www.patentfreedom.com/about-npes/litigations/>. Moreover, a legal practitioner, Steve Moore from the Kelley Drye law firm, wrote a five part series on the popular IPWatchdog blog about NPEs. In the posts, he reported summary data on a variety of NPE related issues that appear to contradict the anti-patent troll narrative. *See, e.g.*, Steve Moore, *Probing 10 Patent Troll Myths – A Fractured Fairytale Part 2* (available at <http://www.ipwatchdog.com/2013/07/30/probing-10-patent-troll-myths-a-fractured-fairytale-part-2/id=43754/>).

¹¹ We understand that Stanford Law School is in the early staging of organizing a publicly available database of litigated patent owner information, including classification of entities that own the underlying patents. We have agreed to contribute our data to this worthwhile effort. We understand that some or all of the data from the Feldman *et al.* article will also be contributed to the public database.

¹² General Accounting Office, *Intellectual Property: Assessing Factors that Affect Patent Infringement Litigation Could Help Improve Patent Quality* (August 2013) (available at <http://www.gao.gov/assets/660/657103.pdf>) (hereinafter “GAO Report”).

¹³ The GAO Report hypothesizes without data that the increase in litigation in the end of 2011 was because patent owner’s anticipated the passage of the AIA, which restricted the number of accused infringers who could be joined in a single lawsuit. *Id.* at p. 15.

¹⁴ We also note that lawsuits do not represent the complete story of patent disputes. Some disputes are clearly raised and either settled or dropped without court intervention. We have no means to evaluate the quantity or

Additionally, Congress has quickly sprung into action. In December 2013, the House of Representatives passed a sweeping bill, the Innovation Act, which is supposed to deter PAE lawsuits. The Innovation Act includes provisions for heightened pleading standards for patent infringement lawsuits,¹⁵ automatic stays of discovery in certain instances,¹⁶ expansion of the Patent Office's review of certain patents,¹⁷ shielding users of technology from liability,¹⁸ disclosure of financial interests of others in litigation,¹⁹ among other changes. The Innovation Act passed via a wide margin, and most expect patent reform to be a high priority for the Senate in early 2014. Defenders of PAEs have offered several purported benefits. They claim that PAEs provide liquidity in the marketplace for patents.²⁰ They permit inventors who are otherwise excluded from the marketplace, because for instance, they are individual who cannot manufacture products or they are companies that tried yet failed to manufacture, to obtain some return on their investment. Even when these entities sell their patents to another to enforce, they are receiving something for their efforts. According to this argument, without the market for patents, these inventors would remain uncompensated for their contributions. Furthermore, PAEs are claimed to be specialists in patent enforcement who are skilled in evaluating allegations of infringement, and hiring and supervising law firms to keep costs down. PAEs also have resources to cover litigate expenses. Under this theory, PAEs assert lawsuits that have a reasonable likelihood of succeeding and which are expected to yield recoveries above out-of-pocket litigation expenses.

To us, the fundamental barrier to understanding these competing narratives is the lack of granular and transparent data. No other NPE study, to our knowledge, has publicly released the underlying data. Other studies maintain their datasets as confidential or otherwise have not yet released the data.²¹ This present study overcomes this barrier.

We have classified all patent holder litigants from calendar years 2010 and 2012, and we are releasing this data to the public. We have attempted to drill down and finely classify the nature of the litigants, beyond the simple PAE or non-PAE definitions. Broad definitions of trolls or PAEs surely cause higher numbers. We believe that providing data to the public that unpacks the definition of PAE can provide better illumination to policy makers, researchers, and others

effect of cease and desist letters sent by patent holders, despite its potential importance. This correspondence between private parties is confidential and not available to research in all but the rarest of circumstances.

¹⁵ Patent Litigation and Innovation Act of 2013, Section 3. <http://www.gpo.gov/fdsys/pkg/BILLS-113hr3309rh/pdf/BILLS-113hr3309rh.pdf>

¹⁶ *Id.*

¹⁷ This provision of the Innovation Act was removed before final approval.

¹⁸ Patent Litigation and Innovation Act of 2013, Section 5.

¹⁹ End Anonymous Patents Act, H.R. 2024.

²⁰ Michael Risch, *Patent Troll Myths*, 42 SETON HALL L. REV. 457 (2012).

²¹ Some of the data is owned by RPX and Patent Freedom. These are for-profit businesses that earn money, in part, because of the data that they have compiled. We understand their legitimate business desire to maintain the data as secret. However, if a business elects to maintain its data as secret, then we believe the data should be severely discounted in debates about public policy. As academics, we do not have these financial incentives with respect to data.

interested in the patent litigation system. It will enable researchers to properly tailor investigations to the specific question they are considering. And if one believes that all PAEs, however defined, are bad, then one can aggregate our classifications to analyze data.

Our dataset, which took months to gather and code, includes 2,521 lawsuits from 2010 and 5,194 lawsuits from 2012. We classified each patent holder as an operating company, university, individual inventor, patent aggregator, technology development company, failed start-up, IP holding subsidiary of an operating company, or patent holding company. In addition, we obtain information about the underlying patents and technologies involved in the lawsuits.

Our data provides a rich account of changes in patent litigation in the last few years. Our most basic descriptive findings are inconsistent with and call into serious question the summary data provided by RPX, Patent Freedom, and other academics. Our data reveals a much lower percentage of litigation brought by patent holding companies than other studies. In fact, for the most part, we find that there has not been any explosion of non-practicing entity litigation between 2010 and 2012, as others have reported. We find, instead, that most of the differences between the years is likely explained by and attributable to a change in the joinder rules adopted in 2011 as part of the America Invents Act. To be sure, the data is slightly complicated, and we do find a modest increase in PAE litigation, especially if one uses a narrow definition of PAEs (including only non-original inventors – patent holding companies and patent aggregators). But overall, the often-repeated “explosion” of PAE litigation from 2010 to 2012 is almost completely a myth.

Our data reveals a modest increase in the number of patent holding companies and in the number of individual inventor suits. We note that many of the patent law changes currently proposed will negatively impact individual inventors. Individual inventors are rarely explicitly described as trolls, but are often included in the counts of ‘bad’ lawsuits. If one believes that the focus should be on speculators who purchase patents from others for the purposes of enforcement, then the data on such individuals should be studied.

The remainder of this Article proceeds in three parts. In Part I, we explain several theories on why PAEs are beneficial or detrimental to the patent system. These theories outline distinct categories of patent holders who enforce their patents. Transforming the distinct categories into a coding scheme, we detail in Part II the methodology we used to generate the dataset. Part III provides descriptive statistics of 2010 and 2012 patent litigation. We discuss implications of the data, including points of disagreement between our data and the data of others, in Part IV. We also describe some areas of future study, many of which we are presently undertaking. Finally, we provide a brief conclusion.

I. THEORIES RELATING TO PAES

There are numerous theories on the role of PAEs in the patent system. As mentioned in the introduction, many people (including President Obama’s economic team) contend that PAEs “significantly retard innovation in the United States and result in economic ‘dead weight loss’ in the form of reduced innovation, income, and jobs for the American economy.”²² They assert that PAEs hold up legitimate innovators by demanding undeserved rents. Opponents of PAEs point to other “unfair” aspects of PAE litigation that stem from the fact that PAEs don’t manufacture any products. For instance, PAEs are immune from a potential weapon used by accused infringers – counterclaims of patent infringement – because they make no products that may potentially infringe a patent. Furthermore, because PAEs do not manufacture, they have few documents. In litigation, the discovery obligations are asymmetric, with it costing more to defend a PAE lawsuit than to prosecute. Supporters of PAEs allege that these entities serve a useful role as intermediaries with skills at monetizing patents, something that many original patent owners lack.²³ But sometimes, the arguments are more nuanced. To untangle these conflicting economic rationales and dueling narratives, the definition of PAE needs to be unpacked and the specific categories of actors within the PAE category and their behavior in litigation needs to be analyzed separately.

An initial question is whether universities should be included within a definition of PAE. University faculty and graduate students are often viewed as important contributors to innovation and scientific research. However, universities are undeniably “non-practicing;” they do not directly commercialize their inventions. A technical definition of PAE or NPE would include universities, although many scholars believe universities should not be included.²⁴

Moving beyond universities, should individual inventors enforcing their own patents be considered PAEs? Again, these individuals are non-practicing in that they are not manufacturing products. Some consider them bad actors and ‘patent trolls.’²⁵ But the story of the garage inventor, “working against all odds to provide society with amazing technological breakthroughs” is part of the American dream.²⁶ And if an important benefit of PAEs is their roles as intermediaries skilled at monetizing patents, it is strange to include individual inventors, who are the original inventors and not intermediaries.

²² Executive Office Report, *supra* note 7 at 12.

²³ Risch, *Patent Troll Myths*, *supra* note 20.

²⁴ See, e.g., Mark A. Lemley, *Are Universities Patent Trolls?*, 18 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 611, 612 (2008) (arguing that universities should not be deemed trolls); Michael Risch, *Patent Troll Myths*, 42 SETON HALL L. REV. 457, 468 (2012).

²⁵ See, e.g., Andrew Beckerman-Rodau, *The Supreme Court Engages in Judicial Activism in Interpreting the Patent Law in eBay, Inc. v. MercExchange, L.L.C.*, 10 TUL. J. TECH. & INTELL. PROP. 165, 173 (2007) (“In contrast, the so-called patent trolls are often individual inventors or small startups.”).

²⁶ Christopher A. Cotropia, *The Individual Inventor Motif in the Age of the Patent Troll*, 12 YALE J.L. & TECH. 52 (2009).

Failed companies, including failed start-ups and failed operating companies, also are a distinct type of PAEs. At one point, these companies either manufactured products or seriously attempted to break into the market. For some reason, these entities failed at selling or developing products or services. They retained their original patents, and later seek to enforce them. To proponents, failed start-ups that enforce their patents are a positive. The revenue from patent monetization permits some return to the original corporate backers and investors, who otherwise would receive no money.²⁷ By providing an alternative method of returning money to investors, patent enforcement helps the investment ecosystem. Critics argue that very few startups plan or ever make money from enforcing their patents.²⁸ They argue that startups are more likely to be on the receiving end than asserting end of a PAE dispute.²⁹

Another category includes companies that develop technology largely for the purposes of licensing to others. These companies are like idea labs, which rely upon patents to protect the inventions. They are separate from individual inventors because they use a corporate structure to bring together numerous employee inventors. But they are original owners of the technology, and for the most part they do not practice the technology. These technology development companies fit as PAEs in some definitions, but not others.

Some definitions of PAE exclude the original owner of the patents. The argument is that financial speculators are purchasing patents, not with the goal of enhancing knowledge or encouraging commercialization, but rather merely to obtain rents. Others counter that these speculators are creating a market for patents to enable individual inventors to receive some compensation, when none was previously available. These speculators, presumably financed by Wall Street, take two potential forms. First, they may purchase a single patent or small portfolio of patents. These speculators form essentially a shell corporation – a patent holding company – to hold title to the patents without other substantial assets. Then, the patent holding company aggressively asserts the patents against an industry. The patent holding company's legal fees are relatively low in patent litigation because it has essentially no documents. Consequently, its discovery costs are low. Moreover, the patent holding company litigates overly aggressively because it has no reputational concerns that an operating company would have when asserting its patents.

A second type of speculator is the mass or large patent aggregator. The mass patent aggregator acquires a large portfolio of patents, sometimes alleged to be as large as 80,000 patents.³⁰ Aggregators then assert the entire portfolio against established industry participants. Critics of these entities claim that they are a tax on production, they unnecessarily raise rival's costs, and

²⁷ Risch, *Patent Troll Myths*, *supra* note 20.

²⁸ Colleen V. Chien, *Patent Assertion and Startup Innovation*, New America Foundation (2013) (available at http://newamerica.net/sites/newamerica.net/files/policydocs/Patent%20Assertion%20and%20Startup%20Innovation_updated.pdf).

²⁹ *Id.*

³⁰ Dennis Crouch, *Intellectual Ventures and its 80,000 Patents* (available at <http://www.patentlyo.com/patent/2013/10/intellectual-ventures-and-its-80000-patents.html>) (Oct. 7, 2013).

engage in potential anticompetitive conduct.³¹ Others tepidly defend mass aggregators by arguing that aggregators reduce transaction costs for companies needing to clear a significant number of patent rights.³² According to this narrative, mass aggregators reduce the number of negotiations, which in turn reduces “royalty stacking.”³³ Thus, according to theory, the total payment by those needing licenses would be lower when negotiating with a mass aggregator than when negotiating with numerous smaller patent holders.³⁴

The Federal Trade Commission (“FTC”) opened an investigation into certain PAEs, presumably ones that acquire patents from others.³⁵ One concern of the FTC is that an insufficient portion of the recoveries from patent assertions is provided to the inventors and innovators. Instead, the argument is that the middlemen – contingent lawyers, venture capitalists, and others – siphon off almost all of the money. Almost none of the money purportedly returns to the deserving party, the original inventor. The financial arrangements among the original owner, subsequent owners, their managers and attorneys, are typically confidential and not available for review. The FTC, through its 6(b) subpoena power, can theoretically obtain this sort of information.

The FTC’s concern highlights an important issue in the study of PAEs: not all of the criticisms in the press apply to all categories of PAEs. The FTC’s concern pertains only to a subset of PAEs. It does not apply to individual inventors and failed start-ups enforcing their own patents. Those groups obtain all or substantially all of the recovery from the lawsuits. Other entities, such as patent holding companies that purchase patents in order to monetize, fall within the desired criticism that the FTC hopes to investigate. Furthermore, large patent aggregators fall within the FTC’s concern.

In sum, there are numerous distinct types of patent holders who may assert their rights. These include universities, individual inventors, failed startups, technology development companies, patent holding companies, mass patent aggregators, as well as operating companies. The argument about the costs and benefits of PAEs vary for the different types of patent holders, with some arguments only being applicable to a subset of all patent holders.

³¹ Tom Ewing & Robin Feldman, *The Giants Among Us*, 2012 STAN. TECH. L. REV. 1 (2012).

³² Mark A. Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117 (2013).

³³ *Id.*

³⁴ *Id.*

³⁵ Edward Wyatt, *Inventive, at Least in Court*, NY Times (July 16, 2013) (noting that the FTC is “expected to begin a sweeping investigation” of patent assertion entities that use shell companies when they sue); Opening Remarks of Chairwoman Edith Ramirez, Competition Law & Patent Assertion Entities: What Antitrust Enforcers Can Do, Computer & Communications Industry Association (June 20, 2013) (“I believe that the Commission should use its 6(b) authority to study the costs and benefits of PAE activity.”) (available at <http://ftc.gov/speeches/ramirez/130620paespeech.pdf>).

II. STUDY DESIGN AND METHODOLOGY

In this Part, we convert the distinct categories of patent holders we set forth in Part I into a usable taxonomy of PAEs for our empirical study. Because the definitions we used are essential to our study, this part explains in detail the techniques used to collect and classify the data. It then reports some basic parameters of the data set. We also report various statistical measures of reliability. To permit others to evaluate our coding and to use the data for other studies, we have made the data set available at <http://www.npedata.com>.³⁶

A. The Coders

Because the data is both central to the Article and difficult to code, the authors personally coded all of the lawsuits.³⁷ We did not delegate the task to our student RAs. We did not outsource the job to foreigners unfamiliar with patents and the U.S. litigation system.³⁸ Instead, each of the three authors spent a significant amount of time coding the identities of the patent holders.

We believe that our previous experience relating to data, patents, and litigation was an important advantage in coding the lawsuits. Each of the authors practiced as a patent attorney before becoming a full time academic. Together we have over twenty years experience in practicing patent litigation representing both practicing and non-practicing entities, and over thirty years academic experience in studying patent litigation. In addition, our collective experience includes serving as legal experts and technical experts in patent litigation, and presiding over patent litigation as a special master. We have each separately conducted empirical studies of patent litigation and previously engaged in large scale coding projects.³⁹ We

³⁶ We have released the raw data we obtained from PACER that permits identification of the case, along with our categorization of the type of entity. PACER is a federal government-operated service providing access to electronic court records.

³⁷ As used in this article, we use the term “case” and “lawsuit” interchangeably. Both terms refer to a dispute that was assigned a particular civil action number by the courts.

³⁸ We do not know who RPX and Patent Freedom rely upon to classify parties in their database, but we suspect experienced patent litigators are not personally performing the coding.

³⁹ See, e.g., David L. Schwartz, *Explaining the Demise of the Doctrine of Equivalents*, 25 BERKELEY TECH. L.J. 1157 (2011); *Pre-Markman Reversal Rates*, 43 LOY. L.A. L. REV. 1073 (2010); David L. Schwartz, *Courting Specialization: An Empirical Study of Claim Construction Comparing Patent Litigation Before Federal District Courts and the International Trade Commission*, 50 WM. & MARY L. REV. 1699 (2009); David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223 (2008); Jay P. Kesan & Gwendolyn G. Ball, *How Are Patent Cases Resolved? An Empirical Examination of the Adjudication and Settlement of Patent Disputes*, 84 WASH. UNIV. L. REV. 237 (2006); Jay P. Kesan & Andres A. Gallo, *The Political Economy of the Patent System*, 87 N.C. L. REV. 101 (2009); Jay P. Kesan, *Transferring Innovation*, 77 FORDHAM L. REV. 2169 (2009); Jay P. Kesan & Gwendolyn G. Ball, *Judicial Experience and the Efficiency and Accuracy of Patent Adjudication: An Empirical Analysis of the Case for a Specialized Patent Trial Court*, 24 HARV. J. L. & TECH. 393-467 (2011); Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421 (2009); Christopher A. Cotropia, *Determining Uniformity Within the Federal Circuit By Measuring Dissent and En Banc Review*, 43 LOY. L.A. L. REV. 801 (2010); Christopher A. Cotropia, *Nonobviousness and the Federal Circuit: An Empirical Analysis of Recent Case Law*, 82 NOTRE DAME L. REV. 911 (2007); Christopher A. Cotropia, Cecil D. Quillen, Jr., & Ogden Webster, *Patent Applications and the Performance of the U.S. Patent and Trademark Office*, 23 FED. CIR. BAR J. 179 (2013);

believe that our prior experience is important. Many of the coding decisions require detailed knowledge of patent litigation and civil procedure, two topics which student coders and inexpensive foreign labor would be particularly deficient. Other coding decisions inherently require some subjective judgment.⁴⁰ We believe that our collective experience provides us substantial value in coding. Furthermore, we have benefitted from reviewing the coding schema used by other academics. These provide us both with a roadmap of potential coding schema and choices, as well as aspects we thought could be improved.⁴¹

B. Identifying Relevant Lawsuits

The data set assembled for the present study includes information from all patent infringement lawsuits filed in two complete calendar years: 2010 and in 2012. The raw data from these years include 3,553 and 5,600 lawsuits, respectively. We wanted two separate years so we could compare them. The year 2010 was well-suited for study because a majority of the lawsuits filed then have since been resolved, thus permitting us to investigate outcomes, settlements, and other information relating to the litigation. The year 2012 provides a more recent snapshot.

The year 2011 was poorly suited for empirical study, in our opinion, because the America Invents Act (“AIA”) was adopted in September of that year. The AIA included a revision to the joinder rules for patent litigation, which required lawsuits filed against multiple unrelated parties to be filed separately. After the negotiated language of the AIA was released to the public and before the President signed it into law, there appeared to be a rush to the courthouse to file before the new rules were effective. Indeed in those few days in September, over 800 defendants were sued for patent infringement.⁴² Because of both the change of law that occurred during the year, and the uncommon spike in filings before the adoption of the AIA, we chose to exclude 2011. We suspect that many of the cases filed in September 2011 would have otherwise been brought later in 2011, and that some of them may have been filed in 2012 (or not filed at all). We don’t believe that the September 2011 spike substantially affects our results from 2012, but at this point, we cannot rule it out.

We do not believe that parties in 2010 anticipated the passage of the AIA. Patent reform bills had been introduced in Congress every year since 2005, becoming progressively more watered down each year.⁴³ There was no indication or expectation that a bill would ever pass.⁴⁴

Christopher A. Cotropia, Mark Lemley, & Bhaven Sampat, *Do Applicant Patent Citations Matter?*, 42 RESEARCH POLICY 844 (2013); Christopher A. Cotropia, *The Strength of the International Trade Commission as a Patent Venue*, 19 TEX. INTELL. PROP. L.J. 1 (2011).

⁴⁰ We note that the government disagreed with 29 out of 500 classifications made by Feldman et al. See GAO Report, *supra* note 12 at p.52 (“We found 29 cases where we differed with Lex Machina’s original classification. They adjusted their classifications in all but five of the cases.”).

⁴¹ Sara Jeruss, Robin Feldman & Tom Ewing, *The AIA 500 Expanded: The Effects of Patent Monetization Entities*, 11 DUKE L. & TECH. REV. 357 (2013).

⁴² <http://www.patentlyo.com/patent/2011/09/rush-to-judgment-new-dis-joinder-rules-and-non-practicing-entities.html>.

⁴³ Dan L. Burk, *Patent Reform in the United States: Lessons Learned*, REGULATION 20 (Winter 2012-2013).

Furthermore, the joinder provision of the AIA was not present in the patent reform bills under debate in 2010 or earlier.⁴⁵

We used Bloomberg Law's Federal Docket Database to identify the patent lawsuits filed in these years.⁴⁶ We understand that Bloomberg Law obtains its data from PACER. As a check on Bloomberg's comprehensiveness, we manually compared the results of a search of patent infringement lawsuits from Bloomberg with an analogous search from PACER.⁴⁷ We found that the Bloomberg results were over 99% accurate in the sample we reviewed, and in fact, appeared to capture consolidated matters slightly more accurately than PACER's raw data.⁴⁸ Consequently, we felt comfortable using Bloomberg's dataset of patent infringement cases.

For every lawsuit, we reviewed the Docket Report and a copy of the Complaint. The Docket Report is a list of the papers filed with or generated by the court in the case. It includes the title and associated date of each entry from the initial complaint until the lawsuit is terminated. The Complaint is the legal document that initiates a lawsuit. While the Complaint is frequently light on facts, it sometimes has information about the parties, including the patent holder.

After reviewing these documents, we eliminated several types of cases from the data set. First, we excluded all cases in which the sole cause of action was Patent False Marking.⁴⁹ There were 666 Patent False Marking cases, which we manually excluded in 2010. The AIA effectively

⁴⁴ *Id.*

⁴⁵ For a summary of the key provisions in the proposed Patent Reform Act of 2010, see <http://patentlyo.com/patent/2010/03/patent-reform-act-of-2010-an-overview.html>. Even the patent reform bills introduced earlier in 2011 did not contain the provision on joinder. See <http://patentlyo.com/media/docs/2011/02/patentreformactof2011asreported.pdf>.

⁴⁶ We limited the docket search on Bloomberg Law to lawsuits from between January 1 and December 31 of the given year. We used the Nature of Suit field to isolate "830 – Patent" cases.

⁴⁷ We limited our search in Pacer to Nature of Suit "830 – Patent" as we did in Bloomberg Law.

⁴⁸ We reviewed lawsuits initiated between January 1, 2012 and March 1, 2012 in both databases. There were only 7 inconsistencies in 778 records. These 7 inconsistencies all were from two groups of lawsuits. In the first, involving Brandeis University, there were a set of cases filed in the W.D. Wisc. and N.D. Ill. between the same parties. Bloomberg merges these into a single lawsuit, specifically the one that was pursued. In the second, PACER has two lawsuits with sequential docket numbers (9:12-cv-80037 and 9:12-cv-80038) between the same parties in the same district. Bloomberg only includes one of these lawsuits. For all of these inconsistencies, we believe that Bloomberg's data is better suited for our purposes than the original PACER data. As discussed in more detail below, we believe that consolidated cases should not be double counted.

⁴⁹ False Marking disputes are cases in which someone, often a member of the general public, complains that a company labeled its product as "patented," when in fact, no unexpired patent covered the product. The issues in Patent False Marking cases are quite different from disputes about whether a party infringes a patent. For instance, the validity of the patent is not at issue in Patent False Marking cases. Many of the cases involved companies that, without bad intent, continued to mark their products with a patent number even though the patent had expired. In these cases, infringement was not at issue either. Furthermore, none of the current debate about NPEs involves claims about false marking. Consequently, we thought it best to remove these cases from the data set.

eliminated nearly all false marking cases.⁵⁰ We did not find any False Marking disputes in the 2012 data.

Second, we excluded all cases in which the only patents asserted were design patents. The current debate about PAEs is about utility patents, not design patents.⁵¹ If a lawsuit involved allegations of both utility and design patent infringement, we retained the lawsuit in the data set. This resulted in 184 lawsuits being dropped in 2010, and 176 lawsuits being dropped in 2012.

Third, we excluded other cases that did not involve an allegation of infringement of a utility patent. This included allegation of legal malpractice, inventorship disputes (including requests for correction of inventorship), demands for patent term adjustments, interferences, motions to quash subpoenas, other actions against the Patent Office, and mislabeled trademark and copyright infringement actions.⁵² We excluded 139 lawsuits on this basis from 2010, and 147 lawsuits from 2012.

Finally, we excluded duplicate cases. Whenever possible, when cases were consolidated or transferred, we eliminated the duplicate lawsuit. While we removed duplicative suits, we did not automatically remove declaratory judgment actions. If there were reciprocal declaratory judgment and patent infringement actions involving the same parties and the same patents, we would exclude one of the lawsuits. Unless there was a reciprocal lawsuit brought by the patent holder, we retained declaratory judgment actions in our data set. We understand that other researchers have systematically eliminated all declaratory judgment actions from their data set.⁵³ We see no reason to exclude them, provided that such lawsuits involved allegations of utility patent infringement and do not result in a double counting of a dispute between the patentee and the alleged infringer.

After removing the categories of lawsuits identified above, our dataset contained 2,521 patent infringement lawsuits in 2010, and 5,194 patent infringement lawsuits in 2012. As we explain in Section II, the difference is largely explained by the AIA change in joinder rules.

⁵⁰ The America Invents Act eliminated the ability of any member of the public to initiate a lawsuit alleging false marking. Instead, only the U.S. government and companies that have been competitively injured can initiate false marking lawsuits. 35 U.S.C. § 292 (2011). Almost none of the false marking cases brought in 2010 were brought by a company that had been competitively injured.

⁵¹ Design patents are becoming more important in the business context, but they still are fundamentally different from utility patents. Design patents contain essentially no text; nearly all of the patent specification and claims are comprised of figures of a design. They cover ornamental and decorative aspects of a design, as opposed to functional aspects. Litigation involving design patents is much cheaper than utility patent litigation. For instance, the American Intellectual Property Law Association estimates that the cost of design patent litigation is substantially below utility patent litigation. But again, the current debate about NPEs is about utility patents, not design patents.

⁵² These cases are quite distinct from patent infringement lawsuits. More importantly, they are not part of the debate about NPEs. Thus, we believe that exclusion of these cases is necessary.

⁵³ Feldman-AIA 500, *supra* note 3, at 365 (noting that “[g]iven our focus on patent holders who file infringement cases, we chose to exclude declaratory judgment cases.”).

For every lawsuit, we obtained certain specific information from Bloomberg Law. We obtained the judicial district that the lawsuit was brought; the judge assigned to the case; the civil action number; the filing date of the lawsuit; the utility patent numbers asserted in the lawsuit; and a list of all of the parties to the lawsuit (including all plaintiffs and defendants). From there, we determined the type of patent holder involved in the lawsuit.

C. Classifying Patent Holders

For each of the patent infringement lawsuits in 2010 and 2012, we classified the patent holder by type of entity. Each of us coded approximately one third of the cases. We intentionally coded overlapping cases so we could gauge the reliability of the coding. When coding, we considered all of the parties involved in asserting patent infringement. When there was only a single party who owned the patent, it was easy. In these cases, we focused on the sole patent holder.

However, when there were two or three plaintiffs (or defendants in declaratory judgment actions), our focus was on who *controlled* the litigation and litigation strategy. This occurred somewhat infrequently. The most common time it occurred was when a patent owned by an individual was asserted in a lawsuit along with an exclusive licensee operating company. In these cases, we identified the patent holder as an operating company since the operating company was likely financing the litigation, taking a large percentage of the winnings (if any), and controlling litigation strategy. Even less common were a lawsuit involving two plaintiffs, one of which was a university patent holder and the other was an exclusive licensee operating company.⁵⁴ In this case, we would assume that the operating company was financing and controlling the litigation. Consequently, we classified that sort of case as an operating company case. Because of these coding decisions, we believe that our count of individual inventors and universities is rather conservative since we coded some cases in which these entity types are the patent holder as operating company cases.

We classified all patent holders into one and only one of the following groups: (1) university; (2) individual inventor; (3) large patent aggregator; (4) failed operating or start-up company; (5) patent holding company; (6) operating company; (7) IP holding company owned by operating company; and (8) technology development company. These categories seemed to capture the essential features of the policy debate. For instance, we separated individual inventors from patent holding companies because some argue that a key shortcoming of ‘trolls’ is that they do not return sufficient money to the original inventor.

For a small number of companies, we could not determine which group to classify them, and therefore labeled them as undetermined. If any coder was unsure of the classification of a

⁵⁴ To provide some context on how frequently this arose, we found 13 patent lawsuits filed in the 2010 involving university and operating company co-plaintiffs. Our core results remain unchanged, even if one were to classify these as university patent holders.

patentee, then the coder would code the classification as ‘unsure’ or ‘undermined.’ We then had a second author review the coding on these entities.⁵⁵

To determine the classification, we looked at several sources. First, we reviewed the complaint filed in the lawsuit. Sometimes, the complaint mentioned whether products were being manufactured by the patent holder that were covered by the patents at issue. If the complaint made that sort of statement, then we coded the patent holder as an operating company. It was not feasible for us to investigate the quantity of products being manufactured or the timing of the manufacture. When the complaint was silent (as it was in the majority of cases), we used web searches to obtain information about the patent holder. If the patent holder had a website that indicated that it manufactured products, then we classified it as an operating company.

Below is a brief description of each category.

(1) university: a public or private institution of higher learning. It includes foreign and domestic institutions.⁵⁶ An example is Cornell University.

(2) individual inventor: one or more inventor who owns a patent (i.e., it is unassigned to a company). Often the party to the litigation would be an individual litigating in their individual capacity. We also included family trusts in this category. Additionally, if it appeared that an individual had formed a corporate vehicle that she completely controlled for the primary purposes of litigation, then we coded this as an individual, and we also created as separate subcategory of individuals litigating in a corporate capacity. This arose when the name of the corporate vehicle included the name of the individual inventor, and no products were being sold. For instance, Ronald A. Katz Technology Licensing, LLC (RAKTL) asserts patents invented by Ronald A. Katz. While Ronald Katz does not technically hold these patents in his individual capacity, we believe that RAKTL is best understood as an individual inventor. Sometimes our review of corporate records revealed that the individual inventor owned all of the shares of the corporation. However, such corporate records were not available for all companies, especially for companies we identified as patent holding companies. Consequently, we suspect we may undercount the number of individuals litigating in a corporate capacity, and similarly overcount patent holding companies. Finally, we note that one of these coding decisions, in a patent owned by an entity named Geotag, is important to our results, as the patent is asserted in numerous litigations.⁵⁷

⁵⁵ As an additional layer of reliability, we had student coders verify the cases we were unsure, as well as other cases.

⁵⁶ We do not believe that any of the entities we categorized as universities were instead patent holding companies that were named to sound like universities. We reviewed the complaints for all cases and the complaints contained recitations of each party in the case. The recitation of universities typically indicated something along the lines that they were not-for-profit educational institutions.

⁵⁷ Geotag is a company frequently in the news. See e.g., Peter Bright, *Google and Microsoft Team Up to Battle Geotagging Patent Troll*, ars technica (March 3, 2011) (available at <http://arstechnica.com/information-technology/2011/03/google-and-microsoft-team-up-to-battle-geotagging-patent-troll/>); Ameet Sachdev, *Obama*

(3) large patent aggregator: a company with a large patent portfolio whose primary business is enforcing patents of numerous others. This includes Acacia companies⁵⁸ and Intellectual Ventures.

(4) failed operating or start-up company: a company that originally invented the patent-in-suit, and attempted to commercialize the technology. At present, the company sells no products and its primary business appears to be patent litigation. An example of the failed operating or start-up company is Broadband Graphics LLC.

(5) patent holding company: companies, usually limited liability companies, that appear to have been formed solely to hold and enforce a patent or small portfolio of patents. As far as we can tell, these companies are not owned by the original inventor. Frequently, these companies were formed shortly before litigation was commenced.

(6) operating company: companies that manufacture products or deliver services (other than licensing patents). An example of an operating company is Hewlett Packard. We have not analyzed whether the operating company is making use of the patent-in-suit.⁵⁹

(7) IP holding company owned by operating company: companies that were wholly owned by operating companies, and which own the patents. For instance, AT&T Intellectual Property I, L.P. is an IP holding company for AT&T Corp.

(8) technology development company: a company which invested in the development of technology, perhaps with the intention of licensing rather than commercialization. A technology development company is the original owner of the patents, but does not manufacture products covered by the patents. Examples of technology development companies are Walker Digital, LLC and Tessera Technologies.

Tries to Curb Some Patent Holding Companies, CHICAGO TRIBUNE (June 5, 2013) (“Hundreds of retailers, for example, were sued in 2010 by a patent-holding company called GeoTag Inc. for having websites that used store locator functions.”). We coded Geotag as an individual inventor since we understand that one of the original co-inventors owns 100% of Geotag. Geotag is a difficult coding decision, as the patent was originally owned by a start-up company that employed the inventor. According to a declaratory judgment complaint lodged against Geotag, the patent has changed ownership five times, and the original inventor was involved in all of the transfers. <http://docs.justia.com/cases/federal/district-courts/delaware/dedce/1:2011cv00175/45847/1/0.pdf?1299179190>. We believe that this scenario fits more closely to an individual inventor. Alternatively, some may classify it as a failed startup. It seems, to us, quite different from a patent holding company which purchases a patent and has no preexisting relationship with the original inventors.

⁵⁸ We identified Acacia companies by several mechanisms. Acacia sometimes litigates in its own name. Other times, an Acacia subsidiary or other company with an agreement with Acacia is the patent holder, and does not contain “Acacia” in its corporate name. We located what we believe are most of these companies by analyzing Acacia press releases of settlements, which identified the Acacia company. Furthermore, we checked the corporate ownership information for most of the patent holders. Acacia’s name often was visible in a corporate ownership check. If the company was an Acacia company, we coded it as a Large Aggregator, regardless of the underlying company’s entity type.

⁵⁹ We know that some operating companies assert patents that they do not practice. See Ted M. Sichelman, *The Vonage Trilog: a Case Study in ‘Patent Bullying’* (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1856703).

As previously mentioned, we coded a subset of each other's coding. From a mathematical calculation, the reliability of our coding appears quite high.⁶⁰ That said, one should be aware that our coding is based upon publicly available information. It is quite possible that some of the companies have confidential transactions relating to the patents that would affect our coding. For instance, some of the patent holding companies may be affiliated with the original inventor, although we cannot tell that from the available public information. Furthermore, it is often difficult to identify failed start-ups.

D. Other Data

Docket Navigator also graciously provided us data about claim construction. More specifically, Docket Navigator told us which patent lawsuits in 2010 had resulted in a claim construction, and which had not. The data captured whether the claims had been construed, which ones were construed during summary judgment motions, in a separate claim construction hearing or proceeding, or at another time during the litigation. We tested a random sample of 2% of the data provided by Docket Navigator and found the data to be highly reliable.⁶¹

Finally, we obtained a list of the patent numbers asserted in each case. We recorded the information that Bloomberg Law generated for each case. It appears that Bloomberg Law used an automated means to scrape the complaints and capture the patent numbers affiliated with each case. After reviewing the Bloomberg Law patent number information, we had concerns

⁶⁰ We chose Cohen's Kappa as the measure of inter-coder agreement. Mark A. Hall & Ronald F. Wright, *Systematic Content Analysis of Judicial Opinions*, 96 CAL. L. REV. 63, 113–14 (2008) (stating that the best practice for relaying reliability information is to report a coefficient such as "Cohen's Kappa"). Cohen's Kappa ranges from 0 to 1, with numbers near 1 indicating a higher degree of reliability. For our 2010 unique parties, Cohen's Kappa is 0.653, which equates to "substantial agreement." Anthony J. Viera & Joanne M. Garrett, *Understanding Interobserver Agreement: The Kappa Statistic*, 37 FAMILY MEDICINE 360 (2005). For our 2012 unique parties, Cohen's Kappa is 0.836, which equates to "almost perfect agreement." *Id.* By calculating Kappas on unique parties instead of all parties, we likely overstate the amount of disagreement in our respective coding. For instance, the Kappa for 2012 duplicate parties is .956, indicating that we almost always agree on the patent holders who appear multiple times in the dataset. We did not code an overlapping set of duplicate parties in 2010 so we cannot report a similar Kappa. The difference between the 2010 and 2012 Kappas likely reflects an incremental improvement in our coding methodology which we refined as we went along, and the numbers do not likely reflect any underlying issue related to the parties or that there is significant subjectivity in our individual coding approaches.

⁶¹ More specifically, we randomly selected 50 cases from 2010. For those cases, we studied the docket report for the litigation, reviewing all relevant documents, to determine if the claims had been construed. We then compared our results with the data provided by Docket Navigator on claim construction. For 49 of the 50 cases, we agreed with Docket Navigator. In one case, we identified claim constructions that were not reported by Docket Navigator. Upon investigation, Docket Navigator informed us that the order construing claims was not immediately available from PACER when filed, so Docket Navigator was unable to record the construed terms when it initially processed the document. Docket Navigator was able to obtain the document at a later date and back-fill the missing claim constructions.

about its accuracy.⁶² We attempted to manually correct the Bloomberg Law results when they appeared likely to be inaccurate. Because we used the patent numbers merely to roughly categorize by technology, we believe that the inaccuracies may be less important.⁶³

III. RESULTS

As previously discussed, we initially collected 3,553 cases filed in 2010 and 5,600 cases filed in 2012 identified as “830—Patent” cases. We manually removed false marking cases, cases involving only design patents, cases that did not include an allegation of patent infringement, and “duplicate” filings such as corresponding declaratory judgment actions to already filed infringement actions and consolidations of already filed cases. This left 2,521 utility patent infringement cases filed in 2010 and 5,194 filed in 2012. These constituted the universe of cases that we analyzed further.

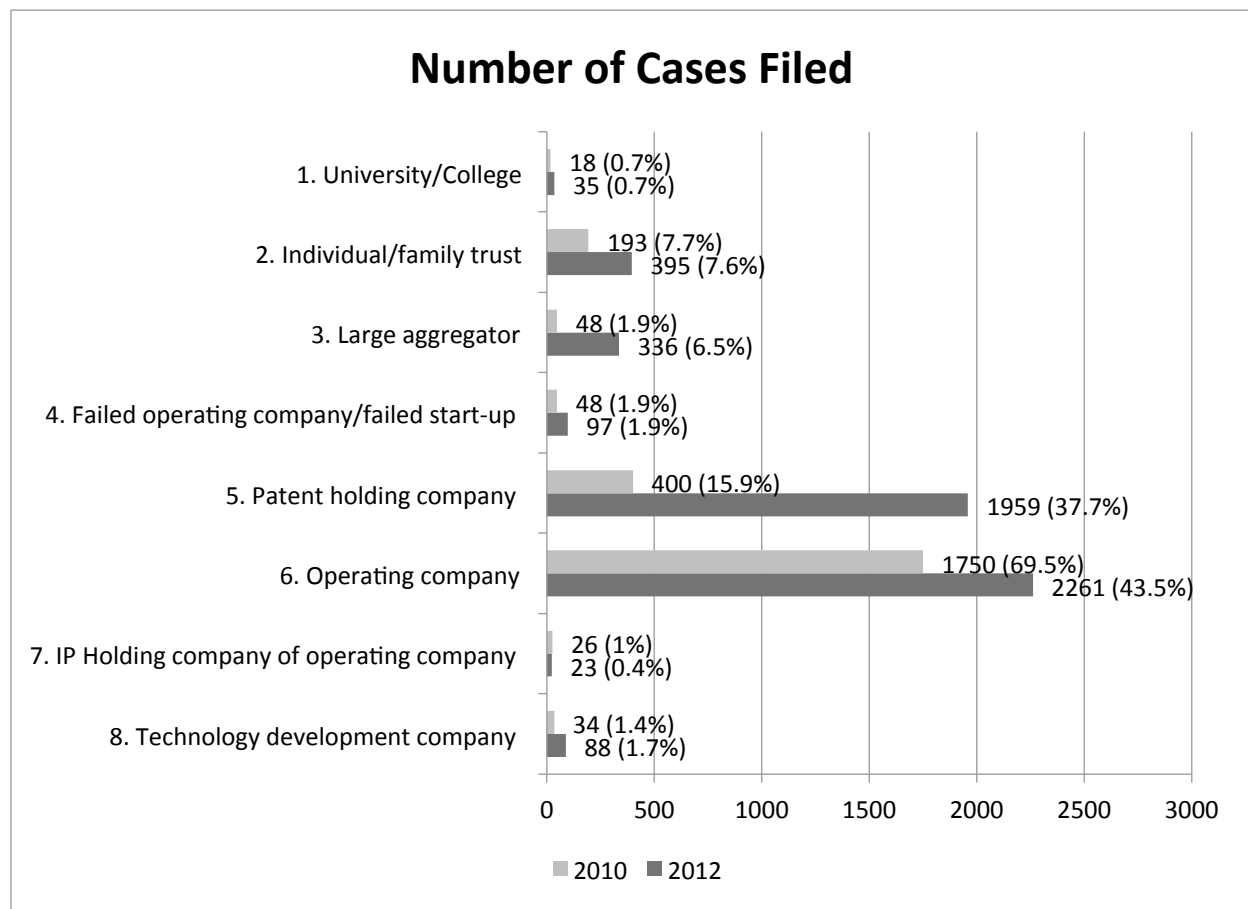
The distribution of the raw number of utility patent infringement cases filed by each patentee category is set forth below in Figure 1 for 2010 and 2012.⁶⁴

⁶² We reviewed a random sample of Bloomberg Law’s coding and found 10-20% of the cases had errors in the patent numbers. The errors appeared especially likely in declaratory judgment complaints in which the plaintiff alleged inequitable conduct. These allegations often mentioned patent numbers of allegedly undisclosed prior art, and Bloomberg Law mistakenly included these patent numbers as being asserted in the case.

⁶³ Take, for example, a case with detailed allegations of inequitable conduct including a recitation of patents that allegedly were withheld from the Patent Office. In this case, Bloomberg Law’s automated manner of identifying the litigated patents would wrongly determine that the patents in the inequitable conduct allegations were patents-in-suit. However, it is likely that all of the patents in the inequitable conduct allegation are in the same technological field as the actual patents-in-suit, as they must be “material” in order to complete the allegation for inequitable conduct. Since we only used patents at the level of technological field, these errors would not affect our analysis.

⁶⁴ There were only four patentees we could not categorize, all in the patent lawsuits filed in 2010. These patentees included Conectflex Technologies LLC, Locked and Loaded Products, Inc., Noah System, Inc., and One-to-One Integrated Technologies.

FIGURE 1: Cases Filed by Patent Holder Category, 2010 and 2012



The total number of utility patent infringement cases increased from 2010 to 2012 from 2,521 to 5,194 cases.⁶⁵ The number of cases for each category of patentee, except IP Holding Companies, increased from 2010 to 2012, with the greatest increase coming in the Patent Holding Company category, with the number of cases rising from 400 to 1959. The number of lawsuits filed by individual inventors increased, but interestingly, the percentage of those cases filed by a true individual (as opposed to a corporate entity formed and owned by the individual inventor) dropped substantially. More specifically, true individual inventors brought 68.2% of the individual inventor cases in 2010, but only 39.7% of the individual inventor cases in 2012⁶⁶. The number of cases filed by Operating Companies increased from 1,750 cases to 2,261 cases. Operating Companies still made up the largest percentage of cases filed in both 2010 and 2012.

⁶⁵ The difference in the distribution between 2010 and 2012 is statistically significant, with a Pearson's chi-squared test reporting a Pearson chi2 = 565.7116 and a p-value < 0.0001.

⁶⁶ True individuals brought 132 of 193 cases in 2010, and 157 of 395 cases in 2012. If Geotag is excluded, then true individuals brought 132 of 184 cases in 2010 (71.7%), and 157 of 300 cases in 2012 (52.3%), still a substantial drop.

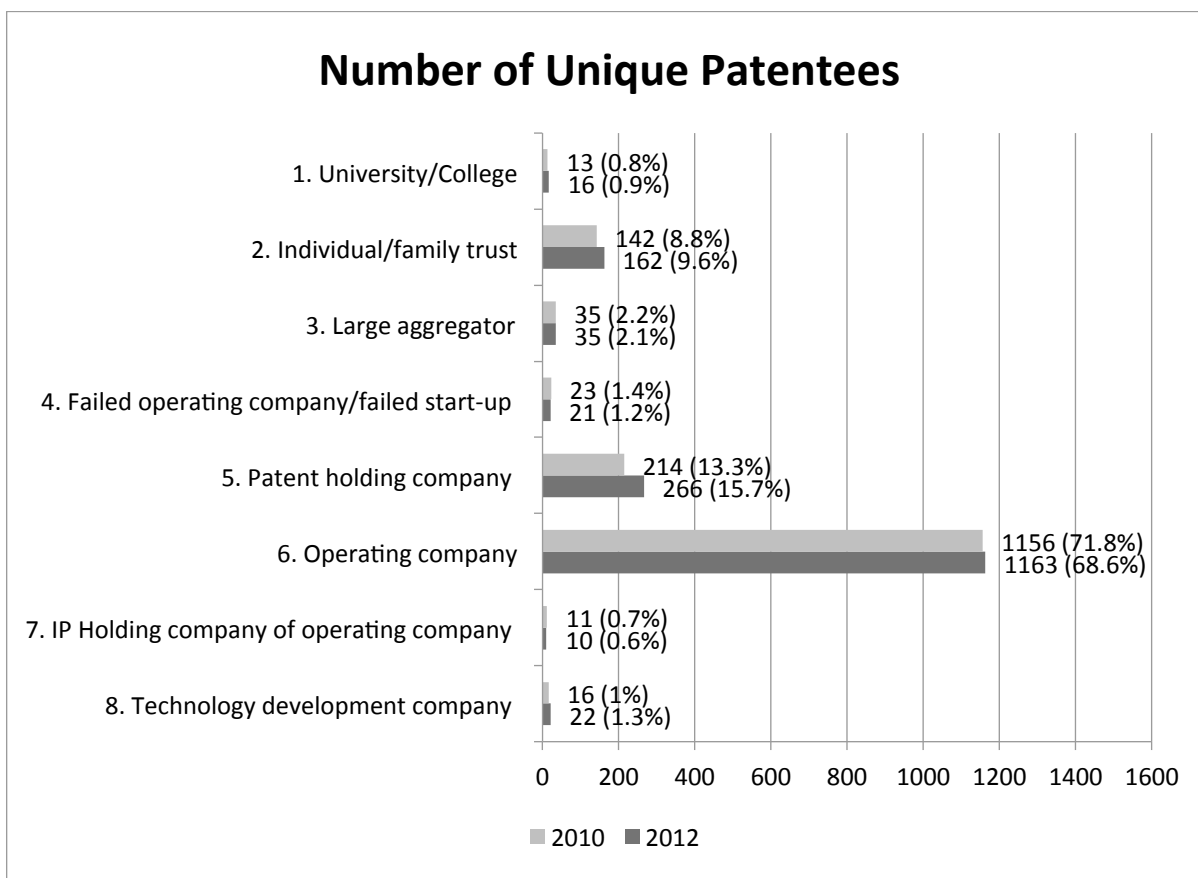
These numbers are insightful for studying the behavior of different types of patent holders, but the change in the number of filings could have been driven, at least in part, by the AIA's change to the joinder rules.⁶⁷ To test whether the increase in the number of cases filed is driven, at least in part, by the new joinder rules, the data collected was examined to determine the number of unique patentees that filed suit for each year—2010 and 2012.⁶⁸ For 2010, we observed 1610 unique patentees. For 2012, there were 1695 unique patentees that filed suit.

Figure 2 set forth the numbers and percentages of unique patentees that filed suit in each year for each patentee category for 2010 and 2012.

⁶⁷ 35 U.S.C. § 299 (2011).

⁶⁸ We recognize that the joinder rules may have decreased the total number of patent lawsuits because it required an additional filing fee for each company selling a separate allegedly infringing product. According to this theory, the cases should have decreased between 2010 and 2012, and if the data indicates a constant number of cases, then that may represent an increase. In the future, we plan to investigate whether the total number of patents asserted have changed, and also study how many patentees filed lawsuits in diverse district involving the same patent.

FIGURE 2: Number of Unique Patentees, 2010 and 2012



The total number of unique patentees for each year studied, 2010 and 2012, was very similar (1,610 compared to 1,695 patentees). And, as can be seen above in Figure 2, the distribution amongst the various patentee types is nearly identical for each year.⁶⁹

However, these figures only account for the number of unique patentees. Another perspective on the data is the number of defendants being sued by patentees in the various categories. Accordingly, we collected the total number of parties for each case filed in the two years studied.⁷⁰ We then coded the number of parties for each patentee category, subtracting

⁶⁹ The difference in the distribution of types of patents between 2010 and 2012 is not statistically significant, with a Pearson's chi-squared test reporting a Pearson chi2 = 6.1845 and a p-value of 0.5185.

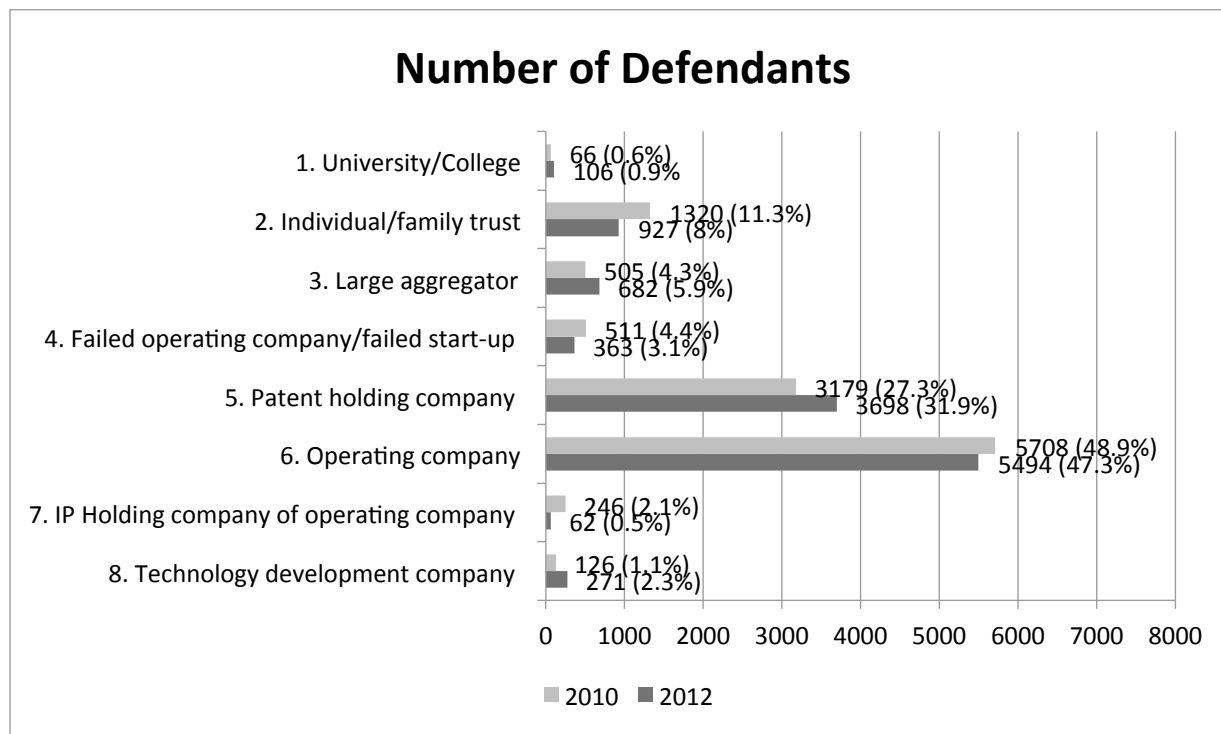
⁷⁰ We coded total number of parties instead of number of alleged infringers because this is the data Bloomberg readily provided. We saw little reason that this would vary magnitude of the results amongst the various categories since the number of plaintiffs observed was typically one, with the addition of another plaintiff likely spread uniformly amongst the categories. Accordingly, we subtracted one from the total number of parties, to avoid counting the patentee in our total number of parties value.

To test whether our assumption was correct, we hand-coded the number of plaintiffs and defendants for 50 random cases in 2010 and 50 random cases in 2012. For 2010, subtracting one from the total number of parties reported 290 defendants for the 50 random cases compared to an actual number of 268 defendants for those

the patentee from this total to prevent double counting of a unique patentee if they initiated more than one suit in a year coded.⁷¹

Figure 3 sets forth the total number of defendants for each patentee category in 2010 and 2012.

FIGURE 3: Total Number of Defendants by Type of Patentee, 2010 and 2012⁷²



cases. The difference in number of defendants between our reporting and the handcoding in 2010 exhibited a mean of 0.44, median of 0, and standard deviation of 0.76. For the 2012 cases, we reported 89 defendants for the 50 random cases compared to an actual number of 86 defendants. The difference in number of defendants between our reporting and the handcoding of the 2012 cases exhibited a mean of 0.38, median of 0, and standard deviation of 1.21.

When comparing these differences between the two years, the variation is not statistically significant, with a Pearson’s chi-square reporting a p-value of 0.2470. Thus, while our automated metric is over reporting the number of defendants, this over reporting is consistent between the two years coded and is not large.

⁷¹ We acknowledge that this method treats all assertions by the same patentee together, even if the assertions involved different patents. When we obtain all of the patent numbers, we will investigate if this matters. We also recognize that related companies are identified as separate defendants. In other words, if Sony North America, Inc. and Sony Japan were separately sued in a single case, they are counted as two defendants. In reality, they may be represented by the same attorney and raise the same litigation arguments. It was not feasible for us to manually adjust the count of defendants to collapse these related defendants.

⁷² We use the label “Total Number of Defendants” for simplicity. As discussed in the text on page 21-22, we calculated the total number of defendants by subtracting one (for the patentee) from the total number of parties to a lawsuit.

The total number of parties excluding the patentee, and thus essentially the number of defendants, stayed constant between 2010 and 2012 for most patentee categories. The total number of parties excluding the patentee was 11,671 in 2010 and 11,603 in 2012. The two notable changes, although not dramatic, were in the number of parties in Patent Holding Company cases and Individual patentee cases.⁷³ The number of parties increased in Patent Holding Company cases from 3,179 in 2010 to 3,698 in 2012. And the number of parties decreased for Individuals from 1,320 in 2010 to 927 in 2012. As we previously mentioned, we suspect we may undercount the number of individuals litigating in a corporate capacity, and similarly overcount patent holding companies because we lack information on the members of most Patent Holding Companies. We only coded an entity as an Individual patentee when it was clear that the individual inventor of the patent owned or controlled the entity.

One benefit of our granular data is that it can be used to construct counts of PAEs based upon various definitions of PAEs. In other words, depending upon one's view of which entities are properly labeled PAEs, one can construct relevant statistics. Some believe that NPEs are all non-operating companies including individual inventors, failed start-ups, universities, technology development companies, along with patent holding companies and patent aggregators. Using such a broad definition, the percentage of unique patentees increased from 2010 to 2012 by 3.2 percentage points (28.2% in 2010; 31.4% in 2012) and the percentage of defendants sued by PAEs increased from 2010 to 2012 by 1.6 percentage points (51.1% in 2010; 52.7% in 2012). For those who exclude individual inventors from their definition of NPEs, the percentage of unique patentees in this category increased by 2.4 percentage points (19.4% in 2010; 21.8% in 2012) and 4.9 percentage points for the percentage of defendants (39.8% in 2010; 44.7% in 2012). For those who include only non-original owners as PAEs – only patent holding companies and patent aggregators – the percentage of unique patentees increased from 2010 to 2012 by 2.3 percentage points (15.5% in 2010; 17.8% in 2012) and the percentage of defendants accounted for by these PAEs increased 6.2 percentage points (31.6% in 2010; 37.8% in 2012). All of these changes are well below the magnitude set forth in the Executive Office Report, but the actual differences depend upon the precise definition of PAE used. Because the Executive Office Report relied upon proprietary industry data, we cannot directly compare the coding.

The number of defendants for 2010 is also observable by the technology at issue. Table I below illustrates that the patent cases are dispersed across all technology fields, but that Computers and Communications has substantially more cases than the other fields. It has nearly double the number of cases and over triple the number of parties than the other fields.

⁷³ A Pearson's chi-squared test reported a Pearson chi2 = 335.4890 and a p-value < 0.0001.

TABLE I: Distribution of Patent Litigation by NBER Technology Class, 2010

NBER Technology	# of Cases	# of Parties Excluding Patentee
1. Chemical (excluding Drugs)	162	497
2. Computers and Communications	865	6,145
3. Drugs and Medical	465	1,699
4. Electrical and Electronics	253	1,161
5. Mechanical	287	775
6. Others	489	1,394

We do not presently have the patent numbers affiliated with the 2012 lawsuits; consequently, we cannot provide analogous information about 2012. To understand better the Computers and Communications NBER category in 2010, in Tables II and III below we provide further information about that category as well as the Drugs and Medical NBER category. We note stark differences in the distribution of individual inventor and Patent Holding Companies in these two categories.

FIGURE 4: Distribution of Patent Cases by Technology

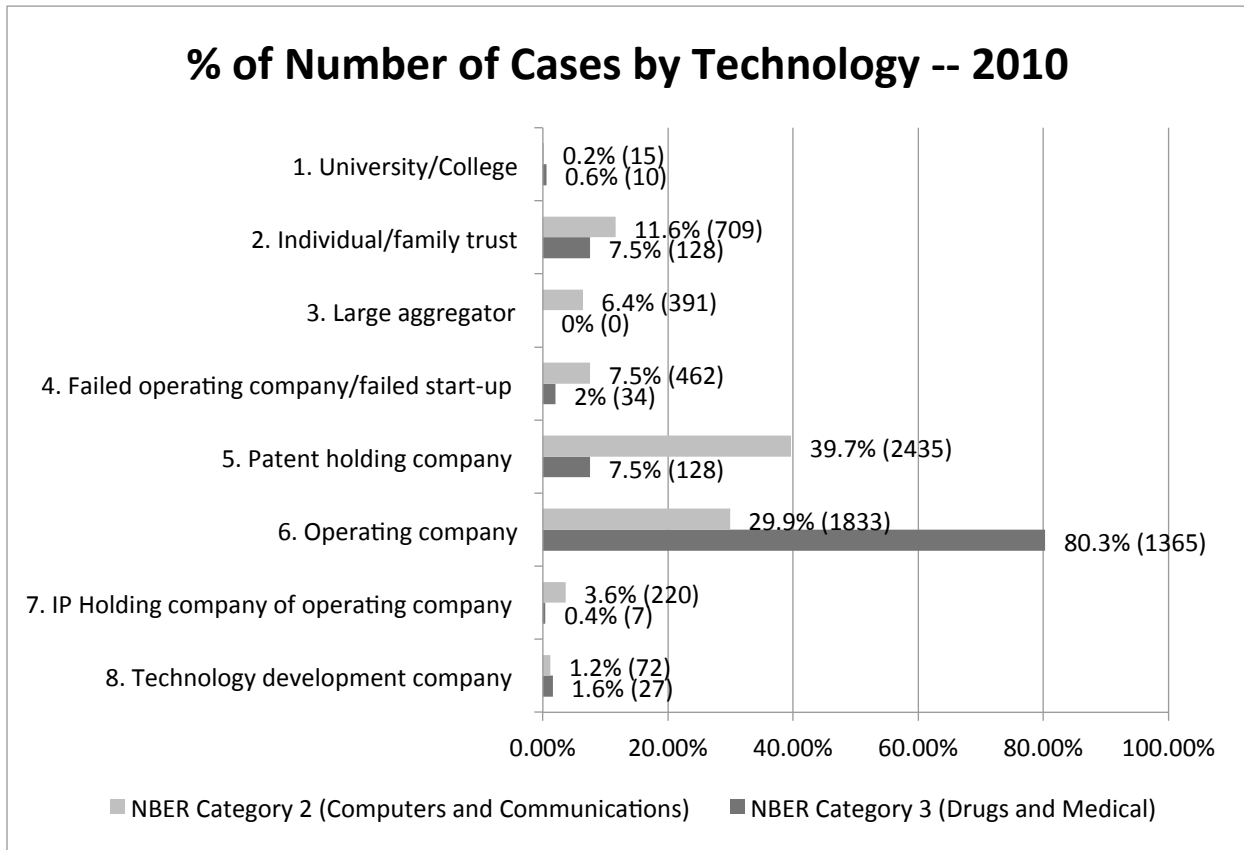
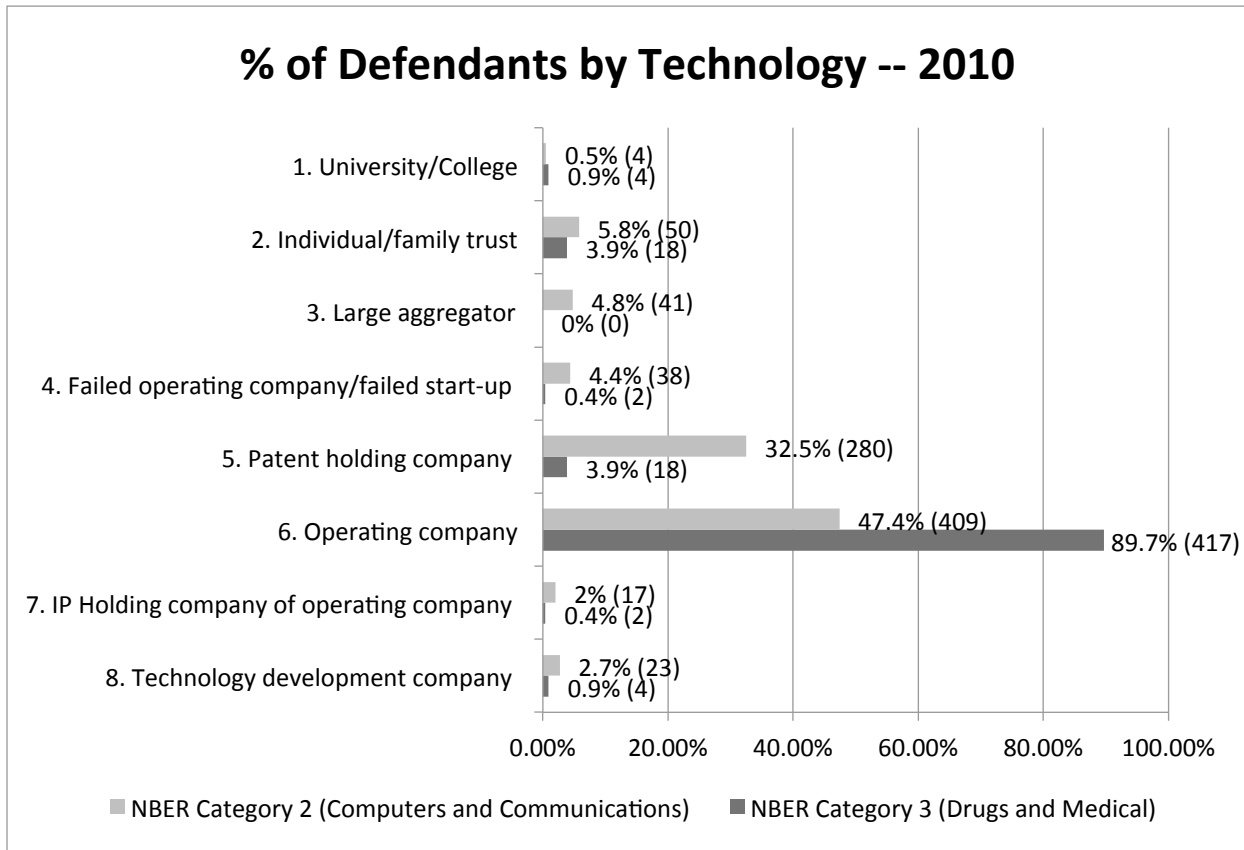


FIGURE 5: Distribution of Number of Defendants by Technology⁷⁴



Notably, for 2010, the number of cases (865) and number of parties excluding the patentee (6,145) in cases involving Computers and Communications was almost double the comparable numbers for the next closest categories—Drugs and Medical (465 cases with 1,699 parties excluding the patentee) and Other (489 cases with 1,394 parties excluding the patentee). For cases involving Computers and Communications, the highest number of cases was brought by Operating Companies (409 cases) and highest number of parties excluding the patentee was brought by Patent Holding Companies (2,435 parties). Thus, in the Computers and Communications industry, most defendants were sued by non-operating companies. Operating Companies dominated cases involving Drugs and Medicine, with 417 cases brought comprising 1365 parties excluding the patentee.

IV. IMPLICATIONS

A. Exploring the Lack of Change Between 2010 to 2012

⁷⁴ We use the label “Total Number of Defendants” for simplicity. As discussed in the text on page 21-22, we calculated the total number of defendants by subtracting one (for the patentee) from the total number of parties to a lawsuit.

Based on our data, there is no major difference in both the number of unique patentees and the number of alleged infringers from 2010 to 2012. While the number of cases increased, the totals for the main players—patentees and defendants—stayed essentially constant. One way to consider this is that the AIA has added substantial cost to the system, by increasing the number of lawsuits without decreasing the number of patentees or defendants.⁷⁵ This observation is confirmed by a two-sample t test with unequal variances reporting a statistically significant variation in the distribution of number of parties excluding patentee for individual,⁷⁶ patent holding company,⁷⁷ and large aggregator patentee cases between 2010 and 2012.⁷⁸

The question then is how is the distribution is different within the various patentee categories. What are the changes in behavior at a more granular level? In other words, what are the changes between 2010 and 2012 that aren't evident from merely looking at the aggregate numbers of plaintiffs, defendants, and lawsuits. To explore this question further, we looked at the number of patentees in a given category that make up the four quartiles of number of parties for each unique patentee in a given year. Set forth below is this quartile information, showing the number of parties, divided in quartiles, involved for each patentee category. This information is presented for both 2010 and 2012 in Figures 6 and 7 below.

⁷⁵ These costs may not be that significant when one considers how the courts have handled multiple lawsuits involving the same patent post-AIA. Many districts try to hold costs down by consolidating cases for specific purposes such as claim construction and discovery. And multidistrict litigation is also being used when the cases are dispersed across courts in multiple venues. But, of course, there is no consolidation of trials.

⁷⁶ T of 6.8722 with a p-value < 0.0001 for patent holding company cases.

⁷⁷ T of 10.5396 with a p-value < 0.0001 for individual cases.

⁷⁸ T of 5.0387 with a p-value < 0.0001 for large aggregator cases.

FIGURE 6: Quartiles by Number Defendants per Unique Patentee, 2010

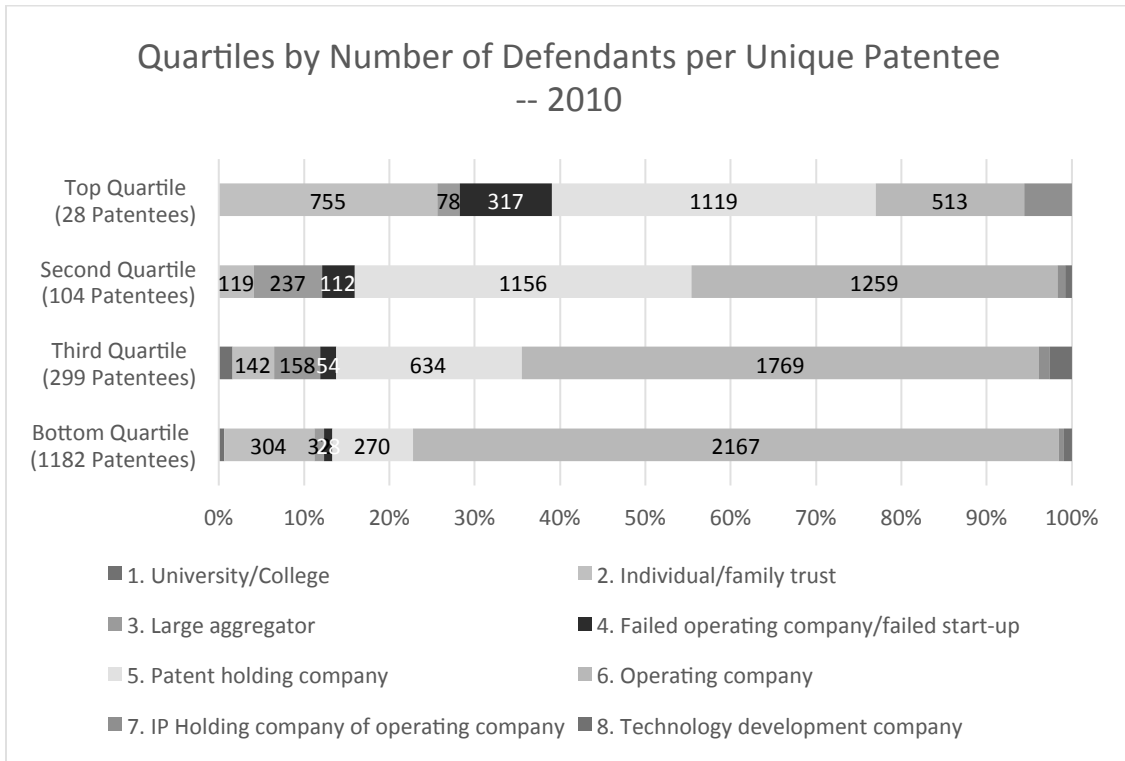
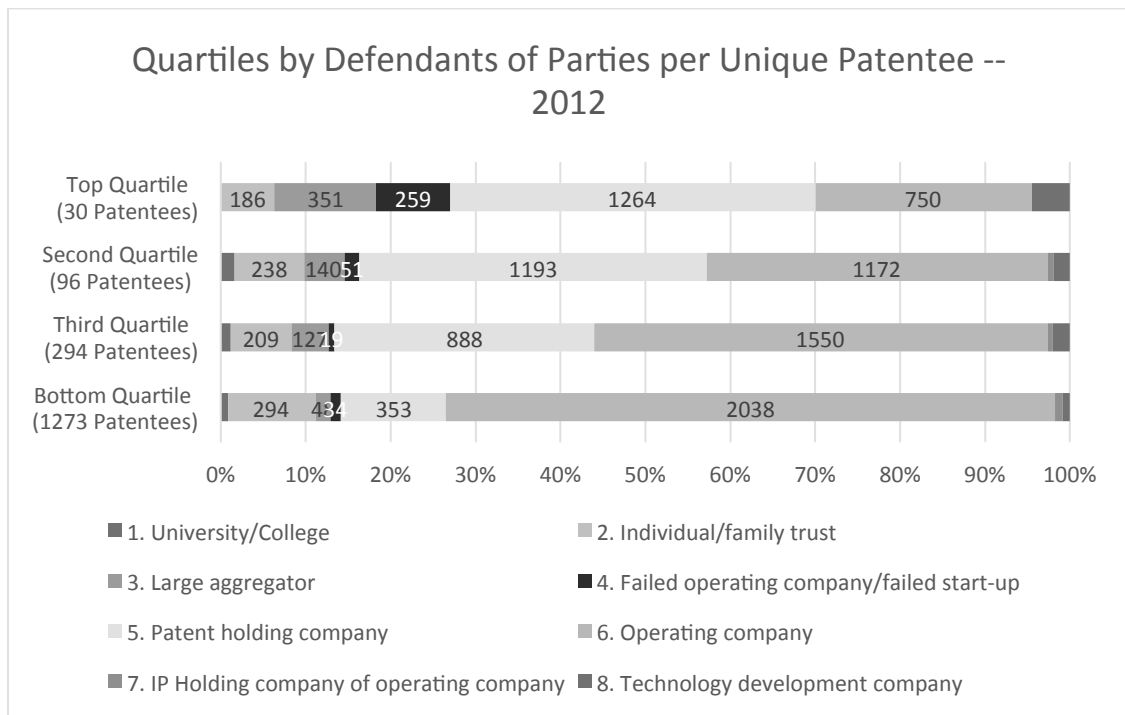


FIGURE 7: Quartiles by Number of Defendants per Unique Patentee, 2012



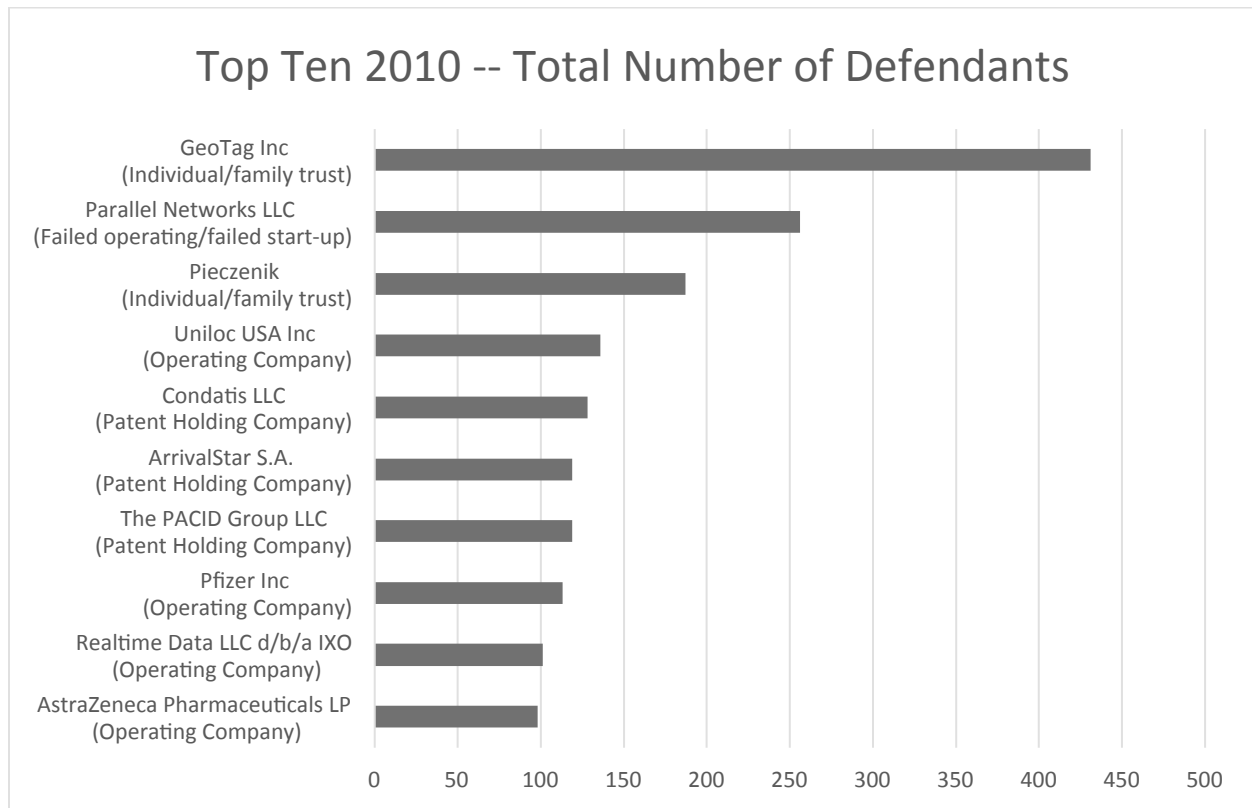
In both Figure 6 and Figure 7, suits initiated by a small number of unique patentees constitute a majority of the alleged infringers for a given year. Thus, a very few patent holders are responsible for a great number of patent lawsuits. For 2010, 28 patentees were responsible for the top quartile of parties, while 30 patentees were responsible for the top quartile in 2012. In 2010, the top quartile included unique patentees alleging infringement against between 54 and 431 accused infringers. In 2012, the top quartile included unique patentees alleging infringement against between 55 and 252 accused infringers. And this distribution by the number of patentees making up each quartile is very similar for both years that we coded (104 to 96 patentees for the second quartile, 299 to 294 for the third quartile, and 1,182 to 1,273 patentees for the bottom quartile). The number of accused infringers in each quartile was also very similar. The second quartile ranged from 18 to 53 in 2010, and 18 to 55 in 2012. The third quartile included from 6 to 18 in 2010, and 6 to 18 in 2012. The bottom quartile ranged from 1 to 6 in 2010, and 1 to 6 in 2012. These results are not surprising, with a small group of aggressive patentees targeting the most alleged infringers while about 75% of the patentees fall into the last quartile, most of whom simply sue only one alleged infringer. Consequently, most patent holders are not significant in terms of the rate of overall patent litigation.

There are very few differences in distribution between the two years. The most obvious is the difference in the distribution for Individual/family trust patentees. In 2010, mainly due to the activity of one patentee, GeoTag Inc., Individual/family trust patentees made up a much greater percentage of the top quartile as compared to 2012. Patent Aggregators also grew in the top quartile from 2010 until 2012. The presence of a major IP Holding Company of an Operating Company, U.S. Ethernet Innovations LLC, in the top quartile in 2010 also created a difference in distribution for the top tier between the two years.

Accordingly, only about 25% of the unique patentees alleged infringement against 75% of the defendants for each year. And there is little change in the make-up of the quartiles between the two years, except for those driven by individual patentees. In the Appendix, we provide further analysis of the distribution of different types of patentees in 2010 and 2012.

The data can also be analyzed focusing on the small number of patentees that are suing large swathes of alleged infringers. To see if this is the case, we calculated the top ten patentees, by number of parties involved in the lawsuits, for each of the observed years. These “top ten” lists are set forth below.

FIGURE 8: Top Ten Most Litigious Patent Holders, 2010⁷⁹



⁷⁹ Uniloc USA Inc. provides a good example of how our coding may differ from others. Some people anecdotally refer to Uniloc as a ‘troll.’ Our investigation indicates that Uniloc sells products that are related to their patents. More specifically, a Google search for Uniloc USA Inc. returns a link for <http://www.uniloc.com>. That website includes a link to “NetAuthority.” When that link is activated, the user is redirected to the website for <http://netauthority.com>, and products related to the patents in suit are clearly being sold by Uniloc USA Inc. We used the Wayback Machine to confirm that Uniloc, through NetAuthority, was selling products back in 2010. See <https://web.archive.org/web/20100105213003/http://uniloc.com/>. Accordingly, Uniloc USA Inc was coded as an operating company.

ArrivalStar is another company that was somewhat difficult to classify. ArrivalStar does not appear to be the original owner of the patents in suit. However, the original inventor appears to have some affiliation with the company. (See http://www.nj.com/business/index.ssf/2013/09/jersey_firm_stands_up_to_paten.html). We limited the individual inventor category to true individuals and to corporate entities which were controlled entirely by the original, individual inventor. We did not feel that there was sufficiently clear information to classify ArrivalStar as an individual inventor company, and instead classified it as a patent holding company.

Finally, although some have called Realtime Data LLC d/b/a IXO an “NPE,” (Ahmed J. Davis & Karolina Jesien, *The Balance of Power in Patent Law: Moving Toward Efficiencies in Address Patent Troll Concerns*, 22 Ford. Intell. Prop. Media & Ent. L.J. 835, 844 (2012)) we classified it as an operating company. It’s website

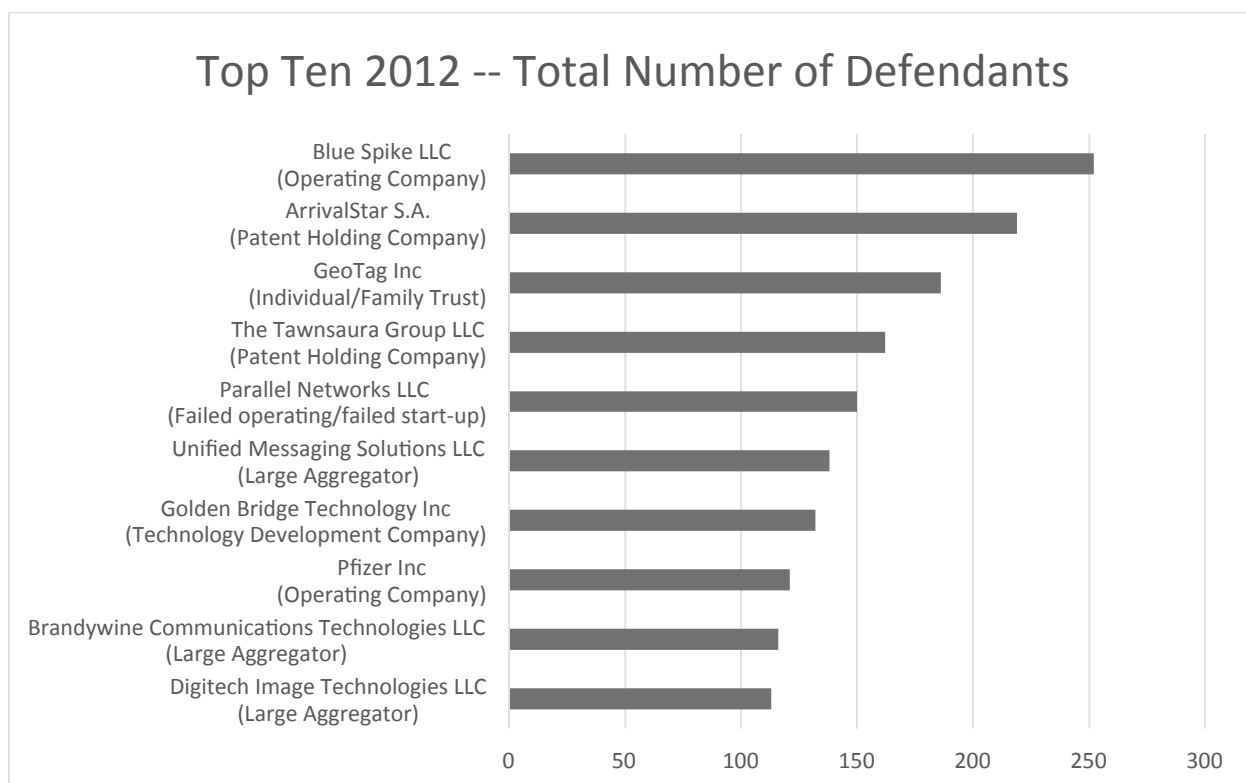
(http://ixorealtime.com/About_Us.html) and the complaints in the lawsuits indicate that it makes products.

Furthermore, Business Week notes it was founded in 1998 and sells software.

(<http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=142803119>).

We note that several of the most litigious patent holders were close calls on categorization. We believe that these entities were some of the more difficult to classify. Our discussion here of these entities should not be read to imply that all of the classifications involved similar difficulties.

FIGURE 9: Top Ten Most Litigious Patent Holders, 2012⁸⁰



A couple of observations are relevant. For 2010, the top ten patentees accounted for 1,688 (14.46%) of the total parties involved in patent infringement suits, while in 2012, the top

⁸⁰ In a prior draft of this article, we discussed the coding of Brandywine Communications Technologies LLC. After reporting that Brandywine appeared to be a subsidiary of Acacia (<http://www.dailyfinance.com/2013/05/17/acacia-subsiadiary-enters-into-license-and-settleme/>), we noted that Brandywine’s website indicated that it sold products (<http://www.brandywinecomm.com/>). Based upon this information, we believed that Brandywine was best categorized as an operating company. We have investigated further, and now believe that Brandywine is best categorized as an aggregator due to its relationship with Acacia. Our further investigation included a phone call to the number listed on the <http://www.brandywinecomm.com/> website. Representatives for that company indicated that it was unaffiliated with the patent holder in the lawsuits. Accordingly, we revised our classification of this entity. We coded Blue Spike as an operating company, although we believe it is a close call whether it should be coded as an individual inventor. Blue Spike’s website (<http://blue-spike.myshopify.com/collections/frontpage>) indicates that it sells products, which means that it is an operating company. However, the website also prominently mentions its patents. Some press stories say that the individual inventor owner doesn't sell products (<http://gigaom.com/2012/08/28/genius-or-troll-patent-owner-sues-dozens-over-anti-piracy-method/>).

ten accounted for 1,589 (13.69%) of the total parties involved. In 2010, one patentee, GeoTag, Inc., dominated the top ten list while the distribution in 2012 was more even. Notably, four patentees make both lists—GeoTag, Inc., Parallel Networks LLC, ArrivalStar S.A. and Pfizer, Inc. And these top ten lists are made up of a smattering of patentees from numerous patentee categories. Interestingly, three large aggregators, Unified Messaging Solutions LLC, Brandywine Communications Technologies LLC, and Digitech Image Technologies LLC, all affiliated with Acacia Technologies, made the list in 2012.

Therefore, based on the data we gathered, things have not changed much from 2010 to 2012. While more lawsuits were filed, the number of unique patentees and defendants remained constant, and the distribution of these numbers amongst patentee categories stayed roughly the same as well. Furthermore, most patent litigation, in fact that involving at least 75% of the patentees, has remained nearly the same between these two years.

B. Comparing Our Data to Previous Studies

Our results can also be compared to previous studies regarding litigation characteristics of different type of patentees. Two specific studies that we looked at are those by Feldman *et al.*⁸¹ and RPX.⁸² A summary of the comparison of the data between the studies and ours is set forth below in Table II.

⁸¹ Feldman, Robin, Ewing, Thomas and Jeruss, Sara, *The AIA 500 Expanded: Effects of Patent Monetization Entities* (April 9, 2013). UC Hastings Research Paper No. 45. Available at SSRN: <http://ssrn.com/abstract=2247195> or <http://dx.doi.org/10.2139/ssrn.2247195>.

⁸² RPX 2012 NPE Activity Report, *supra* note 10.

Table II: Comparison of Descriptive Findings from Various Studies

	Feldman <i>et al.</i> ⁸³	RPX ⁸⁴	Cotropia, Kesan, Schwartz ⁸⁵ (Large Aggregators + Patent Holding Companies)	Cotropia, Kesan, Schwartz ⁸⁶ (Large Aggregators + Patent Holding Companies + Individuals)
% Cases Filed in 2010 by PAEs	N/A ⁸⁷	30% (765 cases)	17.78% ⁸⁸ (448 cases)	25.47% (641 cases)
% Cases Filed in 2012 by PAEs	58.7%	65% (3,054 cases)	44.19% (2,295 cases)	51.79% (2,690 cases)
% Parties/Alleged Infringers Involved in PAE suits in 2010	N/A ⁸⁹	55%	31.59%	42.91%
% Parties/Alleged Infringers Involved in PAE suits in 2012	49.90% ⁹⁰	61%	37.74%	45.74%

As detailed below, there are differences, and these differences are driven, at least in part, by the patentee categories used in the various studies and level of detail used when reporting the data.

1. Cases Filed

Regarding the distribution of cases amongst the various categories, Feldman *et al.* found, in the one overlapping year with our study, 58.7% of the patentees were “Monetizers” in

⁸³ The data in this table from Feldman *et al.* focuses on what they coded as a “[p]atent monetization entity” or “monetizer.”

⁸⁴ RPX’s data represented in this table identified “non-practicing entities” or “NPEs”.

⁸⁵ Our data in this column combines patentees in the Large Aggregator and Patent Holding Company categories.

⁸⁶ Our data in this column combines patentees in the Large Aggregator, Patent Holding Company, and Individuals categories.

⁸⁷ Feldman *et al.* did not report data from 2010.

⁸⁸ Ideally, we would report the same number of significant digits for each study. Unfortunately, we do not have access to the raw data for the other studies, and consequently report it here exactly as it is available to us.

⁸⁹ Again, Feldman *et al.* did not report 2010 data.

⁹⁰ This percentage is calculated based on the total number of defendants reported for 2012 (9,231 defendants) divided by the number of defendants reported based on Monetizer suits (4,606 defendants). See Feldman, *supra* note 81, at 47, 57-58.

2012.⁹¹ And RPX found that “Non-Practicing Entities” (“NPEs”) filed 3,054 cases in 2012 (65% of all cases) and 765 cases in 2010 (30% of all cases).⁹²

In comparison, adding our Large Aggregator and Patent Holding Company category results together to facilitate a proper comparison, our findings show these categories comprising 448 cases (17.78%) in 2010 and 2295 cases (44.19%) in 2012. If the Individual/Family Trust results are added to Large Aggregator and Patent Holding Company results, the findings show 641 cases (25.47%) in 2010 and 2690 cases (51.79%) in 2012.

Accordingly, even if Individual/Family Trust cases are added to categories that more closely fit the other study’s definitions of Monetizers and PAEs, our data reports significantly lower percentages as compared to those of Feldman *et al.* and RPX. These differences could definitely be driven by the different categorical definitions used in the studies. We also believe that the differences are driven by how the data is coded, analyzed, and reported in these studies, and that comparison of the actual raw data may demonstrate smaller differences between the studies’ results.

One final point—while we are comparing the cases filed data, this metric, particularly after the change to the joinder rules, loses much of its significance. As we demonstrate above, the real change between 2010 and 2012 is in the number of alleged infringers, not in the number of cases being filed, or in the number of patentees behind those cases.

2. Number of Parties/Defendants

Thus, the more important point of comparison pertains to the number of parties/defendants in the observed lawsuits. Feldman *et al.* found, in 2012, that Monetizer’s sued 4,606 defendants as compared to 3,832 defendants sued by Operating Companies and 579 defendants by Individuals or Trusts.⁹³ Breaking Feldman’s results into percentages, Monetizer’s comprised 49.90% of the defendants, Operating Companies 41.51%, and Individuals 6.27%. RPX found that NPE’s sued 4,170 defendants in 2010 and 4,351 defendants in 2012.⁹⁴ RPX concluded that NPE suits made up 55% of defendants sued in 2010 and 61% in 2012.⁹⁵

In comparison, our data shows that Large Aggregators and Patent Holding Companies comprise, together, 31.59% (3,684) of the total number of parties in suits excluding the patentee in 2010 and 37.74% (4,380) in 2012. Adding Individual/Family Trust cases increases the total number of parties in suit excluding the patentee to 5,004 (42.91%) in 2010 and 5,307

⁹¹ Feldman, *et al.*, *supra* note 81, at 47 (“Most significantly, in 2012 monetizers crossed into the majority, filing 58.7% of patent infringement lawsuits.”). We do not compare to Professor Chien’s data as she relies upon RPX data for her studies.

⁹² RPX, *supra* note 82, at 11 (Chart 4).

⁹³ Feldman, *et al.*, *supra* note 81, at 57-58.

⁹⁴ RPX, *supra* note 82, at 11 (Chart 5).

⁹⁵ RPX, *supra* note 82, at 12 (Chart 8).

(45.74%) in 2012. This is in contrast to Operating Company cases which involved 49.48% (5,708) of the parties in 2010 and 48.35% (5,610) in 2012.

The proper comparison between the studies are the percentages since Feldman *et al.* and RPX report the number of defendants amongst the various patentee categories, while we report the total number of parties for our categories.⁹⁶ And under this comparison, just as with the comparison as to the number of cases filed, our data indicates that Patent Holding Companies and Large Aggregators make up a smaller percentage of defendants than reported by Feldman *et al.* and RPX. Again, these differences could definitely be driven by the different categorical definitions used in these studies. We also believe that the differences are driven by how the data is coded, analyzed and reported in these studies, and that comparison of the actual raw data could demonstrate smaller differences between these studies.

C. Future Areas for Research

The granular data we have provided can be supplemented to shed more light on patent litigation. Below we list several research questions that we believe are ripe for investigation. We also note that we are presently gathering or acquiring information to enable us to answer each of these questions. We take no position on the optimal number of patent lawsuits, nor of the optimal number of lawsuits by Patent Holding Companies. We note, however, that Patent Holding Companies filed more than a trace number of lawsuits. By sheer numbers of lawsuits, Patent Holding Companies are consequential to the patent litigation system.

A critical question relates to the patents asserted by Patent Holding Companies. By definition, these entities were not involved in the original inventive activity. Instead, they purchased the patent from another. Research into the previous owners and chains of title of these patents is sorely needed. We are unsure at this point whether the patterns in previous patent ownership have changed between 2010 and 2012. Are these Patent Holding Company patents primarily from independent inventors, from universities, from operating companies? Has the proportion changed over time? And there is another difficult to answer yet interesting question: how many of the Patent Holding Company cases involve deals with operating companies to split the proceeds? These “privateering” arrangements are not typically publicly available, which makes them quite hard to study.⁹⁷

We also found that there were a small number of patent holders in both 2010 and 2012 who were responsible for suing a large number of defendants. Specifically, we found that 25% of the patent holders in 2010 and 2012 sued 75% of the defendants. Even more pointedly, we

⁹⁶ Again, given the small number of suits with more than one plaintiff and the even distribution of multiple plaintiff suits between the categories, we believe the total number of parties data adequately represents changes in the number alleged infringers in a given case, for a given category of patentee.

⁹⁷ Tom Ewing, *Indirect Exploitation of Intellectual Property Rights by Corporations and Investors*, 4 HASTINGS SCI. & TECH. L.J. 1 (2012).

found that 28 patent holders in 2010 and 30 patent holders in 2012 sued 25% of all the defendants. This asymmetric distribution in patent holders, with a small number of them suing a large number of defendants, raises numerous interesting questions about the nature of these patent holders and the characteristics of the patents which were asserted against many defendants. We will leave this topic for further exploration in the future.

We also believe that more information regarding the outcomes of patent suits is desirable. This will permit us to compare how often type categories of patent holders are successful. And rather than just considering the overall success rate, we can consider the success rate of various parties in the distribution of cases.

Additionally, we believe that information about the duration of case pendency is salient. The longer a case pends, the higher the legal expenses in general. We suspect that the median Patent Holding Company case pends for shorter than the median Operating Company case. Information about pendency can inform the debate about the costs of PAE disputes, as well as maybe provide insights into the merits of the disputes.

Finally, we recognize that even our granular coding of patent holders has its limitations. Obviously, even the most granular categories are not homogeneous. There must be good and bad Patent Holding Company lawsuits, just as there are good and bad Operating Company Lawsuits. To determine whether NPEs or PAEs or individual inventors (or whatever group one is interested in) are good or bad (or a net cost or a net benefit to the system), one must first understand the make-up of the group and how it compares to other patent litigants. We welcome further refinements to our coding, and other ideas on how one can tease out important heterogeneities within our groups.

V. CONCLUSION

Profound changes appear to be occurring in the patent system. There is a vigorous debate about which entities ought to be the rightful beneficiaries in a well-designed patent system and which entities are currently, in fact, reaping monetary rewards by asserting patents. Granular data on the identities of patent holder litigants are necessary to consider the arguments being advanced and to understand the implications of the changes to the patent system that we are experiencing. The present study provides such granular data, classifying patent holders into numerous categories including failed start-ups, individual inventors, patent holding companies, operating companies, and aggregators. It shows that the changes themselves are much more complex than previously understood.

It appears that much of the recent increase in patent lawsuit filings appears to be the result of the joinder rule changes in the AIA. Surprisingly, various litigation characteristics relating to Patent Holding Companies such as number of unique patent holders, total number of accused infringers, and the distribution of their litigation, appear nearly unchanged from

2010. Finally, individual inventor lawsuits still play a role in the patent litigation system. This may be considered as a positive and previously unnoticed sign, depending upon one's views of the patent system. Further study of the underlying patents in the disputes, including the origination of patents asserted by Patent Holding Companies, will be useful.

APPENDIX

To further analysis PAEs, we report in the Appendix the distribution of any of the particular different types of patentees changed between 2010 and 2012. We were particularly interested in patent holding companies, individual inventors, and operating companies. To move even more granularly than quartiles, we separated each of these types of patent holders and then tabulated the cumulative distribution of defendants in each category. Figures 10, 11, and 12 below report our results.

FIGURE 10: Cumulative Distribution of Unique Individual Patentees

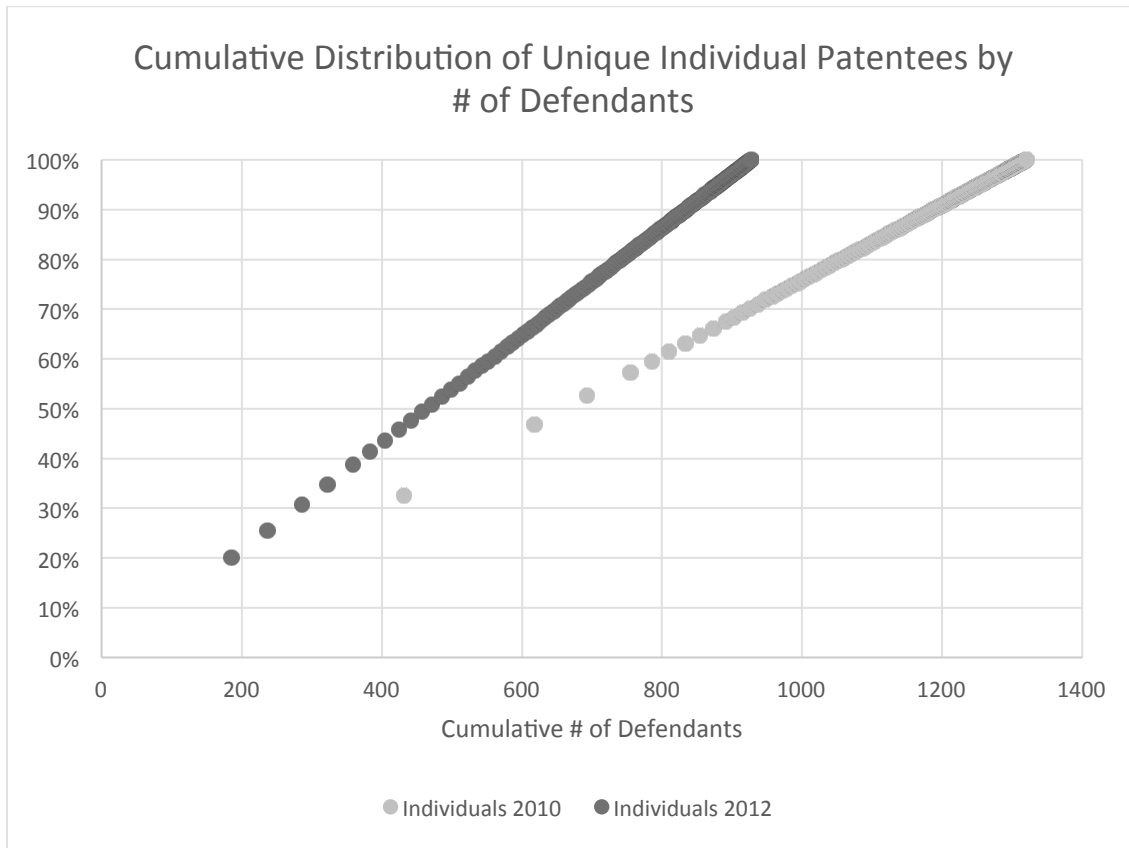


FIGURE 11: Cumulative Distribution of Unique Patent Holding Company Patentees

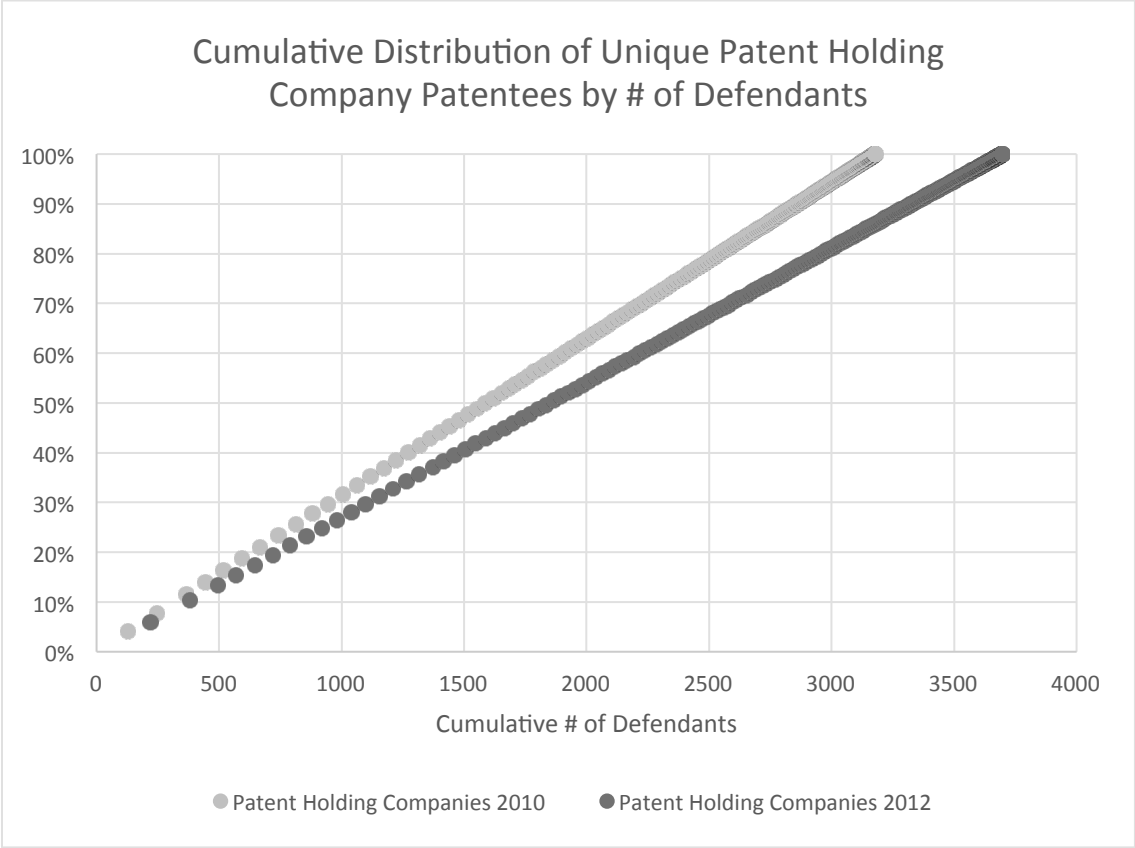


FIGURE 12: Cumulative Distribution of Unique Operating Company Patentees

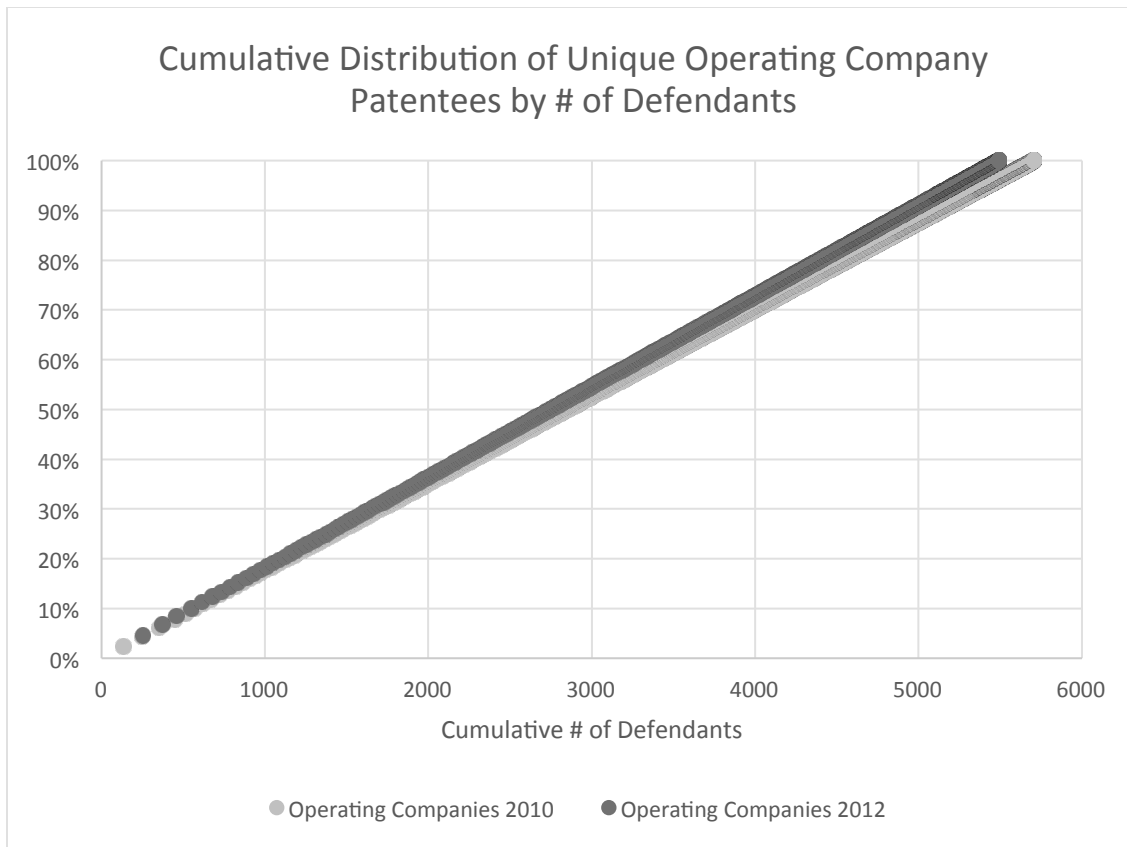


Figure 10 illustrates the distribution for unique individual inventor patentees in 2010 and 2012. It appears the distribution has changed slightly between those years. In 2012, there are fewer total defendants, but the slope of the distribution is similar. Figure 11 shows the distribution of patent holding companies in 2010 and 2012. There are slightly more defendants in 2012, but the slope of the distribution is quite similar. Figure 12 contains the distribution of operating companies in 2010 and 2012. The lines overlap nearly completely, indicating almost no change in the distribution between those two years. We wonder whether the similarities between all of these figures shows that what dominates behavior is not the category of plaintiff, but rather something about patent law or litigation in general.

Turning back to the unique individual inventor patentees, one company, GeoTag, was responsible for almost one third of all accused infringers in 2010. To investigate whether we were observing a “GeoTag effect,” in Figure 13 below we show the cumulative distribution after excluded GeoTag. Basically, GeoTag alone does not appear responsible for the different slopes and configurations of the distributions. Further investigation is warranted.

FIGURE 13: Cumulative Distribution of Unique Individual Patentees (Excluding Geotag)

