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Patent Assertion Entities (PAEs) Under the Microscope: An Empirical Investigation of Patent Holders as Litigants

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**Patent Assertion Entities (PAEs) Under the Microscope:
An Empirical Investigation of Patent Holders As Litigants**

By Christopher A. Cotropia^{*}, Jay P. Kesan^{**}, & David L. Schwartz^{***}

Summary

There is tremendous interest in a certain type of patent litigant—the often-called non-practicing entity (“NPE”), patent assertion entity (“PAE”), patent monetization entity (“PME”), or simply patent troll. But, the fundamental barrier to understanding the current debate is the lack of granular and transparent data on NPE 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 NPE or non-NPE definitions. Releasing this data to the public that unpacks the definition of NPE can provide better illumination to policy makers, researchers, and others interested in the patent litigation system.

The data reveals the following findings.

- The *raw* number of patent lawsuits filed by non-operating companies substantially increased from 2010 to 2012.
- However, the increase in the raw number of lawsuits appears to be driven almost entirely between a procedural rule change relating to joinder passed with the 2011 patent reform. That change required separate lawsuits for each unrelated defendant. There is essentially no increase if one considers only the number of *unique* patent holders or the total number of parties excluding the patentee.

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- There is considerable diversity among the types of non-practicing entities in both 2010 and 2012. Of note, individual inventors enforcing their own patents accounted for approximately 9% of unique patentees in both years.
- Some technologies appear to have more litigation by non-practicing entities. Consistent with other reports, we find that the Computers and Communications field (using NBER categories) has a substantially higher proportion of suits brought by non-practicing entities (including individual inventors) than the Drugs and Medical field.
- To permit others to evaluate our coding and to use the data for other studies, we have made the data set available at www.npedata.com.

Table of Contents

I.	STUDY DESIGN AND METHODOLOGY	8
A.	The Coders	8
B.	Identifying Relevant Lawsuits	9
C.	Classifying Patent Holders	12
D.	Other Data	15
II.	RESULTS	16
III.	IMPLICATIONS	22
A.	Exploring the Lack of Change Between 2010 to 2012.....	22
B.	Comparing Our Data to Previous Studies.....	30
1.	Cases Filed	32
2.	Number of Parties/Defendants	32
C.	Future Areas for Research.....	33
IV.	CONCLUSION	34

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 These new 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 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 NPEs, 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 NPEs. Several academics have argued forcefully that NPEs 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 NPEs 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 lawsuits in 2012, a huge increase from the 29% filed in 2010.⁹ RPX, Inc. and Patent Freedom,

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).

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).

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).

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>).

two companies whose business includes providing subscriptions for businesses facing NPE assertions, each have reported summaries of their proprietary data on NPEs.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 NPEs. Instead, the studies broadly classify companies as either NPEs or not NPEs (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 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 until 2011, which means that it lacked meaningful data after the effective date of the America Invents Act in late 2011.¹³ 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 NPEs are engaging in strategic and opportunistic behavior that does not benefit anyone except them.¹⁴

Additionally, Congress is strongly contemplating changing the patent laws to deter NPE lawsuits. There are at least seven bills that have been introduced in the last few months on the patent ‘troll’ issue.¹⁵ The most aggressive of these laws, known as the SHIELD Act, would

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 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 Michelle Quinn, *Technology Industry Taking Aim at Patent Trolls*, Politico (July 29, 2013) (available at <http://www.politico.com/story/2013/07/technology-industry-taking-aim-at-patent-trolls-94841.html>).

require, among other provisions, ‘trolls’ to post a bond sufficient to cover the defendant’s expected legal fees in order to proceed and maintain a lawsuit.¹⁶ If a troll patent holder was unsuccessful in the lawsuit, the patentee would be responsible for the accused infringer’s legal costs.¹⁷ Other bills provide for heightened pleading standards for patent infringement lawsuits,¹⁸ automatic stays of discovery in certain instances,¹⁹ expansion of the Patent Office’s review of certain patents,²⁰ shielding users of technology from liability,²¹ disclosure of financial interests of others in litigation,²² among other changes. While no action has occurred on any of these bills yet, many expect patent reform to be a high priority for Congress in 2013 and 2014.

In addition to Congress and the White House, the Federal Trade Commission (“FTC”) is considering investigating some PAEs.²³ 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 NPEs: not all of the criticisms in the press apply to all categories of NPEs. The FTC’s concern pertains only to a subset of NPEs. 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.

Defenders of NPEs have offered several purported benefits. They claim that NPEs provide liquidity in the marketplace for patents.²⁴ They permit inventors who are otherwise excluded from the marketplace, because for instance, they are individual who cannot manufacture

¹⁶ Saving Hi-Tech Innovators from Egregious Patent Disputes, H.R. 845, § 2(b).

¹⁷ H.R. 845, § 2(a)(4) (“the Court shall award the recovery of full costs to any prevailing party asserting invalidity or noninfringement.”).

¹⁸ Patent Litigation and Innovation Act of 2013.

https://www.eff.org/sites/default/files/patent_litigation_and_innovation_act.pdf

¹⁹ Patent Abuse Reduction Act of 2013, S. 1013.

²⁰ The Stop Offensive Use of Patents Act, H.R. 2766; Patent Quality Improvement Act, S. 866.

²¹ Representative Goodlatte circulated a draft patent bill for discussion.

²² End Anonymous Patents Act, H.R. 2024.

²³ 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>).

²⁴ Michael Risch, *Patent Troll Myths*, 42 SETON HALL L. REV. 457 (2012).

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.

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.²⁵ 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 NPE or non-NPE definitions. Broad definitions of trolls or NPEs surely cause higher numbers. We believe that providing data to the public that unpacks the definition of NPE can provide better illumination to policy makers, researchers, and others 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 NPEs, 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 5,195 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, 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. Thus, the often-repeated “explosion” of NPE 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

²⁵ 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. As academics, we do not have these financial incentives with respect to data.

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 in detail the methodology we used to generate the dataset. Part II 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 III. We also describe some areas of future study, many of which we are presently undertaking. Finally, we provide a brief conclusion.

I. STUDY DESIGN AND METHODOLOGY

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 www.npdata.com.²⁶

A. The Coders

Because the data is both central to the Article and difficult to code, the authors personally coded all of the lawsuits.²⁷ 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.²⁸ 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 patent attorneys before becoming full time academics. 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.²⁹ We

²⁶ 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.

²⁷ 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.

²⁸ 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.

²⁹ 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*

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.³⁰ 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.³¹

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.³² Because of both the change of law that occurred during

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. ___ (forthcoming 2013); 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).

³⁰ We note that the government disagree 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.”).

³¹ Sara Jeruss, Robin Feldman & Tom Ewing, *The AIA 500 Expanded: The Effects of Patent Monetization Entities*, (available at _____).

³² <http://www.patentlyo.com/patent/2011/09/rush-to-judgment-new-dis-joinder-rules-and-non-practicing-entities.html>.

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 used Bloomberg Law's Federal Docket Database to identify the patent lawsuits filed in these years.³³ 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. 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.³⁴ 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.³⁵ There were 666 Patent False Marking cases, which we manually excluded in 2010. The AIA effectively eliminated nearly all false marking cases.³⁶ We did not find any False Marking disputes in the 2012 data.

³³ 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.

³⁴ 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.

³⁵ 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.

³⁶ 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

Second, we excluded all cases in which the only patents asserted were design patents. The current debate about NPEs is about utility patents, not design patents.³⁷ 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.³⁸ We excluded 139 lawsuits on this basis from 2010, and 146 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.³⁹ 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 5,195 patent infringement lawsuits in 2012. As we explain in Section II, the difference is largely explained by the AIA change in joinder rules.

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

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.

³⁷ 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.

³⁸ 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.

³⁹ 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.”).

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. As previously mentioned, the three authors personally coded the cases, choosing not to rely upon student RAs. 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. 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 patentee, then the coder would code the classification as ‘unsure’ or ‘undermined.’ We then had a second author review the coding on these entities.⁴⁰

⁴⁰ As an additional layer of reliability, we had student coders verify the cases we were unsure, as well as other cases.

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. 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. 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.⁴¹

⁴¹ 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 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.

(3) large patent aggregator: a company with a large patent portfolio whose primary business is enforcing patents of numerous others. This includes Acacia companies⁴² and Intellectual Ventures.

(4) failed operating or start-up company: a company that originally invented the patent-in-suit, and attempted to commercialized 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.

(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.

As previously mentioned, we coded a subset of each other's coding. From a mathematical calculation, the reliability of our coding appears quite high.⁴³ That said, one should be aware

⁴² 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.

⁴³ 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

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.⁴⁴

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 about its accuracy.⁴⁵ We attempted to manually correct the Bloomberg Law results when they were 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.⁴⁶

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.

⁴⁴ 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.

⁴⁵ 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.

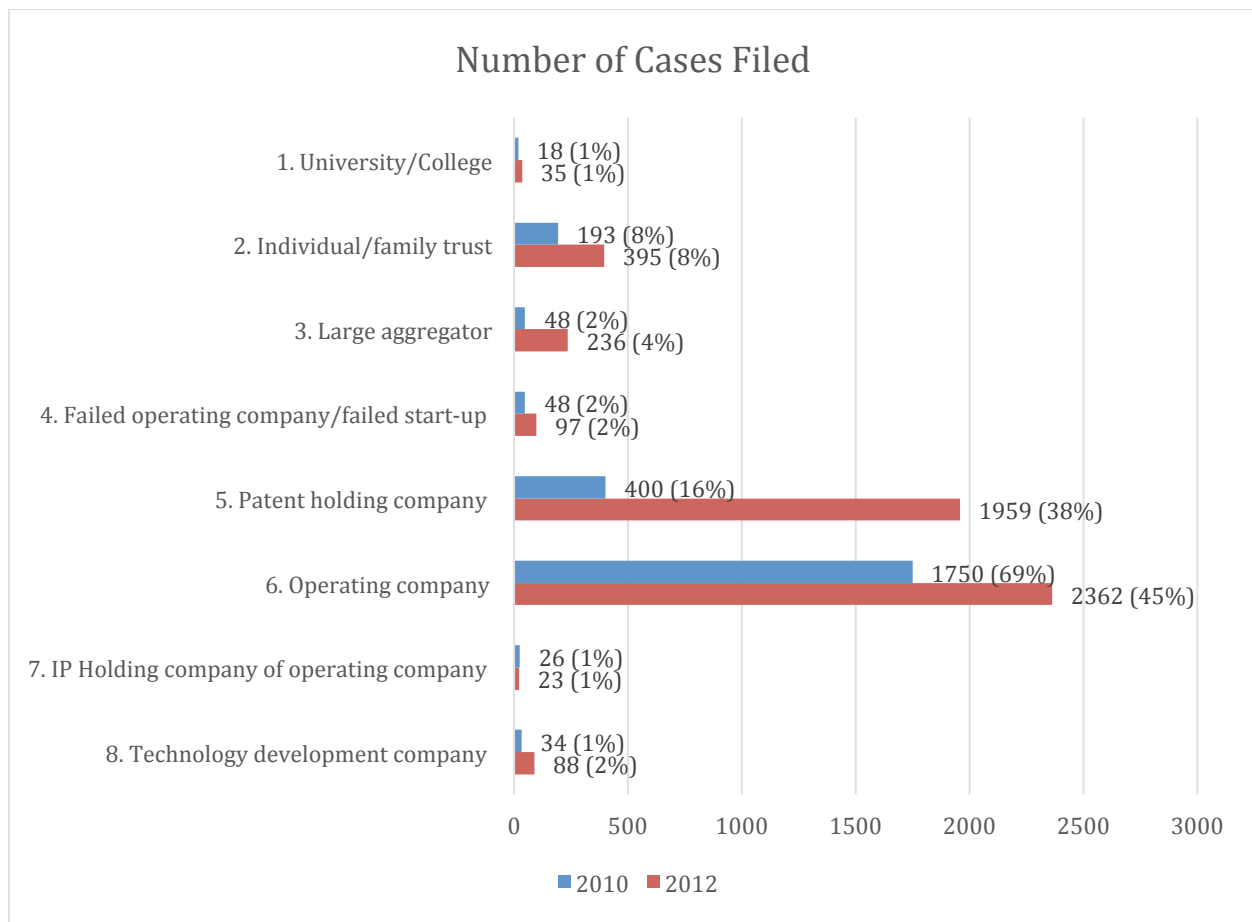
⁴⁶ Take, for example, the case with detailed allegations of inequitable conduct that causes Bloomberg Law to falsely identify extra. In this example, it is likely that all of the patents are in the same technological field so it would not affect our analysis.

II. 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 5,195 filed in 2012. These constituted the universe of cases that we analyzed further.

The distribution of utility patent infringement cases filed by each patentee category is set forth below in Figure 1 for 2010 and 2012.⁴⁷

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



⁴⁷ 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.

The total number of utility patent infringement cases increased from 2010 to 2012 from 2,521 to 5,195 cases. 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 1,959. 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 2012⁴⁸. The number of cases filed by Operating Companies increased from 1,750 cases to 2,362 cases. Operating Companies still made up the largest percentage of cases filed in both 2010 and 2012.

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.⁴⁹ 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 2012.⁵⁰ For 2010, we observed 1,610 unique patentees. For 2012, there were 1,696 unique patentees that filed suit.

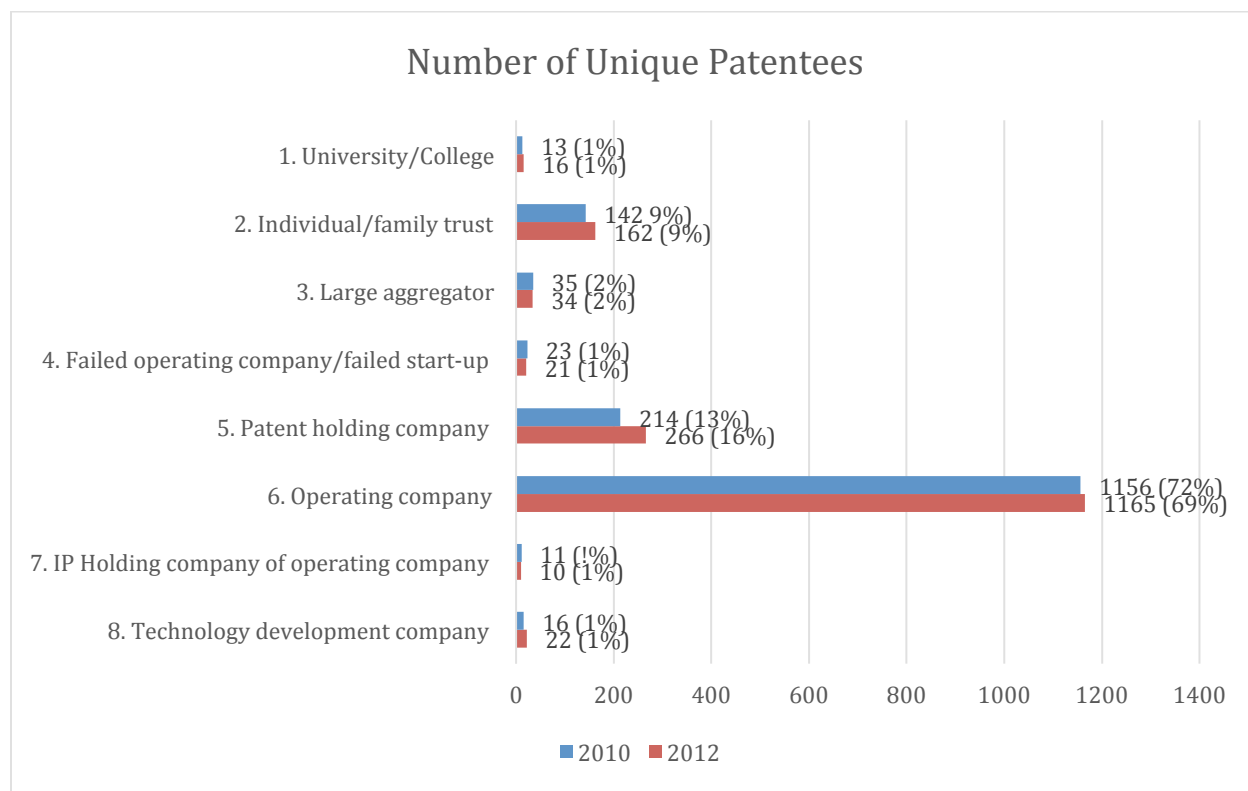
Figure 2 set forth the numbers and percentages of unique patentees that filed suit in each year for each patentee category for 2010 and 2012.

⁴⁸ 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.

⁴⁹ 35 U.S.C. § 299 (2011).

⁵⁰ 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 1,696 patentees). And, as can be seen above in Figure 2, the distribution amongst the various patentee types is nearly identical for each year.

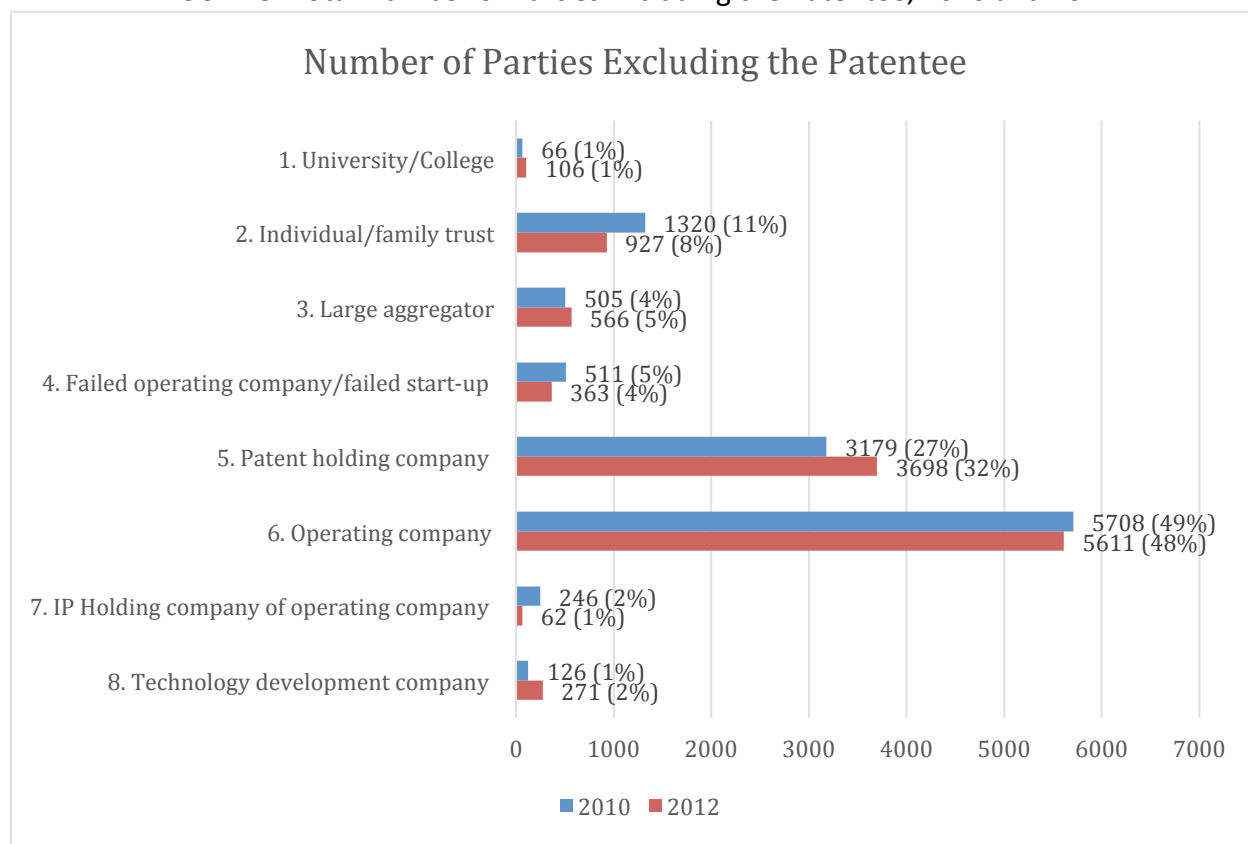
However, these figures only account for the number of unique patentees. Another perspective on the data is the number of defendants being sued by patentees in the various categories. Accordingly, we collected the total number of parties for each case filed in the two years studied.⁵¹ We then coded the number of parties for each patentee category, subtracting the patentee from this total to prevent double counting of a unique patentee if they initiated more than one suit in a year coded.⁵²

⁵¹ We coded total number of parties instead of number of alleged infringers because this is the data Bloomberg readily provided. However, we see 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. In a minority of cases there are more than one patent owner, or a patent owner with one or more exclusive licensees as parties. Our subtraction of one for each cases does not account for multiple parties on the patent holder side of the case. However, we do not believe that these meaningfully affect the results as they occurred infrequently. Thus, the total number of parties value reported in the figures below will equal the number of alleged infringers in almost all cases.

⁵² 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.

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

FIGURE 3: Total Number of Parties Excluding the Patentee, 2010 and 2012



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 11,604 in 2012. The two notable changes, although not dramatic, were in the number of parties in Patent Holding Company cases and Individual patentee cases. 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.

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.

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.

TABLE II: Distribution of Patent Litigation within Computers and Communications Category

Patentee Category	# of Cases in NBER Category 2	# of Parties (Excluding Patentee) in NBER Category 2
1. University/College	4 (0.46%)	15 (0.25%)
2. Individual/family trust	50 (5.80%)	709 (11.69%)
3. Large aggregator	41 (4.76%)	391 (6.45%)
4. Failed operating company/failed start-up	38 (4.41%)	462 (7.62%)
5. Patent holding company	280 (32.48%)	2,435 (40.15%)
6. Operating company	409 (47.45%)	1,833 (30.22%)
7. IP Holding company of operating company	17 (1.97%)	220 (3.63%)
8. Technology development company	23 (2.67%)	72 (1.19%)

TABLE III: Distribution of Patent Litigation within Drugs and Medical Category

Patentee Category	# of Cases in NBER Category 3	# of Parties (Excluding Patentee) in NBER Category 3
1. University/College	4 (0.86%)	10 (0.59%)
2. Individual/family trust	18 (3.87%)	128 (7.53%)
3. Large aggregator	0 (0%)	0 (0%)
4. Failed operating company/failed start-up	2 (0.43%)	34 (2.00%)
5. Patent holding company	18 (3.87%)	128 (7.53%)
6. Operating company	417 (89.68%)	1,365 (80.34%)
7. IP Holding company of operating company	2 (0.43%)	7 (0.41%)
8. Technology development company	4 (0.86%)	27 (1.59%)

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.

III. IMPLICATIONS

A. Exploring the Lack of Change Between 2010 to 2012

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.⁵³

The question then is whether the distribution is different within the various patentee categories. Are there really changes in behavior at a more granular level. 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 4 and 5 below.

FIGURE 4: Quartiles by Number of Parties per Unique Patentee, 2010

⁵³ 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.

Quartiles by Number of Parties per Unique Patentee -- 2010

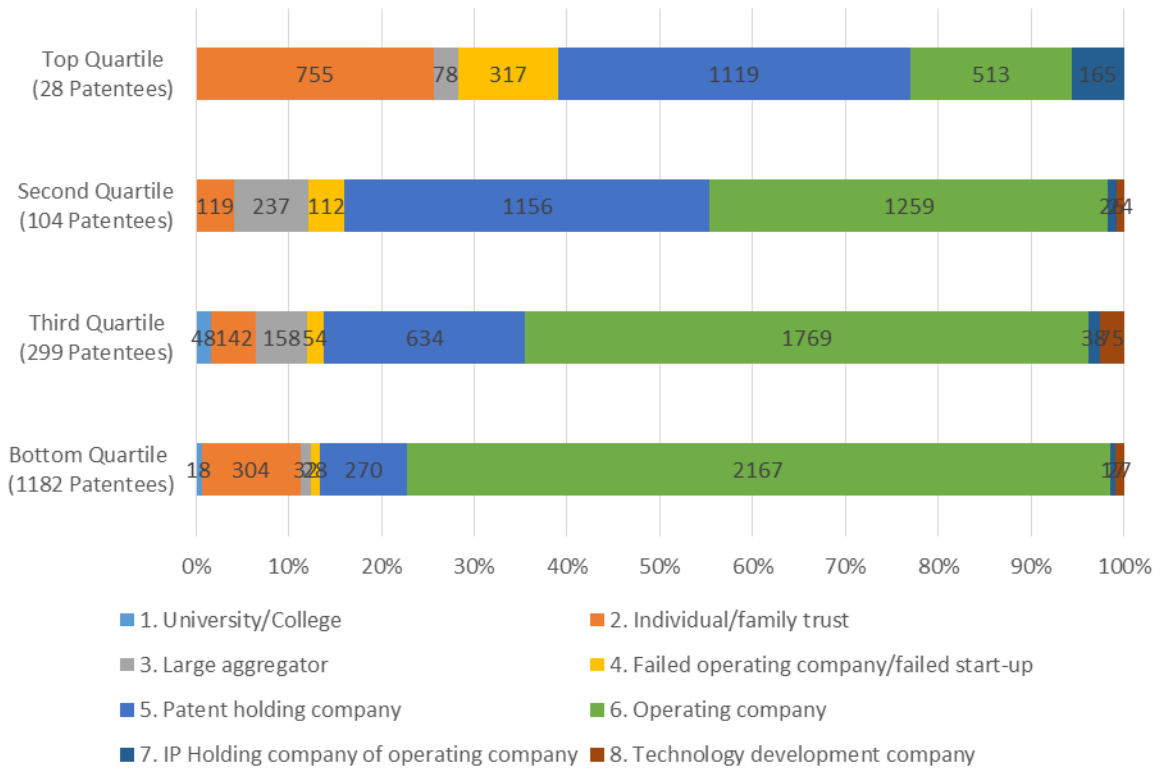
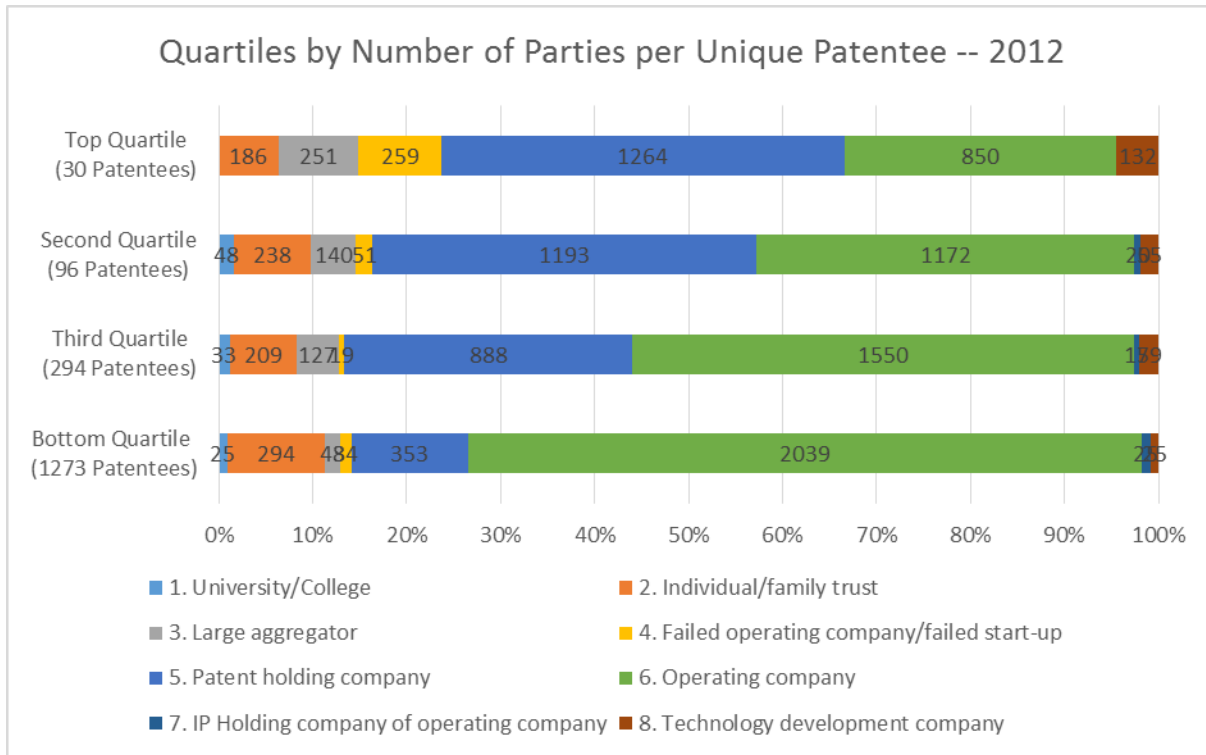


FIGURE 5: Quartiles by Number of Parties per Unique Patentee, 2012



In both Figure 4 and Figure 5, 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. 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.

We were interested in whether 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 6, 7, and 8 below report our results.

FIGURE 6: Cumulative Distribution of Unique Individual Patentees

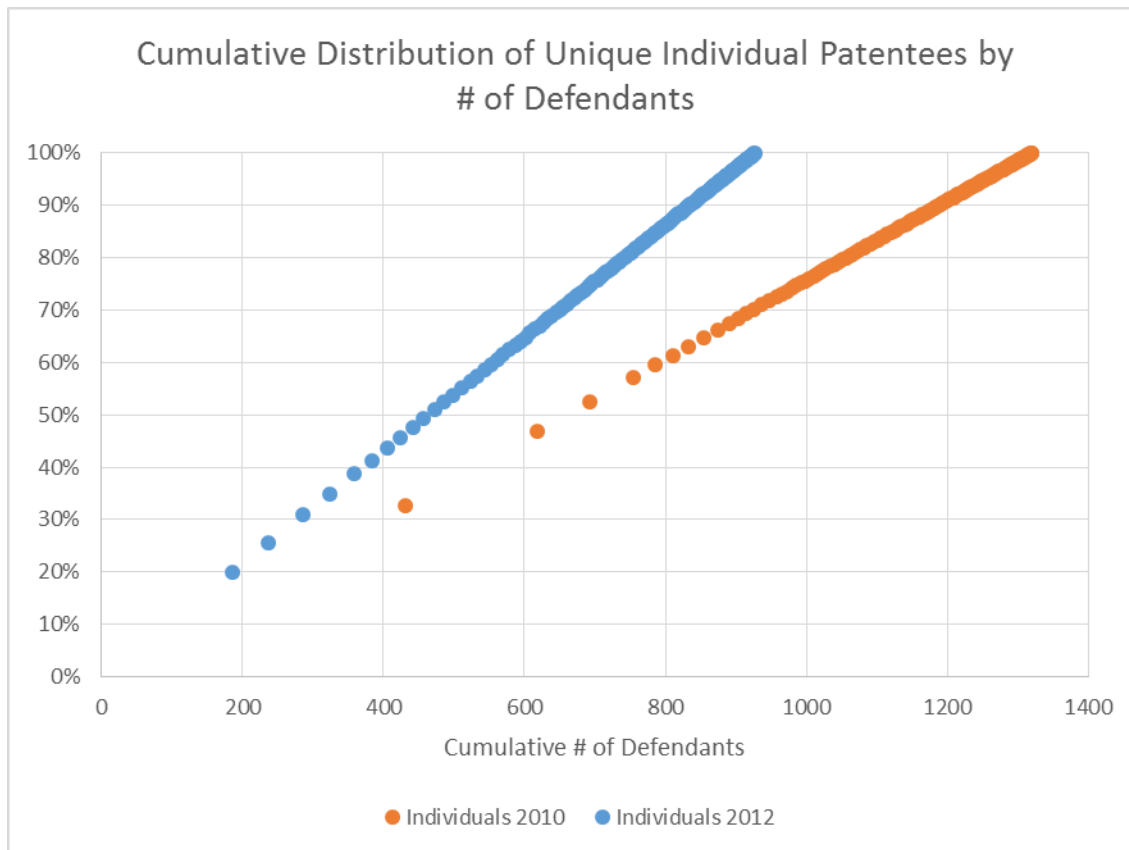


FIGURE 7: Cumulative Distribution of Unique Patent Holding Company Patentees

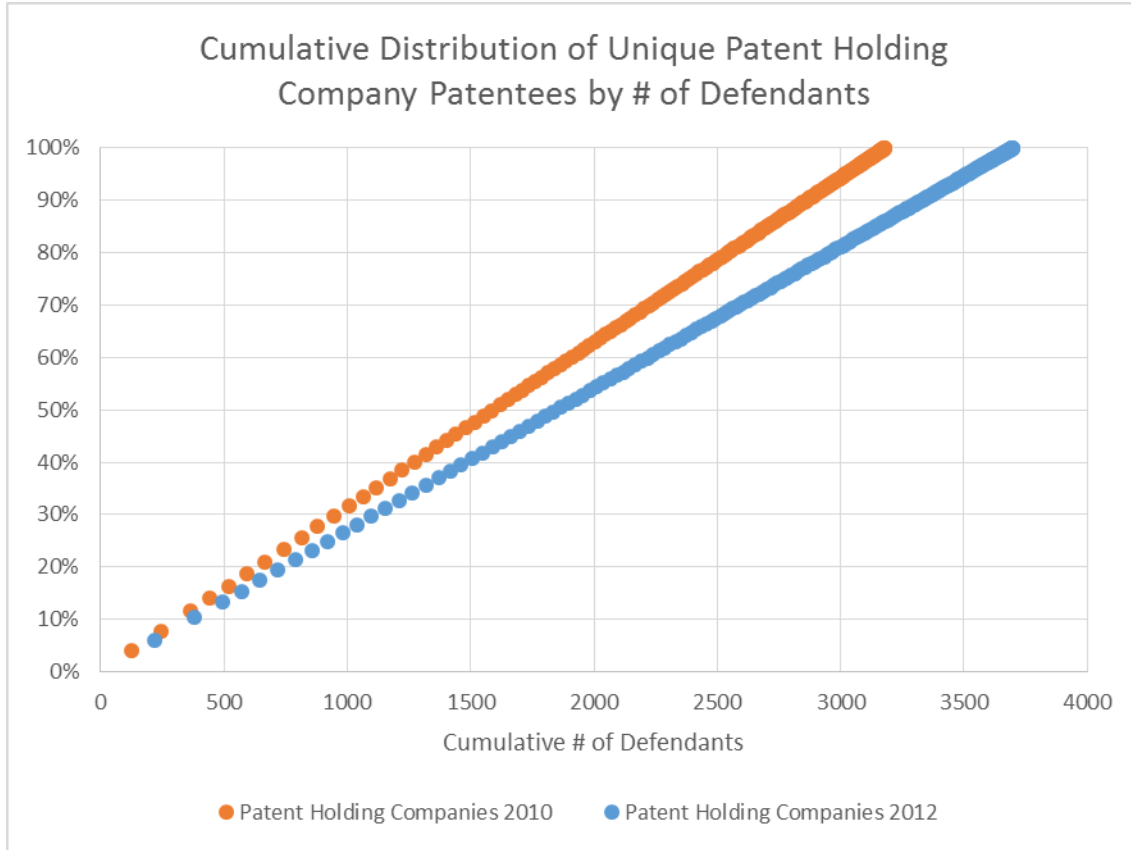


FIGURE 8: Cumulative Distribution of Unique Operating Company Patentees

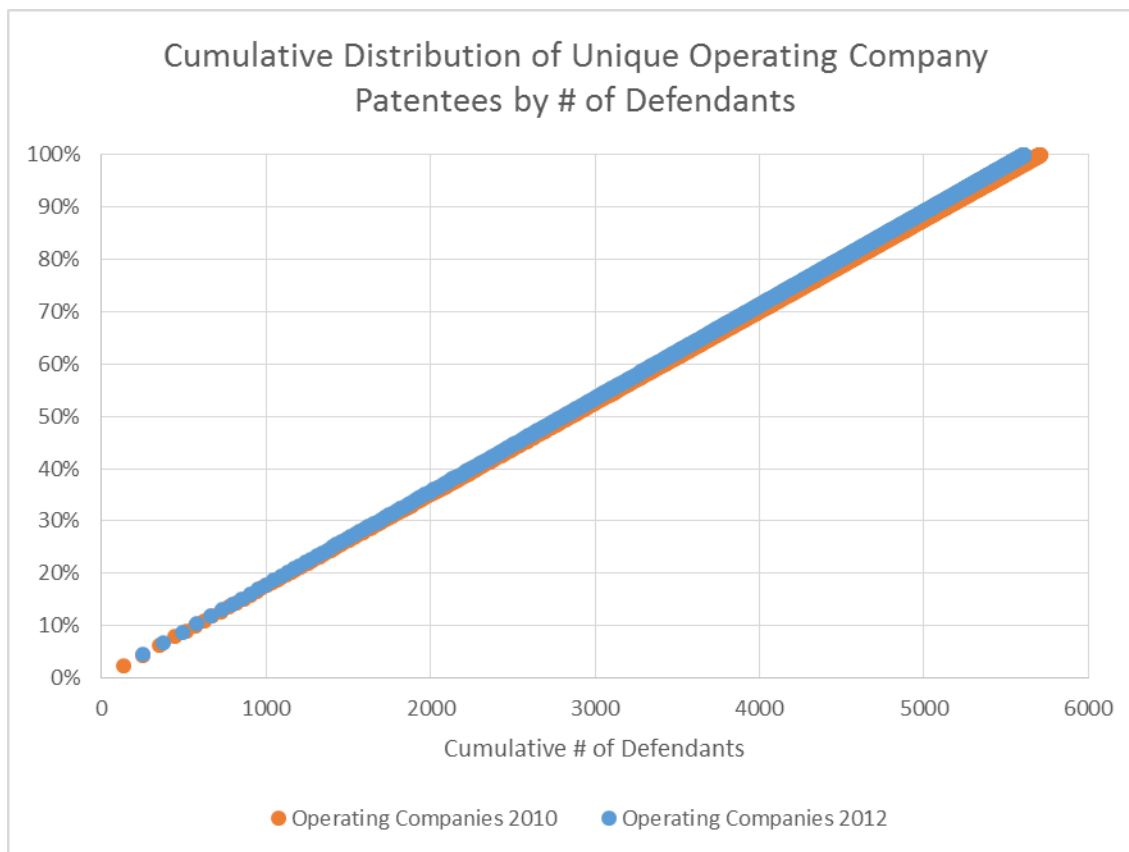
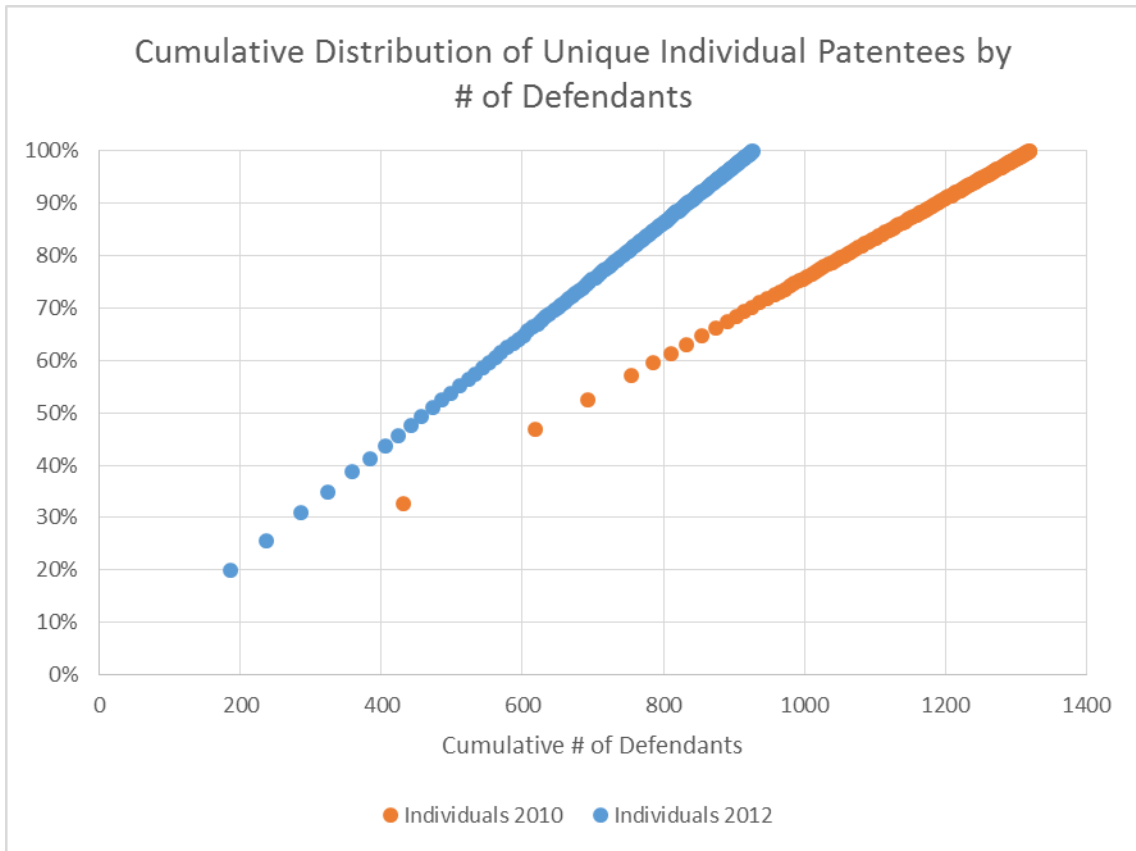


Figure 6 illustrates the distribution for unique individual inventor patentees in 2010 and 2012. It appears the distribution has changed slightly between those years. In 2012, there are fewer total defendants, but the slope of the distribution is similar. Figure 7 shows the distribution of patent holding companies in 2010 and 2012. There are slightly more defendants in 2012, but the slope of the distribution is quite similar. Figure 8 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 9 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 9: Cumulative Distribution of Unique Individual Patentees (Excluding Geotag)



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 10: Top Ten Most Litigious Patent Holders, 2010⁵⁴

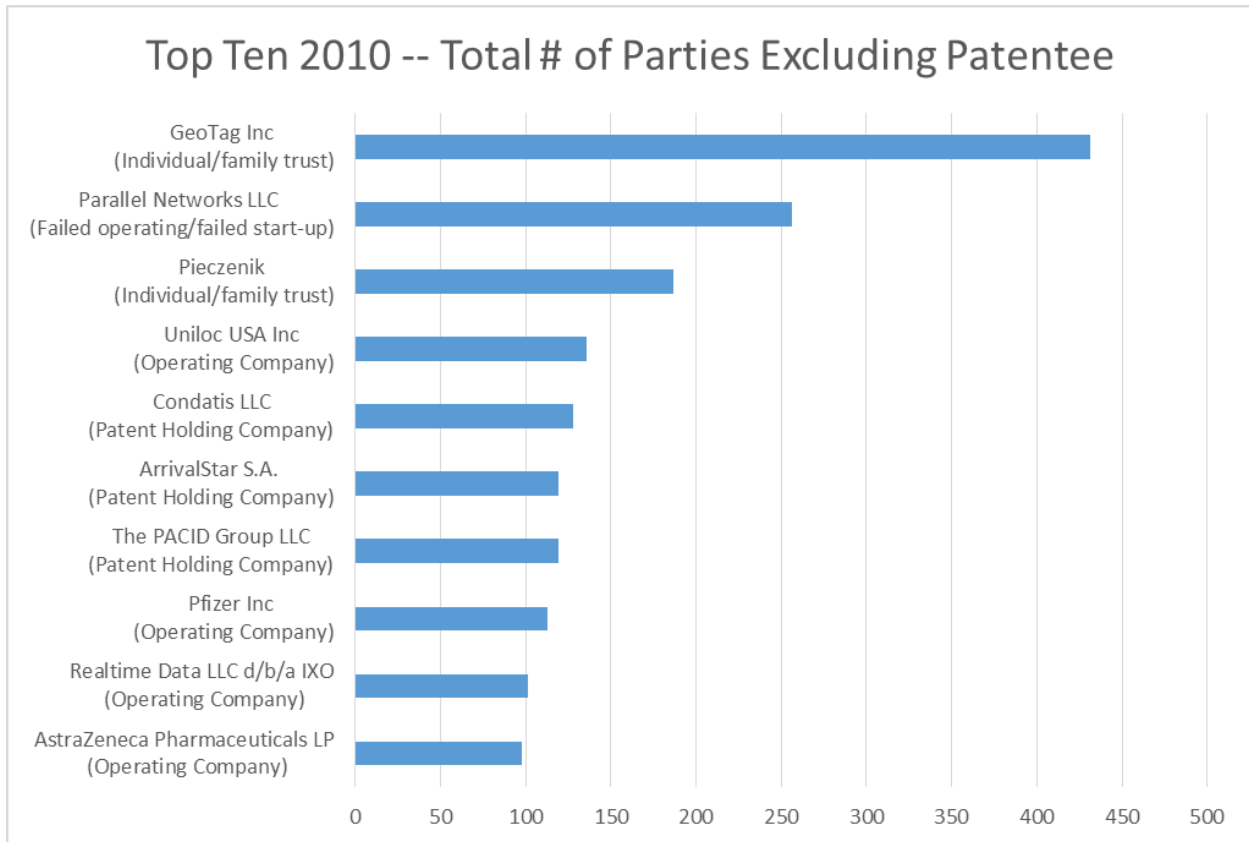
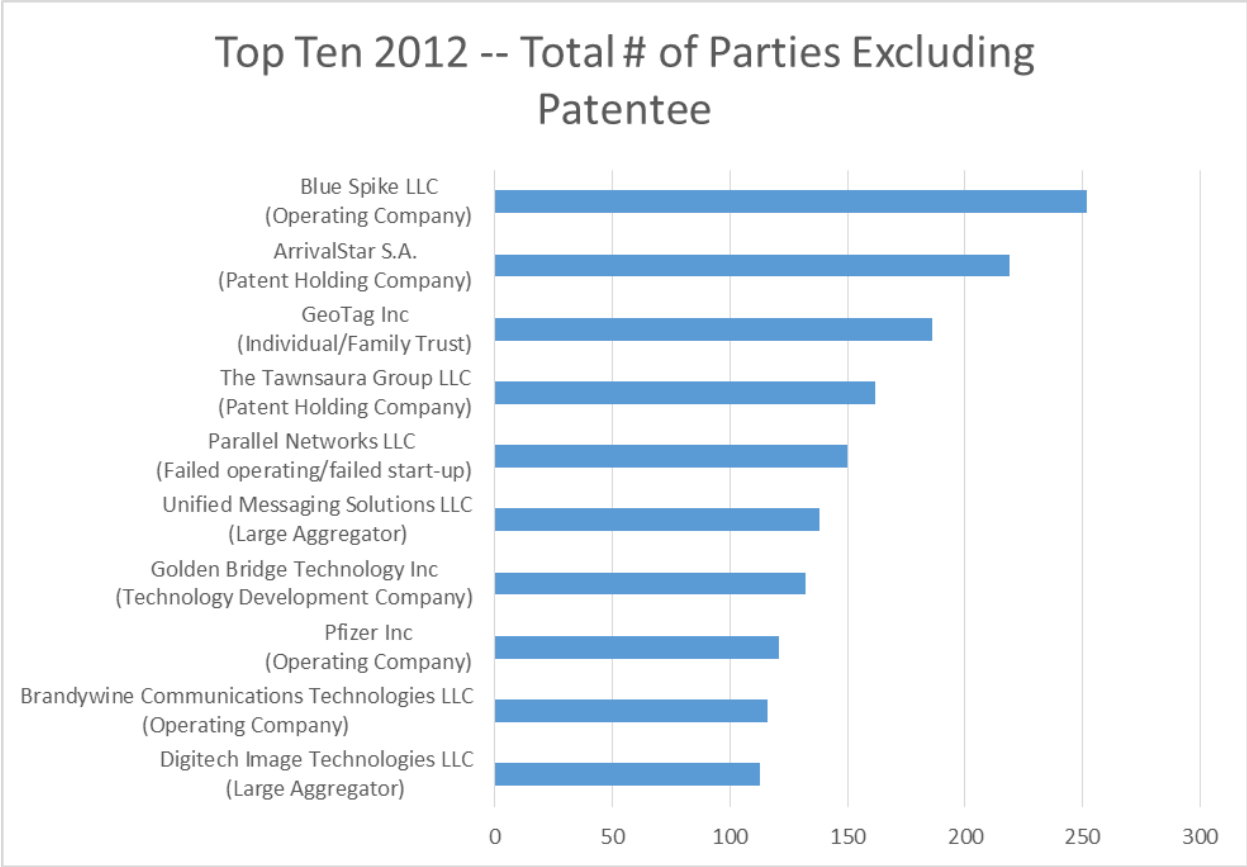


FIGURE 11: Top Ten Most Litigious Patent Holders, 2012⁵⁵

⁵⁴ Uniloc USA Inc. provides a good example of how our coding may differ from others. A Google search for Uniloc USA Inc. returns a link for <http://www.uniloc.com>. From here, if the link to NetAuthority is clicked, the website for <http://netauthority.com> is provided, where products related to the patents in suit are clearly being sold by Uniloc USA Inc. Accordingly, Uniloc USA Inc was coded as an operating company.

⁵⁵ The coding of Brandywine Communications Technologies LLC is another example as to how our coding methodology may differ from others. While the popular press identifies Brandywine Communications as a patent holding company, a search returns <http://www.brandywinecomm.com/>, which clearly sells products falling under some of the patents owned by Brandywine Communications Technologies LLC. Therefore, this patentee was coded as an operating company. Brandywine also appears to be a subsidiary of Acacia. See <http://www.dailyfinance.com/2013/05/17/acacia-subsiary-enters-into-license-and-settleme/>. However, that does not change the fact that Brandywine appears to sell products covered by the patents.



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 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, two large aggregators, Unified Messaging Solutions LLC and Digitech Image Technologies LLC, both 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.*⁵⁶ and RPX.⁵⁷ A summary of the comparison of the data between the studies and ours is set forth below in Table IV.

Table IV: Comparison of Descriptive Findings from Various Studies

	Feldman <i>et al.</i> ⁵⁸	RPX ⁵⁹	Cotropia, Kesan, Schwartz ⁶⁰ (Large Aggregators + Patent Holding Companies)	Cotropia, Kesan, Schwartz ⁶¹ (Large Aggregators + Patent Holding Companies + Individuals)
% Cases Filed in 2010 by PAEs	N/A ⁶²	30% (765 cases)	17.78% ⁶³ (448 cases)	25.47% (641 cases)
% Cases Filed in 2012 by PAEs	58.7%	65% (3,054 cases)	42.25% (2,195 cases)	49.86% (2,590 cases)
% Parties/Alleged Infringers Involved in PAE suits in 2010	N/A ⁶⁴	55%	31.59%	42.91%
% Parties/Alleged Infringers Involved in PAE suits in 2012	49.90% ⁶⁵	61%	36.75%	44.73%

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.

⁵⁶ 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>.

⁵⁷ RPX 2012 NPE Activity Report, *supra* note 10.

⁵⁸ The data in this table from Feldman *et al.* focuses on what they coded as a “[p]atent monetization entity” or “monetizer.”

⁵⁹ RPX’s data represented in this table identified “non-practicing entities” or “NPEs”.

⁶⁰ Our data in this column combines patentees in the Large Aggregator and Patent Holding Company categories.

⁶¹ Our data in this column combines patentees in the Large Aggregator, Patent Holding Company, and Individuals categories.

⁶² Feldman *et al.* did not report data from 2010.

⁶³ 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.

⁶⁴ Again, Feldman *et al.* did not report 2010 data.

⁶⁵ 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 56, at 47, 57-58.

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 2012.⁶⁶ 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).⁶⁷

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 2195 cases (42.25%) 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 2590 cases (49.85%) 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 NPEs, 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.⁶⁸ 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 2012.⁶⁹ RPX concluded that NPE suits made up 55% of defendants sued in 2010 and 61% in 2012.⁷⁰

⁶⁶ Feldman, *et al.*, *supra* note 56, 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.

⁶⁷ RPX, *supra* note 57, at 11 (Chart 4).

⁶⁸ Feldman, *et. al.*, *supra* note 56, at 57-58.

⁶⁹ RPX, *supra* note 57, at 11 (Chart 5).

⁷⁰ RPX, *supra* note 57, at 12 (Chart 8).

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 36.75% (4,264) 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 5,191 (44.73%) in 2012. This is in contrast to Operating Company cases which involved 49.48% (5,708) of the parties in 2010 and 48.35% (5,611) 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.⁷¹ And under this comparison, just as with the comparison as to 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

⁷¹ 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.

companies to split the proceeds? These “privateering” arrangements are not typically publicly available, which makes them quite hard to study.⁷²

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 NPE 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.

IV. CONCLUSION

Profound changes appear to be occurring in the patent system. Granular data on the identities of patent holder litigants are necessary to consider the implications of these changes. 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.

⁷² Tom Ewing, *Indirect Exploitation of Intellectual Property Rights by Corporations and Investors*, 4 HASTINGS SCI. & TECH. L.J. 1 (2012).