ON THE DECLINE OF THE DOCTRINE OF EQUIVALENTS

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ABSTRACT

The doctrine of equivalents is a judicial creation that allows patentees to exclude others from the use of subject matter beyond the textual scope of a patent’s claims. This venerable—and extremely controversial—doctrine is tolerated (or promoted) on the theory that it is fundamentally necessary to protect the incentive structure of the patent system.

The perceived importance of the doctrine of equivalents makes all the more remarkable recent scholarly arguments that this ancient doctrine is a dead letter in American patent law. One recent empirical study argues that the doctrine is dead but hypothesizes that it did not succumb because courts acted to restrict it; indeed, it argues that the legal rules of the doctrine simply do not much matter. The hypothesis instead emphasizes that the doctrine succumbed because changes in the procedural circumstances in which equivalents claims are heard caused courts to lump them together with literal infringement determinations, making it more likely that they would be resolved in the same way—against the patentee.

This Article uses empirical techniques to independently test this hypothesis. It first develops evidence that supports the contention that the doctrine of equivalents has indeed been in decline over the last fifteen years. It then establishes detailed evidence for two additional findings. The first is that procedural context contributes to the decline of the doctrine. The second, however, is that the legal rules imposed by courts to restrict the doctrine also contribute. The Article interprets the

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results to mean that the decline of the doctrine of equivalents is something more than just the happy (or unhappy) accident of the procedural context in which equivalents claims are now litigated. It is the culmination of a concerted and prolonged court-driven effort to make its favorable application the exception, not the rule.

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INTRODUCTION

No doctrine invested in the Federal Circuit has produced more angst, controversy, or expense than the doctrine of equivalents.1 Highly visible internal disputes2 and outcry from the bar3 have been paralleled

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1 See, e.g., Michael J. Meurer & Craig Allen Nard, Invention, Refinement, and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents, 93 Geo. L.J. 1947, 1948-49 (2005) ("Perhaps no doctrine in patent law is as controversial as the Doctrine of Equivalents . . . ."); Paul R. Michel, The Role and Responsibility of Patent Attorneys in Improving the Doctrine of Equivalents, 40 Idea 123, 123 (2000) (stating that the doctrine has "proven to be the most difficult and least predictable of all doctrines in patent law to apply. Even judges cannot agree on its contours. Imagine the dilemma for lawyers! Pity lay jurors!"); S. Jay Plager, Challenges for Intellectual Property Law in the Twenty-First Century: Indeterminacy and Other Problems, 2001 U. Ill. L. Rev. 69, 72 (2001) (fingering the doctrine of equivalents as the "most obvious and well-known example" of doctrinal indeterminacy). General scholarly interest is also high—at least as measured by the frequency with which the doctrine is mentioned. A search of law review and journal articles that mention the term “doctrine of equivalents” at least five times yielded 528 articles. The search, conducted November 10, 2009, is in LEXIS—“US Law Reviews and Journals, Combined” database, with the term “atl 5 (doctrine of equivalents).” A similar search targeting only two mentions of the specific term yielded 873 articles.

by Supreme Court review in some of the Court’s most famous patent cases of the modern era. Since the creation of the Federal Circuit, no patent doctrine has been considered by the high Court more frequently than the doctrine of equivalents.

A judicial doctrine of ancient origin, the doctrine of equivalents permits patentees to establish infringement liability where the accused product or process is insubstantially different from the patented invention. The core purpose of the doctrine is the protection of the
incentive structure of the patent system. After all, if competitors could escape infringement liability by practicing embodiments of an invention that represented insubstantial changes from the embodiments claimed in a patent, it is reasonable to think that potential innovators would be discouraged from disclosing new inventions or even from taking the risks of some types of innovation. As the Supreme Court has put it: “[T]o permit imitation of a patented invention which does not copy every literal detail would be to convert the protection of the patent grant into a hollow and useless thing... leaving room for—indeed encouraging—the unscrupulous copyist to make unimportant and insubstantial changes.”

But the systemic protection provided by the doctrine of equivalents comes at a cost. By allowing a patentee to exclude others from subject matter beyond the textual scope of a patent’s claims, the doctrine fosters uncertainty in competition. The reason is that notice of the scope of the rights conferred by a patent cannot be delivered by a full and thorough reading of the patent and its prosecution history. As the Supreme Court has put it: “There can be no denying that the doctrine of equivalents, when applied broadly, conflicts with the definitional and public-notice functions of the statutory claiming requirement.”

Reconciling these two competing values—protecting the patent system from the consequences of allowing the free practice of insubstantial changes, and providing adequate public notice of the rights conferred by a patent—has been the challenge presented by the doctrine of equivalents. And many, I think, would agree that the Federal Circuit has at least sought to meet it.

The Federal Circuit has pursued two main avenues of reform. The first avenue is the development of a set of legal standards that govern the comparison between a patent claim and an accused device. These infringement standards are factual in character in the sense that their application is directed to the fact finder. Subject to the usual exception. See id. at 39 n.8 ("Where the evidence is such that no reasonable jury could determine two elements to be equivalent, district courts are obliged to grant partial or complete summary judgment. If there has been a reluctance to do so by some courts due to unfamiliarity with the subject matter, we are confident that the Federal Circuit can remedy the problem.") (citations omitted).
deference on review by the Federal Circuit. The two major standards—and those scored for in this study—are known as the “function-way-result” test\(^\text{12}\) and the “insubstantial differences” test.\(^\text{13}\) In general terms, they are both relatively open-ended fact-dependent inquiries.

The second avenue is the development of a set of legal rules that limit the scope of equivalents that a patentee may assert. These legal limits are legal in character in the sense that they are entirely judge-operable; juries need not apply, and the Federal Circuit reviews a trial court’s application of these rules de novo. A conventional list of legal limits includes the following:

- Amendment-based prosecution history estoppel—which seeks to prevent a patentee from recapturing through the doctrine of equivalents subject matter surrendered during patent prosecution by claim amendment;\(^\text{14}\)
- Argument-based prosecution history estoppel—which seeks to prevent a patentee from recapturing through the doctrine of equivalents subject matter surrendered during patent prosecution by argument;\(^\text{15}\)
- All Elements Rule—which requires that each claim element (or limitation) be present either literally or equivalently in an accused device, or else infringement cannot lie (essentially prohibiting a patentee from asserting a particularly holistic view of the scope of equivalent subject matter);\(^\text{16}\)
- Prohibition against a scope of equivalents that encompasses prior art—which seeks to prevent a patentee from capturing

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\(^{12}\) See *Graver Tank*, 339 U.S. at 608-10 (a patentee may invoke the doctrine of equivalents against an infringer if the infringer’s device “‘performs substantially the same function in substantially the same way to obtain the same results’”) (quoting *Sanitary Refrigeration Co. v. Winters*, 280 U.S. 30, 42 (1929)).


\(^{15}\) See *Cybor Corp. v. Fas Techs., Inc.* 138 F.3d 1448 (en banc) (recognizing estoppel by argument).

\(^{16}\) See *Pennwalt Corp. v. Durland-Wayland, Inc.*, 833 F.2d 931 (Fed. Cir. 1987). The Supreme Court adopted the principle in *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29 (1997), where it held that the doctrine of equivalents should not be applied so broadly as to effectively eliminate a claim element. 520 U.S. at 39 n.8 (“Thus, under the particular facts of a case . . . if a theory of equivalence would entirely vitiate a particular claim element, partial or complete judgment should be rendered by the court, as there would be no further material issue for the jury to resolve.”).
through the doctrine of equivalents subject matter in the prior art (and presumably unpatentable in the first instance);\(^\text{17}\)

- Prohibition against a scope of equivalents that encompasses subject matter disclosed but not literally claimed in a patent specification—which seeks to prevent a patentee from capturing through the doctrine of equivalents subject matter that it has, in a sense, publicly represented that it could have claimed but decided not to;\(^\text{18}\)

- Specification Disclaimer/Disavowal—which seeks to prevent a patentee from capturing through the doctrine of equivalents subject matter disavowed in the description part of the patent specification;\(^\text{19}\)

- Limitation of the doctrine of equivalents in some cases to after-arising technologies.\(^\text{20}\)

Perhaps the most notable characteristic of the legal limitations is that they are all restrictive. They are nearly all concerned with preventing patentees from accessing the doctrine of equivalents in a variety of different contexts. And while, admittedly, this form of rule development tends to imply some amount of open range for the doctrine of equivalents, it positively admits to little, leading at least one scholar to infer from these developments that the “doctrine of equivalents is in decline.”\(^\text{21}\)

A recent empirical study supports the general claim that the doctrine is in decline, but it largely rejects the notion that the legal rules of the doctrine of equivalents have had much to do with it.\(^\text{22}\) The study’s interpretation of the empirical findings instead emphasizes the effect of the procedural circumstances in which equivalents claims are litigated. Specifically, it contends that procedural incentives threatened—and ultimately killed\(^\text{23}\)—the doctrine of equivalents. The


\(^{19}\) See Gaus v. Conair Corp., 363 F.3d 1284 (2004) (“Dr. Gaus described the invention as requiring the protective circuitry to function regardless of the operating state of the apparatus . . . . Having disavowed coverage of devices in which . . . the protective cut-off mechanism is not triggered until the water reaches the electrical operating system, the patentee cannot reclaim that surrendered claim coverage by invoking the doctrine of equivalents.”).

\(^{20}\) This legal limitation helps to define the application of the doctrine of equivalents in cases involving 35 U.S.C. § 112 ¶ 6 (2000). See Al-Site Corp. v. VSI Int’l, Inc., 174 F.3d 1308 (Fed. Cir. 1999).

\(^{21}\) See Adams, supra note 4, at 1113; id. at 1156-57 (interpreting doctrinal developments and arguing that the doctrine has been so substantially limited over time that it is obsolete).

\(^{22}\) Allison & Lemley, supra note 3, at 976-79 (interpreting empirical data gathered from the content of a mix of Federal Circuit and trial court opinions addressing the doctrine of equivalents).

\(^{23}\) Id. at 976-77 (“The doctrine of equivalents was largely dead by 1998.”).
analysis fingers the *Markman v. Westview Instruments, Inc.* case\(^{24}\) as the cause of the incentive threat.

The argument is that by making claim construction\(^{25}\) a question of law,\(^{26}\) *Markman* encouraged judges to grant summary judgments of noninfringement. The basic idea\(^{27}\) is as follows:

1. By making claim construction a question of law, the *Markman* decision caused judges to construe claims at pretrial “*Markman* hearings”;

2. Claim construction often decides the question of literal\(^{28}\) (or textual) infringement,\(^{29}\) so having a *Markman* hearing increases the likelihood that the trial judge will grant summary judgment on literal infringement;\(^{30}\)

3. Patentees usually claim both literal infringement and infringement by equivalents; and

4. To have a final—and therefore appealable\(^{31}\)—judgment, the equivalents claim has to be decided.

Thus, where the trial court construes a patent claim and summarily determines on that construction that it is not literally infringed, the court, in order to dispose of the case, will have to get rid of the equivalents claim. This creates, it is argued, an incentive to lump the decision-making for both claims together, i.e., to also order summary judgment of noninfringement on the equivalents claim. The incentive is arguably amplified by the frequency with which the Federal Circuit reverses trial court determinations on the grounds that the trial court misconstrued the claims.\(^{32}\)

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\(^{24}\) *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996), aff’g 52 F.3d 967 (Fed. Cir. 1995).

\(^{25}\) Claim construction refers to the task of construing, or interpreting, the words of patents’ claims to the end of operationalizing the patent claim for its application to legal inquiries (e.g., patent infringement and validity).

\(^{26}\) See *Markman*, 517 U.S. at 391.

\(^{27}\) Allison & Lemley, *supra* note 3, at 977 (setting forth the argument).

\(^{28}\) For a description of the difference between literal infringement and infringement by the doctrine of equivalents, see *supra* note 8.

\(^{29}\) *Markman v. Westview Instruments*, Inc., 52 F.3d 967, 989 (Fed. Cir. 1995) (en banc) (Mayer, J., concurring) (“[T]o decide what the claims mean is nearly always to decide the case.”).


\(^{31}\) The general rule is that the Federal Circuit will not hear interlocutory appeals on the question of the proper construction of the claims.

This Article uses empirical techniques to examine the hypothesis that the doctrine of equivalents succumbed because of changes in the procedural circumstances in which the doctrine is litigated rather than because of the legal rules imposed to restrict it. It thus presents a rather unconventional approach to legal scholarship: the application of the scientific method—the independent testing of an announced hypothesis.

The study reported in this Article differs from the empirical work just discussed in at least two important ways. First, it uses only appellate decisions as its source of information. In relevant part, the work of Professors Allison and Lemley conflates Federal Circuit and trial court opinions. This study uses a substantially different source of information about the doctrine of equivalents.

Second, this study has attempted to collect the entire population of appellate decisions on the doctrine of equivalents over a continuous period extending to decisions both before and after the earliest and latest decisions examined in the prior work—overall, it covers a roughly fifteen-year period. By using a large data set and allowing no gaps, this study might be less prone to missing some important jurisprudential developments. This approach also contrasts aspects of the prior work that relied on judicial decisions collected from discrete periods and used measures of differences in outcomes between periods to support its main hypothesis. The approach used here also allows for the statistical argument that the descriptive data reported is by definition statistically significant (even though this study also employs inferential techniques for other purposes).

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33 See supra note 22 and accompanying text.

34 Allison & Lemley, supra note 3, at 978 (reporting that “most” of the effect “came from district courts”).

35 In this regard it provides something of a test of appellate opinions as sources of information for empirical studies. As the results make apparent in this instance, Federal Circuit opinions provide information about the outcomes of patent cases and the nature of case law highly similar to that gleaned from methods that aggregate decisions from trial courts and the Federal Circuit.

36 See infra Part I.B.

37 For example, one of the central empirical supports for the hypothesis that procedure, not rules, killed the doctrine of equivalents is the finding that patentees were more successful before the Federal Circuit’s Markman decision than they were afterwards. See Allison & Lemley, supra note 3, at 978.

This Article begins by exploring whether there is evidence that the doctrine of equivalents is in fact in decline. Finding that there is evidence supporting the claim that the doctrine of equivalents has declined, the Article next moves to an examination of the details of that decline. The evidence developed supports the interpretation that procedural circumstances have played a prominent role in the decline of the doctrine of equivalents. However, the evidence suggests that the legal rules restricting the doctrine of equivalents have also played a role. Together the results suggest that the decline of the doctrine of equivalents is not simply the product of the unilateral effect of either procedural incentives or restrictive rules. It is perhaps best described as the product of a Supreme Court-encouraged assault on the doctrine that integrates rules and procedure. The basic judicial lesson appears to be that the successful assertion of the doctrine of equivalents should be the exception, not the rule.

The Article proceeds in three parts. Part I describes the study design and methodology. Part II presents the results and provides analysis of their meaning. Finally, Part III offers some concluding remarks.

I. METHODS

A. Overall Approach

The central approach of the study is to systematically code judicial opinions and to utilize the resulting data to empirically analyze the jurisprudence. This approach is commonly known in legal and social sciences scholarship as "content analysis." As employed here it relies on much the same information as conventional legal scholarship (judicial opinions), but it differs somewhat in the sense that it seeks a comprehensive, objective understanding of a body of law as opposed to an interpretation of judicial opinions viewed as symbolic or important.

Content analysis is capable of helping scholars verify, analyze, or refute empirical claims about case law, and it is to that purpose the approach is put in this study. It is worth pointing out that applying this approach to judicial opinions presents a set of well-recognized biases. The most important of these biases include unobserved reasoning, selection bias, and strategic behavior\(^{40}\)—biases that affect not only content analysis but also more traditional interpretive forms of legal scholarship. It is thus worth emphasizing that the source of information relied upon in this sort of study (judicial opinions) is essentially the same source that is traditionally relied on by legal scholars, attorneys, inventors, and firms.

B. Sample Collection

The dataset was assembled from a search of the LEXIS—“Federal Circuit, US Court of Appeals Cases” database. The following terms were searched\(^{41}\):

- patent! and equivalent! and (“prosecution history estoppel” or “file wrapper” or “estoppel” or “all elements” or “vitiate” or “vitiation” or “dedicate” or “dedication” or “disclaim” or “disclaimed” or “disavow” or “disavowal” or “graver tank” or “hilton” or “warner-jenkinson” or “festo” or “doctrine”) and not name (in re) and not “sec’y”

The search returned 1235 cases. The data set was then truncated to a roughly fifteen-year period spanning January 1, 1992 to May 2, 2007 and manually screened for decisions on the doctrine of equivalents.\(^{42}\) Cases not addressing the doctrine of equivalents, including those involving the so-called “reverse doctrine of equivalents,” were excluded from the data set.

The defining characteristic of an individual record in the data set is that it comprises an analysis deciding infringement under the doctrine of equivalents in an opinion for the court.\(^{43}\) Accordingly, three records could be entered for a single opinion if, for example, the opinion decided the application of the doctrine to three claims, using distinct

\(^{40}\) See Hall & Wright, supra note 39; see also Wagner & Petherbridge, Is the Federal Circuit Succeeding?, supra note 39, at 1128-30.

\(^{41}\) No date restrictions were imposed on the search.

\(^{42}\) The intent of the study was to collect the entire population of written equivalents analyses over the period studied. If the entire population really is included, the results are statistically significant by definition. See Allison & Lemley, supra note 38. That said, due to inherent uncertainties in data collection and an interest in the predictive significance of the data, the analysis provided in Part II treats the data set as a sample of a super-population.

\(^{43}\) As the study is concerned with how the court treats the doctrine of equivalents, it excludes concurrences and dissents.
analyses for each claim. Similarly, two records could be entered for a single opinion if it applied two distinct analyses to a claim or claim limitation. In an opinion involving a single patent, if the court decided several equivalents claims with a single equivalents analysis (e.g., a single incidence of estoppel barred resort to the doctrine for more than one claim), a single record was entered in the data set. However, if a single analysis decided equivalents claims from different patents (e.g., a single incidence of estoppel barred resort to the doctrine for claim 1 from the ’123 patent and claim 1 from the ’456 patent), two records were entered, one for each patent. This approach produced 911 total analyses.

One additional selection step was applied. This study includes an examination of the hypothesis that Markman (and the procedural consequences of its holding that claim construction is a question for the judge) has had a severe impact on patentee success when it comes to the doctrine of equivalents. Accordingly, only analyses that were clear with respect to claim construction status were included in the data set. To be clear, an opinion had to either (1) show that the construction of a claim limitation involved in an equivalents analysis had been considered by the Federal Circuit and report whether the court agreed with the lower court’s construction, or (2) contain no indication that claim construction had been considered in the analysis. Analyses that were ambiguous with respect to claim construction status were thus excluded, reducing the total number of analyses from 911 to 878.

C. Measurement Criteria

The analyses were scored for content. Most of the scoring was binary in nature, i.e., positive (a “1”) if the content was present and negative (a “0”) if the content was not present. A broad array of content was scored leading to the variables used in this study. The following discussion describes those variables.

The overwhelming majority of variables used in this study fall into three main categories. The first includes information on the procedural status of equivalents claims. The second provides measures of equivalents outcomes at the Federal Circuit. The third provides measures of the legal rules of the doctrine of equivalents.

The main variables in the procedural status category are:

44 For example, if the court tested the range of equivalents using one legal rule and separately tested its scope using another legal rule.
Summary Judgment (SJ), positive when an analysis addresses a lower court summary judgment on the doctrine of equivalents, otherwise negative;

Claim Construction (CC), positive when an analysis considers the proper construction of a claim limitation involved in an equivalents analysis, otherwise negative;

Judgments Noninfringement (JNI), positive when an analysis addresses a lower court judgment of noninfringement under the doctrine of equivalents, otherwise negative;

Summary Judgment Noninfringement (SJNI), positive when an analysis addresses a lower court summary judgment of noninfringement under the doctrine of equivalents, otherwise negative; and

Infringement, positive when an analysis addresses a lower court judgment of infringement under the doctrine of equivalents, otherwise negative.

The main variables in the outcome category are:

Dispositive Wins, positive when an analysis evinces a mandate that an accused infringer is liable for infringement under a theory of equivalents, otherwise negative;

Patentee Wins, positive when an analysis evinces a favorable result for a patentee on the question of infringement by equivalents (i.e., judgment of infringement affirmed, or judgment of noninfringement reversed or vacated), otherwise negative;

Nondispositive Judgments, positive when an analysis evinces neither a dispositive patentee win nor a dispositive patentee loss on the question of infringement by equivalents (in other words, when remanded for additional consideration), otherwise negative;

Dispositive Losses, positive when an analysis evinces a mandate that an accused infringer is not liable for infringement under a theory of equivalents, otherwise negative;

Affirmed, positive when an analysis affirms a lower court’s decision on the doctrine of equivalents, otherwise negative; and

Affirmed—Summary Judgment Noninfringement, positive when an analysis affirms a lower court summary judgment of noninfringement by equivalents, otherwise negative.

The main variables in the legal rules of the doctrine of equivalents category are:

45 These variables follow the developments in equivalents jurisprudence described in more detail earlier, see supra Introduction, so I will not describe them here. In a nutshell, together they
Amendment Estoppel (Amendment), positive when an analysis is exclusive\(^{46}\) in considering the application of this rule, otherwise negative;

Argument Estoppel (Argument), positive when an analysis is exclusive in considering the application of this rule, otherwise negative;

All Elements Rule (All Elements), positive when an analysis is exclusive in considering the application of this rule, otherwise negative;

Prior Art Limits (Prior Art), positive when an analysis is exclusive in considering the application of this rule, otherwise negative;

Disclosed but Unclaimed Subject Matter Limits (Unclaimed), positive when an analysis is exclusive in considering the application of this rule, otherwise negative;

Function-Way-Result (FWR), positive when an analysis is exclusive in considering the application of this rule/standard, otherwise negative;

Insubstantial Differences (Insubstantial), positive when an analysis is exclusive in considering the application of this rule/standard, otherwise negative;

Equivalent Specific Totals (Eq Sp Totals), a grouped variable, positive when an analysis applies at least one of the rules/standards just listed, otherwise negative;

Legal Limits Only (Legal Limits), a grouped variable, positive when an analysis discusses a single legal limit,\(^{47}\) otherwise negative; and

Infringement Standards Only (Infringe Stds), a grouped variable, positive when an analyses discusses a single infringement standard,\(^{48}\) otherwise negative.

A few other variables appear in the results. The most notable is, perhaps, authorship of analyses by judges who have been shown to have distinct approaches to claim construction analysis.\(^{49}\)

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\(^{46}\) With the exception of Equivalent Specific Totals, these rule-specific variables count only analyses that use one rule, allowing for an exploration of the impact of the individual rules.

\(^{47}\) See supra Introduction.

\(^{48}\) See supra Introduction.

\(^{49}\) They do not play a prominent role but provide a perspective on the impact of claim construction. For a definition of the categories, see Wagner & Petherbridge, *Is the Federal Circuit Succeeding?*, supra note 39.
D. Statistical Arguments

The empirical evidence reported in this study comes from the application of several statistical techniques. Some are simple descriptive statistical techniques such as graphical representations that reveal the performance of variables at various points in the modern history of patent law. The study also employs more complex statistical arguments, including regression techniques that are useful for exploring and defining relationships between variables.

This study uses linear regression to develop statistical information concerning the trends in the rates of positive outcomes for variables over the last fifteen years. This technique is also used to test for significant relationships between some variables—to ask, in effect, whether an increase in the average frequency of one variable ($X$) corresponds to an increase or decrease in the average frequency of another variable ($Y$).

Logistic regression is used in this study to explore the effect of a variety of potential explanatory variables on binary response variables. In particular, it provides a statistical argument as to whether a given explanatory variable has a quantifiable effect on the odds of a successful outcome for a response variable. As used here, it allows for the examination of a number of variables together, providing information concerning their relative effects on the odds of a successful outcome for a response variable.

At times the analysis uses the argument that results are statistically significant—a contention that the observed results are not due to chance. Significance is indicated by the letter $p$, which stands for probability. Any $p$-value less than 0.05 is considered statistically significant because it indicates that the probability that the results are due to chance is less than five percent. Values between 0.05 and 0.10 are considered marginal, indicating that the probability that the observed results are due to chance is between five and ten percent.

II. RESULTS AND DISCUSSION

Analysis of the collected data proceeds in three main parts. Part II.A generally explores the fate of the doctrine of equivalents over the last fifteen years. This Part establishes three general findings. First, this Part shows that Federal Circuit analyses spanning the last fifteen years evince a significant decline in ultimate patentee success on claims of infringement under the doctrine of equivalents. Second, it provides evidence confirming the hypothesis that the decline in the doctrine of
equivalents can be linked to the procedural circumstances in which doctrine of equivalents claims are litigated. However, the third general finding of this Part is evidence suggesting that the legal rules of the doctrine of equivalents do matter and have meaningfully contributed to the demise of the doctrine as a means of establishing infringement liability.

Parts II.B and II.C pursue more detailed examinations of the latter two general findings. Part II.B examines the role of procedural context in the decline of the doctrine of equivalents and argues that the doctrine’s decline can be linked to an increase in the rate at which the Federal Circuit addresses lower court summary judgments of noninfringement. At a general level, this finding supports the idea that the doctrine’s decline is a product of the circumstances in which it is litigated. However, the evidence overall supports the interpretation that procedural circumstances do not provide the sole explanation—the legal rules also matter and have helped to shape the current state of the doctrine.

Part II.C develops more detailed evidence concerning the role of the legal rules of the doctrine of equivalents. It finds that this evidence does not support the idea that the legal rules of the doctrine of equivalents do not matter. Indeed, the most direct interpretation of the evidence presented is that the rules have played an important role in the demise of the doctrine as a means by which to establish infringement liability.

A. The Decline of the Doctrine of Equivalents

What does it mean to say that the doctrine of equivalents is “in decline” or “dead” or “killed”? To be meaningfully employed in an empirical context, the concept underlying those terms should be operationalized. To do this, the Allison and Lemley study compared the rates of patentee success at different points in time.\textsuperscript{50} The present analysis proceeds similarly, using as an initial measure of doctrinal decline the response variable\textit{ Dispositive Wins}. As noted earlier,\textsuperscript{51} this variable provides a measure of the rate at which Federal Circuit opinions evince a mandate that an accused infringer is liable for infringement under a theory of equivalents.\textsuperscript{52} As a definitional matter,

\begin{itemize}
\item \textsuperscript{50} Allison & Lemley, \textit{supra} note 3, at 978.
\item \textsuperscript{51} See \textit{supra} Part I.C.
\item \textsuperscript{52} This is not the same definition of a patentee win employed by John Allison and Mark Lemley in \textit{The (Unnoticed) Demise of the Doctrine of Equivalents, Allison & Lemley, supra} note 3. That study conflated Federal Circuit and trial court opinions, while this one utilizes only appellate opinion content. So, the definitions, while directed to a similar measurement—ultimate patentee success—are not the same.
\end{itemize}
the doctrine is “in decline” if there is a decrease in the average frequency of patentee success over time.

Figure 1 provides some evidence that the doctrine of equivalents is in decline. Over the last fifteen years, the trend in average rates of positive outcomes for *Dispositive Wins* is downward. The slope of the trend line is strongly significant, suggesting that the observed decline in ultimate patentee success is not the product of chance observation. A visual inspection of the average rates of patentee success also suggests that patentees’ best times (in terms of success) were, generally speaking, long ago.
Figure 1 thus supports the claim that the doctrine of equivalents is in decline. This is an important result in its own right. Figure 1 also suggests a second empirical element of the procedure-killed-the-doctrine-of-equivalents hypothesis: the involvement of claim construction. A central tenet of the hypothesis is that the doctrine of

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The ordinate represents a thirty-analysis lagged (moving) average of the percentage of positive outcomes on the response variables, plotted against the number of analyses (n=878). It provides a measure of the recent-average frequency of any given opinion content, approximating what a lawyer might see if he or she were to sample the court’s most recent twenty to twenty-five opinions on the topic at any point in time. On the abscissa, the analysis number moves from left to right (1992-2007). The variables are Nondispositive Judgments and Dispositive Wins. See supra Part I.C. The linear trend lines are least squares lines, having the following statistical characteristics: Nondispositive Judgments, \( r = 0.607 \), \( r^2 = 0.369 \), \( t-obs = 22.252 \), \( p = 0.000 \); Dispositive Wins, \( r = -0.357 \), \( r^2 = 0.134 \), \( t-obs = -11.433 \), \( p = 0.000 \). The calculations for the moving averages and linear regressions were performed with Microsoft Excel, the graph was created using Numbers.
equivalents declined because trial judges became enamored with deciding claim construction and literal infringement—and therefore the doctrine of equivalents—adversely to patentees at pretrial Markman hearings. If that is true, the rate of trial court orders evincing claim construction decisions should increase after the Markman decision. If Federal Circuit decisions are a fair sample of what is happening at the trial level, they should also reflect the increase.

Claim construction has presented difficulties for the Federal Circuit. Prior work shows not only so-called “high” reversal rates in claim construction analyses around the year 2000; it also shows that the court’s struggles with claim construction foreshadowed acute unpredictability in appellate-level equivalents outcomes starting in the year 2000—around the time of the Festo decision. The sharp and significant increase in Nondispositive Judgments shown in Figure 1, starting around the time of the Festo decision, is therefore consistent with a role for claim construction in the decline of the doctrine of equivalents.

The significant increase in the rate of Nondispositive Judgments also reveals a weakness of the evidence presented in Figure 1. Measuring Dispositive Wins in the context of all possible decisional outcomes does a relatively poor job of accounting for nondispositive decisions. It is hard to tell whether the average rate of Dispositive Wins declined because patentees really are winning at a lower rate or because more decisions are being remanded. In the latter case, the decline might not mean that patentees are ultimately less successful on the doctrine of

56 See, e.g., Moore, Are District Court Judges Equipped, supra note 32, at 27 (“The high reversal rate on claim construction is problematic.”); id. at 28 (referring to “the high percentage of reversals” when it comes to claim construction); see also Bender, supra note 32, at 221-22 (“Given the confusion expressed by the trial courts about claim construction procedures and the extremely high percentage of changes to claim construction language by the Federal Circuit, claim construction is not consistent or predictable at either the trial or the appellate level.”); Moore, Markman Eight Years Later, supra note 32, at 245–46 (2005) (characterizing Federal Circuit reversal rates as “high”).
57 See Lee Petherbridge, The Claim Construction Effect, 15 MICH. TELECOMM. & TECH. L. REV. 215 (2009) (measuring the Federal Circuit’s ability to dispose of claims of infringement by equivalents and arguing that unpredictability in claim construction doctrine has affected other areas of patent law, specifically including the doctrine of equivalents).
58 This is not to say that the doctrine of the Festo decision had much, if anything, to do with the decline of the doctrine of equivalents; results presented later indicate that it probably did not, a conclusion also reached by Allison and Lemley.
equivalents. It might simply mean that equivalents analyses are impacted by a variable that has a “swamping” effect, pushing down the average rate of *Dispositive Wins*.

To better assess the decline of the doctrine of equivalents, Figure 2 examines the rate of *Dispositive Wins* in analyses that have dispositive outcomes. This approach removes cases that the Federal Circuit remands, providing a somewhat more absolute measure of ultimate patentee success.
Figure 2\textsuperscript{59}

Trends in Rates of Dispositive Wins in Dispositive Decisions

The evidence presented in Figure 2 supports the argument that the rate of patentee success has declined. A visual inspection reveals a

\textsuperscript{59} The ordinate represents a thirty-analysis lagged (moving) average of the percentage of positive outcomes for Dispositive Wins, plotted against the number of analyses (n=599). Analysis number moves from left to right (1992-2007). The least squares trend line is: \( r = -0.316, \quad r^2 = 0.100, \quad t_{\text{obs}} = -7.930, \quad p = 0.000 \). Logistic regression models for the pre-Festo and post-Festo periods are shown; the explanatory variables are described \textit{supra} Part I.C. \textit{Wald \( \chi^2 \)} reports the significance of predictive effect; higher values are more strongly significant. \% Change in Odds reports the effect of an explanatory variable on the odds of a positive outcome for Dispositive Wins, calculated by \((\text{Exp}(b)-1) \times 100\). \textit{R}\textsuperscript{2} refers to Nagelkerke's \textit{R}\textsuperscript{2}, a pseudo \( r^2 \) measurement that seeks to measure strength of models. Each model employed a constant and is significant. Linear calculations were performed with Microsoft Excel, the logistic regressions with SPSS, and the graph was created using Numbers.
higher and more consistent rate of patentee success earlier in time. Also, the trend in average rates of positive outcomes for Dispositive Wins moves downward with a statistically significant slope.

To develop an understanding of which variables explain the decrease in patentee success, Figure 2 also includes a table presenting two logistic regression models. The first column models the predictive effect of certain explanatory variables before the Federal Circuit’s decision in Festo, while the second column models the predictive effect of the variables after the decision. Taken together these models support two general understandings about the decline of the doctrine of equivalents.

The first understanding is that changes in the procedural circumstances of equivalents claims explain the decline of the doctrine. As noted earlier, a central tenet of the procedure-killed-the-doctrine-of-equivalents hypothesis is that the doctrine declined because trial judges became enamored with deciding claim construction—and therefore the doctrine of equivalents—adversely to patentees at pretrial Markman hearings. If this is so, analyses in which patentees fail might be expected to evince two features: an increase in the appearance of claim construction and an increase in the appearance of summary judgments of noninfringement.

Figure 2 provides evidence that patentees fail in analyses that have these characteristics. In the period before Festo, Claim Construction (CC) and Summary Judgment Noninfringement (SJNI) significantly predict sharp declines in the odds of patentee success. The explanatory power of SJNI continues in the post-Festo model, suggesting that the effect of procedural context continues into the modern era. Patentees lose on the doctrine of equivalents on summary judgment, and that outcome is often affirmed on appeal.

The second general understanding about the decline of the doctrine of equivalents is that it is also explained as an effect of legal rules. In the period before Festo, Equivalents Specific Totals (Eq Sp Totals), Legal Limits, and Infringement Standards (Infringe Stds) had no

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60 It cannot be emphasized enough that this study does not argue that the doctrine of Festo is important to the decline of the doctrine of equivalents, nor does it argue that the Festo decision itself is even important to the decline. While the decision might be important—perhaps as a blaze mark of judicial view or feeling about the doctrine of equivalents—it is used in this study only as a convenient temporal dividing line, cabining Federal Circuit analyses into somewhat arbitrarily defined periods (one older and another more recent).

61 A 72.2% and a 98.2% decrease in odds, respectively.

62 This variable measures the presence of an application of at least one of the equivalents-specific doctrines (i.e., infringement standards or legal limits) set forth in the Introduction. See supra Part I.C.

63 This variable groups analyses that are positive for the application of any one of the legal limits set forth in the Introduction. See supra Part I.C.

64 This variable groups analyses that are positive for the application of any one of the
significant explanatory effect on patentee success. The post-*Festo* model, however, shows that patentees have significantly better odds of winning in analyses that apply at least one equivalents-specific doctrine (*Eq Sp Totals*), although they have significantly poorer odds of winning in analyses that apply only one equivalents-specific doctrine (*Legal Limits*).

This result suggests two things. First, it suggests that the influence of the legal rules has expanded in recent years; after *Festo* the rules significantly impact outcomes, but before they did not. Second, the pattern of predictive effect suggests how the rules have evolved. The court uses the legal limitations it developed to explain why patentees lose, and it more frequently requires patentees to overcome the application of the rules—and perhaps more than one rule—in order to succeed.

*Legal Limits* measures analyses that address only a single legal limit, providing a perspective on the general impact of individual rules. The influence of the rules is, as interpretive scholarship predicts, strongly restrictive to patentees. The increase in patentee success predicted by the variable *Eq Sp Totals* most likely reflects the fact that, in order to win on the doctrine of equivalents after *Festo*, patentees regularly had to confront at least one legal limitation as well as the standards that define the infringement comparison between a range of equivalents and an accused device or process.

This makes sense if an analysis first addresses a challenge to the permissible scope of the doctrine of equivalents based on the judge-operable rules that limit its scope. If the accused infringer succeeds, the patentee fails—an outcome predicted by *Legal Limits*. If the accused infringer fails on that aspect of its challenge, the next challenge may be that the accused device’s elements are substantially different from those of the patented one. Again, if the accused infringer succeeds, the patentee fails. But if the infringer fails—and thus the patentee wins—the analysis has addressed at least one legal limit and an infringement standard, making it positive for *Eq Sp Totals* but negative for either *Legal Limits* or *Infringe Stds*.

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infringement standards set forth in the Introduction. See supra Part I.C.

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65 A 1,195.7% increase in the odds.

66 An 80.3% decrease.

67 See, e.g., Adams, supra note 4, at 1151, 1152, 1156.

68 Recall that *Eq Sp Totals* is a grouped variable; it is the only variable in the model that accounts for analyses that apply a legal limitation and an infringement standard. See supra Part I.C.; accord Allison & Lemley, supra note 3, at 974-75 (reporting it is often the case that an analysis of the doctrine of equivalents included the application of more than one doctrinal component of equivalents).
Parts II.B and II.C explore these two general findings in more detail. Part II.B concerns itself with the role of procedure, and Part II.C addresses the impact of legal rules.

B. The Role of Procedure

If the doctrine of equivalents declined because Markman-driven changes in incentives encouraged trial judges increasingly to grant summary judgments of noninfringement, one might expect Federal Circuit analyses to evince two things. First, the rate of analyses written in response to such judgments should increase. Second, the Federal Circuit should affirm much of the increase. As discussed infra, Figure 3 shows that both of these predictions are supported by the patterns of content of Federal Circuit analyses.

To begin with, Figure 3 shows that the trend in the average rate at which Federal Circuit analyses evince a lower court judgment of noninfringement moves upward from approximately seventy to eighty-five percent over the last fifteen years. This comports well with the understanding that the doctrine of equivalents is in decline. It also suggests that Federal Circuit analyses provide a reasonably accurate sample of what is happening at the trial level. If patentees are losing more often at the trial level, one prediction...
also shows—consistent with the hypothesis—a strong increase in the average rate at which Federal Circuit analyses address summary judgments of noninfringement and a strong increase in the average rate at which the Federal Circuit affirms such judgments.

The natural (or perhaps instinctive) inference is that increases in the rates of lower court summary judgments of noninfringement by equivalents correspond to increases in rates of affirmances, thus explaining the decline in the doctrine of equivalents. To develop additional evidence that this might be true, linear regression was used to test the hypothesis that there is no linear relationship\(^\text{72}\) between the average rate at which the Federal Circuit hears appeals from summary judgments of noninfringement and the average rate at which it affirms such judgments. The hypothesis was strongly rejected,\(^\text{73}\) with a slope coefficient of 0.878;\(^\text{74}\) this evidence supports the interpretation that, as the rate at which the Federal Circuit hears appeals from summary judgments of noninfringement by equivalents increases, so does the rate at which the court affirms the judgments.

Some additional support is found in the observation that the slopes of the trend lines for \textit{Summary Judgment Noninfringement} and \textit{Affirmed—Summary Judgment Noninfringement} are very close in value.\(^\text{75}\) Taken together, this evidence suggests the possibility that a positive outcome for one variable roughly tracks a positive outcome for the other. If it does, then the decline in the doctrine of equivalents may find some explanation in the Federal Circuit’s willingness to affirm much of the increase in incoming summary judgments of noninfringement by equivalents.

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that can be made (if appellate opinions provide a fair sample of all tried cases) is that those losses will be expressed in appellate opinions. Figure 3 provides evidence that they are. It is also worth pointing out here that there is little evidence, empirical or otherwise, that there is an appreciable set of summary judgments of infringement by equivalents that are being summarily affirmed—and which might, if they could be included, reduce the rates or slopes of the trends in Figure 3. This presents a concern, of course, because the Federal Circuit has the power to affirm lower court judgments without writing an opinion. See \textit{Fed. R. App. P. 36}.

\(^\text{72}\) Put somewhat differently, the test seeks evidence that an increase in the average frequency of an \(X\) variable (\textit{Summary Judgment Noninfringement}) corresponds to an increase or decrease in the average frequency of a \(Y\) variable (\textit{Affirmed—Summary Judgment Noninfringement}). \(r = 0.828, r^2 = 0.685, t\text{-obs} = 42.922, p = 0.000\) (evidence of a strong and positively directed linear relationship).

\(^\text{73}\) If a one-unit increase in average rate of \textit{Summary Judgment Noninfringement} corresponded to a one-unit increase in average rate of \textit{Affirmed—Summary Judgment Noninfringement}, the slope coefficient would be one. In this case, every one-unit increase in \textit{Affirmed—Summary Judgment Noninfringement} corresponds to a 0.878 unit increase in \textit{Summary Judgment Noninfringement}, suggesting the average rates might closely track one another.

\(^\text{74}\) Technically speaking, the slopes themselves are not identical. The slope of \textit{Affirmed—Summary Judgment Noninfringement} is slightly steeper. But a comparison of the confidence intervals for both of the slopes finds they overlap, suggesting the observed differences could be due to chance.
The similar slopes of the trend lines for Summary Judgment Noninfringement and Affirmed—Summary Judgment Noninfringement, depicted in Figure 3, suggest that the Federal Circuit may be affirming summary judgments of noninfringement at a somewhat steady rate. The decline is, from that perspective, a product of trial judge behavior. Trial judges are simply producing more summary judgments of noninfringement by equivalents than they used to.

In sum, the results presented in Figure 3 are quite consistent with what one would expect to see if the doctrine of equivalents succumbed because of changes in the procedural circumstances in which it was litigated. In fact, it rather graphically depicts the decline. If one were to imagine extending the trend lines (to engage in an informal extrapolation), it seems quite evident that the future of the doctrine of equivalents will be trial court summary judgments adverse to the patentee, affirmed by the Federal Circuit.

C. The Role of Legal Rules

Part II.B emphasized the role of procedure in the decline of the doctrine of equivalents. The evidence provided in that Part, and in Part II.A, supports the hypothesis that changes in the procedural circumstances of equivalents claims help to explain the decline of the doctrine. But the hypothesis that the legal rules do not much matter finds less support in that evidence. In fact, the evidence developed supra has been to the contrary. It suggests that the legal rules imposed to restrict the doctrine of equivalents have had a significant effect on the decline of the doctrine.76

This Part develops more detailed evidence concerning the role of the legal rules of the doctrine of equivalents. If the legal rules did not contribute to the doctrine’s decline, they should have no predictive effect on equivalents outcomes (an expectation already subject to some contrary evidence). If, on the other hand, the legal rules did contribute to the decline of the doctrine, one might expect them to have a significant negative predictive effect on patentee success. As set forth in more detail infra, the evidence suggests that the rules do matter. The rules are used to explain why patentees lose.

This analysis seeks evidence for the impact of rules on three response variables that measure outcomes. The first is Patentee Wins. As noted earlier,77 this variable is positive when an analysis evinces a favorable result for a patentee on the question of infringement by

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76 See supra Figure 2.
77 See supra Part I.C.
equivalents (i.e., judgment of infringement affirmed, or judgment of noninfringement reversed or vacated), and thus it provides a broader measure of patentee success than Dispositive Wins. The second is Affirmed. As noted earlier, this variable is positive if the Federal Circuit affirms a lower court’s decision on the doctrine of equivalents. The third is a measure of Dispositive Losses in the subset of analyses where the underlying judgment was one of infringement by equivalents. It provides a perspective on how judgments of infringement by equivalents are treated on appeal.

Table 1 presents logistic regression models for Patentee Wins and Affirmed. The shaded portion of the Table highlights the variables that relate to specific legal rules. Looking at individualized applications diminishes the overall predictive power of these variables because, as noted earlier, a number of analyses address the application of more than one legal rule. But the approach has the benefit of providing a perspective on the individual impact of a rule.

The logic of this test of the hypothesis is that if the legal rules contributed to the decline of the doctrine, then the use of the rules should predict a decrease in Patentee Wins. Moreover, since Figure 3 indicates that the decline of the doctrine of equivalents corresponds to an increase in incoming (to the Federal Circuit) judgments of noninfringement by equivalents, another expectation might be that the rules should predict an increase in the odds that the court will affirm. Table 1 confirms these predictions, suggesting the interpretation that legal rules have contributed to the demise of the doctrine.

78 See supra Part I.C.
79 See supra Part I.C.
80 See supra note 68.
81 The effect of Eq Sp Totals—the variable that measures any analysis that addresses the application of at least one of the legal rules—was tested in logistic regression models. In those models it predicted a decrease in Patentee Wins and an increase in the odds that the Federal Circuit would affirm.
Table 1

Legal Rules Predict a Decline in the Odds that Patentees Will Have Success on Appeal

<table>
<thead>
<tr>
<th>Response - Patentee Wins</th>
<th>Response - Affirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exp(B)</td>
</tr>
<tr>
<td>SJ</td>
<td>1.628</td>
</tr>
<tr>
<td>CC</td>
<td>1.433</td>
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<tr>
<td>Amendment</td>
<td>5.89</td>
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<tr>
<td>Argument</td>
<td>.417</td>
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<tr>
<td>All Elements</td>
<td>2.99</td>
</tr>
<tr>
<td>Prior Art</td>
<td>1.349</td>
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<tr>
<td>Unclaimed</td>
<td>.485</td>
</tr>
<tr>
<td>PWR</td>
<td>2.22</td>
</tr>
<tr>
<td>Irrelevant</td>
<td>.206</td>
</tr>
<tr>
<td>Procedural</td>
<td>1.900</td>
</tr>
<tr>
<td>Swing</td>
<td>1.770</td>
</tr>
<tr>
<td>Infringement</td>
<td>2.600</td>
</tr>
<tr>
<td>Noninfringement</td>
<td>2.508</td>
</tr>
</tbody>
</table>

Table 1 suggests that, for the most part, the rules are significantly harmful to patentees’ claims of infringement by equivalents. The predictive force of the individual rules, where significant or marginally significant, is uniformly negative with respect to Patentee Wins. This result is nicely complemented by an inverse impact on Affirmed, which, in view of the high rate of incoming judgments of noninfringement, further suggests the interpretation that the rules serve the purpose of explaining why patentees lose on the doctrine of equivalents.

One might anticipate that the most forceful expression of a rule effect would be found where the underlying judgment was one of infringement. In that instance, to turn a patentee’s winning judgment into a losing one (not just a remand for additional consideration), the Federal Circuit will need to overcome the trial court’s fact-dependent

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82 Logistic regression models for the response variables Patentee Wins and Affirmed, see supra Part I.C; the explanatory variables are also described supra Part I.C. Wald $\chi^2$ reports the significance of predictive effect; higher values are more strongly significant. % Change in Odds reports the effect of an explanatory variable on the odds of a positive outcome for the response variables, calculated by $(\text{Exp}(b)-1) \times 100$. R refers to Nagelkerke’s R, a pseudo r measurement that seeks to measure strength of models. The models employed a constant and are strongly significant. The logistic regressions were performed using SPSS; the Table was built with Pages.
determination that the accused and patented subject matters are only insubstantially different. From that perspective, reversing a judgment of infringement arguably takes a stronger showing of judicial power than vacating and remanding for additional consideration.

The final two pieces of evidence suggest that the Federal Circuit has significantly increased the rate at which it reverses trial court judgments of infringement by equivalents, and that it uses legal rules to do so. In that sense, this final evidence paints what might be considered to be a harsh picture of reality for patentees who would like to use the doctrine of equivalents to exclude.

The first piece of evidence shows the average rate at which patentees suffer *Dispositive Losses* in analyses where the incoming judgment is a judgment of infringement by equivalents. In Figure 4, the trend in average rates of *Dispositive Losses* moves upward sharply and significantly. In view of the fact that the overall rate of noninfringement judgments addressed by the Federal Circuit increased over the period studied—suggesting ever fewer judgments of infringement overall—this result most likely indicates that Federal Circuit resistance to the successful assertion of the doctrine of equivalents has risen.

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83 See supra Figure 3.
A second piece of evidence is provided in Table 2, which presents a logistic regression model for Dispositive Losses in the subset of analyses where the underlying judgment is one of infringement by equivalents. Analyses positive for any of the equivalents-specific legal limitations or infringement standards predict dispositive losses,\(^85\) as do analyses positive for just legal limitations to the doctrine of equivalents.\(^86\) Analyses that address just infringement standards\(^87\)

\(^{84}\) The ordinate represents a thirty-analysis lagged (moving) average of the percentage of positive outcomes on the response variable Dispositive Losses in dispositive decisions where the trial court’s judgment was infringement by equivalents. The analysis number moves from left to right, starting in 1992 \((n=140)\). The response variables are defined supra Part I.C. The least squares trend line is: \( r = 0.662, r^2 = 0.439, t\text{-obs} = 9.233, p = 0.000 \). The calculations for the moving averages and linear regression were performed with Microsoft Excel; the graph was created using Numbers.

\(^{85}\) **Supra** Part I.C.

\(^{86}\) See **supra** Introduction.
predict (with marginal significance) a decrease in dispositive patentee losses. The lesson appears to be that if—as a patentee—you have a favorable equivalents judgment, you want the Federal Circuit to focus on the differences between the patented invention and the accused device, not on possible legal limitations to the permissible scope of the doctrine of equivalents.

### Table 2

<table>
<thead>
<tr>
<th>Legal Rules Are Used to Reverse Infringement Judgments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response - Dispositive Losses</strong></td>
</tr>
<tr>
<td>Exp(B)</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>CC</td>
</tr>
<tr>
<td>Eq To</td>
</tr>
<tr>
<td>Totals</td>
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<td>Legal</td>
</tr>
<tr>
<td>Limits</td>
</tr>
<tr>
<td>Infringe</td>
</tr>
<tr>
<td>R2</td>
</tr>
</tbody>
</table>

D. **What Is Happening?**

The results support important conclusions from prior empirical work in the sense that they clearly suggest procedural context played a role in the decline of the doctrine of equivalents. On the other hand, the results do not support all aspects of that work because they suggest

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87 See supra Introduction.
88 Logistic regression models for the response variable Dispositive Losses, see supra Part I.C; the explanatory variables are also described supra Part I.C. Wald \( \chi^2 \) reports the significance of predictive effect; higher values are more strongly significant. % Change in Odds reports the effect of an explanatory variable on the odds of a positive outcome for Dispositive Losses, calculated by \( (\text{Exp}(b)-1) \times 100 \). \( R^2 \) refers to Nagelkerke’s \( R^2 \), a pseudo \( r^2 \) measurement that seeks to measure the strength of models. The model employed a constant and was strongly significant. The logistic regressions were performed with SPSS; the Table was built with Pages.
89 There could be a number reasons for this, all of which are speculative, making it somewhat futile to try to address them all. The most probable explanation for the differences derives from the sources of data used. This study uses appellate opinions as its source of information (and so expressly provides an appellate perspective), while the prior study in its most relevant part conflates trial and appellate decisions. In addition, the studies engage in different specific inquiries. This study also examines a broader set of data; had it examined less, it might not have detected the relationships it did. Had the other study examined more, it might have detected relationships it did not. In the final analyses, however, the studies are remarkably cross-confirmatory. This study finds support in appellate opinion content for essentially every claim the Allison and Lemley study made concerning procedural posture and outcomes. The only distinctions involved findings concerning the rules, and that study particularly emphasized the impact (or lack thereof) of the rule implicated by Festo, a result this study confirms. See supra Tables 1 & 2 (reporting no predictive effect for the amendment form of prosecution history
that the imposition of restrictive legal rules has helped to put the doctrine in decline. In that sense, the results support interpretive work that argues the rules should have this effect. So what is going on? Is it procedure or rules?

The answer is that it does not have to be either one or the other. It can be, and most likely is, both. In view of these results, the decline of the doctrine of equivalents is best understood as the product of a Supreme Court-encouraged assault on the doctrine that integrates procedure and rules. The key to understanding why involves two points, one empirical and one interpretive.

The empirical point is the observation that the impact of the rules developed later in time. There is evidence throughout the results that supports the understanding that the rules did not have a significant impact on outcomes until more recently.90

The interpretive point explains this observation and helps to put the procedure/rules dichotomy in perspective. In its 1997 Warner-Jenkinson Co. v. Hilton Davis Chemical Co. opinion,91 addressing concerns about certainty in the application of the doctrine (particularly with respect to jury involvement), the Supreme Court somewhat directly encouraged the development and use of legal rules to effect summary judgment of noninfringement:

Where the evidence is such that no reasonable jury could determine two elements to be equivalent, district courts are obliged to grant partial or complete summary judgment. If there has been a reluctance to do so by some courts due to unfamiliarity with the subject matter, we are confident that the Federal Circuit can remedy the problem. Of course, the various legal limitations on the application of the doctrine of equivalents are to be determined by the court, either on a pretrial motion for partial summary judgment or on a motion for judgment as a matter of law at the close of the evidence and after the jury verdict. Thus, under the particular facts of a case, if prosecution history estoppel would apply or if a theory of equivalence would entirely vitiate a particular claim element, partial or complete judgment should be rendered by the court, as there would be no further material issue for the jury to resolve.92

These empirical and interpretive points suggest an interpretation that largely unifies the procedure or rules debate. The Markman decision, in encouraging summary judgments in literal infringement estoppel).

90 See supra Figure 2 and Table 1. Moreover, some of the rules did not even come into existence until more recent years. See supra Introduction (describing the legal limits and citing authority for them).

91 Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17 (1997). This case also firmly inculcates the legal limit that the results suggest most strongly predicts a decline in patentee success, the All Elements Rule. See id. at 29-30; supra Table 1; see also supra note 16.

analyses, provides a context within which the rules can have their desired effect. But the rules are also necessary to the decline of the doctrine of equivalents.

This makes tremendous sense because the Markman decision and the development of the legal limitations concerning the scope of the doctrine of equivalents can be understood as part of an evolutionary continuum directed to the same conceptual problem: fair notice concerning the rights conferred by a patent. The Markman decision sought to address the problem—to improve notice—by giving the claim construction inquiry to the judge.93

However, making claim construction a question of law for the judge provided only part of the solution to the notice concern because patentees were still entitled to juries to resolve the fact of equivalents. Thus, something else was needed94: a means to clarify the application of the doctrine of equivalents to the point that the entire patent scope inquiry could reliably be determined without always asking a jury if an accused device or process was only insubstantially different from the one patented.

In other words, the legal developments reflected in Markman and in the development of legal rules to explain why patentees should lose on the doctrine of equivalents serve the same normative master: providing adequate public notice of the rights conferred by a patent.95 Once courts resolved the competing policies—protecting the patent system from the widespread practice of insubstantial changes, and providing adequate public notice—in favor of public notice, the emphasis on legal rules restricting the doctrine of equivalents became largely inevitable.

The decline of the doctrine of equivalents—from this perspective—involves the natural integration of procedure and rules in service of a normative policy goal. The direction and purpose of legal development naturally led to the aggregation of infringement judgments. This understanding does not rule out the possibility that there may be an aggregation effect—an incentive to decide equivalents

93 Markman v. Westview Instruments, Inc., 517 U.S. 370, 390-91 (1996) (holding claim construction to be a question of law for the judge so that patent claims will be more effective at providing public notice).
94 As a matter of thinking logically about judicial decision-making, judges who would summarily reject a patentee’s equivalents claim need a way to operationalize their judgments. But the actual infringement standard—asking whether the accused subject matter is more than insubstantially different—is highly fact-dependent and indeterminate. For an intellectually honest jurist, this heightens the information costs of arguing that there is no material issue in the infringement claim. Legal rules can reduce these costs and provide a framework in which judges can more comfortably summarily dispose of equivalents claims; in effect, they provide a more secure way to “say why” a patentee loses.
95 Cf. Warner-Jenkinson, 520 U.S. at 30 (adopting the all elements rule so that “the doctrine will not vitiate the central functions of the patent claims themselves”).
claims against patentees (the logic of this point is of such force that it is hard to imagine that it does not happen). But it helps to put it into perspective. The decline of the doctrine of equivalents is something more than a happy (or unhappy) accident of the procedural context in which equivalents claims are litigated. It is the culmination of a concerted and prolonged effort to make its favorable application the exception, not the rule.

CONCLUDING REMARKS AND SOME IMPLICATIONS

This study uses empirical techniques to examine the hypotheses that the doctrine of equivalents is in decline and that the decline is explained by changes in the procedural circumstances in which the doctrine is litigated rather than by the impact of the legal rules imposed to restrict it. The results offer evidence that the doctrine is in decline, thereby confirming prior empirical and interpretive work. They also offer evidence that the decline is not solely explained as an effect of procedural context; the legal rules imposed to restrict the doctrine have played a significant role. This study, therefore, harmonizes what were, to some extent, competing understandings about the decline of the doctrine of equivalents.

The picture painted by the results reveals two larger perspectives on the doctrine of equivalents. First, the decline of the doctrine is the natural evolution of judicial efforts to emphasize the policy that the public should have reliable notice of the scope of a patentee’s right to exclude.

Second, by electing to emphasize the policy of public notice, courts have challenged the legitimacy of the premise that the doctrine of equivalents is necessary to protect the incentive structure of the patent system. And, the idea that the doctrine of equivalents is necessary to encourage inventors to invent and to disclose inventions may have been found wanting. Ample evidence suggests that all the while the courts were killing the doctrine of equivalents, patent applicants were increasing the rate at which they filed applications for new inventions. This suggests that innovators might not need the encouragement of the doctrine of equivalents to innovate and disclose. Ample evidence also


97 Another possibility is that the unavailability of the doctrine has encouraged the additional inventing behavior. In other words, the death of the doctrine of equivalents has pushed innovators to invent and disclose more, perhaps to ensure that commercial innovations (which may embody many inventions) find adequate protection. This may or may not be optimal.
exists that more patents are subject to litigation.\textsuperscript{98} This could suggest that patents are increasingly conferring commercially valuable rights.\textsuperscript{99} If that is true, then the doctrine of equivalents might be unimportant in terms of systemic economic significance. The only reason to keep it in any form might be to use it in only the most exceptional cases—and essentially only for reasons of fairness. Put differently, the application of the doctrine of equivalents really should be the exception, not the rule.


\textsuperscript{99} Why else litigate them? Note that, even if this point is true, it does not mean that the mechanisms encouraging patent litigation are necessarily good for the patent system.