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Patent Troll Myths

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PATENT TROLL MYTHS
FORTHCOMING, 42 SETON HALL L. REV (2012)

Michael Risch

ABSTRACT

It turns out that just about everything we thought about patent trolls – good or bad – is wrong. Using newly gathered data, this article presents an ethnography of sorts about highly litigious non-practicing entity (NPE) plaintiffs. The results are surprising: they show that the conventional wisdom about patent trolls is likely based on anecdotal, but infrequently occurring, events. Instead, the patents enforced by so-called trolls – and the companies that obtained them – look a lot like other litigated patents and their owners.

To be sure, whether an NPE qualifies as a troll depends on who is doing the name-calling. Regardless of definition, though, commentators have used little evidence to support their positions. The reason is simple: there has been little research about the patents litigated by NPEs and even less about the source of those patents.

Understanding NPEs is critically important to better understanding the role of patents in society and in entrepreneurial businesses. The debate cannot be resolved without further study of the companies whose patents are now litigated by NPEs. This study is the first step in that direction.

TABLE OF CONTENTS

Abstract 1
Table of Contents 1
Introduction 1
I. Background 4

A. The Debate 4
B. Evidence to Date 8

II. Methodology and Data Collection 9

A. Phase I: NPEs and their Litigation 12
B. Phase II: Patents 14
C. Phase III: Initial Assignees 15

III. Testing NPE Criticism.....17

A. Are Litigious NPEs a Recent Phenomenon? 17
B. Are NPE Patents All Business Methods? 18
C. Are NPE Patents Low Quality? 20
D. Do NPE Patents Come From Nonproductive Endeavors?.....26

1. Who Obtained NPE Patents?.....27
2. Corporate Patent Owners Were Productive Companies.....27
3. The Role of Individuals 30

E. Do NPEs Get Their Patents from Fire Sales?.....31
F. Do NPEs Really Wait for an Industry to Develop? 31

IV. Testing NPE Justifications.....33

A. Do NPEs Promote Investment in Startups? 33
B. Are Small Companies Crushed by Larger Infringers?.....35
C. Do NPEs Provide Better Enforcement Avenues for Individuals? 36

Conclusions.....39

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INTRODUCTION

It turns out that just about everything we thought about patent trolls – good or bad – is wrong. Using newly gathered data, this article presents an ethnography of sorts about highly litigious non-practicing entity (NPE) plaintiffs. The results are surprising: they show that the conventional wisdom about patent trolls is likely based on anecdotal, but infrequently occurring, events. Instead, the patents enforced by so-called trolls – and the companies that obtained them – look a lot like other litigated patents and their owners.

Scholars, practitioners, and entrepreneurial businesses have all recognized the growing number of patent plaintiffs that do not produce a product or sell a service, leaving them immune to a counterclaim for patent infringement. Such immunity significantly reduces the likelihood of a low-cost cross-licensing settlement;[1] the ten most active NPEs generate legal costs of $500 million at a minimum. There are many types of non-practicing entities (NPEs) – failed companies, universities, and individuals to name a few. Other NPEs are in business simply to assert patents; they obtain their patents from others or even apply for their own.

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[1] For a good discussion of the importance of cross-claims and defensive patenting, *see* Colleen Chien, *From Arms Race to Marketplace: The New Complex Patent Ecosystem*, 62 HASTINGS L.J. 297 (2010).

Many NPEs are pejoratively called "patent trolls"[2] because they allegedly wait for an industry to develop, then appear to exact a toll on companies who commercialize the technology.[3] According to the detractors' narrative, trolls are recent fly-by-night shops that assert business method and internet patents. Trolls assert low-quality patents in low quality litigation. They obtain patents from failed companies in fire sales. Worse, some trolls "invent" while not actually producing anything of value to society. In short, patent trolls represent a significant break from past practices and foreshadow the downfall of innovative society.

NPEs are not without their defenders, however. According to the justifications, NPEs create patent markets, and that those markets enhance investment in start-up companies by providing additional liquidity options. NPEs help businesses crushed by larger competitors who infringe valid patents with impunity. NPEs allow individual inventors to monetize their inventions. These functions, they argue, justify the existence of NPEs.

To be sure, whether an NPE qualifies as a troll depends on who is doing the name-calling. Regardless of definition, though, commentators have used little evidence to support their positions.[4] The reason is simple: there has been little research about the patents litigated by NPEs and even less about the source of those patents.

Understanding NPEs is critically important to better understanding the role of patents in society and in entrepreneurial businesses.[5] The debate cannot be resolved without further study of the companies whose patents are now litigated by NPEs.[6]

This case study of the ten most litigious NPEs is the first step toward understanding the role NPEs play in society. It examines their litigation,

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[2] Tam Harbert, *If You Can't Beat Patent Trolls, Join Them*, EDN (Sept 9, 2008) http://www.edn.com/index.asp?layout=article&articleid=CA6594114.

[3] Sannu K. Shrestha, Note, *Trolls or Market-makers? An Empirical Analysis of Nonpracticing Entites*, 110 COLUM. L. REV. 114 (2010) provides a good overview of the literature and competing arguments.

[4] Gerard N. Magliocca, *Blackberries and Barnyards: Patent Trolls and the Perils of Innovation*, 82 NOTRE DAME L. REV. 1809, 1810 (2007) ("Like most fresh legal questions, the debate on patent trolls is long on passion and short on proof.").

[5] Markus Reitzig, et al., *On Sharks, Trolls, And Their Patent Prey—Unrealistic Damage Awards And Firms' Strategies Of "Being Infringed"*, 36 RES. POL. 134 (2007).

[6] Magliocca, *supra* note 4, at 1810-1811 (discussing differing claims about trolls but noting lack of proof to support either side); Jennifer Kahaulelio Gregory, Note, *The Troll Next Door*, 6 J. MARSHALL REV. INTELL. PROP. L. 292 (2007) ("Patent troll" is a misnomer that masks underlying fears about patent system; such fears should be directly addressed instead).

their patents, and the companies that created those patents. The study includes information about 350 patents asserted in nearly 1000 cases. More important, it is the first study to examine the provenance of patents asserted by NPEs to see what happened to the inventors/assignees of those patents. Much of the conventional wisdom is supported by anecdotal stories that do not reflect the whole picture.

Most of the factual criticisms of NPEs do not bear out.

•First, NPEs are not particularly new.

•Second, their patents look like other litigated patents. They are not dominated by business methods, though there are plenty of software patents and no biotech/pharmaceutical/chemical patents.

•Third, while measuring patent quality is extremely difficult, the available information implies that NPE patent quality is not drastically lower than other litigated patents. The same cannot be said for litigation quality; trolls almost never win infringement judgments.

•Fourth, only a small minority of patents were originally obtained by non-productive companies whose only purpose was to obtain and monetize patents.

•Fifth, very few of the companies supplying patents to NPEs are out of business; instead most came from productive companies (and most of those continue to operate).

•Finally, while the timing of lawsuits is not consistently trollish, the moniker may be somewhat accurate. The average patent sat on the shelf for more than seven years before being litigated, though several were asserted almost immediately. Of course, NPEs cannot win this argument – they would be condemned whether they rush to court or wait for an industry to develop.

Those defending NPEs do not fare much better.

•First, the evidence does not support a theory that NPEs incentivize investment by providing a market for patents. A small percentage of the companies that obtained NPE patents received venture capital investment, as did a random group of companies that held patents. While there is a difference between the two, that difference is not clearly attributable to NPE activity. That said, any startup holding a patent is much more likely to receive funding than a company without patents, and the increased probability is at least possible that NPEs contribute to that difference.

•Second, it is unlikely that NPEs are vindicating the rights of small companies forced out of business by infringers. Very few of the initial owners of NPE patents failed, and the patents were held for a long time before they were asserted.

•Finally, the evidence does support one defense of NPEs: they provide a better way for individual inventors to enforce their patents than bringing lawsuits themselves.

To be sure, not every question could be answered here. Non-litigious NPEs, including universities, were not studied, and the data does not lend itself to rigorous empirical regressions. Even so, this study is a critical first step to better understanding the role of NPEs in society.

Part I presents some background about the NPE debate, including a discussion of the various criticisms and justifications of NPEs.

Part II describes the methodology and novel data set developed for this study.

Part III applies the data from this study to criticisms of NPEs, while Part IV considers how the data applies to defenses of NPEs.

The article concludes with the observation that NPEs represent a microcosm of inventive society, and how one views each type of inventor should inform how one views NPEs.

I. BACKGROUND

The assertion of patents by NPEs has captured the imagination and fears of many who follow the patent system. A simple Google search for "patent troll" yields more than two million hits. The same search in Lexis's LGLPUB database of law reviews and legal periodicals yields nearly 550 articles. The rhetoric is so heated, and the moniker "patent troll" so pejorative, that blogs have been devoted to tracking NPEs and have been sued for defamation for doing so.[7] There is an active debate, but little evidence supporting either side's claims.

A. The Debate

The debate has centered on a few different areas: quality, innovation, and investment.

One group considers the quality of NPE patents. Some argue that the patents are of low quality[8] and not infringed, such that the NPE is a nuisance extracting rents from those who would rather avoid the expensive

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[7] *See, e.g.*, Joe Mullen, *Troll Tracker sued: Judge Ward's son is one of the plaintiffs*, PRIOR ART BLOG, http://thepriorart.typepad.com/the_prior_art/2008/03/judge-wards-son.html (March 11, 2008 12:45AM).

[8] Magliocca, *supra* note 4, at 1827.

cost of litigation.[9] Others argue that NPEs fully research their patents, such that only those least likely to be found invalid are pursued, leaving defendants with no choice but to settle or face a large judgment.[10] The merit of this latter observation as a "problem" is questionable; while the social costs of patent litigation by non-producing companies might be debated, it seems doubtful that society is worse off if such entities only chose to enforce the most meritorious patents.[11] However, to the extent that any plaintiff can rely on injunctions or royalties on small pieces of complex products, there is a potential detriment to society.[12]

Another group argues that NPEs hinder innovation because their "blocking patents" stop otherwise industrious companies from delivering desired products and services to the market.[13] This is more costly than other litigation because the NPEs do not themselves use the patents to create anything of value,[14] and the evidence is clear that most infringers

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[9] Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 368 (2010) (NPEs impose transactions costs that harm commercialization); *but see*, Golden, *supra* note 13 (problem of settlements in excess of value is not limited to NPEs); Magliocca, *supra* note 4, at 1830 (vague NPE patents and litigation costs increase uncertainty and may drive settlements).

[10] Magliocca, *supra* note 4, at 1828 (arguing that defendants settle not out of nuisance, but because of fears of high damages and high costs of non-infringing substitutes); Timo Fischer & Joachim Henkel, *Patent Trolls on Markets for Technology – An Empirical Analysis of Trolls' Patent Acquisitions* (2009), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1523102 (NPEs acquire high quality patents); Tim Wu, *Weapons of Business Destruction How a Tiny Little "Patent Troll" Got BlackBerry in a Headlock*, SLATE (Feb. 6, 2006), http://www.slate.com/id/2135559.

[11] *Real Drawback to NPE Model is Inefficiency, not Greed*, RPX BLOG (August 13, 2009), http://www.rpxcorp.com/index.cfm?pageid=14&itemid=10 (NPEs would serve society better if it were cheaper to enforce patents); *cf.* Magliocca, *supra* note 4, at 1827-28 (NPEs only important during two instances in history of patents, such that patent merit cannot be the sole basis for "troll problem").

[12] *See, e.g.,* Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2002-2003 (2007); *but see* Einer Elhauge, *Do Patent Holdup and Royalty Stacking Lead to Systematically Excessive Royalties?*, 4 J. COMPETITION L. & ECON. 535 (2008).

[13] David G. Barker, *Troll or No Troll? Policing Patent Usage with an Open Post-Grant Review*, 2005 DUKE L. & TECH. REV. 9, ¶7 (2005); *cf.* James Bessen & Robert M. Hunt, *An Empirical Look At Software Patents.*, 16 J. ECON. AND MGMT. STRATEGY 157 (2007) (software patents associated with lower R&D intensity and are inconsistent with incentive theory of patents); Sichelman, *supra* note 9, at 343 (every patent has the potential to block commercialization by others); *but see* John M. Golden, *"Patent Trolls" and Patent Remedies*, 85 TEX. L. REV. 2111 (2007) (problem of strategic injunctions may be greater for competitive companies rather than NPEs).

[14] Magliocca, *supra* note 4, at 1818-19; Robert P. Merges, *Commercial Success and*

do not copy from patents but rather independently develop.[15] Others argue that the companies that assign their patents to NPEs attempted to commercialize technology,[16] only to lose in the marketplace to large companies that infringed without payment.[17] Thus, it may be that NPEs are simply licensing entities that give all inventors better credibility[18] in early commercialization and patent enforcement.[19]

Patent Standards: Economic Perspectives on Innovation, 76 CALIF. L. REV. 805, 844-45 (1988) (patents reward invention, not innovation); *id.* at 850 ("By separating a firm's revenue predictions from its assessment of technical feasibility, the Kamien and Schwartz model lends analytical rigor to the skepticism some judges have felt intuitively: sometimes firms decide not to innovate; they do not always try and fail."). *But see* Jack Kaufmann, *Antitrust And The Suppression Of Technology In The United States And Europe: Is There a Remedy*?, 66 ANTITRUST L.J. 527 (1998) (true technology suppression is rare).

[15] Christopher Cotropia & Mark Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421 (2009). Of course, failure to copy may mean wasteful duplicative inventive activities.

[16] Brief for Rembrandt IP Management, LLC as Amicus Curiae Supporting Respondents, eBay v. MercExchange, L.L.C., 547 U.S. 388 (2006) (No. 05-130).

[17] Magliocca, *supra* note 4, at 1817-18; James F. McDonough III, Note, *The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy,* 56 EMORY L.J. 189, 209-11 (2006); John E. Dubiansky, *An Analysis For The Valuation Of Venture Capital-Funded? Startup Firm Patents*, 12 B.U. J. SCI. & TECH. L. 170, 172 (2006) (NPEs create exit for failed start-ups); *Real Drawback to NPE Model is Inefficiency, not Greed*, RPX BLOG, http://www.rpxcorp.com/index.cfm?pageid=14&itemid=10 (last visited August 13, 2009); *but see* Merges, *supra* note 14, at 845-46 (many factors other than technical superiority can affect commercial success).

[18] Christopher A. Cotropia, *The Individual Inventor Motif in the Age of the Patent Troll*, 12 YALE J.L. & TECH. 52 (2009) (NPEs might damage individual inventor mystique, thus reducing their credibility); McDonough, *supra* note 17, at 198 (Thomas Edison is one of the most famous inventors, yet would be considered a patent troll today); c*f.* Iain M. Cockburn & Stefan Wagner, *Patents and the Survival of Internet-Related IPOs,* 39 RES. POL. 214 (2010) (patents and patent applications have significant effect on likelihood of acquisition versus failure of internet bubble companies). *But see* Gwendolyn G. Ball & Jay P. Kesan, *Transaction Costs and Trolls: Individual Inventors, Small Firms and Entrepreneurs in Patent Litigation*, at 14 (U. Ill. L. & Econ., Working Research Paper No. LE09-005 2009), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1337166 (large percentage of patent plaintiffs are individuals and small companies).

[19] Magliocca, *supra* note 4, at 1818; Jean O. Lanjouw & Mark Schankerman, *Protecting Intellectual Property Rights: Are Small Firms Handicapped?*, 47 J.L. AND ECON. 45 (2004) (small inventors are at a significant disadvantage in enforcement); Brief for Qualcomm Inc. et al. as Amici Curiae Supporting Respondents, eBay v. MercExchange L.L.C., 547 U.S. 388 (2006) (No. 05-130); *cf.* Joshua S. Gans, et al.,

A third group looks at investment incentives. The idea that patents might be used as tools to obtain venture funding is not new.[20] Indeed, studies now suggest that a primary benefit of patents – indeed patent applications – is that they signal company value to potential investors.[21] It is no surprise, then, that some have suggested that NPEs play a critical role in venture financing. Some suggest that NPEs offer another exit strategy that increases the value of patents.[22] The ability to potentially transact with an NPE provides a type of insurance, but one that applies *ex post*, as most companies would not pay to obtain *ex ante* enforcement

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When Does Start-Up? Innovation Spur The Gale Of Creative Destruction?, 33 RAND J. OF ECON. 571 (2002) (Value of cooperation increases as IP control becomes stronger and transactions cost decrease); Sichelman, *supra* note 9, at 394 (failure to enforce patents through compulsory licensing might reduce *ex ante* incentive to enter into license agreements with patentees); Thomas J. Prusa & James A. Schmitz Jr., *Are New Firms An Important Source Of Innovation? Evidence from the PC Software Industry*, 35 ECON. LETTERS 339 (1991) (new firms have comparative advantage in developing new technology while existing firms have advantage in developing improvements).

[20] Mark A. Lemley, *Reconceiving Patents In The Age Of Venture Capital*, 4 SMALL & EMERGING BUS. L. 137 (2000) (suggesting that study shift to role of patents in obtaining venture funding); Ronald J. Mann & Thomas W. Sager, *Patents, Venture Capital, and Software Startups*, 36 RES. POL. 193, 199-200 (2007); Ronald J. Mann, *Do Patents Facilitate Financing in the Software Industry?*, 83 TEXAS L. REV. 961 (2005); Samuel Kortum & Josh Lerner, *Assessing the Contribution of Venture Capital to Innovation*, 31 J. OF ECON. 674 (2000); Dirk Engel & Max Keilbach, *Firm-level Implications of Early Stage Venture Capital Investment — An Empirical Investigation*, 14 J. OF EMPIRICAL FIN. 150, 157 (2007).

[21] Carolin Haeussler, et al., *To Be Financed Or Not … -The Role Of Patents For Venture Capital Financing*, 2009-2, DISCUSSION PAPERS IN BUS. ADMIN. (Univ. of Munich) (Jan. 20, 2009), *available at* http://epub.ub.uni-muenchen.de/8970/1/Haeussler_et_al_VCPat_Jan2009LMU_WP_Reihe.pdf (last visited Jan. 24, 2011); Stuart J. H. Graham, et al., *High Technology Entrepreneurs and the Patent System: Results Of The 2008 Berkeley Patent Survey* 24 BERKELEY TECH. L.J. 255 (2009); David H. Hsu & Rosmarie H. Ziedonis, *Patents As Quality Signals For Entrepreneurial Ventures* (May 2007), *available at* http://www2.druid.dk/conferences/viewpaper.php?id=1717&cf=9; Kortum & Lerner, *supra* note 20 (venture funding has causal effect on patenting).

[22] Dubiansky, *supra* note 17, at 171-72 (2006) ("The new potential of the R&D licensing market, coupled with the slump in the IPO market, has increased the attractiveness of using technology transfer as an exit strategy. Firms such as Cerian Technology Ventures have sprung up to assess and remarket the intellectual property of failed startup firms."); *but see* Mann & Sager, *supra* note 20, at 200 ("On rare occasions, patents might generate licensing revenues, but that is quite uncommon for software startups and rarely, if ever, the ex ante aim of a venture capital investment.").

insurance.[23] This *ex post* insurance makes the patent more valuable by providing a potential revenue stream even if the company fails. Others, however, argue that signal value leads to proliferation of non-productive dormant patents that are later used by NPEs.[24] They deride the system, claiming that such patents are merely fire-sale castoffs that lack any commercial value.

Similarly, some argue that NPEs create a market for patents, even if the firm remains in business.[25] Some argue that such a market enhances the value of invention, and thus incentivizes inventive pursuits.[26]

Patent market theories are generally consistent with a strong patent rights theory;[27] even so, some commentators suggest that there are better ways to create patent markets.[28] No one has studied whether the initial assignees of NPE litigated patents themselves attempted to commercialize technology or were productive companies.

B. Evidence to Date

Some studies have looked at NPE litigation. Many studies have examined the number of NPE suits in comparison with patent litigation generally; the uniform findings indicate that NPEs file only a small

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[23] Luigi Buzzacchi & Giuseppe Scellato, *Patent Litigation Insurance and R&D Incentives*, 28 INT'L REV. OF L. & ECON. 272, 282 (2008).

[24] Magliocca, *supra* note 4, at 1815-17.

[25] McDonough, *supra* note 17, at 209-11; Marc Morgan, Comment, *Stop Looking Under The Bridge For Imaginary Creatures: A Comment Examining Who Really Deserves The Title Patent Troll*, 17 FED. CIR. B.J. 165 (2008); Gary Odom, *Patent Liquidity,* THE PATENT HAWK, (Oct. 3, 2005, 8:23 PM), http://www.patenthawk.com/blog/2005/10/patent_liquidity.html; *cf.* Paul J. Heald, *A Transaction Costs Theory Of Patent Law*, 66 OHIO ST. L.J. 473 (2005).

[26] Steven Rubin, *Defending The Patent Troll: Why These Allegedly Nefarious Companies Are Actually Beneficial To Innovation*, 10 J. OF PRIVATE EQUITY 60 (2007).

[27] Edmund W. Kitch, *The Nature And Function of the Patent System*, 20 J.L. AND ECON. 265 (1977); F. Scott Kieff, *Property Rights and Property Rules For Commercializing Inventions*, 85 MINN. L. REV. 697 (2001).

[28] Mark A. Lemley & Nathan Mhyrvold, *How to Make a Patent Market*, 36 Hofstra L. Rev. 257 (2007); Elizabeth D. Ferrill, *Patent Investment Trusts: Let's Build A Pit To Catch The Patent Trolls*, 6 N.C. J.L. & TECH. 367, 369 (2005).

fraction of all patent infringement suits.[29] However, it appears that many highly litigated patents are owned by NPEs.[30]

Other studies have examined the quality of patents owned by trolls. The findings are discussed in more detail below, but none of these studies have been comprehensive.

Finally, a few studies have examined NPE behavior. One scholar describes the conditions that foster NPE activity, including difficulty in designing around, low costs of patenting, and incremental improvements as the dominant inventive contribution.[31] These features appear to be true of software and IT patents, but there is no definitive study showing the technology of NPE enforced patents. Another study found that licensing companies are more likely to settle cases than other small entities.[32] This follows a theory that NPEs are most successful when they do not reach a jury verdict.[33]

None of the prior evidence settles the debate about NPEs. Prior studies examine what NPEs do now rather than looking at where they come from. This study is the first to examine the provenance of NPE patents; this new evidence sheds light on the debate about NPEs.

II. METHODOLOGY AND DATA COLLECTION

The goal of this study was to find evidence to support the various positive and negative assertions made about NPEs. To do so, this study uses a novel data set gathered from several sources, allowing a look not only into the cases filed by NPEs, but also the source of the underlying patents.[34] However, it is decidedly a study of litigious NPEs – indeed, the most litigious NPEs.

Patent litigation is notoriously expensive. Each case can cost from $500,000 through summary judgment to more than $4,000,000 through

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[29] Ball & Kesan, *supra* note 18, at 18; Colleen Chien, *Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High – Tech Patents*, 87 N.C. L. REV. 1571, 1572 (2009).

[30] John R, Allison, Mark A. Lemley & Joshua Walker *Extreme Value or Trolls on Top? The Characteristics of the Most Litigated Patents*, 158 U. PA. L. REV. 1 (2009) (showing that approximately half of the most litigated patents are enforced by NPEs) [hereinafter *Most Litigated*].

[31] Magliocca, *supra* note 4, at 1812.

[32] Ball & Kesan, *supra* note 18, at 20.

[33] Magliocca, *supra* note 4, at 1812-13.

[34] The information was gathered by tireless work of several dedicated assistants in addition to the author's efforts.

trial in legal fees, not to mention administrative costs.[35] Furthermore, evidence shows that patent litigation can lead to a multi-million dollar market value reduction companies involved in patent litigation, and that at least some of such losses are a social cost that is not recouped by the plaintiff.[36] By extension, litigation can drag down productivity and value of privately-held defendants.

The most litigious NPEs are worth studying because they, by definition, impose the greatest costs associated with litigation. Even with a minimal cost of $500,000 per case, these ten NPEs alone generate costs of nearly $500 million dollars. Additionally, many litigious parties can impose additional social costs by making litigation very complex, most notably by suing many defendants at the same time or asserting many patents at the same time.[37] As a result, studying just these ten entities should lead to important conclusions, even if the results do not extend to other NPEs.

While the focus is on active NPEs, this study excludes large but non-litigious NPEs,[38] such as Intellectual Ventures, for a few reasons. First, and most practically, quality data is not as available. Second, while non-litigious NPEs are by no means popular, they are not the object of scorn that litigious entities are. The wrath Intellectual Ventures received when it filed its first lawsuit illustrates this fact.[39]

Third, NPEs that never (or even rarely) file suit may not impose the same social costs as those that litigate patents. At the very least, litigation costs are avoided when there is no litigation. Additionally, early stage settlements and license agreements may cost potential infringers less than post-litigation settlements, though not always. Also, while one can never know why defendants settle, NPEs that never have to bring suit may be

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[35] JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 169 (2008).

[36] *Id.* at 137-38.

[37] *See In re* Katz Interactive Call Processing Patent Litigation, Case Nos. 2009-1450, -1451, -1452, -1468, -1469, 2010-1017 (Fed. Cir. Feb 18, 2011) for an example of both tactics.

[38] These include so-called "defensive" patent pools that obtain patents to use as a defense to suits by competitors.

[39] *See*, *e.g.,* Gene Quinn, *Intellectual Ventures Becomes Patent Troll Public Enemy #1*, IP WATCHDOG (Dec. 9, 2010, 1:39 PM), http://ipwatchdog.com/2010/12/09/intellectual-ventures-becomes-patent-troll-public-enemy-1/id=13711/; *see also When Patents Attack!*, This American Life (radio show), available at http://www.thisamericanlife.org/radio-archives/episode/441/when-patents-attack (last visited July 30, 2011).

asserting stronger patents against potential defendants that are more likely to actually infringe. To be sure, study of non-litigious NPEs is a worthy exercise, but it is beyond the scope of this article.

Similarly, NPEs such as universities are excluded by virtue of not having sufficient litigation activity to become the most litigious. In fact, universities are very rarely patent plaintiffs.[40]

Some might argue that because this study examines only litigated patents by a small subset of NPEs, the results may not apply to all NPEs. In some ways this is certainly true; the studied NPEs are very different than universities, which generate most of their patents through faculty research rather than through assignment and licensing. Further, a highly litigious NPE will have more experience selecting patents to enforce than a solo inventor suing on his or her own patent. Indeed, solo inventor and university plaintiffs have fewer (or even single) patents, limiting their choices about which patents to pursue. Non-litigious NPEs, such as Intellectual Ventures, may be different as well, though there is less theoretical reason to think so and IV's initial patent litigation implies the opposite.[41]

Further, the study's results should extend to other litigious NPEs with similar enforcement models. There is no reason to believe that slightly less litigious NPEs will acquire and enforce patents differently than the studied NPEs. The least active NPE studied filed 43 lawsuits over a 20 year period while the most active brought 293, so there is a wide range of activity among the studied plaintiffs. Also, different types of NPEs are represented, including those that acquire patents, those that enforce the IP of a related practicing entity, and those operated by the inventor of the patents at issue. These types of NPEs mirror smaller NPEs in kind, even if not in size.

Finally, while statistical methods analyzing the data presented here lead to some inferences about NPEs, this article is a cautious first step. Regression analysis would require more information about missing, but

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[40] Ball & Kesan, *supra* note 18, at 14; *but see* Jacob H. Rooksby, *University Initiation of Patent Infringement Litigation*, 10 JOHN MARSHALL REV. INT. PROP. L. 623 (2011) (finding that rate of litigation is high among universities that patent, even if absolute number of lawsuits is low).

[41] Michael Risch, *A Patent Behemoth Rears Its Head*, MADISONIAN BLOG, http://madisonian.net/2010/12/08/a-patent-behemoth-rears-its-head/ (Dec. 8, 2010) (arguing that Intellectual Ventures patents have characteristics similar to the patents in this study, such as coming from individual inventors, start-ups, and large corporations).

likely important, covariates as well as a more developed control data set. Consequently, this article leaves such analysis to future work.

A. Phase I: NPEs and their Litigation

We[42] selected the ten most litigious NPEs based on recent filings; the list includes the NPEs involved in the most cases since 2003, when comprehensive data became available on PACER. This list was provided by Patent Freedom, an information company that tracks more than 250 NPEs.[43] Because only recently litigious NPEs were studied, notorious NPE Jerome Lemelson is not on the list – most of his activities were concluded some time ago.[44] Once the recently active top-ten list was identified, however, litigation data was gathered for all years available, dating back to 1986 and ending on December 31, 2009.

We did not independently verify that these were, in fact, the most litigious NPEs, but there is no reason to doubt this assertion, and some reasons to believe it. First, the list includes names of well known and high-profile NPEs, such as Acacia Research, General Patent, and Ronald A. Katz. Second, the list includes several patents that have been identified as the most litigated patents;[45] it stands to reason that the most litigious NPEs would have the most litigated patents.[46] Third, Patent Freedom's entire business is based on accuracy, such that it is unlikely that the company would misreport data so grossly as to change the rankings. Ironically, if this were not, in fact, an accurate list but instead a randomly dispersed group of NPEs, then the data might be even more representative of NPEs generally.

After identification of the most litigious NPEs, we identified the litigations in which they or their related business entities were involved; this was a non-trivial exercise. Some NPEs sued using a single party name, while others used various subsidiaries – in one case more than 150. We identified as many subsidiaries as possible for each NPE using press

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[42] The use of "we" throughout refers to the author and research assistants/data coders. Final decisions about methodology and data collection were the author's.

[43] The latest version of the list is publicly available at https://www.patentfreedom.com/research-ml.html (last visited Jan. 24, 2011).

[44] It is not clear that Lemelson would make the list in any event. *See Most Litigious*, PATENT FREEDOM, https://www.patentfreedom.com/research-ml.html (last visited Jan. 24, 2011) (showing Lemelson as filing 38 cases, fewer than the least litigious NPE studied here).

[45] Lemley, Allison & Walker, *Most Litigated*, *supra* note 30.

[46] The findings discussed below bear this out.

releases, informal reports, litigation tracker websites, news services, and, in one case, SEC filings.

Because no single dataset reported all cases for each subsidiary, we comprehensively searched several sources for litigation involving these parties, including the Stanford IP Litigation Clearinghouse (IPLC), Pacer dockets, Lexis and Westlaw docket reports, and the U.S. PTO's and Lexis's databases of patent litigation notices.[47] Additionally, Patent Freedom generously agreed to provide its litigation data for the studied entities. We also kept track of transferred cases to ensure that there was no double counting.[48] Though a few cases were undoubtedly missed, the data includes most complete and accurate list of cases available; we found mistakes and typos in many of the databases (and even some of the source documents filed by the parties themselves!).

The litigation data was coded to include case name, location, filing date, and number of parties.[49] Later, we gathered data about outcomes of litigation. [50] Table 1 lists the top 10 NPEs and the number of unique cases in which each is a party.

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[47] 35 U.S.C. § 290 (2010) requires district court clerks to notify the PTO when any patent litigation is initiated.

[48] We noted the source and destination case numbers, such that movement of cases might be studied in the future.

[49] Defendant names were not recorded; some cases had more than 100 defendants. Additionally, we kept track of whether the NPE had filed the case or was a declaratory relief defendant.

[50] Case dispositions change on a daily basis given the large number of recent cases, and are best gathered in a short period of time after the remainder of the data set is complete. Other studies have also tracked outcomes. Ball & Kesan, *supra* note 20; John R. Allison, Joshua Walker & Mark A. Lemley, *Patent Quality and Settlement Among Repeat Patent Litigants* (Stan. L. & Econ. Olin Working Paper No. 398 2010) [hereinafter *Repeat Litigants*], *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1677785; Chien, *supra* note 29, at 1605-06; Shrestha, *supra* note 3, at 114.

TrollName	# Cases	Cum. %	Cases/Year[51]	Total Defendants[52]
Acacia Technologies	293	30.18%	21.7	1143
Rates Technology	137	44.28%	6.1	233.4
Millennium LP	105	55.10%	8.3	111.1
Plutus IP	78	63.13%	12.0	807.18
Catch Curve Inc	71	70.44%	4.6	160.3
General Patent Corp	68	77.45%	5.6	114.4
Ronald A Katz	66	84.24%	6.3	976.8
F&G Research Inc	58	90.22%	5.3	65.8
Papst Licensing GmbH	52	95.57%	2.3	82.6
Cygnus Telecomm.	43	100%	4.5	84.9
Total	971			

B. *Phase II: Patents*

The next phase of the study identified the patents at issue in each of the cases identified in Phase I. To do this, we read the Complaints, Answers, motions, and other documents accessible in docketing databases. We also (again) searched the U.S. PTO and Lexis databases of litigation notices.

The ten NPEs were involved in 971 unique litigations. These litigations involved 347 patents. In turn, the 347 patents resulted from 208 initial patent applications, many of which spawned multiple patents.

Many litigated cases involved multiple patents, emphasizing the repeated use of a relatively small number of inventions. The average number of litigations for each patent was 8.27 (maximum 64), and the average number of patents per litigation was 3.62 (maximum 47).

Phase II revealed a significant limitation of the study; prior to the introduction of electronic filing in the late 1990's, Pacer did not contain litigation documents. Indeed, because complaints were always filed in

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[51] This measure considers all years each NPE has been active. Many of the plaintiffs, however, were more active recently than in prior years (or vice versa), such that the average may appear incongruent with current activity.

[52] Because the number of defendants was not available for all cases, this is a weighted calculation for those NPEs that had missing data (all but Acacia). The average number of defendants was calculated for the litigation data available, and that average was then multiplied times the total number of litigations. This assumes, of course, that each NPE was consistent in the number of defendants sued in each case.

paper form to open a case, many districts did not make complaints available on-line until approximately 2002 even if they had adopted electronic filing rules. As a result, there are a few cases with missing patents in the 2000's,[53] and more than a few cases (almost all of them) filed prior to 1999 that are missing patent data. The result is that the 347 patents identified came from 812 of the 971 litigations.

This should not affect the results tremendously, as only one NPE, Rates Technologies, had most of its litigation activity before 1999. Further, because NPEs typically litigated the same patents multiple times, it is likely that many of the cases for which data is unavailable involved the same patents already included in the study.

Also, given that many commentators associate the rise of particular NPE behavior with the 2000's, a data set covering post-1999 activity will still provide useful information.[54]

Phase II patent data included the patent number, patent filing and issue dates, technology classifications, total number of claims, inventors and assignees, and number of continuations.[55] We also determined the earliest claimed priority date for each patent. Patent citation data was gathered, including references cited (backward cites) and citing patents (forward cites). Finally, assignment history was retrieved from the PTO assignments database.

C. Phase III: Initial Assignees

Understanding the role of NPEs depends not only on the attributes of the patents, but also the source of those patents. While some NPEs, usually inventor-founded companies, enforce their own patents, most arrive at the NPE from somewhere else. Just where has yet to be studied, and provides information to evaluate how one might think about NPEs.

In Phase III, we gathered data about the parties that obtained each patent – the initial assignees. Inventors must always apply for patents in

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[53] Many gaps were filled using litigation notices, but not all court clerks follow the statute in every case.

[54] Of course, there might be a difference in the types of patents litigated now than litigated before 2003. However, most of the patents litigated after 2003 issued before 2003 and were certainly applied for before 2003, such that this is a minor concern. Future studies might obtain paper court filings to determine the patents at issue in pre-1999 cases.

[55] No distinction was made between continuations and continuations-in-part, and divisionals were not recorded.

their own names. They can, however, assign their patent to a company or another person at any time. If they do so before a deadline set by the PTO, that assignee is shown on the face of the patent, and is called an "initial assignee." This study includes data about inventors and initial assignees. Some patents may have been assigned to others shortly after their issuance, but such conveyances are not considered initial assignments here.

We collected information about the initial assignees of patents. First, we gathered objective data available in Hoovers and in Dun & Bradstreet's Million Dollar Database. Objective data includes founding date, number of employees, revenues, and industry codes. Data was not available for all companies for all fields, and missing data was dropped from relevant analytical analysis.[56]

Second, we gathered publicly available information about companies from a variety of sources, including the SEC, press releases, financial web sites, and Wharton's WRDS database. This data includes date of initial public offering, market value at the time of patent filing and grant, and various dummy variables relating to the relationship of the company's public status and the patent.

Third, we gathered venture investment data using Thomson's VentureXpert database. The analysis here assumes that absence from that database indicates no venture funding for the company. This, of course, may not be true, but Thomson tracks millions of venture backed companies and virtually all of the largest venture funds, such that most venture-backed companies would appear in the database.[57] However, missing venture funding information is a limitation of the data. The VentureXpert data included the number of investment rounds, the amount invested, the date of first investment, and public offering/acquisition data.

Fourth, we gathered whatever subjective and objective data we could from other sources, including the world-wide-web. This includes press releases, company name changes, self-reported revenues and employee counts, industry focus, and mergers and acquisitions.

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[56] For a variety of reasons, one would expect missing data in Dun & Bradstreet to skew toward operating companies.

[57] There is no reason to believe that there is a selection bias, though it is theoretically possible that the types of venture capital companies that would invest in the types of assignees here are the same types that would be excluded from VentureXpert. *See* Mann & Sager, *supra* note 20, at 195, for further discussion of VentureXpert.

Finally, we tracked whether any sole inventors were licensed attorneys[58] in the home state reported on the patent. The intuition is that a lawyer/inventor is less likely to use the patent in a productive company. Joint inventors were not included: having an attorney as an inventor is less probative where multiple inventors are on the patent. For example, a patent attorney might contribute to an engineer's invention at the drafting stage.

III. TESTING NPE CRITICISM

The data collected provides a window into how long NPEs have been active and what types of patents they assert. This part presents some evidence relating to the criticism of NPEs and concludes that most of the criticism is based on a few, perhaps anecdotal, cases.

A. Are Litigious NPEs a Recent Phenomenon?

The studied NPEs are recently active, but on the whole they did not originate in this decade. Acacia Technologies is by far the most active litigant, comprising about one-third of the total cases filed. Rates Technology is a party in approximately 13% of the cases, but many of these were prior to 1999; it is far less active in the last decade. Millennium LP is a party in about 10% of the cases.

The median date that a case was initiated is in July 2005, with a mean of June 2004. This implies that the cases skew earlier, not later. This is not a surprise, given that the time before 2005 is unbounded, while the sample included only four years after 2005. The mean will likely shift later than the median as time goes by and the number of cases filed grows.

Two NPEs (Papst Licensing and Rates Technology) filed their first cases in 1986. All but one of the NPEs filed their first cases before 2000: Plutus IP first filed in 2003. As of the study's cutoff, two NPEs (F&G Research and Cygnus Telecommunications) had not filed a case since 2008, and one (Ronald A. Katz) had not filed since late 2007.

The data thus tells a story not often advanced by conventional wisdom. For some of these NPEs, litigiousness is due to longevity, not newness and aggressiveness. Papst Licensing, for example, has averaged two cases per year for nearly 25 years, far less than many practicing companies

[58] We included all lawyers, not just patent lawyers.

today. However, due to its long-term patent enforcement strategy, its cumulative activity is significant.

Indeed, when aggressiveness in suing defendants is considered, NPEs lower on the list look more litigious. Ronald Katz is the best example; while seventh in the number of cases filed, he is second in the number of defendants sued. Katz has sued on average nearly 15 defendants per case, compared to 3.9 for Acacia, with F&G suing only 1.1 defendants per litigation.[59]

B. Are NPE Patents All Business Methods?

The patents were related to a variety of different technologies. It is always difficult to classify technology, especially without detailed analysis of each patent. However, patent classification codes provide some general information about the variety of patents litigated by NPEs.

The patent classifications are varied. In the interest of completeness, each patent class – rather than just the first or primary listed class – was counted. As a result, the number of classes reported exceeds the number of patents because some patents list multiple classes.[60]

Most of the patents are classified in the PTO's communications and computers (Group II), but some are in the mechanical arts (Group III). A small minority were in the chemical arts (Group I).

Table 2 shows the top 11 subclasses for the studied patents. Because patents were listed under multiple classes, the top 11 do not necessarily constitute 95% of the patents, as the total percentage implies.

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[59] For a discussion of different NPE patent assertion models, see Chien, *supra* note 1.

[60] The mean number of classes listed for each patent is 1.8 (619 classes on 347 patents).

US patent class #	US Classification description	Patents Categorized	Percent (347 Total)
379	Telephonic Communications	73	21.04%
348	Television	54	15.56%
705	Data Processing: Financial, Business Practice, Management, or Cost/Price Determination	33	9.51%
360	Dynamic Magnetic Information Storage or Retrieval	29	8.36%
709	Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating	24	6.67%
707	Data Processing: Database and File Management, Data Structures, or Document Processing	23	6.92%
358	Facsimile and Static Presentation Processing	22	6.34%
715	Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing	21	6.05%
G9B	Information Storage Based on Relative Movement Between Record Carrier and Transducer	21	6.05%
725	Interactive Video Distribution Systems	20	5.76%
340	Communications: Electrical	13	3.75%

Of particular interest is Class 705 for data processing, financial, business practice, management, or price/cost determination – more commonly known as the catch-all classification of business methods patents. While a patent may be a business method without falling under class 705, any patent listing in class 705 is almost surely a business method. Thirty-three patents, or 9.5%, include Class 705 as one of their technology classes, though not necessarily the first. This suggests that pure business methods are a relatively small part of NPE litigation; perhaps smaller than conventional wisdom might assume.

However, many of the patents were related to software and data processing even if they were not "pure" business methods or internet patents. Interestingly, only two of the assignees were incorporated in California. One might have expected more California companies to contribute patents if they were internet companies (i.e. business methods patents) or if they were assigned by failed startups.

Another way to determine whether the patents were business methods is to consider whether the patents are "high technology." Professor Colleen Chien identifies a variety of patent classes that she considers to be

high technology hardware, software, or financial inventions.[61] Using those definitions, 40% of the NPE patents are high technology, including 21 hardware patents, 84 software patents, and 33 financial inventions. This means that the other 61% do not fall into this definition of high technology.

While the patents are not dominated by business methods, the distribution of technologies represented by NPE patents statistically differs from technologies litigated by non-NPEs. The NBER database[62] classifies patents into six coarse groupings. The six classes are: chemical, computers, drugs/medical, electrical, mechanical, and others. These classes convey little information in themselves, but they are helpful for comparison. Quite simply, the distribution of NBER classes of NPE patents is different[63] than the classification of all patents involved in litigation filed in 2000 and 2002.[64] The primary differences are the relatively infrequent patents in chemical and drugs/medicine categories enforced by NPEs as compared to the number enforced by all patent plaintiffs.

The lack of chemical and pharmaceutical patents is corroborated by NBER's slightly more detailed technology sub-classifications. NBER classifies 93 of the NPE patents[65] as "communications," 61 as "computer hardware and software," 30 as "information storage," 30 as "electronic business methods and software," and 24 as "miscellaneous electrical & electronic." Notably missing are biochemistry and pharmaceuticals.

C. Are NPE Patents and Infringement Claims Low Quality?

Patent quality is notoriously difficult to measure, but the evidence found here and in other studies[66] implies that those criticizing patent

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[61] Chien, *supra* note 29, at 1616; Stuart J.H. Graham & David C. Mowery, *Software Patents: Good News or Bad News?*, *in* INTELLECTUAL PROPERTY RIGHTS IN FRONTIER INDUSTRIES: SOFTWARE AND BIOTECHNOLOGY 45 (Robert Hahn ed., 2005).

[62] NBER includes an analysis of all patents from 1976 to 2006. Bronwyn H. Hall, et al., *The NBER Patent Citation Data File: Lessons, Insights, and Methodological Tools* (NBER Working Paper No. 8498, 2001).

[63] And statistically so, with $p=0$ in a chi-squared test.

[64] Ball & Kesan, *supra* note 18, at 18 and 37.

[65] Data was only available for 371 patents because the NBER data does not include the most recent patents.

[66] This article will not probe patent quality of NPE patents in detail; other articles have done so. Fischer & Henkel, *supra* note 10; Allison, Lemley & Walker, *Most Litigated*, *supra* note 30; Shrestha, *supra* note 3; Allison, Lemley & Walker, *Repeat*

quality need more proof to show NPE patents are weaker than other litigated patents.

Quality is usually measured in two ways. The first is to look at indicia of the patents themselves, such as numbers of citations and claims. This method, though often used, may not correlate with win rates,[67] and thus many consider them to be poor indicators of patent quality. The second method is to look at whether such patents are affirmed in court. The third method is to look simply at whether NPEs win infringement judgments in court.

1. Quality Indicia

With respect to patent indicia, the results of this study are consistent other studies to consider the quality indicia of NPE enforced patents. Table 3 shows the mean, median, and standard deviation of a variety of traditional patent quality measures associated with the 347 patents studied here.

	Mean	Median	Std. Deviation	Minimum	Maximum
Number of References Cited	80.57	20	199.63	0	1557
Number of Citations Rcvd	50.16	25	82.33	0	1034
Number of Continuations	2.48	1	3.65	0	23
Number of Claims	33.58	24	33.16	1	254
Number of Inventors	1.90	1	1.41	1	11
Number of Patent Classes	4.71	4	2.88	1	24

Table 4 considers several recent studies of patent quality, including random samples of patents litigated by non-NPEs. The comparison is helpful for two primary reasons. First, it shows how NPE patents compare to other litigated patents, regardless of whether one believes that these measures indicate quality. Second, it helps determine whether the results here generalize to other groups of NPEs.

Litigants, *supra* note 50.

[67] Allison, Lemley & Walker, *Repeat Litigants*, *supra* note 50.

Study[68]	Number of References Cited	Number of Citations Rcvd	Number of Continuations	Number of Claims
NPE (this study)	78.12	49.14	2.40	33.09
Non-NPE Litigated[69]	34.64%%%% (p=0.01)	N/A	~1.32	25.46** (p=0.013)
Non-NPE Non-Litigated[70]	15.16%%%% (p=0.00)	N/A	~.42	14.87*** (p=0.00)
Most Litigated Patents[71]	~122	32.25 (p=0.14)	4.32	39.29^^^ (p=0.01)
Patents Litigated Once[72]	~31	14.07### (p=0.00)	1.4	24.46 (p=0.14)
Litigated by Trolls[73]	N/A	36 (p=0.31)	N/A	41^^^ (p=0.006)
Litigated by Non-Trolls[74]	N/A	15.8$$$ (p=0.00)	N/A	23.5^^^ (p=0.00)

Some attributes of the patents studied here look much like other litigated patents – for example, the number of claims is greater than – but within a practically similar range compared to – other litigated patents.[75]

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[68] Where the data allowed a statistical comparison, the results are reported as follows, using different tests based on the available data:

**significant at 95% (one sample t)

***significant at 99% (one sample t)

%%%significant at 99% (log transformed, one sample t)

^^^significant at 99% (two sample t)

###significant at 99% (age adjusted, log transformed, two sample t)

$$$ significant at 99% (age adjusted, two sample t)

Note that tests on the number of claims are difficult, as number of claims are skewed and data was unavailable to perform a log transformation. Thus, the tests are more illustrative than statistically certain.

[69] Random sample of litigated patents. John R. Allison, et al., *Valuable Patents*, 92 GEO. L.J. 435 (2004) [hereinafter *Valuable Patents*].

[70] Random sample of unlitigated patents. *Id.*

[71] Sample of the most-litigated patents. Allison, Lemley & Walker, *Most Litigated*, *supra* note 30.

[72] Random sample of patents litigated once. *Id.*

[73] Sample of patents identified as being litigated by "trolls." Shrestha, *supra* note 3. Some of the litigating entities overlap with this study, and some do not.

[74] Random sample of litigated patents. *Id.*

[75] Fischer & Henkel, *supra* note 10, find that patents acquired by "trolls" have more claims than those acquired by non-trolls, which this study corroborates. If one expects trolls to always enforce patents, while others may acquire patents for a variety of reasons, such as defensive patenting, then this finding is consistent with prior comparisons between litigated and unlitigated patents. *See, e.g.,* Allison, et al., *Valuable*

Even the number of references cited is close once outliers are excluded.[76] There is one measure where NPE patents differ both statistically and substantially from other litigated patents: number of citations received. The 50.16 citations received by patents studied here are high compared to the non-NPE counts of 14.07 and 15.8, but statistically similar to the 32.25 and 36 citations received by the most litigated and troll-litigated patents of other studies.[77]

This is a potentially important difference. It implies that those who choose to litigate patents obtained by others attempt to select important or influential patents, to the extent that importance and influence are measured by the number of other inventions the patent relates to. Such highly cited patents might be better for two reasons. First, such patents might have a better chance at being found valid, though references cited by the patent has more of an effect on its validity than forward references by others. Second, such patents likely have a larger population of potential infringers from which to seek royalties or litigation damages. Large numbers of citations received by such patents implies that they are more than trivial patents, as suggested by some.[78]

Thus, traditional patent quality measures imply at the very least that NPE patents look a lot like other litigated patents. If one believes that these measures indicate patent quality, then NPE patents would appear to be of equal or higher quality. They certainly do not appear to be worse than other patents.

2. Litigation Outcome

Studies of litigation outcomes may be a better way to determine patent quality. Here, too, the evidence indicates that NPE patents are not demonstrably worse than other litigated patents.[79] Of the patents studied

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Patents, *supra* note 69 (finding litigated patents to have more claims and backward references).

[76] Fischer & Henkel, *supra* note 10, find even fewer references cited (mean of 11.4) in their sample of patents acquired by trolls. This implies that patents litigated in this study have significantly (statistically and substantively) more backward citations than patents acquired by trolls generally.

[77] The large standard deviation accounts for the non-significant differences. Fischer & Henkel, *supra* note 10, find similar results in unlitigated patents acquired by their definition of patent trolls.

[78] Magliocca, *supra* note 4, at 1827.

[79] The findings discussed are not limited to the most litigious patentees, as other studies used different criteria to select data.

here, 43 resulted in merits rulings.[80] Only 4 were found completely valid; that is, no claim was held invalid. Another 23 patents (53.5%) were found completely invalid; every asserted claim was found invalid. Additionally, 19 patents (44.2%) were found partially invalid; some of the asserted claims were valid and some were invalid.[81] One patent was found unenforceable, but it was also found invalid. The validity of the remaining 314 patents was untested.

A future paper will analyze case outcomes studied here in detail, including timing, type of invalidity, infringement results, and the relationship between quality indicia and outcome.

These validity results are reasonably close to the results of other studies. For example, Shrestha found that, of 18 studied NPE cases resulting in a judgment on the merits, only three cases (or 16%) invalidated patents.[82] When grouped by final (consolidated) case, the results in this study show a greater invalidity rate than Shrestha–13 cases invalidated a patents out of 46 cases with any merits ruling (or 28.2%). It is unclear why there is a difference in the results. One explanation may be that Shrestha selected cases by NPEs that were discussed on the internet, and those NPEs and their cases may have had higher win rates. Another difference is that this study counted merits rulings even if there was no final judgment on the merits with respect to that patent (for example, if other patents in the case were appealed).

The NPE invalidity rate reported here is higher than a study of all patent cases filed in 1995, 1997, and 2000.[83] There, of 584 summary judgment and trial verdicts, only 118 (19.8%) resulted in an invalidity judgment.[84] Here, too, the numbers do not directly compare, because this study only recorded merits rulings, rather than all summary judgment and trial verdicts. There were many summary judgment rulings that did not result in a merits ruling (that is, where summary judgment was denied). Further, this study looks at appellate rulings, which may yield different

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[80] Because many cases were consolidated, a single judicial opinion might apply to many different cases.

[81] This totals more than 44 patents, because some patents resulted in different rulings in different cases.

[82] Shrestha, *supra* note 3, at 158 (of 18 studied cases resulting in judgment on the merits, seven cases won by plaintiff, and only 3 cases invalidated patents).

[83] Jay P. Kesan & Gwendolyn G. Ball, *How Are Patent Cases Resolved? An Empirical Examination of the Adjudication and Settlement of Patent Disputes*, 84 WASH. U. L. REV. 237, 246 (2006).

[84] *Id*. at 276. The difference was not statistically significant in a t-test.

outcomes than summary judgment and trial verdicts. Even with different bases for comparison, the 28% invalidation rate here is not so much greater than the 20% rate for other litigated patents to justify a conclusion that NPE patent quality is *bad*. At most, the conclusion is that the patent quality is a bit worse than patents enforced generally.

There is one data point to the contrary – for the most litigated patents, the patent was invalidated in 60 of 86 cases decided on the merits.[85] Even here, the inferences are not clearly that NPE patents are weaker. Many of the most litigated patents were not enforced by NPEs, implying that after multiple bites at the apple, a large number of patents will be invalidated whether NPE owned or not. Second, most of the invalidations related to written description and on-sale bars, not obviousness.[86] These are still invalid patents, but a different kind of weakness. Third, many of these outcomes are still pending; for example, invalidity findings on many of Katz's patents were recently reversed by the Federal Circuit but not taken into account in the most-litigated study.[87] Thus, including appellate outcomes with district court outcomes may not be comparable.[88]

In any event, the most litigated patents in this study fare slightly better than those in the Allison, Lemley & Walker study. For all patents litigated 7 or more times, there were 52 merits rulings. All of the patent claims were invalidated in 13 of those rulings – about 25%. Some of the claims were invalidated in 21 other cases. The full invalidation percentage is better than the most litigated patents reported by ALW. The full and partial invalidation percentage (65%) is nearly equal to that reported by ALW (69%). This implies that ALW's count may include not only cases where the entire patent is invalidated, but also cases where only some of the patent is invalidated.

3. Do NPEs Bring Quality Cases?

While the patents may not be poor quality in terms of validity, they are rarely infringed. Of the 46 cases with merits rulings (40 of which directly ruled on infringement), only 2 cases resulted in a finding of literal

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[85] Allison, Lemley & Walker, *Repeat Litigants*, *supra* note 50.

[86] *Id.*

[87] *In re* Katz Interactive Call Processing Patent Litigation, Case Nos. 2009-1450, -1451, -1452, -1468, -1469, 2010-1017 (Fed. Cir. Feb 18, 2011).

[88] Matthew D. Henry & John L. Turner, *The Court of Appeals for the Federal Circuit's Impact on Patent Litigation*, 35 J. LEGAL STUD. 85, 99-100 (2006) (discussing affirmance rates of invalidity decisions).

infringement and no case found infringement by the doctrine of equivalents. Further in one of the cases finding literal infringement, 25 other patent/defendant combinations were found not to infringe. This is consistent with other studies.[89]

The infringement results may be connected to the invalidity results. For example, many patents may be construed very narrowly, such that they are valid (or more likely partially valid) but not infringed. Interestingly, NPEs likely have more information about infringement than they do validity ex ante. Thus, NPEs could be acting strategically to extract rents with non-infringed patents, *or* NPEs could believe that their patents are broader than they really are. The data does not answer this question.

One important caveat is that most cases settle. Indeed, most of the cases studied here settled or were otherwise disposed of without a merits ruling. This can affect the findings in a couple of ways. First, it reduces the sample size. Second, it is unclear why cases settle. It may be that only the weakest patents are litigated because defendants refuse to pay. However, it could also be that the strongest patents are litigated because plaintiffs refuse to settle for a nuisance payment. Third, many cases are litigated to judgment because NPEs are asserting infringement where there is none.

D. Do NPE Patents Come From Nonproductive Endeavors?

Initial owners of NPE litigated patents are similar to not only owners of other litigated patents, but also owners of patents generally. While some of the attributes of NPE litigated patents might differ from other patents, the initial assignees of these patents are similar to a cross-section of inventive society.

Those who believe that NPEs present a net cost to society will at least have to consider the provenance of these patents; if the source of patents are pursuing the course intended by the patent system, then the fact that such patents are alienable should not affect the calculus. As discussed further below, many large, productive companies associated with positive aspects of the patent system also allowed NPEs to enforce their patents. Of course, it would be optimal for companies to pursue research and

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[89]Allison, Lemley & Walker, *Repeat Litigants*, *supra* note 50 (highly litigated patents, many belonging to NPEs, are often found non-infringed); *but see* Shrestha, *supra* note 3, at 158 (7 of 18 cases found non-infringement for NPE litigants, compared to 17 of 23 for non-NPE litigants).

development to obtain patents and then never enforce them, but that is an unlikely scenario.

1. Who Obtained NPE Patents?

The 347 patents in litigation were originally owned by a smaller group. There were 150 unique initial assignee/inventor combinations. This number is deceptively high – several patents were initially owned by inventors that later formed companies, or by various combinations of the same two or three inventors. As a result, there are fewer than 150, and perhaps fewer than 125, unrelated sources of patents involved in the thousand cases filed by the ten most litigious NPEs.

These NPEs appear to obtain patents from a small group for two reasons. First, some NPEs obtain all their patents from one or two sources; this is especially true for inventor operated NPEs. Second, some NPEs acquire patent families, whereby a single inventor receives several patents stemming from a single application. The patent family effect is not fully reflected in the data, because some patents stemming from the same original application were initially assigned to different entities. For example, one application yielded three patents that were initially assigned to three different entities. All three entities are counted separately here.

Of the 347 patents, 243 were initially assigned to a company; there were a total of 91 unique companies listed as initial assignees on these 243 patents.[90] More than 75% of these companies were corporations while the remainder were assigned to LLC's and limited partnerships. Another four patents were initially assigned to two other entities: a hospital and a university.

Seven of the patents were assigned to four different individuals by the original inventors. In most cases, one of two inventors assigned to the other inventor, though some were assigned to a non-inventor. The remaining 93 patents were unassigned, and initially owned by 53 different inventor combinations.

2. Corporate Patent Owners Were Productive Companies

Most corporate owners of patents now enforced by NPEs had business models other than patent licensing. We reviewed the data available for each assignee, including web sites, press releases, product offerings,

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[90] Companies that changed from an LLC to a corporation were considered different assignees.

corporate structure, and sales data to classify initial assignees as pure licensing/enforcement entities. Of the 93 entities classified, only 20, or 21.5%, were non-practicing entities at the time of patenting, representing 32% of the patents initially assigned to a company.[91]

Instead, it appears that the remaining assignees either had or were attempting to build product or service based businesses. For example, 74 of the entities were corporations while only 8 were LLCs and 7 were limited partnerships. One might expect more LLCs if the purpose of patenting was licensing.[92] One surprising finding is just how few university patents were enforced by the most litigious NPEs – only one.

Other information implies that these sources of NPE patents were productive companies.

a. Small/Large Entity Status

The PTO tracks whether initial assignees are small entities; applicants have an incentive to report their status for reduced fees. Small entity status data were available from the PTO for 343 of the 347 patents. Of those, 191 assignees (55.5%) claimed small entity status. This is similar to the percentages found for once-litigated non-NPE patents (53.7%).[93]

The PTO could identify 93 of these as individuals, 46 as small businesses (500 or fewer employees),[94] and 3 as non-profits; the remaining 49 were uncategorized small entities. This means that, at most, 95 of the 243 patents originally assigned to companies were small entities. Logic

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[91] A potential limitation is that the categorization of patentee business models is somewhat subjective. This is an inherent limitation in any study of this type. While at least two people (in addition to the author) examined each company, this particular subjectivity may not be solved by using multiple coders because the categorizations require judgment calls about an assignee's motives. All disagreements were resolved by the author.

[92] The first LLC statute was adopted in 1977, and the last was adopted in 1997. David K. Staub, *Information on LLCs*, LIMITED LIABILITY COMPANY CENTER, http://www.limitedliabilitycompanycenter.com/ (last visited Feb. 13, 2010).

[93] Allison, Lemley, & Walker, *Most Litigated*, *supra* note 30, at 10. Interestingly, it is much larger than the representation of small businesses among the most litigated patents (37.7%). While the most litigated patents included many patents asserted by NPEs, many were asserted by large companies. ALW argue that Katz skews the small entity count downward for the most litigated patents because the Katz patents were not filed with small entity status. This study does not make such a distinction; many initial assignees of Katz's patents were, in fact, productive companies and as such are fairly counted as large entities if they did not seek small entity status.

[94] 37 C.F.R. § 1.27(a)(2) (2010) and 13 C.F.R. § 121.802 (2010).

dictates that the remaining 148 – 42.6% of the total 347 patents – were assigned to large firms. Compare this to a study of litigated non-NPE patents, which showed that 37% of the sampled litigated patents were initially issued to large firms.[95] The percentage of large entities alone implies that there were many productive companies providing NPE patents.

b. Industry Groups

Industry group data was available for 45 (about half) of the companies. Among those, there were 26 NAICS industry groups represented.[96] No single category dominated the types of companies. The top five categories (using 4-digit NAICS codes) were Computer Systems Design and Related Services (6/13.3%); Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (4/8.8%); and Semiconductor and Other Electronic Component Manufacturing/Other Financial Investment Activities/Electronics and Appliance Stores (3/6.7% each). And while computer systems, controls, semiconductors, and communications were the best represented industries, also included were a university, hospital, doctor, construction manufacturer, and cleaning compound manufacturer.

c. Financing

Nineteen initial assignees (20%) were publicly traded at some point, and an additional twelve were subsidiaries whose ultimate parent is publicly traded. Also, 26 of the companies were incorporated in Delaware, which is consistent with the number of public companies and their subsidiaries.

For those companies that were public at the time of patenting (either 8 at the time of filing or 9 at the time of issuance), market value ranged from $100 million to over $122 billion. Market value for both the date of filing and the date of issuance was available for fourteen patents assigned to seven public companies. The median change in market value between filing and issuance was a gain of $93 million (the largest gain was $60 billion, skewing the mean). However, the largest loss in value was $1.6 billion, and six patents were held by companies that lost market value between patent filing and issuance.

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[95] Allison, et al., *Valuable Patents*, *supra* note 69, at 466.

[96] At 4 digits of NAICS. At 5 digits there were also 26, and at 6 digits there were 32.

Venture funding also implies a non-licensing business model. Sixteen of the assignees, about 17.6%, appeared in the VentureXpert database, with a mean total investment of $22.25 million and a median investment of $10.12 million. Investment varied with a range of much less than $500,000 to $72.49 million, with a standard deviation of $23.44 million. Seven of these companies went public and another five were acquired by non-NPE[97] public companies. In sum, 35 – more than a third – of the companies were public, a public subsidiary, or venture-backed. Similarly, 42 of the companies were listed in the public records of Hoovers or Dun & Bradstreet.[98]

d. Sales and Employees

Finally, sales and employee numbers ranged widely. Sales data was available for 41 companies and employee data was available for 51 companies. Sales ranged from less than $1 million to $79 billion (median of $6.3 million). Number of employees ranged from 4 to 172,438 (median of 29).

3. The Role of Individuals

While there were many business entities that obtained patents, a large portion of the patents were initially held by individuals. Perhaps these individuals were not patenting for productive reasons. Unfortunately, little is discernable about individual patentees. Some are related to companies that eventually became NPEs, but this is not necessarily probative. For example, Henry Von Kohorn did not assign every patent to his company, Response Reward Systems; two of the patents in the study are listed as individually owned. Response Reward Systems, in turn, appears to have been an inventor-owned company, but its patents are now enforced by General Patent Corporation, an acquisition-based NPE.

In another example, Joseph Weinberger held five patents individually,[99] assigned four patents to companies that were not licensing entities, and assigned two other patents to Rates Technologies, a licensing NPE. All of his patents are now enforced by Rates Technologies.

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[97] Acacia Research is publicly traded, but was not the acquirer of these venture funded companies.

[98] More companies were likely listed in the private credit databases of Dun & Bradstreet.

[99] They were assigned to him by co-inventors.

Indeed, even if an inventor enforces his or her own patents, it may not mean that they were initially non-productive. Ronald Katz, one of the more famous individual NPEs (though an LLC technically enforces the patents), initially assigned most of his patents to First Data Resources, a going concern affiliated with American Express that eventually went public.

However, there are a few individual inventors that did not assign to any entity. It is difficult to know what efforts such inventors made to commercialize or enforce their patents before allowing an NPE to do so.

In an effort to shed light on the role of individuals, we tested whether the inventor was a lawyer in his or her home state. The intuition is that lawyer inventors are more likely to have a licensing business model; that is, lawyers are likely NPEs rather than commercial companies. We considered 183 of the patents. Of the patents with one inventor, 11 were invented by lawyers, with another 10 possibly claimed by lawyers, for a total of 5.8% of all patents, and 11.4% of single inventor patents. Thus, it appears that at least some NPE patents come from lawyers themselves.

E. Do NPEs Get Their Patents from Fire Sales?

A surprisingly small number of companies were demonstrably defunct – only 9 of 91, or 9.9%. We could not find the status of 9 companies. Five of them are licensing entities, so information is expectedly scarce. It stands to reason that the other four companies are non-operational, bringing the total to 13, or 14.3%. The remaining 78 (85.7%), in addition to the university and hospital, appear to be operating today, even if only as a recipient of licensing revenues.

Whether a company is out of business is only one data point. Companies may license their patents under distress even if they do not fail. Acquisitions may shed some light on the question. A total of 25 (27.4%) of the companies have been acquired at some point, four by NPEs. The implications of these data are a bit ambiguous, as some companies might be acquired if successful, while others might be acquired in a fire sale. In any event, any characterization that all, or even most, patents were acquired in a fire sale is unsupported by the evidence.

F. Do NPEs Really Wait for an Industry to Develop?

We examined the timing of issuance, filing and assignments to test how long NPEs wait before filing suit. The longer they waited, the more like mythical trolls their behavior might appear, even if there are other

explanations for delay.[100] If wait times are short, however, that might imply that NPEs are vindicating the rights of contemporaneous competitors or, alternatively, that they are rushing to file suit after patents issue.

The average number of days between patent issuance and the filing of a complaint was 3021 days (about 8.3 years) with a standard deviation of 1864 days (5.1 years). The median was 2900 days (8.1 years), suggesting that the data is not skewed.[101] When the time to *first* filing of a complaint for each patent is considered,[102] the mean delay is still 2559 days (7.0 years). One would expect that the time to file suit would grow shorter as the issue date gets closer to the present, given that the date of filing a complaint is bounded at 12/31/2009. This appears to be true with a correlation value of .22 between the date of issue and shelf time, but there are clearly other factors that lead to the timing of suits.

Finally, it appears that many of these patents sat on the shelf not only before suit was filed, but also before assignment to the NPEs. The mean time between patent issuance and the last assignment recorded[103] was 2566 days (7.0 years) with a median of 2197 days (6.0 years) and standard deviation of 1842 days (5.1 years).

The assignment records do not lead to a clear conclusion, because the last assignment might not be to the NPE, and other assignments may not recorded in the database. Nonetheless, it appears that a good portion of any delay is attributable to the inventor/initial assignee as opposed to the NPEs.[104]

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[100] *See, e.g.*, Allison, Walker & Lemley, *Repeat Litigants*, *supra* note 50 (arguing that long continuation chains imply that patent applications were filed before industry developed); John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 237 (1998) (litigated patents took on average 12.3 years from filing of the application to resolution of the case).

[101] The dates are obviously truncated at zero.

[102] All future complaints seeking to enforce a patent will only increase the average delay.

[103] This count excludes assignments recorded before the issuance of a patent, though some of such assignments might have been to an NPE. The total number of patents considered was 130.

[104] It was impossible to test delay directly by the NPE, because the last assignment often occurred after lawsuits were instigated. Thus, deciphering which assignments applied to which lawsuits yielded little information.

IV. TESTING NPE JUSTIFICATIONS

The data allows for analysis of three different normative justifications of NPEs: 1) NPEs create a patent market that enhances investment; 2) NPEs provide enforcement for small companies crushed by large competitors that infringe with impunity; and 3) NPEs vindicate the rights of individual inventors.

A. Do NPEs Promote Investment in Startups?

A primary justification of NPEs is that they provide an aftermarket for patents of failed (and even going) companies, providing a new liquidity option that enhances investment in startups. There is no doubt that NPEs help create markets for patents, but the social benefits of this are questionable if the market does not promote innovation and investment in research and development. Investment in startups is one proxy for such social benefits.

Examining this question involves two components: 1) the rate of venture capital investment among companies, and 2) how often failed companies contribute patents. While the data show that companies contributing NPE patents have a slightly higher rate of venture capital investment than other patent holding companies, the small number of failed companies contributing patents and the small percentage of firms receiving venture funding implies that NPEs may have minimal investment-inducing benefits even if they marginally increase the likelihood of investment.

The first component is the rate of venture capitalization among firms with and without patents. The Kauffman Firm Survey of startups ("KFS") provides a control data set. The KFS is a panel survey of nearly 5,000 companies founded in 2004. The survey tracks companies in several categories, including whether they hold patents and receive venture funding.[105] This data provides some areas of comparison.

Table 6 shows venture capital investment rates for firms with and without patents. The last column is the p-value for the hypothesis that observed rate of VC funding among the KFS firms is the same as that observed in this study.

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[105] *Kauffman Firm Survey*, EWING MARION KAUFFMAN FOUNDATION, http://www.kauffman.org/kfs/ (last visited Feb. 13, 2010).

Study	N Companies	N VC Financed	% Financed	p-value (one-tailed)
NPE contributors	91	16	17.6%	
KFS (firms having patents)	263	28	10.6%	.06**
KFS (firms without patents)	4665	41	.9%	0.00***

The data show a slightly higher, but statistically significant, venture capital investment rate between NPE contributor companies and other firms with patents. Further, the difference in venture funding between companies with patents and those without patents is both statistically significant and economically striking.

One might conclude, therefore, that the existence of NPEs may well improve investment opportunities for all companies that hold patents. This conclusion is tenuous, however. First, the timing of investments might explain the difference. The median date of venture funding for NPE contributors was in 1997 (with only one after March of 2001), whereas all of the KFS firms were started in 2004. Differential investments between the boom during the late 1990's, as compared to the post-recession period in the middle of the last decade could explain the entire difference.

Second, as discussed above,[106] patents might be used – whether rationally or not – as indicia of technological value unrelated to an aftermarket for those patents.

Third, the number of NPEs is dwarfed by the number of patent-holding companies, and only a small fraction of firms with patents received venture funding.[107] The odds of any one firm convincing investors to gamble because they a) have patents, and b) might be able to license to an NPE, are long indeed.

As a result, venture capital reliance on potential aftermarket activity cannot be considered a large part of the equation unless there was strong evidence that venture capitalists examined patent quality as carefully as NPEs do. Survey evidence shows the contrary.[108]

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[106] *See* note 21, *supra*.

[107] The same is true of all start-ups – not just those related to NPEs. Mann & Sager, *supra* note 20, at 197; Graham, et al., *supra* note 21.

[108] Graham, et al., *supra* note 21; Stuart J.H. Graham & Ted Sichelman, *Why Do*

Thus, while the differential rate of venture funding implies that patenting is at least correlated with investment,[109] the conventional story that NPEs provide investment incentive by creating an aftermarket appears to be consistent with the evidence but still somewhat questionable.

The second component is how many of the patents were contributed by failed startups. As noted above, around 14.2% of the companies who originally obtained the NPE patents are defunct. More telling, however, is the fact that only 3 of the 13 failed companies received venture funding. Further only 2 of the 16 venture-backed companies were acquired by NPEs, and those companies were already publicly traded at the time of the acquisition. In other words, if NPEs are supposed to be a source of post-failure liquidity in order to encourage venture funding, they are doing a seemingly poor job of it in practice.

Nonetheless, this finding does not rule out some role of NPEs in aiding venture capital investment. The availability of an additional enforcement option may unmeasurably attract venture capital as one of many signals,[110] especially for risk seeking investors or those that have a relationship with an NPE. This effect may be one of the reasons why NPE contributors were more likely to have venture capital investments than the Kauffman panel sample. However, support for this theory will likely require more data, including a better understanding of the ex ante motives of venture capitalists. The data here could be combined with other data on venture financing to perform regressions to capture the effect of NPEs, but that is left for future research.

B. Are Small Companies Crushed by Larger Infringers?

NPEs are not dominated by patents of small companies driven out of business by their larger competitors. First, small firms are likely able to bring their own lawsuits. More than 35% of all patent plaintiffs are small firms.[111] Second, as noted above, small entities according to the PTO – which at 500 employees may be much bigger than "small firms" – represent the same percentage of both NPE patents and litigated non-NPE

Start-Ups Patent?, 23 BERKELEY TECH. L.J. 1063 (2008).

[109] *See also* Mann & Sager, *supra* note 20 (finding correlation between patenting and financing).

[110] Graham & Sichelman, *supra* note 108, at 1079 ("If a patent can be sold to others who are well-positioned to demand royalties or file infringement suits, it may have value quite apart from its utility to the business model of the start-up venture.").

[111] Ball & Kesan, *supra* note 18, at 14 and 31.

patents – about 50%. Third, only 14% of the companies were out of business. Fourth, the long average time between patent issuance and litigation initiation implies that many patents were obtained well before any head-to-head competition might have occurred.

Undoubtedly, some of the patents enforced by NPEs were created by companies driven out of business by large competitors, but the data does not support a view that many fit this description. Instead, it appears that the patents are very early attempts to patent in a field of technology, and had little relevance until asserted much later – one reason they are so maddening to defendants.

C. Do NPEs Provide Better Enforcement Avenues for Individuals?

A third justification of NPEs is that they provide better opportunities for individual inventors to enforce their patents. There are two reasons they might do so. First, they may provide cost money and other resources to continue litigation, where contingent-fee lawyers may not provide such resources.[112] Second, they may provide better credibility for settlement purposes. Each of these reasons explains why NPEs might serve the needs of individuals in ways unnecessary for small companies. The evidence here supports an individual inventor theory more than any of the others.

It is certainly true that NPEs enforce patents assigned to individuals; about 27% of the patents in this study were initially owned by individuals, and several others, like von Kohorn's Response Reward patents, were held by inventor-owned companies. Still more, like the Katz and Papst patents, were initially owned by productive companies, but have since been assigned back to companies run by the initial inventors or their families. However, this does not necessarily mean that NPEs provide new or better opportunities as compared with business assignees of patents.

One tool to test the role of NPEs is the Lemley & Myhrvold categorization of patent plaintiffs.[113] This categorization is helpful because it allows for analytical analysis of each type of NPE rather than simply calling them all "trolls." Of the twelve categories, only one category,

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[112] Shrestha, *supra* note 3, at 147 (noting that NPEs settle cases less often than individuals enforcing their own patents); Ball & Kesan, *supra* note 18, at 17-18 (finding that small parties are active in the legal system, but that only 20% of pairings are small plaintiff/large defendant). Individuals are only approximately one-fifth of the small defendants, meaning that only 4% of cases are individual v. large defendant.

[113] Allison, Lemley, & Walker, *Most Litigated*, *supra* note 30, at 10.

"product company," includes practicing entities.[114] Each of the other categories describes some type of NPE, from those entities that merely acquire patents to enforce, to inventor-owned companies,[115] to inventors themselves.

Table 5 compares categorizations for this study with Allison, Lemley, and Walker's (ALW) categorizations for the most-litigated patents (many of which are now owned by NPEs) as well as a random sample of once-litigated patents. ALW categorized the current owners, while this study categorizes initial owners, whether or not they are currently the plaintiff. This leads to some key differences discussed after the table.

	This study	%	Most Lit.	%	Once Lit.	%
1 (Acquired Patents)	31	8.93%	12	11.21%	3	2.83%
2 (University heritage)	0	0.00%	0	0.00%	1	0.94%
3 (Failed startup)	7	2.02%	0	0.00%	3	2.83%
4 (Corporate heritage)	0	0.00%	0	0.00%	1	0.94%
5 (Individual-inventor-started company)	51	14.70%	43	40.19%	7	6.60%
6 (University/Gov't/NGO)	4	1.15%	0	0.00%	1	0.94%
7 (Startup, pre-product)[116]	5	1.44%	0	0.00%	0	0.00%
8 (Product company)	144	41.50%	47	43.93%	85	80.19%
9 (individual)	103	29.68%	2	1.87%	0	0.00%
10 (undetermined)	0	0.00%	3	2.80%	4	3.77%
11 (Industry consortium)	0	0.00%	0	0.00%	1	0.94%
12 (IP sub. of product co.)	2	0.58%	0	0.00%	0	0.00%

With the notable exception of category 9, individual inventors, the categorizations of initial assignees in this study fall somewhere between the categorizations of plaintiffs enforcing patents only once and plaintiffs

[114] Service companies are included in the product company category.

[115] We categorized companies that sell something as product companies, even if they were founded by the inventor. After all, such companies are not NPEs.

[116] *Id.* This study's categorizations are a bit arbitrary with respect to categories 7 and 8. The categorizations were usually based on the company's status during the time between filing and patent issuance, but in many cases it was difficult to tell when a product was released. Thus, a company that later shipped a product might have been in category 8 when it perhaps should have been in category 7. The differences do not affect the conclusions.

enforcing patents many times.[117] This table supports the finding above that a significant percentage of NPE patents – nearly half – came from productive companies.

The biggest difference is the large percentage of product companies that enforced once-litigated patents, compared to zero individuals. In contrast, individual inventors contributed 29% of the patents to the NPEs in this study. An extension of this is the doubled percentage difference between NPE patents in this study and random once-litigated patents for category 5, inventor-founded companies, from approximately 6% to 14%.

This implies that individuals are more likely to be represented in NPE litigation than in the general population of patent plaintiffs. It is notable that a large percentage of NPE enforced patents were originally held by individuals and their companies, while not a single individual owned a patent litigated in the ALW sample.

Of course, the ALW sample is quite small, and there are surely individual-patentee plaintiffs. For example, another study – the much-cited *Valuable Patents* analysis – found that while individuals obtain 18% of all patents, 27% of the litigated patents observed in that study were unassigned at issue.[118] The study did not report who brought suit.[119]

A comparison to the provenance of NPE patents here leads to potentially ambiguous results. On the one hand, the 27% from *Valuable Patents* is close to the 28% found here, which might imply that the same proportion of patents initially owned by the inventor get litigated, regardless of who litigates them. On the other hand, it is unclear what proportion of patents in *Valuable Patents* was enforced by the original inventors as opposed to later assignees.

Comparison with a different study of all patent lawsuits filed in 2000 and 2002 might shed more light on this question. That study showed that 14% and 12% of patent plaintiffs, respectively, were individuals.[120] Given that 28% (or 40% if inventor-founded companies are included) of the patents enforced by NPEs were initially owned by individuals, NPEs appear to be a primary outlet for the enforcement of inventor owned patents. Even excluding inventor-owned NPEs, NPEs enforce around

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[117] Fisher's Exact for each of these was 0.00, implying that the values were statistically different.

[118] Allison, et al., *Valuable Patents*, *supra* note 69, at 465 n.131.

[119] *Id.*

[120] Ball & Kesan, *supra* note 18, at 14 and 31.

twice the percentage of inventor plaintiffs in a random population of litigated patents.[121]

Of course, just because NPEs allow inventors to enforce their patents does not mean that NPEs are normatively justified. The answer to that question depends on whether one believes that it is better for inventors to enforce their patents or for them to remain dormant, or even whether unaffiliated inventors should be entitled to patents at all.

CONCLUSIONS

NPE enforcement is more complex than any of the traditional stories about patent trolls allow, and the conventional wisdom appears to be based on periodic anecdotal accounts that are true only some of the time.

There is no uniform story about NPE patents or where they come from.[122] While some are business methods patents, most are not. While some litigated patents come from failed start-ups, most did not. While some patents were initially assigned to licensing NPEs, most were not. Indeed, some extremely large companies – and even the federal government – have turned to the very same NPEs to enforce some patents.

Some patents enforced by NPEs are invalid, while most are not. NPEs litigate patents with objective indicia that are similar to other litigated patents and appear to be invalidated about as often as other litigated patents, so long as they are not repeatedly asserted.[123]

To be sure, not every patent is valid and most have at least one invalid claim, but NPEs choose to litigate patents that look like the patents that productive entities enforce. Nonetheless, the social effects of this practice are unknown. Corporate defendants surely dislike defending against patents that are more difficult to invalidate. However, if NPEs are to bring any value to their constituents, they can best do so by litigating strong patents and leaving weak patents on the shelf.

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[121] 28% versus 14% of the total number of patents. Here too, the data is not iron-clad, because the data measured was by case, not by patent. It may be that individuals enforce more patents per case than other types of plaintiffs, though there is no basis to think so.

[122] Because this is a population study, the primary source of bias is uncollectable data. For the most part, there is no reason to believe that uncollectable data is sufficiently different from the available data to create a uniform story.

[123] And when they are repeatedly asserted, they are invalidated just as often as patents that are repeatedly asserted by productive companies.

Even a finding of average patent quality refutes the conventional wisdom that NPEs seek to extract rents with weak patents. It may be that parties settle weak patent claims for a nuisance fee before litigation is filed, but even if true, it is telling that defendants would be willing to litigate only the strongest patents. Perhaps more is at stake, and thus there is a selection bias in the data.

These findings imply that patenting activity that leads to NPE litigation is a microcosm of patenting in general. NPE patents come from individuals, start-ups, established companies, failed companies, licensing companies, and public companies, and, with the notable exception of biotech/pharma, the patents look similar to others.

There is one marked difference, however. Individuals may face a significant disadvantage in high-stakes patent litigation unless they allow NPEs to enforce their patents. This means that NPE litigation may be the best way for garage inventors to capitalize on their patents if infringers refuse to license.

These observations imply that how one feels about NPEs depends on how one feels about patenting in general. After all, any patent may be alienated and enforced by another.

Those that favor strong patent rights should be equally whether a large public company or a startup enforcing a patent or an NPE enforces the patent for them. Those that believe patents impede innovation should be equally unhappy regardless of the suing entity.

The same is true for different technologies. Because NPEs enforce a variety of patents that reflect a variety of different commercial fields, normative judgment of NPE enforcement should be based on judgment of the underlying technology. An NPE enforcing a business method is little different than an operating company enforcing a business method.

To be sure, the NPE is not currently producing a consumer benefit in exchange for the method, but that has never been the quid pro quo for patents.[124] Based on the data here, the initial inventor of a business method disclosed the patent, and most likely attempted to commercialize it. Of course, if one believes in working requirements that force inventors to practice patents before enforcing them, then one should still be indifferent between a non-operating startup and an NPE.

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[124] Patentees need not practice their invention to enforce a patent. *Cf.* 35 U.S.C. 271 (2010).

Individual invention leads to a similar mapping. Strong believers in individual inventing[125] will favor NPEs because they provide a remedy to such inventors. On the other hand, those that believe individual inventors contribute little to innovation and growth[126] will not favor NPEs.

In all events, as patenting society goes, so go NPEs. While it is useful to study their benefits and costs, scholars, courts, and policy-makers should not lose sight of the fact that an NPE bringing a lawsuit could just as well be the entity that initially sought the patent in the first place.

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[125] *See generally* Cotropia, *supra* note 18.
[126] BESSEN & MEURER, *supra* note 35, at 169.