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**HETEROGENEITY AMONG PATENT OWNERS IN LITIGATION:
AN EMPIRICAL ANALYSIS OF SETTLEMENT, CASE PROGRESSION,
AND ADJUDICATION**

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**HETEROGENEITY AMONG PATENT OWNERS IN LITIGATION:
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Christopher A. Cotropia* , Jay P. Kesan , and David L. Schwartz*****

I. INTRODUCTION

A national epidemic cost the economy \$320 billion within five years.¹ The President announced a number of actions and asked Congress to enact legislation to combat the problem.² Advocates joined the call and tried to push a bill through Congress, only to be stymied by powerful special interests lobbyists.³ What is the epidemic?

It's the "explosion of patent litigation" that "everyone agrees" has occurred.⁴ There has been a sharp increase in patent litigation and, more than previously, cases

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¹ Laurie White and Dale Venturini, *Protect Main Street from Patent Trolls*, PROVIDENCE JOURNAL (Feb. 27, 2014), <http://www.providencejournal.com/opinion/commentary/20140227-laurie-white-and-dale-venturini-protect-main-street-from-patent-trolls.ece>

²THE WHITE HOUSE OFFICE OF THE PRESS SECRETARY, FACT SHEET – EXECUTIVE ACTIONS, ANSWERING THE PRESIDENT'S CALL TO STRENGTHEN OUR PATENT SYSTEM AND FOSTER INNOVATION, *available at* <http://www.whitehouse.gov/the-press-office/2014/02/20/fact-sheet-executive-actions-answering-president-s-call-strengthen-our-p>

³ Joe Mullin, *How the Patent Trolls Won in Congress*, ARS TECHNICA (May 23, 2014), <http://arstechnica.com/tech-policy/2014/05/how-the-patent-trolls-won-in-congress/>

⁴ Timothy B. Lee, *New study shows exactly how patent trolls destroy innovation*, VOX (Aug. 19, 2014), <http://www.vox.com/2014/8/19/6036975/new-study-shows-exactly-how-patent-trolls-innovation>

are settled before trial.⁵ The culprits are patent trolls, also known as "patent assertion entities" ("PAEs") or "non-practicing entities" ("NPEs"), who are responsible for the majority of all patent lawsuits filed in the United States.⁶ Because they make no products, they are immune from counterclaims for patent infringement in a way that operating companies are not.⁷ They sue thousands of defendants, from operating companies to individual consumers of allegedly infringing products, carefully picking the judicial districts where they bring their patent lawsuits and asserting questionable Internet patents.⁸ PAEs rely heavily upon the asymmetric costs of litigation, which swing heavily in their favor since they have few documents to produce in discovery.⁹ And PAEs collect "nuisance fees" from those afraid of expensive litigation.¹⁰ To combat this "explosion," Congress proposed new litigation and civil procedure rules applicable only to patent cases, including some directed specifically at those who don't practice the patent.¹¹

However, there is an increasing realization within the legal community that this "explosion" in patent litigation may be overblown. A major factor is the anti-joinder provision of the 2011 Leahy-Smith America Invents Act (AIA). That provision required that a patent holder file a separate lawsuit against each unrelated defendant, reversing the practice of some courts which permitted unrelated defendants to be sued in a single lawsuit.¹² After the AIA was passed, there were an increased number of suits filed, as each defendant needed to be sued in a separate lawsuit since many

⁵ Megan M. La Belle, *Against Settlement of (Some) Patent Cases*, 67 VAND. L. REV. 375 (2014).

⁶ Robin Feldman, Thomas Ewing, and Sara Jeruss, *The AIA 500 Expanded: The Effects of Patent Monetization Entities*, 11 DUKE L. & TECH. REV. 357 (2014).

⁷ Brian J. Love, *An Empirical Study of Patent Litigation Timing: Could a Patent Term Reduction Decimate Trolls Without Harming Innovators?*, 161 U. PA. L. REV. 1316 (2013) ("Because NPEs do not sell products that could be the subject of a counterclaim, they do not face this risk when filing suit.").

⁸ Daniel Nazer & Vera Ranieri, *Why Do Patent Trolls Go To Texas? It's Not for the BBQ* (July 9, 2014) (available at <https://www.eff.org/deeplinks/2014/07/why-do-patent-trolls-go-texas-its-not-bbq>) (arguing that patent "trolls" forum shop, viewing as Eastern District of Texas as particularly favorable); but see Joff Wild, *The Way To Reduce the ED Texas's Popularity is to Reduce the Patent Hostility of Other US Courts*, IAM BLOG, Oct. 19, 2015 (available at <http://www.iam-media.com/blog/Detail.aspx?g=2dd23087-1df5-4b41-b5f6-041b070182a8>) (arguing that few U.S. district courts are fair to patent holders, with E.D. Texas being a notable exception).

⁹ General Accounting Office, *Intellectual Property: Assessing Factors that Affect Patent Infringement Litigation Could Help Improve Patent Quality* at 10 (August 2013) (available at <http://www.gao.gov/assets/660/657103.pdf>) ("parties that do not offer products or services using the patents at issue often have far fewer documents to disclose—because they do not have any documents related to their products or services—than patent owners or accused infringers who do offer products or services.").

¹⁰ Jim Spencer, *Patent Trolls Collect "Nuisance Fees" and Political Enemies*, STAR TRIBUNE (June 15, 2013), <http://www.startribune.com/business/211615651.html>

¹¹ Paul R. Gugliuzza, *Patent Litigation Reform: The Courts, Congress, and the Federal Rules of Civil Procedure*, 95 B.U. L. REV. 279 (2015); *See Innovation Act, Proposed Revision to 35 U.S.C. 299* (requiring that, upon a showing that the patentee "has no substantial interest in the subject matter at issue other than asserting such patent claim in litigation," the other interested parties can be joined to the lawsuit to pay potential awards of attorneys' fees.)

¹² Fabio E. Marino and Teri H.P. Nguyen, *Has Delaware Become the "New" Eastern District of Texas? The Unforeseen Consequences of the AIA*, 30 SANTA CLARA HIGH TECH. L.J. 527 (2014), available at <http://digitalcommons.law.scu.edu/chtlj/vol30/iss4/3>

defendants could no longer be joined in the same action.¹³ This largely ministerial change caused the number of lawsuits to rapidly increase, while the underlying amount of litigation (*i.e.* the number of plaintiffs and the number of defendants) remained constant. After accounting for the changes in the joinder provision, the apparent explosion of PAE activity from 2010 until 2012 appears to be a mirage.¹⁴

But what about the other serious charges, charges that patent trolls or PAEs behave badly in litigation? For instance, are PAEs bringing mainly frivolous charges of infringement, seeking nuisance fee settlements? Are PAEs settling their cases quickly to avoid adjudication of their claims on the merits? More broadly, do PAE lawsuits look noticeably different from lawsuits asserted by other types of patentees? Within the broader category of PAEs, does one group, such as individual inventors, behave differently from other groups within the broader category? Do failed companies litigate differently from companies whose sole business purpose is to purchase patents? While there is anecdotal evidence behind these charges, there is little solid empirical evidence to date. We recognize that the role of PAEs in the patent system is not confined to litigation. It may be interesting to study patent grants, patent assignments and related transactions among various entities, and patent demands that do not result in litigation. However, most of the charges about PAEs are focused on litigation abuses by patent holders. As such, we focused our initial inquiry there.

In this work, we present an empirical study of the relationship between the type of patentee-plaintiffs and litigation behavior (e.g., settlement, duration, grant of summary judgment, trial, and procedural dispositions) in patent lawsuits. We take into account, among other factors, the technology of the patents being asserted, the judicial districts where these lawsuits were filed, the judge to whom the case is assigned, and the lawyers representing the patent holder. Using a hand coded unique dataset, we break down the different types of patentee-plaintiffs on a refined basis, distinguishing among operating companies, patent holding companies, large patent aggregators, individual inventors, universities, and failed start-ups. To study the relationship between patentee entity type and case progression and disposition, we employ a variety of empirical approaches. We present summary statistics, regression results, and duration/survival analysis. As a result, we are able to provide a detailed picture of the relationship between the type of patentee-plaintiffs, choice of patented technology, and venue and litigation outcomes, including settlement. In sum, we find significant heterogeneity among patent holder entity types. Individual inventors, failed operating companies, patent holding companies, and large patent aggregators each have distinct strategies. They appear to litigate differently from each other and from operating companies.

The remainder of this Article is organized as follows. In Part II, we propound an economic explanation of the litigation incentives for the disparate types of patent holders. We continue, in Part III, by setting forth our study design and methodology.

¹³ There was an uptick in litigation after the joinder provisions were publicly announced and just before they went into effect in September 2011. Brian Howard, *Year in Review, Continued Analysis*, LEX MACHINA (July 23, 2014), <https://lexmachina.com/2014/07/year-review-continued-analysis/>

¹⁴ Christopher A. Cotropia, Jay P. Kesan & David L. Schwartz, *Unpacking Patent Assertion Entities*, 99 MINN. L. REV. 649, 660-73 (2014).

Next, in Part IV, we provide the results of the study. The results include information about case duration and case dispositions. We discuss implications in Part V. We briefly conclude in Part VI.

II. ECONOMIC MOTIVATIONS OF PATENT HOLDERS IN LITIGATION

In this section, we expound a basic economic theory of how various patent holders should litigate. We provide separate theories for operating companies, patent holding companies, large aggregators, individual inventors, and other types of patent plaintiffs.

Until very recently, patent litigation was primarily between companies who were operating and offering goods and services in the same technology sector. For instance, until about 2008-09, there were four times as many operating companies as there were non-operating companies filing patent lawsuits.¹⁵ While each case is different, often when an operating company sued another operating company, the stakes and overall litigation exposure of both parties were quite symmetric. The defendant entity in this scenario may assert a patent infringement counterclaim based on its patent portfolio and even the liability exposure for both sides. The discovery costs (such as e-discovery, documentary evidence, depositions and experts) and challenges of proving infringement *vel non* are also symmetric. Remedies including reasonable royalty estimates, lost profit claims, possible price erosion, injunctive relief, and willful infringement are also equally available to both patent plaintiffs and counter claim defendants, since they are both operating companies.

This scenario becomes considerably more asymmetric when the patent plaintiff is not an operating company. An individual inventor, a research university, a failed start-up or a patent holding company that does not make goods or offer services is not exposed to a patent infringement counterclaim. As a result, the defendant is limited in terms of increasing the litigation risk and exposure on the plaintiff. The discovery costs become more asymmetric as the patent plaintiff may not possess significant documentary evidence to turn over to the defendant, although it still bears the costs of proving infringement based on the defendants' evidence. In addition, the available remedy that must be proven by the plaintiff is limited in this scenario since it most often comprises an estimate of the reasonable royalty for past and future sales. In short, when a non-operating company sues an operating company for patent infringement, the costs involved and the litigation stakes may be more asymmetric compared to a patent lawsuit between two operating companies.

That said, all non-operating companies are far from being similarly situated. The motivations of different types of non-operating, non-practicing companies varies. For instance, when a patent holding company or large aggregator of patents (also referred to as a patent assertion entity) is the plaintiff, there are several relevant factors at play that influence the outcome in the patent lawsuit. First, the patent holding company may create a new entity for holding the patents that are asserted in the lawsuit thereby minimizing the discovery burdens and the downside litigation

¹⁵ See, Kirti Gupta and Jay P. Kesan, *Studying the Impact of eBay v. MercExchange on Injunctive Relief in Patent Cases* (2016) (draft available with author).

exposure. The new entity has few assets other than the patents and may be dissolved in the event the lawsuit fails. Second, the patent holding company may be able to spread any potential loss arising from this lawsuit over many other patent lawsuits involving the same patent portfolio. In addition, large patent aggregators, companies who purchase and aggregator numerous patent portfolios from various sources, may be monetizing several other patent portfolios and spread the risks even wider. Third, since the patent holding company is a third party purchaser and not the inventor/assignee, they do not have to contend with any issues related to the genesis of the invention giving rise to the asserted patent(s) and are insulated from any issues/matters related to the inventors/assignees. Fourth, a large aggregator may be seen by a defendant to be a repeat player in the world of patent litigation and thus the defendant's strategies (such as aggressively continuing the lawsuit or offering a settlement) will take that into account. Moreover, the large aggregator will also consider the possibility that they may have to sue the same defendant again in connection with another patent portfolio. In short, a large aggregator can pursue a patent monetization strategy that is highly diversified, with reduced risk, and involving cumulative assimilation of specialized knowledge over time.

Individual inventors, research universities and failed start-ups, while falling within the broad rubric of non-operating companies find themselves in a very different position compared to a patent holding company and large aggregators. First, the patents that are asserted by them in litigation are the result of their own research efforts and their involvement in the development of the underlying technology. The resulting patents being asserted are of personal importance and their association with the patents are often intimate. Consequently, these entities may be inclined to overvalue their patents and their exclusivity in the market, a phenomenon that is referred to the inventors/creators' endowment effect. As a result, individual inventors and other similar entities, may be inclined to continue litigating a patent case (including spurning a settlement offer), even if continued litigation is not in their objective best interest. Second, unlike patent holding companies, the patents that individual inventors, universities and failed start-ups choose to monetize are necessarily limited in number since they that are involved in the creation of these patents and the technologies protected by the patents. Third, individual inventors, universities and failed start-ups may be seen to be rare patent plaintiffs, and thus defendants may be incentivized to continue to litigate these patent cases or not offer a meaningful settlement, knowing that these entities are less sophisticated litigants against whom they may never have to litigate again.

There is even a diversity among individual inventors, research universities and failed startups. Universities' primary business is in education and research, not patent enforcement. Reputation is very important to universities. Failed startups, in contrast, have little ongoing business. They may feel that the alleged infringer unfairly beat them in the marketplace. The alleged infringer may have the opposite view of the marketplace battle, and these underlying divergent views may affect the patent case. Failed startups also have investors who may desire some return, via the patent lawsuit, on their otherwise lost capital. Even within individuals, there is diversity. Individual inventors sue in their personal capacity (*i.e.*, John Dow) or they can form a corporate vehicle (*i.e.*, John Dow LLC). Those with access to sophisticated counsel are

likely to be advised to form a corporate vehicle. Those without, may even litigate *pro se*, representing themselves in the litigation. Defendants may litigate against individuals, especially *pro se* individuals, quite differently. They may be less willing to offer meaningful settlements and more aggressive in litigation positions.

Based on the foregoing, it is clear that a straightforward examination of the economic incentives faced by different types of patent plaintiffs to settle or to continue to litigate a patent case can be distinctly different. Therefore, dividing the world of patent plaintiffs into binary categories—operating entities and non-operating entities—as a way to understand behaviors in patent litigation may well be unjustifiable and misguided. More granular categories will be more revealing.

III. STUDY DESIGN AND METHODOLOGY

In the following section, we set forth how data was located, collected, and coded. Our work here expands upon a unique dataset we previously collected by hand. As described in detail elsewhere,¹⁶ the authors previously spent several weeks personally attending to gathering information about all patent lawsuits brought in 2010 and 2012. For the sake of comprehensiveness, we briefly review the contents of the unique dataset with particular emphasis on additional information about the lawsuits that we added for the present study.

In what follows, we explain the contours of our initial dataset and the additional coding we conducted for this Article.

A. THE PREVIOUSLY COLLECTED DATA

The previously collected dataset includes information from all patent infringement lawsuits filed in two complete calendar years: 2010 and 2012. We used Bloomberg Law’s Federal Docket Database to identify the patent lawsuits filed in these years.¹⁷ We verified that Bloomberg Law’s database was substantially identical to that of PACER, the database maintained by the federal courts.

For the present study, we focus on only lawsuits filed in 2010 because almost all of the lawsuits filed then have been resolved, thus permitting us to investigate outcomes, settlements, and other information related to litigation. Of course, if we chose a more recent year, then a much larger number of cases would still be pending, reducing our ability to observe settlement and judgment patterns. Lawsuits filed in 2010 are, nevertheless, relatively recent.¹⁸ While there are reasons to think that

¹⁶ Cotropia, Kesan & Schwartz, *supra* note 13 at 660-73.

¹⁷ 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.

¹⁸ In many areas of law, one may expect lawsuits filed today to be resolved similarly to lawsuits filed five years ago. However, patent law may be different. Several major changes have occurred in the last five years, including the rise of Inter Partes Review (IPR) that is concurrent with much patent litigation, and the Supreme Court decision in *Alice Corp. v. CLS Bank*, 134 S.Ct. 2347 (2014). Furthermore, the America Invents Act (AIA) requires that lawsuits filed against multiple unrelated parties are filed separately. 35 U.S.C. § 299 (2012). For example, in 2010, while a patentee could sue three defendants in one patent lawsuit in some venues, after the implementation of the AIA, the same

recent changes, including adjustments to the law of patentable subject matter, joinder, and administrative reviews of patents, are significant, our results indicate an accurate portrayal of patent litigation in 2010. We contend that information about patent litigation in 2010 has some continued relevance toward understanding what patent litigation looks like in 2015. More importantly, patent litigation in 2010 provides a telling snapshot of economic incentives of a plaintiff relate to settlement and case duration and progression.

For every lawsuit, we reviewed the docket report and a copy of the complaint, amended complaints, answers, and amended answers. The complaint is the legal document that initiates a lawsuit, and the answer is the legal response filed by the defendant to the lawsuit's allegations.¹⁹ While the complaint frequently does not contain detailed factual contentions, it always identifies the parties to the lawsuits, and sometimes includes background information about the parties.²⁰ We eliminated several types of cases from the dataset, including all complaints alleging patent false marking, complaints alleging only design (and not utility) patents, non-patent infringement allegations (*i.e.*, legal malpractice, inventorship disputes, demands for patent term adjustments, interferences, motions to quash subpoenas, other actions against the Patent Office, and mislabeled trademark, and copyright infringement actions), and duplicate cases (*i.e.*, mirror-image complaints for patent infringement and declaratory judgment actions for no patent infringement, involving the same patents and parties). After elimination, our dataset contained 2,520 patent infringement lawsuits in 2010.

We obtained certain specific information for each lawsuit from Bloomberg Law. We recorded the judicial district in which 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 parties to the lawsuit (including all plaintiffs and defendants). Patent numbers asserted in the 2010 cases were used to categorize the lawsuits by technology.²¹

We hand counted the defendants in the 2010 patent lawsuits. To hand count, we relied upon the complaint, and any amended complaints, for each coded lawsuit and counted the number of defendants listed. We included in the defendant count any party identified by the plaintiff(s) as a defendant in the complaint.²² For declaratory judgment cases, we counted plaintiffs as "defendants." A defendant was still counted as a "defendant" even if that party was dismissed from a lawsuit.

Then, we determined the type of patent holder involved in the lawsuit. We

patentee may have to sue each defendant separately, resulting in three patent lawsuits. The number of defendants in a lawsuit may relate to the measured variables, including duration.

¹⁹ *Complaint*, LEGAL INFO. INST., <http://www.law.cornell.edu/wex/complaint/> (last visited Sept. 19, 2014).

²⁰ *Id.*; *see generally* FED. R. CIV. P. 8–10.

²¹ Information about the NBER patent classification can be found in Hall, B. H., A. B. Jaffe, and M. Trajtenberg (2001). "The NBER Patent Citation Data File: Lessons, Insights and Methodological Tools." NBER Working Paper 8498.

²² Unfortunately, it was unfeasible for us to excluded "related" defendants. Thus, if two distinct yet apparently related corporate entities (*i.e.*, LG Electronics Inc. and LG Electronics USA Inc.) appeared as separate defendants, we counted those as two defendants. In follow on research, we are manually identifying such related parties to permit them to be removed, when appropriate.

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; and (7) Technology Development Company.²³

Below is a brief description of each category:

(1) University: A public or private institution of higher learning. It includes foreign and domestic institutions.²⁴ An example is Cornell University.

(2) Individual Inventor: One or more inventors who own(s) a patent (*i.e.*, it is unassigned to a company). Often the party to the litigation would be an individual litigating in his 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 a 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, L.P. (RAKTL) asserts patents invented by Ronald A. Katz.²⁵ 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 shares of the corporation. Unfortunately, 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.

(3) Large Patent Aggregator: A company with a large patent portfolio whose primary business is enforcing patents of numerous other individuals and entities.²⁶

²³ To determine the proper classification for a plaintiff 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 and whether those products 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 indicating that it manufactured products, then we classified it as an Operating Company.

²⁴ 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.

²⁵ See *Company Overview of Ronald A. Katz Technology Licensing, L.P.*, BLOOMBERG BUSINESSWEEK, <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=7672486> (last visited Sept. 19, 2014).

²⁶ The line between Patent Holding Company and Aggregator is not completely clean. We generally used the Aggregator category sparingly, limiting it to companies that had assembled via acquisition of portfolios with hundreds of patents or more.

This includes Acacia companies, Wi-Lan, 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 a 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, the original inventor does not own these companies. 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.²⁷ We also included IP holding companies owned by manufacturing companies in this category. For instance, AT&T Intellectual Property I, L.P. was considered an Operating Company.²⁸

(8) Technology Development Company: A company that invested in the development of technology, perhaps with the intention of licensing rather than commercializing. 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.

We previously reported our intercoder reliability for the coding of patentee entity types, and the consistency of our coding appears to be high.²⁹

B. ENHANCED DATA

For the present Article, we gathered new information about the 2010 patent lawsuits. More precisely, we gathered information about when and how each defendant in each lawsuit exited the lawsuit. It is important to note that we gathered this information on a per-defendant basis, not a per-lawsuit basis. Thus, if a lawsuit had five unrelated defendants, we would record separate disposition information for each of the five defendants. Our dataset includes 7,461 defendants in total, not all of whom are unique. If, instead, we gathered the information on a per-lawsuit basis, we

²⁷ We know that some operating companies assert patents that they do not utilize in their business operations. See Ted M. Sichelman, *The Vonage Trilogy: A Case Study in "Patent Bullying,"* 90 NOTRE DAME L. REV. (forthcoming 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1856703.

²⁸ There were only 150 defendants that were sued by IP holding companies of manufacturing companies. As a robustness check, we performed all statistical analysis both separating IP holding companies owned by manufacturing companies and combining them with operating companies. The results were entirely consistent. Because we believe these entities very close to manufacturing companies – they typically report to the same management – we report in this Article only the combined results.

²⁹ The three co-authors personally coded the entity types of the patent holders, with each co-author completely slightly more than one third of the lawsuits.

would capture only information about the last defendant to settle or exit the lawsuit. While it was substantially more time intensive for us to gather information on a per-defendant basis, we believe that this information is significantly more useful when analyzing patent litigation. A majority of the 2010 lawsuits involved multiple defendants.³⁰ If most defendants settled earlier than the final defendant, then using a per-lawsuit method may substantially overestimate case durations. On the other hand, if most defendants settled early, but one defendant litigated until judgment, then reviewing only the judgment would not completely or accurately represent the litigation. A large number of early settlements may show evidence of patentees' strategic behavior that would otherwise be missed by viewing the data on a per-lawsuit basis. Again, only by evaluating data on a per-defendant basis can permit patent litigation to be comprehensively unpacked and untangled.

For each defendant, we identified the date that the party entered the case and exited the case. The entrance date is the date of the first complaint naming the party, which is typically the original date of the lawsuit. Sometimes a party is added after the original filing date via an amended complaint. In such instances, we used the date of filing of the amended complaint.³¹ The date of exit from a lawsuit is the date that the party was dismissed from the lawsuit. In most instances, there is a voluntarily dismissal entered by the court, presumably and often clearly following a settlement agreement. We used the date of an actual dismissal as the exit date.³² In lawsuits without dismissal, we used the date of judgment by the district court. From the entry and exit dates, we were able to determine the case duration for each party in each lawsuit filed in 2010.

We also recorded the reason for the dismissal of each defendant from the lawsuit. There are many reasons that a defendant may exist a case, and we call this reason the "disposition." We recorded this information on a very granular level. For simplicity, we group these types of dispositions into three category: (1) voluntary dispositions; (2) procedural dispositions; and (3) substantive dispositions. Voluntary dispositions include stipulated dismissals and voluntary dismissals by the patent holder. Procedural dispositions include dismissals for lack of standing, improper joinder, lack of personal jurisdiction, and lack of subject matter jurisdiction. We classified default judgments, which occur when the defendant does not appear in court to answer the complaint, as procedural dispositions. Substantive dispositions include trial outcomes and grants of summary judgment on merits issues. We also included the small number of cases decided under Rule 12(b)(6) for failure to state a claim as substantive dispositions. There were a small number of defendants – 270 – that were still pending when we completed our coding in November 2015. We report some information on these pending defendants in Figure 5 *supra*. For our analysis, we right censored the data by assuming that the close date of these defendants is

³⁰ 1,364 of the 2,520 (54.13%) cases in 2010 included two or more defendants.

³¹ A small number of cases had "John Doe" defendants. If a defendant was later substituted in place of a John Doe defendant, we used the date that the defendant was specifically named in a complaint as the entrance date.

³² Rarely, there was a motion for violation of a settlement agreement. We did not consider the case still open if such a motion was filed. Once the party was dismissed from the lawsuit, even if there was a later dispute, we counted the party as having resolved the lawsuit.

November 2015.³³

We recorded if the case had been stayed or transferred. Stayed and transferred cases pended for longer than run-of-the-mill cases. Much of the delay was caused by the stay or transfer itself. For that reason, we omit stayed and/or transferred cases from the analysis below, unless we specify otherwise.

We made another important classification of defendants. Many times, a patent owner asserts infringement against multiple, related parties. For instance, a patentee may sue Fujitsu America, Inc. and Fujitsu Components America, Inc. These companies are frequently represented by the same counsel, and they enter and exit the case on the same date. These entities, when they file papers in the litigation, always file a joint brief, motion, or other filing. For the purposes of our analysis, we had concerns about considering the two Fujitsu parties as two defendants. We are primarily measuring case duration, settlement behavior, and adjudications. The costs on these two defendants is likely the same as if either one were sued. The burden on the court and the plaintiff is similarly the same for one or two parties. In fact, it appears that multiple, related parties are often sued because plaintiffs may be overly cautious, desiring to make sure that there is no possibility of naming the wrong defendant. For that reason, we chose to collapse related defendants into a single defendant for the purposes of our analysis.

To collapse related defendants into a single defendant, we identified “related” defendants using two different definitions, one broad and one narrow. Our narrow definition of related defendants required that the parties share a root name, like the Fujitsu example above, and enter and exit the case on the same dates. If two parties fit our narrow definition of related defendants, then we would exclude one of the two for our analysis. Our broad definition of related defendants included everything in the narrow definition, and a small number of additional parties. The broad definition included multiple defendants where one defendant owned another, even if they did not share the same name. For instance, in one lawsuit, the patentee sued the American Broadcasting Company (ABC), as well as various Disney entities.³⁴ Disney owns ABC, so we identified ABC within our broad category of related defendants. We recognize that the ABC and Disney defendants may be duplicative for the same reasons that we identify above with respect to narrow defendants. However, these defendant *may* make different allegedly infringing products, requiring additional time for the court and the parties. It is not feasible for us to investigate each of these defendants more fully; consequently, we identify them as broadly related.

In the results section below, we identified where we exclude related defendants using the narrow definition. In unreported results, we analyzed the data using the broad definition of related parties. There are no material differences in the

³³ As a robustness check, we also analyzed the data assuming that all open defendants reached a substantive disposition. Because the number of open cases was large relative to the number of substantive dispositions, our results with respect to individual inventors on substantive dispositions lost significance when assuming that all open cases would reach a substantive disposition. We believe that such an assumption is too conservative as even cases that pend for a long period of time frequently settle. However, one should know that this result is more vulnerable than others to what transpires in the open cases.

³⁴ See Civil Action No. 3:10-cv-00146 in the Southern District of California.

results, given that few defendants fell within our broad definition and not our narrow definition.³⁵

Finally, we supplemented our dataset with information about the lawyers and law firms who represented the parties in the cases. Docket Navigator provided us with a list of every attorney who ever represented a party in a 2010 lawsuit. We matched these attorneys to our cases. Some of the individual inventors in our dataset represented themselves a ‘pro se’ litigants. A case was deemed ‘pro se’ if the patent holder was an individual inventor,³⁶ the lawyer’s name was the individual inventor, and there was no law firm identification present.

IV. RESULTS AND ANALYSIS

A. Influence of Patentee Entity Type on Overall Case Progression

Based on our data, we looked at whether the category of patentee entity type was correlated with the duration of the case and how the case was disposed. We also explored if the technology of a given case or the venue or judge was correlated to the patentee entity type. Our main focus was whether the entity was linked to litigation behavior, the popular narrative being that PAEs either brought weak cases or engaged in “hit and run” tactics, and thus their cases were voluntarily disposed of (most likely via settlement), and this disposition happened early. We also sought to determine if the cases had particular settlement patterns based upon entity type.

1. Duration of the Cases

As previously mentioned, we coded for duration by defendant, and not by case. And of the 9,101 defendants, we coded for 2010, 8,399 of those defendant’s cases were closed at the time of coding. Among those remaining, 245 were still open, 347 had been transferred or consolidated, and for 110 of the defendants, termination was impossible to reliably code. The transferred or consolidated cases were often merged into other cases. Thus, excluding the transferred or consolidated cases, 96.2% of the cases were closed at the time of coding.

Below, in Figure 1, the median and mean of the duration of these closed cases is reported. And these durations are separated by patentee entity type—with Figure 1 separately reporting case durations on a defendant-basis for lawsuits brought by Individual Inventors (including family trusts), Operating Companies, Patent Holding Company, Failed Operating Company, and Large Aggregators.³⁷ These last three could be considered collectively as PAEs—or non-operating companies. We

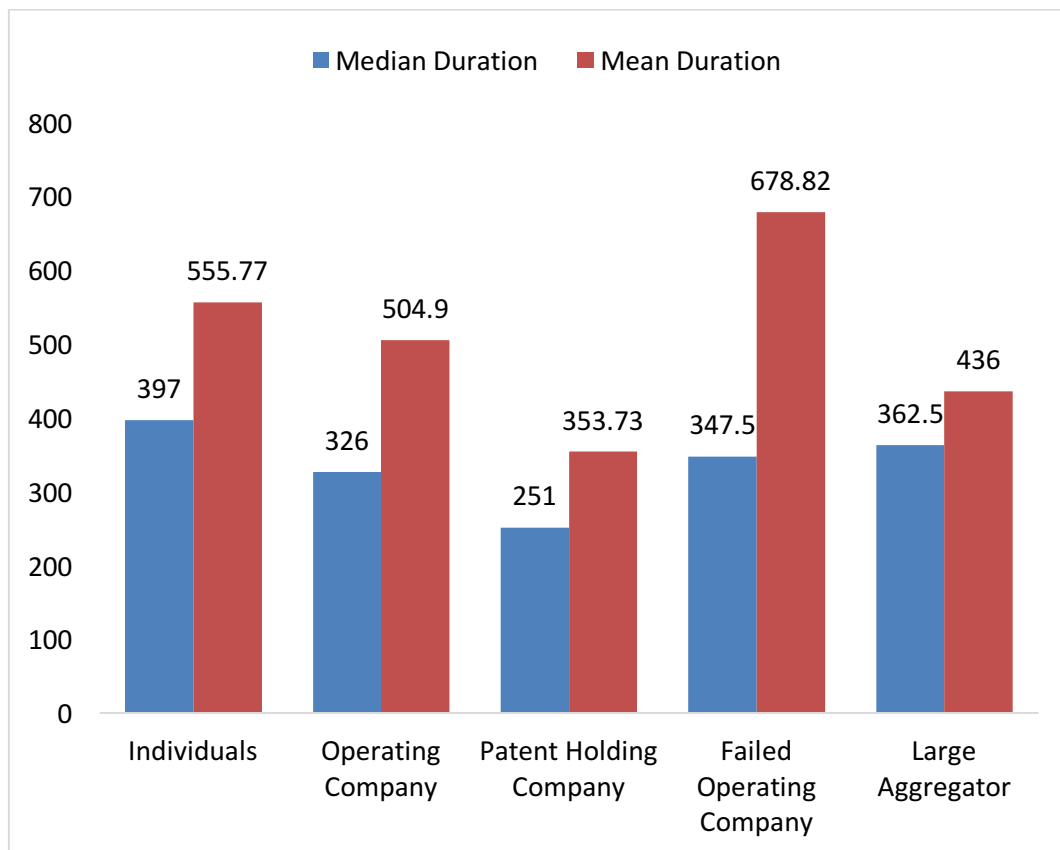
³⁵ In fact, only 45 defendants fell within the broad definition as compared to the narrow definition.

³⁶ Under the rules of legal ethics, only individuals can appear pro se. Corporations must appear through an attorney.

³⁷ We are aware of only one study investigating duration of lawsuits by entity type. That study uses the broad classifications of NPE or non-NPE, not the granular categories that we use. See Alex Haus & Steffan Juranek, *Patent Trolls: A Specialization or Hold-Up Story* (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2424407).

separated individual inventors litigating on in own name from those who formed a corporate vehicle before initiating a lawsuit. We also collected data for other non-operating companies such as Universities, Technology Development Companies, and IP Holding Companies, but do not report those results here because of the small number of defendants falling under these three categories.³⁸

Figure 1
Case Duration by Patentee Entity Type



Notably, Failed Operating Companies showed the longest mean duration at almost 700 days, with Individuals patentees having the second longest duration. The difference in mean duration for such patentees was statistically significant.³⁹ Patent Holding Companies had a lower mean and median duration than Operating Companies and this difference was statistically significant.⁴⁰ The range of median

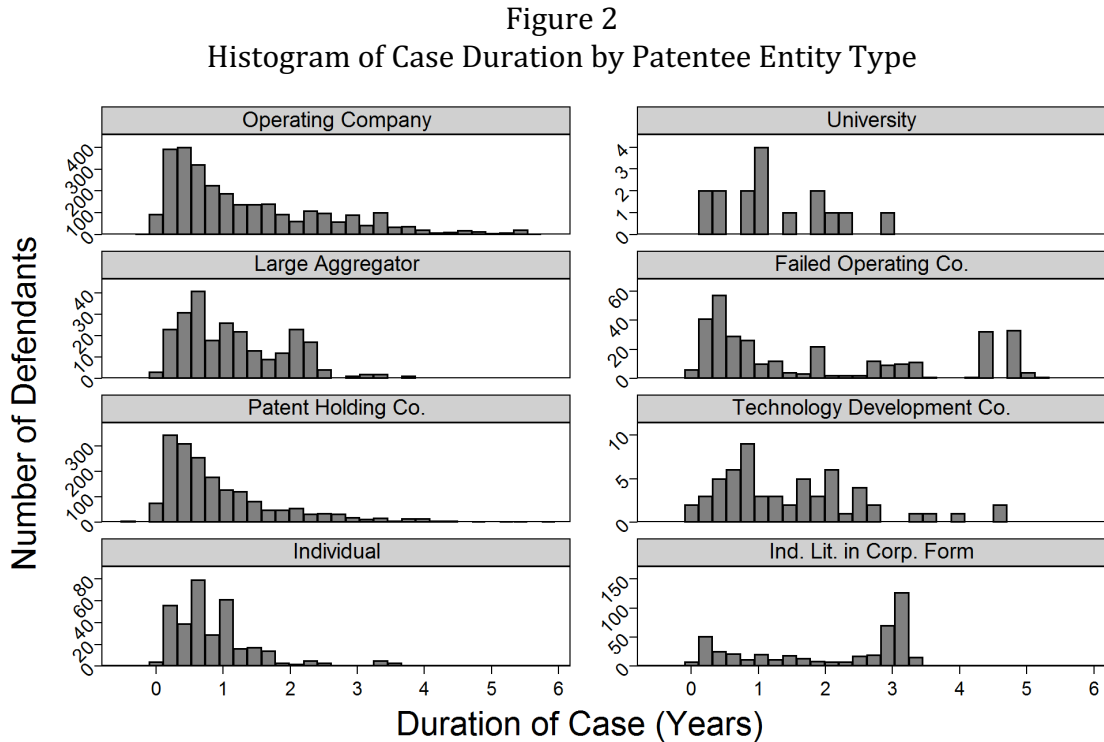
³⁸ We follow this convention throughout – reporting the descriptives for patent holding companies, failed operating companies, and large aggregators to give the reader an insight into the behavior of non-operating companies/PAEs. However, when we perform any of our statistical analysis, we look at all categories of patentees.

³⁹ A t-test assuming unequal variance reported a two-tailed p-value of 0.0005, with a t-statistic of -3.3284 with 451.275 degrees of freedom.

⁴⁰ A t-test assuming unequal variance reported a two-tailed p-value of 0.0000, with a t-statistic of -6.7264 with 3596.84 degrees of freedom. Accord Risch, *A Generation of Patent Litigation*.

durations was fairly large, ranging from a low of 251 days for Patent Holding Companies to a high of 397 days for Individual/Family Trust patentee. We focus here on median durations since they are not influenced as much by outliers.

While mean and median durations are a useful start, we further analyzed the data by examining the complete distribution of durations. In Figure 2 below, we plot the duration of each defendant by patentee entity type.



From the histogram, we observe that durations for defendants sued by Operating Companies and Patent Holding Companies are both right skewed. The Patent Holding Company distribution is slightly fatter at shorter durations, hinting at a great propensity of Patent Holding Companies to settle earlier in litigation. The Large Aggregator and Failed Operating Company durations are most evenly spread apart. The Individual Inventor, especially the individuals who have formed a corporate vehicle to litigate (the right, bottom box in Figure 2) show a bimodal distribution, with some defendants exiting the case very early and others exiting very late in the litigation.

Next we used a hazard model to fit the case durations. A hazard model estimates how various factors affect a known hazard. These models, such as the Cox Proportional Hazard Model that we employ, are widely employed in the medical field where the hazard is patient death. Our hazard is termination of the case for a particular defendant. To better understand the effect of entity types on case duration, we used the hazard model to estimate how entity type affects the time to termination

(i.e., survival time)—both any type of termination in general and just those terminations that were settlements.

The first hazard model looked at all defendants that terminated, regardless of the type of termination (substantive ruling by the court, procedural ruling by the court, or voluntary dismissal of the complaint). The survival is quantified in terms of number of days the case is pending before termination. Below, in Table 1, we report the survival quartiles for each entity type. The 50% column in Table 1 below corresponds to the median duration of defendants, as shown in Figure 1.

**Table 1: Survival in Days
for 2010 Patent Lawsuits (Any Disposition)**

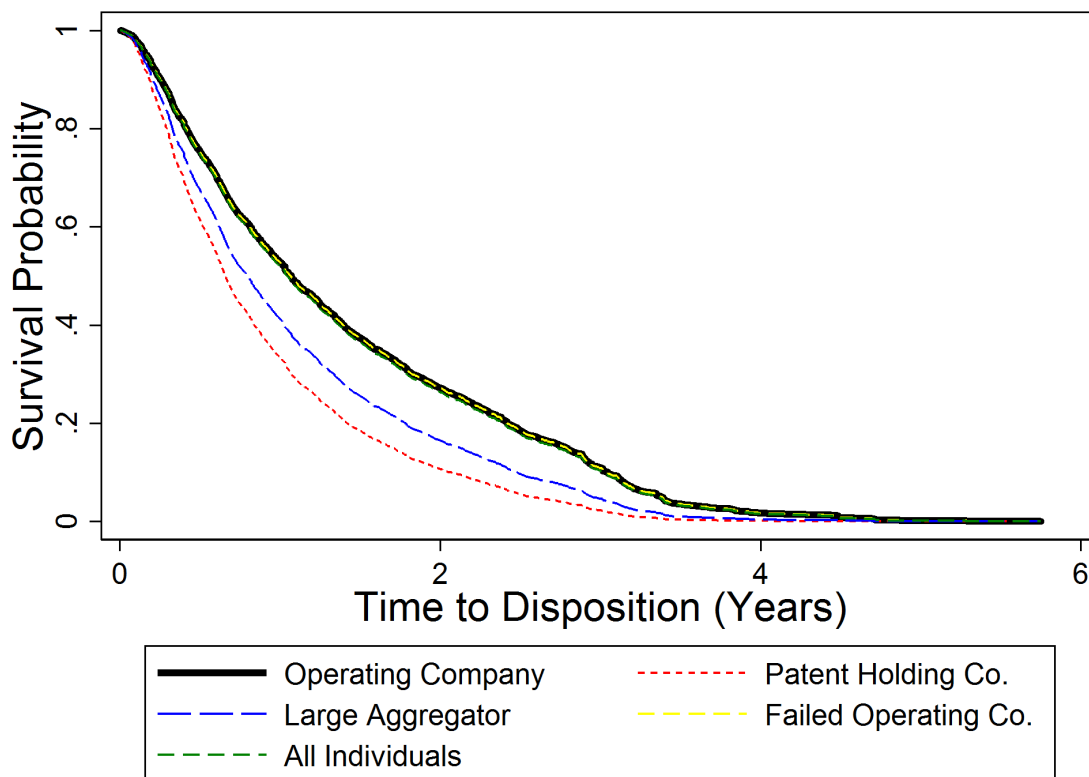
	# of Defs	25%	50%	75%	90%
1. University	16	241	395	698	820
2. Individuals	817	206	397	1043	1148
3. Large Aggregator	278	202	362.5	674	827
4. Failed Operating Company	330	160	347.5	1192	1722
5. Patent Holding Company	1943	120	251	468	804
6. Operating Company	2899	147	326	693	1118
7. IP Holding Company	127	197	302	590	794
8. Tech. Development Co.	56	231	515	766	1020

Most entity types exhibited a similar distribution amongst the various quartiles. The range of durations in the first quartile were the most compact. In the first quartile (25%), all of the entity types had resolution times between 120 and 241 days. The survival times spread out across the categories by the third quartile (75%), with resolution dates ranging from 468 days (Patent Holding Companies) to 1192 days (Failed Operating Companies). Individuals and Failed Operating Companies both appear to pend longer in the later quartiles. Operating companies exhibit a similar behavior, but not to the same extent.

To further investigate whether there are any statistically significant differences, we controlled for a variety of independent variables that may also influence the survival time of a case. These include the total number of defendants in a given case, the technology at issue, and the district court in which the case is pending. The results of the series of hazard model regressions are reported in Appendix A1, with the graphical output shown in Figure 3A below.⁴¹

⁴¹ Figure 3A corresponds to model (3) of Appendix A1. In unreported hazard models and regressions, we performed the same analyses using uncollapsed defendants. The same trends were identical to those reported in this paper. The same variables were statistical significant and the coefficients were in the same direction.

**Figure 3A: Hazard Model
(Any Disposition)**



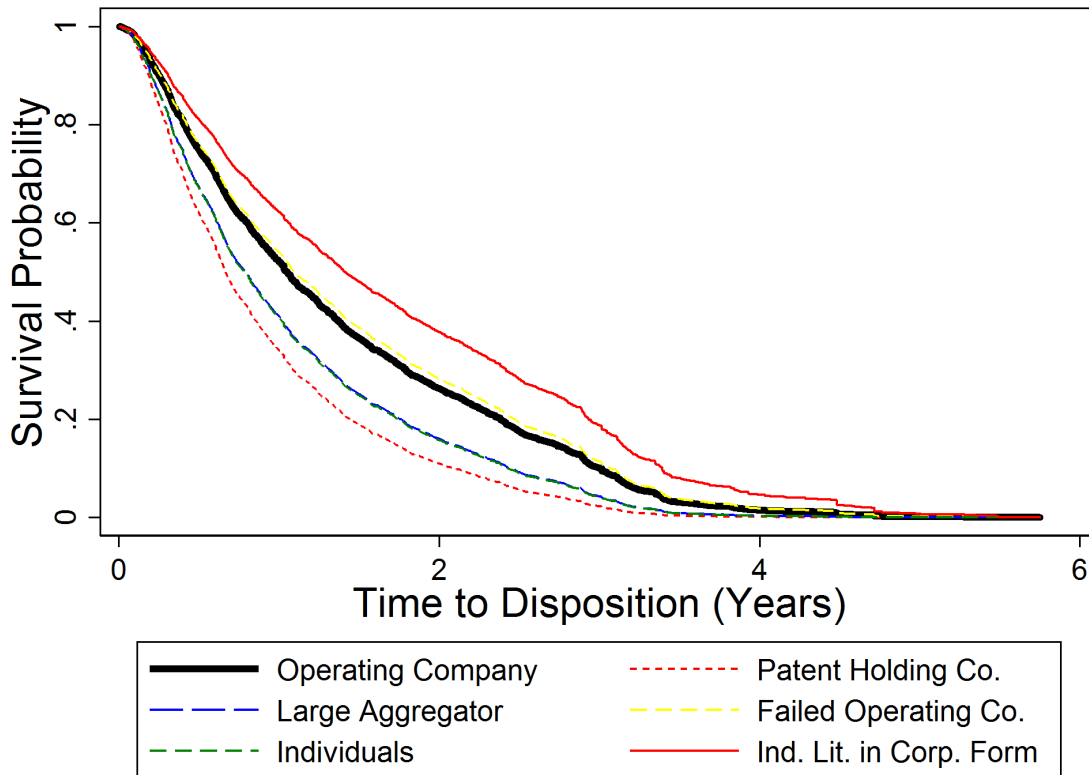
The lines in Figure 3A illustrate the survival rate (the y-axis, between 0 and 1) over time (the x-axis, measured in years from lawsuit filing). Half of the defendants will have settled at a survival of 0.5. Figure 3A plots the survival curves for four different types of patent holders: Individual Inventors (including family trusts), Operating Companies, Patent Holding Companies, Large Aggregators, and Failed Operating Companies. The curves shown in Figure 3A illustrate survival after controlling for the aforementioned independent variables. For purposes of comparison, we had to choose a “base” category for entity type. The base category forms the baseline to compare the other categories, both in terms of testing for significance and the magnitude of difference. We chose to use Operating Companies as the base entity type because we are interested in differences in durations for various forms of NPEs in comparison to operating companies.⁴²

⁴² In unreported hazard models and regressions, we performed the same analysis using Failed Operating Companies as the base category. The difference between this base and every other entity type was statistically significant. Because our core hypotheses deal with the difference between operating companies and various types of NPEs, we felt that operating companies were a more appropriate base category.

The general configuration for all entity types, and in particular Individual Inventors, Failed Operating Companies, and Operating Companies is strikingly similar. Patent Holding Companies and Large Aggregators survive at lower rates, both compared to Operating Companies. That means that Patent Holding Company cases are disposed of quicker. Defendants sued by Large Aggregators also are resolved more quickly.

We decided to separate Individual Inventors who litigated as in their personal capacity from Individual Inventors who formed a corporate vehicle before litigating. The survival curves of these two seemingly similar groups are sharply different. Individual Inventors who litigated in their personal capacity survived shorter --- their cases were resolved faster. In contrast, Individual Inventors who litigated in corporate form survived longer than Operating Companies, meaning that their cases were resolved slower. In Figure 3B below, we plot the survival curves for entity types, separating these individual inventors.

Figure 3B: Hazard Model
(Any Disposition, Separating Individual Inventors)



As reported in Appendix A1, we performed a series of regression models with a range of control variables. The results were completely consistent across models, providing more evidence that our results are robust. We removed related defendants. As we previously discussed, we are concerned that some patentees sued multiple related defendants which may result in some double counts. The remaining controls

we include are consistent with several *ex ante* views on various factors that may relate to case duration. One control variable was the total number of defendants in the lawsuit. While our unit of analysis is the individual defendant, we recognize that cases may proceed more slowly the greater the number of defendants in the case. There is more discovery to take and a greater chance of a disagreement that requires court intervention.

We controlled for technology because case complexity may be related to technology. Technology, especially the Chemical/Pharmaceutical category, may be an imperfect proxy for generic drug litigation. Those cases have a complex statutory framework that includes an automatic thirty month stay upon filing of an application for approval of the generic formulation. In these cases, there is little incentive for the patent holder to quickly press for a ruling on the merits. We controlled for judicial district⁴³ as the districts across the country vary in backlog and speed. We also controlled for the number of patents asserted. The thinking here was that more asserted patents means more work for the parties, which could mean longer duration. Finally, we controlled for whether the plaintiff was a declaratory judgment plaintiff as previous empirical work has found this related to duration.⁴⁴

The regression results confirm that there are some statistically significant differences in the duration of cases by entity type and district. Notably, Failed Operating Companies cases survived longer than Operating Company cases. Failed Operating Companies had the smallest coefficient in the most complete model. Individual Inventor who formed a corporate vehicle before litigation also survived longer than Operating Companies.

Two entity types survived shorter than Operating Company cases: Patent Holding Companies and Large Aggregators. Patent Holding Companies had the largest coefficient in the most complete model. The other entity types did not have statistically significant differences from the base. Individual Inventors litigating in their individual capacity also survived shorter.

The second hazard model focused on a subset of the dispositions, only those cases that terminated voluntarily. These voluntary terminations are settlements, which may be useful to evaluate litigation strategies of entity types without formal court adjudication. To truncate the dataset, we excluded defendants which did not settle, but instead exited the case through a procedural or substantive determination. Below, in Table 2, we report the survival quartiles for each entity type.

⁴³ For our district fixed effects, we included a separate dummy variable for each judicial district in which a patent case was filed in 2010.

⁴⁴See Michael Risch, *A Generation of Patent Litigation*, 52 SAN DIEGO L. REV. 67, 95-96 (2015).

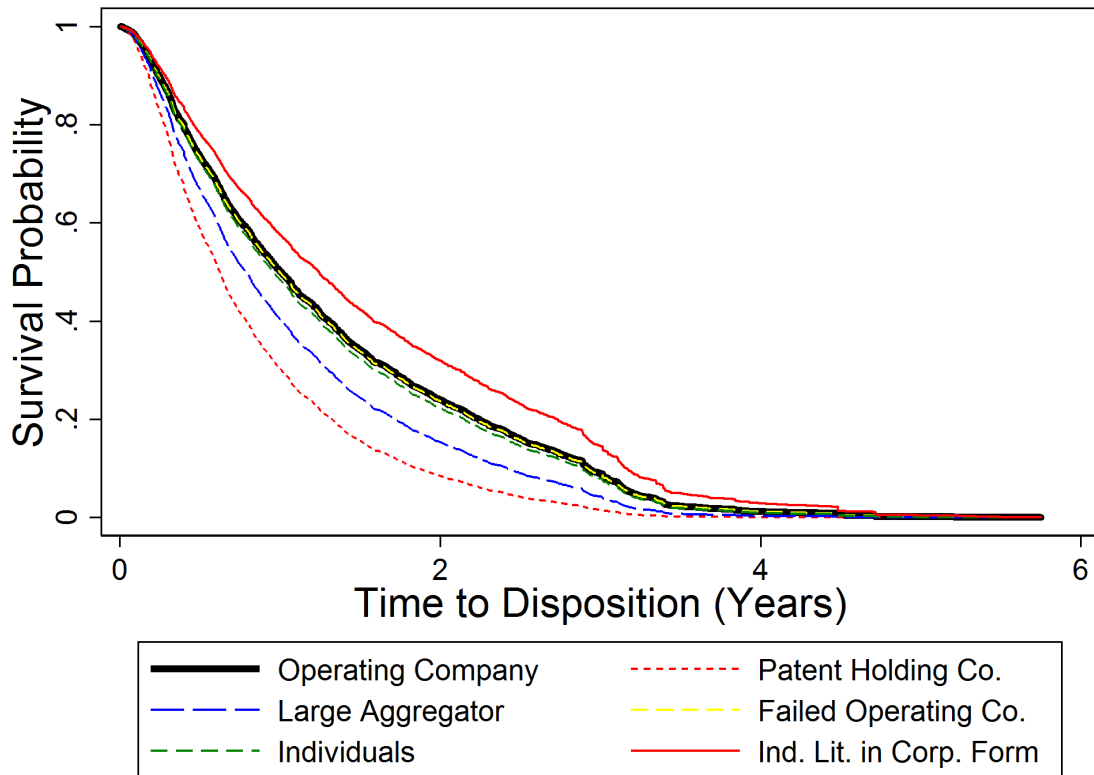
Table 2: Survival in Days (Voluntary Dispositions Only)

	# of				
	Defs	25%	50%	75%	90%
1. University	16	241	395	698	820
2. Individuals	659	192	481	1067	1160
3. Large Aggregator	277	202	363	674	827
4. Failed Operating Company	286	160	324	1259	1722
5. Patent Holding Company	1844	117	237.5	449	747
6. Operating Company	2545	142	298	622	1044
7. IP Holding Company	116	166	260	590	794
8. Tech. Development Company	44	220	388	739.5	931

The distribution amongst entity types is very similar to that observed for all dispositions. Again, Individuals and Failed Operating Companies, which both appear to pend longer in the later quartiles. The difference between Operating Companies and other entities is not as pronounced as seen above in Table 1.

To further investigate whether there are any statistically significant differences, we controlled for the same independent variables listed above. The results of the hazard model regressions are reported in Appendix A2, with the graphical output shown in Figure 4 below.

**Figure 4: Hazard Model
(Voluntary Dispositions Only)**



As reported in Appendix A2, our basic results with respect to statistical significance of Patent Holding Companies and Individual Inventors litigating in corporate form— all relative to Operating Companies — were consistent across all models, which was the same for voluntary dispositions as it for all dispositions. Failed Operating Companies had longer durations, but Individual Inventors litigating as individuals had shorter.

In addition to the hazard models, we also investigated the relationship between entity type and case duration using a series of linear regression models. As reported in Appendix A3, we find similar results in the linear regression models as we do in the hazard models. More specifically, we find that Patent Holding Companies litigate on average between 127 and 197 days less than Operating Companies, while Large Patent Aggregators litigate on average between 91 and 132 days shorter than Operating Companies.⁴⁵ True Individuals litigate on average between 91 and 195 days fewer than Operating Companies. Individual Inventors litigating in corporate form litigate on average between 149 days and 207 days longer than Operating Companies. We note that while these results are statistically significant, that does not mean that the differences are practically important.

⁴⁵ To estimate the number of days, we converted the coefficients from the regressions from years to days.

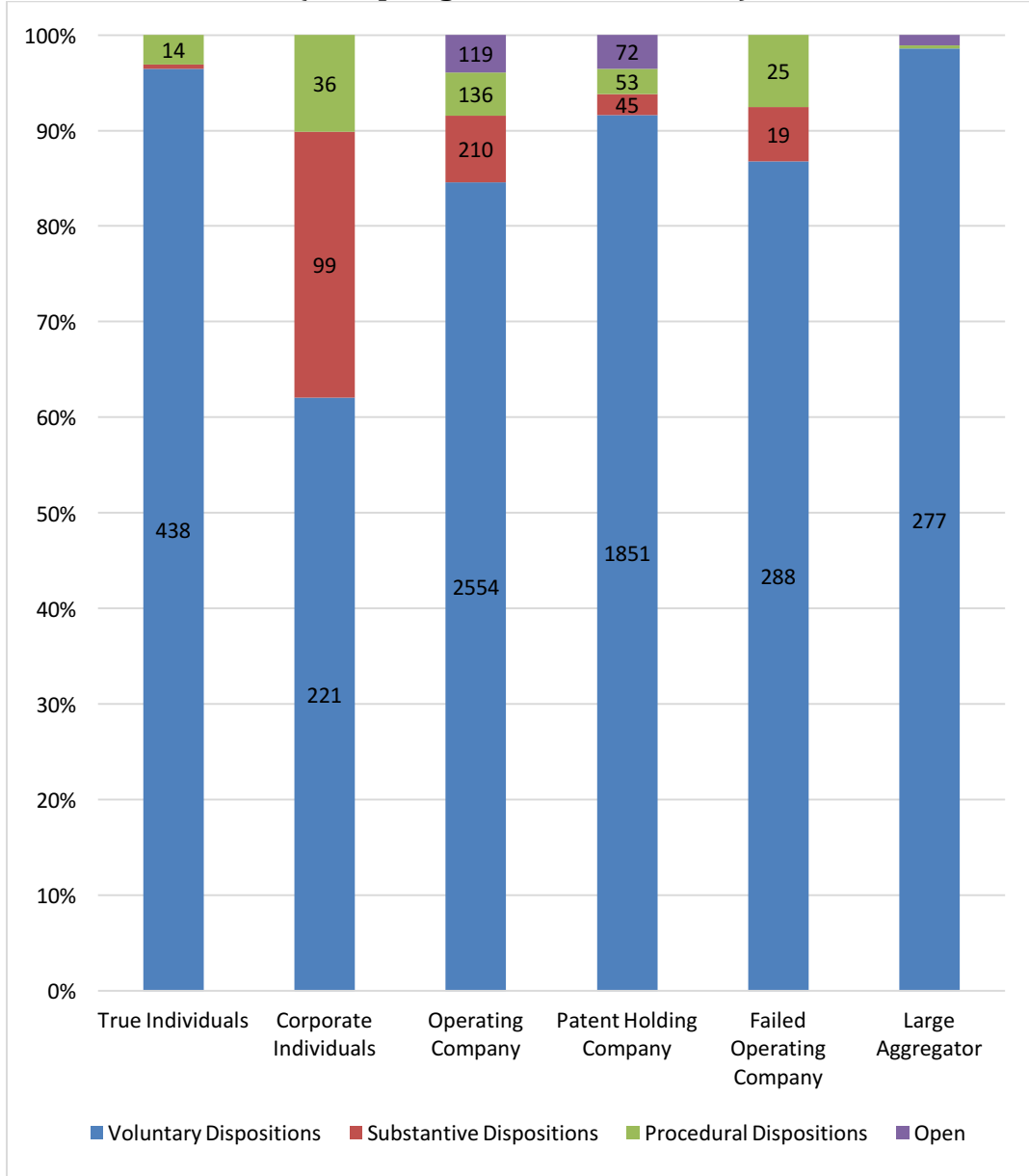
In sum, in terms of raw durations, there are differences in durations based upon the patentee entity type. And this survivability is statistically significant amongst between many entity types.

2. Disposition of the Cases

Moving beyond case duration, we now discuss case dispositions. Our data also allows us to observe the disposition of the 8,399 terminated defendants by patentee entity type. As previously mentioned, we grouped dispositions into three categories—voluntary, procedural, and substantive dispositions. Figure 5 reports these results for all of the coded defendants for six categories of patentee types — Individuals litigating in their individual capacity, Individuals forming a corporate vehicle to litigate, Operating Companies, Patent Holding Companies, Failed Operating Companies, and Large Aggregators, after correcting for related defendants.⁴⁶

⁴⁶ In unreported results, we find essentially the same pattern without collapsing multiple, related defendants into a single defendant.

**Figure 5
Number of Disposition By Patentee Entity Type
(Collapsing Related Defendants)**



As can be seen in Figure 5, the dominant disposition for all patentee entity types is voluntary, which are highly likely to be settlements. Over 80% of all defendants exit lawsuits because of voluntary settlements. However, a larger percentage of defendants sued by Individual Inventors who formed a corporate vehicle before litigating patentees are terminated by procedural or substantive dispositions compared to other patentee type categories. A larger percentage of defendants sued

by Large Aggregators are terminated by settlements compared to other categories of patentees.⁴⁷

There are, as seen in Figure 5, differences in distribution amongst the different disposition categories depending on the patentee entity type. We have, however, concerns that certain aspects of the raw distribution are endogenous including where the lawsuits are filed and the technology. To try to untangle these potential effects, we performed a series of linear regressions for each disposition—Voluntary, Procedural, and Substantive—with the entity type.⁴⁸ In the full specification, we also controlled for the total number of defendants in each case, the number of patents asserted, whether the action was a declaratory judgment action, technology group fixed effects, district court fixed effects, judge fixed effects,⁴⁹ plaintiff attorney fixed effects,⁵⁰ most litigious patent holder fixed effects,⁵¹ and a *pro se* representation dummy.⁵² We ran separate regressions for each disposition, in part as a robustness test, since the cases which reach each phase may be different. As reported in full in Appendices B1, B2, and B3, , there is statistical significance between some entity types. For comparison purposes, we used Operating Company as the base category. The judge fixed effects model controlled for the identity of the judge. Including judge fixed effects increased the explanatory power of some of our models from about 13.5% to over 38%, a large increase. The increase in the power of predicting durations when the judge is controlled for makes sense since the judge has substantial power over the case schedule.

Individual Inventors are statistically significant in many models. Individual Inventors litigating as true individuals are positively correlated with Substantive Dispositions.⁵³ They are across our models about 7-24% more likely to result in Substantive Dispositions than Operating Companies. They are negatively correlated with Voluntary Dispositions (settlements) by about 5-25%. That means that Individual Inventors were more likely than Operating Companies, on average, to have their cases proceed to a resolution by the courts, and less likely to result in a settlement. Fewer settlements and more adjudications is in accord with our findings

⁴⁷ The differences are not statistically significant.

⁴⁸ We separately ran logit, probit, and linear regression models. The results were consistent. For ease of interpretation of the coefficients, we report in this paper the results from the linear regression models.

⁴⁹ For judge fixed effects, we included a separate dummy variable for each judge who presided over 5 or more defendants in 2010. The remaining judges were included in a residual dummy variable.

⁵⁰ We included a separate fixed effect for each attorney appearing in more than 25 cases, which included 36 lawyers..

⁵¹ We included a separate fixed effect for each of the most litigious patent holders in 2010. For the most litigious patent holders, we used any patent holder who sued 50 or more companies in 2010. These were Geotag, Parallel Networks, Condatis, PACid Group, Uniloc, Adjustacam, ArrivalStar, Gharb, Lexmark, Lottotron, Patent Harbor, Tripharma, Wolf Run Hollow, and Wordcheck Tech.

⁵² For these models, we only performed the analysis on the collapsed defendants. The unreported results for all defendants showed the same variables as statistically significant and in the same direction.

⁵³ One individual inventor patentee, Dr. Pieczenik, sued over 40 defendants in 2010. In unreported results, we excluded the doctor from our regressions and found the same variables statistically significant in the same direction. Thus, our results are robust regardless of whether he is included in the dataset.

on Individual Inventor case duration. Typically, settlements occur quicker than adjudications.

Consistent with the descriptive data presented in Figure 5, Large Aggregators were much more likely to settle their cases than Operating Companies. They are about, depending upon the model, 6-16% more likely to settle. Large Aggregators are between 6% and 10% less likely to have their cases reach a substantive disposition.

Patent Holding Companies were different in a statistical sense from Operating Companies on Substantive Dispositions but not Voluntary Dispositions or Procedural Dispositions. With respect to settlements (voluntary dispositions), only the least complete model showed statistically significant differences between Patent Holding Companies and Operating Companies. Patent Holding Companies were between 3% and 5% less likely to reach a substantive disposition relative to Operating Companies. However, the differences between Patent Holding Companies and Operating Companies was smaller than the differences between Individual Inventors and Operating Companies.

Further, Patent Holding Companies and Large Aggregators displayed the opposite behavior from Individual Inventors. Large Aggregators settled more than Operating Companies while Individual Inventors settled less. And Patent Holding Companies and Large Aggregators were less likely to adjudicate to a substantive disposition than Operating Companies, while Individual Inventors went to a substantive judgment more than Operating Companies.

We pause here to briefly talk about selection concerns. Lawsuits are not randomly distributed among entity types, technologies, judicial districts, declaratory judgment actions, numbers of asserted patents, or a whole range of other variables. In fact, these attributes themselves may be correlated with our variable of interest, patentee entity status: PAEs may select patents in certain technologies such as software and file lawsuits in particular districts such as the Eastern District of Texas. Each of these separately or together may influence the propensity of a given lawsuit to settle. Our regression models cannot account for any of these intrinsic characteristics, and our results should be understood with this important caveat.

B. Influence of Patentee Entity Type on Early Settlement and the Merits

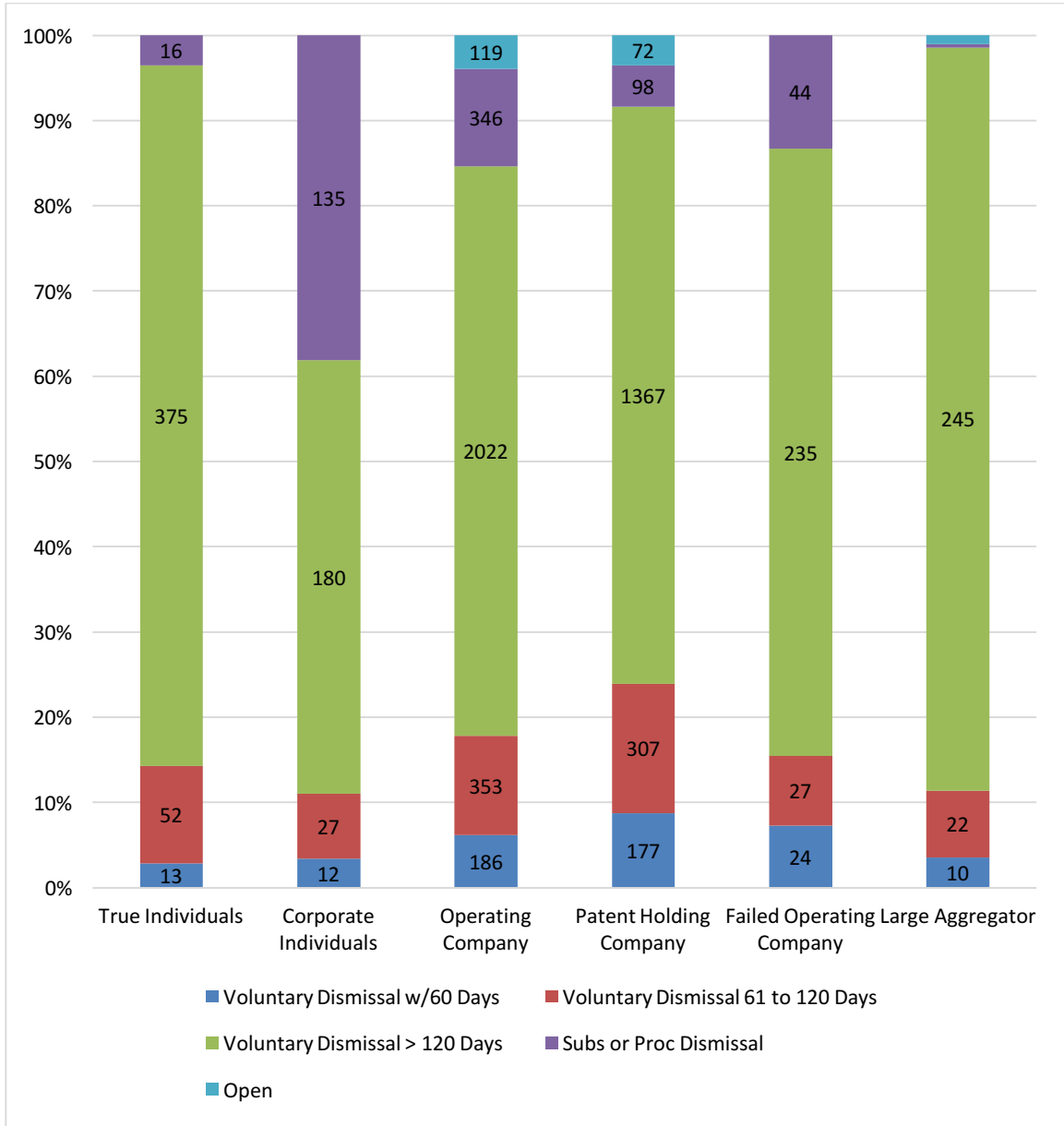
We now turn back to the policy-relevant questions of whether PAEs bringing mainly frivolous charges of infringement, seeking nuisance fee settlements. We cannot directly answer these questions since we do not have any information on the amount of settlements. However, we can analyze how frequently different types of PAEs are quickly settling their cases, perhaps with an eye to avoiding adjudication of their claims on the merits. In other words, it may be that cases that settle very early are settling for very small amounts of money.⁵⁴ We analyzed the amount of time it

⁵⁴ We recognize that the opposite may also be true. The early settlements may represent cases in which the parties agree that the patent is valid and infringed, and early settlement reduces both parties' litigation fees. We are skeptical that many defendants settle for large sums of money very early in

took for various defendants to have their cases disposed. We divided voluntary dispositions amongst various patentee entity types and looked at whether it took less than sixty days, less than 120 days, or more than a 120 days to voluntary dispositions. We also observed, by patentee entity type category, the number of defendants who had their cases terminated by the court or who still had their cases pending. We report the results in Figure 6 below.

litigation. Patent litigation is quite unpredictable, in our experience, and defendants are frequently unwilling to settle for significant amounts before serious litigation.

Figure 6
Time to Disposition by Patentee Entity Type



For the patentee entity type cases identified above, a large percentage of defendants were dismissed voluntarily, but after 120 days. In fact, over half of the defendants were dismissed voluntarily after 120 days.

Just as we did with dispositions, we examined whether the difference in distribution of these times to voluntary dismissal was explainable by various control variables. We performed similar linear regressions as we did with disposition. However, this time, Voluntary Dismissal within 60 and within 120 days were the dependent variables with the wide range of control variables used in the earlier models.

As reported in full in Appendices C1 and C2, when using all of the patentee category types shown in Figure 6, there is statistical significance between some entity types, and other independent variables, and time to voluntary disposition when using Operating Companies, Mechanical technology, and district courts other than those identified as the base categories. Of note, Patent Holding Companies are more likely to settle in every different time period.

The regression models show statistically significant results for some of the entity types compared to the base category of Operating Company. Patent Holding Companies were more likely than Operating Companies to voluntarily settle a case within 60 days from the date the defendant was sued. Our regression models estimate the rate of such an early settlement increases 4-5% compared to an Operating Company, although the differences are not statistically significant in our most complete model (which includes lawyer fixed effects). True Individual Inventors are also positively correlated with early settlements.⁵⁵ The other entity types were not statistically discernable from Operating Companies.

Voluntary Dispositions within 120 days tells a different story. Only Patent Holding Companies are statistically significant in each of our regression models. Thus, there is robust evidence that in the patent lawsuits filed in 2010, Patent Holding Companies were more likely to settle early --- within 60 or 120 days of suing a defendant --- than Operating Companies. Individual Inventors are significant, but only in the most comprehensive model, and with a much smaller magnitude than seen in the 60 day model. No other entity type, including Large Aggregators, was statistically discernable from Operating Companies.

We also observed the ultimate result in those cases that were not voluntarily disposed. That is, we coded for whether the patentee or alleged infringer received a winning judgment in those cases with substantive or procedural dispositions. These are a very small percentage of all filed lawsuits, representing only 640 defendants out of 6,468 defendants sued (9.89%). The outcomes, by patentee entity type, are reported below in Table 3.

⁵⁵ When Dr. Pieczenik was removed from the analysis, the results lost significance in several of the models. Accordingly, we are less confident of the robustness of the findings with respect to True Individual Inventors.

Table 3: Outcomes by Patentee Entity Type

	Patentee Wins	Alleged Infringer Wins
1. University	0	0
2. Individuals	3 (6%)	47 (94%)
3. Large Aggregator	0	0
4. Failed Operating Company	8 (40%)	12 (60%)
5. Patent Holding Company	11 (20.4%)	43 (79.6%)
6. Operating Company	182 (47.1%)	204 (52.9%)
7. IP Holding Company	1 (14.3%)	6 (85.7%)
8. Technology Development Company	0 (0%)	15 (100%)

When just looking at outcomes, the differences between Operating Companies and PAEs are quite stark. Operating Companies won just under half of their cases. PAE entity types lost more cases than they won. Patent Holding Companies prevailed at adjudication on just over twenty percent of defendants. Individual inventors do extremely poorly in adjudicated cases, winning just 6% of those decisions. Unlike our data on case duration and settlement where Individuals and Patent Holding Companies were on opposite sides of Operating Companies, both types of PAEs lose much more in adjudications than Operating Companies. This is consistent with the narrative that patent holding companies prosecute weaker cases or have fewer resources to prevail at trial. It is also generally consistent with findings that another study conducted by one of the present authors that analyzed lawsuits filed in other years, 2008 and 2009.⁵⁶

Interestingly, Large Aggregators took no cases to a final adjudication. There were no defendants who either won or lost, meaning that all of their cases either settled or resulted in a procedural disposition. Figure 5 shows that procedural dispositions account for almost none of the distribution of Large Aggregator cases; Large Aggregators settle with almost every single defendant. The reasons for and amounts of the settlements, of course, are unknown to us. It's possible that these entities, with large portfolios of patents, have sizable bargaining power with defendants. Alternatively, these entities may settle for small cost-of-defense amounts making settlement quite enticing to defendants. We note that there were no Intellectual Ventures lawsuits filed in 2010, but that Acacia Research Corporation was very active and its affiliates make up over half of our Large Aggregator patent holders. Wi-Lan was also a frequent Large Aggregator litigant in 2010.

However, the adjudicated defendants represent a very small percentage, about five percent, of all of the defendants sued. The settlement rates, while all high, differ by entity type. Unfortunately, we do not know the amount in dispute in these cases nor the settlement amounts. It is possible that the additional cases settled by Patent

⁵⁶ John R. Allison, Mark A. Lemley & David L. Schwartz, *How Often Do Patent Assertion Entities Win Patent Cases?* (draft on file with authors).

Holding Companies, for instance, were lawsuits they would have won if they reached a final ruling. If this is true (and we have no evidence, either way, on this point), it could explain the differences in win rates. Classic law and economics theory argues that the cases which reach judgment should be the closest cases, the fifty-fifty cases.⁵⁷ Our results for Operating Companies fits this theory, but our results for other patentee types do not. The Priest-Klein theory of litigation also asserts that when the parties have asymmetric stakes, the win rate will vary from 50-50. Here, Operating Companies can obtain injunctive relief in lawsuits while most PAEs cannot.⁵⁸ Injunctive relief may result in asymmetric stakes. Priest-Klein predicts that having more to gain will result in higher trial win rates, which is consistent with what we observe. The long and the short is that because it is unlikely that the litigated to judgment cases are representative of the settled cases, we urge caution in drawing conclusions from them.

V. IMPLICATIONS

Our analysis of case progression, settlement, and adjudication, taken together, reveals a complicated settlement picture of litigation by different entity types. Some of this may be expected. For instance, cases where an Operating Company is the patentee plaintiff may be more likely to have patent counterclaims, which increase the complexity and length of the litigation. And perhaps most interesting and counterintuitive is that the data suggests that not all PAEs are equal—with some PAE cases exhibiting higher survivability—Individuals—and others less—Patent Holding Companies and Large Aggregators—as compared to Operating Companies. Thus, different types of PAEs are on opposite sides of Operating Companies in terms of how long their cases last.

Individual Inventors are more likely to settle quickly, but less likely to settle overall. Patent Aggregators are much more likely to settle overall, but there is no evidence that Patent Aggregators settle early. And Patent Holding Companies settle early and later. It may be that these early settlements as nuisance value settlements. But we offer two observations. First, while the common cost estimates of patent litigation are that it costs millions of dollars in attorneys' fees, cases that settle within a few months cost only a fraction of that amount. Second, the fact that we only observe early settlements for Individuals, but not later ones may relate to the selection of disputes for litigation. While competitors may resolve some disputes before commencing formal litigation, non-competitors may not have that opportunity. It may be that the only way that large defendants, or at least their lawyers and corporate decisionmakers, will only take a license from companies with whom they aren't familiar is if the matter progresses to litigation.

⁵⁷George L. Priest and Benjamin Klein, *The Selection of Disputes for Litigation*, 13 J. Legal Stud. 1, 16–17 (1984). Others have criticized parts of the Priest-Klein theory. See e.g., Yoon-Ho Alex Lee & Daniel M. Klerman, *The Priest-Klein Hypotheses: Proofs and Generality* (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2538854).

⁵⁸ Christopher B. Seaman, *Permanent Injunctions in Patent Litigation after eBay: An Empirical Study*, IOWA L. REV. at p. 48, Figure 3 (forthcoming 2016) (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2632834).

Perhaps Large Aggregators want to settle, but seek larger sums. Perhaps they are well schooled in finding the optimal point to settle lawsuits, as repeat players in the business. They don't settle too early. Rather, they wait until they receive information during discovery or wait for important court rulings. Then they settle before trial to avoid uncertainty. We need to carefully consider policy recommendations to make sure it will have the intended effect. For instance, because Large Aggregators are more likely to settle than other types of patentees, fee shifting upon an unsuccessful lawsuit will have less bite.

Individual inventors who have formed a corporate vehicle to enforce litigate for a substantial duration. These individual inventors may be more sophisticated than the individual inventors who litigate without forming a corporate entity. They may be guided by more sophisticated counsel, which results in more strategic litigation. For instance, these patent holders may embark on a "war chest" model of litigation.⁵⁹ True individual inventors may be making small technical contributions to the field, as they are outsiders. Thus, they may be entitled to small compensation. Furthermore, as for trial win rates, perhaps this is explained by resources at trial. Large corporate defendants and plaintiffs have the financial resources to pay well-credentialed experts and prepare polished graphical presentations. One expects that this matters in terms of jury perspective and outcomes.

Individual inventors settle less frequently, reach merits rulings more, but have a shorter duration. At first glance, the shorter duration and more substantive rulings seem in direct conflict. However, many of the individual inventor lawsuits were resolved quickly, some even by motions to dismiss. Thus, even when the court resolved the case, it often occurred quickly (and frequently finding against the individual inventor on the merits.)

It is possible that true individual patent holders may be less sophisticated and reject reasonable settlement offers. Or perhaps there are differences in their litigation counsel, the underlying patents, or some other characteristic of the litigation system which may explain these results.

Why are true individuals different from individuals who chose to incorporate before litigating? It may be that true individuals lack sophistication if they bring a lawsuit without forming a corporate entity. As a litigant, they are subject to potential fee shifting as well as responsibility for litigation costs if they fail on the merits. If the individual incorporates, then the corporate entity will be liable for any award, but not the individual. Thus, lack of incorporation may signal less sophistication. Alternatively, patents owned by an individual may be purchased by a Large Aggregator or Patent Holding Company. If these entities decline to purchase a patent from an individual, the individual may assert it herself in litigation. We would expect these patents to be weaker, however, since PAEs declined to purchase and enforce them.

⁵⁹ David L. Schwartz, *The Rise of Contingent Fee Representation in Patent Litigation*, 64 ALA. L. REV. 335, 368-69 (2012) (describing the "war chest" model of enforcing a patent against multiple alleged infringers, which entails using settlement money from early defendants to build a "war chest" to pay experts and lawyers, in subsequent cases. This permits the later cases to be litigated more aggressively).

VI. CONCLUSION

The actual litigation behavior of PAEs is much more complicated than the simple narratives portrayed in the media. Within the broad category of PAEs, there is tremendous heterogeneity. Entity types, particularly individual inventors and patent holding companies, behave differently than operating companies. However, individual inventors litigate longer, while patent holding companies litigate shorter. The differences in litigation behavior, while contrary to the common narrative, is not altogether unexpected. The differences are indeed consistent with economic intuition. Different entity types likely have different risk profiles and different incentives, for instance, which drive settlement and litigation strategy. Our study confirms that not all PAEs are alike.

Cries that PAEs are universally different from other types of patentee-plaintiffs appear to be overstated with respect to case progression and settlement. Using granular data on a per-defendant basis, we have analyzed the relationship between entity type in settlement behavior and litigation outcomes. The relationship is more complex than previously understood. Individual inventors play a larger role in the patent system than others have recognized, as do failed operating companies. Surprisingly, individual inventors and failed operating companies appear to be quite different from operating companies and even from other PAEs. Their cases pend longer, indicating that they litigate more, and they settle at lower rates. Why individual inventors and failed operating companies may be behaving differently is an important question, and one that we cannot fully answer with our data. That said, our analysis indicates that some of the “hit and run” complaints about patent trolls do not seem to apply to individual inventors and failed operating companies.

Turning to PAEs, we examine whether they settle cases more quickly compared to operating companies. We find that certain venues, technologies, and types of PAEs are correlated with early settlement, but other types of PAEs exhibited the opposite behavior. We cannot, unfortunately, analyze the amount of money included in settlement agreements, as that information is not publicly available and typically treated as confidential. Thus, we can’t directly confront the story that PAEs seek nuisance fee settlements, especially in ways that are meaningfully different from Operating Company patent holders. The duration data indirectly contradicts the story, but further study is recommended. Finally, further study of the underlying patents in the disputes, including the origination of patents asserted by PAEs, will be useful.

Appendix A1 - Hazard Model Regression (All Dispositions)

	<i>Duration (years)</i>				
	(1)	(2)	(3)	(4)	(5)
University	0.065 (0.149)	0.041 (0.186)	-0.036 (0.194)	0.132 (0.330)	0.161 (0.338)
Large Aggregator	0.303*** (0.108)	0.308*** (0.117)	0.337*** (0.123)	0.384*** (0.129)	0.599*** (0.165)
Failed Operating Co.	-0.232 (0.198)	-0.484** (0.204)	-0.420** (0.205)	-0.767*** (0.260)	0.199 (0.220)
Patent Holding Co.	0.436*** (0.076)	0.475*** (0.081)	0.507*** (0.087)	0.554*** (0.100)	0.543*** (0.108)
Technology Development Co.	-0.101 (0.159)	-0.048 (0.157)	-0.019 (0.165)	0.069 (0.252)	0.121 (0.215)
Individual	0.503*** (0.090)	0.371*** (0.110)	0.349*** (0.119)	0.398** (0.172)	0.363** (0.178)
Ind. Lit. in Corp. Form	-0.221** (0.112)	-0.371*** (0.118)	-0.311*** (0.120)	-0.379** (0.176)	0.002 (0.160)
Pro se Plaintiff					1.567** (0.764)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
Dec Judge.	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	6,127	6,127	6,105	6,105	6,105
<i>Note:</i> Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.					

Appendix A2 - Hazards Regression (Voluntary Dispositions Only)

	<i>Duration (years)</i>				
	(1)	(2)	(3)	(4)	(5)
University	-0.030 (0.161)	-0.108 (0.191)	-0.174 (0.189)	-0.268 (0.407)	-0.264 (0.447)
Large Aggregator	0.226** (0.113)	0.258** (0.124)	0.274** (0.132)	0.275** (0.139)	0.349** (0.174)
Failed Operating Co.	-0.246 (0.230)	-0.480** (0.238)	-0.417* (0.239)	-0.853*** (0.308)	0.477** (0.227)
Patent Holding Co.	0.440*** (0.078)	0.495*** (0.087)	0.523*** (0.092)	0.527*** (0.106)	0.438*** (0.117)
Technology Development Co.	-0.137 (0.201)	0.004 (0.204)	0.043 (0.213)	0.033 (0.263)	0.159 (0.252)
Individual	0.354*** (0.113)	0.163 (0.137)	0.142 (0.145)	0.112 (0.169)	0.060 (0.164)
Ind. Lit. in Corp. Form	-0.244** (0.121)	-0.373*** (0.130)	-0.320** (0.133)	-0.368* (0.203)	0.182 (0.178)
Pro se Plaintiff					2.159*** (0.557)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
DJ	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	5,456	5,456	5,452	5,452	5,452

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Appendix A3 – Linear Regression on Duration

	<i>Duration (years)</i>				
	(1)	(2)	(3)	(4)	(5)
University	-0.027 (0.168)	-0.053 (0.236)	-0.005 (0.251)	-0.257 (0.286)	-0.247 (0.304)
Large Aggregator	-0.354*** (0.126)	-0.327*** (0.113)	-0.341*** (0.120)	-0.248** (0.112)	-0.363*** (0.135)
Failed Operating Co.	0.243 (0.275)	0.572** (0.238)	0.522** (0.237)	0.674** (0.266)	-0.077 (0.218)
Patent Holding Co.	-0.521*** (0.076)	-0.506*** (0.077)	-0.539*** (0.086)	-0.419*** (0.093)	-0.347*** (0.085)
Technology Development Co.	0.132 (0.198)	0.066 (0.183)	0.026 (0.189)	0.011 (0.253)	0.003 (0.203)
Individual	-0.534*** (0.083)	-0.393*** (0.098)	-0.397*** (0.104)	-0.337*** (0.121)	-0.249** (0.113)
Ind. Lit. in Corp. Form	0.408*** (0.153)	0.551*** (0.151)	0.504*** (0.151)	0.566*** (0.158)	0.055 (0.152)
Pro se Plaintiff					-0.725*** (0.278)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
DJ	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	6,127	6,127	6,105	6,105	6,105
R-squared	0.116	0.183	0.186	0.384	0.430
Dep Var Mean	1.29	1.29	1.29	1.29	1.29

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Appendix B1 – Voluntary Dispositions

	<i>Voluntary Dispositions</i>				
	(1)	(2)	(3)	(4)	(5)
University	0.112 (0.068)	0.163* (0.086)	0.158* (0.081)	0.157 (0.115)	0.154 (0.119)
Large Aggregator	0.158*** (0.035)	0.100*** (0.031)	0.094*** (0.032)	0.057* (0.030)	0.132*** (0.043)
Failed Operating Co.	0.035 (0.075)	0.002 (0.079)	0.014 (0.079)	-0.063 (0.079)	-0.024 (0.055)
Patent Holding Co.	0.067*** (0.025)	0.036 (0.025)	0.041 (0.028)	0.010 (0.024)	0.041* (0.025)
Technology Development Co.	-0.062 (0.061)	-0.044 (0.060)	-0.033 (0.060)	0.084 (0.068)	0.017 (0.068)
Individual	-0.249*** (0.091)	-0.193** (0.079)	-0.171** (0.081)	-0.114** (0.045)	-0.053 (0.043)
Ind. Lit. in Corp. Form	0.138** (0.064)	0.102* (0.056)	0.109** (0.054)	0.080 (0.051)	-0.073 (0.102)
Pro se Plaintiff					-0.118 (0.103)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
DJ	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	6,343	6,343	6,321	6,321	6,321
R-squared	0.054	0.143	0.135	0.382	0.426
Dep Var Mean	0.86	0.86	0.87	0.87	0.87
<i>Note:</i> Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.					

Appendix B2 – Substantive Dispositions

	<i>Substantive Dispositions</i>				
	(1)	(2)	(3)	(4)	(5)
University	-0.082*** (0.015)	-0.061*** (0.021)	-0.053** (0.021)	-0.128** (0.052)	-0.124** (0.051)
Large Aggregator	-0.075*** (0.015)	-0.073*** (0.022)	-0.070*** (0.025)	-0.058*** (0.021)	-0.102*** (0.029)
Failed Operating Co.	-0.008 (0.036)	0.008 (0.041)	-0.005 (0.042)	0.004 (0.042)	0.070 (0.056)
Patent Holding Co.	-0.049*** (0.015)	-0.047*** (0.017)	-0.052*** (0.019)	-0.034** (0.017)	-0.044** (0.020)
Technology Development Co.	0.091 (0.065)	0.081 (0.070)	0.072 (0.069)	0.041 (0.064)	0.036 (0.059)
Individual	0.225** (0.095)	0.237*** (0.087)	0.204** (0.089)	0.122*** (0.040)	0.065* (0.034)
Ind. Lit. in Corp. Form	-0.063*** (0.023)	-0.047** (0.023)	-0.056** (0.026)	-0.071* (0.040)	-0.017 (0.032)
Pro se Plaintiff					0.151 (0.125)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
DJ	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	6,343	6,343	6,321	6,321	6,321
R-squared	0.073	0.127	0.108	0.337	0.380
Dep Var Mean	0.06	0.06	0.06	0.06	0.06

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Appendix B3 – Procedural Dispositions

	<i>Procedural Dispositions</i>				
	(1)	(2)	(3)	(4)	(5)
University	-0.054*** (0.009)	-0.072** (0.034)	-0.073** (0.034)	-0.076 (0.058)	-0.072 (0.057)
Large Aggregator	-0.034*** (0.011)	-0.015 (0.010)	-0.024** (0.010)	-0.021 (0.014)	-0.038** (0.019)
Failed Operating Co.	0.047 (0.053)	0.052 (0.059)	0.053 (0.059)	0.074 (0.067)	-0.038 (0.026)
Patent Holding Co.	-0.004 (0.013)	0.004 (0.015)	-0.002 (0.015)	0.002 (0.014)	-0.007 (0.017)
Technology Development Co.	0.003 (0.034)	0.003 (0.035)	0.008 (0.040)	-0.029 (0.035)	-0.028 (0.036)
Individual	0.065 (0.047)	0.009 (0.021)	0.010 (0.022)	0.025 (0.024)	0.026 (0.028)
Ind. Lit. in Corp. Form	0.001 (0.032)	0.010 (0.031)	0.007 (0.034)	0.025 (0.036)	0.117 (0.106)
Pro se Plaintiff					-0.039 (0.038)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
DJ	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	6,343	6,343	6,321	6,321	6,321
R-squared	0.016	0.103	0.112	0.364	0.386
Dep Var Mean	0.04	0.04	0.04	0.04	0.04
<i>Note:</i> Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.					

Appendix C1 – Voluntary Dispositions 60 Days or Less

	<i>Voluntary Dispositions 60 Days or Less</i>				
	(1)	(2)	(3)	(4)	(5)
University	-0.018 (0.063)	-0.031 (0.061)	-0.036 (0.062)	0.015 (0.058)	0.018 (0.059)
Large Aggregator	0.003 (0.022)	0.008 (0.023)	0.013 (0.024)	0.004 (0.021)	-0.011 (0.029)
Failed Operating Co.	0.053 (0.047)	0.045 (0.030)	0.044 (0.031)	0.017 (0.022)	0.005 (0.032)
Patent Holding Co.	0.046*** (0.015)	0.049*** (0.016)	0.048*** (0.016)	0.037** (0.016)	0.022 (0.021)
Technology Development Co.	-0.010 (0.036)	-0.005 (0.038)	-0.003 (0.036)	-0.010 (0.045)	-0.002 (0.045)
Individual	-0.012 (0.018)	-0.013 (0.020)	-0.015 (0.022)	0.001 (0.019)	0.003 (0.023)
Ind. Lit. in Corp. Form	0.016 (0.016)	0.019 (0.018)	0.019 (0.019)	0.017 (0.025)	0.031 (0.049)
Pro se Plaintiff					0.010 (0.070)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
DJ	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	6,343	6,343	6,321	6,321	6,321
R-squared	0.021	0.049	0.052	0.234	0.243
Dep Var Mean	0.06	0.06	0.06	0.06	0.06

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Appendix C2 – Voluntary Dispositions 120 Days or Less

	<i>Voluntary Dispositions 120 Days or Less</i>				
	(1)	(2)	(3)	(4)	(5)
University	-0.087 (0.088)	-0.096 (0.078)	-0.128 (0.094)	-0.098 (0.064)	-0.104 (0.065)
Large Aggregator	-0.018 (0.034)	-0.020 (0.032)	-0.008 (0.031)	-0.044 (0.032)	-0.053 (0.048)
Failed Operating Co.	0.056 (0.062)	0.044 (0.046)	0.061 (0.047)	0.014 (0.041)	0.009 (0.044)
Patent Holding Co.	0.111*** (0.025)	0.112*** (0.025)	0.119*** (0.027)	0.077*** (0.028)	0.054* (0.031)
Technology Development Co.	-0.104** (0.041)	-0.092** (0.043)	-0.077* (0.045)	-0.061 (0.063)	-0.041 (0.061)
Individual	-0.040 (0.026)	-0.052* (0.030)	-0.040 (0.032)	-0.048 (0.035)	-0.059 (0.042)
Ind. Lit. in Corp. Form	0.060* (0.034)	0.050 (0.036)	0.065* (0.035)	0.066 (0.046)	0.103 (0.068)
Pro se Plaintiff					0.040 (0.063)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
DJ	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	6,343	6,343	6,321	6,321	6,321
R-squared	0.034	0.075	0.082	0.257	0.276
Dep Var Mean	0.18	0.18	0.18	0.18	0.18
<i>Note:</i> Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.					

Appendix C3 – Dispositions 121 Days or More

	<i>Dispositions 121 Days or More</i>				
	(1)	(2)	(3)	(4)	(5)
University	0.096 (0.088)	0.098 (0.081)	0.131 (0.096)	0.089 (0.065)	0.097 (0.066)
Large Aggregator	0.024 (0.034)	0.021 (0.032)	0.005 (0.032)	0.044 (0.033)	0.058 (0.048)
Failed Operating Co.	-0.052 (0.062)	-0.045 (0.047)	-0.061 (0.047)	-0.014 (0.041)	-0.009 (0.045)
Patent Holding Co.	-0.107*** (0.025)	-0.110*** (0.025)	-0.117*** (0.027)	-0.076*** (0.028)	-0.052* (0.031)
Technology Development Co.	0.112*** (0.041)	0.098** (0.043)	0.085* (0.045)	0.063 (0.063)	0.050 (0.060)
Individual	-0.031 (0.048)	-0.016 (0.056)	-0.035 (0.057)	-0.012 (0.045)	0.009 (0.053)
Ind. Lit. in Corp. Form	-0.056 (0.035)	-0.051 (0.037)	-0.066* (0.036)	-0.065 (0.046)	-0.105 (0.068)
Pro se Plaintiff					-0.270 (0.208)
Controls					
Attorney FE	No	No	No	No	Yes
Litigious FE	No	No	No	No	Yes
Court FE	No	Yes	Yes	No	No
Judge FE	No	No	No	Yes	Yes
DJ	Yes	Yes	Yes	Yes	Yes
No. Def.	Yes	Yes	Yes	Yes	Yes
Technology	No	No	Yes	Yes	Yes
No. Patents	Yes	Yes	Yes	Yes	Yes
Obs	6,343	6,343	6,321	6,321	6,321
R-squared	0.033	0.074	0.082	0.265	0.284
Dep Var Mean	0.81	0.81	0.81	0.81	0.81
<i>Note:</i> Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.					

