"Patent Quality and Risk Aversion Among Repeat Patent Litigants"

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*presenting

Patent Quality and Risk Aversion Among Repeat Patent Litigants[1]

John R. Allison,[2] Mark A. Lemley,[3] & Joshua Walker[4]

Abstract

Repeat patent plaintiffs – those who sue eight or more times on the same patents – have a disproportionate effect on the patent system. They are responsible for a sizeable fraction of all patent lawsuits. Their patents should be among the strongest, according to all economic measures of patent quality. And logic suggests that repeat patent plaintiffs should be risk averse, settling more of their cases and taking only the very best to trial to avoid having their patents invalidated. In this paper, we test those hypotheses. We find, to our surprise, that repeat patent plaintiffs are not substantially more likely to settle their cases, and when they do go to trial or judgment, overwhelmingly they lose. This result seems to be driven by two parallel findings: both software patents and patents owned by non-practicing entities (so-called "patent trolls") fare extremely poorly in court. We offer some possible explanations for why a group of apparently weak patents nonetheless have so much influence over the patent system, and some preliminary thoughts about how these findings should shape the patent reform debate.

Patent owners who file lawsuits put their underlying patents at risk. A significant percentage of litigated patents are held invalid.[5] And a finding of invalidity is the death-knell for a patent. Because of the arcane civil procedure doctrine of offensive non-mutual collateral estoppel, the consequences of validity and invalidity holdings are highly asymmetric.[6] A patentee who wins a suit against defendant *A*, having proven the patent infringed and fought off a validity challenge, gets no credit for the win in a subsequent suit against defendant *B.*[7] Because *B* was not a party to the first suit, it is entitled to once again challenge the validity of the patent, even on the very same grounds rejected in the first lawsuit. The same is true in subsequent suits against defendants *C, D, E,* and so on. Indeed, for this reason Federal Circuit Judge Rich used to insist that patents were not held valid, but merely held "not invalid."[8] By contrast, should *A* succeed in proving the patent invalid, the game is up. The doctrine of collateral estoppel will prevent the patentee from enforcing the patent against *B, C, D*, or *E;* each of those defendants is entitled to rely on the patentee's prior loss to defeat the lawsuit.[9]

If you're a patent owner who faces multiple infringers, then, the deck is stacked against you. How might patentees respond to this asymmetry? One possible option is to sue all the defendants at once. Doing so makes the resulting case more complex, of course, but it

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[5] *See, e.g.,* John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 **AIPLA Q.J.** 185 (1998) (finding that 46% of litigated patents are held invalid); Paul Janicke & LiLan Ren, *Who Wins Patent Infringement Cases*, 34 **AIPLA Q.J.** 1 (2006) (finding that patentees win only 26% of cases, in part because of invalidity and in part because of noninfringement).

[6] Blonder-Tongue Labs. v. Univ. of Illinois Found., 402 U.S. 313 (1971).

[7] Indeed, the Federal Circuit has even refused to allow the prior judgment to be considered by the jury in a subsequent lawsuit. *See* Mendenhall v. Cedarapids, Inc., 5 F.3d 1557 (Fed. Cir. 1993).

[8] *See, e.g.,* Thomson, S.A. v. Quixote Corp, 166 F.3d 1172 (Fed. Cir. 1999).

[9] In patent law, this is true even if the patentee has already litigated and won one or more cases before its first loss. *See, e.g.,* Mendenhall v. Barber-Greene Co., 26 F.3d 1573 (Fed. Cir. 1994); Mississippi Chem. Corp. v. Swift Agricultural Chems. Corp., 717 F.2d 1374 (Fed. Cir. 1983); Stevenson v. Sears, Roebuck & Co., 713 F.2d 705 (Fed. Cir. 1983).

insulates the patentee from the risk of having to litigate validity again and again. And even the complexity of the multi-defendant suit can redound to the patentee's advantage if defendants cannot agree to present a unified front on issues like claim construction.[10] Second, patentees that are involved (or expect to be involved) in multiple lawsuits might reasonably be risk averse, and therefore more likely to settle cases rather than risk taking them to judgment.[11]

Corollaries of these anticipated patentee responses are that we should expect to see rational patentees file single lawsuits against multiple entities rather than filing multiple suits, that patentees who file multiple lawsuits should settle more often than other patentees, and that those patentees who do file multiple lawsuits and litigate those suits to judgment might do so because they have a stronger than average patent and therefore face less risk of invalidity. In this paper, we test each of these hypotheses using a unique database, the Stanford IP Litigation Clearinghouse. In Part I, we explain the source of our data and our methodology.

Part II provides our results. There has been an increase in the number of defendants named in a particular suit. Nonetheless, many patents are enforced in multiple different lawsuits. We focus on the most-litigated patents – all 106 patents that have been the subject of eight or more lawsuits since the year 2000. Those patents do in fact exhibit characteristics that

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[10]   The patentee's costs go up with more defendants, because they must prove more infringements. But the increase is not linear, because many of the issues – claim construction, validity, unenforceability – will take just as much time to litigate against one defendant as against ten. On the defense side, there may be some cost savings from sharing research, but it has been our experience that trying to coordinate strategy among many different lawyers is often more rather than less costly.

[11]   For a discussion of the game-theoretics of claim preclusion, see Bruce L. Hay, *Some Settlement Effects of Preclusion*, 1993 **U. Ill. L. Rev.** 21. Hay suggests that claim preclusion might not drive more settlements, because the parties could bargain for their own preclusion rules. But he is focused only on mutual collateral estoppel, which governs subsequent suits between the same parties. His argument does not apply to non-mutual collateral estoppel – the kind we are concerned with here.

economists have associated with value. Surprisingly, however, we find that serial patent litigants do not appear especially risk averse – those patents are only slightly more likely to settle than ordinary litigated patents. Even more surprising, we find that the willingness of these patentees to litigate their cases to judgment is a mistake. Far from being stronger than other litigated patents, the most-litigated patents that go to judgment are far more likely to be held invalid or not infringed. The differences are dramatic. Once-litigated patents win in court 50% of the time, while the most-litigated – and putatively most valuable – patents win in court only 10.8% of the time.

The results are even more striking for patents owned by non-practicing entities (NPEs) and for software patents. NPEs and software patentees overwhelmingly lose their cases, even with patents that they litigate again and again. Their win rates are less than ten percent.

In Part III, we offer some preliminary thoughts about what might explain these results. We first investigate whether the outcome data are the result of clustering – a few cases in multi-district litigation that invalidate or hold not infringed multiple patents at once. We find some evidence of clustering, but not enough to explain the full differences in the outcomes. One possible explanation is that defendants rather than plaintiffs are driving the decision to take a case to judgment, simply refusing to settle. Another possibility is that the enforcement of a patent against multiple infringers is an indication of widespread simultaneous invention, and hence of obviousness. A third possibility is that these plaintiffs are by definition outliers, and that that may affect both their rationality and their skill at litigation. For instance, the decision

to sue in multiple different suits rather than consolidating the suits may itself give us evidence about the sophistication of the plaintiff and hence about the likely outcome.

None of these explanations are entirely satisfactory. The result is a bit of a puzzle. The most-litigated patents – the patents that by all measures should be the most important – seem mostly to fail in court. So too do the patents that have occupied the most public attention – software patents, and patents filed by NPEs. That fact has implications for patent policy, and in particular for patent reform directed at litigation abuse. It appears that as a society, we are spending a disproportionate amount of time and money litigating a class of weak patents. Our results may also have implications for our models of patent value and of rational behavior in litigation, since it appears we know quite a bit less than we thought about what makes patents valuable.

I. The Most-Litigated Patents

In prior work, two of the authors demonstrated that litigated patents have significantly different characteristics than other patents.[12] They include more claims, cite more prior art, are cited more often by later patents, file more continuation applications, and come from larger "families" of patents.[13] They are also concentrated in some industries, not others;

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[12] John R. Allison et al., *Valuable Patents*, 92 **Geo. L.J.** 435 (2004) (hereafter ALMT); *see also* John R. Allison & Thomas W. Sager, *Valuable Patents Redux: On the Enduring Merit of Using Patent Characteristics to Identify Valuable Patents*, 85 **Tex. L. Rev.** 1769 (2007) (defending the statistical power of the results in the earlier study).

[13] ALMT, *supra* note __, at __.

semiconductor patents are particularly unlikely to be litigated.[14] Many of these characteristics

are within the control of the patent applicant, and most are known by the time the patent

issues.   ALMT suggest that these characteristics are evidence of the private value of patents,

following a significant economic literature correlating each of these attributes with value.[15]

That prior work depended significantly on a randomly selected sample of cases actually

litigated, collected by hand from district courts around the country. The development of the

Stanford IP Litigation Clearinghouse in December 2008 opened up a second alternative.[16] The

Clearinghouse collects every patent lawsuit filed since January 1, 2000 in searchable format,

and links those suits to the patents involved.[17] Using that database, in a prior paper the

authors identified every patent that has been litigated eight or more times since 2000

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[14] *Id*. at __.

[15] See, e.g., Dietmar Harhoff et al., Citations, Family Size, Opposition and the Value of Patent Rights, 32 **Res. Pol'y** 1343, 1345 (2003) (finding that "patents which are upheld against opposition . . . are particularly valuable"); Jean O. Lanjouw & Mark Schankerman, Characteristics of Patent Litigation: A Window on Competition, 32 **RAND J. Econ.** 129, 140 (2001) [hereinafter Lanjouw & Schankerman, Characteristics] (finding that litigation correlates with patent value and that "the number of claims is another . . . indicator of the 'bits of information' contained in a patent, and therefore its value"); Stuart J.H. Graham et al., Post-Issue Patent "Quality Control": A Comparative Study of US Patent Re-Examinations and European Patent Oppositions (Nat'l Bureau of Econ. Research, Working Paper No. 8807, 2002) (comparing USPTO and EPO opposition mechanisms and finding that the most valuable patents were challenged in both systems); Dietmar Harhoff & Markus Reitzig, Determinants of Opposition Against EPO Patent Grants--The Case of Biotechnology and Pharmaceuticals 4 (Ctr. for Econ. Policy Research, Discussion Paper No. 3645, 2002) (confirming that "patents with above-average values are more likely to be attacked"); Jean O. Lanjouw & Mark Schankerman, Enforcing Intellectual Property Rights 5 (Nat'l Bureau of Econ. Research, Working Paper No. 8656, 2001) ("[M]ore valuable patents . . . are much more likely to be involved in suits."); cf. Jean O. Lanjouw & Josh Lerner, The Enforcement of Intellectual Property Rights: A Survey of the Empirical Literature, 49/50 **Annales d'Economie et de Statistique** 223 (1998) (surveying the literature on the issue).

[16]   That site is presently hosted at http://www.lexmachina.org.

[17]   Due to increased availability over time of electronic filings in federal court, the ability to identify patents in suit improves markedly later in time, particularly from 2003 onwards. Moreover, electronic access also varies by district, potentially making this patent data set under-inclusive for certain districts despite hand collection of cases from those districts. Nevertheless, the patents identified represents the best, most representative such data set available.

(including cases still pending). There were 106 such patents, which have been litigated in a total of 2,987 different patent assertions in 478 different cases.[18] For purposes of that study, we identified a randomly-selected control set of 106 patents that have been litigated only once during this time period. This allowed us to extend the work ALMT did in 2003, comparing the "ordinary" litigated patents (already outliers, as we have seen) to the most-litigated patents. To assess the ALMT value hypothesis, we collected data on the number of continuation applications filed leading to issuance of the patent, the raw and adjusted number of "forward citations" (citations to the patent by later patents), the number of "backward citations" to U.S. patents, foreign patents, and non-patent prior art (the citations the patent makes to prior art), and the number of claims in each patent. Each of these factors has been identified in the economic literature as evidence of the value of a patent.[19] As ALMT predicted, those most-litigated patents exhibited even more evidence of private value and even more of an industry skew than did the average litigated patent.[20]

In this paper, we use the same cases, but collect information about the outcome of each case.

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[18] John R. Allison, Mark A. Lemley, & Joshua Walker, *Extreme Value or Trolls on Top? Evidence From the Most-Litigated Patents,* 158 **U. Pa. L. Rev.** 1 (2009). For purposes of this analysis we include declaratory judgment actions as well as actions filed by the patent owner; until 2007 the rules for declaratory judgment required a clear threat of suit by the patent owner. Teva Pharm. USA, Inc. v. Pfizer, Inc., 395 F.3d 1324, 1333 (2005), *abrogated by* MedImmune, Inc. v. Genentech, Inc., 549 U.S. 118 (2007). We count only separate lawsuits; many patent lawsuits are filed against multiple defendants in a single proceeding. There are 478 separate lawsuits involving these patents, but because many of those lawsuits involve several different patents in the data-set, the total number of assertions of the 106 patents is 2,987.

[19] *See supra* note __.

[20] ALMT, *supra* note __, at __.

For each litigated patent, we also determined small entity status (i.e. whether the patent owner at issue was an individual, university, or small business, as opposed to a large business), whether the patent is assigned before litigation, and – following Lemley and Myhrvold[21] – the nature of the patent plaintiff, divided into one of twelve different "entity status" categories listed in Table 1.

Of the twelve classes of entity, only one (class 8) involves enforcement by a patent owner that actually makes products. The rest are different types of "non-practicing entities," sometimes called "patent trolls" for the practice of hiding under a bridge they did not build and demanding a toll from surprised passers-by. Rather than take a position on what if any non-practicing entities should be considered "trolls," we classify each patent owner and let the reader decide. We do, however, report the results for practicing vs. non-practicing entities (that is, class 8 vs. all other classes except 10).[22]

Table 1
Entity Status Classes
Entity Class 1 (Acquired patents)
Entity Class 2 (University heritage or tie)
Entity Class 3 (Failed startup)
Entity Class 4 (Former product company no longer

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[21] Mark A. Lemley & Nathan Myhrvold, *The Complex Ecology of Patent Plaintiffs* (vaporware 2010).
[22] For a few patent owners we could not identify their entity status after a diligent search. We have classed those entities as 10 (Undetermined), and have excluded them from our entity status analyses. As a practical matter, however, the fact that a diligent search could not identify what an entity did suggests that it is some form of non-practicing entity.

producing)
Entity Class 5 (Individual inventor started company)
Entity Class 6 (University/govt/NGO)
Entity Class 7 (Startup, pre-product)
Entity Class 8 (Product company)
Entity Class 9 (Individual)
Entity Class 10 (Undetermined)
Entity Class 11 (Industry consortium)
Entity Class 12 (IP subsidiary of product company)

We also categorize each patent into both an industry and a technology in order to ascertain whether significant differences existed in the technology and industry areas.[23] In our description of technology and industry areas for inventions that we actually encountered in our data sets, we attempted to define the areas in a comprehensive way, and our definitions thus

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[23] We did not attempt to create a comprehensive typology of such areas, but for obvious reasons only identified and defined those technology and industry areas we actually encountered in the population of 106 most-asserted patents and the sample of 106 once-litigated patents. Although the size of our data sets is sufficient for sound statistical analysis, the relatively small numbers of observations necessarily results in our having encountered fewer technology and industry areas that we would have been encountered in a much larger patent data set. The technology categories are not necessarily mutually exclusive, because modern inventions so often involve multiple technologies.

Our industry categories are also not all mutually exclusive, reflecting the reality of modern industry crossovers. For example, a software-implemented telecommunications process or product rightly belongs in both a computer and a communications industry category. There are, however, fewer inventions belonging in more than one *industry* category than there are inventions belonging in more than one *technology* area because mixes of technologies in inventions are more common than industry crossovers.

are broad enough to include specific inventions not actually found in our data sets. We report

the list of technology and industry areas here; they are defined in detail in our prior work.[24]

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[24] Allison et al., *Extreme Value*, *supra* note __, at __.

Technology areas

(1) Software

(2) Pure software

 (3) Software business method

(4) Mechanical

(5) Electronics

(6) Optics (other than imaging)

(7) Imaging

(8) Biotechnology

(9) Chemistry

Industry Areas

(1) Computer

(2) Semiconductor

(3) Electronics

(4) Medical

(5) Pharmaceutical

(6) Biotechnology

(7) Chemical

(8) Communications

(9) Transportation

(10) Energy and utility services

(11) Financial

(12) Consumer goods and services

(13) Construction

We test each of the results we report in this paper for statistical significance. We report the results in the tables in most cases, or sometimes in the margins, along with each result.

Finally, we evaluated the status of each of the cases as of August 2009. We categorize the outcomes of patent cases in the following ways: (1) settlements, (2) consent judgments, (3) procedural dispositions, (4) pending (including stays), (5) transfers (including MDLs),[25] (6) patentee wins, and (7) accused infringer wins.

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[25]   We break multi-district litigation (MDL) cases out of the pending category because there is a reasonable argument for treating them as either pending cases or transfers.

II. Results

A. Outcomes and Settlements

As noted above, our previous work suggests that the most-litigated patents are the most valuable ones by all the available measures economists have used. Assuming those value measures are accurate, it is reasonable to expect that the most-litigated patents are more likely to be held valid and infringed than the once-litigated patents. At the same time, the doctrine of offensive non-mutual collateral estoppel means that the most-litigated patents are also the most vulnerable. A patentee who files one suit puts the patent at risk, but unless the patent is widely licensed to others the scope of that risk is not in fact much greater than the risk of losing the one suit. By contrast, a patentee who has multiple lawsuits pending at the same time should be very worried about the possibility of losing even one of those suits, because doing so will bring down the whole edifice. These two assumptions can reinforce each other; it is reasonable to assume that where a serial patent plaintiff doesn't settle, but actually takes the case to judgment, the patents selected for litigation should be even stronger than the average most-litigated patent, and more likely still to be held valid and infringed.

As a result, we test two hypotheses: first, that the most-litigated patent owners will be risk averse, and therefore more likely than other litigants to settle their lawsuits before judgment; and second, that where the most-litigated patents *do* get litigated to judgment, the patentee is more likely to prevail than other litigants.

The basic descriptive results of our outcome study are presented in Table 2.

Table 2: Outcome Data

Outcomes	Most-Litigated Patents	Once-Litigated Patents
settlement/consent judgment	714	72
~~procedural disposition~~	15	6
~~pending (incl. stay)~~	40	13
~~transfers~~ (inc. MDL)	139	5
default judgment	0	4
plaintiff win	8	5
defendant win	67	5
plaintiff win rate	10.70	50%

It is worth noting the substantial number of the most-litigated patent suits that are resolved on procedural grounds, whether involving personal jurisdiction or standing, transfers to another venue, or MDL consolidation. It shouldn't be surprising that these non-merits resolutions are more common in the more complex environment of multiple litigation. But the widespread use of the MDL process, which is quite new to patent litigation, is notable, as is the sizeable number of transfers outside the MDL context. For purposes of our statistical analyses in the remainder of this paper, we exclude all pending cases, transfers, and procedural dispositions other than default judgments. The result is a data set of 877 results, either on the merits, default judgment or settlement, 86 of which were outcomes among once-litigated patents and the rest the most-litigated patents.

Several facts stand out in these results. Most notably, our hypothesis that the most-litigated patents will fare well in litigation does not hold up. While the population size is quite

small, it appears that the most-litigated patents don't hold up well in court. The most-litigated

patent plaintiffs won only 10.7% of their cases, compared with 26% across all lawsuits[26] and

50% in the once-litigated set.

Statistical tests bear this out. We compared the proportion of win rates, testing the null

hypothesis that there is no difference between the most-litigated and once-litigated patent

outcomes.[27] We tested this in several ways, both including and excluding settlements in the

denominator of decided cases, and both including and excluding default judgments as plaintiff

wins. No matter which test we used, the differences were highly statistically significant – the

most-litigated patentees were more likely to lose.[28]

The relationship between repeat litigation and the likelihood of settlement is more

complex. By some measures, the settlement rates are lower for the most-litigated patents than

for the once-litigated patents. Once we control the settlement data by removing pending

cases, the most-litigated cases settle 57.8% of the time, if MDLs are counted as transfers, or

72.3% of the time, if we treat MDLs as pending cases.[29] The settlement rate for the once-

litigated patents is 77.4% once pending cases are removed.[30] A related measure is the ratio of

the number of substantive judgments to settlements; this would exclude all transfers and

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[26] Janicke & Ren, *supra* note __, at __.
[27] Because the number of wins on the merits were too small to use the chi-squared test, we used Fischer's exact test.
[28] Including settlements and default judgments, p = 0.000. Including settlements but excluding default judgments, p = 0.006. Excluding settlements but including default judgments, p = 0.000. Excluding both settlements and default judgments, p = 0.006.
[29] There are plausible arguments for both approaches, but we think it is better to treat an MDL transfer as a pending case, and therefore to exclude it from the settlement ratio).
[30] There were no MDL cases among the once-litigated set, since those patents by definition aren't involved in multi-district litigation.

procedural distributions.   If we exclude all procedural dispositions and transfers, the numbers

change. If the denominator is just settlements plus merits dispositions, settlements account for

90.5% of the outcomes in the most-litigated patent set, but only 83.7% of the outcomes among

the once-litigated patents. This difference is statistically significant (p=0.043). But the

difference depends critically on the treatment of transfers and other procedural dispositions.

In short, our initial hypothesis regarding the strength of the most-litigated patents does

not appear to hold up. Patent plaintiffs are repeatedly litigating patents that are less likely to

be enforced in court than the once-litigated patents. And while they are somewhat more likely

to settle than the once-litigated patents, at least by some measures, the most-litigious

patentees are obviously not willing enough to settle, because they regularly lose the cases that

do go to judgment. In Part III, we consider possible explanations for this surprising result.

B. Entity Size and Status

1. Entity Size

We also tested the relationship between entity size and entity status and the outcome

of cases. The PTO distinguishes between large and "small" entities; a small entity is an

individual, a university, a non-profit organization, or a company with less than 500

employees.[31] The measure is of the status of the entity that owned the patent when it issued

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[31]   An entity is defined by the PTO as "small" if it meets the requirements of 35 U.S.C. §41(h)(1), which incorporates by reference section 3 of the Small Business Act. A small entity is either an individual, nonprofit, or a corporation with fewer than 500 employees.

from the PTO; one complication is that many patents are sold before litigation.[32] Nonetheless,

PTO small entity status is a useful proxy for the size of the patent plaintiff. We test the effect of

the plaintiff's size on the outcome of patent litigation.[33]

Large entities make up a surprisingly small percentage of the most-litigated patents.

They represent only 22.4% of the most litigated patents, compared with 48.8% of the once-

litigated patents.

We found no significant difference in the propensity of large and small entities to settle

their cases. Indeed, the settlement rates were virtually identical. Overall, large entities settled

89.4% of the cases, compared with 88.9% settled by small entities. In the once-litigated set,

large entities settled 83.3% of the cases, compared with 84.1% settled by small entities. In the

most-litigated set, large entities settled 91.9% of the cases, compared with 89.5% settled by

small entities. [34]

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[32] Kimberly A. Moore, *Populism and Patents*, 82 **N.Y.U. L. Rev.** 69, 96-97 (2007) (documenting a high rate of pre-litigation transfer of patents).

[33] As we did in our prior paper, we removed Ronald S. Katz Technology Licensing LLP from the entity size analysis, because Katz owns some patents classed as small entity patents and others classed as large entity patents.

[34] None of the results are statistically significant (p=0.505 for all patents; p=0.577 for once-litigated patents; p=0.308 for most-litigated patents).
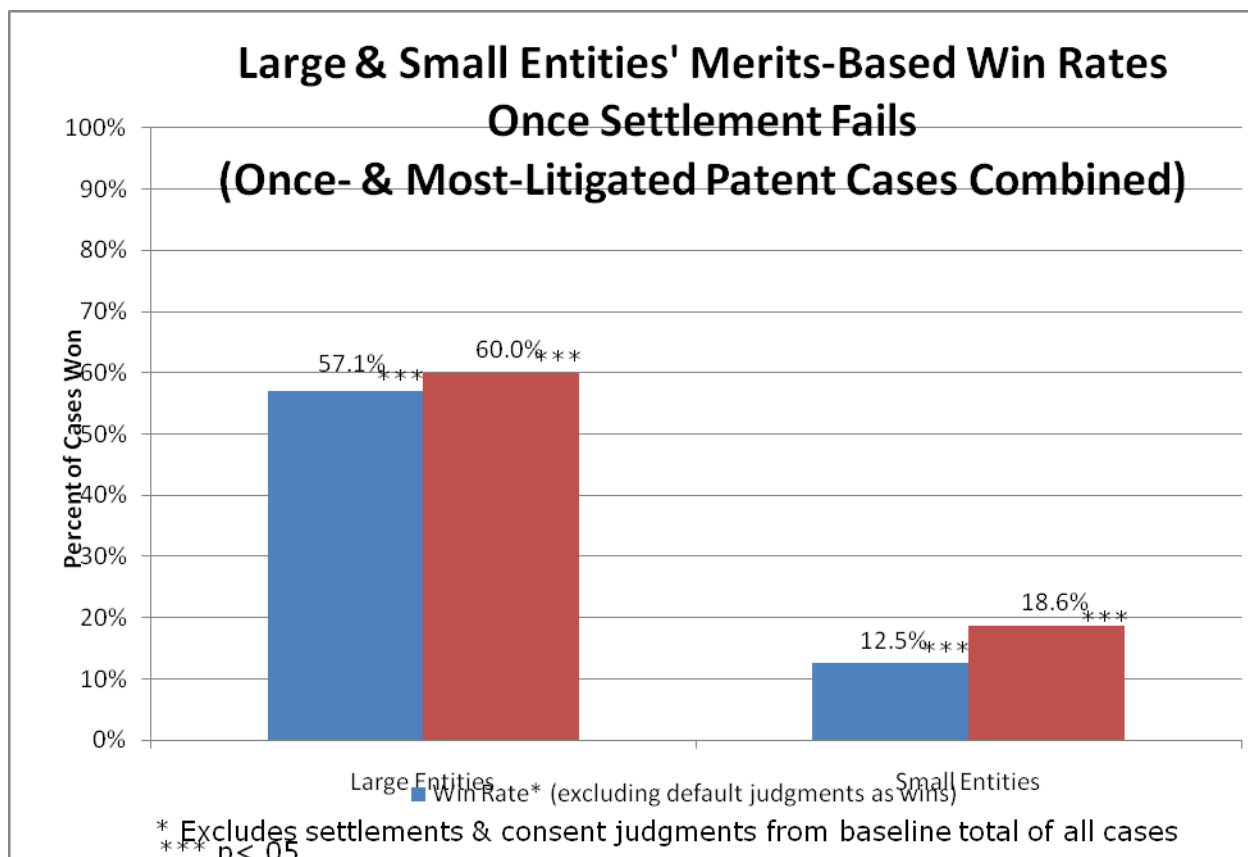
Figure 1
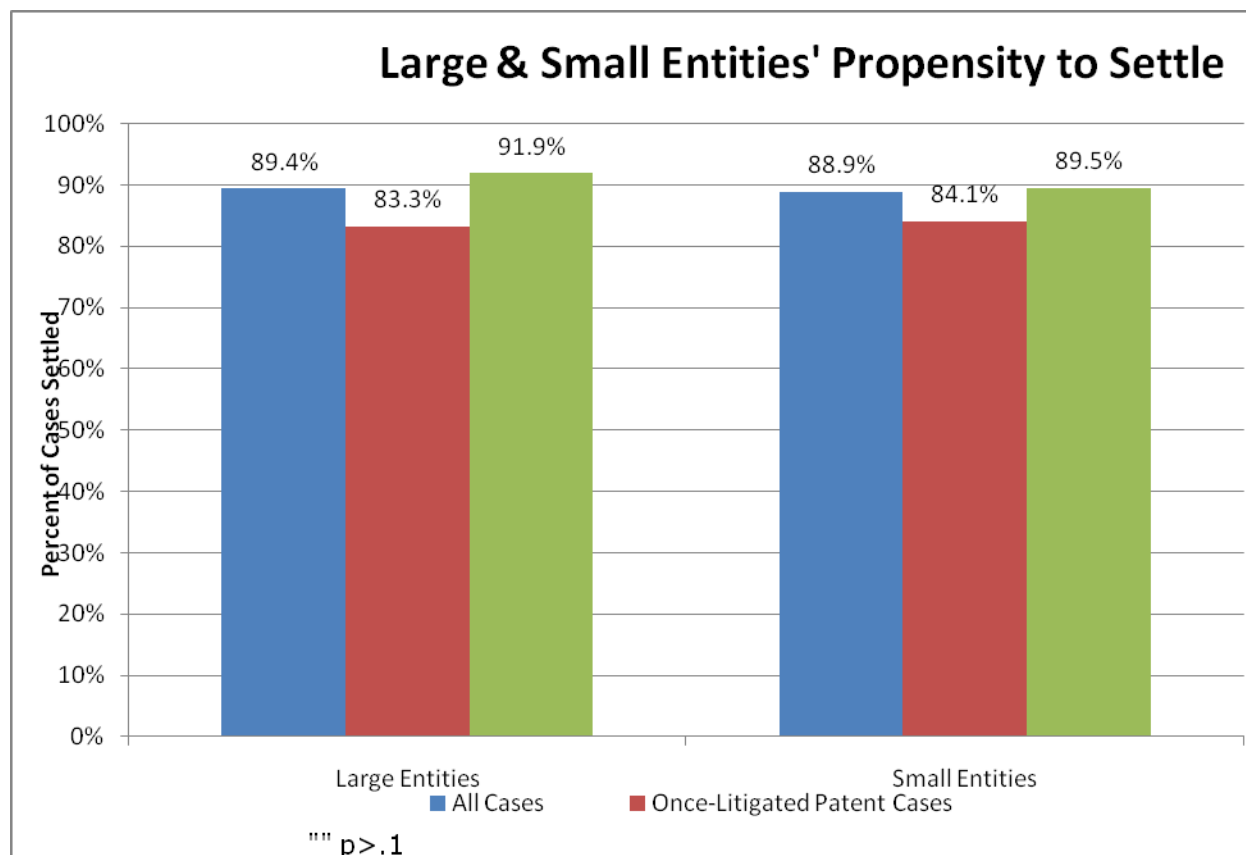
When the cases do not settle, large patent plaintiffs are significantly more likely than small ones to win, almost without regard to how the data is sliced. When we combine the two data sets, large entities win 57.1% of the cases decided on the merits (60% if default judgments are included), while small entities win only 12.5% of their cases (18.6% if default judgments are included). These differences are highly statistically significant.[35] Adding settlements into the denominator naturally reduces the number of patentee wins, but doesn't change the relationship: large entities win judgments in 5.7% of all cases in the combined data sets (6.4% if

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[35] Excluding default judgments, p=0.002. Including default judgments, p=0.004.

default judgments are included), compared to 1.3% of small entities (2.1% if default judgments are included). These differences too are highly significant.[36]

Figure 2

Large & Small Entities' Merits-Based Win Rates
Once Settlement Fails
(Once- & Most-Litigated Patent Cases Combined)

If we disaggregate the most-litigated and the once-litigated patents, the situation becomes more complex. In the once litigated set, large entities are much more likely to win. If we exclude default judgments, large entities won 83.3% of the once litigated patent cases that went to judgment, and small entities won 0% of their once-litigated patent cases.[37] Adding settlements to the denominator once again reduces the win rates, but doesn't change the

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[36] Excluding default judgments, p=0.008. Including default judgments, p=0.018.
[37] p=0.024. When default judgments are added, the numbers change to 85.7% large entity wins and 42.9% small entity wins, but the results are no longer statistically significant.

dramatic differences in the once-litigated data set. Excluding default judgments, large entities

in the once-litigated data set won judgments in 11.9% of all cases, compared with small

entities, who won judgments in 0% of their cases.[38]

Figure 3
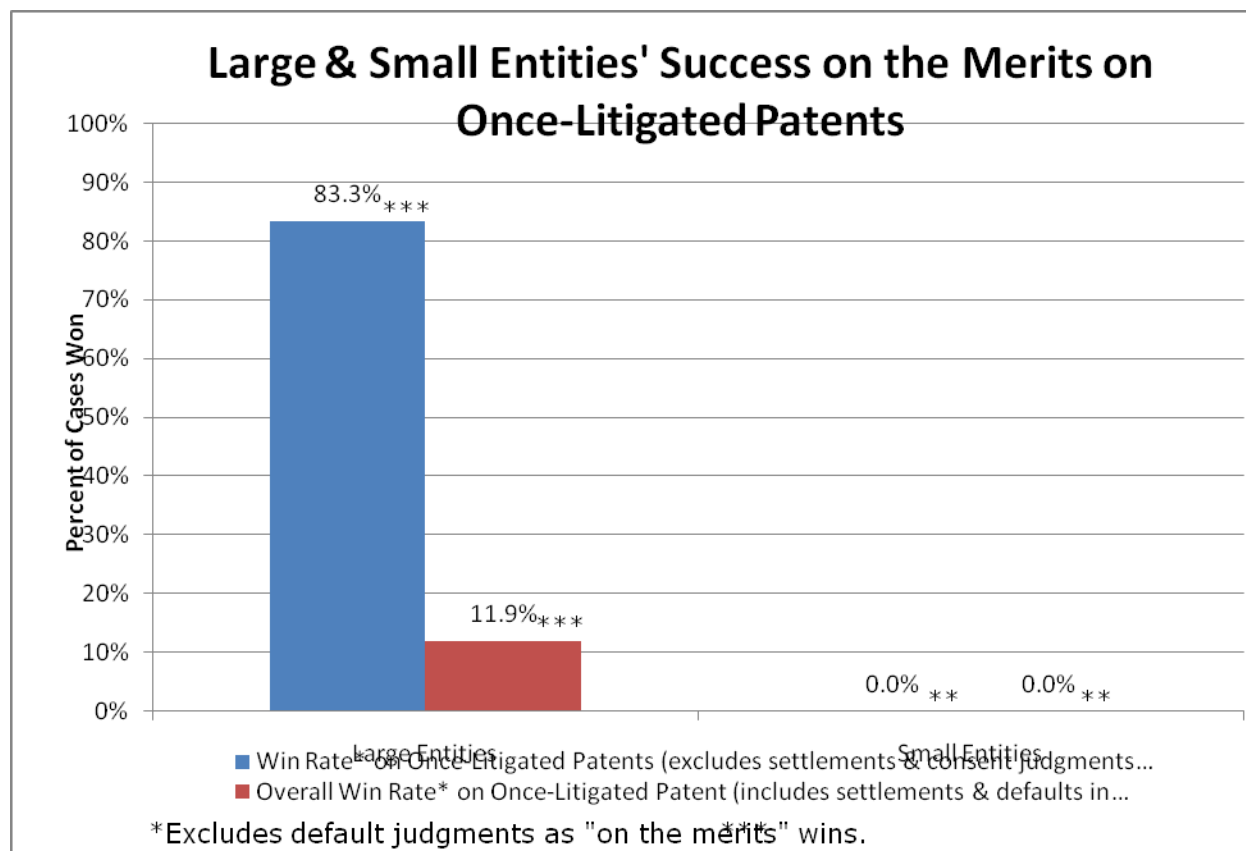
There are also differences in the most-litigated set, again in the direction of large entities

winning more than small entities, but because there are so few large entity plaintiffs who went

to judgment in the most-litigated cases, the results are not statistically significant.

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[38] P=0.024. When default judgments are added, the numbers change to 14.3% large entity wins and 6.8% small entity wins, but the results are no longer statistically significant.

In short, patents originally issued to large entities do substantially better in litigation than those originally issued to small entities.

2. NPE Status

Because many patents are sold before being litigated, however, entity status is at best an indirect proxy for the nature of the current plaintiff.[39] To get more directly at the question of whether different types of plaintiffs fare differently in court, we characterized each of the patent owners into one of the twelve entity-status categories described above. For statistical analysis purposes, we aggregated the patents into practicing entities (class 8) and non-practicing entities (NPEs) (all other classes except class 10).

As with small entities, NPEs were much more prevalent among the most-litigated patents. 81.3% of the once-litigated patent plaintiffs were companies that made products, while only 16.8% of the most-litigated patents were owned by product-producing companies.

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[39] It may, however, reflect differences in the prosecution of patents between large and small entities.

Figures 4 and

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Composition of Plaintiffs in Once-Litigated Patent Cases

Non-Practicing Entities 18.7%

Product Producing Companies 81.3%

Non-Practicing Entities
Product Producing…
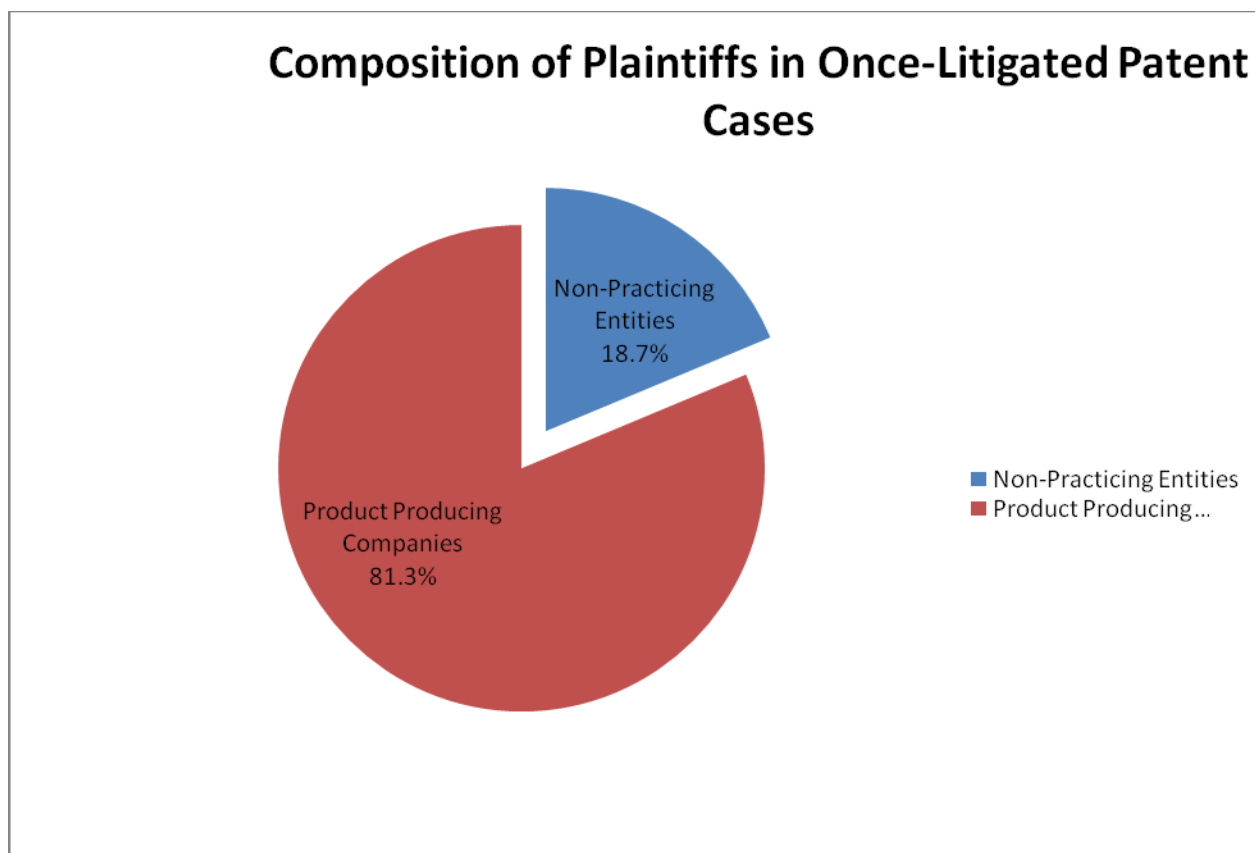
Composition of Plaintiffs in Most-Litigated Patent Cases

Product Producing Companies 16.8%

Non-Practicing Entities 83.2%

- Non-Practicing Entities
- Product Producing...
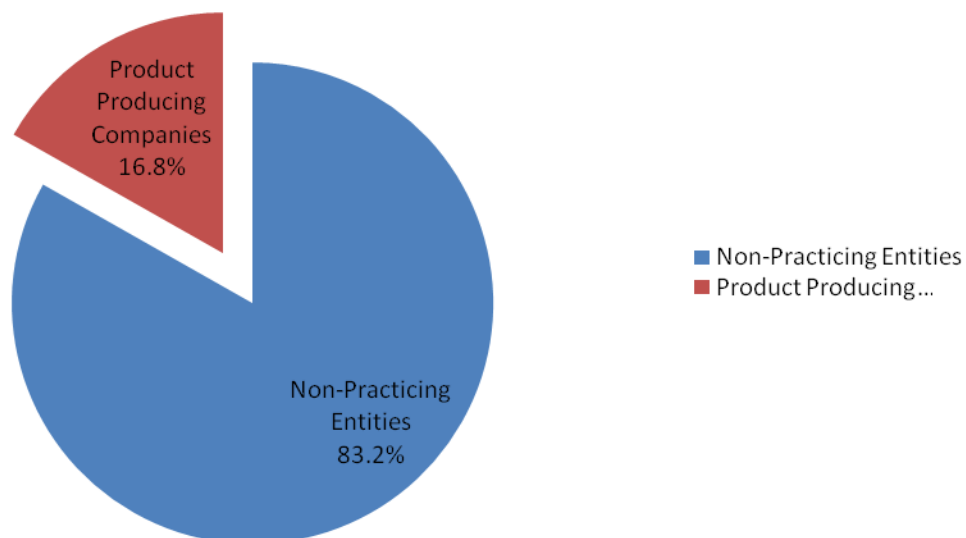
As for outcomes, the results are dramatic – no matter how the data are sliced, practicing entities are far more likely to win their cases than NPEs.[40] If we consider just patent owner wins and defendant wins on the merits, product owners win 52.9% of their cases across both the most-litigated and once-litigated data sets, while NPEs win only 5.9%. If we include default judgments, product-producing companies win 60% of their cases, while NPEs win only 7.2%.[41]

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[40] One scholar has found to the contrary, that NPEs are no more likely to lose their cases than other types of plaintiffs. *See* Sannu K. Shrestha, *Trolls or Market-Makers: An Empirical Analysis of Non-practicing entities*, 110 **Colum. L. Rev.** 114, 147-48 (2010). Shrestha also used data from the Stanford IP Litigation Clearinghouse. However, because Shrestha chose a non-random sample of NPE cases based on companies reported as NPEs, representing only a small fraction of NPEs, we think the most likely explanation for the difference in our outcomes is selection bias. It should not be surprising that companies known to the world as NPEs are known precisely because they fare better than average in litigation.

[41] Each of these results is highly significant (without default judgments, p=0.000; with default judgments, p=0.000).

Figure 6
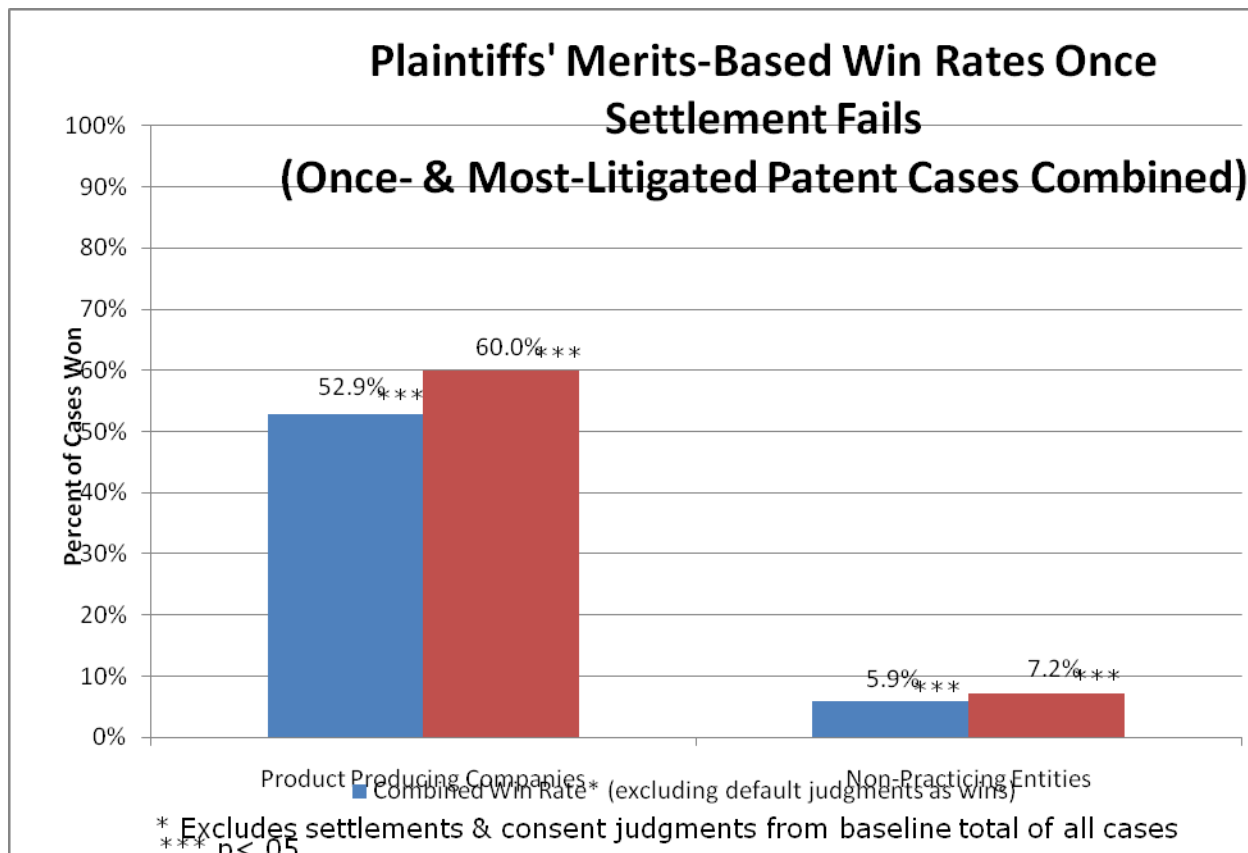
As with other data, including settlements in the denominator reduces the percentage of wins but does not change the relationship. Once settlements are included, product-producing companies win judgments in 4.5% of their suits, while NPEs win judgments in only 0.6% of their suits. Adding default judgments changes these numbers to 5.9% for product-producing companies and 0.7% for NPEs.[42]

Given this dramatic difference in win rates, it is quite striking that NPEs are no more likely to settle their lawsuits than product companies. Product companies settled 90.1% of

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[42]   Each of these results is highly significant (without default judgments, p=0.000; with default judgments, p=0.000).

their cases, while NPEs settled 89.7%.[43] Thus, it appears that NPEs are not as risk-averse as

they should be; they take cases to judgment rather than settle them even though they are very

unlikely to win those cases. This is particularly surprising given that NPEs are interested

primarily in money damages, not excluding a competitor, so they are less likely to have the sort

of asymmetric-stakes case that prior literature predicts might not settle.[44]

Figure 7

**Overall Propensity of Plaintiffs to Settle**
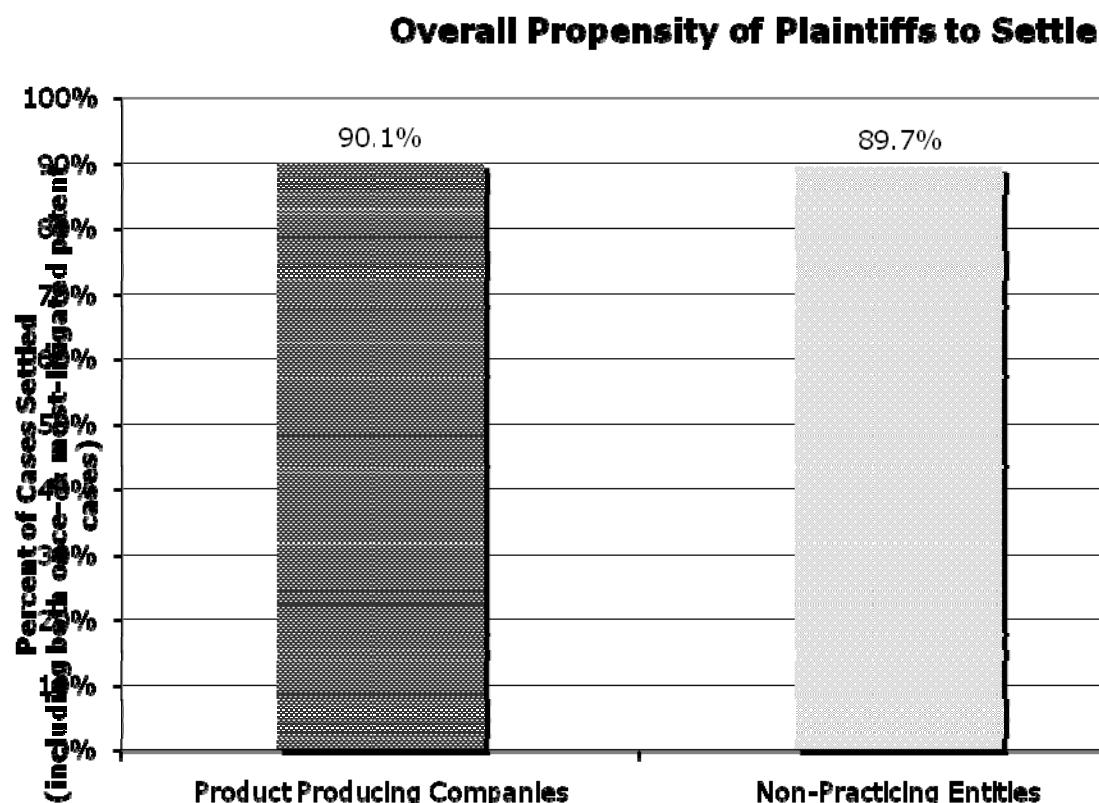
C. **Industry Differences**

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[43]   Not surprisingly, this difference is not statistically significant. p=0.503.
[44]   George L. Priest & Benjamin Klein, *The Selection of Disputes for Litigation*, 13 **J. Legal Stud.** 1 (1984).

We also divided the dataset by industry and technology. Because many industries had relatively few cases litigated to judgment, we chose to test the outcomes of software patents compared to non-software patents. The overrepresentation of software patents in the most-litigated set is quite remarkable. Software patents constituted 19.8% of the once-litigated patents but 93.7% of the most-litigated patents.[45]

Figure 8
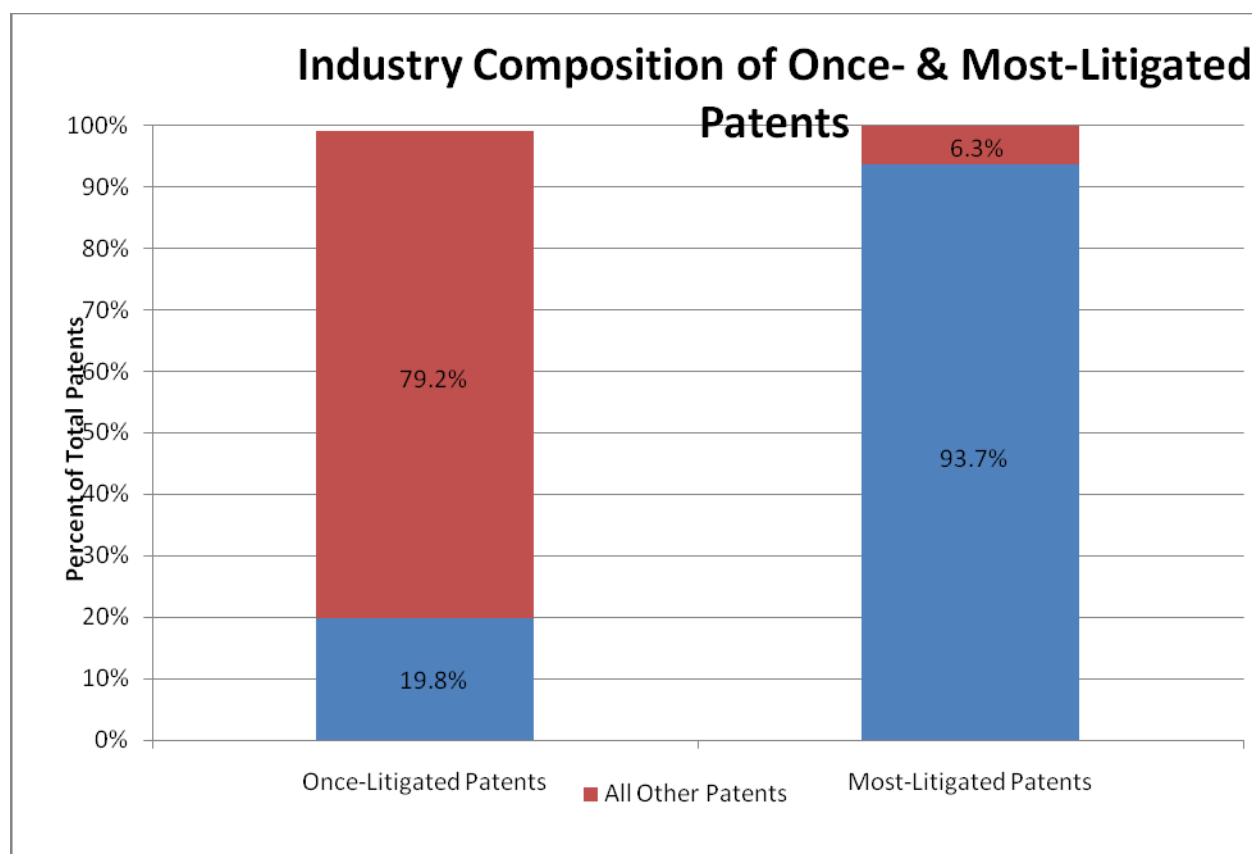
The outcomes here are equally dramatic. No matter how we test it, owners of non-software patents are far more likely to win their cases than are software patent owners. If we

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[45] The descriptive statistics reported in this section differ somewhat from those reported in our prior paper because for this paper we are considering only cases that went to settlement or judgment, and we consider the resolution of each patent a separate event.

consider just patent owner wins and defendant wins on the merits, non-software patent owners win 43.8% of their cases across both the most-litigated and once-litigated data sets, while software patentees win only 8.7%. If we include default judgments, non-software patent owners win 55.0% of their cases, while software patentees win only 8.7%.[46] As with other data, including settlements in the denominator reduces the percentage of wins but does not change the relationship. Once settlements are included, non-software patent companies win judgments in 5.9% of their suits, while software patentees win judgments in only 0.8% of their suits. Adding default judgments changes these numbers to 9.2% for non-software patent owners and 0.8% for software patentees.[47]

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[46] Each of these results is highly significant (without default judgments, p=0.002; with default judgments, p=0.000).

[47] Each of these results is highly significant (without default judgments, p=0.001; with default judgments, p=0.000).

Figure

9

Overall Win Rates
(Once- & Most-Litigated Patent Cases Combined)
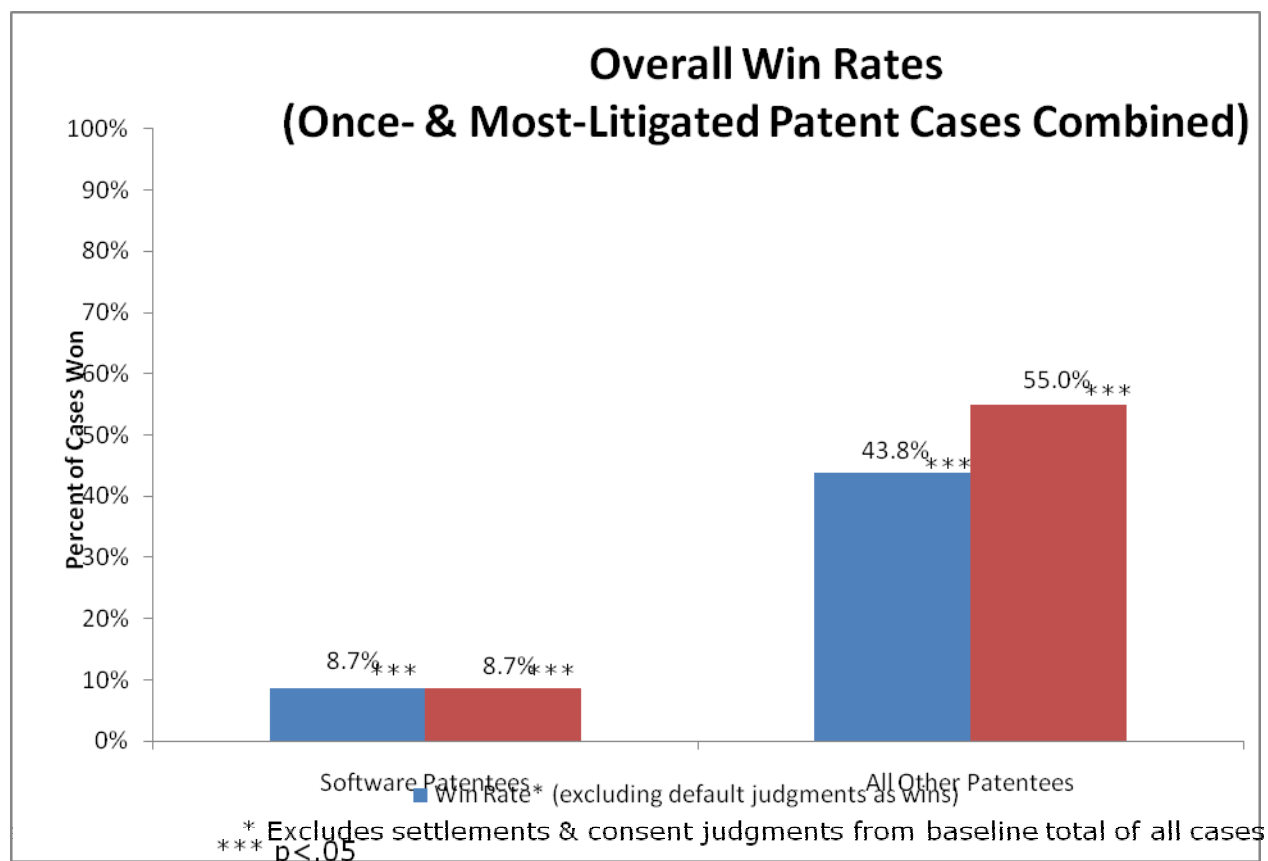
These results appear to be driven by differences in the most-litigated patent set. When we disaggregated the most-litigated and once-litigated data sets, the differences in all four tests remained highly statistically significant for the most-litigated set.[48] By contrast, there were no statistically significant differences in the once-litigated set, both because there were relatively

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[48] p=0.035 without settlements, and p=0.011 with settlements, whether or not default judgments were included.

few software patent cases decided in that set and because the win rates were much closer.[49]

In other words, repeat software patent litigants are particularly unlikely to win their cases.

Unlike NPEs, however, software patentees appear to recognize the risks they face, because they are more likely to settle than non-software patent owners. Software patent owners settle 90.9% of their cases across both data sets, compared with 83.2% of non-software patent owners.[50]

D. Logistic Regression

We also conducted a logistic regression in an effort to measure what influences outcomes. The logistic regression allows us to include other variables, including patent claims, prior art citations, forward citations, and family size, as well as industry and technology characteristics that were too small to test independently. There were too few patent owner wins in the overall data set to regress patentee wins against patent characteristics, but we were able to regress defendant wins against various patent characteristics. The model overall has a good fit, but only one patent characteristic is significant independent of all the other

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[49] p=.0778 without settlements or default judgments; p=0.604 with default judgments but not settlements; p=0.677 with settlements but without default judgments; p=0.432 with both settlements and default judgments.

[50] The difference is statistically significant (p=0.011). When we further disaggregate into the most-litigated and once-litigated sets, the same basic differences appear in both, but the results are not statistically significant (p=0.091 for the most-litigated set, p=0.443 in the once-litigated set).

variables.[51] The more adjusted forward citations a patent has – that is, the more other patents cite it – the more likely the plaintiff is to win.[52]

III. Explanations and Implications

What explains these surprising results? In this section, we explore some possible reasons the most litigated patents turn out to be weaker than other litigated patents, as well as some reasons the owners of those patents nonetheless seem willing to let the cases go to judgment.

A. Missing Data?

1. Number of Defendants

One possible explanation – the simplest – is that our original hypotheses are sound, but that we need additional data to evaluate them properly. For example, perhaps the settlement results are being driven by defendants rather than plaintiffs in the most-litigated cases. The most-litigated patents are generally asserted against multiple defendants in each suit; perhaps the presence of multiple defendants gives the patentee less control over settlement, since even one obstinate defendant who refuses to settle can force the case to judgment. On this theory, the more defendants in a case, the more likely it should be to go to judgment with respect to at least one of those defendants.

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[51] For the reasons we explained in our prior paper, logistic regression is unlikely to provide much differentiating information in a case like this, where the characteristics of the patents tend to be highly interrelated.

[52] p=0.004.

There are reasons to be skeptical of this "defendant control" theory. To begin, the economic literature suggests the opposite – that invalidation of a patent is a public good, because the defendant that takes a case all the way to judgment shoulders all the risk of losing the case, but must share the benefit of invalidating the patent with all its competitors.[53] Thus, if anything we should expect that defendants in multi-party patent cases should be more likely to settle out and leave their competitors holding the bag, particularly since while defendants can share information, they cannot act jointly in deciding to settle.[54] Similarly, because the patentee faces the risk of losing the patent if it doesn't settle, it is reasonable to expect that the patentee will often be willing to accept a lower payment in settlement from each individual defendant. This is particularly true if the defendant has discovered a strong argument against the patent, such as a killer piece of prior art. When that happens, it is in the interest of both the plaintiff and the defendant to give that particular defendant a confidential "sweetheart" deal that keeps the argument out of court and keeps the patent alive.[55] Indeed, there is no reason the patentee in such a case couldn't simply drop one determined defendant from the suit, before or after settling with others.

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[53] Joseph Farrell & Robert P. Merges, *Incentives to Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Patent Review Might Help*, 19 **Berkeley Tech. L.J.** 943 (2004).

[54] Jones Knitting Corp. v. Morgan, 361 F.2d 451 (3d Cir. 1966) (sharing settlement authority violates the antitrust laws).

[55] If prior settlement agreements have "most-favored nation" clauses, sweetheart deals may not be feasible. We have no way to assess how common those clauses are, though for the same reason patentees treat settlement agreements as confidential we would expect serial patent litigants to object to the inclusion of such clauses. Our anecdotal sense is that patent settlements are not uniform, but vary depending on the defendant.

We collected data on the number of defendants per suit in the most-litigated and once-litigated sets. We report the results in Tables __ and Figures __. Overall, both the once-litigated and the most-litigated sets showed a strongly skewed distribution, with the modal number of defendants in both sets being one and the median number of defendants 2. But the most-litigated patents had a much higher average number of defendants (5.2 versus 2.4), driven by a few outlier suits against as many as 69 different defendants.

Table 3
Descriptive statistics of Number of defendants for
Most litigated set

N	791
Mean	5.19
Median	2
Mode	1
Std. Deviation	7.962
Variance	63.397
Range	68
Minimum	1
Maximum	69

Histogram

Mean =5.19
Std. Dev. =7.962
N =791
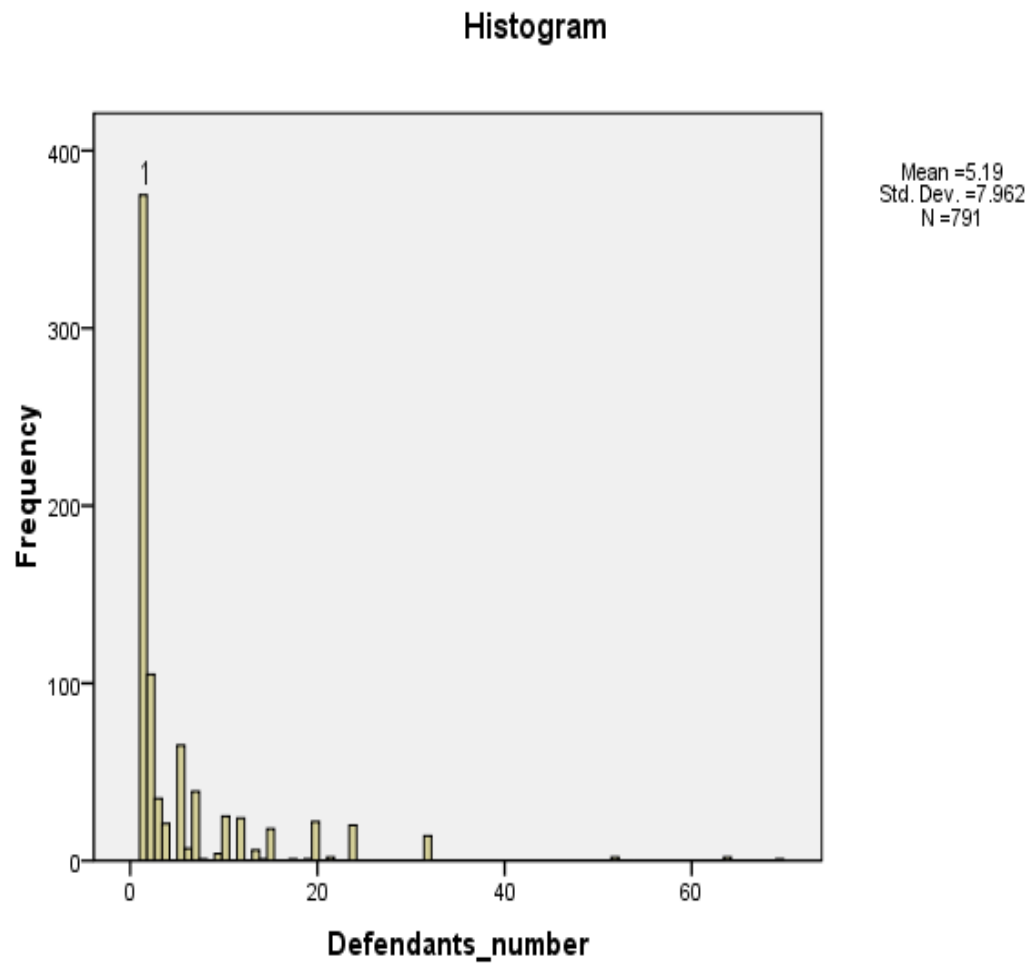
Table 4

**Descriptive statistics of No of defendants for
Once litigated set**

N	86
Mean	2.43
Median	2
Mode	1
Std. Deviation	1.773
Variance	3.142
Range	9
Minimum	1
Maximum	10

Histogram
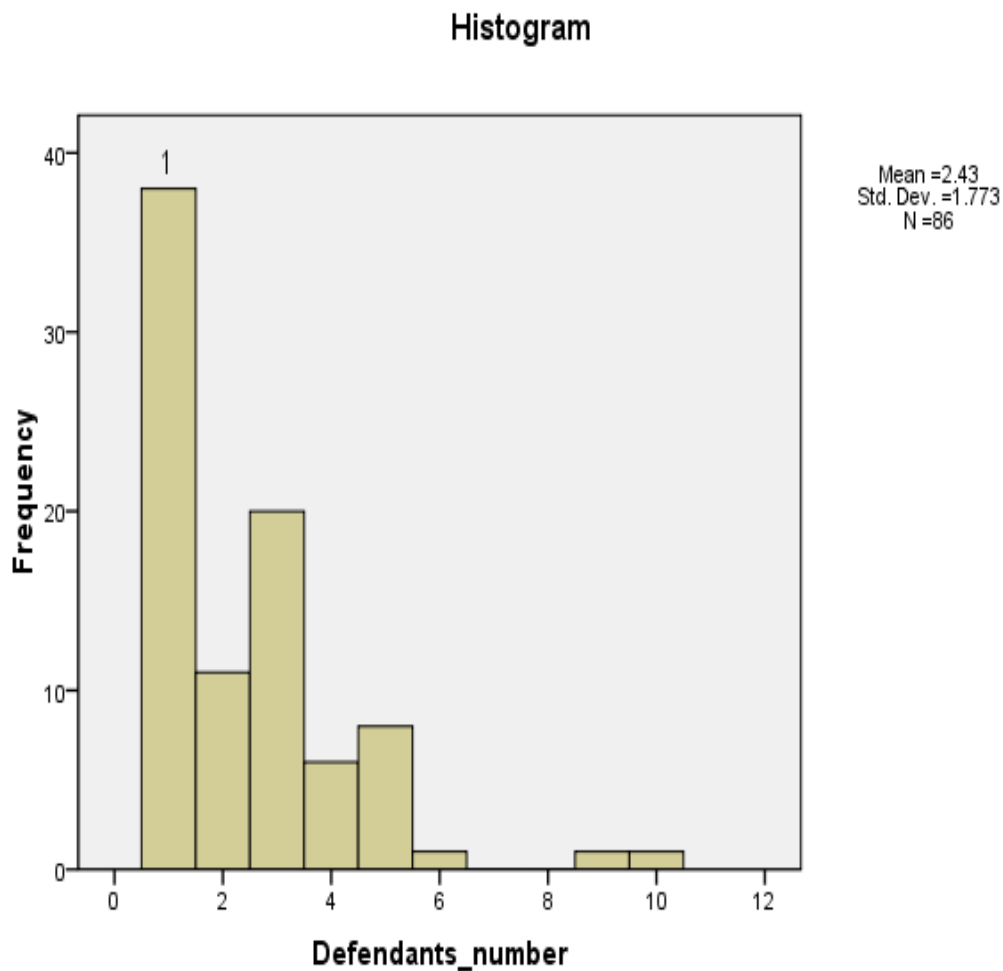
The IP Litigation Clearinghouse data allow us to test the effect of multiple defendants on the likelihood of settlement. The results are mixed. When we test the effect of multiple defendants on the likelihood of settlement separately in the most-litigated and once-litigated sets, we find no statistically significant effect. When we combine the two data sets, however, the result is statistically significant: cases with more defendants are less likely to settle. We report these results in Table 5.

Table 5: Combined Data Sets--Effect of Number of Defendants on Likelihood of Settlement

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1ª	Defendants_number	-0.042	0.011	14.973	1	0	0.959
	Constant	2.407	0.135	317.301	1	0	11.103

This data could be consistent with the multiple-defendants explanation, since the most-litigated cases have on average more defendants per case than the once-litigated patents. But the results are statistically significant only when we combine the data sets, meaning that we cannot draw that conclusion as a matter of statistics.[56]

Even if it is true that the larger number of defendants causes cases to be less likely to settle, we are still left with a puzzle. For we also find that the more defendants are named, the more likely the defendants are to win the case. We present those results in Table 6.

Table 6: Combined Data Sets--Effect of Number of Defendants on Likelihood of Defendant Win

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1ª	Defendants_number	0.049	0.011	18.419	1	0	1.05
	Constant	-2.721	0.152	321.135	1	0	0.066

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[56] This is likely a function of the size of our data set, though we cannot prove that.

Thus, a plausible explanation for at least some of the results is that when a patentee sues multiple defendants, the patentee loses control over the case, being forced to trial or judgment even in cases it would prefer to settle, and which it is more likely to lose.

But this just pushes the puzzle back a level. If patentees lose control over their cases when they sue multiple defendants, why do they choose to sue multiple defendants in the same suit? One explanation may be cost. Litigation is expensive, and the plaintiff may minimize its costs by filing multiple lawsuits. Having made this choice, plaintiffs could still choose to drop their cases against particular defendants, or settle those cases for a nominal sum, rather than go to judgment and risk their invalidation. And according to the data, that is precisely what they should do. But they don't seem to.

2. License Agreements and Risk Aversion

Key to our hypothesis of risk aversion among repeat patent litigants is the assumption that the number of different lawsuits is evidence of how much the patentee has to lose if the patent is invalidated or construed narrowly. This assumption strikes us as a reasonable first-order approximation, because we can identify concrete things the plaintiff has to lose if the patent is invalidated. But there may be other evidence we cannot see that changes the risk aversion calculus. Most notably, if a patentee in the once-litigated patent set has an established set of license agreements with an ongoing royalty, and has happened to sue the only user who did not take a license, that patentee has an unobservable but quite significant stake in not having the patent invalidated that may make it risk averse. Similarly, we don't

know whether serial patent litigants have an established licensing practice outside of the lawsuits.

To affect our findings, though, it must be true not only that some once-litigated patents have hidden licenses and therefore unseen risk aversion, but that once-litigated patents are systematically more likely than the most-litigated patents to have such licenses. We can think of no way to test this with available information; licensing agreements outside of litigation are almost always confidential.[57] But one plausible reason it might be true comes from the very fact of observed litigation behavior. While the difference between filing one suit and multiple suits may reflect the value of the patent, the necessity of using the patent, or the number of competitors, it might also reflect the willingness of companies to license the patent from the plaintiff. If two companies, each with twenty infringers, send license demands to all twenty companies, the company that gets paid without litigation will file relatively few lawsuits, while the company whose license efforts are rebuffed will have to file more lawsuits if it hopes to collect revenue.[58]

A second possible explanation has to do with the dependence of risk aversion on the structure of the licenses entered into. If the parties enter into a royalty-bearing license, the obligation of the licensee to pay royalties ends when the patent is held invalid.[59] By contrast, if a company pays a lump sum to license a patent, it is far from clear that it can get that money

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[57] For an argument that they shouldn't be, see Mark A. Lemley & Nathan Myhrvold, *How to Make a Patent Market*, 36 **Hofstra L. Rev.** 257 (2008).

[58] Strictly speaking, that defendant will merely have to sue more defendants; it could sue them all in the same case. But our data suggest that those who sue multiple defendants also tend to file multiple lawsuits. The plaintiffs who filed the most lawsuits also sued more defendants per case on average – 5.2 defendants compared with 2.4 in the once-litigated set.

[59] Lear, Inc. v. Adkins, 395 U.S. 653 (1969).

back merely because the patent is later held invalid.[60] And while the confidentiality of the data prevents a rigorous analysis, our experience has been that settlements of patent lawsuits more commonly involve lump sum rather than ongoing royalty payments. So a serial patent plaintiff that has settled a number of its cases may feel more comfortable litigating the rest, since it probably won't be forced to give the money back even if it loses.

We emphasize that we can't test any of this empirically. It is all speculation. But it does serve to point out that the relationship between patterns of litigation and risk aversion is more complex than we might at first assume.

B. Weak Litigated Patents?

More surprising to us is the finding that the most litigated patents that do make it to judgment fare so poorly. Are there structural reasons to think the most litigated patents are likely to be weaker, and therefore most likely to be rejected? And if so, what does this say about the evidence economists use to assess the value of patents?

1. Multiple Lawsuits As Evidence of Obviousness?

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[60] *See, e.g.,* MedImmune Inc. v. Genentech Inc., 535 F. Supp. 2d 1000 (C.D. Cal. 2008) (noting but not resolving the issue); Studiengesellschaft Kohle v. Shell Oil, 112 F.3d 1561 (Fed. Cir. 1997) (pre-*MedImmune*, concluding that a licensee could not recover royalties paid before a patent challenge). As a result, lawyers and scholars have argued that patent owners should license for lump sums rather than ongoing royalties whenever possible. Michael Risch, *Patent Challenges and Royalty Inflation,* 85 **Ind. L.J.** __ (forthcoming 2010).

The most litigated patents are enforced against a wide array of companies – an average of 5.2 defendants per *suit* per patent, with some patents involved in as many as 97 different suits. While in theory that could result from a pattern of widespread copying of a particular technology, in fact, other work suggests that patent plaintiffs are overwhelmingly suing independent developers, not those they accuse of copying their ideas.[61] Thus, one reasonable inference from the filing of multiple lawsuits against multiple defendants is that the technology in question is one that was widely adopted by an industry as a result of widespread, near-simultaneous invention.

Simultaneous invention is sometimes used as evidence an invention is obvious.[62] After all, if most of the companies interested in a particular field independently develop the same technology at about the same, that's pretty good evidence that the technology was in fact within the capability of one of ordinary skill in the art.   So one hypothesis is that the very fact a patent is enforced against an entire industry is evidence of simultaneous invention, and therefore that the patent is invalid as obvious.

We don't believe this can explain our results, however. First, we discovered in our prior paper that the most-litigated patents result from long chains of continuation applications –

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[61] Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 **N.C. L. Rev.** 1421 (2009). This is particularly true in the information technology industries in which the vast majority of the most-litigated patents exist.

[62] Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1380 n.4 (Fed. Cir. 1986) (noting the use of this factor, but not applying it in the case at hand). For discussion of secondary considerations of nonobviousness, see Robert P. Merges, *Economic Perspectives on Innovation: Patent Standards and Commercial Success*, 76 **Cal. L. Rev.** 803 (1988); Rochelle Dreyfuss, *The Federal Circuit: A Case Study in Specialized Courts*, 64 **N.Y.U. L. Rev.** 1 (1989).

more than four applications on average[63] – and therefore were based on applications filed well

before the lawsuits.[64] As a result, the patents in our study were more likely than average to

have been invented well before the rest of the industry adopted the technology. Second, and

more important, the patentee losses in the most-litigated patents data set were

overwhelmingly not based on findings of obviousness. They are split between findings of

invalidity, noninfringement, and unenforceability; those based on invalidity are more likely to

be findings of on-sale bar or written description than findings of obviousness. While there are

more findings of invalidity than noninfringement (60 of the 84 cases in the most-litigated set

involved findings of invalidity; 44 involved findings of noninfringement, and 3 involved findings

of unenforceability),[65] the most common grounds for invalidation of the most-litigated patents

were written description, anticipation, and on sale bar.

2. Overclaiming?

The fact that serial patent litigants have sued so many defendants might suggest that

they are overclaiming. Perhaps what distinguishes these cases from the once-litigated cases is

that the patentees have either obtained a patent that is too broad or that they are over-reading

the claims they received. If so, the patent in question would be more likely to be found either

invalid (in the first case) or not infringed (in the second). The fact that the patentees in this

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[63] Allison, Lemley & Walker, *supra* note __, at __.

[64] *Cf.* John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 **AIPLA Q.J.** 185, __ (1998) (finding that even the average litigated patent spent 12.3 years from filing of the application to resolution of the case).

[65] These numbers add up to more than 84 cases because in many cases the court ruled on more than one ground.

data set filed so many continuation applications may also support the overclaiming hypothesis, because one use of continuation applications is to change patent claims over time to cover technologies developed after the original application was filed.[66] Doing so doesn't necessarily violate the patent laws, but it is far more likely to involve overclaiming, since the patentee is attempting to extend the claims to something she did not have in mind when she filed her original patent application.

It is hard to know whether the patentees in these cases are more likely than others to involve overclaiming, though the explanation is plausible. To measure overclaiming, we would need to know what the "right" scope of the patent was in a Platonic sense, as well as whether the court was right to find the patent invalid or not infringed.[67]

3. Bad Software Patents? Bad Trolls?

One of the most striking findings is the weakness of software and NPE-owned patents in the overall dataset. Given the enormous percentage of the cases we review that involve software patents, especially in the most-litigated set, it seems likely that software patents are dragging down the averages. After all, 758 of the 877 patents we evaluate, or 86.4%, involve

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[66] *See, e.g.,* Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 **B.U. L. Rev.** 63 (2004).

[67] We cannot distinguish overclaiming from other explanations based on the reason the patent was rejected, because an overbroad claim may be invalid either under section 112 for lack of description or enablement or under sections 102 and 103 because it is written so broadly as to encompass the prior art.

software. There have been numerous complaints about the quality of software patents;[68] our

data may give some empirical support to those assertions. If we consider just patent owner

wins and defendant wins on the merits, non-software patent owners win 43.8% of their cases

across both the most-litigated and once-litigated data sets, while software patentees win only

8.7%. If we include default judgments, non-software patent owners win 55.0% of their cases,

while software patentees win only 8.7%.[69]

Something similar can be said about suits brought by NPEs. NPE suits, like software

suits, are a large percentage of the most-litigated cases; they represent 675 of the 877 cases in

our combined data set, or 77.0%. If we consider just patent owner wins and defendant wins on

the merits, product owners win 52.9% of their cases across both the most-litigated and once-

litigated data sets, while NPEs win only 5.9%. If we include default judgments, product-

producing companies win 60% of their cases, while NPEs win only 7.2%.[70]

The authors have elsewhere expressed skepticism over efforts to eliminate particular

types of patents,[71] and one has argued that we shouldn't single out patent trolls for special

treatment.[72] But it is important to recognize that software patents are both taking

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[68] *See, e.g.,* Peter S. Menell, *A Method for Reforming the Patent System*, 13 **Mich. Telecomm. & Tech. L. Rev.** 487 (2007); Pamela Samuelson et al., *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 **Colum. L. Rev.** 2308 (1994).

[69] Each of these results is highly significant (without default judgments, p=0.002; with default judgments, p=0.000).

[70] Each of these results is highly significant (without default judgments, p=0.000; with default judgments, p=0.000).

[71] *See, e.g.,* John R. Allison & Ronald J. Mann, *The Disputed Quality of Software Patents*, 85 **Wash. U. L.Q.** 297 (2007); John R. Allison & Starling D. Hunter, *On the Feasibility of Improving Patent Quality One Technology at a Time: The Case of Business Methods*, 21 **Berkeley Tech. L.J.** 729 (2006).

[72] Mark A. Lemley, *Are Universities Patent Trolls?*, 18 **Fordham Intell. Prop., Media & Ent. L.J.** 611, 630 (2008).

disproportionate resources in patent litigation and that the social benefit from those cases

appears to be slight.

It is less clear what implications we should draw from this fact. Perhaps judges (and

juries, though most of the outcomes were the result of judicial decisions) simply don't like

either NPEs or software patents. After all, both have been subject to substantial criticism by

both legal scholars and the popular press.[73] There is no way to tell whether the rejection of

particular NPE and software patents is right or wrong without having some Platonic insight into

the "true" validity and scope of each patent. But even if we think that courts are wrong to

invalidate these patents or limit their scope, the fact is that they are doing so. Society is

spending a large chunk of its resources devoted to patent law dealing with what are – for

whatever reason – the weakest cases. And the patent plaintiffs are pursuing those cases

despite the overwhelming odds against them.

What might this mean for patent reform? On the one hand, it should give substantial

ammunition to those who argue against software patents and who want to restrain patent

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[73] On patent trolls, see, e.g., See, e.g., Robin M. Davis, Note, *Failed Attempts to Dwarf the Patent Trolls: Permanent Injunctions in Patent Infringement Cases Under the Proposed Patent Reform Act of 2005 and eBay v. MercExchange*, 17 **Cornell J.L. & Pub. Pol'y** 431, 438 (2008) ("Most patent trolling behavior thrives on the inequities of enforcing patent rights without contributing anything to either the invention or production of new technologies."); Jason Kirby, Patent Troll or Producer?, Fin. Post, Jan. 14, 2006, available at http:// www.financialpost.com/story.html?id=1509d361-0144-4432-b6dc-2c14026c98d6 ("Companies who do the costly grunt work of actually developing and marketing new technologies are being held ransom by tiny outfits whose only assets are 'kooky and vague' patents...."); Joe Beyers, Rise of the Patent Trolls, CNET News.com, Oct. 12, 2005, at http:// news.cnet.com/Rise-of-the-patent-trolls/2010-1071_3-5892996.html.
On software patents, see James Bessen & Michael Meurer, **Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk** 194-98 (2008); Jacqueline Lipton, IP's Problem Child: Shifting the Paradigms for Software Protection, 58 Hastings L.J. 205, 208 (2006). *Cf.* 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, 73 (Robert W. Hahn ed., 2005) (evaluating claims that software patents are bad for innovation).

trolls. If software and NPE patents are overwhelmingly bad – either invalid or overclaimed –

the social benefit of allowing them may well be outweighed by the harm they cause. At the

same time, however, one could read this evidence as proof that the system is working – that

the bad patents are being weeded out of the system and are not stifling innovation.

The truth probably lies somewhere in between. The latter claim – that the widespread

invalidation of software and NPE-owned patents shows that the system is working – seems

altogether too facile. After all, roughly 90% of those cases settled without judgment. While

those settlements are confidential, we expect that the vast majority involved some sort of

payment to the patent plaintiff – a payment that the outcomes data suggests might represent

not the acquisition of real legal rights but a nuisance settlement over a likely-invalid patent. At

the same time, the fact that these patents are so weak should – at least once exposed – limit

the value of those settlements, and quiet concerns that software or troll patentees will actually

shut down very many innovative products.

C. Outliers

Finally, it is worth noting that by definition, our study is a study of outliers. Ronald Katz

is obviously an outlier, having filed a sizeable percentage of the patent lawsuits in the last

decade, against hundreds of defendants. But in some sense, anyone in the most-litigated

patent set is an outlier simply by virtue of being willing to sue multiple times in different courts

over the same patent. It may be that outliers behave differently than others, and that they are

either irrational or simply have motivations that are not shared by the majority of patent

owners. That is a possible explanation both for their unwillingness to settle and perhaps for

their willingness to pursue losing cases to judgment. And it may be particularly true of the NPEs

that dominate the most-litigated data set, since their motivations are likely to differ

systematically from those of product companies.

We think there is something to this explanation, though we cannot test it. But the fact

that the most litigated patents are outliers doesn't mean that they are irrelevant. They

represent a substantial percentage of patent litigation, and – precisely because they appear

willing to take to trial weak cases others might settle – they may have an even larger influence

on the law.

D. Do We Understand Patent Value?

Whatever the explanation for the poor performance of the most-litigated patents, the

fact of that poor performance calls into question the evidence economists have long relied

upon to demonstrate patent value. The connection between patent claims, forward citations,

backward citations, and application family size and the value of patents is well-established in

the economic literature, and forms the basis for a great deal of economic analysis not only of

patents but of innovation and growth more generally.[74] Allison and Mann have found software

patents to be of above-average quality by traditional economic measures.[75] Allison et al found

in 2004 a very strong connection between these measures of patent value and whether patents

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[74] *See supra* note __ (citing this literature).

[75] John R. Allison & Ronald J. Mann, *The Disputed Quality of Software Patents*, 85 **Wash. U. L. Rev.** 297 (2007).

were litigated.[76] And in our previous work, we found that that connection was even stronger

for the most-litigated patents.[77] Shrestha found that NPE patents had characteristics that

indicated that they were more valuable than other patents.[78] And while we have always

emphasized that it is private, not social, value that is measured by these statistics, that value

should be reflected at the end of the day in litigation outcomes. The fact that it isn't – that the

very patents that by every measure are the most valuable ones turn out to be much weaker

than other litigated patents – should give economists and other social scientists significant

pause in using those measures of value for other purposes as well.   Perhaps there is a

definition of value that is independent of whether or not the patent is in fact valid and what it

covers, but once we understand that the existing measures of value don't correspond to "good"

patents, we suspect that definition will have to be very specialized. And in any event, the

voluminous literature that measures the value of patents based on these characteristics, and

the value of innovation based on the number of patents that have those characteristics, stands

on rather shakier ground than previously thought.

IV. Conclusion

We designed this study to explore the effects of repeat play on litigation behavior,

contributing to a literature on the economics of civil procedure as well as the substance of

patent law. But what we found was dramatic and unexpected: The patents and patentees that

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[76]   Allison et al., *supra* note __, at __.
[77]   Allison, Lemley, & Walker, *supra* note __, at __.
[78]   Shrestha, *supra* note __, at 145-46.

occupy the most time and attention in court and in public policy debates – the very patents that

economists consider the most valuable – are astonishingly weak. NPEs and software patentees

almost never win their cases. That may be a good thing, if you believe that most software

patents are bad or that NPEs are bad for society. But it certainly means that the patent system

is wasting more of its time than expected dealing with weak patents.