WHY PRIEST-KLEIN CANNOT APPLY TO INDIVIDUAL ISSUES IN PATENT CASES

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Abstract: The Priest-Klein hypothesis is commonly used to support the expectation of a fifty-percent success rate for patent holders on issues such as obviousness or inequitable conduct. As this essay explains, such a use of Priest-Klein is mathematically flawed. At best, the Priest-Klein hypothesis only applies to the selection of disputes, not the selection of individual issues. Due to the presence of multiple issues in patent cases, there is axiomatically no basis for inferring that a patentee would expect a fifty-percent chance of winning on each one. This essay supports its argument with theory and examples, demonstrating why application of the Priest-Klein hypothesis to individual issues - particularly in explaining or analyzing the results of empirical studies of doctrinal issue outcomes in patent law - is incorrect. This is not to say that such studies cannot yield useful and insightful results, but that conclusions about their meaning should not be based on deviations from a fifty-percent success rate.

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Despite - or more accurately, precisely because of - its widely-recognized assumptions, the Priest-Klein hypothesis is commonly used to support the expectation of a fifty-percent success rate for patent holders on issues such as obviousness or

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2 In their seminal 1984 paper, George Priest and Benjamin Klein hypothesized that where the outcomes from litigation are equal to the parties, the rate of success for plaintiffs at trial or appellants at appeal will be biased toward 50 percent regardless of the substantive standard of law. See George L. Priest & Benjamin Klein, The Selection of Disputes for Litigation, 13 J. LEGAL STUD. 1, 5 (1984). Scholars have debated the validity, assumptions, effects, and implications of the Priest-Klein hypothesis over the decades since, spawning enough citations to fill an article by themselves. Particularly noteworthy critiques of the Priest-Klein hypothesis include Theodore Eisenberg, Testing the Selection Effect: A New Theoretical Framework with Empirical Tests, 19 J. LEGAL STUD. 337 (1990), Steven Shavell, Any Frequency of Plaintiff Victory at Trial is Possible, 25 J. LEGAL STUD. 493 (1996) and 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. Studies 233 (1996). These critiques have been directed at the Priest-Klein hypothesis as it relates to the outcome of disputes, however, not at its application to particular doctrines or issues decided in those disputes.

3 I use issue here to refer to a single doctrinal question. Common issues in patent cases include claim construction, anticipation, nonobviousness, inequitable conduct, infringement, enablement, written description, and willful infringement. An issue is thus distinct from a dispute outcome, in that in order to arrive at an outcome, multiple issues (typically, but not always) must be decided. Patent law scholars frequently use qualitative and quantitative approaches to study discrete issues or doctrines, as these
claim construction. According to Priest and Klein’s theory, only the most uncertain disputes - those that tend toward fifty-fifty - will be resolved by a court. This is because the more certain the resolution of the dispute, the more likely parties are to agree on settlement terms to save litigation costs. Thus, the proportion of plaintiff victories in litigated disputes will approach 50 percent as these are the disputes whose outcomes are least predictable.

When empirical studies report data that does not reflect an even split, researchers posit that it’s due to one of the assumptions of Priest-Klein: differential stakes in the outcome, asymmetrical information, risk neutrality, strategic behavior, or concepts make up the fundamental units of patent law. An issue could certainly refer to an even more discrete determination, such as a single factual question, but that is not what this essay (along with most empirical studies in patent law) is concerned with.

4 See, e.g. Christopher A. Cotropia, Nonobviousness and the Federal Circuit: An Empirical Analysis of Recent Case Law, 82 NOTRE DAME L. REV. 911, 931, 935 (2007) (“The almost even spread between lower court decisions finding a patent claim nonobvious and those finding a patent claim obvious falls right in line with Professors Priest and Klein's model.”); Jennifer Nock & Sreekar Gadde, Raising the Bar for Nonobviousness: An Empirical Study of Federal Circuit Case Law Following KSR, 20 FED. CIR. B.J. 369, 396 (2010) (“The results of this study and the Cotropia study both show the ratio of obvious to nonobvious outcomes from district court cases hovering near the fifty-fifty mark. This may reflect the nature of litigated disputes, which Professors George L. Priest and Benjamin Klein observed are strongly biased “toward a rate of success for ... appellants at appeal of [50%] regardless of the substantive standard of law.”); David L. Schwartz, Pre-Markman Reversal Rates, 43 LOY. L.A. L. REV. 1073, 1011 (2010) (“Because claim construction is a central issue in a majority of appeals decisions on the merits, such an approach suggests that claim construction appeals should be resolved with a 50 percent reversal rate.”); Kristen Osenga, Linguistics and Patent Claim Construction, 38 RUTGERS L.J. 61, 67-68 (2006) (applying Priest-Klein hypothesis to selection of claim construction disputes for appeal); Gregory N. Mandel, Patently Non-Obvious: Empirical Demonstration that the Hindsight Bias Renders Patent Decisions Irrational, 67 OHIO ST. L.J. 1391, 1451 (2006) (citing Priest-Klein to support the proposition that close non-obvious cases will be litigated); c.f. Jonathan Masur, Patent Inflation, 121 YALE L.J. 470, 516 (2011) (conflating case outcome with issue outcome). While some of these works proceed to challenge the explanatory power of Priest-Klein, see, e.g., Schwartz at 1102, Priest-Klein is used as the jumping off point for these critiques. This Essay reaches a very different conclusion: that Priest-Klein should not be used even as a jumping off point when multiple issues are involved.

5 Priest & Klein, supra note 2, at 17. Priest & Klein envisioned their theory as applying to both the selection of disputes for trial and appeal, id. at 5, although it is considered by some to be more applicable to trials than appeals. In any event, the theory is commonly applied to analyses of the Federal Circuit’s appellate decisions in patent cases. See citations in footnote 4.

6 Id. at 16.
7 Id. at 17.
some novel explanation. Given the number of empirical studies on patent issue outcomes reporting results that deviate from a 50% success rate for appellants, these assumptions and limitations have done a lot of work over the past few years.

But there’s a reason to be skeptical of the application of Priest-Klein to patent issues, one so fundamental that perhaps we should stop playing the Priest-Klein assumption game altogether, at least in the context of patent law issues: mathematically, it’s just plain wrong to apply Priest-Klein to individual issues. This is because at best the Priest-Klein hypothesis applies to the selection of dispute outcomes. But dispute outcomes in patent law, as Mark Lemley recently discussed, involve multiple issues, all of which the patent holder must generally win to prevail. Because of the presence of these multiple issues, there is axiomatically no basis for inferring that a patentee would expect a fifty-percent chance of winning each one.

An example illustrates this point. In *Therasense v. Becton, Dickinson and Co.*, the patent holder appealed an adverse district court determination of obviousness.

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8 This practice is common in patent scholarship - indeed, many of the references cited in footnote 4 go on to analyze some of the insights about litigation that have arisen from Priest-Klein’s hypothesis, such as selection effects based on asymmetrical stakes, or to challenge its explanatory power. I am not suggesting that these insights are not valuable. In many instances they may be both valuable and correct observations about the case law - but not for the reason that they explain a deviation from a fifty-percent expected success rate for success on individual issues.
9 *Id.* at 7. Priest and Klein define a “dispute” as “any occasion in which a plaintiff asserts a claim for some injury against a defendant. The resolution of a dispute in Priest-Klein’s model leads to a binary liability/no liability result.
10 Mark A. Lemley, *The Fractioning of Patent Law* 4 (Stanford Public Law Working Paper No. 1895681, 2011), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1895681 ("One break in the chain - one patentee loss - and the game is up."). Lemley examines the inverse issue, exploring why patentee win rates in litigation overall are so low. I think he’s right, but the analysis goes the other way as well: multiple issues means that even if we could predict or calculate the overall win rate for patentees, we still can’t predict the win rate on particular issues.
11 593 F.3d 1289 (Fed. Cir. 2010) (vacated in part).
Accepting the Priest-Klein hypothesis for the sake of this argument,\textsuperscript{12} we would conclude that the appellant likely had a 50% probability of succeeding on the appeal as a whole.\textsuperscript{13} If obviousness were the only issue on appeal, then, and assuming symmetrical stakes and complete party information, Priest-Klein would predict a 50% expectation of success for the appellant on obviousness.

But obviousness was not the only issue appealed in \textit{Therasense}. The district court also found the patent to be unenforceable due to inequitable conduct, a ruling that the patent holder appealed as well. Thus, in order to succeed on the appeal altogether - such that the patent would be both valid and enforceable - we would \textit{not} expect the probability of success on both the obviousness and inequitable conduct claims to be 50%. Indeed, if both claims were independently expected to succeed at a 50% rate, the patent holder’s overall expectation of success would be equal to 0.5 * 0.5 or only 25%!\textsuperscript{14} In order to have an expectation of a 50% success rate on the appeal as a whole, the patentee would need an expectation of success on each issue of approximately 70% if the probabilities of success on both issues were equal and

\textsuperscript{12} Priest & Klein, supra note 2, at 4-5 (“Our model, however, demonstrates that, where the gains or losses from litigation are equal to the parties, the individual maximizing decisions of the parties will create a strong bias toward a rate of success for plaintiffs at trial or appellants at appeal of 50 percent regardless of the substantive standard of law.”).

\textsuperscript{13} This assumption is not necessarily true, although that does not diminish my argument. The stakes of the litigation may have been much higher for the patent holder or the accused party in this litigation, a violation of one of the recognized assumptions of Priest-Klein. Likewise, the parties may have incomplete information, or be error-prone in making predictions of success. But as this example demonstrates, there is no need to fall back on such assumptions: Priest-Klein is mathematically inapplicable to individual issues decided by the Federal Circuit.

\textsuperscript{14} David Freedman, Robert Pisani, & Roger Purves, \textit{Statistics for the Social Sciences}, Fourth Ed., 229 (2007) (“The chance that two things will both happen equals the chance that the first will happen, multiplied by the chance that the second will happen given that the first has happened.”). Note that I have assumed independence, but absolute independence is unlikely in this circumstance, given that some of the facts relevant to the court’s obviousness decision were also relevant to its inequitable conduct determination. \textit{See Therasense, supra} note 11. Even with partial dependence, however, the point still holds: absent complete dependence (which also is not the case), the probability of both events happening would still not equal the probability of the dispute outcome itself.
independent. In short, the more issues the patentee needs to succeed on, the higher the average probability of success on each needs to be if the Priest-Klein hypothesis about the selection of disputes is correct.\(^{15}\)

The reverse is true as well. Consider a patent owner who asserts three patents against an accused infringer who defends only the ground of noninfringement. Applying the Priest-Klein hypothesis, we might expect the litigation would only proceed to a judicial resolution if the patent owner’s overall probability of success approaches 50%. However, in order to prevail, the patent owner need only win on one patent - one noninfringement success. Thus, to have a 50% expectation of success on the outcome of the dispute, the patent owner would only need an expectation of success on any one patent of about 20\%.\(^{16}\)

For simplicity, the above examples assumed that the expectation of success on all three issues is equal; this need not be the case, however. Relaxing the assumption of equality of success allows for a multitude of possible probabilities on each issue, making it impossible to calculate expectations of success even if there are only two issues in play. Attempting to calculate the probabilities of success on a given issue becomes equivalent to asking someone to solve the following equation for \(x\) and \(y\):

\[
.50 = x \times y.
\]

As a quick bit of thought will reveal, there are an infinite number of ways

\(^{15}\) Of course, if one of the issues is completely dependent on another, such as infringement of an independent claim following a finding of infringement of a dependent claim, then it would not count as a separate issue.

\(^{16}\) The probability that at least one of several different independent events will occur is equal to 1 minus the probability that any of those events will not occur; in other words \(P(A \cup B \cup C) = 1 - ((1-P(A))*(1-P(B))*(1-P(C))\). In this case, a \(P(A \cup B \cup C)\) of approximately 50% can be achieved at \(1 - ((1-.2)*(1-.2)*(1-.2))\). See Freedman, supra note 14, at 249-50. Note that this again assumes independence.

\(^{17}\) It might be theoretically possible to solve this equation if there was a relationship between \(x\) and \(y\) and it was known. I’m willing to concede that this relationship might exist in some cases - obviousness and
to reach a 50% overall likelihood of success when two are more issues are involved in a case outcome.\textsuperscript{18} The appellant in the \textit{Therasense} example above might have reached this expectation if the probability of success on the obviousness issue were 90% and the probability of success on the inequitable conduct issue were about 55% or vice versa.\textsuperscript{19} Or a probability of success on obviousness of 80% and 62.5% on inequitable conduct or vice versa.\textsuperscript{20} And so on. In short, lots of combinations of predictions of success on individual issues can lead to an expectation of success on the appeal overall.

So what does this mean for empirical studies, particularly studies of issue-outcomes? Most importantly, it suggests that there is no basis for appellants to be biased towards picking close doctrinal issues for trial or appeal. Even if appellants are likely to appeal trial court outcomes on which they have a 50% expectation of success, as long as there is more than one issue being appealed there is no reason to expect an appellant to have a 50% expectation of success on each issue.

Indeed, expectations of success on individual issues could vary wildly, as the above examples demonstrate. One appellant might have a 19% expectation of convincing the Federal Circuit to reverse a district court finding of nonobviousness; another might have a 70% expectation of convincing the same court to reverse a finding of inequitable conduct could conceivably be linked to a degree, and there is empirical evidence that decision-makers will sometimes rule by party rather than by issue. See Kimberly A. Moore, \textit{Judges, Juries, and Patent Cases - An Empirical Peek Inside the Black Box}, 99 Mich. L. Rev. 365, 403-4 (2000). Ultimately, though, this doesn’t make the problem any more solvable: being told that there is some unknown relationship between x and y isn’t going to cause any attempt to solve for both turn out differently.

\textsuperscript{18} Although from any practical standpoint, there are probably just a really lot.\textsuperscript{19} P(AnB) = P(A) * P(B). In this case, P(AnB) = .90 * .55 = .495.\textsuperscript{20}\.80 * .625 = .50.
of obviousness. In short, Priest-Klein does not provide any reason to posit that appellants will select only the close issues to appeal, and thus no reason to expect a 50% success rate on those issues.

In theory, one might posit that rational parties would settle individual issues that are not hard calls, thus leaving only the close issues. In other words, if both parties knew that the patentee had a high likelihood of success on infringement, the parties could conceivably settle that portion of the case. And in practice, this does sometimes happen when the parties are able to exchange something of equal value, such as each dropping a fairly weak issue from the case. Sometimes a party will also voluntarily stipulate to or withdraw an issue in order to narrow the dispute, perhaps because it believes it is particularly strong on the remaining issues. In the end, however, whether or not parties settle issues for which they have the same expectation of success, or which one party is particularly unlikely to succeed, does not undermine the key point that as long as multiple issues remain in the litigation, one cannot expect 50% plaintiff success rates on any individual issue.

Deviations from - or even results that indicate - a 50% success rate might thus be explained by random variation in the selection of issues alone. Perhaps there were just

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21 Keep in mind that these are examples only. It’s also possible to envision scenarios where the appellant-patentee could have only a 19% expectation of convincing the Federal Circuit to reverse a finding of obviousness or the appellant-accused infringer a 70% expectation of reversing a finding of nonobviousness.

22 There’s another reason to be skeptical of applying Priest-Klein to issue outcomes: sometimes the Federal Circuit will decline to address particular issues when there is another issue that disposes of the appeal. Id. at 398. (“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.”). This may be particularly true when it comes to difficult issues that are hard to resolve. Thus, the Federal Circuit itself may be selecting for issues that are, at least on the margins, against close cases.
a large number of patentee-appellants who needed to win on multiple issues, and thus obviousness was appealed even though all parties involved knew that the patentee-appellant was likely to win that issue at a high rate. That might result in a high reversal rate for findings of obviousness - not because of asymmetric stakes or a pro-patentee bias at the Federal Circuit, but simply because that was the nature of the obviousness issues being appealed.

There might be an even more important consequence of this rejection of Priest-Klein’s applicability, however. If, in fact, individual issues are being randomly selected for appeal, then empirical studies of outcomes might actually have more meaning in terms of understanding the Federal Circuit’s jurisprudence. Perhaps, in that case, they do reflect variations in the favorability of the standard of decision to plaintiffs23 - and are not merely the result of party selection bias.

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23 Priest & Klein, supra note 2, at 4 (“If disputes were selected for litigation randomly, then the rate of plaintiff verdicts would differ as the standard of decision becomes more or less favorable to plaintiffs.”).