Michigan Law Review
November, 2000

Article

*365 JUDGES, JURIES, AND PATENT CASES--AN EMPIRICAL PEEK INSIDE THE BLACK BOX

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> Honest to God, I don't see how you could try a patent matter to a jury. Goodness, I've gotten involved in a few of these things. It's like somebody hit you between your eyes with a four-by-four. It's factually so complicated.
>
> -- Judge Alfred V. Covello [FN1]

Introduction

The frequency with which juries participate in patent litigation has skyrocketed recently. At the same time, there is a popular perception that the increasing complexity of technology being patented (especially in the electronic, computer software, biological and chemical fields) has made patent trials extremely difficult for lay juries to understand. These developments have sparked extensive scholarly debate and increasing skepticism regarding the role of juries in patent cases. [FN2]

*366 Juries have participated in some aspects of patent litigation since the enactment of the first patent statute in 1790, which provided for "such damages as shall be assessed by a jury." [FN3] The enactment of the Patent Act of 1870, however, which gave equity courts the power to award common law damages, [FN4] spawned an era in which patent cases were almost exclusively decided by the bench. This pattern has changed only recently--and the change has been dramatic. In 1940, 2.5% of all patent cases tried in district court were heard by juries. [FN5] From 1968 to 1970, the figure was almost unchanged at 2.8%. [FN6] By contrast, from 1997 to 1999, 59% of all patent trials were tried to juries. [FN7] This surge in jury requests has prompted a flurry of recent litigation over the right to a jury trial in patent litigation. [FN8]

*367 Figure 1

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Despite extensive debate over the role of the jury in patent cases, no comprehensive empirical research has been done to ascertain, to the extent possible, the differences between jury and judge resolution of patent cases and the cause of the increased demand for jury trials in recent years. Given that patent litigation is an expensive endeavor--it routinely costs each party in excess of a million dollars [FN9]--there is an urgent need for empirical evidence on patent litigation. This Article undertakes that task by providing the first large-scale comparison of patent-holder win rates and recoveries in cases tried before juries and judges. The data include all patent cases that went to trial in the period from 1983 through 1999 (seventeen years of data). [FN10] This time period was selected in order to analyze, among other things, the impact the creation of the Federal Circuit may have had on the resolution of patent trials in the district courts. [FN11] Accord-

ingly, each of these cases was followed through to appeal to ascertain the issues appealed and the ***368** relative affirmance rate by issue, by adjudicator, and by year. The data were analyzed to determine whether popular perceptions or theoretical models about judges and juries can be validated, to provide descriptive statistical data, and to develop predictive models from the data through regression analysis.

At first blush, the results of the study suggest that complaints about jury bias and incompetency are unfounded. Judges and juries decide some issues differently. For example, juries are significantly more likely to find patents valid, infringed, and willfully infringed than judges. The differences, however, are not as profound or pervasive as one might expect. Judges and juries find patents enforceable with similar frequency. Additionally, juries seem as "accurate" in their decisionmaking as judges are, as measured by appellate affirmance rate. [FN12]

And yet, despite similar affirmance rates for judge and jury trials, there is some ground for concern with jury resolution of patent cases. To a greater degree than judges, juries tend to decide whole suits rather than delineate individual issues, even when separate issues are presented to them via special verdict forms or interrogatories. This finding suggests that judges are subtler at managing the complex nature of patent cases and the technical distinctions between patents and products. It may also affirm the popular perception that juries are unduly swayed by tangential factors.

In addition, who filed the suit is a significant predictor of win rate in jury trials. Juries are significantly pro-patentee in suits for infringement (68% patentee win rate); but when a possible infringer initiates a declaratory judgment action, the patentee only has a 38% win rate. If the same were true of judges, then one could attribute the difference in win rate to the strength of the cases--namely, that alleged infringers only bring declaratory judgment suits when they have strong cases. But patentee win rates are substantially uniform in bench trials, regardless of who initiated the suit.

These data suggest that there may be some problems with juror adjudication of patent suits, though the system masks them. Deferential standards of review leave the Federal Circuit with little ability to disturb potentially flawed jury decisions. Moreover, the system lacks sufficient transparency to ascertain flaws in jury verdicts. The "black box" nature of jury verdicts leaves the Federal Circuit unable to correct inaccuracy or bias on the part of jurors. This reality--particularly in light of the increase in jury adjudication of patent disputes and the ***369** potential for jury error where increasingly technical inventions are involved--highlights the value of a peek inside the black box.

Part I of the Article presents popular impressions of judge and jury outcomes in patent cases--in particular, popular perceptions of juror incompetence and bias--and considers how win-rate data might confirm or refute these beliefs. Part I also discusses selection effect theory, an economic model of the case selection process, and how win-rate data may be affected by parties' knowledge of adjudicator biases. Part II describes the data set, its acquisition, and the methodology used to analyze the data. Part III tests the impressions of judge and jury outcomes in patent cases against the empirical data. It presents descriptive statistics, the hypotheses, and the results of the regression models. Part III also discusses what insight the data lend on the role of the jury in the adjudication of patent disputes.

I. Impressions of Judge and Jury Outcomes

A. Popular View: Juror Incompetence

The increased participation by juries in patent cases and the detailed attention given by the judiciary has caused a number of scholars and other commentators to question the propriety of jury resolution of patent cases. In this Part, I discuss the perceived wisdom regarding juries in patent cases. Typical complaints about the use of juries in patent cases in-

clude: juries are unable to comprehend the technology [FN13] or the nuances of the legal standards for patent validity and infringement; juries are pro-patentee [FN14]--they favor inventors and have a high regard for the U.S. Patent & Trademark Office ("PTO"); [FN15] juries are biased in favor of domestic companies; [FN16] juries award excessively high damage awards; [FN17] and juries are swayed too easily by tangential factors.***370** [FN18] Jury consultants believe that juries do have distinct biases and preconceptions in patent cases. [FN19] These popular perceptions of juror incompetence and bias have caused commentators to argue that the role of the jury in patent litigation should be severely limited, and many alternatives have been proposed. [FN20]

Although purely anecdotal, the following transpired between a judge and the jury in an antitrust case which involved, what was at the time, complex technology after the jury returned its verdict:

> The Court: Do you know what demand substitutability is, [Juror A]?
> Juror A: Well, I would like to kind of look into that.
> The Court: Okay. And how about the barriers to entry, [Juror B]?
> Juror B: I would have to read about it. . . .
> The Court: All right. And how about reverse engineering, [Juror C]?
> Juror C: That's when you would take a product and you would alter it in a, or modify it for your own purpose; that is, you would reverse its function and use it in your own method.
> The Court: And [Juror D], what is software?
> ***371** Juror D: It's software.
> The Court: Well, what is software?
> Juror D: That's the paper software.
> The Court: What's the hardware?
> Juror D: That's the wires and hardware.
> The Court: And what is--do you know what an interface is? [FN21]
> Juror D: Yes.
> . . .
> The Court: Can you given me an example of that?
> Juror D: Well, if you take a blivet, turn it off one thing and drop it down, its an interface change, right? [FN22] This apparent lack of comprehension of the underlying technology exemplifies the fears many harbor about jury resolution of patent cases. As technology becomes increasingly complex, especially in the software and biotech fields, concerns would naturally escalate over a lay jury's ability to comprehend the technology in order to resolve the suits. These complaints often revolve around the educational make up of the jury. [FN23] For example, after a jury ruled that AT&T had infringed a small company's patent, lawyers for AT&T complained that the jury consisted of "unemployed laborers and housewives [who] did not understand that stuff." [FN24] Despite increasing complexity of technology and ***372** the corresponding patents that protect it, there is no minimum educational requirement for serving on a jury in a patent case--"blue ribbon" or expert juries are not mandated, regardless of technical complexity.

If juries are unable to understand the technology or apply the law, then their decisions will be based on emotional or other irrelevant factors. [FN25] Who tells the better story? Who is the more likeable or sympathetic party? Many commentators suspect that the party who demands a jury in a patent case has a weaker case [FN26] and therefore prefers an adjudicator less likely to focus on the merits.

Many attorneys believe that juries are mesmerized by the inventor's story and tend to favor the patentee. [FN27] Juries respond well to descriptions of the inventive process and the inventor's flash of genius or slow methodical trial and error. Whether it is Bob Kearns taking on the automotive industry over his intermittent windshield wipers [FN28] or

Jerome Lemelson suing Mattel over "Hot Wheels," [FN29] juries appear to love inventors. If this is true, we would expect to see higher win rates for patentees than for alleged infringers in jury trials. [FN30]

There is a popular perception that jurors are more likely than judges to defer to the administrative patentability determinations made by the PTO. [FN31] Juries may be impressed with the blue ribbon on ***373** the cover of a patent and the fact that the patent was reviewed by an "expert agency" with technically trained examiners. Moreover, juries are instructed that an issued patent carries a presumption of validity that can only be overcome by clear and convincing evidence. Judges, on the other hand, may harbor more skepticism about agency accuracy and may be willing to scrutinize agency decisions closely. If this is true, we would expect patent-holder win rates on validity to be higher in jury trials than bench trials.

In 1999, I conducted a survey of forty-seven Chief Patent Counsels of leading corporations [FN32] and found that this group had little confidence in juries' ability to understand the technology in patent cases and, interestingly, not much more confidence in the ability of judges. [FN33] In addition, the respondents believed that juries award higher damages than judges do, [FN34] that juries are more likely to uphold the validity of a patent, [FN35] and that juries are biased in favor of the patent holder. [FN36]

If the jury is not an ideal adjudicator, the question is who should step in and resolve patent cases? There are some who believe that juries should continue to resolve patent cases because they are competent to do so or because there is no evidence to suggest that judges ***374** would be better at resolving these cases. [FN37] In fact, Chief Judge Mayer of the Federal Circuit, commented: "[T]here is simply no reason to believe that judges are any more qualified than juries to resolve the complex technical issues often present in patent cases." [FN38] There are more than 600 active district court judges and more than 200 senior district court judges. With only 2000 patent cases being filed each year and only approximately 100 of these reaching trial, [FN39] a district court judge's exposure to patent cases is very limited. Most judges have no special knowledge, education or training in the technology that is at issue in a patent case. It has even been suggested that a jury may be better equipped to resolve a patent case: whereas judges generally must divide their attention among several cases, a jury can focus exclusively on the one patent case presented to it. [FN40] Finally, some have argued that patent law is not unique in terms of its complexity; other fields of law have equal or greater technological and legal complexity. [FN41]

Popular perception suggests that jurors are not capable of resolving patent cases; that their decisionmaking will be based on emotional or tangential factors or bias. If juries are biased in favor of the patent holder and are not competent to comprehend patent cases as many suggest, the data ought to reflect a high win rate for the patent holder when the jury adjudicates patent cases.

B. A Theoretical Model: Selection Effect Theory (The 50% Implication)

> For the rate of plaintiff verdicts to be an accurate measure of the influence of a legal standard, of judicial or jury attitudes, or of the substantive fairness of any adjudicatory process, litigated disputes must be representative of the entire class of underlying disputes. [FN42]

For example, a measure of patentee outcome rates in tried cases would only confirm popular perceptions that juries are pro-patentee, if the tried cases are a random subset of all disputes. Most scholars ***375** agree, however, that the small percentage of all legal disputes that reach trial is not a representative or random sampling of all cases. [FN43] To predict the selection of cases for trial, several formal economic models have been developed. [FN44]

George L. Priest and Benjamin Klein present a selection effect model of the litigation process that predicts that the

tendency for plaintiffs to prevail at trial will approach a probability of 50% as the fraction of cases going to trial approaches zero. [FN45] This theory is predicated on parties making rational determinations regarding whether to settle or litigate, based on economic factors such as: the potential gain from a favorable outcome and the potential loss from an adverse one, the estimated likelihood of success at trial (including both the likelihood of success under the applicable legal standard and the likelihood that the decisionmaker will reach an accurate result), [FN46] and the transaction costs (litigation costs). [FN47]

According to this model, the disputes that proceed to trial are the cases in which the parties substantially disagree on their chance of success, which is most likely to happen when the case falls close to the governing decision standard (that is, where the estimated outcome approaches 50%). [FN48] When the legal rule or the adjudicator clearly favors one side, economically rational behavior dictates that the parties should settle to avoid transaction costs. [FN49] The cases that proceed to trial are likely the difficult or close cases in which the parties are more likely to disagree on the predicted outcome. These close cases should ***376** fall more or less evenly on both sides of the decisional standard resulting in a 50% win rate. [FN50]

There are two ways to utilize this economic model to make predictions regarding patent-holder win rates. [FN51] First, selection effect theory suggests that the empirical data regarding patent-holder win rates at trial ought to approach 50% regardless of who the legal standards favor or what biases exist in the adjudication system. Considering whether this simple economic model will accurately predict patent-holder win rates in tried cases requires thinking about how patent cases may deviate from the purified assumptions of the model. Second, selection effect theory suggests that there ought not to be any significant differences in resolution of these cases by judges and juries since any biases that exist for the adjudicator would be factored into the outcome predictions in the determination of what cases to take to trial.

1. Assumptions Underlying the 50% Model

Many empirical studies have failed to substantiate the 50% prediction. [FN52] The win rate tends to be closest to 50% among those cases that conform most closely to the underlying assumptions of the Priest/Klein model. [FN53] First, the model is an “all or nothing” model where damages are stipulated and only liability is in issue. [FN54] Moreover, the model assumes***377** equal stakes, [FN55] symmetrical information, [FN56] risk neutrality, [FN57] and lack of strategic behavior. [FN58] To the extent that one or more of these assumptions does not hold true for a given set of disputes, the outcomes may not approximate 50%.

At least one of these assumptions does not hold true in patent cases. [FN59] If the parties have differential stakes in the outcome, litigation is more likely when the party with greater stakes has a higher probability of success. When the plaintiff stands to gain by winning the exact amount the defendant will lose, the win rate should approximate the decisional standard (50%), if the parties have accurate information about success rates. When the stakes are greater to one party, more victories for that party ought to be observed in litigated disputes. [FN60]

In patent cases, the stakes are frequently asymmetrical. A patent is by its nature a public right. It is not a private contract between two parties, but rather a property right that impacts all competition in a given technology. In most competitive markets, the patent holder has a much greater stake in the outcome of the litigation than does the alleged infringer. A limiting claim construction for the patent holder could insulate many non-parties from future infringement or, if the infringer succeeds on its defenses of invalidity or unenforceability, the ***378** patent will no longer be enforceable against anyone. [FN61] This loss is significantly greater than the monetary damages the infringer would have paid. [FN62]

If these asymmetrical stakes are systematic and predictable, then we would expect to see a higher patent-holder win

rate from the empirical data. Because the patent holder stands to lose more than the defendant, the patent holder will be more risk-averse to trial. Hence, the patent holder will settle close cases (to avoid bad precedent or an invalid patent) and try only those cases it estimates it will win. In light of the systematic asymmetrical stakes present in most patent disputes, the empirical results should implicate a higher win rate for the patent holder (greater than 50% win rate for the patent holder).

2. Selection Effect Theory Predicts Similar Win Rates for Judge and Jury Cases

Under the selection effect theory, judge and jury patent-holder win rates should not reflect bias, even if juries may be biased in all of the popularly perceived manners, because the parties would factor these biases into the outcome estimations, and settle accordingly. [FN63] Hence, the selection effect theory forecasts similar win rates for patent holders before judges and juries. The parties' selection of cases to take to trial would therefore incorporate the litigants' stereotypical views about judge and jury biases. Regardless of whether the overall patent-holder win rate is 50% or higher than 50%, the win rate should not differ substantially in judge and jury cases. Even though there are systematic differential stakes in patent cases, these differential stakes apply equally to cases adjudicated by judge or jury. Deviations from the underlying assumptions are generally useful in explaining empirical results inconsistent with the economic model. These deviations, however, do not generally explain differences between judge and jury ***379** patent-holder win rates, because they do not vary with the mode of trial. [FN64]

II. The Study

Despite increasing skepticism regarding juror comprehension and bias in patent cases, no comprehensive research has been done to ascertain the differences between judge and jury resolution of patent cases or the cause of the increased demand for jury trials in patent cases. [FN65] Very little empirical or economic research has been performed on the function and impact of the patent system. [FN66] This Article provides***380** the first large-scale comparison of patent-holder win rates before judges and juries.

A. The Data Collection: The Administrative Office of the Courts

The Administrative Office of the United States Courts compiles statistics on filed and terminated cases by subject matter. When a patent case is terminated, the district court files with the Administrative Office [FN67] a form that includes the dates of filing and termination of the suit, the judicial district, the procedural stage of the termination (e.g., by court action prior to trial, by the parties in a settlement, or after a trial), the method of disposition (e.g., default judgment, consent judgment, jury verdict, bench trial), whether the case was tried to a judge or jury, who prevailed in the suit (plaintiff or defendant), and what relief was granted. The data set consists of the population of tried cases from 1983 to 1999. The data reflect 1411 cases that reached trial, 1209 of which were resolved by the factfinder. This latter figure includes 533 jury trials and 676 bench trials. [FN68] In these trials, 1948 individual patent claims were tried, 1676 of which were ruled on by the factfinder (781 by jury trial and 895 by bench trial). This includes every jury trial that has taken place in the last 17 years. [FN69]

***381** B. Deficiencies in the Data

The data acquired from the Administrative Office (“AO”) have several weaknesses. Their major deficiency is that they do not contain detailed information about the cases. For example, the AO data are reported only in terms of

plaintiffs and defendants. This creates a problem in determining a patentee win rate. If a suit is a declaratory judgment action brought by the infringer, rather than a patent infringement suit, the data that report judgment for the plaintiff is actually judgment for the infringer rather than the patentee. While 14% of all patent trials were declaratory judgment actions, detailed verification prevented this method of reporting from skewing the outcome rates.

Another limitation in the data is that they only indicate which party won the suit, not the basis upon which the case was decided. [FN70] In addition, the Administrative Office provides very little data on the amount of the damage awards. Only damage awards up to $9,999,000 are recorded. Hence a $200 million damage award is reported the same way as a $10 million damage award. [FN71]

Finally, a few reported cases were eliminated from the data set. Some were not patent trials. For example, a case would be classified as a patent trial, yet the patent claims might have been dismissed by dispositive motion and the only issue actually tried dealt with antitrust or copyright or trade secret. Since these suits were not patent trials, they were eliminated from the study. Duplicate cases were also eliminated. [FN72]

***382** C. The Collection Process

I sought to verify the Administrative Office data and to fill in the missing data by researching each of the decisions reported to the Administrative Office. These data were obtained by locating opinions related to the case or news reports, special verdict forms, district court orders and judgments, complaints, and docket sheets from the district courts. When reported district court or appellate decisions detailing the trial court proceedings could not be located, I contacted the courts, the parties, or the attorneys who represented the parties and obtained judgment sheets, courts orders, and verdict forms. In the small number of instances in which verification of whether a particular issue was tried was not possible, it was excluded from the data set. [FN73] For each case, the following information was collected:

- Party names and docket number.
- Date the suit was filed and date of termination.
- Judicial district in which the proceedings occurred.
- Stage of proceedings when the termination occurred and the manner of the termination (summary judgment, settlement, motion to dismiss, trial, etc.).
- Whether the adjudicator was judge or jury.
- Which party prevailed in the suit (patentee or alleged infringer [FN74]).
- Which party was the patentee.
- How many separate claims were tried (multiple patents or multiple accused products).
- Whether the factfinder found the patent valid or invalid. [FN75]
- Whether the factfinder found the patent enforceable or unenforceable.
- Whether the factfinder found the patent infringed or not infringed.

***383** • Whether the factfinder found the patent willfully infringed or not willfully infringed.

• The amount of damages awarded (not including costs, interest, attorneys fees or trebling).

• Whether and how much the district court enhanced damages after a finding of willfulness.

• Whether there was an appeal to the Federal Circuit and, if so, whether the factfinder's decisions were affirmed or reversed.

The population consisted of 1411 cases comprising 1948 separate patent claims. [FN76]

III. The Empirical Results

The popular view expects greater success for patent holders in patent litigation before juries than for patent holders in litigation before judges. The economic theory, however, forecasts similar success rates for patent holders regardless of adjudicator, assuming that parties have equally accurate information about both. Does either of these views explain the increased demand for jury trials in recent years? The empirical evidence suggests that juries are more likely to hold for the patent holder on some issues, substantiating the popular view. It also exposes some shortcomings of jury decision-making which may not be measurable from appellate affirmance rates.

Surprisingly, few patent cases go to trial each year. For the period of the study, the percentage of patent suits going to trial each year ranged from 3.3% to 11.9%. The percentage of suits going to trial for the entire period was 6.9%. Table 1 contains statistics detailing patent suit resolutions and trials.

***384** Table 1

YEAR	Patent Suits Terminated[FN] [FN77]	# of Patent Trials[FN] [FN78]	% of Patent Cases Going to Trial	# of Jury Trials	% of Trials to a Jury
1983	940	112	11.9	24	21
1984	995	90	9.0	23	26
1985	988	85	8.6	20	24
1986	1088	89	8.2	26	29
1987	1031	89	8.6	37	42
1988	1122	108	9.6	54	50
1989	1248	105	8.4	38	27

1990	1124	96	8.5	34	35
1991	1097	86	7.8	39	45
1992	1315	90	6.8	52	58
1993	1461	94	6.4	47	50
1994	1513	90	5.9	64	71
1995	1509	89	5.9	47	53
1996	1697	101	6.0	54	53
1997	1828	103	5.6	60	58
1998	2034	103	5.1	62	60
1999	2191	73	3.3	49	67

The vast majority of suits are resolved in advance of trial either by the court on dispositive motion or by the parties themselves through settlement. [FN79] Increasingly, the patent cases that do progress to trial have been tried to a jury rather than to a judge. Why has jury resolution of patent cases increased so dramatically in recent years? Has the jury become better or more accurate at adjudicating these cases? Has the jury become increasingly biased in favor of the patent holder on liability or more favorable on damages? A jury trial will result if either side requests one. If neither side requests a jury, the trial proceeds before a judge. If juries are biased in the manner popularly perceived, it is a wonder that there are ever any bench trials. Why would the patent holder ever forgo this valuable advantage? [FN80] This section explores possible explanations for the increased use of juries in patent cases and dissects, as much as possible, judge and jury resolution of patent cases ***385** in the last seventeen years in light of popular perceptions and economic theory on win rates.

Figure 2

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A. Overall Patentee Win Rates

As shown in Figure 2, of the 1209 patent trial decisions in the data set, the patentee won 58% of all suits (706 cases) and the alleged infringer prevailed in 42% (503 cases). [FN81] These data indicate a statistically significant difference in overall win rate for the patentee and infringer. Hence, we can reject with 99% confidence the null hypothesis that either party has an equal chance of winning a patent lawsuit. [FN82]

***386** Table 2: Party Win Rate Suit-by-Suit

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I also considered whether these results would change if overall win rate was determined based on a claim-by-claim analysis rather than a suit-by-suit analysis. A claim-by-claim analysis involves considering the win rate on each patent and product separately. Those results are as follows:

Table 3: Party Win Rates Claim-by-Claim

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These data suggest that there is little difference between examining case win rates and claim win rates. When the jury is the adjudicator, the patent holder prevails in 63% of all claims and 68% of all suits. When the judge is the adjudicator, the patent holder succeeds in 49% of all claims and 51% of all suits.

Figures 3 & 4

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There is a significant difference in win rate when the jury decides patent claims. Hence, the null hypothesis that "when a jury decides a patent claim there is an equal chance of success for the patent holder and the infringer" can be rejected. There is not a significant difference in the win rate, however, when the patent case is decided by a judge (51% win rate). The null hypothesis that "when a judge decided a patent claim there is an equal chance of success for the patent holder and the infringer" cannot be rejected. The identity of the adjudicator, ***387** therefore, is a statistically significant predictor of who wins the claims in the lawsuit. [FN83]

At least initially, the patent-holder win rates follow the pattern predicted by popular perception--namely, higher win rates for the patent holder in jury trials, but not in judge trials. It would seem that the overall patent-holder win rate of 58% could be explained either by the notion that jury biases favor the patent holder, or by the selection effect theory, which predicts a patent-holder win rate above 50% to reflect the differential stakes that exist in patent cases. The data do not support the economic model, however, when broken down by judge and jury. The economic model predicted similar win rates for judges and juries because the parties factor known biases of the adjudicators into the determination of whether to try a case. In jury cases, the win rate exceeds 68%. Again, one might argue that this is attributable to differential stakes in the suit that would cause the patentee to only try cases it has a high probability of winning and that correspondingly, there ought to be a high patentee win rate. This explanation for the higher win rate should be equally true in bench trials, however, but it is not. Bench trial adjudication would support the basic Priest/Klein 50% hypothesis only if there were no systematic differential stakes in these cases. The empirical results suggest that the purified model with its simplistic assumptions does not reflect the reality of patent disputes.

Professors Clermont and Eisenberg, in their study of product liability and medical malpractice cases, also observed a significant difference in judge and jury win rates. [FN84] Their data revealed a significantly higher win rate for plaintiffs in judge trials, contradicting popular perceptions of pro-plaintiff jury bias. [FN85] They considered possible explanations for observable differences in judge and jury resolution of cases and concluded that misperceptions about adjudicators could explain differences in adjudicator win rates. [FN86] If the parties perceive the jury as biased in favor of the patent holder, but the jury turns out not to be biased, then cases that the parties assess to be close cases will actually be losers for the patent holder. If the parties perceive the jury to be bias in favor of the patent holder, but they do not accurately assess the magnitude of the juror bias, apparently close cases could actually be routine winners for the patent holder. Mis-

perceptions regarding the severity of adjudicator bias could be the reason for differences***388** in judge and jury win rate in patent cases, and, at least in patent cases, this misperception may well be tied to the rapid increase in jury demands.

Figure 4 shows that win rates in judge trials have remained relatively constant over the years. Jury win rates fluctuate over time [FN87] and do not reveal a trend towards increasing patent-holder win rates, which might have explained the increase demand for jury trials. It does not appear as though changes in win rates over the last seventeen years can explain either the increase in juror resolution of patent cases or the difference in judge and jury win rates, unless the answer lies in the fluctuation itself. Perhaps bench trial win rates approximate 50% because judges are more consistent, allowing the parties to evaluate more accurately their relative win rates before a judge. The most important assumption of the Priest/Klein model is that parties form rational estimates of likely outcome based on applicable legal precedent and adjudicator bias. [FN88] The Priest/Klein model assumes that if parties are making outcome estimation errors, the errors are homoskedastic, that is, independent of each other and random. [FN89] As party estimation error diminishes, the patentee win rate should approach 50%. [FN90] Stated another way, if the parties are unable to estimate outcome predictably because of a lack of clarity in the legal standard that will be applied or because of unpredictability in the adjudicator's application of the legal standard, then their estimation error will be higher and the tendency towards a 50% outcome prediction less certain.

Figure 5

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***389** The seventeen-year time line for judge resolution of patent trials shows a relatively steady patent-holder win rate over the years. This indicates that judges' behavior in adjudicating patent disputes has followed expected patterns. Such predictability allows for more accurate outcome estimation by parties, which will result in an outcome rate closer to the decisional standard (50%). However, with jury resolution of patent trials being considerably less predictable during the seventeen-year time line (due in part to the relatively small number of jury trials that traditionally occurred), parties are less capable of accurately estimating outcome. If, however, the parties realize that the jury is less predictable and that their outcome estimations are less accurate, one would expect the settlement range for both sides to increase and thereby reduce the number of cases going to trial. Moreover, there is no reason to believe error would be systematically skewed in one direction.

The phenomenon of jury resolution of patent cases is relatively new. As the parties and their attorneys become more experienced with jury resolution of patent cases, outcome estimation error will likely diminish, and there should be a progressive convergence toward an observable 50% outcome. [FN91] Estimation error decreases with experience under a legal standard because the legal standard becomes more defined over time with experience; it becomes more predictable and more certain. [FN92] A jury may never be like a legal standard, because juries are one-time players in the litigation game and have no opportunity to learn from or build on past juror experiences or reasoning. If popular perception holds true, juries may be biased in ways that defy predictability. One can predict jury biases in favor of the patent holder, but it is more difficult to quantify juror incompetence to resolve technical matters or juries being swayed by emotional or tangential issues in a case.

B. Substantive Issues Tried

In order to dissect further each patent trial and isolate the issues that affect win rates before judges and juries, the 1209 cases going to trial in the data set are broken down by substantive issue: validity, enforceability, infringement, willfulness, and damages. A decision on one ***390** of these issues is reported below only if it was made by the factfinder

(resolved at trial).

Table 4

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The results of the study allow confident assertion of the following:

• patents are more likely to be held valid than invalid; [FN93]

• patents are more likely to be held enforceable than unenforceable; [FN94]

• patents are more likely to be held infringed than not infringed; [FN95]

• patents are more likely to be held willfully infringed than not willfully infringed; [FN96]

• patents are more likely than not to be held valid, [FN97] enforceable, [FN98] infringed, [FN99] and willfully infringed [FN100] when adjudicated by a jury;

• patents are more likely than not to be held valid, [FN101] enforceable, [FN102] and infringed [FN103] when adjudicated by a judge;

***391** • either party has an equal chance of winning on the issue of willfulness when adjudicated by a judge. [FN104]

The higher win rate for the patent holder on the issues of validity and enforceability could reflect the fact that the patent is presumed valid and that the infringer must therefore prove the affirmative defenses of invalidity or unenforceability by clear and convincing evidence. [FN105] This evidentiary burden is higher than the evidentiary standard of preponderance of the evidence which applies to infringement. [FN106] The patent holder, however, must prove willfulness by clear and convincing evidence, [FN107] and they are able to do so with great frequency when juries are adjudicating the issue.

These findings suggest that the patent holder has an edge on almost every issue in front of any adjudicator. Patent holders tend to succeed on the same types of issues before judges and juries, with the exception of willfulness where the jury is much more pro-patentee than the judge. The empirical results suggest that the evidentiary burden of proof is more meaningful when judges are adjudicating. When judges adjudicate validity and enforceability, infringers are only successful 36% and 28% of the time, respectively. Juries conclude patents are invalid or unenforceable 29% and 25% of the time, respectively. Patent holders' success rate in proving willful infringement, which also has the higher evidentiary burden, is 53% when judges are adjudicating the issue. When juries decide willfulness, patent holders are successful in 71% of the cases. On the issue of infringement, judges find infringement in 59% of the cases, reflecting this issue's lower evidentiary burden of preponderance of the evidence. Juries find infringement in 71% of the cases, which, considering the difference in evidentiary standards, is remarkably close to juries' findings of willfulness. This contrast with judges' tendencies suggests that juries may be ***392** swayed by bias and may not be giving the evidentiary burden much significance.

1. Invalidity and Unenforceability: Not Easy Defenses at Trial

These data reveal the impact that the choice of adjudicator has on the outcome of each issue. Adjudicator is a significant predictor for validity [FN108] but not for enforceability. [FN109] Judges and juries uphold the validity of patents

with roughly the same frequency--64% and 71% respectively. [FN110] The fact that there is a significant difference between judge and jury adjudication of validity substantiates popular expectations that juries are more likely than judges to hold a patent valid because of perceived deference to the PTO. Other studies have indicated that when judges invalidate patents, they are more likely to do so on a dispositive motion in advance of trial than in a ruling following a trial. [FN111] The import of this tendency is obvious: infringers need to put forth their best case of invalidity prior to trial, because if the case makes it to trial before either adjudicator, the patentee holds a significant advantage in challenges to the patent. The data set for the present study includes only tried cases; it does not include dispositive motions. [FN112] For this reason, it may underestimate the total likelihood of judicial invalidation.

***393** 2. Infringement and Willfulness: Does the Jury Know Them When It Sees Them?

Adjudicator is not a significant predictor for challenges to the patent's enforceability, but it is a significant predictor for infringement [FN113] and willfulness. [FN114] We can reject (with 99.9% confidence) the null hypotheses that there is no difference between judge and jury resolution of infringement and that there is no difference between judge and jury resolution of willfulness. The fact that juries are significantly more likely to find infringement and willfulness than a judge suggests that juries may harbor (as borne out by the outcome data) the popularly perceived bias in favor of the patent holder. These results could also support the common skepticism regarding the jury's ability to resolve complex, technical issues. If juries are less adept than judges at understanding the intricacies of complex technology, subtle technical differences between an alleged infringer's product and the product(s) covered by a patent may be lost on them--with the result that they find infringement more frequently.

Juries find willfulness in almost three of four cases (71%) and judges only find it half the time (53%), suggesting that juries are more easily convinced of an infringer's thieving intent. Juries may perceive the patentee who brings an infringement action as a victim and an infringer accused of stealing patented technology, a villain. To find willfulness, the factfinder must conclude that the infringer intentionally or flagrantly disregarded the patentee's rights. The outcome data indicate that juries are more easily persuaded than judges by “bad guy” evidence.

After a factfinding of willful infringement is made by the judge or jury, the judge has the discretion to enhance damages, up to trebling, and to award attorneys' fees. [FN115] The judge considers many factors in determining whether to enhance damages for willfulness including whether the infringer deliberately copied the patented technology, the infringer's behavior, size and financial condition, and closeness of the case. [FN116] I examined the percentage of cases in which willfulness is found, how often damages are enhanced in response to willfulness, and how much they are enhanced. Judges considered whether to enhance damages in 219 cases, [FN117] and the mean enhancement amount was ***394** 1.69, indicating a mean of less than double damages when enhancement is considered. Table 5 details the likelihood that damages will be enhanced by the judge.

Table 5

	TOTAL	Jury Decided Willfulness	Judge Decided Willfulness
Enhancement[FN118]	219	136	83

0	63 (30%)	59 (44%)	4 (5%)
1-1.9	23 (11%)	15 (11%)	8 (11%)
2-2.9	50 (24%)	24 (18%)	26 (35%)
3	74 (35%)	37 (27%)	37 (50%)
Mean Enhancement	1.69	1.33	2.33
Attorney Fees Awarded	84	50	34

Who decided that the patent was willfully infringed (judge or jury) is a statistically significant predictor of enhancement. [FN119] These data indicate that in 95% of the cases in which the judge found willfulness, damages were likely to be enhanced; however, when a jury found willfulness, the judge only enhanced damages in 63% of the cases. Attorneys fees were awarded to the patentee by the judge after a finding of willfulness in 84 cases: 50 in which the jury decided willfulness and 34 in which the judge decided willfulness. In some instances, attorney fees were awarded in addition to multiplying damages; in some instances, attorney fees alone were awarded as an enhancement. These data indicate that judges function as a check to temper jury findings on willfulness--or that judges simply give themselves more credit in terms of the likelihood that the willfulness decision is correct.

C. Damages

Of the 1209 tried cases in the data set, the factfinder awarded damages in 501. [FN120] These awards are the raw compensatory dollar value ***395** found by the factfinder; they are exclusive of costs, interest, trebling, or attorneys' fees. To prevent a few exorbitant awards from distorting the data, [FN121] the awards are examined in the following groupings: $0-$500,000; $500,001-$1,000,000; $1,000,001-$5,000,000; $5,000,001-10,000,000; $10,000,001 and up.

Figure 6

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Although adjudicator (judge or jury) is a statistically significant predictor for damages as grouped above, [FN122] the perception that juries are much more likely to award multimillion dollar damages seems unfounded. Judges make damage awards in excess of $5 million in 17% of the cases, and juries award them in 21%. Jury awards, as the Figure shows, are higher than judge awards, but the magnitude of the discrepancy is lower than popularly predicted. This may be attributed in part to the fact that many parties who fear large jury verdicts settle their cases rather than take a chance on a runaway verdict. [FN123]

***396** D. Appeals

> Frankly, I don't know why I'm so excited about trying to bring this thing [patent suit] to closure. It goes to the Federal Circuit afterwards. You know, it's hard to deal with things that are ultimately resolved by people wearing propeller hats. But we'll just have to see what happens when we give it to them. I could say that with impunity because they've reversed everything I've ever done, so I expect fully they'll reverse this, too.
>
> -- Judge Samuel B. Kent [FN124]

In order to assess the "accuracy" of the factfinder's decisions, the following issues were considered: how many of the final judgments were appealed, which issues were appealed, and the affirmance and reversal rates by issue and by adjudicator. Overall, district court reversal rates for all cases appealed to the Federal Circuit for each calendar year are as follows:

Year	% reversed
1993	26%
1994	31%
1995	17%
1996	13%
1997	29%
1998	19%

The data from this study should have demonstrated a considerably lower reversal rate than these overall rates because the data set was limited to issues resolved at trial by a factfinder. Such factual issues would be subject to the clearly erroneous standard of review for factfindings by the bench [FN125] and the substantial evidence standard of review for factfindings by the jury. [FN126] These deferential standards of review should result in a greater number of overall affirmances (lower reversal rates) by the Federal Circuit than in cases resolved on dispositive motions (such as summary judgment), where the standard of review***397** would be de novo. But such was not the case. Although the "substantial evidence" standard (for juries' findings) is, in theory, more deferential than the "clear error" standard (for judges' findings), there is no practical difference that would predict different affirmance rates under the two standards. [FN127] The tables below contain appeal results from the data set of tried cases. The first table contains the number of cases and issues appealed and overall affirmance and reversal rates. [FN128]

Table 6

	All Decisions	Decided By Jury	Decided By Judge
Cases Appealed	620 (51%)	230 (43%)	390 (58%)

Cases Not Appealed	589 (49%)	303 (57%)	286 (42%)
Issues Appealed[FN129]	1261	490	771
Affirmance	78% (979)	78% (381)	78% (598)
Reversal	22% (282)	22% (109)	22% (173)

The results are remarkable. The Federal Circuit affirms judge factfindings in 78% of all judge issues appealed and affirms jury factfindings in 78% of all jury issues appealed. [FN130] These data indicate that the Federal Circuit upholds the findings of both types of adjudicators at the same rate, suggesting that jury factfindings are no less "accurate" than judge factfindings, as measured by appellate affirmance rate.

Perhaps the appellate affirmance rate over time could help explain the increased demand for jury resolution of patent cases. [FN131] Yet, as ***398** Figure 7 indicates, there has been no improved "accuracy" as measured by Federal Circuit affirmance over time of jury trials that explains their increased demand. [FN132]

Figure 7

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1. Appeals By Substantive Issue

In order to examine further the affirmance rate of the adjudicators on appeal, the 1261 appealed issues are broken up by subject matter. As Figure 8 indicates, the issues most frequently addressed on appeal are infringement and validity. These data do not correspond directly to the overall frequency with which particular issues are appealed because not all appealed issues are actually decided by the court. In many cases in the data set, several issues were appealed but the Federal Circuit limited its review to what was necessary to resolve the case. For example, an appeal might be made on validity, enforceability, and infringement by the party who lost on those issues, and the Federal Circuit might hold the patent invalid and not reach the other issues. The category "?," which comprises 3% of appealed issues, represents summary affirmances for which I was unable to obtain briefs to ascertain the issues appealed. [FN133]

***399** Figure 8

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Table 7

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The appellate affirmance rates for judge and jury resolution of the substantive issues of validity, infringement, and enforceability are almost identical. The affirmance rate for willful infringement is considerably higher when the jury finds willfulness. Is the jury more "accurate" at assessing bad intent than the judge? Jury findings of willfulness alone

have little meaning in an infringement litigation unless the judge agrees to enhance the damage award as a result. As discussed above, judges are a significant check on juries' willfulness findings and are much more likely to enhance their own willfulness findings. [FN134] It is therefore unsurprising that willfulness findings by the jury generally are appealed only when the judge enhances damages. [FN135] Because virtually all jury willfulness findings that are appealed have actually been endorsed both by the jury, who made the finding, and by the judge, who decided the willfulness warranted enhanced damages, it is not surprising that these findings have a higher appellate affirmance rate.

***400** Figure 9

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There are several points worth noting about these appellate affirmance rates. First, the standards of review for the various issues differ but are generally very deferential. Infringement and willfulness are fact questions that would be reviewed under the substantial evidence standard for jury findings and the clearly erroneous standard for judge findings. As previously discussed, there is not much practical difference between these standards. Validity is a question of law which is reviewed de novo regardless of adjudicator. Certain types of validity decisions, such as obviousness, however, are questions of law based on underlying facts determined by the factfinder and those facts are reviewed under the deferential standards for each adjudicator. Enforceability is an equitable consideration which is reviewed under the abuse-of-discretion standard of review. These very deferential standards of review make appellate review far from an "accuracy" meter.

Second, there is a significant difference between what these two adjudicators give the Federal Circuit to review. Judges are required by Rule 52(a) to articulate their findings of fact and conclusions of law. [FN136] Hence, the appellate court has a detailed roadmap of the district court judge's decision. The judge's findings, decisions, and reasoning are open to scrutiny by the appellate court. If the judge made erroneous factfindings or misapplied the law, the Federal Circuit can correct these errors on appeal. The jury's findings, however, cannot be dissected and reviewed by the appellate court, because the jury is not required to articulate reasoning for its judgments. In fact, the Federal Circuit has concluded that it lacks supervisory power over the district courts [FN137] and therefore cannot even mandate the use of special verdict ***401** forms or general verdicts with interrogatories. [FN138] Although special verdict forms are used in most patent trials, most of them are very general in nature and give no insight into the jury findings on particular issues. The special verdict might simply ask, "Did the defendant prove the patent obvious by clear and convincing evidence?" Seldom do the special verdict forms actually force the jury to answer questions regarding the underlying facts. These sorts of verdicts are sometimes referred to as black box verdicts. With no insight into the jury's factfindings or reasoning underlying the verdict, how then can the Federal Circuit review the verdict on appeal?

The Federal Circuit reviews black box jury verdicts by presuming that the jury found all facts in the record in support of the verdict it chose. [FN139] This evaluative process makes it much more difficult to overturn the black box jury verdicts on appeal than it is to overturn a judge verdict with its detailed factfindings and reasoning. This review process may mask errors in jury comprehension of the technology at issue and potential flaws in the application of the law to the facts. For this reason, appellate affirmance rates provide little insight into the "accuracy" of jury decisionmaking. Given deferential standards of review, a lack of transparency in jury findings, and inability to mandate special verdicts, the Federal Circuit has limited ability to identify and correct jury inadequacies.

***402** E. Problems with Jury Resolution of Issues That Can Be Teased Out of the Data

As the statistical data thus far have shown, juries may harbor some of the biases that popular perceptions about them

suggest. Juries do find for the patent holder more often on validity, infringement, and willfulness issues and they do award somewhat higher damages. The magnitude of the differences is much smaller than many might have anticipated, however. This could be explained in part by the economic models of selection effect theory, which suggest that known biases ought not to appear in the outcome data for tried cases because these biases would have been factored into the parties' estimations and decisions regarding settlement. Because tried cases are not a random subset of all disputes, I would not expect outcome data to reflect real biases or incompetence that may exist.

If I stopped here, I might conclude that the data have not substantiated significant reasons for concern about jury competence. There are other ways, however, to evaluate and assess the statistical data to ascertain whether they suggest that there are problems with jury resolution of patent cases. The remainder of this Part performs that evaluation.

1. Winning is All or Nothing: Correlation Between Validity and Infringement of Same Patent

Many believe that juries vote for parties rather than decide issues, and that tangential issues sway decisionmaking. [FN140] In order to test this idea, I looked at how many patent claims get decided all for a single party, and how many produce mixed results on validity and infringement, and what happens when there are multiple patents being tried. In evaluating each case where the factfinder considered both infringement and validity issues for the same patent, I determined in what percentage of cases the factfinder found for the same party on both issues. The chart below shows the possible choices:

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If the factfinder found the patent valid and infringed or invalid and not infringed, then those claims would be counted as a verdict for the same party. If the factfinder found the patent invalid but infringed or valid ***403** but not infringed, then the claim would be counted as a mixed result. [FN141] As Figure 10 indicates, juries are much more likely than are judges to find for the same party when multiple issues need to be resolved. Juries find for the same party in 86% of all instances where they resolve both validity and infringement. Judges find for the same party only 74% of the time. This difference in how judges and juries resolve multiple issues regarding a single patent claim is statistically significant. [FN142]

Figure 10

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2. Winning is All or Nothing: Multiple Claims

In 301 of the 1209 suits in the data set (25%), the trial involved two or more patents or alleged infringement by two or more distinct products. [FN143] I expected a correlation in outcome of multiple claims, because generally when multiple patents are asserted, they are related patents with similar limitations and similar infringement analysis. This expected correlation did not, however, predict the difference between judge and jury resolution of multiple claim cases which the data revealed.

***404** Judges reached mixed results with significantly greater frequency than juries, which decided cases in an all-or-nothing fashion. When the jury resolved multiple claims, in 87% of the cases it would resolve all the claims for the same party, while judges resolved all claims for the same party 72% of the time.

Figure 11

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Adjudicator (judge or jury) is a statistically significant predictor of whether multiple issues and multiple claims will get resolved for the same party or with mixed results. [FN144] These data may indicate that juries are less able to understand the subtle technical differences which would result in mixed conclusions, while judges may be more subtle at resolving claims issue-by-issue rather than suit-by-suit.

3. Declaratory Judgment Actions

A perception exists that the alleged infringer will achieve some advantage by filing a declaratory judgment action against the patentee rather than waiting for the patentee to file an infringement suit. By filing the declaratory judgment action, the alleged infringer is able to choose the forum (the one it thinks most sympathetic to it) and the time that the suit will begin (enabling it to surprise the patentee and force it to litigate before it might be ready).

Of the 1209 cases in the data set, 14% (168 cases) were declaratory judgment actions brought by the alleged infringer. [FN145] Of the 1676 separate claims, 15% (243) were declaratory judgment claims.

***405** Table 8

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Who files the suit (patentee or alleged infringer) is a statistically significant predictor of who wins patent claims. [FN146] It is also a statistically significant predictor of validity, [FN147] enforceability, [FN148] and infringement, [FN149] but not willfulness. [FN150]

When these results are broken down by adjudicator, there are significant differences. Who filed the suit is a statistically significant predictor of who wins patent claims in jury trials, [FN151] but not in bench trials. [FN152] The difference for jury trials may occur because: (1) there is some advantage gained by the choice of forum; (2) the infringer benefits from determining when the lawsuit begins; or (3) the jury is less likely to be biased in favor of the patentee when the infringer brings suit rather than the patentee. If popular perception is accurate, juries are more likely to find for the patent holder when they perceive her as the injured party seeking vindication. When the infringer brings suit, the patent holder may appear to be less of a victim and the infringer less of a villain. [FN153]

***406** Figure 12

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Breaking the claims down by substantive issue merely echoes the outcome findings. In jury trials, who files suit is a statistically significant predictor of validity, enforceability, and infringement, but not willfulness. In bench trials, however, who files suit is not a statistically significant predictor for resolution of any of the substantive issues. Namely there is no obvious impact in the outcome data of judge resolution of declaratory judgment actions versus patent infringement suits.

Figure 13

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***407** Figure 14

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These data suggest that forum selection may impact outcome. Perhaps most significantly, the data imply that juries, but not judges, are much more sympathetic to the patent holder when the patent holder brings the infringement suit and much less so when the accused infringer seeks declaratory judgment.

F. Multivariate Regression Model

A multivariate regression model has been used to isolate the effects of several independent variables on patent-holder win rate. [FN154] The dependent variable is patent-holder win rate (win or lose) and the independent variables are adjudicator (judge or jury), year of judgment, and who filed suit (patent holder or accused infringer). Multivariate regression facilitates examination of the separate effect of each independent variable on the dependent variable (patent-holder win rate)--that is, the statistical significance of each independent variable in predicting patent-holder win rate.

Table 9

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***408** Table 9 shows that who adjudicates the case (judge or jury) and who files the case (patent holder or accused infringer) are significant predictors of the patent-holder win rate, but the year of the judgment is not a significant predictor of patent-holder win rates. When all these variables are held constant in the regression, who adjudicates the case, judge or jury, continues to have a significant effect on patent-holder win rate.

The logistic regression makes possible estimation of the magnitude of the effect on outcome produced by each independent variable. Using the coefficients from Table 9, one can calculate the approximate change in win rate attributable to who is adjudicating the case. Compared to a bench trial, in which the patent holder has a 50% chance of winning, the patent holder in an identical case tried to a jury has a 65% chance of winning. [FN155] Compared to a case in which the accused infringer filed suit, where the patent holder has a 50% chance of winning, when the patent holder files the suit the chance of winning increases to 64%.

Conclusions

In this Article, a database of all tried patent cases from 1983 to 1999 has been used to test popular perceptions of juror bias and incompetence and academic predictions of win rates. At times, the statistical results do validate some popular perceptions about judges and juries. Patent holders have been more successful in jury trials than in bench trials. Juries find for the patent holder more often on validity, infringement, and willfulness issues and they do award higher damages. The magnitude of the differences, however, is much smaller than many might have anticipated. In addition, there are no significant differences in outcome data from judge and jury trials on the issue of enforceability of the patents confounding popular perception.

This could be explained by the economic models of selection effect theory which suggest that known biases ought not to appear in the outcome data for tried cases because these biases would have been factored into the parties' estimations and decisions regarding settlement. Because tried cases are not a random subset of all disputes, I would not expect outcome data accurately to reflect real biases or incompetence that may exist.

Concerns that juries are incompetent to resolve patent cases seem unsubstantiated by the results at first blush. Judges and juries are affirmed***409** on appeal with equal frequency. The problem with using outcome data and appellate affirmance rate as a measure of juror competency may lie in the lack of transparency of black-box jury verdicts combined with the deferential standards of review. It may be that the appellate affirmance rate and outcome data do not tell the whole story.

Closer scrutiny of judge and jury decisionmaking elucidates differences which could implicate flaws in juror comprehension. Juries do not delineate issues in patent cases whether it be infringement and validity or infringement of multiple patents. Juries decide patent cases on an all-or-nothing basis more frequently than judges do. Jury decisions in declaratory judgment actions are also problematic. The patent holder has a significantly greater win rate in actions brought by the patent holder than in declaratory judgment actions brought by the infringer. If this were true for both judge and jury trials, one could conclude that infringers only bring the action when they have stronger cases. There is no difference, however, in win rates in judge trials between infringement actions and declaratory judgment actions.

The most plausible explanation of the data is that there are some differences in judge and jury resolution of patent cases. Because the database of tried cases is not a random or representative sampling of all patent disputes, however, it is impossible to quantify these differences beyond the results disclosed. It may be that the biases implicated by the outcome data can be identified because there has been a dramatic rise in demand for jury trials of patent cases. The parties' outcome estimations have a higher error rate because of the sudden increased demand for juror resolution of patent cases. If this explanation is correct, jury outcome data should tend towards 50% as parties get better at predicting outcome when juries are involved. This, of course, presumes that jury decisionmaking will become more predictable over time. Only time will tell.

[FNa1]. Associate Professor, George Mason University School of Law. B.S.E.E. 1990, M.S. 1991, Massachusetts Institute of Technology; J.D. 1994, Georgetown. I am grateful to Anita Bernstein, Theodore Eisenberg, David Hyman, Bruce Kobayashi, Leandra Lederman, Mark Lemley, Clarisa Long and Matthew Moore for helpful comments on earlier drafts of this work. I wish to thank the Statistics Division of the Administrative Office of the U.S. Courts with special thanks to Maurice Galloway for providing a starting point for my research. I would also like to thank the many research assistants who helped with data collection and Marilyn S. Murphy and Susan G. Dorsey for statistical help. For additional information or comments, the author can be contacted at kamoore@gmu.edu.

[FN1]. Judicial Panel Discussions on Science and the Law, 25 Conn. L. Rev. 1127, 1144 (1993) (statement of Judge Covello, U.S. District Judge, Dist. of Conn.).

[FN2]. See, e.g., The Advisory Commission on Patent Law Reform, A Report to the Secretary of Commerce 107 (1992) [hereinafter Advisory Report] (discussing problems with jury trials of patent cases); Fourth Biennial Patent System Major Problems Conference, 34 IDEA 77 (1994) [hereinafter Major Problems Conference] (twenty-nine prominent patent practitioners and professors debate the role of the jury in patent cases); John B. Pegram, Should the U.S. Court of International Trade Be Given Patent Jurisdiction Concurrent with that of the District Courts?, 32 Hous. L. Rev. 67, 70-84 (1995) (reporting that principal complaints regarding adjudication of patent suits are unpredictability, delay, and expense); Edmund L. Andrews, A ‘White Knight’ Draws Cries of ‘Patent Blackmail, ’ N.Y. Times, Jan. 14, 1990, § 3, at 5 (calling a jury trial of a patent case “a ‘judicial lottery,’ an often unpredictable system that can yield huge rewards for those who are sufficiently aggressive”); Richard B. Schmitt, Juries' Role in Patent Cases Reconsidered, Wall St. J., Feb. 18, 1994, at B6 (quoting patent attorney Donald Dunner as saying, “Give [jurors] a complicated biotechnology case or one involving lasers or computers, and their eyes glaze over,” and Professor Martin J. Adelman as saying that jury confu-

sion has created “a system of justice that is basically a lottery”). As Judge Nies stated in her dissent in In re Lockwood, “No more important nor contentious an issue arises in patent law jurisprudence than the appropriate role of juries in patent litigation.” In re Lockwood, 50 F.3d 966, 980-81 (Fed. Cir. 1995) (Nies, J., dissenting), vacated, 515 U.S. 1182 (1995).

[FN3]. Act of April 10, 1790, ch.7, § 4, 1 Stat. 109, 111.

[FN4]. Act of July 8, 1870, ch. 230, § 55, 16 Stat. 198, 206.

[FN5]. Director of the Administrative Office of the United States Courts Annual Report 109 tbl. 8 (1941). 1940 was the first year these statistics were compiled.

[FN6]. In 1968, 3.7% of the cases that went to trial (4 of 108 cases) were tried to a jury. Director of the Administrative Office of the United States Courts Annual Report 209 tbl. C4 (1968). In 1969, 2.1% of the cases that went to trial (2 of 95 cases) were tried to a jury. Director Admin. Off. U.S. Cts. Ann. Rep. 222 tbl. C4 (1969). In 1970, 2.6% of the cases that went to trial (3 of 116 cases) were tried to a jury. Director Admin. Off. U.S. Cts. Ann. Rep. 245b tbl. C4 (1970).

[FN7]. In fiscal year 1997, 52% of all patent cases (54 out of 103) were tried to a jury. Admin. Off. U.S. Cts., Jud. Bus. U.S. Cts. 153 tbl. C4 (1997). In fiscal year 1998, 60% (62 out of 103) of all patent cases were tried to a jury. Admin. Off. U.S. Cts., Jud. Bus. U.S. Cts. 167 tbl. C4 (1998). In fiscal year 1999, 62% of all patent cases (61 out of 98) were tried to a jury. Admin. Off. U.S. Cts., Jud. Bus. U.S. Cts. 161 tbl. C4 (1999).

[FN8]. The Federal Circuit recently has had three occasions to consider whether the Seventh Amendment's guarantee of a jury trial applies to certain aspects of patent litigation. The first was the 1995 case, In re Lockwood, 50 F.3d 966 (Fed. Cir.), vacated, 515 U.S. 1182 (1995), in which the Federal Circuit held that there was a Seventh Amendment right to a jury trial of validity issues in a declaratory judgment action. The Supreme Court vacated this decision after the plaintiff withdrew his request for a jury trial. The second was the en banc decision in Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed. Cir. 1995), aff'd, 517 U.S. 370 (1996), which addressed the Seventh Amendment right to have a jury interpret patent claims. The Supreme Court affirmed the Federal Circuit decision that the construction of patent claims is a task exclusively to be performed by the judge. The Court found that a judge, with her legal training, is better equipped than a jury to construe patent claims. Markman, 517 U.S. at 388-89. The third, also in 1995, was another en banc decision, Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512 (Fed. Cir. 1995), rev'd, 520 U.S. 17 (1997), in which the Federal Circuit held that infringement under the doctrine of equivalents is a question of fact to be decided by the jury, rather than a question of law to be decided by a judge. The Supreme Court declined to decide conclusively whether this issue should be decided by a judge or jury, instead offering what it termed “guidance” to help facilitate uniformity and reliability. Hilton Davis, 520 U.S. at 39 n.8. The Court encouraged greater participation by the judge, more frequent use of summary judgment, and increased use of special verdict forms and interrogatories. Id.

[FN9]. The American Intellectual Property Law Association conducted an economic survey in 1995 that examined the total cost of a patent infringement suit from filing to final adjudication, including all attorneys' fees, court costs, and other expenses. The analysis was broken down by geographic area and cost of litigation. In California, the median legal costs for a patent litigation were $2,493,000. 1999 American Intellectual Prop. Law Ass'n, Report Of Economic Survey 72 tbl. 22.

[FN10]. Details on the acquisition of this data set are provided in Part II. The data set includes every patent case that went to trial in the United States from the period 1983-1999 as reported to the Administrative Office of the Courts. I have personally verified the substantive issues resolved by the factfinder in each of these cases.

[FN11]. The Federal Circuit was created in 1982 by the merger of the United States Court of Claims and the United States Court of Customs and Patent Appeals. See Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (1982).

[FN12]. I do not mean to suggest that the mere lack of disturbance on the part of the Federal Circuit of tried issues on appeal indicates that the factfinder reached the "accurate" or right result. The most that can be said about the high affirmance rate is that the Federal Circuit could not conclude that the jury's verdict was not supported by substantial evidence (on fact questions) or that the court's decision was not clearly erroneous (on fact questions). This issue is discussed more fully infra notes 125-132 and accompanying text.

[FN13]. See infra notes 21-24 and accompanying text.

[FN14]. See Allan N. Littman, The Jury's Role in Determining Key Issues in Patent Cases: Markman, Hilton Davis and Beyond, 37 IDEA 207, 209 (1996) (stating that juries favor the patent holder); Major Problems Conference, supra note 2, at 82 (quoting patent attorney Don Dunner: "I am privy, as other [sic] of you may be, to some statistics in Delaware. The last fourteen patent jury cases tried in the District of Delaware, all resulted in holdings in favor of the patent owner except for one, which was a hung jury, and that does not bode well for the system. I don't think jurors by and large are capable [of] doing the job nearly as well as judges").

[FN15]. See infra note 31 and accompanying text.

[FN16]. See Jack L. Lahr, Bias and Prejudice Against Foreign Corporations in Patent and Other Technology Jury Trials, 2 Fed. Cir. B.J. 405, 405 (1992) ("A widespread perception within the corporate communities of many industrial countries holds that they will be treated unfairly in U.S. jury trials due to the jury bias and prejudice against foreigners.").

[FN17]. See Timothy L. Swabb, Federal Circuit Cannot Stop Runaway Jury Awards in Patent Suits; Companies Should Insure Themselves Against this Risk, Mealey's Litig. Rep.: Patents, Sept. 5, 1995, at 11, 11.

[FN18]. See Gregory D. Leibold, In Juries We Do Not Trust: Appellate Review of Patent-Infringement Litigation, 67 U. Colo. L. Rev. 623, 623 n.4, 624 (1996); Swabb, supra note 17, at 13.

[FN19]. Decision Quest, a trial consulting firm specializing in jury behavior and trial strategy, has concluded that juries believe that:

-- regarding the patent itself, patents are almost impossible to get, the information in them is secret, they last forever, and they can't be invalidated;

-- regarding the patent process, patent applications are thoroughly reviewed by the Patent Office, and patent applicants don't lie;

-- regarding patent suits and the claims and defenses raised, patentees are expected to vigilantly enforce their patents in a timely manner, plaintiffs often overdefend validity and wind up hurting their case, inequitable conduct is a difficult defense because the patent office impartially and diligently reviews each application, it is an important defensive tactic to provide an alternative motivation for the plaintiff's suit, and the "human" aspect of the case story is more important than the details of the technology and infringement evidence;

-- regarding corporations, big companies stealing ideas from one another is commonplace, patents hurt competition between corporations, and it is not unusual for a company to change one or two things and then call it a new idea; and

-- regarding inventors, they are idealized by the jury, they are often victimized by powerful companies, and the more an inventor can be personalized in the case, the greater the impact on the jury.

Nicholas M. Cannella & Timothy J. Kelly, Jury Trials and Mock Jury Trials, in Practicing Law Institute, Patent Litigation 1993, at 731, 741-42 (PLI Patents, Copyrights, Trademarks, and Literary Property, Handbook Series No. G-375).
[FN20]. See, e.g., Richard P. Cusick et al., A Critical Analysis of the Proposed National Patent Board, 13 J. Ohio St. J. on Disp. Resol. 461 (1997) (endorsing a proposal for an industry-sponsored National Patent Board ("NPB") to resolve patent infringement disputes); Leibold, supra note 18 (recommending the creation of a specialized trial court or panels of expert juries to resolve patent cases); Major Problems Conference, supra note 2; Pegram, supra note 2 (discussing inadequacies in patent infringement adjudication system and proposing that the U.S. Court of International Trade be given patent case jurisdiction); Franklin Strier, The Educated Jury: A Proposal for Complex Litigation, 47 DePaul L. Rev. 49 (1997) (proposing use of specially qualified juries in cases such as patent litigation where the lay jury is ill-equipped to deal with the complexity of the issues being tried); Tom Arnold, Why is ADR the Answer?, Computer Law, July 1998, at 13 (suggesting that Alternative Dispute Resolution would be better than judge or jury resolution of patent cases).

[FN21]. An interface is the connection between a computer and an auxiliary piece of equipment. This concept was discussed at length during this trial.

[FN22]. Record at 19,490-91, ILC Peripherals Leasing Corp. v. IBM Corp., 458 F. Supp. 423 (N.D. Cal. 1978), aff'd sub nom. on other grounds, Memorex Corp. v. IBM Corp., 636 F.2d 1188 (9th Cir. 1980).

[FN23]. For example, following the antitrust trial quoted above, see supra text accompanying note 22, the district court judge noted that only 1 out of 11 jurors had even limited technical education. See ILS Peripherals, 458 F. Supp. at 448. Here is another example of attention to jurors' educational backgrounds:

After three years of trial preparation, almost a month of courtroom battle and six hours of jury deliberation, the patent trial between inventor Raymond Damadian and General Electric Co. appeared to have come to a climax. "We have reached a decision," the bailiff said, reading the message from the jury to a hushed audience of lawyers who had rushed in to brace for the verdict. "We need more Diet Coke." GE's attorneys didn't smile at the attempted humor. Nor were they amused two hours later when the jury delivered a real punchline: A $110.5 million verdict against GE for infringing on two patents covering magnetic resonance imaging technology. GE's not alone in being touchy on this issue. The Fairfield, Conn.-based manufacturer is only the latest company to get walloped by a big jury verdict in a patent suit. And like most corporate defendants, GE took its wrath out on the jurors, saying the panel "apparently acted on emotion, not facts or law" by favoring an underdog inventor over a deep-pocketed corporation. Corporate defendants and patent lawyers have long griped that intellectual property litigation is too complex to leave to plumbers, housewives, mailmen and music teachers.

Jury Cases on Patent Infringement on Trial, Chi. Trib., June 12, 1995, at 6, available at 1995 WL 6216112 (emphasis added).
[FN24]. Schmitt, supra note 2; see also Advisory Report, supra note 2, at 107 (asserting that comprehending patent trial principles is very demanding on the factfinder); Steven I. Friedland, The Competency and Responsibility of Jurors in Deciding Cases, 85 Nw. U. L. Rev. 190, 193-98 (1990) (arguing that dissatisfaction with the jury system exists because of two conflicting expectations--that the jury should be (1) an accurate decision maker, and (2) impartial--although impartiality virtually requires that jurors do not possess the training or experience necessary to deal with issues requiring specialized knowledge).

[FN25]. See Jury Cases on Patent Infringement on Trial, supra note 23 (quoting GE attorneys as stating that the jury "apparently acted on emotion, not facts or law"); infra note 36 (quoting a Chief Patent Counsel as saying, "Jurors' decisions are based on emotional perceptions of good guy vs. bad guy.").

[FN26]. 1 Ethan Horwitz & Lester Horwitz, Patent Litigation: Procedure & Tactics § 2.02[6], at 2-21 to 2-22 (1995)

("[C]ourts suspect some weakness on the merits of the case of the party who puts a patent case on the jury docket."); Schmitt, supra note 2 (quoting Martin Adelman: "There are many lawyers who believe they can benefit by jury confusion.").

[FN27]. See, e.g., Jonathon Taylor Reavill, Tipping the Balance: Hilton Davis and the Shape of Equity in the Doctrine of Equivalents, 38 Wm. & Mary L. Rev. 319, 366 (1996) (stating that "juries also tend to idealize inventors"); Barry S. Wilson, Patent Invalidity and the Seventh Amendment: Is the Jury Out?, 34 San Diego L. Rev. 1787, 1787 n.4 (1997) (asserting that juries prefer individual inventors challenging large corporations or foreign defendants); Andrews, supra note 2 (observing that juries "have proven eager to side with inventors against large companies").

[FN28]. A jury awarded Robert Kearns $19 million for Chrysler's infringement of his intermittent windshield wiper patent. High Court Refuses to Hear Verdict Appeal by Chrysler, Wall St. J., March 21, 1995, at B7. After a second jury found Ford liable for infringement, Ford settled with Kearns for $10.2 million. Id.

[FN29]. An Illinois jury awarded Jerome Lemelson $25 million in his 1989 action against Mattel over "Hot Wheels." Lemelson v. General Mills, Inc., 968 F.2d 1202, 1206 (Fed. Cir. 1992) (reversing jury finding of infringement).

[FN30]. Unless the parties accurately factor this bias into predictions and settlements. See infra Section I.B.

[FN31]. See 1 Horwitz & Horwitz, supra note 26, at § 2.02[6], at 2-21.

[FN32]. This survey was conducted at the 1999 annual conference of the Association of Chief Patent Counsels. In order to be a member of this organization and attend the conference, you must head the intellectual property legal group (Chief Patent Counsel) of a corporation which has at least five full-time intellectual property attorneys on staff. The average level of experience of this survey group was 25.3 years of practice. In fact, all but three of the respondents had at least 15 years of experience practicing patent law.

[FN33]. I asked the respondents to quantify on a scale of 1-10 (with 10 being very confident) their level of confidence in the jury's ability. When asked, "Are juries able to understand technology in patent cases?," the respondents' answers averaged 3.7. There were many comments written on the survey such as this one from a Chief Patent Counsel with more than 30 years experience, "JURIES JUST PLAIN CAN'T DECIDE PATENT CASES PERIOD.... THIS IS HOPELESS." Many of the Chief Patent Counsels surveyed believed that juror decisionmaking was often swayed by tangential or emotional issues such as attorney personalities, likeable witnesses, etc. One Chief Patent Counsel with 35 years experience commented, "I have won and lost cases with juries, and in both situations, the jury reasoning was not related to the facts."

In response to the question, "Are judges able to understand the technology in patent cases?," the confidence level was only 5.6.

[FN34]. In response to the question, "Do you think that juries generally award higher damages than judges? YES or NO," 86% of the respondents answered YES (38).

[FN35]. In response to the question, "Do you believe juries are more likely to hold a patent valid?," 85% (40) believed the jury was more likely to uphold the validity of a patent, 15% (7) believed that there was an equal chance of validity or invalidity and 0% believed juries were more likely to hold a patent invalid.

[FN36]. When asked, "Do you think jurors are biased in any of the following ways: Jurors favor the patent holder (inventor)? YES NO," 86% of the respondents (37) answered YES. One Chief Patent Counsel with 25 years experience

characterized her confidence in juries as follows: “Most jurors' attention span is too short to assimilate and analyze the conflicting information presented by opposing counsels. Jurors' decisions are based on emotional perceptions of good guy vs. bad guy.”

[FN37]. See, e.g., Howard T. Markey, On Simplifying Patent Trials, 116 F.R.D. 369, 372 (1987); supra text accompanying note 33.

[FN38]. Markman v. Westview Instruments, Inc., 52 F.3d 967, 993 (Fed. Cir. 1995) (Mayer, C.J., concurring).

[FN39]. See infra Table 1 and accompanying text.

[FN40]. See Greg J. Michelson, Note, Did the Markman Court Ignore Fact, Substance, and the Spirit of the Constitution in its Rush Toward Uniformity?, 30 Loy. L.A. L. Rev. 1707, 1734 (1997) (arguing that judges are not better than juries at deciding patent cases because they have relatively little experience with patent cases, no technical expertise, and may be distracted by other trials).

[FN41]. See Markey, supra note 37, at 372.

[FN42]. George L. Priest & Benjamin Klein, The Selection of Disputes for Litigation, 13 J. Legal Stud. 1, 4 (1984) (emphasis added).

[FN43]. See, e.g., Theodore Eisenberg, Litigation Models and Trial Outcomes in Civil Rights and Prisoner Cases, 77 Geo. L.J. 1567, 1568 (1989) (describing “expectations theory,” which suggests that tried cases might not reflect the pool of all disputes); Karl N. Llewellyn, The Bramble Bush: On Our Law and its Study 58 (2d ed. 1951) (commenting that litigated cases bear the same relationship to the underlying pool of disputes “as does homicidal mania or sleeping sickness, to our normal life”).

[FN44]. See Leandra Lederman, Which Cases Go To Trial?: An Empirical Study of Predictors of Failure to Settle, 49 Case W. Res. L. Rev. 315, 322-24 (1999) (discussing three formal models for predicting the selection of cases for trial: divergent expectations, asymmetrical stakes, and asymmetrical information). Each of the economic models for predicting case selection is predicated on one or more assumptions that may not be present in actual cases. These assumptions include: (1) risk neutrality of the parties; (2) equal stakes; (3) equal information; (4) identical outcome estimation; and (5) lack of strategic behavior. Id.

[FN45]. Priest & Klein, supra note 42, at 19-20.

[FN46]. The selection effect model allows for “divergent expectations” of the parties in estimating outcome. For example, a patent holder may believe that she has a 60% chance of winning the case on the merits, whereas the alleged infringer, with the same information, evaluates the patent holder's chance of success at 40%. Under such circumstances, both parties may be unwilling to settle the case. The selection effect model allows for these self-serving estimation errors but assumes that the errors are random and based on differences of opinion rather than asymmetrical information.

[FN47]. Priest & Klein, supra note 42, at 4.

[FN48]. Id. at 16.

[FN49]. Alternatively, one would expect these cases to be resolved by the judge on dispositive motion. In either event, they are unlikely to proceed to trial.

[FN50]. Priest & Klein, supra note 42, at 3.

[FN51]. Several scholars have found it useful to test this model using a database that compares the characteristics of cases that went to trial and settled cases. See, e.g., Lederman, supra note 44 (using a database of settled and tried Tax Court cases to confirm that cases are not randomly selected for trial and identifying five independent variables--whether the case went through an IRS appeals process, the dollar amount at stake, and three characteristics about the judge--that were statistically significant in predicting an increased likelihood that a case would go to trial); Jeffrey M. Perloff & Daniel L. Rubinfeld, Settlements in Private Antitrust Litigation, in Private Antitrust Litigation 149 (Lawrence J. White ed., 1988) (confirming a nonrandom selection of antitrust cases for trial and identifying predictors of settlement based on surveys sent to parties that settled). The characteristics of settled versus tried patent cases are not compared to validate selection effect theory (which would be a very useful endeavor), but rather evaluate patent-holder win rates to determine if they substantiate any of the economic models.

[FN52]. See, e.g., Kevin M. Clermont & Theodore Eisenberg, Trial By Jury or Judge: Transcending Empiricism, 77 Cornell L. Rev. 1124, 1175-76 (1992) (only 23 of 93 types of bench trials and 16 of 93 types of jury trial show plaintiff win rates from 45% to 55%); Daniel Kessler et al., Explaining Deviations from the Fifty Percent Rule: A Multimodal Approach to the Selection of Cases for Litigation, 25 J. Legal Stud. 233, 236-42 (1996) (discussing 20 empirical studies which have found plaintiff win rates not approximating 50%, summarizing the numerous empirical studies that have tested the 50% rule, and concluding that the win rate is closer to 50% among cases that conform more closely to the underlying assumptions of the Priest/Klein model). Some commentators have argued, however, that these deviations from the 50/50 prediction can be explained by deviations from the underlying assumptions. E.g., Bruce H. Kobayashi, Case Selection, External Effects, and the Trial/Settlement Decision, in Dispute Resolution: Bridging the Settlement Gap 17, 27 (David A. Anderson ed., 1996).

[FN53]. See Kessler et al., supra note 52, at 257.

[FN54]. See Kobayashi, supra note 52, at 17.

[FN55]. See id. at 29 (stating that “[o]ne of the most common explanations of deviations from the fifty-percent rules is the existence of asymmetric stakes”); Kessler, supra note 52, at 257 (finding that “differential stakes... affect[] win rates in the manner that the theory would suggest”).

[FN56]. See Evan Osborne, Who Should Be Worried About Asymmetric Information in Litigation?, 19 Int'l Rev. L. & Econ. 399 (1999) (finding that asymmetric information does exist in cases that proceed to a decision and it that generally favors the defendant, by testing how litigants fare after trial relative to their expectations).

[FN57]. A party is risk-neutral if they are indifferent between a guaranteed settlement amount of $6000 and proceeding to trial with a 60% chance of winning $10,000. A risk-averse party would settle for less than $6,000 to avoid the risk. See W. Kip Viscusi, Product Liability Litigation With Risk Aversion, 17 J. Legal Stud. 101, 103 (1988) (determining, in products liability cases, “how the decisions to drop and to settle a claim are affected by risk aversion, as well as how risk aversion affects the settlement amounts”).

[FN58]. See Samuel R. Gross & Kent D. Syverud, Getting to No: A Study of Settlement Negotiations and the Selection of Cases for Trial, 90 Mich. L. Rev. 319, 328 (1991) (stating that strategic behavior by a party is an attempt to capture more of the surplus from the settlement range); Leandra Lederman, Precedent Lost: Why Encourage Settlement, and Why Permit Non-Party Involvement in Settlements?, 75 Notre Dame L. Rev. 221, 259-60 (1999) (stating that finding a settlement range depends on the absence of strategic behavior).

[FN59]. There are many identifiable real-world complications that could alter the expected outcome for this economic model, such as strategic behavior by the parties, the risk aversion or neutrality of the parties, asymmetrical information, a focus in the dispute on damages rather than liability, or differing abilities of counsel. None of these complications, however, exists for patent cases (any more than for any other type of case) in a systematic and predictable way which would cause the need to alter the prediction of the economic model.

[FN60]. See Kobayashi, supra note 52, at 37 (noting a bias in the selection of cases towards the repeat litigant--that is, the party with the higher stakes).

[FN61]. In a two-supplier market, the stakes might be closer to symmetrical. In such a market, the patent holder would stand to win in damages exactly what the infringer would stand to lose. Whether the infringer wins the suit by succeeding on a defense of non-infringement or a defense that the patent is invalid or unenforceable is irrelevant. Regardless of how the suit is lost, the patent owner only loses the exact amount of money it would have won from the defendant (because there are no other potential infringers to sue).

[FN62]. But the accused infringer may also have more at stake than the monetary damage award because of the injunctive relief that is almost guaranteed if the patent holder succeeds in the suit. In some circumstances, the injunction could dramatically upset the commercial status quo by forcing the infringer out of the market entirely.

[FN63]. Clermont & Eisenberg, supra note 52, at 1130 ("[A]ccording to this selection effect theory, any judge/jury distinction that the parties evaluate without systematic inaccuracy should not lead to a difference in win rates before judges and juries."); Priest & Klein, supra note 42, at 4 ("[P]otential litigants form rational estimates of the likely decision, whether it is based on applicable legal precedent or judicial or jury bias.").

[FN64]. Professors Clermont and Eisenberg concluded that factors developed within the context of selection effect theory and routinely used to explain deviations from the 50% rule (such as differential stakes) carry little weight because they do not vary with the mode of trial. Clermont & Eisenberg, supra note 52, at 1130-31. Minor differences between judge and jury win rates could arise if a difference existed in the ability of the parties (or their attorneys) to assess their chances of success with different adjudicators. See Donald Wittman, Dispute Resolution, Bargaining, and the Selection of Cases for Trial: A Study of the Generation of Biased and Unbiased Data, 17 J. Legal Stud. 313, 325-28 (1988) (discussing effect of differential assessments generally on win rate).

[FN65]. Although no detailed empirical analysis has been undertaken to ascertain whether judges and juries behave differently in patent cases, it has been done for other fields. See, e.g., Harry Kalven, Jr. & Hans Zeisel, The American Jury (1966); Clermont & Eisenberg, supra note 52. Kalven and Zeisel surveyed trial judges about jury verdicts in cases over which they presided in an attempt to ascertain how often the judge and the jury would have reached the same result. The study concluded that judges and juries agreed on outcome in a large number of personal injury cases, but that jury verdicts averaged 20% higher than the judges' awards would have been. Kalven & Zeisel, supra, at 64 & n.13. Moreover, the study concluded that juries were not more pro-plaintiff than were judges and that there was no statistically significant difference in disagreement between judge and jury in difficult versus easy cases, indicating that complexity did not affect outcome. Id. at 157. Clermont and Eisenberg compared win rates before judges and juries in product liability and medical malpractice cases to conclude that neither the popular perception that juries are pro-plaintiff nor the academic theory that win rates should equalize was supportable. Clermont & Eisenberg, supra note 52, at 1173.

[FN66]. A 1987 study examined whether patents encouraged innovation across various industries and concluded that, in some industries, patents were not an effective means of encouraging innovation. Richard C. Levin et al., Appropriating the Returns from Industrial Research and Development, in 1987 Brookings Papers on Econ. Activity 783 (1987); see also

Josh Lerner, Patenting in the Shadow of Competitors, 38 J.L. & Econ. 463 (1995) (finding that the higher the patent enforcement costs (litigation costs), the less likely biotech companies are to patent new inventions). More empirical research needs to be done to validate the existence of the patent system as a mechanism for encouraging innovation. The universe of empirical studies pertaining to patent litigation is very small. There are two outstanding studies that were conducted prior to the creation of the Federal Circuit. P.J. Federico studied validity and infringement data for litigated cases from 1948-1954 and found that appellate courts invalidated patents 63% of the time and district courts invalidated patents 54% of the time. P.J. Federico, Adjudicated Patents, 1948-54, 38 J. Pat. Off. Soc'y 233, 236 tbl. 2, 237 tbl. 4 (1956). Gloria Koenig studied cases reported in the United States Patent Quarterly ("U.S.P.Q.") from 1953 through 1977 and found that findings of validity or invalidity were reversed in 35% of the cases in which validity was an issue. See Gloria K. Koenig, Patent Invalidity: A Statistical and Substantive Analysis § 4.02, at 4-41 n.35.2 (rev. ed. 1980). Koenig also noted the wide variation among the Circuits in the treatment of validity. See id. at 4-33 to 4-36. This variation among the regional circuits in their treatment of validity and the forum shopping that resulted were the impetus for the creation of the Federal Circuit in 1982. There have also been studies examining the Federal Circuit's treatment of patents, most notably a study testing whether the Federal Circuit was more pro-patentee than its predecessor courts. Donald R. Dunner et al., A Statistical Look at the Federal Circuit's Patent Decisions: 1982-1994, 5 Fed. Cir. B.J. 151 (1995). Finally, a recent study by Professors John Allison and Mark Lemley collected a database of written validity decisions reported in the U.S.P.Q. from 1989-1996 (239 cases). John R. Allison & Mark A. Lemley, Empirical Evidence on the Validity of Litigated Patents, 26 AIPLA Q.J. 185 (1998). The authors determined that patents were found valid in 54% of the cases in their data set. Id. at 205. Among other things, the authors provide useful validity statistics by issue, i.e., by 35 U.S.C. sections 101, 102, 103, and 112. Id. passim. In addition, they considered outcome variation based on variables such as the time the patent was in prosecution, the number of prior art references considered in prosecution, subject matter of the invention, and domestic vs. foreign patentee. Id. There is very little overlap between my study and the Allison/Lemley study. I do not replicate their detailed analysis of the variables that underlie validity decisions. Also, the Allison/Lemley study did not consider other substantive issues that arise in patent cases, such as enforceability, infringement, willfulness, or damages. Moreover, their study considered only written decisions published in the U.S.P.Q., and juries do not write opinions. Therefore, their pool of jury decisions was limited (73 total) to cases in which the jury verdict was challenged and the district court generated an opinion regarding judgment as a matter of law ("JMOL") or the case was appealed to the Federal Circuit. Id. at 211.

[FN67]. See Administrative Office of the United States Courts, Guide to Judiciary Policies and Procedures, Transmittal 64, vol. XI, at II-19-II-28 (March 1, 1985).

[FN68]. Cases that reached trial, but were not resolved by the factfinder were resolved on directed verdict or judgment as a matter of law prior to a final verdict by the factfinder, or they were settled by the parties during trial.

[FN69]. This data set does not include cases resolved by district courts on dispositive motion which certainly shed light on how judges resolve patent cases. However, jury trial win rates in which the jury is resolving a disputed issue of fact and judge rulings on dispositive motion where the judge is deciding that no reasonable juror could conclude differently are not comparable. A more accurate comparison between judge and jury resolution of cases can be acquired by limiting the analysis to cases where each adjudicator resolved a material issue of fact after a trial. These "close" cases provide the best insight into whether judges and juries decide cases differently (comparing apples to apples). Comparing win-rate data at various stages of litigation (such as when cases are resolved by the court on dispositive motion) and at what stage in the litigation courts generally resolve patent cases is the subject of further research I am currently performing. Kimberly A. Moore, Forum Shopping in Patent Cases: Does Geographic Choice Affect Innovation?, 79 N.C. L. Rev. (forthcoming 2001).

[FN70]. A judgment for the defendant, for example, could indicate a finding of non-infringement, invalidity, or unenforceability.

[FN71]. Occasionally, I discovered inconsistencies in the way the damage award was reported to the Administrative Office. While some jurisdictions reported the actual damages awarded by the factfinder, others apparently reported the final amount paid to the victor. This amount would include prejudgment interest, postjudgment interest, attorneys' fees, and treble damages for willfulness. The damage awards used in this study were limited to the award granted by the factfinder. For more detailed explanation, see infra [section on damages].

[FN72]. Consolidated cases which went to a single trial were often reported twice because of the existence of two separate docket numbers. I have eliminated these duplications from the data set. When a case actually resulted in more than one trial because issues were bifurcated or because a second trial was required after the appeal was remanded, the case is actually reported twice.

[FN73]. For example, if the case discussed the infringement determination made by the court, but did not mention whether validity was tried because the resolution of that issue was not appealed or not discussed in the court opinion, I included no information in the study regarding validity of that case.

[FN74]. Throughout the results and tables, I will refer to the alleged infringer as “the infringer” for brevity.

[FN75]. When patents are issued by the PTO, they are presumed valid. 35 U.S.C. § 282 (1994). Accordingly, the alleged infringer has the burden of proving the patent invalid by clear and convincing evidence. Since patents are already valid, when validity is challenged, the court holds the patent invalid or not invalid. But for brevity, I refer to patents as adjudicated valid or invalid throughout the tables and results.

[FN76]. This number reflects the entire population of patent trials, not a sample study that chooses a limited number of trials or only reported trials. There were 1411 patent cases that made it to trial, but only 1209 of these were actually resolved by the factfinder. The other 202 were either settled during trial, or the court ruled on directed verdict or JMOL prior to resolution by the factfinder. If JMOL occurred after the jury verdict, the original jury resolution is reported.

[FN77]. This column includes every patent case that was terminated by any means (settlement, motion, trial, etc.).

[FN78]. This column includes only those cases that ended after a trial was begun. These numbers include cases resolved by the factfinder at the conclusion of trial, cases resolved by directed verdict or JMOL, and cases that settled after the trial had begun.

[FN79]. For example, in 1998, 24% of cases were resolved without court action, 59% of cases were resolved by court order or judgment on a motion, 12.5% were resolved after the pretrial conference but before trial, and 4.5% of all cases were resolved during or after a trial.

[FN80]. I am presently conducting research to examine characteristics of bench trials to determine whether there are any statistically significant predictors for the type of cases in which neither party requests a jury.

[FN81]. A case was considered won by the patentee if the patentee won at least one patent claim in its entirety. If the patentee claimed two patents were infringed and the court concluded that one of the two patents was valid, enforceable, and infringed, it was considered a verdict for the patentee, even if the other patent was held invalid or not infringed. If, however, the infringer prevailed on any issue with respect to each claim, it was considered a verdict for the infringer. For example, if the patent was held valid and enforceable, but not infringed, this case would be considered won by the in-

fringer.

[FN82]. In this study, I generally test a null hypothesis which would posit “no difference” in outcome or “no relationship” between events. In this case the null hypothesis would be “patentees are not more likely to win patent suits than alleged infringers.” The p value (also called significance level) is the probability of rejecting the null hypothesis when it is actually true. A rejection of null hypothesis with a p value p<.001 indicates that there is less than 1 chance in 1000 of erroneously rejecting the null hypothesis of equal predicted win rates. This would translate into a confidence level of 99.9%. Hence we could reject the null hypothesis with 99.9% confidence. A rejection of the null hypothesis with p<.01 is 99% confidence. A rejection of the null hypothesis with p<.05 is 95% confidence. Throughout this Article, I use the term “significant” in the formal statistical sense, indicating that the null hypothesis can be rejected with at least 95% confidence (p<=.05). If p>.05, I conclude that observed differences or relationships are not statistically significant; the null hypothesis cannot be rejected in these cases. I have tested these null hypotheses using chi-square analysis (the “Pearson statistic”) which provides an inverse measure of the likelihood that the difference in means show real difference in win rate rather than random variation.

[FN83]. A simple linear regression indicates that whether the adjudicator is a judge or jury is a statistically significant predictor of who wins both by suit (<<beta>>=.174; t=6.172; p=.000) and by claim (<<beta>>=.144; t=5.997; p=. 000).

[FN84]. Clermont & Eisenberg, supra note 52, at 1137.

[FN85]. Id. at 1137-38.

[FN86]. Id. at 1170-74 (“[T]he parties must inaccurately perceive the realities of judge and jury trial.”).

[FN87]. Such apparent fluctuation in win rate can be explained to some degree by the low number of instances of jury trials in the early years of the study (20-30 per year). With a small number of jury trials a few outcomes can significantly impact the win rate for the year.

[FN88]. See Priest & Klein, supra note 42, at 4.

[FN89]. See Kobayashi, supra note 52, at 23.

[FN90]. See Priest & Klein, supra note 42, at 19.

[FN91]. Priest and Klein describe this implication as follows:

> [A]n important determinant of the extent to which the observed success rate approximates 50 percent will be the parties' error in estimating the outcome. As the parties' error diminishes, the 50 percent proportion of victories will be approached more closely. Since, for example, we would imagine error to diminish with experience under a legal standard, the approach would imply a progressive convergence toward 50 percent victories after a change in a rule of law.

Id. at 19.

[FN92]. See id.

[FN93]. ^{2}=138.889, df=1, p=.000

[FN94]. ^{2}=112.332, df=1, p=.000

[FN95]. ^{2}=127.954, df=1, p=.000

[FN96]. ^{2}=41.684, df=1, p=.000

[FN97]. ^{2}=93.519, df=1, p=.000

[FN98]. ^{2}=52.505, df=1, p=.000

[FN99]. ^{2}=127.479, df=1, p=.000

[FN100]. ^{2}=58.164, df=1, p=.000

[FN101]. ^{2}=49.799, df=1, p=.000

[FN102]. ^{2}=60.494, df=1, p=.000

[FN103]. ^{2}=20.963, df=1, p=.000

[FN104]. ^{2}=.983, df=1, p=.322

[FN105]. See Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co., 204 F.3d 1360, 1367 (Fed. Cir. 2000) ("An accused infringer alleging that a claim is invalid must overcome the statutory presumption of validity that attaches to an issued patent, see 35 U.S.C. § 282 (1994), by proving invalidity by facts supported by clear and convincing evidence."); Elk Corp. of Dallas v. GAF Bldg. Materials Corp., 168 F.3d 28, 30 (Fed. Cir. 1999) (stating that materiality and intent for inequitable conduct must be proven by clear and convincing evidence).

Not all enforceability issues require clear and convincing evidence. Laches and equitable estoppel, which are affirmative defenses not challenging the validity of the patent, but rather the enforceability of it against an individual defendant, require proof by a preponderance of the evidence. See A.C. Aukerman Co. v. R.L. Chaides Constr. Co., 960 F.2d 1020, 1045 (Fed. Cir. 1992).

[FN106]. See Seal-Flex, Inc. v. Athletic Track & Court Constr., 172 F.3d 836, 842 (Fed. Cir. 1999) (stating that infringement must be proven by a preponderance of the evidence).

[FN107]. See Georgia-Pacific Corp. v. U.S. Gypsum Co., 195 F.3d 1322, 1334 (Fed. Cir. 1999) ("Willful infringement is a question of fact and must be established by clear and convincing evidence, for 'the boundary between unintentional and culpable acts is not always bright.'") (quoting Pall Corp. v. Micron Separations, Inc., 66 F.3d 1211, 1221 (Fed. Cir. 1995)).

[FN108]. <<beta>>=-.062; t=-2.247; p=.025

[FN109]. <<beta>>=-.036; t=-.919; p=.359

[FN110]. This is considerably higher than the pre-Federal Circuit statistics of Koenig, who found that patents were held valid in 42% of cases, and Federico, who found that patents were held valid (not invalid) in 39% of cases. See Koenig, supra note 66, § 4.02, at 4-19 (reporting that, from 1953 through 1977, 42% of litigated patents were held valid in the district courts, excluding those cases finding no infringement without ruling on validity); Federico, supra note 66, at 236 tbl. 2, 237 tbl. 4 (reporting that, from 1948-1954, 39% of litigated patents were not invalidated by the courts of appeals and 48% were not invalidated by the district courts). My results also differ from the Allison/Lemley study (300 cases from 1989-1996), which found 54% validity. See Allison & Lemley, supra note 66, at 205. The Allison/Lemley statistic, however, includes validity decisions rendered by the court on dispositive motion which resulted in a lower validity rate

(on dispositive motion only 28% of 82 patents held valid). See Allison & Lemley, supra note 66, at 212 tbl. 3. Their statistics on validity decided at trial are closer to mine (67% of 73 patents valid after jury trials, 57% of 143 patents valid after bench trials). See id.

[FN111]. See Allison & Lemley, supra note 66, at 212 tbl. 3 (reporting that, in a data set of published U.S.P.Q. decisions from 1989 to 1996, judges only invalidated patents at trial in 43% of 143 cases, but they invalidated patents before trial in 72% of 82 cases).

[FN112]. In order to compare accurately judge and jury decisionmaking, I limited the study to issues resolved at trial, as indicated supra note 76.

[FN113]. <<beta>>=-.123; t=-4.792; p=.000

[FN114]. <<beta>>=-.181; t=-4.417; p=.000

[FN115]. See 35 U.S.C. § 284 ("[T]he court may increase the damages up to three times the amount found or assessed."); id. § 285 ("The court in exceptional cases may award reasonable attorney fees to the prevailing party.").

[FN116]. See, e.g., Read Corp. v. Portec, Inc., 970 F.2d 816 (Fed. Cir. 1992).

[FN117]. In many cases, willfulness was determined by the factfinder in an earlier stage of the proceedings than damages and/or the determination as to whether to enhance. The willfulness finding, along with other issues, was often appealed and reversed or vacated prior to a decision by the trial court regarding enhancement, or the case settled.

[FN118]. Enhancement of 0 indicates no enhancement of the damage award found by the factfinder despite a finding of willfulness. Enhancement of 1-1.9 indicates that the judge did enhance damages and the magnitude of the enhancement was 1-1.9. For example, if the patent holder was awarded damages of $100,000, an enhancement of 10% would be 1.1 which would equal a total damage award of $110,000. The maximum allowable enhancement under the law is treble damages. This would be a 300% enhancement or 3 which would equal a total damage award of $300,000.

[FN119]. <<beta>>=.319; t=5.676; p=.000

[FN120]. In cases resolved in favor of the infringer, there generally were no damage awards reported. In a few instances damage would be decided despite a verdict for the infringer in order to avoid piecemeal litigation (if there is a reversal at the Federal Circuit or by the trial court on JMOL, there need not be a new trial if all issues are resolved). In cases resolved in favor of the patentee, there often were no reported damage awards because damages were stipulated, the case settled, or damages were bifurcated and not reported.

[FN121]. These results are reported in thousands:

TABULAR OR GRAPHIC MATERIAL SET FORTH AT THIS POINT IS NOT DISPLAYABLE

As the enormous standard deviation indicates, utilizing the mean or median damage awards would not be a satisfying approach to analyzing the differing awards.

[FN122]. <<beta>>=-.364; t=-2.854; p=.005

[FN123]. In addition, courts can force a remittitur of the damage award or order a new trial on damages when the jury verdict is excessive. See, e.g., Celeritas Tech., Ltd. v. Rockwell Int'l Corp., 150 F.3d 1354, 1357 (Fed. Cir. 1998)

(ordering remittitur of jury verdict from $57,658,000 to $17,484,160); Modine Mfg. Co. v. Allen Group Inc., 917 F.2d 538, 540 (Fed. Cir. 1990) (jury verdict of $55,634,153 remitted to $14,000,000); AccuScan, Inc. v. Xerox Corp., No. 96 Civ. 2579(HB), 1998 WL 603217, at *9 (S.D.N.Y. Sept. 11, 1998) (granting new trial on damages because jury award of $40,000,000 relied on an impermissible basis). Although the courts do not have the power to order a remittitur they effectively do so by issuing an order that states that if the parties do not accept a remittitur of $x, then a new trial on the issue of damages will be granted because the jury verdict was excessive and not supported by the evidence. This data set reports the awards actually granted by the jury, not the amounts as modified by the judge.

[FN124]. O.I. Corp. v. Tekmar Co., No. 95-CV-113 (S.D. Tex. June 17, 1996). Judge Samuel B. Kent made this statement during a summary judgment hearing. Interestingly, the “propeller hats” at the Federal Circuit affirmed the judge this time. See O.I. Corp. v. Tekmar Co., 115 F.3d 1576 (Fed. Cir. 1997).

[FN125]. See, e.g., Weatherchem Corp. v. J.L. Clark, Inc., 163 F.3d 1326, 1332 (Fed. Cir. 1998) (stating that factfindings made during a bench trial are reviewed for clear error).

[FN126]. See, e.g., Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 172 F.3d 1361, 1376-77 (Fed. Cir. 1999) (reviewing jury factfindings to ascertain whether they are supported by substantial evidence).

[FN127]. See United States v. Hill, 196 F.3d 806, 808 (7th Cir. 1999) (Posner, C.J.) (“Basically there is deferential review and non-deferential (plenary) review, and whether deferential review is denominated for ‘abuse of discretion’ or ‘clear error’ or ‘substantial evidence’ or any of the other variants (with the exception of ‘mere scintilla of evidence’) that courts use makes little practical difference.”); see also Louis L. Jaffe, Judicial Review: Question of Fact, 69 Harv. L. Rev. 1020, 1041 (1956) (“I know, however, that there are conscientious judges who find difficulty in deriving for themselves the distinction between ‘clearly erroneous' and the present ‘substantial evidence’ rule.”).

[FN128]. In this study, an issue is counted as reversed if the adjudicator got it wrong, meaning that the appeals court reversed or vacated the decision because of an error by the adjudicator. Hence, any decision by the Federal Circuit vacating an issue and remanding it because it was wrongly decided by the adjudicator is treated as a reversal. When an issue is vacated simply because it need not be decided by the Federal Circuit (such as when an infringement finding is vacated because the patent is held invalid), it is not included in this study.

[FN129]. No percentage is given for issues appealed versus issues resolved by district courts because it would be too difficult to ascertain this information. For example, if the Federal Circuit held a patent invalid, it need not resolve other appealed issues (enforceability, infringement, willfulness). Since I could not verify that the issues resolved were in fact the only issues appealed, this percentage is left blank.

[FN130]. Of course, there is some selection bias inherent in these figures. Not all cases get appealed.

[FN131]. The appellate affirmation rates in Figure 7 are only for tried cases. They do not include appeals from summary judgments or cases resolved prior to adjudication by the factfinder.

[FN132]. The wildly divergent affirmance rates for 1999 only reflect cases decided by the Federal Circuit as of October 31, 2000. Any Federal Circuit opinions issued after this date are not included in the dataset. It should be noted that the appeals process can be quite lengthy and many appeals of cases resolved by trial in 1998 or 1999 may not have been resolved as of this date.

[FN133]. To determine what issues were being appealed in Rule 36 summary affirmance cases, I obtained the briefs from

the Federal Circuit archives. The 3% figure represents the appeals for which the briefs could not be found and which were likely lost due to a flood at the Federal Circuit.

[FN134]. Judges enhanced damages in 95% of the cases in which they themselves found willfulness, but only 63% of the cases in which the jury found willfulness.

[FN135]. The issue of willfulness was appealed in 98 instances in the data. In 70 instances, a finding of willfulness by the factfinder was challenged on appeal. In 28 instances, a finding of no willfulness was appealed. Where willfulness was challenged on appeal the court below had enhanced damages 92% of the time.

[FN136]. Fed. R. Civ. P. 52(a).

[FN137]. See In re Mark Indus., 751 F.2d 1219, 1222 (Fed. Cir. 1984) ("This court has no administrative authority over any district court."); In re Oximetrix, 748 F.2d 637, 643 (Fed. Cir. 1984) ("This court lacks the general authority over district courts exercisable, for example, under 28 U.S.C. § 332."); Petersen Mfg. Co. v. Cent. Purchasing, Inc., 740 F.2d 1541, 1552 (Fed. Cir. 1984) ("Unlike other Circuit Courts of Appeal, we have no direct supervisory authority over district courts.") (citation omitted).

[FN138]. In Structural Rubber Prods. Co. v. Park Rubber Co., the court noted:

This court has counselled district courts in appeals to us that specific answers from the jury on factual issues are desirable, and has praised courts which have provided comprehensive opinions in ruling on motions for JNOV. The decision of an appellate court is likely to be better focused when it is assisted in this manner. Otherwise the task of review may be unnecessarily comprehensive. Nevertheless, it must be left to the sound discretion of the trial court what form of verdict to request of a jury. Thus, we have held that a trial court may, with proper instructions, present a patent case to a jury for a general verdict encompassing all of the issues of validity and infringement or may ask for a general answer on one or more specific legal issues, such as obviousness, a practice not specifically provided for in the Federal Rules.

749 F.2d 707, 720 (Fed. Cir. 1984) (citations omitted); see also American Hoist & Derrick Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1361 (Fed. Cir. 1984); Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1546 (Fed. Cir. 1983).

[FN139]. [In reviewing] a jury special verdict on patent claim obviousness where the underlying facts have been disputed... [w]e first presume that the jury resolved the underlying factual disputes in favor of the verdict winner and leave those presumed findings undisturbed if they are supported by substantial evidence. Then we examine the legal conclusion de novo to see whether it is correct in light of the presumed jury factfindings.

Jurgens v. McKasy, 927 F.2d 1552, 1557 (Fed. Cir. 1991) (citations omitted).

[FN140]. See supra notes 14-36 and accompanying text.

[FN141]. It may seem strange that a factfinder would find the patent invalid, yet still go on to determine infringement. It is more efficient, however, to have the factfinder resolve all issues at once in case the appellate court overturns one issue. If the factfinder does not determine infringement when it finds a patent invalid, then if the appellate court reverses on validity, it must remand for a second trial to determine infringement. If the factfinder finds the patent invalid and still determines whether there was infringement, there is no need for a second trial, even if the appellate court reverses the invalidity determination.

[FN142]. <<beta>>=.117; t=4.469; p=.000

[FN143]. Multiple claim cases in this data set are cases in which multiple patents were tried or multiple distinct products were alleged to infringe. If multiple products were accused of infringement, but they shares identical traits (a single claim term, for example, would resolve the infringement issue for all products) for purposes of the patent infringement

analysis, the case was not treated as one involving multiple claims. In such a case, the factfinder's single infringement finding determined the outcome of all claims.

[FN144]. <<beta>>=.149; t=3.261; p=.001

[FN145]. A case is considered a declaratory judgment action if the suit was filed by the alleged infringer. These statistics do not include counterclaim declaratory judgment actions.

[FN146]. <<beta>>=.141; t=4.106; p=.000

[FN147]. <<beta>>=-.210; t=-5.618; p=.000

[FN148]. <<beta>>=-.206; t=-3.895; p=.000

[FN149]. <<beta>>=-.163; t=-4.306; p=.000

[FN150]. <<beta>>=-.067; t=-1.0; p=.318

[FN151]. <<beta>>=.298; t=6.168; p=.000

[FN152]. <<beta>>=.005; t=.113; p=.910

[FN153]. In most cases, the patent holder who files a counterclaim for infringement, not the declaratory judgment plaintiff, will proceed first at trial. During argument or witness examination, however, the declaratory judgment plaintiff could likely make the jury aware that it, not the patent holder, filed the suit.

[FN154]. A logistic, rather than a linear, regression model is used because the dependent variable, patent-holder win rate, is binary or dichotomous (win or loss). See David W. Hosmer, Jr. & Stanley Lemeshow, Applied Logistic Regression 1 (1989).

[FN155]. Magnitude is calculated by taking the anti-log of the coefficient. For example, the coefficient for adjudicator is .6118. $e^{0.6118}$=1.844. With all other variables constant, jury resolution changes the odds of the patent holder winning from 1:1 to 1.844:1. This corresponds to a probability of winning of 65% (1.844/(1.844+1)). See Kevin M. Clermont & Theodore Eisenberg, Xenophilia in American Courts, 109 Harv. L. Rev. 1120, 1131-32 & n.25 (1996) (explaining the mechanics of regression analysis).
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