

# AN EMPIRICAL ANALYSIS OF INTELLECTUAL PROPERTY LITIGATION: SOME PRELIMINARY RESULTS

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I received very helpful comments from Professor Mark Lemley and other participants in the 2004 IPIL/Houston Santa Fe Conference: *Trademark in Transition*, sponsored by the University of Houston Law Center's Institute for Intellectual Property & Information Law in June 2004. I would like to thank Liss Palamkunnel and Meghan Maloney for valuable research assistance and the Olin and Bradley Foundations for their generous support of the law and economics program at the University of Chicago Law School.

## I. INTRODUCTION

This paper applies economic analysis to two puzzling features of intellectual property litigation over the past twenty-five years or so. One is that there has been little increase in intellectual property litigation while, at the same time, there has been rapid growth in both the output and legal protection of intellectual property.<sup>1</sup> The other is that the percentage of intellectual property cases terminated by trial has fallen sharply from approximately 3.5% to 1.5% during the 1978 to 2000 period.<sup>2</sup> These observations are mirrored in the overall trends in all civil litigation in the federal courts—terminations have been relatively flat and trials have declined sharply.<sup>3</sup> This suggests that there are factors common to both intellectual property and civil litigation, taken as a whole, which are likely to be important determinants of intellectual property litigation.

The empirical features of the litigation process itself that may bear on the observed changes in intellectual property litigation are also explored in this paper. These include looking at trademark, copyright, and patent litigation separately and considering factors such as court delay or the time from filing to terminating a case, the proportion of trials won by plaintiffs (i.e., the win rate), the number of jury and judge trials, and the respective win rates.

This paper is organized as follows: Part I reviews the standard economic model of litigation and extends the model to intellectual property litigation. Not surprisingly, the economic model predicts that the important determinants of civil litigation are legal uncertainty, the cost of litigation (including time costs), the expected judgment from trial, the impact of litigation on the firm's future profits, and the possibility that the intellectual property in question will be held invalid. Part II applies the economic model to data on trademark, copyright, and patent litigation in the time period from 1978 to 2000. Finally, Part III summarizes the main findings of the paper.

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1. See WILLIAM M. LANDES & RICHARD A. POSNER, *THE POLITICAL ECONOMY OF INTELLECTUAL PROPERTY LAW* 4 (2004) (observing empirical evidence on both the increase in output and legal protection of intellectual property), available at <http://aei-brookings.org/admin/authorpdfs/page.php?id=985>.

2. Refer to Figure 2 *infra*.

3. In future work, Richard Posner and I plan to analyze the trends in federal litigation over the past twenty-five years.

## II. THE ECONOMIC MODEL OF LITIGATION

A. *The Basic Model*

The standard model of civil litigation assumes that the parties involved in litigation are rational maximizers. Thus, a plaintiff or defendant will settle or go to trial depending on the alternative that yields him the highest expected utility.<sup>4</sup> To simplify the analysis, assume further that the parties are risk neutral; that they agree on the judgment  $J$  if the plaintiff wins at trial; that each party's litigation costs are fixed; each party bears its own litigation costs (i.e., the American Rule prevails); and that (unrealistically) settlement and nontrial costs are zero.<sup>5</sup> Let the plaintiff  $A$ 's expected value of litigation,  $V_A$ , equal

$$V_A = p_A J - a \quad (1)$$

where  $p_A$  is  $A$ 's estimate of the probability of winning at trial and  $a$  his costs of pursuing his claim through trial.  $A$  will file a lawsuit against the defendant  $B$  only if  $V_A \geq 0$  or, in other words, if the expected value of litigation is positive.<sup>6</sup> Observe that

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4. See William M. Landes, *An Economic Analysis of the Courts*, 14 J.L. & ECON. 61, 66 (1971); John P. Gould, *The Economics of Legal Conflicts*, 2 J. LEGAL STUD. 279 (1973); Richard A. Posner, *An Economic Approach to Legal Procedure and Judicial Administration*, 2 J. LEGAL STUD. 399, 417–18 (1973). For a simple exposition of the model (which is sometimes called the mutual optimism or divergent expectation model) and a discussion of the literature, see chapters nineteen and twenty-one of RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* (6th ed. 2004) [hereinafter POSNER, *ECONOMIC ANALYSIS*]. Although mutual optimism is the best known and most widely used explanation for why parties go to trial rather than settle, it is not the only explanation. The other well-known model stresses the role of asymmetric private information in generating disputes that result in trials.

5. These assumptions are not essential to the main results of the litigation model. For example, the parties can have different estimates of the judgment or can influence the probability of winning by varying litigation expenditures without altering the predictions of the model.

6. If  $V_A$  were negative,  $A$  would be better off doing nothing rather than filing a lawsuit against  $B$ . There is, however, a significant amount of literature that tries to explain the conditions that could lead a rational plaintiff to file a negative expected value or frivolous lawsuit. Because a rational plaintiff would not pursue his claim through trial, a negative expected value lawsuit would only be brought for its settlement value. Rosenberg and Shavell show that this would occur if it is relatively cheap for the plaintiff to file a claim compared to the cost to the defendant of responding to the suit. See David Rosenberg & Steven Shavell, *A Model in Which Suits Are Brought for Their Nuisance Value*, 5 INT'L REV. L. & ECON. 3, 4–5 (1985). Then  $A$  would file a suit knowing that  $B$  would be willing to pay  $A$  an amount up to  $B$ 's response costs (which is assumed to be greater than  $A$ 's filing costs) to induce  $A$  to drop its suit. *Id.*

$V_A$  also represents  $A$ 's minimum demand to settle before trial.<sup>7</sup> For example, suppose  $P_A = 0.8$ ,  $J = \$100$ , and  $a = \$10$ .  $A$ 's minimum settlement demand is \$70 because a sum of \$70 plus one penny makes  $A$  better off compared to the expected value of a trial.

Let  $V_B$  denote defendant  $B$ 's expected loss from  $A$ 's lawsuit as in

$$V_B = p_B J + b \quad (2)$$

where  $p_B$  equals  $B$ 's estimate of the probability that  $A$  will prevail in a trial and  $b$  equals  $B$ 's litigation costs if the case is tried.  $V_B$  also represents  $B$ 's maximum offer to settle out of court. If  $B$  can settle for a penny less than  $V_B$ , he expects to be better off settling than going to trial. The parties will settle before trial if  $V_B \geq V_A$ , because both  $A$  and  $B$  can be better off (in an expected sense) settling than going to trial. Alternatively, if  $V_B < V_A$ , a trial will take place.

Rewriting equations (1) and (2) leads the parties to settle before trial if

$$a + b \geq (p_A - p_B)J \quad (3a)$$

or go to trial if

$$a + b < (p_A - p_B)J. \quad (3b)$$

Thus, the necessary but not sufficient conditions for a trial is that  $p_A > p_B$  or that the parties are mutually optimistic about their chances of prevailing at trial. The sufficient conditions for a settlement are that  $p_A \leq p_B$  or that the parties are mutually pessimistic or in agreement on  $A$ 's probability of success at trial (for then equation (3b) must hold because the right hand side is negative or zero and litigation costs are positive). In short, if  $p_A - p_B \leq 0$ , both parties can be made better off by settling

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7. The simple model does not distinguish between settling at different points before or even during trial, nor does it distinguish between different trial outcomes (e.g., summary judgment or a jury verdict in favor of the plaintiff). For simplicity, therefore, there are two methods of disposition: pretrial settlements and trials.

8. If settlement costs are positive,  $a$  and  $b$  would be redefined as the incremental costs (assumed positive) of going to trial compared to settling increased.

rather than going to trial, independent of the stakes, litigation costs, or estimates of the probability of  $A$  winning at trial.

### *B. Trial vs. Settlement*

The litigation model has a number of testable implications. Consider the following:

1. The greater the degree of uncertainty about legal precedents and the outcome of a trial, the more occasions there will be for  $p_A > p_B$  and the greater the number of trials that will take place relative to settlements. Alternatively, if the legal rules are clear and the parties agree on the relevant precedents and facts,  $p_A$  and  $p_B$  are not likely to differ significantly, so a settlement will result. Although no direct data on legal uncertainty exists, the passage of new laws and amendments to existing laws—particularly if they create new or expanded rights as opposed to clarifying existing laws and regulations—are likely to be associated with greater legal activity.

In the area of intellectual property, for example, we expect that statutory activity will increase the number of lawsuits because the statutes will cover a greater range of subject matter and activities. Less obviously, trials should comprise an increasing proportion of terminations because greater legal uncertainty, until a sufficient body of precedents interpreting the new statutes is established, increases the relative number of disputes in which the degree of mutual optimism,  $(p_A - p_B)J$ , is greater than the costs of going to trial.

2. An expansion in the level of economic activity associated with the creation of new intellectual property is likely to increase the number of potential disputes that have a positive expected value (see equation (1)) and hence the number of lawsuits and trials.

3. Litigation costs and the stakes  $J$  also play a role in the settlement or trial decision. The greater the litigation costs—more correctly, the greater the incremental costs of going to trial compared to settling—the more likely equation (3a) will hold and the more likely the parties will settle rather than go to trial. It also follows that if the parties are mutually optimistic ( $p_A > p_B$ ), which is a necessary condition for a trial, as  $J$  increases—provided litigation costs don't increase as rapidly—the parties become more likely to go to trial rather than settle. This occurs because for a given positive value of  $p_A - p_B$ , the greater  $J$  is, the greater the right-hand side of equations (3a) and (3b) and the greater the chance the right-hand side will exceed the costs of litigation. Note that if the parties have identical expectations or

are mutually pessimistic, a settlement will always occur, regardless of the stakes or litigation costs.<sup>9</sup> This implies that (all other factors constant) an increase in the size of damages and the value of injunctive remedies in intellectual property litigation raises the incentive to file lawsuits and creates a greater percentage of terminations that are resolved by trial.

4. An increase in the waiting time between filing and trial will lower the value of  $J$  in equation (1) by pushing recovery further into the future and will increase  $A$ 's costs of going to trial ( $a$  in equation (1)) because the plaintiff will incur legal and other types of expenditures to keep the case on the docket for a longer period of time. In short, delay reduces  $V_A$ , which reduces both the number of lawsuits filed because a larger fraction of potential claims will have a negative expected value, and the plaintiff's minimum settlement amount. On the other hand,  $B$  may benefit from delay because it pushes any judgment  $B$  must pay further into the future, which in turn lowers  $B$ 's maximum settlement offer  $V_B$ . It would appear, therefore, that the net effect of delay on the likelihood of a settlement is unclear.

There is, however, another consideration that suggests that delay also imposes costs on the defendant. For example,  $B$  may find it more difficult to exploit the intellectual property to which he claims rights, or  $B$  may have more difficulty raising money in the capital market until the case is resolved. On net, therefore, an increase in delay between filing and the completion of a trial should reduce the proportion of trials.

### C. Trial by Judge or by Jury

Because either party can opt for a jury trial, it follows that a judge or bench trial will take place only if both parties prefer it to a jury trial. Suppose both parties expect the likelihood of the plaintiff prevailing at trial to be the same whether it is a judge or jury trial. Although each party will choose a judge trial about 50% of the time, there is only a 25% chance that both parties will simultaneously select a judge trial.<sup>10</sup> We should observe,

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9. The analysis is easily modified to allow for risk aversion or risk preference. Risk aversion means  $A$  prefers to settle for a value less than  $V_A$  (how much less depends on  $A$ 's dislike for risk), and  $B$  is willing to pay more than  $V_B$  to avoid the risk of litigation. This widens the settlement range and, all other factors constant, risk makes a settlement more likely. Alternatively, risk preference narrows the settlement range and makes a settlement less likely.

10. The plaintiff and defendant can choose between a Judge ( $J$ ) or Jury ( $Y$ ) trial. In probability terms, four distinct outcomes can result:  $JJ$ ,  $YY$ ,  $JY$ , and  $YJ$ . Thus, the probability of event  $JJ$  occurring is 1 out of 4 distinct outcomes, or 25%. See Arnold Kling, *AP Statistics Lectures*, at <http://www.arnoldkling.com/apstats/rules.html> (last visited

therefore, about three times as many jury rather than judge trials—jury trials will be about 75% of total trials—unless the cost of jury trials is significantly greater than judge trials.<sup>11</sup> Now imagine that one party believes he will do better before a jury than judge. For example, suppose plaintiffs believe they have a higher probability of prevailing in front of juries. In those cases, plaintiffs will always prefer jury trials, and we would not observe any bench trials. Alternatively, if defendants believe they will do better in front of juries than judges, defendants will always opt for juries. In a sample of trials, therefore, we will only observe judge trials if both parties simultaneously believe they have a higher probability of winning before a judge than a jury. Stated differently, *A* and *B* will choose a judge trial only if  $p_A$  in equation (1) is greater before a judge than a jury and  $p_B$  in equation (2) is greater before a jury than a judge; that is, the plaintiff believes he will do better in front of a judge rather than a jury and the defendant believes the opposite.

Notice that the model does not predict whether plaintiffs will win a greater or smaller fraction of cases in front of juries than judges. To explain, assume for simplicity that plaintiffs win 50% of their jury trials. These are trials in which the plaintiff, the defendant, or both prefer a jury to a judge trial. At the same time, suppose there is another group of trials in which both parties prefer a judge. In these trials, assume that plaintiffs believe their chances of winning are 0.8 before a judge and 0.6 before a jury, and defendants believe the opposite—that the plaintiff's chances are 0.6 before a judge and 0.8 before a jury. Both parties would prefer a judge, and yet plaintiffs will win about 70% of judge trials compared to 50% of jury trials. Alternatively, both parties would choose a judge trial if the plaintiff's estimates were 0.5 and 0.3 before a judge and jury respectively, and the defendant's estimates were 0.3 and 0.5 before a judge and jury respectively. Here, plaintiffs might win an average of 40% of judge trials. Both the 40% and 70% judge win rates are possible equilibrium outcomes, even though plaintiffs win 50% of their jury trials.

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Sept. 26, 2004) (explaining that “[t]he intersection of two events A and B is the probability of A and B occurring” and “is written as  $P(A \text{ and } B)$ ,” which is obtained by dividing the event by the number of different outcomes,  $\text{Event}/\text{Number of Outcomes}$ ).

11. This assumes that each party's choice is independent of the other's choice. This is unlikely. For example, if the plaintiff observes that the defendant prefers a judge trial, the plaintiff is likely to believe that the defendant has private information indicating that the defendant believes he will do better in front of a judge. This is likely to increase the possibility that the plaintiff chooses a jury trial.

*D. Asymmetric Stakes: The Risk of Invalidity*

The preceding analysis ignores a distinguishing feature of intellectual property litigation—namely, that a plaintiff claiming that its intellectual property has been infringed risks a court finding that its intellectual property is invalid.<sup>12</sup> For example, a patent owner who unsuccessfully sues an alleged infringer may incur substantial losses if a court also holds that the patent is invalid. Empirical evidence suggests that this factor imposes a significant risk on patent holders. For example, in the last twenty years or so, about 46% of patents have been held invalid in patent suits that have gone to trial.<sup>13</sup> In contrast, the risk of invalidity is probably considerably lower for copyrights and trademarks than for patents, in part, because the absence of data or discussion suggests that the problem is slight.

There are, however, related risks for copyright and trademark owners that can impose significant losses if the plaintiff loses an infringement claim. For example, if a copyright or trademark holder loses an infringement suit, he may risk losses in future licensing and other revenues because the adverse court decision has effectively narrowed the scope of his intellectual property as well as provided potential licensees with greater bargaining power.

To incorporate this into the analysis, let a plaintiff who loses his infringement claim at trial face a probability  $q$  (conditional on losing at trial) that his intellectual property is invalid. We can rewrite  $V_A$  as

$$V_A = p_A J - (1 - p_A) \cdot qL - a \quad (4)$$

where  $L$  denotes  $A$ 's losses in current and future revenues if his intellectual property is held invalid.<sup>14</sup> Observe that the potential loss in intellectual property will reduce the incentive of  $A$  to sue in the first instance. Indeed,  $L$  may be so large relative to  $J$  that  $A$  will prefer not to sue even if  $A$  is very likely to win

12. See Gregory J. Maier & Bradley D. Lytle, *The Strategic Use of Means-Plus-Function Claims*, 80 J. PAT. & TRADEMARK OFF. SOC'Y 241, 246 (1998) (stating that a patent becomes worthless when it is invalidated).

13. See John R. Allison & Mark Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AM. INTELL. PROP. L.J. 185, 205 (1998). The authors also report on earlier studies that have found higher invalidity rates in periods before the creation of the Federal Circuit in 1984. *Id.* at 206 & n.53.

14. The analysis also applies to lost licensing revenues, in which  $q$  would denote the probability that the plaintiff's legal protection for its intellectual property is weakened and  $L$  is the related losses.

his suit and litigation costs are zero. To illustrate,  $V_A < 0$  and  $A$  will not sue  $B$  if  $p_A/(1-p_A) < qL/J$  or, in other words, when  $A$ 's estimate of the odds of winning at trial is less than the ratio of  $A$ 's expected loss  $qL$ —if his intellectual property is held invalid—to the judgment  $J$  he receives from a successful infringement claim. Suppose, for example,  $qL$  was nine times greater than  $J$  in a trademark suit—not an unreasonable assumption for a valuable trademark even if the likelihood of invalidity  $q$  were small—then  $A$  would have to believe that he faced at least a 0.9 probability of prevailing at trial in order to file a lawsuit. In comparison, if  $qL = 0$  (the typical civil suit) and  $a = 0$ , the plaintiff would file a lawsuit provided the probability of prevailing were greater than zero, however small.

Now consider the choice between settling and going to trial assuming  $V_A > 0$ . The parties will settle before trial if  $a + b + (1 - p_A)qL > (p_A - p_B)J$ . Thus, the prospect that the trial court will invalidate the plaintiff's intellectual property has the same impact as an increase in the cost of going to trial (i.e., the cost equivalent of  $(1 - p_A)qL$ ), which in turn will reduce the fraction of cases that go to trial. Note that an increase in this trial equivalent "cost" will probably be substantial relative to both the actual cost of litigation and the amount the winning plaintiff will recover in a trial unless  $p_A$  is very high. But in that case, the precedents are likely to be clear and the parties are unlikely to go to trial because  $p_A - p_B$  will be close to zero or negative. In short, the threat of invalidity leads to weaker incentives to file intellectual property than other civil suits and leads to a smaller proportion of trials among cases that are filed.

## II. EMPIRICAL ANALYSIS

The litigation data in my sample come from a database of about five million civil cases that were terminated in the federal district courts in the 1978 to 2000 period. In each district court, a clerk records the subject matter, jurisdictional basis, dates of filing and termination, method of disposition (e.g., default or consent judgment, disposal on motion before trial, and jury or court trial), the winning party, and any judgment (amount awarded to plaintiff or other relief). The trial data are available by calendar year for the years 1978 to 2000, but terminations (dismissals, consent judgments, trials, etc.) are only available by fiscal years 1987 to 2000.<sup>15</sup> The data were gathered by the

15. In the Federal Circuit, the fiscal year ended on June 30 from 1987 to 1991; however, starting in 1992, the fiscal year ended on September 30. See Analytical Services Office, Office of Judge Programs, Administrative Office of the U.S. Courts, *Table 1.4: U.S.*

Administrative Office of the United States Courts and are disseminated by the Inter-University Consortium for Political and Social Research.<sup>16</sup>

#### A. *Civil Terminations and Trials*

Figure 1 summarizes time series data on trials and terminations for intellectual property (defined as the sum of trademark, copyright and patent cases) and all civil cases (excluding prisoner petitions) in the federal district courts.<sup>17</sup> To facilitate comparisons among the different series, I have set the value of each equal to 1 in the base year (1978 for trials and 1987 for terminations).

Two differences between intellectual property and civil litigation are worth noting. One difference is that since 1978, intellectual property trials have remained relatively flat (although trials rose sharply in the 1980s and fell thereafter by about 1.7% per year), whereas civil trials have declined by more than 50% (or by more than 4.2% per year and by nearly two-thirds since 1983).<sup>18</sup> The other difference is that terminations of intellectual property cases increased by about 3% per year, or by more than 50% since 1987 (the first year the data are available).<sup>19</sup> In contrast, civil terminations remained relatively constant (a 0.6% annual increase, which was not significantly different than zero) in the same time period.<sup>20</sup>

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*Court of Appeals for the Federal Circuit. Appeals Filed, Terminated, Pending* (Mar. 2003) (showing that the fiscal year ended on June 30 from 1988 to 1991 and on September 30 from 1992 through the present), <http://www.uscourts.gov/judicialfactsfigures/table1.04.pdf>. Thus, the fiscal year 1992 covers fifteen months.

16. The detailed trial data begin in 1978, and civil termination data begin in 1987. Note also that because the data on trials for 1978 is for six months, we doubled these values to facilitate comparison with the full years from 1979 to 2000. The data is available online from Ted Eisenberg at <http://teddy.law.cornell.edu:8090/questata.htm> (last visited Sept. 26, 2004).

17. Unless otherwise indicated, I exclude prisoner petitions from the civil case category. Prisoner petitions are about 10% of all civil trials and 16% of all civil terminations. See Eisenberg, *supra* note 16 (listing prisoner petitions under categories 510 through 555).

18. Refer to Figure 1 *infra* (showing that IP trial activity has not changed significantly, whereas civil trial activity has significantly declined).

19. Refer to Figure 1 *infra* (showing an increase in intellectual property terminations).

20. Refer to Figure 1 *infra* (showing essentially no change in civil terminations).

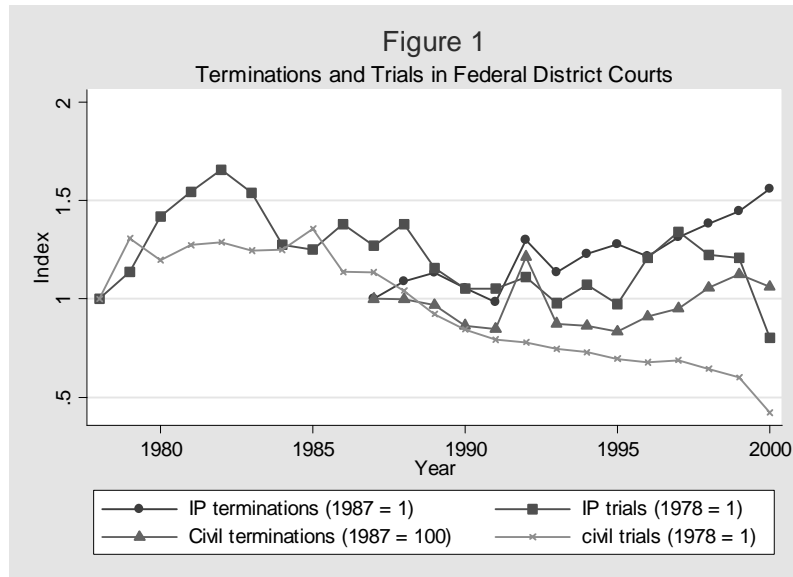


Figure 2 presents data on the ratio of trials to terminations from 1987 to 2000.<sup>21</sup> The most striking feature of Figure 2 is the significant drop in the percentage of cases terminated by trials. For civil cases, the percentage falls from 4.2% to 1.4%, or by 6% per year, and for intellectual property, the percentage falls from 3.7% to 1.4%, or by 4% per year.<sup>22</sup> Notice that the decline in the ratio of trials to terminations for IP cases results primarily from the increase in the number of terminations between 1987 and 2000 because the number of trials remains relatively constant.<sup>23</sup> In contrast, the decline in the trial ratio for civil cases resulted primarily from a sharp decline in the number of trials as terminations remained relatively constant.<sup>24</sup>

Figure 2 strongly suggests that the significant decline in the ratio of trials to terminations for intellectual property cases is part of an overall decline in the fraction of civil cases terminated by trial. Why this has occurred remains a puzzle. One explanation is the increase in use of arbitration and mediation to

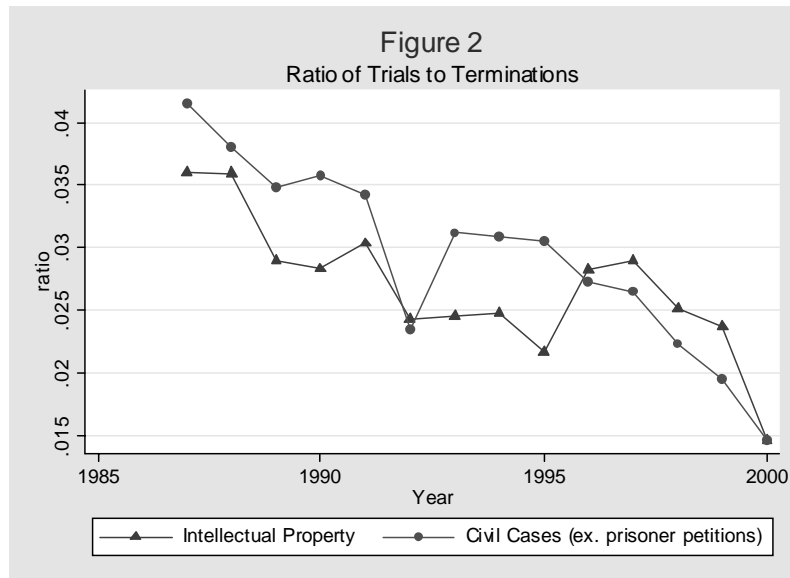
21. We cannot compute the ratio of trials to terminations before 1987 because it is the first year of the termination data. Note also that the trial ratio refers to trials in the fiscal year divided by terminations in the same calendar year.

22. Refer to Figure 2 *infra*. The difference between -.060 and -.040 is significant at the .005 level. We estimated the negative growth rates from the regression  $\log Y = a + rt$  where  $Y$  is either the civil or IP ratio of trials to terminations,  $t$  is the year variable, and  $r$  is the rate of decline. The regression coefficients (t-statistics in parentheses) are -.060 (6.43) and -.040 (3.82) for the civil and IP ratios, respectively. Refer to Figure 2 *infra*.

23. Refer to Figure 1 *supra*.

24. Refer to Figure 1 *supra*.

resolve legal disputes.<sup>25</sup> However, if much of the growth in alternative dispute resolution takes place before a case is filed, then both terminations and trials would decline, but not necessarily the percentage of trials. A second possible explanation is the growth in the number of “meritless” claims that are brought under several recent federal statutes.<sup>26</sup> Because many of these cases will be dismissed by motion, this would lead to a decline in the percentage of cases terminated by trials. The data, however, do not support this claim.<sup>27</sup> One observes significant declines in the percentage of cases terminated by trials in well-established areas of law such as contracts, real property, and antitrust.<sup>28</sup>



Three additional points are worth noting.

1. Intellectual property litigation accounts for a small fraction of civil litigation in the district courts. For example,

25. *ADR Is a Factor in Decreasing Number of Trials, Study Says*, DISP. RESOL. J., Feb.–Apr. 2004, at 5 (mentioning the increased use of alternative dispute resolution as a factor in the decrease in trials and discussing a study by Professor Marc Galanter on the decrease in federal trials).

26. See LANDES & POSNER, *supra* note 1, at 4 (noting several federal statutes enacted in the 1990s: Visual Artists Rights Acts, Architectural Works Protection Act, Federal Trademark Dilution Act, Anticybersquatting Consumer Protection Act, Sonny Bono Copyright Term Extension Act, and the Digital Millennium Copyright Act).

27. Refer to Figure 5 *infra*.

28. The percentage declines from 1987/1988 to 1999/2000 are as follows: 2.73% to 1.28% for contracts; 4.1% to 1.86% for antitrust; and 1.8% to .009% for real property. See Eisenberg, *supra* note 16.

intellectual property cases accounted for about 3.5% (91,784 cases) of total civil terminations (2,738,000 cases) in the 1987 to 2000 time period.<sup>29</sup> With respect to civil trials, intellectual property accounted for 2.7% (4264 trials or an average of 185 per year) of the 160,583 civil trials in the 1978 to 2000 period.<sup>30</sup>

2. Figure 1 aggregates data on trademark, copyright, and patent litigation into a single intellectual property category, which conceals differences among types of intellectual property. Although we explore these differences later, we note here that in the 1987 to 2000 period, copyright terminations were unchanged, patent terminations increased by more than 200%, and trademark terminations increased by 175% compared to a 50% overall increase in intellectual property terminations.<sup>31</sup> As Figure 3 shows, the more rapid the increase in terminations, the greater the decrease in the percentage of cases terminated by trial—the percentage declines more rapidly for patents than trademarks, which, in turn, decline more rapidly than copyrights during the 1987 to 2000 time period.

3. Because an intellectual property owner who brings an infringement action risks a finding that his trademark, copyright, or patent is invalid, the economic model predicts that the percentage of intellectual property cases terminated by trial will be lower than for all civil cases (all other factors constant). Overall, the data provide weak support for that prediction. The average percentage of civil cases terminated by trial in the 1987 to 2000 period is 2.89% compared to 2.62% for intellectual property cases—1.99% for trademark cases, 1.78% for copyright cases, and 5.38% for patent cases.<sup>32</sup> Although the lower trial ratio for trademarks and copyrights is consistent with the litigation model, the substantially higher ratio for patents is not. One must interpret these findings cautiously because we have not held constant differences in litigation cost, legal uncertainty, and other factors that also influence the percentage of cases terminated by trial. For example, the establishment of the specialized court for patent appeals in 1982 probably increased the amount of legal uncertainty at the appellate level—at least until the court decided enough cases to build up a stock of precedents—which would show up in an increase in the

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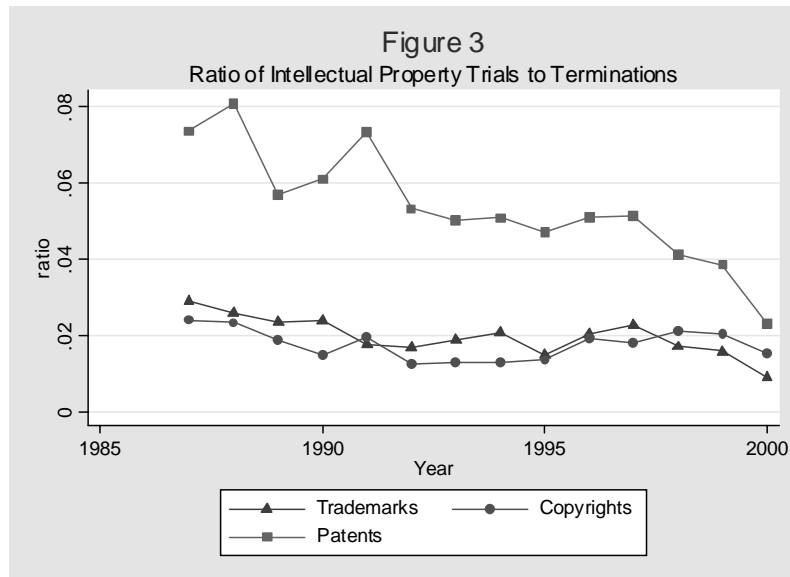
29. *Id.*

30. *Id.*

31. Refer to Figure 1 *supra*.

32. The difference between the trial ratio for civil and intellectual property is significant at the .05 level, and the differences between the ratio for civil and the separate types of intellectual property are all significant at the .001 level.

percentage of patent cases that go to trial.<sup>33</sup> Figure 3 provides some support for this hypothesis because the difference in the trial ratio between patent cases and trademark or copyright cases is greatest in the ten or so years following the establishment of the patent court and narrows considerably after 1995.



### B. Intellectual Property Output

We expect that an increase in the underlying activities that generate intellectual property, which can be roughly proxied by federal trademark and copyright registrations and patent grants, is likely to generate an increase in the number of intellectual property disputes and, ultimately, an increase in litigation in district courts. A simple comparison of current activity levels and litigation activity, however, poses two problems. Consider, for example, the relationship between trademark registrations and litigation. Data on the number of trademark cases that are terminated in the district court in year  $t$  will depend not just on recent trademark registrations but also on the total stock of trademarks, which equals the sum of past annual registrations appropriately discounted to reflect depreciation. That is, a trademark registered ten or fifty years ago, or one registered two

33. The U.S. Court of Appeals for the Federal Circuit was created on October 1, 1982. This court has exclusive jurisdiction over appeals from the district court in patent infringement cases. See William M. Landes & Richard A. Posner, *An Empirical Analysis of the Patent Court*, 71 U. CHI. L. REV. 111, 111 (2004).

years ago, may produce litigation today—although one suspects that litigation is more likely to arise from recently registered trademarks in which the scope of legal protection will tend to be less certain. Second, current registrations will have little connection to current terminations (as opposed to the filing of lawsuits) because the time delay between the filing and termination of a case often exceeds two years.<sup>34</sup>

It is still worthwhile to look at data on the annual figures on trademark and copyright registrations and patent grants in the 1978 to 2000 period to get a rough notion of the growth in the activities that generate intellectual property. Figure 4 shows substantial growth in activities that, for the most part, exceeded the growth in real GDP. Trademark registrations more than tripled and patent grants more than doubled compared to a two-fold increase in real GDP between 1978 and 2000.<sup>35</sup> On the other hand, copyright registrations doubled from 1978 to 1992 but then declined by about 25% in the post-1992 period.<sup>36</sup> The post-1992 decline in copyright registrations is puzzling because other data suggest a continued growth after 1992 in copyright producing activities.<sup>37</sup> Logarithmic regressions yielded annual percentage growth rates (t-statistics in parentheses) of 5.7% (9.9) for trademark registrations, 1.5% (4.01) for copyright registrations, 4.5% (14.5) for patent grants, and 3.0% (39.1) for real GDP.<sup>38</sup> In comparison, the growth in intellectual property litigation was significantly less than growth in activities generating intellectual property. We showed earlier that intellectual property terminations grew by about 3% per year beginning in 1987,

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34. The medium time from filing to termination by trial in a calendar year ranges 420 to 696 days (with a medium of 555 days) for the 1978–2000 period for trademarks; 434 to 993 days (with a medium of 680 days) for copyright; 658 to 1839 days (with a medium of 1006) for patents; and 542 to 641 (with a medium of 651 days) for all civil trials (excluding prisoner petitions). Eisenberg, *supra* note 16. I have not yet analyzed some scattered data on the delay from filing to termination, including cases that are terminated without a trial.

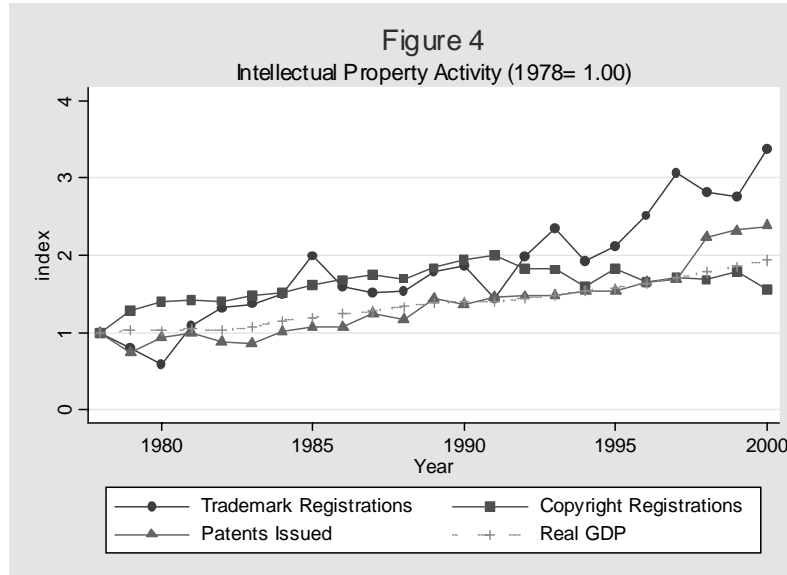
35. Refer to Figure 4 *infra*.

36. Refer to Figure 4 *infra*.

37. For example, data on annual real recreation expenditures (in which expenditures on music, movies, books, and periodicals account for 50% of the total) increased just as rapidly in the post-1992 as the 1978 to 1991 time period. See William M. Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. CHI. L. REV. 471, 504, 508 n.63 (2003). One factor that does not appear to contribute to this decline is the amendment to the Copyright Act in 1992 that made copyright renewals automatic. *Id.* at 512–13. We observe the same post-1992 decline in registrations in Figure 4 when renewal registrations are excluded. One factor that explains part of the post-1992 decline in registrations was the increase in 1991 of the registration fee from \$10 to \$20. *Id.* at 499.

38. All two-way comparisons of growth rates are statistically significant at the .001 level except for the difference between the trademark and patent growth rates in which the difference is significant at the .10 level.

although trials remained relatively constant during the 1978 to 2000 period.



### C. *The Growth in the Legal Protection of Intellectual Property*

Other things constant, an expansion in intellectual property protection is likely to increase the number of legal claims that allege violations of these expanded rights. Thus, an increase in the legal protection of intellectual property should generate increased litigation in trademarks, copyrights, and patents. It is undisputed that intellectual property protection has grown in the last fifty years or so, particularly since the passage of the 1976 Copyright Act.<sup>39</sup> In a recent paper, Richard Posner and I estimated the expansion in intellectual property rights by the increase in the number of words in the principal intellectual property statutes, because most of those statutes expand intellectual property rights—or create new ones—rather than reduce existing rights.<sup>40</sup> In the 1946 to 2000 period, Posner and I estimated that the copyright statute increased by nearly eleven-fold (from 11,550 words in 1946 to 124,300 words in 2000); the patent statute increased by more than four-fold (from 24,565 words in 1946 to 110,880 in 2000); and the trademark statute

39. Copyright Act, Pub. L. No. 94-553, 90 Stat. 2541 (1976) (codified as amended at 17 U.S.C. § 101 et seq. (2000)); see LANDES & POSNER, *supra* note 1, at 1 (much of this section comes from this paper); see also Mark A. Lemley, *Romantic Authorship and the Rhetoric of Property*, 75 TEX. L. REV. 873, 886–87 (1997) (expounding on the expansion of protection for copyright owners).

40. See LANDES & POSNER, *supra* note 1, at 2.

(the Lanham Act)<sup>41</sup> by more than two-fold (from 10,640 words in 1946 to 24,750 words in 2000).<sup>42</sup> This translates into a 4.4% annual rate of growth for the copyright statute; a 2.9% rate for the patent statute; and a 1.4% rate for the trademark statute.<sup>43</sup> We also showed that these increases were not continuous, but typically coincided with major statutory changes, such as the new Copyright Act in 1976, the Trademark Revision Act in 1988, and amendments to the Copyright Act in 1998 concerning digital copying and the copyright term.<sup>44</sup>

As Figure 5 shows, if we restrict the data to the 1978 to 2000 period (the period that covers the litigation data and which comes after the rapid growth in words associated with the 1976 Copyright Act), the annual rates of growth are about the same for the three statutes: 3.9% for the number of words in the Lanham Act; 3.1% for the copyright act; and 2.9% for the patent act.<sup>45</sup>

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41. Trademark (Lanham) Act of 1946, ch. 540, 60 Stat. 427 (1946) (codified as amended at 15 U.S.C. § 1051 et seq. (2000)).

42. See LANDES & POSNER, *supra* note 1, at 2.

43. *Id.* A regression of the logarithm of words on time yielded annual rates of growth (t-ratios in parentheses) in the 1946–2000 period of 0.044 (21.7) for copyrights, 0.014 (11.63) for trademarks, and 0.029 (23.54) for patents. All the differences in these growth rates are highly significant.

44. *Id.*

A related indicator of the recent expansion in intellectual property protection is the number of new laws and amendments enacted in the approximate quarter century since the Copyright Act of 1976, the first major revision of the copyright laws in the United States in nearly seventy years. The act added unpublished works to the category of covered works (thereby preempting common law copyright), significantly lengthened the copyright term, and added numerous provisions specifying the scope of protection for particular categories of work. The 1980s saw provisions added to deal with record rentals, semiconductors, and satellite transmissions, and to relax various formalities regarding notice and filing in order to bring our copyright law into compliance with the Berne Convention.

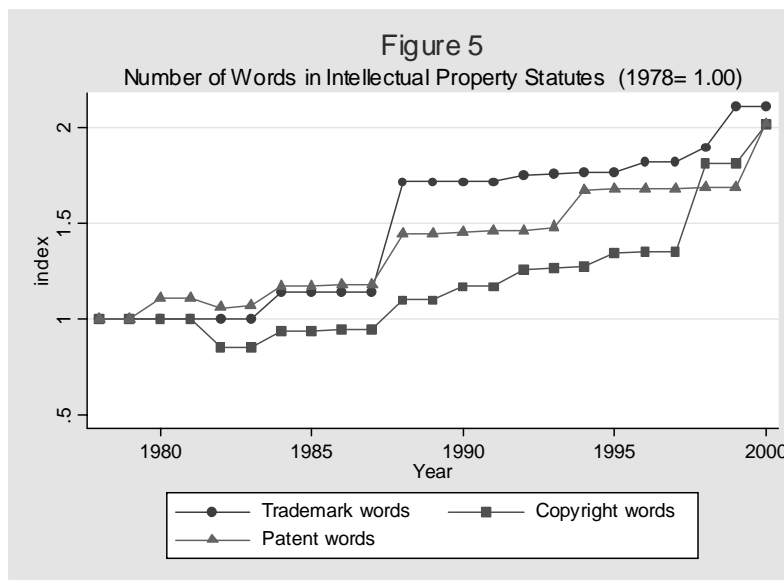
Trademark law also expanded in the 1980s. The Trademark Revision Act of 1988 created “an intent to use” system for registration that altered the longstanding principle that a trademark must be used in commerce before the owner can apply for registration. Yet, at the same time, the act weakened trademark protection by requiring that the use (which is required for actual registration, as distinct from the application for registration, the date of which would establish priority in a trademark dispute) be commercially significant and not merely a token use.

The most significant change in the patent area was the creation in 1982 of the U.S. Court of Appeals for the Federal Circuit to be the exclusive patent appellate court, in the expectation (about which more later) that it would interpret and apply the patent statute in a way that would strengthen inventors’ rights.

*Id.* at 3–4.

45. These annual rates were estimated from regressions of the log of words on time. All three regression coefficients are statistically significant at the .001 level. We also reject the hypothesis that the three growth rates are not significantly different from each

Figure 5 implies that (all other factors constant) we should observe significant growth in trademark, copyright, and patent litigation, and slightly higher growth rates for trademarks than either copyright or patents. The data does not support these hypotheses. The estimated annual growth rates in trials from 1978 to 2000 were all negative (-.027 for trademarks, -.004 for copyrights, and -.005 for patents), although only the trademark growth rate is statistically significant. Terminations in the 1987 to 2000 period increased at annual rates of 5.8% for patents, 3.3% for trademarks, and .001% for copyrights.



D. Regression Analysis

Regression analysis allows us to examine more rigorously the relationship between intellectual property litigation and several variables that are proxies for the factors discussed above. We present regressions on trials<sup>46</sup> and terminations<sup>47</sup> for trademarks, copyrights, and patents separately of the following specification:

$$Y_t = a + b_1Y_{t-1} + b_2ACT_{t-2} + b_3W_{t-2} + b_4CIV_t + u_t \tag{5}$$

other. In particular, the higher growth rate for the number of words in the trademark statutes is significantly greater than either the growth rate of words in the copyright or patent statutes at the .002 level.

46. Refer to Table 1 *infra*.

47. Refer to Table 2 *infra*.

where  $Y_t$  denotes either trials or terminations in year  $t$ ,  $Y_{t-1}$  the value of  $Y$  lagged one year,  $ACT_{t-2}$  the underlying activity (e.g., trademark registrations), and  $W_{t-2}$  the number of words in the relevant statute (in which an increase in  $W$  should reflect an expansion in property rights and legal uncertainty until the sufficient precedents interpreting the statute have developed) lagged two years,  $CIV_t$  equals the number of civil trials or terminations in year  $t$ , and  $u_t$  denotes the residual term. Notice that the  $ACT$  and  $W$  variables are lagged two years to correspond to the average delay between filing and termination. We include civil trials or terminations as an independent variable in order to hold constant factors that are common to both civil and intellectual property litigation (e.g., an overall increase in the costs of going to trial relative to the costs of settling should reduce the number of cases filed, terminated, and tried). All variables are in log form so that the regression coefficients measure elasticities—the percent change in the dependent variable for a 1% change in the independent variable. The purpose of including the lagged value of the dependent variable as an independent variable in equation (5) is as follows. The litigation model predicts that  $Y_t$  will depend on the underlying activity  $ACT$  in periods  $t-2$ ,  $t-3$ ,  $t-4$ , and so on, and therefore that  $Y_{t-1}$  will also depend on  $ACT$  in periods  $t-3$ ,  $t-4$ , and so on. We can now substitute  $Y_{t-1}$  for past values of  $ACT$  into the original regression equation, which reduces the number of independent variables (because  $Y_{t-1}$  substitutes for activity levels in period  $t-3$  and beyond) and still captures the relationship between current litigation and the stock of the underlying activity.

The preliminary results in Table 1 are inconclusive. With the exception of patent trials, none of the independent variables is statistically significant in Table 1. In the patent regression, the coefficients on civil trials and the number of words in the patent statute are both significant at the .05 level. Although lagged trials has a positive elasticity in the trademark, copyright, and patent regressions—indicating that a 10% increase in the number of trials last year increases the number this year by about 3%—and the coefficients are greater than the standard errors, only the coefficient in the copyright regression is marginally significant.

<b>Table 1</b>			
<b>Regression Analysis of Trials:</b>			
<b>1978–2000</b>			
<i>(t-statistics in parentheses)</i>			
<i>Log Trials in Year t</i>			
<i>Independent Variables</i>	<i>Trademark</i>	<i>Copyright</i>	<i>Patent</i>
Log Activity <sub>t-2</sub>	-.15 (0.77)	-.07 (0.20)	-.06 (0.16)
Log Trials <sub>t-1</sub>	.29 (1.31)	.31 (1.65)	.26 (1.14)
Log Civil Trials <sub>t</sub>	.14 (0.33)	.30 (0.70)	.78 (2.06)
Log Words <sub>t-2</sub>	-.29 (0.57)	.11 (0.17)	1.13 (2.95)
Constant	6.10 (0.69)	2.01 (0.49)	-15.6 (1.69)
R <sup>2</sup>	.53	.30	.36
n	22	22	22

Notes: (1) The lagged activity trial and word variables are specific to the intellectual property specified in the dependent variable (i.e., in the trademark regression the activity, trial, and words variables are lagged trademark registrations, lagged trademark trials, and lagged words in the Lanham Act); (2) The  $R^2$  is adjusted for the degrees of freedom (equal to number of observations minus number of independent variables minus 1); (3)  $n$  is the number of observations in the regression.

The results are somewhat stronger for terminations in Table 2. Lagged terminations, both for the relevant intellectual property terminations and for civil terminations in general, are positive and significant in the trademark and patent regressions. Past trademark registrations are also a significant determinant of trademark terminations. Notice that the number of words in the relevant statutes is insignificant in all equations (though it is marginally significant and positive in the patent equation). Overall, the variables account for 90% (the adjusted  $R^2$ ) of the variation in trademark and patent terminations.<sup>48</sup>

48. One should be extremely cautious about reaching any conclusions from Table 2 because the regressions are based on only thirteen observations (1988–2000).

<b>Table 2</b>			
<b>Regression Analysis of Terminations: 1987–2000</b>			
<i>(t-statistics in parentheses)</i>			
<i>Log Terminations in Year t</i>			
<i>Independent Variables</i>	<i>Trademark</i>	<i>Copyright</i>	<i>Patent</i>
Log Activity <sub>t-2</sub>	.35 (3.09)	.59 (1.32)	.14 (0.57)
Log Term <sub>t-1</sub>	.45 (2.86)	.47 (1.25)	.52 (2.72)
Log Civil Term <sub>t</sub>	.63 (3.68)	.06 (0.20)	.84 (4.58)
Log Words <sub>t-2</sub>	-.06 (0.46)	-.01 (0.07)	.43 (1.39)
Constant	-6.52 (2.90)	-4.33 (0.46)	-13.14 (4.07)
R <sup>2</sup>	.89	.03	.91
n	13	13	13

Notes: (1) The lagged activity, termination, and word variables are specific to the intellectual property specified in the dependent variable (i.e., in the trademark regression the activity, termination, and word variables are lagged trademark registrations, lagged trademark termination, and lagged words in the Lanham Act); (2) The  $R^2$  is adjusted for the degrees of freedom (equal to number of observations minus number of independent variables minus 1); (3)  $n$  is the number of observations in the regression.

### *E. Other Factors that Influence Litigation*

This section looks at several additional factors that bear on intellectual property litigation.

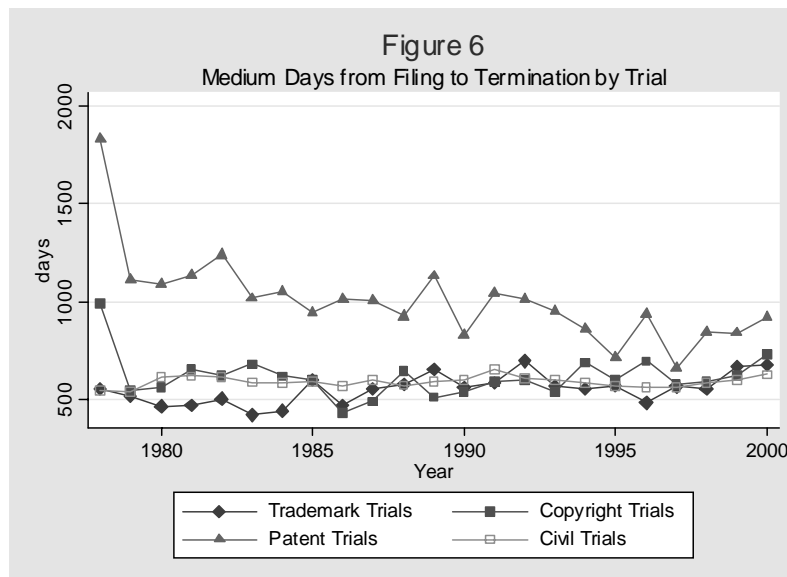
1. *Time from Filing to Disposition.* The economic model of litigation implies that an increase in waiting time between filing and trial will reduce the expected value to  $A$  of filing a lawsuit<sup>49</sup> because  $A$ 's litigation costs are likely to be greater— $A$  will incur costs to maintain his lawsuit over a longer period of time—and the present value of  $J$  will be lower as a trial is pushed further into the future. The reduction in  $V_A$ , in turn, should reduce the number of suits that are filed.

The impact of increased delay on the proportion of cases that go to trial is less clear. Although delay reduces the minimum offer the plaintiff will accept to settle, it also reduces the maximum amount the defendant will pay to settle, assuming the

49. Refer to equation (1) *supra*.

defendant gains from having to pay a judgment at a later date. As a first approximation, the proportion of cases that go to trial will not change if *A*'s minimum acceptance amount and *B*'s maximum offer fall at the same amount and there is no change in litigation costs *a* and *b*. More likely, however, delay will increase both the plaintiff and the defendant's costs. Not only will delay increase *A*'s cost of maintaining his legal claim, but it also increases *B*'s cost to the extent his reputation or access to the capital markets are adversely affected by the prospect of an unresolved lawsuit over a longer period of time. This implies that an increase in delay will decrease the proportion of cases that go to trial.<sup>50</sup>

Figure 6 indicates that the delay has been relatively constant in the federal district courts during the 1978 to 2000 period.<sup>51</sup> The mean time from filing to termination by trial is 723 days for all civil trials, 657 days for trademark trials, 709 for copyright trials, and 1170 for patent trials. The relative stability of delay implies that delay cannot account for the significant decline in the percentages of cases terminated by trial in the 1987 to 2000 period.<sup>52</sup>



50. Because delay reduces the value of *J*, it also tends to reduce the likelihood of a trial for any given degree of mutual optimism.

51. The one exception is patent cases where delay has fallen from a high of 1,834 days in 1978 to a low of 658 days in 1997. Note, however, that the percent of patent cases terminated by trial has fallen more rapidly (not less as might be expected) than the comparable percentages for trademarks and copyrights. Refer to Figure 3 *supra*.

52. Refer to Figures 2 & 3 *supra*.

2. *The Plaintiff's Win Rate.* As the probability that the plaintiff will win at trial and the expected value of the lawsuit rise ( $V_A$  in equation (1)), so does the probability that the plaintiff will file a lawsuit. Recall that mutual optimism,  $p_A - p_B > 0$ , is a necessary condition for a trial to take place. As a first approximation, therefore, an increase in the plaintiff's win rate will not affect the likelihood of a trial, which depends on the difference in the plaintiff's and defendant's estimate of the win rate, not the win rate itself. Table 3 presents data on the plaintiff's win rate at trial (fraction of trials in which the plaintiff prevails at trial) in the 1978 to 2000 period.

	1978–1984	1985–1989	1990–1994	1995–2000	All Years
Trademark	.67 (564)	.67 (347)	.64 (242)	.67 (311)	.67 (1,464)
Copyright	.73 (289)	.74 (236)	.71 (165)	.74 (239)	.73 (929)
Patent	.49 (603)	.57 (396)	.65 (394)	.57 (478)	.56 (1,871)
All Civil	.48 (63,148)	.49 (41,241)	.48 (28,687)	.45 (27,507)	.48 (160,583)
Note: (1) Plaintiff's win rate is a weighted average of proportion of trials plaintiff wins, weighted by the number of trials. (2) Numbers in parentheses are the number of trials. Note that the number of trials actually used to calculate the win rate is about 80% of all trials.					

Table 3 shows that win rates have been relatively constant for a twenty year period with the exception of patents in which there was a significant increase in win rate (nearly 20% after the creation of the patent court). For the full 1978 to 2000 period—the last column of Table 3—the win rate is highest for copyright, second highest for trademarks, third highest for patents, and lowest for all civil cases. Moreover, the differences in mean win rates among categories are statistically significant. Overall, intellectual property plaintiffs do better than plaintiffs in civil litigation, in which the win rate is just under 50%.

The litigation model suggests an explanation that ties together the higher win rate for plaintiffs in intellectual property trials than civil trials and the smaller proportion of intellectual

property cases compared to civil cases that are terminated by trial.<sup>53</sup> Recall that an intellectual property plaintiff risks an invalidity finding in the event the plaintiff loses at trial. Because the trial stakes are asymmetric—the plaintiff has more at stake than the defendant—there will be selection bias in intellectual property cases that go to trial. The intellectual property cases that go to trial are likely to have higher win rates on average than all civil trials because a higher threshold probability is required to offset the loss from an invalidity finding. In short, the litigation model predicts—and we observe—a higher win rate for intellectual property trials and a lower proportion of terminations by trial.

3. *Jury vs. Judge Trials.* The economic model of litigation predicted that, all other factors constant, jury trials would account for about 75% and judge trials the remaining 25% of all trials. The model also predicted that in equilibrium the probability the plaintiff will prevail at trial (the win rate) will be the same for jury and judge trials.

In our sample, the percentage of jury trials is significantly lower than the predicted 75%. The percentages over the 1978 to 2000 time period are 49.4% for civil trials, 40.4% for patent trials, 27.7% for copyright trials, and 24.6% for trademark trials.<sup>54</sup> Figure 7 also indicates that jury trials, as a percentage of all trials, have been growing on average between 1% and 2% per year, although recent percentages are still below 75%.<sup>55</sup> The most obvious explanation for why jury trials are less than 75% of trials is that jury trials are more costly to the parties than judge trials.<sup>56</sup> If cost considerations lead each party to prefer a judge trial 70% (as opposed to 50%) of the time, jury trials would comprise about 50% of all trials.

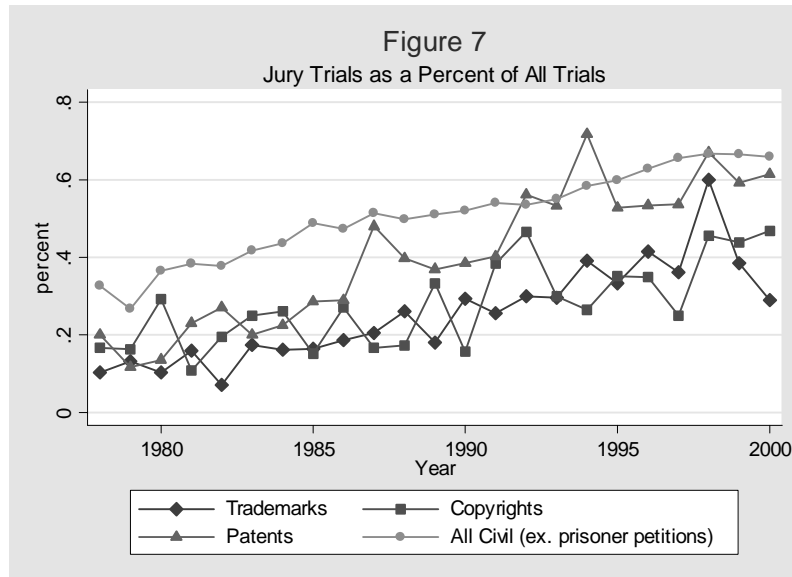
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53. This holds for copyrights and trademarks, but not for patents because the percentage of terminations by trials was significantly higher in this category than for civil terminations. We noted earlier that the higher trial ratio for patents is not unexpected because the creation of the patent court in 1982 is likely to have initially diminished the stock of precedents and added to legal uncertainty. Refer to Part II.A *supra*.

54. All two-way differences are statistically significant except for the difference between the proportion of jury trials for copyrights and trademarks.

55. The rates of growth (t-statistics in parentheses) in regressions of the form  $Y = ae^{rt}$  are .016 (21.06) for civil trials, .024 (11.16) for patents, .016 (7.97) for trademarks, and .012 (4.78) for copyrights.

56. See POSNER, *ECONOMIC ANALYSIS*, *supra* note 4, at 598–99.



Although we have no direct cost data in our sample on jury and judge trials, jury trials tend to be more costly because they are more cumbersome and take longer to complete from start to finish.<sup>57</sup> On the other hand, the results in Table 4 are inconclusive. The average time from filing to disposition (which differs from the actual trial time) is significantly greater for judge than jury trials in the patent and all civil case categories, significantly lower for judge than jury trials in trademarks, and about the same for judge and jury trials in copyrights.<sup>58</sup>

57. *Id.*

58. Refer to Table 4 *infra*.

	Jury Trials	Judge Trials	Judge + Jury
Trademark	732 (340)	633 (1095)	656 (1,435)
Copyright	713 (254)	704 (663)	706 (917)
Patent	950 (741)	1275 (1095)	1162 (1,836)
All Civil Trials	694 (75,931)	753 (80,966)	725 (156,897)

The economic model also predicted that win rates in jury and judge trials should be the same—in equilibrium there would be no net advantage to a plaintiff or defendant from a jury compared to a judge trial; otherwise, the favored party would opt for a jury trial and we would not have any judge trials. With the exception of patent trials, the results in Table 5 strongly confirm the equal win rate hypothesis—the difference between the win rate in jury and judge trials is statistically insignificant in all categories but patents. Table 5 shows that plaintiffs are significantly more likely to win in front of a jury than judge. Not surprisingly, therefore, Figure 7 showed that the fraction of jury trials as a percentage of all trials is significantly higher for patents than copyrights or trademarks.

	Jury Trials	Judge Trials	Judge + Jury
Trademark	.63	.68	.67
Copyright	.70	.74	.73
Patent	.65	.50	.56
All Civil Trials	.48	.48	.48

## III. CONCLUDING REMARKS

In this paper, I applied the economic model of litigation to two puzzling features of intellectual property litigation. The first is the small increase in intellectual property litigation over the last twenty-five years or so while, at the same time, there has been rapid growth in both the output and legal protection of intellectual property. The second is that the number of intellectual property trials has fallen sharply as a percentage of intellectual property cases terminated from roughly 3.5% to 1.5% in the 1978 to 2000 period. These observations are mirrored in the overall trends in civil litigation in the federal courts—terminations have been relatively flat and trials have declined sharply. This suggests that there are factors common to both intellectual property and civil litigation taken as a whole that are likely to be important determinants of intellectual property litigation—in particular, the increase in use of arbitration and mediation to resolve legal disputes.

The paper also explores empirical features of the litigation process itself that may bear on changes in trademark, copyright, and patent litigation considered separately. These include the following:

1. The decline in the percentage of cases terminated by trial has been greater for patents than copyrights or trademarks. The data also indicate a sharp decline in the trial/termination ratio for patents in the 1997 to 2000 period. The Supreme Court's 1996 *Markman* decision may have played a role in this decline.<sup>59</sup>

2. The economic model of litigation suggests that an increase in court delay tends to reduce the number of cases filed and litigated through trial. Trial delay (as measured by the time from filing to disposition by trial), however, has been relatively constant in the federal district courts during the 1978 to 2000 period, and thus does not explain changes in intellectual property litigation.

3. Plaintiff win rates have been relatively constant over the 1978 to 2000 period with the exception of patents, which experienced a significant increase in the win rate (nearly 20% after the creation of the patent court). Overall, intellectual property plaintiffs win about 60% to 70% of trials compared to just under 50% for all civil litigation.

4. The percentage of jury trials over the 1978 to 2000 time

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59. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996) (recognizing that interpreting the construction of a patent and defining terms of art is exclusively within the province of the court).

period are 49.4% for civil trials compared to 40.4% for patent trials, 27.7% for copyright trials, and 24.6% for trademark trials. The most obvious explanation for why jury trials are less than 75% of trials (the predicted value if plaintiffs on average do as well in front of juries as judges) is that jury trials are more costly to the parties than judge trials.