

THE MEASURE OF THE DOUBT: DISSSENT, INDETERMINACY, AND  
INTERPRETATION AT THE FEDERAL CIRCUIT

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*On appeal to the Court of Errors the court was equally divided. Spencer, Senator, wrote that the indictment was bad, and Stebbins, Senator, that it was good. The President gave a casting vote, with the result that the indictment fell. The closeness of the division attests the measure of the doubt. . . . It is one of the battlefields of the law.*

- CARDOZO<sup>1</sup>

ABSTRACT

*The law of patent claim interpretation articulated by the United States Court of Appeals for the Federal Circuit is commonly supposed to be markedly indeterminate, and to be responsible for a lack of certainty and predictability in patent infringement litigation. But there has been no attempt to measure objectively the indeterminacy associated with patent claim interpretation, or, for that matter, of any other field of law. This Article shows that under appropriate conditions the indeterminacy of a legal regime may be measured empirically by the frequency of judicial dissents. Application of this method to the Federal Circuit's jurisprudence demonstrates that while patent litigation as a whole is less determinate than other bodies of law overseen by the Federal Circuit, there is little or no evidence that claim interpretation is any more or less indeterminate than other aspects of patent law over time. Nor is the law of claim interpretation any less*

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<sup>1</sup> *People ex rel. Hayes v. McLaughlin*, 160 N.E. 357, 358 (N.Y. 1928) (Cardozo, J.). The question before the court, which had divided the New York Supreme Court a century prior (*Lambert v. People*, 9 Cow. 578 (N.Y. 1827)), was whether an indictment for conspiracy need set forth the unlawful means employed by the alleged conspirators.

*determinate than that of another interpretive regime, contract interpretation. When the indeterminacy of patent law is taken into account, the district courts perform as well, or better, than the specialized tribunals reviewed by the Federal Circuit. These findings call into question the notion that specialized trial courts are necessary to bring certainty or predictability to patent infringement litigation.*

## INTRODUCTION

The law of patent claim interpretation, we are told, is a mess. A patent's claims define with words the limits of the inventor's exclusive rights, just as physical boundaries may define the limits of real property rights. Perhaps no subject is as central to patent law. To determine whether a patent has been infringed, or to determine whether the patent ought to have been granted that patent in the first place, a court must first define the boundaries of the patent by interpreting its claims. With claim construction the linchpin of so many disputes in patent law, we would expect the United States Court of Appeals for the Federal Circuit, which was vested with nearly complete appellate jurisdiction over patent matters in order to promote consistency and predictability in patent law, to have articulated a framework that resolves these central interpretation questions with a high degree of predictability. Yet this appears not to have been the case. As one commentator put it:

Claim construction jurisprudence is in disarray. The United States Court of Appeals for the Federal Circuit reverses trial court claim construction decisions at a worryingly high rate. The proportion of Federal Circuit claim construction opinions that include separate concurrences or dissents continues to grow. And the muddled mix of issues the Federal Circuit framed for en banc review in the *Phillips* case suggests that the court cannot reach consensus on what the central questions are, much less on how to answer them. Perhaps the path to adequately predictable claim construction is continued tinkering with the analytical constructs internal to the Federal Circuit's claim construction jurisprudence, but that is not likely.<sup>2</sup>

Dire warnings that the appellate courts have left off all stability, predictability, and certainty are not unique to patent law, nor to this era.<sup>3</sup> But at least within patent law,

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<sup>2</sup> Miller, 9 Lewis & Clark L. Rev. 177, 177. (2005).

<sup>3</sup> Llewellyn in 1960 began *The Common Law Tradition* with that era's lamentation about unpredictability: "This book starts with the fact that the bar is bothered about our appellate courts - not the much discussed

on no other question is there such uniformity of opinion as there is on the lack of uniformity in the law of claim interpretation. Whether it be the substantive principles of claim interpretation; the procedures (or lack thereof) prescribed by the Federal Circuit for the district courts to perform claim interpretation; or the manner in which the Federal Circuit reviews the claim interpretations of the district courts; commentators, practitioners, trial judges, and even some judges of the Federal Circuit themselves seem united in their view that uncertainty and unpredictability are the order of the day.<sup>4</sup> This dissatisfaction is more than just the anecdotal grumblings of disappointed litigants. Empirical studies of patent litigation have shown that a large proportion of district court claim constructions are upset by the Federal Circuit on appeal,<sup>5</sup> and have identified differences in the methodology of claim construction among the appellate judges themselves.<sup>6</sup> Concerns over the rate at which the Federal Circuit reverses district court claim constructions have also prompted legislation that would assign patent infringement actions to specific district courts and judges with experience in patent cases.<sup>7</sup> The Federal Circuit itself was sufficiently moved by worries about its claim construction jurisprudence to grant *en banc* review on an unprecedented and extraordinarily wide array of claim construction questions<sup>8</sup> in *Phillips v. AWH Corp.* in 2004, although the court ultimately addressed few of those questions in its *en banc* opinion.<sup>9</sup>

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Supreme Court alone, but our appellate courts in general. The bar is so much bothered about these courts that we face a crisis in confidence which packs danger." Though Llewellyn recognized that "roughly since before Genesis, each new crucial decision has been, for some vocal citizens, the brink of perdition," he thought the angst of his time to strike at the core of the profession: "[I]t has come to lay a pall and palsy on heart and hand because it goes to whether there is any reckonability in the work of our appellate courts, any real stability of footing for the lawyer, be it appellate litigation or in counseling, whether therefore there is any effective craftsmanship for him to bring to bear to serve his client and justify his being." Llewellyn, *The Common Law Tradition* (1960) at 1-2.

<sup>4</sup> See, e.g., Kimberly A. Moore, *Markman Eight Years Later: Is Claim Construction More Predictable?*, 9 *Lewis & Clark L. Rev.* 231, 231-333 (2005) ("There is concern among the bench and bar that the Federal Circuit's de novo review of district court claim construction decisions and lack of guidance have caused considerable unpredictability. . . . criticism over the lack of guidance and unpredictability caused by the current claim construction process is warranted. The problem is getting worse, not better.") (footnotes omitted); *Id.* at n. 2 (collecting criticisms from judges, scholars, practitioners)

<sup>5</sup> See Kimberly A. Moore, *Are District Court Judges Equipped to Resolve Patent Cases?*, 15 *Harv. J.L. & Tech.* 1, 8-10 (2001); Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 *Berkeley Tech. L.J.* 1075, 1104 (2001); Andrew T. Zidel, *Patent Claim Construction In The Trial Courts: A Study Showing The Need For Clear Guidance From The Federal Circuit*, 33 *Seton Hall L. Rev.* 711 (2003).

<sup>6</sup> See R. Polk Wagner and Lee Petherbridge, *Is the Federal Circuit Succeeding? An Empirical Assessment of Judicial Performance*, 152 *U. Penn. L. Rev.* 1105 (2004)

<sup>7</sup> See 70 *PTCJ* (BNA) 657; 72 *PTCJ* (BNA) 360.

<sup>8</sup> 376 F.3d 1382 (Fed. Cir. 2004)

<sup>9</sup> 415 F.3d 1303 (Fed. Cir. 2005)

Yet beneath the nearly<sup>10</sup> seamless consensus about the unhappy state of the law, important questions have remained unasked and unanswered. Is the existing empirical evidence really sufficient to conclude that the law and process of claim interpretation is in urgent need of repair? More particularly, if the resolution of claim construction disputes is unpredictable, is this an unusual state of affairs? Or is it one common to other aspects of patent law and to other fields of law as well? And if participants in the system cannot predict the outcome of claim construction disputes, is it because the principles of claim construction are insufficiently determinate, or do such principles exist but remain hidden from the majority of observers?

This study attempts to answer these questions. Specifically, I attempt to measure the legal indeterminacy associated with claim construction and other legal issues by determining the frequency with which various legal issues and regimes provoke dissents among the judges of the Federal Circuit. Part I of this Article briefly reviews the role of claims in patent law and the regime currently governing resolution of claim construction disputes. Part II considers the extant theoretical and empirical work on judicial dissent, and argues that dissent frequencies at intermediate appellate courts may be used to measure the indeterminacy of legal regimes. Part III erects a simple theoretical framework to model quantitatively the relationship between legal indeterminacy and judicial dissent, and describes the methodology used to implement the model. Part IV compares dissent rates in appeals originating from the various tribunals reviewed by the Federal Circuit, to investigate the relative indeterminacy of patent law as a whole against other bodies of law. Part V reports the frequency of dissent on claim construction and other issues arising in patent cases, to establish the relative indeterminacy of claim construction against other aspects of patent law. Part VI describes the theoretical framework necessary to compare the indeterminacy of different legal regimes between different courts, and attempts to apply that framework by assessing the indeterminacy of claim construction against that of another interpretive regime, contract interpretation. Finally, Part VII considers what conclusions might be drawn from these investigations of indeterminacy, and what prescriptions they imply for improving certainty in patent litigation and counseling.

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<sup>10</sup> There are occasional arguments that claim interpretation is not exceptional, at least not in light of the inherent difficulties in construing language. See 70 BTCJ 657, 659 (testimony of Judge Ellis)

## I. PATENT CLAIMS AND CLAIM CONSTRUCTION IN A NUTSHELL

A brief exposition of the role of claims and claim interpretation will suffice for the reader unfamiliar with patent law. A patent on an invention grants the holder the right to exclude others from making, using, selling, or importing the invention in the United States. Aside from certain formalities, a patent contains only a written description disclosing the invention to the public, and one or more "claims."<sup>11</sup> A patent's claims define, in words, exactly what "the invention" is. They may be only a few words long or extend for pages, but in either case they are the *raison d'etre* of the patent. When we ask whether the inventor is entitled to a patent, or when we ask against what things and activities the patent holder may assert the exclusive rights granted by statute,<sup>12</sup> the claims control our inquiry. Whether or not the meaning of the claims is disputed, nearly all disputes under the patent laws involve at least one of three comparisons with the claims: a comparison of the claims against what the alleged infringer has made or done, to determine whether the alleged infringer has infringed the patent; a comparison of the claims against what was previously known ("the prior art"), to determine whether the inventor has met the novelty and non-obviousness requirements of 35 U.S.C. § 102 and § 103; or a comparison of the claims against the patent's written description, to determine whether the inventor has complied with the disclosure requirements of 35 U.S.C. § 112.

The intertwined issues of whether interpretation of patent claims is a question of fact or law, and whether interpretation is a task for the jury or the judge, divided the Federal Circuit for more than a decade after its creation.<sup>13</sup> In 1995, the court decided *Markman v. Westview Industries* en banc, holding (over vigorous dissents) that claim construction was a matter of law, to be decided by the judge alone, and reviewed *de novo* on appeal. The Supreme Court affirmed, ruling that while the question of infringement itself was guaranteed a jury trial under the Seventh Amendment, historical practice and

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<sup>11</sup> 35 U.S.C. § 111. Generally, the disclosure of the written description remains fixed from the point when the inventor submits her application for a patent to the Patent and Trademark Office. In contrast, the claims usually evolve over a course of negotiation between the applicant and the patent examiner, in which the applicant and the examiner reach agreement over what scope of coverage the inventor is entitled to in light of the statutory standards of patentability.

<sup>12</sup> 35 U.S.C. § 271. The judicial "doctrine of equivalents" may permit the patent holder to assert infringement against things not literally encompassed by the claims, but substantially similar to the invention defined by the claims.

<sup>13</sup> See *Markman*, 52 F.3d 967, 976-77 (Fed. Cir. 1995) (cataloging Federal Circuit opinions conflicting on issue).

interpretive competency favored assigning the interpretative task to judges.<sup>14</sup> The Court also reasoned that, at least at the level of the individual patent, treating claim interpretation as a question of law would promote uniformity of interpretation given that all patent appeals were resolved by the Federal Circuit.<sup>15</sup> Despite the Court's classification of claim construction as a question of law, following *Markman*, some panels of the Federal Circuit persisted in applying a clearly erroneous standard of review to district courts' claim constructions, on the theory that claim construction frequently required factual determinations.<sup>16</sup> Once again meeting *en banc*, and once again over vigorous dissent, the Federal Circuit held in *Cybor Corp. v. FAS Technologies* that it would review the district court's claim constructions *de novo* on appeal.<sup>17</sup> Judges on the Federal Circuit continue to voice their disagreement with *de novo* review of claim construction,<sup>18</sup> and commentators often identify the *de novo* standard of review as the villain principally responsible for high reversal rates and other uncertainties surrounding claim construction.<sup>19</sup>

## II. INDETERMINACY AND DISSENT

### *Interpretation and Indeterminacy*

For the most part, the debate over claim construction has not been about outcomes; few argue that the Federal Circuit systematically interprets patent claims too narrowly or too broadly. The debate has been over the claim construction process itself. Criticism of the Federal Circuit's claim construction jurisprudence assumes many forms: commentators most frequently speak of "unpredictability", "uncertainty", "confusion" and the court's failure to bring about "uniformity." to this aspect of the law. While different commentators may mean different things when they refer to these unhappy

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<sup>14</sup> *Markman v. Westview Instr., Inc.*, 517 U.S. 386 (1996).

<sup>15</sup> *Id.* at 390-91.

<sup>16</sup> See *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998)

<sup>17</sup> *Id.* at 1456. Several judges of the Federal Circuit, while agreeing with the standard of review enunciated in *Cybor*, have maintained that in practice the court accords weight to a well-reasoned claim construction by the district judge. See, e.g., *Cybor*, 138 F.3d at 1462-63 (Plager, J., concurring); *id.* at 1463 (Bryson, J., concurring).

<sup>18</sup> See *Phillips*, 415 F.3d at 1339 (Mayer, J., dissenting) ("Now more than ever I am convinced of the futility, indeed the absurdity, of this court's persistence in adhering to the falsehood that claim construction is a matter of law devoid of any factual component.").

<sup>19</sup> Chu, Empirical Analysis of the Federal Circuit's Claim Construction Trends, 16 Berkeley Tech. L.J. 1075, 1113 (2001); Staheli, Deserved Deference: Reconsidering the De Novo Standard of Review for Claim Construction, 3 Marq. Intell. Prop. L. Rev. 181, 198-99 (1999). See also District Judge Young's comments before the ABA Section of Intellectual Property Law, 72 PTCJ (BNA) 238 (2006).

states, they all may be taken to cluster around a single norm: the assertion that the legal regime governing claim construction disputes is indeterminate. Now, "indeterminate" and "determinate" are loaded words and little can be accomplished without first setting out what we mean by them. My concern in this work is not whether claims do or do not have definite meaning, nor is it whether a regime of claim construction free of ambiguity is possible in the abstract. My concern is practical: whether participants in the patent system can adequately predict the scope of a patent's claims. When I speak of indeterminacy I am thereby speaking of what Kress termed epistemological indeterminacy: not whether there is law, but whether the law can be known.<sup>20</sup> Be known, by those people whose concern it is to determine the scope of patent rights, namely lawyers advising clients, and judges deciding cases. To paraphrase one of the formulations of epistemological determinacy provided by Kress<sup>21</sup>: a question of claim construction would be epistemologically determinate if the "right"<sup>22</sup> construction would be arrived at by most reasonable judges and lawyers using a proper method of legal reasoning.

This definition of determinacy is highly operational, presuming interpreters embedded in a particular interpretive community, and the context of a particular dispute. It is also observational and outcome-driven: I do not differentiate at this stage between reasons *why* judges and lawyers might not reach the same outcome. Participants may disagree on the facts; they may agree on facts but disagree on whether or which principle constrains the outcome upon those facts; they may agree that existing principles do not constrain the outcome but disagree on what new principles should be supplied; they may agree upon the facts and substantive principles but disagree on the procedures to be employed in reaching the outcome. All we are concerned with is the degree to which the entire legal regime governing claim construction - substance, procedure, and everything else - permits multiple outcomes upon a particular set of facts. If the law is sufficiently determinate, predictability and certainty ought to follow; if most participants within the system would agree that one outcome is the "right answer", then the predictions of lawyers, the judgments of the district courts, and the rulings of the Federal Circuit ought

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<sup>20</sup> Kress, A Preface to Epistemological Indeterminacy, 85 Nw. U. L. Rev. 134, 138 (1990).

<sup>21</sup> Id at 139.

<sup>22</sup> Like other interpretive questions in law, interpretation of claims takes not in the abstract, but in the service of a particular dispute over infringement, validity, or enforceability of the patent. The

to correspond. Consequently, while critics of the Federal Circuit's jurisprudence may or may not be explicitly asserting that the law of claim construction is indeterminate, an epistemologically determinate system would seem to satisfy most of their objections.

If the alarm over the state of claim construction law is, at its core, a worry that the current regime of claim construction is indeterminate, how may we evaluate that indeterminacy? The underpinning of this Article is the thesis that the frequency of disagreement between judges - the frequency of dissenting opinions - can be used to measure the indeterminacy of legal regimes or legal issues resolved by appellate judges. By comparing the frequencies with which dissents occur, we may estimate the relative indeterminacy of different bodies of law.

The notion that disagreement and dissenting opinions signal the presence of indeterminacy is not original. Cardozo may have said it first, and certainly most elegantly: "The closeness of the division attests the measure of the doubt."<sup>23</sup> Dworkin framed *Law's Empire* as a work about disagreement,<sup>24</sup> although he had relatively little to say about the nature of disagreement itself. Kress and D'Amato debated whether low dissent rates at appellate courts signaled that law determinate, or actually proved the law to be indeterminate.<sup>25</sup> However, there has been no systematic attempt to *use* disagreement as a probe of the indeterminacy of the law. We must therefore ask: can we take Cardozo literally? In other words, does division *measure* doubt?

### *Measuring Indeterminacy by Dissent*

I begin by arguing that judges of an appellate court are the best possible subjects for an attempt to measure indeterminacy observationally. Judges of any appellate court consider a case on the basis of a defined set of materials presented to them by the litigants: briefs, excerpts from the trial record and other supporting documents, and oral argument. The judges of an appellate court therefore constitute a set of observers

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<sup>23</sup> See note 1, *supra*

<sup>24</sup> Dworkin, *Law's Empire* 3-11.

<sup>25</sup> See Kress, *Legal Indeterminacy*, 77 Cal. L. Rev. 283, 324; D'Amato, *Aspects of Deconstruction*, 85 Nw. U. L. Rev. 113, 114-115. D'Amato argued that dissents are rare because judges recognize that decisions are "reached by the brute force of majority rule" rather than the rule of law, and therefore judges see no point in dissenting. *Id.* at 115. D'Amato's position implies that the judges who do bother to dissent are deluding themselves; this is may be why D'Amato's subsequent argument focused more on the claim that dissent was futile, rather than on the claim that judges know dissents to be futile. D'Amato, *Pragmatic Indeterminacy*, 85 Nw. U. L. Rev. 148, 157-159 (1990). Neither Kress nor D'Amato has the better of the argument, for the simple reason that a dissent frequency in isolation is meaningless. See text accompanying nn. \*\* *infra*.

presented, at the same point in time, with the same set of facts, and the same set of legal principles, that might determine the outcome of the case.<sup>26</sup> If determinacy is defined by the extent to which outcome is determined by a set of legal principles on a set of facts, then there can be little better test of whether the legal principles are determinative than to assess whether different observers arrive at the same outcome when presented with the same legal and factual scenario.<sup>27</sup>

If indeterminacy permits similarly situated observers to reach different legal conclusions, we would expect that indeterminate bodies of law would also provoke disagreements between trial judges and appellate judges; why not then rely on reversal rates to measure indeterminacy? Although indeterminacy ought to yield reversals as well as dissents, appellate dissent is a superior measure. Dissent at an appellate court measures disagreement within a small and relatively fixed group of observers, appellate judges, while reversal rates represent disagreements between that group and a larger and more variable population of trial judges. Moreover, the reviewing court and the reviewed court do not necessarily decide cases on the basis of the same set of facts and principles. Disagreement between judges occupying different positions in the legal system may arise not because the law is indeterminate with respect to a given dispute, but because they view the dispute from different vantage points, and a measure based on reversal may overstate the effect of indeterminate law. Even if the appellate judges disagree with the trial court, they may nonetheless affirm its decision under a deferential standard of review; reversal rates will therefore vary across bodies of law for reasons unrelated to the indeterminacy of the legal question *ab initio*. Likewise, considerations of judicial economy, comity or repose may lead reviewing courts to suppress some proportions of their disagreement with the reviewed tribunal.

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<sup>26</sup> Appellate judges may, of course, reach beyond the materials provided by the litigants to obtain principles, or even facts, not obtained by their colleagues. In such cases, the judicial actors are not deciding the case on the same basis as each other. Such divergences are expected to be minor if judges share such inputs with each other either informally, in conference and discussion with each other, or formally, by relying on them in their written opinions.

<sup>27</sup> C. Herman Pritchett, whose studies of the Supreme Court pioneered the analysis of judicial voting in political science, reached the same conclusion, though his interest was in the behavior of the judges when freed from legal constraint rather than the legal constraint itself. C. Herman Pritchett, *The Roosevelt Court* (1948) at 240 ("It is, consequently, only where the Court's decision is not unanimous that there is genuine assurance that the result was influenced by judicial preferences as to public policy. For here we see judges, working with an identical set of facts, and with roughly comparable training in the law, coming to different conclusions.")

Of course, similar criticisms may be leveled against a study of disagreement between appellate judges. Appellate judges at the same level of the judicial system may suppress some disagreements with each other because they believe disagreement and dissent are detrimental to the law or to their court. Well-known anecdotal examples of such attitudes include John Marshall's insistence on unanimous opinions in the United States Supreme Court, and Learned Hand's view that dissent "cancels the impact of monolithic solidarity on which the authority of a bench of judges so largely depends."<sup>28</sup> Appellate judges, when interviewed, maintain that they seek to reach consensus even if it means compromising on their own view of how a case should be decided.<sup>29</sup> But this desire for consensus is but one of a host of "extra-legal" factors that political scientists have hypothesized to affect the incidence of dissent in the United States judicial system. Other factors include organizational and institutional variables, such as size of the court, professionalism of the court<sup>30</sup>, workload, heterogeneity of judicial background, the court's leadership, inter-court relations, and the internal political process of the court;<sup>31</sup> the social and political background against which the judges work, including degree of the jurisdiction's urbanization, lack of a societal consensus on controversial issues, or periods during which social values are in flux;<sup>32</sup> and of course, individual characteristics of judges, including ideology, social background, and perceptions of the judicial role.<sup>33</sup>

If all these factors, which we might call "structural variables," contribute to the incidence of dissent, is it reasonable to assume that the frequency of judicial disagreement reflects the determinacy of the law itself? Or will the contribution of legal indeterminacy to dissent be obscured by these extra-legal factors? We must first recognize that despite the impressive array of hypotheses amassed in the political science literature to explain dissenting behavior, few have been verified by observation. According to one survey, only a few of these factors have been directly or indirectly shown to affect the frequency of dissent: the attitude that dissent is harmful to the court, the existence of intermediate appellate courts, the degree of urbanization of the

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<sup>28</sup> LEARNED HAND, THE BILL OF RIGHTS 72 (1958).

<sup>29</sup> Goldman, Conflict and Consensus in the United States Courts of Appeal, 1968 Wis. L. Rev. 461, 477-78

<sup>30</sup> I.e., factors such as organization of the court, policies of judicial selection and retention, administration of the court, and judicial pay. See Petersen, 43 J. of Politics at 415.

<sup>31</sup> See Petersen at 414-20.

<sup>32</sup> Petersen, 420-21

<sup>33</sup> Id. at 421-23.

jurisdiction, the judge's ideological orientation, and the workload of the court.<sup>34</sup>

However, even among those factors that have been shown to affect the frequency of dissent, contrary findings exist.<sup>35</sup>

Certainly the influence of structural variables limits how much information can be extracted from a study of judicial dissent. Most significantly, it highlights the need for a *comparative* approach. The observation that judges disagree with each other 1%, or 10%, or 100% of the time means nothing in isolation, because that frequency reflects a contribution both from the indeterminacy of the legal regime and from organizational, institutional, or personal factors.<sup>36</sup> Neither the magnitude nor the direction of the contribution of the extra-legal factors can be determined from dissent frequencies alone. Without an independent measure of the structural variables, the only way to draw strong conclusions about legal indeterminacy is to compare the frequency of dissent at the same court<sup>37</sup> between different fields of law. If the identity of the court is held constant, then variations in dissent frequency should be driven by variations in the legal regimes governing the court's decision, and not the characteristics of the court and its judges.<sup>38</sup>

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<sup>34</sup> Petersen regards the first four as having been directly confirmed to affect the frequency of dissent; the hypothesis that increasing workload decreases dissent he regards as "indirectly" confirmed. See Petersen at 423-424. Petersen also views the hypothesis that difficult question of law produce more dissent to have been indirectly confirmed.

<sup>35</sup> See, e.g., Goldman and Lamb, "Epilogue," in *Judicial Conflict and Consensus*, at 285 (discussing studies contradicting in part earlier findings that increased caseload suppresses judicial dissent).

<sup>36</sup> Perhaps the only useful metric is the following: in a case comprising only a single issue, that issue having two outcomes with equally likely probabilities, we would expect dissents in one-fourth (25%) of cases adjudicated by three-judge panels, if judges always express disagreement in the form of a dissent. It is unlikely that any case ever satisfies these conditions.

<sup>37</sup> As discussed in Part VI, comparing dissent frequencies between courts is difficult, because the contribution of extra-legal factors need not be (and is likely not) constant among different courts. The confounding effects of extra-legal factors may be minimized by comparing courts sharing the same organizational characteristics (e.g., comparing the United States Courts of Appeal with each other), but discrepancies between institutional cultures and judges' personal characteristics complicate comparisons between different courts.

<sup>38</sup> A more accurate statistic would be a judge's individual dissent frequency when considering a particular aspect of law, normalized for that judge's overall tendency to dissent. Normalization to a judge's overall dissent frequency would eliminate bias in the measured frequencies of dissent arising from a judge's general tendency to agree or disagree with his or her colleagues, although random assignment of judges to cases ought to eliminate such bias. More significantly, the distribution of normalized individual dissent frequencies for a given aspect of the law would permit us to determination of whether a high frequency of dissent in a particular field of law reflects indeterminacy of the law, or an assumed ideological bias of a particular judge that generates increased disagreement with his or her colleagues when deciding cases presenting that aspect of the law. That is, if each judge dissents on a particular issue with approximately equal frequency (after normalizing for each judge's overall "agreeableness" or "disagreeableness"), we might conclude that dissent on that issue reflects solely the indeterminacy of the legal regime. In contrast, if the dissents are distributed such that a few judges contribute disproportionately to the court's overall

*Conditions of Validity for the Measurement of Indeterminacy by Dissent*

We may set forth precisely, though not quantitatively, the conditions under which a study of dissent frequency is valid as a measure of determinacy of a set of legal principles. First, and obviously, judicial decision-making must be in part determined by the legal principles. If judicial behavior is not significantly constrained by legal principles, then a study of judicial behavior does not provide any information about those legal principles. Thus, the thesis of radical indeterminacy cannot be true for a study such as ours to be valid; judges must behave at least some of the time as if they make decisions based on legal principles they are constrained to obey.<sup>39</sup>

Second, individual characteristics of judges must cause them to disagree with each other on the disposition of at least some cases.<sup>40</sup> Without disagreements, there are of course no dissents, and it would be impossible to conclude that the legal principles are indeterminate. Less obviously, the converse is not true. That is, an absence of judicial disagreement does not necessarily indicate that the legal principles are determinate. A court composed of absolutely identical judges would always agree with each other unless the process of judicial decision was purely stochastic. Therefore, if indeterminacy is to be revealed through judicial disagreement, judges must possess individual characteristics that cause them to reach different conclusions when presented with the same set of facts and the same set of legal principles.

Third, disagreements between judges must be expressed at least some of the time in the form of dissents. If the legal principles allow judges to reach different conclusions, and the judges do in fact reach different conclusions due to their individual characteristics, but the judges fail to express their disagreement in the form of a dissent, then a study of dissents will underestimate the determinacy of the legal regime.

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frequency of dissent on that issue, we might conclude that dissent reflects more idiosyncratic positions of individual judges.

<sup>39</sup> Conversely, at least some cases must be under-determined to permit judges to reach different conclusions about their resolution; if all cases were so clear as to permit only one outcome, no dissents would appear.

<sup>40</sup> Even without disagreement between judges about how a particular case should be resolved, it is theoretically possible to ascertain “hidden disagreement” between panels of an appellate court considering similar cases; panel composition data can then be used to extract an estimate of each judge’s position on a particular issue. Such measurements obviously require subjective coding of case outcomes, since the methodology relies on conflicting outcomes between panels considering similar cases. See Atkins & Green; Songer; notes \*\* below. Less obviously, such studies assume the condition that different cases provide similar opportunities for expression of judicial discretion.

Fourth, for a comparative study of courts that resolve cases by subsets of the court (i.e., panels), the absolute incidence of overall indeterminacy or disagreement cannot be overly large. The need for this condition to prevail may not be immediately apparent, but follows from essentially statistical grounds and the argument advanced in connection with the second condition of validity. In any underdetermined case, whether or not a dissent will be produced will depend on the particular combination of judges considering the case and the individual characteristics of those judges. Thus, random assignment of judges to a panel may determine whether or not a particular case generates a dissent. If the proportion of underdetermined cases is large, then differences between dissent rates in various fields of law may reflect only an uneven distribution of judges on the panels hearing cases in those fields. These effects will diminish as the number of cases included in the study increases.

Fifth and finally, for a comparative study, the extent to which the contribution of extra-legal factors to the frequency of dissent *changes* when judges are confronted with different kinds of cases must be relatively small. If judges follow similar decision-making processes in all cases, then the comparative frequency with which they disagree in different fields of the law will reflect the determinacy of those fields. Judges A and B may disagree in underdetermined cases because of ideological differences, but that is no obstacle to identifying the underdetermined cases by judicial disagreement. Suppose, however, that Judge A follows “ordinary” decision-making processes in most fields of law, but always rules in favor of one class of litigant in one category of cases. That category of cases will register a higher dissent frequency than other categories, at least to the extent that the other categories are free from idiosyncratic behavior of Judge A’s colleagues. To the extent that indeterminacy is defined *solely* empirically - the existence of different outcomes on identical law and fact, without reference to the process by which judges arrive at those resolutions - then differential behavior across categories of cases is unobjectionable. If Judge A never votes in favor of the death penalty, then the outcome of all capital cases may depend on whether Judge A hears the case. However, if we consider the case of the idiosyncratic judge not to reflect indeterminacy - perhaps because we think we have some way of identifying the “correct” outcome of capital cases that does not require us to take Judge A’s behavior into account - then the presence of an

idiosyncratic judge confounds a measure of determinacy by comparing dissent frequencies.<sup>41</sup>

Having defined the conditions under which a study of dissent rates is valid as a measure of determinacy, we may now ask to what extent those conditions are fulfilled. The first three conditions - the requirement of at least partial legal determinacy; differentiation of judges' decision-making characteristics; and the expression of disagreement in dissent - describe the relationship between judicial input and judicial output. As such, they relate to the internal decision-making process of the judge and are difficult to disaggregate by any study of judicial behavior. Nonetheless, the second and third conditions seem easily met: judges are obviously not identical, and the appearance of judicial dissents indicates that judges do disagree and express their disagreement in dissents at least some of the time. Some evidence also supports these intuitions: At the Circuit Courts of Appeals, behavioral analysis of judges' dissent frequency, when paired with judges of similar or dissimilar voting behavior, has suggested that neither jurisprudential norms of unanimity, nor psychological pressures to conform, inhibit judges from expressing disagreement in the form of a dissent.<sup>42</sup>

With regard to the first condition, the constraining effect of legal principles, I have no intention of enlarging the voluminous theoretical literature debating the merits of indeterminacy theses.<sup>43</sup> I confine myself to the question of to what extent legal principles have been shown to constrain the judicial decision-making process. Operationally the satisfaction of this condition is easy to define: it requires that a change in the legal regime that nominally constrains judges (such as statute, precedent of a higher court, or precedent from one's own court that cannot be overruled) leads to a change in the outcomes of the cases decided under that regime. Actually assessing this condition is another matter entirely. One approach to assessing the validity of the first condition

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<sup>41</sup> If such idiosyncrasies are exercised evenly across the different categories of cases - whether by the same judge, or by different judges - then this problem disappears.

<sup>42</sup> Burton M. Atkins, *Judicial Behavior and Tendencies toward Conformity in a Three Member Small Group: A Case Study of Dissent Behavior on the U.S. Court of Appeals*, 54 *Social Science Quarterly* 41, 52-53 (1973) ("Though in most instances the judges do conform [when placed on a panel with two other judges who tend to vote together], the frequency of dissent is substantial enough in [this] condition to suggest that these judges are neither conforming to group pressure nor adhering to a jurisprudential norm of legal harmony.") (footnote omitted)

<sup>43</sup> See Solum, in Dennis Patterson (ed), *A Companion to Philosophy of Law and Legal Theory*, for review

*independently* of judicial behavior might be to ask the judges themselves how they decide cases. When interviewed, judges of the Circuit Courts of Appeal have reported that they follow precedent of the Supreme Court even when they disagree with it, although fidelity to the precedent of their own court is less certain.<sup>44</sup> We might regard the expression of such attitudes as evidence for the validity of the first condition. Obviously, however, judges' self-reported attitudes may or may not reflect their actual decision-making processes. The only reliable indication of judicial thinking is what can be determined from judicial behavior: the validity of the first three conditions aggregated together. The question therefore becomes to what extent actual studies of judicial behavior support the thesis that judicial disagreement in the form of dissents reflects indeterminacy of the law.

The formal model that legal indeterminacy permits judicial disagreement is usually ascribed<sup>45</sup> to Pritchett's studies of the United States Supreme Court.<sup>46</sup> Certainly by now, the thesis that judicial disagreement reflects the exercise of judicial discretion in cases where the law does not determine the outcome has by now been accepted as true, at least by political scientists who study intermediate appellate courts. As summarized by Songer, Sheehan and Haire:

Analyses of the decision-making patterns of American courts have generally operated on the assumption that a substantial portion of the docket for courts below the Supreme Court has consisted of 'easy' cases in which the legal texts are determinative so that judges, regardless of their personal preferences, will mechanically apply the law. In such cases, judges' policy preferences can be expected to be irrelevant to the decision making process. However, judicial decisions do not appear to be constrained by legal texts in a substantial number of cases. A wide variety of analyses have reinforced the conclusion of appeals court scholar Sheldon Goldman that some cases present judges 'with choice citations sufficient to alter the outcomes while other cases do not'. While there is no agreement as to precisely how many such 'hard' cases exist, it is reasonable

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<sup>44</sup> Goldman (1968) at 476-77

<sup>45</sup> As summarized by Goldman: "Pritchett over two decades ago persuasively argued that cases decided with public judicial disagreement can be considered to have presented the judges with choices among limited alternatives. Judicial dissensus is thus taken as an objective indicator that presumably legitimate conflicting paths to decision were open to the judges. . . . Dissensual case situations are characterized for the most part (but not) exclusively by the judge's attitudes/values toward the substantive issues influencing the decisional path taken." Goldman (1969) at 217. The referenced works are C. Herman Pritchett, *The Roosevelt Court* (New York: Macmillan, 1948) and *Civil Liberties and the Vinson Court* (Chicago: Univ. of Chicago Press, 1954).

<sup>46</sup> See Pritchett (1948) at 30 (ascribing increase in Supreme Court dissent to increase in "hard cases").

to assume that judicial discretion exists at least in all ‘non-consensual’ decisions of the courts. This lack of consensus is evident when at least one circuit court judge who heard the case dissents or the circuit court reverses the decision below. In either of these situations, the existence of disagreement among some judges would indicate that all of the judges who participated in the processing of the case exercised discretion as they determined which side should prevail.<sup>47</sup>

The notion that indeterminate cases present opportunities for the exercise of judicial discretion - and hence disagreement - seems intuitive; it also finds at least indirect support from studies on the fate of legal rules announced in contested opinions.<sup>48</sup> Less obvious, but no less important for a correlation between determinacy and dissent, is the notion that apparent judicial *agreement* reflects the constraint of legal principles. Does the absence of dissent indicate determinacy? A lack of dissent might merely reflect a coincidence of the values or attitudes that lead a judge to decide one way or the other in an indeterminate case, rather than the constraining effect of legal principles.<sup>49</sup>

Analysis of unanimous judicial opinions is inherently more difficult than analysis of opinions with dissent,<sup>50</sup> and requires the researcher to score cases based on their outcome rather than merely noting the expression of disagreement. Nonetheless, analysis of the correlations between judicial “liberalism” and outcome in unanimous and split labor opinions of the U.S. Courts of Appeals has suggested that judicial attitudes and values play little role in the resolution of unanimously decided cases.<sup>51</sup> The implication is that, if judicial characteristics do not account for the outcome of the unanimously decided

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<sup>47</sup> Songer, Sheehan, and Haire, *Continuity and Change on the United States Courts of Appeals* (Univ. of Mich. Press 2000): (citations omitted). See also Hettlinger et al. (2006) at 115 (“Horizontal dissensus is a *reflection* of the indeterminacy of legal rules . . . . When political scientists discuss nonunanimous decisions, . . . they are often referring to such rule indeterminacy.”)

<sup>48</sup> As part of an inquiry into what factors caused judges on the United States Courts of Appeals to follow or reject rules promulgated by earlier decisions, Klein evaluated (among other factors) the treatment of rules announced in unanimous and split opinions, and the relationship between ideology of the earlier and later judges. Klein concluded that dissents were better explained as indicators of legally problematic issues, rather than indicators of ideological conflict. David E. Klein, *Making Law in the United States Courts of Appeals* (2002), at 139-141.

<sup>49</sup> See Goldman (1969) at 218; Pritchett (1948) at 240. Coincidence of judicial values or attitudes is problematic for this study only to the extent that it manifests differentially between the categories of cases examined. See note \*\* *infra*.

<sup>50</sup> See generally Green, in Goldman & Lamb (eds) (1986) 139-141, 147-151.

<sup>51</sup> Goldman (1969) at 219-20.

cases, then the most likely explanation is that legal principles dictated the outcome of the unanimous cases.<sup>5253</sup>

But that unanimous opinions emerge from cases in which legal principles dictate outcome, and that dissenting opinions emerge from cases where the legal principles are under-determinative are insufficient support for the validity of this study. It is also necessary, as expressed in the fourth and fifth conditions of validity, that *variations* in dissent rates reflect variations in the determinacy of the legal regimes being compared. The mere existence of variation in dissent rates between fields of law, between periods of time, or between similar courts, says little by itself. Dissent rates might vary; but this variation might reflect differences in the determinacy of the cases being compared, rather than variation in the characteristics of judges that cause them to disagree on the resolution of underdetermined cases.<sup>54</sup>

We may pose two tests or predictions that ought to be satisfied if variations in dissent rates are the result of variations in the determinacy of the legal regimes under study. The first is positive: Changes in the type of case being considered, more specifically changes in the determinacy of the legal regime as assessed by some independent criterion, should yield changes in the rate of judicial dissent. The second is negative: Variations in dissent rates should *not* be entirely explained by variables other than the legal regime in question, such as the structural characteristics of the courts or the individual characteristics of the judges. If systematic variation remains that cannot be

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<sup>52</sup> See id at 219-220. Goldman also identifies support for the “consensus proposition” (the proposition that legal principles dictate the outcome of unanimously decided cases) in studies of the U.S. Supreme Court. See id at 220-221.

<sup>53</sup> We may postulate three other circumstances in which a lack of dissent among appellate judges fails to reflect the indeterminacy of the law. The first is when opinions, though ostensibly the product of a multi-judge court, are in fact the product of only one judge, in which case no disagreement is possible. Frequently cited is Sickels’s study of zoning cases decided by the Maryland Court of Appeals, in which court practice assigned zoning cases to individual judges in rotation, despite their nominal consideration by the entire court. See Robert J. Sickels, “The Illusion of Judicial Consensus: Zoning Decisions in the Maryland Court of Appeals,” 59 *American Political Science Review* 100-04 (1965). The second is when individual panels reach unanimous decisions that are nonetheless opposed to the decisions of other panels of the same court. See Atkins and Green, “Consensus on the United States Courts of Appeal: Illusion or Reality?” 20 *American Journal of Political Science* 735-48 (1976); Songer, “Consensual and Nonconsensual Decisions in Unanimous Opinions of the United States Courts of Appeals,” 26 *American Journal of Political Science* 225-39 (1982). The third circumstance is when judges disagree but suppress disagreement or reach a negotiated compromise. See, e.g., Howard, “On the Fluidity of Judicial Choice,” 52 *American Political Science Review* 43-55 (1968). So long as these circumstances occur equally frequently among the fields of law under study, none of them interferes with a study comparing resolution of different kinds of cases within the same court.

<sup>54</sup> See, e.g., Goldman, “Voting Behavior on the United States Courts of Appeals 1961-1964,” 60 *American Political Science Review* 374, 378 (1966)

explained by structural variables, it becomes more likely that variations in dissent rate correlate with variation in the determinacy of the legal regime.

Testing the positive prediction is difficult, for the obvious reason that we have no outcome-independent method of assessing whether a particular case was undetermined or not.<sup>55</sup> Nonetheless, several indirect tests of this prediction may be found in studies that have examined the relationship between dissent and an appellate court's discretion to control its own docket. On the theory that appellate courts with discretionary dockets will eschew "easy" cases in favor of ones that pose unsettled or difficult questions of law, we might expect higher rates of dissent when courts exercise discretion over which appeals they will hear. The distinction between appeal by leave and appeal by right has frequently been suggested as a reason for the much higher frequency of dissent observed in the U.S. Supreme Court than in the U.S. Courts of Appeals.<sup>56</sup> But a stronger test would be to compare dissent frequencies between discretionary and non-discretionary cases in the same court.<sup>57</sup> Such a study has been conducted on the Louisiana Supreme Court, in which prior to 1982, appeal was by leave in civil cases but by right in criminal cases.<sup>58</sup> Dissents arose more frequently in civil cases than criminal cases,<sup>59</sup> suggesting that the discretionary civil appeals were underdetermined compared to the "routine" criminal appeals.<sup>60</sup> However, once statutory changes made the Court's criminal docket discretionary,<sup>61</sup> the frequency of dissent in criminal appeals approached closely that observed in the civil appeals.<sup>62</sup> Additional support for this hypothesis may be found by

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<sup>55</sup> One could imagine an experimental approach to evaluating determinacy, such as providing a defined set of facts and legal constraints to a group of legally trained observers, and assessing whether which the observers reached identical conclusions. But aside from the difficulties defining and recruiting a qualified group of legal observers, it is difficult to see how such an experiment could yield information beyond the determinacy of the exact legal and factual materials provided to the observers. Such materials might or might not correspond to the actual set of legal and factual materials considered by judges.

<sup>56</sup> See, e.g., Goldman & Lamb (1986) at 9-10.

<sup>57</sup> Such a test avoids the obvious complications in comparing the U.S. Courts of Appeal, which usually sit in panels of three judges and are bound to follow the precedent of the Supreme Court, and the Supreme Court, which sits with nine judges and is not bound by a higher court.

<sup>58</sup> Hall, "Docket Control as an Influence on Judicial Voting," 10 *Justice System Journal* 243, 245-46 (1985).

<sup>59</sup> Prior to 1982, dissents arose in 52.6% of the civil cases but in only 21.6% of the criminal cases. *Id.* at 250.

<sup>60</sup> *Id.* Hall was unable to identify consistent patterns of individual judges' voting in her analysis, suggesting that expression of judges' policy preferences played little role in the non-unanimous cases. *Id.* at 251-53.

<sup>61</sup> *Id.* at 246 n. 8.

<sup>62</sup> *Id.* at 252 (reporting that in 1984-85, 58.6% of criminal appeals and 61.4% of civil appeals were decided unanimously).

comparing frequencies of dissent between state supreme courts that exercise control over their dockets and those supreme courts whose jurisdiction is obligatory.<sup>63</sup> After controlling for other variables,<sup>64</sup> analysis of dissent frequencies shows that state supreme courts exercising control over their dockets register higher frequencies of dissent than do state supreme courts which have no control over their dockets.<sup>65</sup> Thus, to the extent that the exercise of state supreme court judges' discretion to hear an appeal correlates with the indeterminacy of the legal principles presented by that case, the connection between exercise of docket control and dissent provides strong support for the hypothesis that variations in determinacy correlate with variations in dissent frequencies.<sup>66</sup>

A further test of the positive hypothesis is to compare dissent frequencies between categories of cases thought to be more or less determinate. The difficulty, of course, is that the validity of such a test is entirely dependent on the subjective judgment of the researcher that a particular field of law is relatively underdetermined. Nonetheless, moderately strong support for this prediction may be found in the three-fold increase in dissent in cases of obligatory jurisdiction at the U.S. Supreme Court after 1925, after the Judiciary Act eliminated obligatory jurisdiction for most "routine" federal law cases.<sup>67</sup> The increase indicates that, at least at the U.S. Supreme Court, cases involving more complex principles of law<sup>68</sup> are more likely to generate judicial disagreement.<sup>69</sup>

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<sup>63</sup> See Glick and Pruet, *Dissent in State Supreme Courts: Patterns and Correlates of Conflict*, in Goldman & Lamb (1986) 199, 208.

<sup>64</sup> Glick and Pruet's analysis assessed as independent variables various measures of state social and economic complexity, political complexity and competition, and complexity of court structure. *Id.* at 205-08.

<sup>65</sup> *Id.* at 206 (finding statistically significant zero order correlation between jurisdiction of supreme court and dissent frequency).

<sup>66</sup> For a contrary example from Australia, see Smyth, *What explains Variations in Dissent Rates?: Time Series Evidence from the High Court*, 26 Sydney L. Rev. 221, 238 (2004) (finding no significant correlation between introduction of discretion and increased dissent on Australia's High Court)

<sup>67</sup> Halpern and Vines, *Institutional Disunity, the Judge's Bill and the Role of the U.S. Supreme Court*, 30 Western Political Quarterly 471, 475 (1977) (finding that percentage of obligatory cases generating dissents increased from 8.2% to 25.1% after the Judiciary Act, while the frequency of dissent in certiorari cases only increased from 7.6% to 8.3%). See also *id.* at 474 n.23 (cataloging fields of law for which appeal by leave replaced appeal by right).

<sup>68</sup> The categories of cases for which appeal by right was eliminated included most general federal question cases, postal cases, civil rights cases, and cases brought by the United States.

<sup>69</sup> See *id.* ("The increased dissent rate in obligatory cases is explained by the fact that the Act eliminated appeal as a matter of right in numerous classes of cases which generally raised relatively straightforward legal issues."). The observation that appeals classified as involving "public" law - as opposed to "private" or "criminal" law - tended to generate more dissent at the Arizona Supreme Court over a 60-year period reinforces, albeit weakly, these conclusions. See John A. Stookey, *A Longitudinal Study of the Docket Composition Theory of Conflict and Consensus*, in Goldman & Lamb (eds) (1986) 240, 245. Whether "public" cases are more complex than "private" or "criminal" cases is open to question. See *id.* at 251.

Somewhat more tenuous support for this prediction might be drawn from studies of the U.S. Courts of Appeals, showing that dissent is more frequent in cases for which Supreme Court review was granted or sought.<sup>70</sup> If indeterminate questions of law prompt litigants to seek Supreme Court review, or prompt the Supreme Court to grant review, then the increased frequency of dissent in such cases serves as a marker for indeterminacy.<sup>71</sup>

In sum, while no single study confirms the positive test of the relationship between determinacy and dissent, taken together, existing empirical work supports the notion that dissent increases in proportion to certain properties of the legal regime under study. To the extent that these properties are proxies for determinacy of the legal regime in question, we may regard as satisfied the condition that less determinate cases provoke increased expression of judicial dissent.

The negative test or prediction of the hypothesis is that variations in the dissent frequency for a particular system cannot be explained, at least not entirely, by changes in structural variables such as the personal characteristics of the judges, or structural characteristics of the court. At the U.S. Supreme Court, dissent frequencies vary significantly depending on the justices' ideological attitudes and social backgrounds.<sup>72</sup> However, such variables have much less success explaining variations in dissent frequencies at the U.S. Courts of Appeals.<sup>73</sup> Perhaps the most comprehensive study of the effect of judicial background, Goldman's examination of all non-unanimous Court of Appeals decisions from 1965 to 1971<sup>74</sup>, found that all judicial background variables<sup>75</sup>

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<sup>70</sup> See Donald A. Songer, *Factors Affecting Variation in Rates of Dissent in the U.S. Courts of Appeals*, in Goldman & Lamb (eds.) (1986) 117, 122-23 (finding significant increases in dissent in labor and criminal law cases where Supreme Court review was sought or granted).

<sup>71</sup> The obvious difficulty with this interpretation is that the expression of dissent at the appellate court may well independently encourage litigants to appeal to the Supreme Court, or the Supreme Court to hear the case.

<sup>72</sup> For review, see Peterson (1981) at 421-22.

<sup>73</sup> While not assessing the question directly, Klein's conclusion that legal indeterminacy rather than ideological conflict better explained the subsequent fate of dissenting opinions may be relevant here as well. See Klein (2002), *supra* note \*\*.

<sup>74</sup> Sheldon Goldman, *Voting Behavior on the United States Courts of Appeals Revisited*, 69 *Am. Pol. Sci. Rev.* 491 (1975).

<sup>75</sup> Namely, political party, age, religion, prior experience as a candidate for public office, , prior judicial service, length of service on the Court of Appeals, and prior experience as a prosecutor. *Id.* at 501.

collectively explained only 5.5% of the variance in judges' frequency of dissent.<sup>76</sup> Likewise, a study of dissent frequencies in criminal and labor cases at the Courts of Appeals from 1953 to 1975<sup>77</sup> found no significant connections between dissent frequency and the court's workload<sup>78</sup> or diversity of political party membership on the panel.<sup>79</sup>

Consistent with these findings, studies of case *outcomes* at the Courts of Appeal (as compared to studies that record judicial disagreement without regard to how the case was decided<sup>80</sup>) have found relatively modest correlations between outcome and judicial characteristics. Other than political party, religion, and age, demographic characteristics of Court of Appeals judges have little or no effect on case outcomes,<sup>81</sup> and even the effects of party, religion and age are small.<sup>82</sup> Even stronger conclusions have been drawn

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<sup>76</sup> See *id.* at 500-01. Prior judicial experience was the variable explaining most of the variance in dissent frequency, accounting for 2.4% of the variance. *Id.* at 503

<sup>77</sup> Songer, in Goldman & Lamb (eds) (1986) 117.

<sup>78</sup> *Id.* at 125-26. These findings contradicted the hypothesis that busy judges would be less inclined to take the time to prepare dissents.

<sup>79</sup> *Id.* at 128. However, reversing the decision of the district court, diversity of 'judicial ideology' on the panel, and degree of urbanization of the circuit in question were shown to correlate significantly with the observed frequencies of dissent. These variables did not, however, account for changes in dissent frequencies over time. *Id.* at 126-35. Curiously, Songer does not explain what 'ideology' is or how it was determined. His reference to Atkins, *supra* note \*\*\*, might suggest that a process similar to Atkins's was followed: identify judicial voting blocks by analysis of en banc decisions, and then ascertain the frequency with which judges dissent when they are placed on panels with members of the same or different voting blocs. See Atkins at 46-49. If so, the finding that diversity of judicial ideology provokes dissent might appear (to the uninitiated) to be the relatively trivial observation that judges who tend to disagree with each other when the court sits en banc, still disagree with each other when the court sits in panels of three.

<sup>80</sup> Studies of outcomes require analysis and subjective coding of the outcome of the case. For example, outcomes of private economic cases may be coded according to whether "underdogs" (insureds, small businesses, antitrust plaintiffs, tenants, debtors, bankrupts, buyers of goods, or stockholders) or their opposites (insurers, large business, antitrust defendants, landlords, creditors, sellers of goods, or management) prevailed. See, e.g., Goldman (1966) at 376. While a fairly standard mode of analysis in political science, such classifications are obviously crude and may fail to recognize many subtle distinctions or biases acted upon by judges.

<sup>81</sup> See Goldman (1966) at 381-82 (finding no correlation between outcome and judges' place of birth, paternal occupation, type of educational institution attended, prior public office held, district court experience, bar association leadership, occupation when appointed, length of judicial experience, or ABA qualification rating);

<sup>82</sup> Goldman's 1965 to 1971 study found that the variance in outcome explained by seven combined variables of judicial background (political party, age, religion, years of service on the court, and prior experience as a judge, candidate for public office, or prosecutor) ranged from a high of 37% in labor cases, to a low of 8% in government fiscal cases, an amount he regarded as "far from spectacular." Goldman ultimately concluded: "On balance, party and age seemed to have some limited importance in explaining the variance in judicial behavior, and the other background variables appeared negligible (with the possible exception of religion)." *Id.* at 500-0. Goldman's overall assessment was distinctly lukewarm: "These findings lend some slight encouragement to background-behavior research at the aggregate level." *Id.* at 505.

from studies at the district court level. A study<sup>83</sup> of all civil rights and prisoner cases filed in three federal district courts,<sup>84</sup> accounting for a significant proportion of federal filing for the study period,<sup>85</sup> found some influence of individual judges on procedure, but little on outcome.<sup>86</sup> Even the effects exerted by individual judges could not be significantly correlated with the judges' individual characteristics (such as political party or appointing president), leading the authors to conclude: "In the mass of cases that are filed, even civil rights and prisoner cases, the law -- not the judge -- determines the outcomes."<sup>87</sup>

Recent theories of judicial behavior have added strategic behavior - defined as instances in which a judge's decision is based in whole or in part on the expected behavior or response of her colleagues, rather than solely according to her own view of the case - to the repertoire of factors that might contribute to judicial decision-making.<sup>88</sup> Strategic behavior could interfere with the correlation of indeterminacy and dissent, because the decision to dissent would be based in part on considerations other than the judge's view of the correct disposition of the case. However, a large-scale study of dissenting opinions in cases at the United States Courts of Appeals from 1970 to 1988, based essentially on the theory that the dissenting judge employs dissent as a plea for en banc review from a more (or less) sympathetic court majority, found no evidence of strategic behavior in the incidence of dissent.<sup>89</sup>

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<sup>83</sup> Ashenfelter, Eisenber, and Schwab, *Politics and the Judiciary: The Influence of Judicial Background on Case Outcomes*, 24 J. Legal Stud. 257 (1995).

<sup>84</sup> The Central District of California, the Eastern District of Pennsylvania, and the Northern District of Georgia. *Id.* at 265.

<sup>85</sup> The study examined all cases filed in the three specified districts in 1981. According to the authors, during the period 1980-81 these three districts accounted for 8.1% of all federal nonbankruptcy filings, and 7.9% and 4.2% of nonprisoner and prisoner civil rights filings respectively. *Id.*

<sup>86</sup> *Id.* at 281 ("We find that judges influence the procedures within civil rights cases but have relatively little effect on whether cases settle or win. Further, judicial characteristics such as political party cannot explain what few effects we see.").

<sup>87</sup> *Id.*

<sup>88</sup> For review, see Hettinger et al (2004), at 123-25.

<sup>89</sup> Hettinger et al., (2004), at 133 ("[W]e find no evidence in support of a strategic account of dissenting opinions on the U.S. Courts of Appeals."). Hettinger et al. did find a strong and significant correlation between the "legal complexity" of a case and the incidence of dissent. *Id.* at 134. However, their study does not support a correlation between indeterminacy and dissent. Hettinger et al. measured "legal complexity" by the length (in pages) of the opinion and the number of issues considered. The more legal issues, the more opportunities for dissent, regardless of their determinacy. One might also naively expect that dissent leads to longer opinions, rather than vice versa.

*Advantages Of The Federal Circuit and Other Intermediate Appellate Courts for the Study of Dissent*

Most studies of dissent, and judicial behavior in general, have focused on the Supreme Court of the United States. However interesting the Supreme Court may be for a study of judicial process, as a forum for measuring determinacy of the law, the Supreme Court suffers from several disadvantages shared with other courts of last resort. For courts where appeal is by leave rather than by right, the selection of cases is biased by the discretion of the court to hear the appeal. A court may decline to hear an appeal for any number of reasons which may or may not be related to the determinacy of the law.<sup>90</sup> Particularly in light of findings that exercise of judicial discretion in the selection of appeals significantly affects frequencies of dissent,<sup>91</sup> a study of determinacy optimally should be confined to courts in which judges do not control their dockets. The Federal Circuit, along with other intermediate appellate courts, meets this criterion: appeal is by right rather than by leave.<sup>92</sup> The Federal Circuit does retain discretion whether to hear interlocutory appeals<sup>93</sup>, raising the possibility that selective hearing of interlocutory appeals could bias the frequencies of dissent.<sup>94</sup> However, the frequency at which the Federal Circuit grants interlocutory appeals is low enough that such biases, if present, would be insignificant.

The second advantage of the Federal Circuit as a system for the study of determinacy lies in the role of *stare decisis* at the court. When a court is free to overrule its earlier precedent, disagreement among judges may arise from several distinct sources, only one of which relates directly to the determinacy of the legal regime. Judges may disagree on whether existing precedent or statute determines the outcome of the particular case before the court, in which case disagreement measures indeterminacy. But disagreement may also reflect disagreement on the merits of the court's existing

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<sup>90</sup>E.g., the case may not present an issue the court considers worthy of its attention; the legal issues in the case may not be properly framed or may not be ripe for decision; the court wishes to wait for further exploration of the issue in other lower court decisions; the court regards the issue as too politically sensitive to address, etc.

<sup>91</sup> See text accompanying notes \*\*\* supra.

<sup>92</sup> See 28 U.S.C. 1295(a)(1)

<sup>93</sup> See 28 U.S.C.1292(b)

<sup>94</sup> Such bias would only occur if tendency to grant interlocutory appeal does not correlate with case determinacy. If the court granted interlocutory appeal with equal frequency among cases with equal levels of indeterminacy, no bias would result. Such equivalence is likely if the court restricts leave to file an interlocutory appeal to cases of

precedent, notwithstanding the clarity of that precedent, or disagreement about the threshold at which disapproval of the merits of the court's existing precedent justifies departing from the principle of *stare decisis*.<sup>95</sup> All three disagreements may arise when the Federal Circuit sits en banc, in which case the decision-making process of the court resembles that of the Supreme Court<sup>96</sup>. However, when the court sits in panels, the sources of possible disagreement are fewer. Like the other federal Circuit Courts of Appeals,<sup>97</sup> the Federal Circuit follows the rule (sometimes termed the principle of "interpanel accord") that the decision of one panel of the court is binding upon subsequent panels until the decision is overruled by the court en banc.<sup>98</sup> With rare exceptions,<sup>99</sup> adherence to this rule means that judges in a panel are constrained to follow the precedent established by earlier panels of the court. Although disagreement with the existing legal regime may be expressed in a concurring opinion, dissent as an expression of disagreement with precedent of the court is foreclosed to a judge following the rule of interpanel accord. In panel decisions of a court that follows the rule of interpanel accord, dissent at least nominally is confined to indeterminate cases: cases in which the judges disagree about the identity or meaning of statutes or precedents that control the case, or disagree about what principles should be promulgated when none yet exist.

The third advantage of the Federal Circuit as a laboratory of dissent arises from its circumscribed jurisdiction. The diversity of cases which most courts of last resort (and most intermediate appellate courts as well) hear complicates efforts to measure dissent rates within or between specific fields of law. The more scattered a court's jurisdiction,

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<sup>95</sup> Most famously by the Supreme Court in *Planned Parenthood of Southeastern Pennsylvania v. Casey*, 505 U.S. 833 (1992) (disagreeing whether *stare decisis* required adherence to *Roe v. Wade*)

<sup>96</sup> The Federal Circuit is, of course, still constrained to follow the precedent of the Supreme Court.

<sup>97</sup> See Am Jur 2nd § 601 (collecting cases).

<sup>98</sup> See, e.g., *Kimberly-Clark Corp. v. Fort Howard Paper Co.*, 772 F.3d 860, 863 ("Counsel is apparently unaware that a panel of this court is bound by prior precedential decisions unless and until overturned *in banc*."). In its first decision, the Federal Circuit adopted as binding precedent the decisions of its predecessor courts, the Court of Claims and the Court of Customs and Patent Appeals. See *South Corp. v. United States*, 690 F.2d 1368, 1370-71 (Fed. Cir. 1982).

<sup>99</sup> See *Atlantic Thermoplastics Co. v. Faytex Corp.*, 970 F.2d 834, 838 n.2 (Fed. Cir. 1992) (declining to follow earlier Federal Circuit panel because earlier panel allegedly did not follow Supreme Court precedent); *Atlantic Thermoplastics Co. v. Faytex Corp.*, 974 F.2d 1279, 1281 (Fed. Cir. 1992) (Rich, J., dissenting from denial of rehearing en banc) ("The most egregious act of the *Atlantic* panel, however, is its defiant disregard, for the first time in this court's nearly ten-year history, of its rule that no precedent can be disregarded or overruled save by an *in banc* court. . ."). See also Note, *En Banc Hearings in the Federal Courts of Appeals: Accommodating Institutional Responsibilities* (Part I), 40 N.Y.U. L. Rev. 563, 578-81 (1965) (noting rare cases of "panel overruling"). Interviews with Circuit Court of Appeals judges have also revealed perceptions among some judges that fidelity to the rule of interpanel accord is less than absolute. See Goldman, 1968 Wisc. L. Rev 461, 467.

the more fields of law its decision address. For the researcher, such diversity is problematic because it may decrease the number of opinions addressing a field of law - making it more difficult to draw robust conclusions from variations in dissent rates - and because it may increase the difficulty and subjectivity faced by the researcher in classifying cases. Typically, empirical studies have used relatively crude categories such as “public,” “private,” “criminal,” “labor,” or “business regulation,”<sup>100</sup> or, more frequently, ignored the distinction between fields of law altogether. In contrast, the Federal Circuit’s jurisdiction is delimited by a relatively few categories of subject matter.<sup>101</sup> The limited scope of subject matter makes classifying Federal Circuit cases by field of law more uniform and less subjective. Furthermore, each field of law within the Federal Circuit’s appellate jurisdiction arises from one, or at most two, distinct tribunals.<sup>102</sup> The association of tribunal with field of law facilitates first-order categorization of appeals by the field of law addressed.<sup>103</sup>

The ability to easily categorize Federal Circuit appeals by field of law provides the opportunity to conduct a *controlled* study, comparing the rate at which Federal Circuit judges disagree on each of the fields of law within their appellate jurisdiction. Comparison is between decisions of the same court over the same period of time minimizes the effect of personal, institutional, or social factors that might affect frequencies of judicial disagreement. Minimize, not eliminate: personal, institutional,

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<sup>100</sup> See, e.g., Goldman (1966) at 376; Songer, Sheehan & Haire (2000) at 105.

<sup>101</sup> 28 USC 1295

<sup>102</sup> Patent infringement actions usually originate from the district courts, but proceedings to block import of infringing articles may be brought before the International Trade Commission. 19 U.S.C. §1337(d). Review of Patent and Trademark Office decisions usually proceeds from administrative boards within the Office, the Board of Patent Appeals and Interferences and the Trademark Trial and Appeal Board, *see* 28 U.S.C 1295(a)(4)(A),(B); but on occasion review of a BPAI decision arrives at the Federal Circuit by way of a district court under 35 U.S.C. §§ 145 or § 146.

<sup>103</sup> Of course, while classifying cases in such categories as “patent,” “international trade,” or “veterans” is more accurate than broader categories like “civil v. criminal,” it still conceals enormous diversity of issues within each category. A customs case from the Court of International Trade, for example, might turn on something as esoteric as the proper accounting treatment of research and development expenses in an antidumping proceeding, *see, e.g., Hynix Semiconductor, Inc. v. United States*, 424 F.3d 1363, 1369-72 (Fed. Cir. 2005), or as foundational as the proper degree of judicial deference to agency statutory interpretations, *see, e.g., Mead Corp. v. United States*, 185 F.3d 1304, 1306-08 (Fed. Cir. 1999), *rev’d*, \_\_\_ U.S. \_\_\_\_\_. Is it meaningful to assess the determinacy of “international trade” cases in light of such diversity. Perhaps not. But the endpoint of such reasoning would be that no case can be meaningfully grouped with any other case, unless the facts and law in the cases are identical. This study discriminates between various issues in patent cases, but otherwise its conclusions are tempered by the imprecision of its categories.

or social factors may vary across different fields of law for the same judge.<sup>104</sup>

Nonetheless, to the extent that personal and institutional factors which might provoke judicial disagreement remain constant across the fields of law within the Federal Circuit's jurisdiction, then differences in dissent frequency between cases in each field of law should reflect only the degree to which the law is outcome-determinative in each field of law. If Judges A, B, and C tend to vote in a bloc because they like each other, then presumably their affection does not change depending upon the subject matter presented by the case before the panel. Likewise, institutional norms in favor of unanimity should not change depending on the particular issues before the court.

The Federal Circuit's circumscribed jurisdiction may also make judicial conflict at the Federal Circuit a more accurate proxy for legal indeterminacy than conflict at other courts would be. It is commonly assumed among judicial scholars, although not proven, that socially controversial issues are more likely to provoke judicial disagreement.<sup>105</sup> The Federal Circuit's jurisdiction typically does not encompass controversial issues such as criminal justice or personal liberties; Federal Circuit judges thus would seem less likely than their colleagues on the regional Circuits to be selected for the bench because they hold particular ideologies. Notably, in Goldman's study of the effect of judicial characteristics on outcomes in the United States Courts of Appeals, the voting patterns *least* explainable by judicial background variables were those on government fiscal issues, assertion of federal jurisdiction, and private economic issues.<sup>106</sup> As defined by Goldman,<sup>107</sup> the categories of "government fiscal" and "private economic" seem to correspond most closely with the caseload of the Federal Circuit, which is dominated by various money claims against the United States,<sup>108</sup> and economic disputes between private

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<sup>104</sup> See discussion of the fifth condition of validity in text accompanying n. 15 *supra*.

<sup>105</sup> See Peterson (1981) at 420-21; 424 (classifying hypothesis as "very indirectly confirmed").

<sup>106</sup> Goldman (1975) at 500-01 (reporting percentage of variation accounted for by background variables for government fiscal, activism, and private economic categories as 7.7%, 12.4%, and 12.8% respectively).

<sup>107</sup> Goldman classified as "government fiscal" cases those involving "tax, eminent domain, and other fiscal cases," and as "private economic" those addressing insurance, antitrust, commercial, bankruptcy, and stockholder issues. *Id.* at 492. See note \*\*\* above for his other categories and the percentage of variance explained by background variables. Of the remaining categories, the only ones that might correspond to a significant portion of the Federal Circuit's caseload are labor cases, given that the Federal Circuit hears appeals from the Merit Systems Protection Board and the Office of Personnel Management in federal employee claims. But these cases, dominated by statutes and regulations applicable only to federal employees, would seem to share little with the labor-management and NLRB cases tallied by Goldman from the regional Circuit Courts.

<sup>108</sup> E.g., contract claims arising from the various contract appeals boards or the Court of Federal Claims and veterans' benefits claims

litigants in patent infringement cases. Of all the federal Article III courts, we would expect decision-making the Federal Circuit to be least influenced by the political characteristics of individual judges. Whether the observation that decision-making is instead influenced by immeasurable characteristics of individual judges comes any closer to revealing indeterminacy of the legal regime is a theoretical question I do not seek to resolve. Nonetheless, to the extent that conflict stemming from polarization of judges along political or demographic axes is viewed as undesirable in a study of determinacy, a study focusing on the Federal Circuit is least affected by such conflict.

### III. THEORY AND PRACTICE OF MEASURING INDETERMINACY

#### *A Simple Model of the Incidence of Dissent*

From the foregoing examination of the extant literature on the causes of judicial dissent, the causes of judicial dissent may be summarized crudely but concisely: indeterminate issues of law contribute to the expression of appellate dissent, but so do a range of other factors, such as the personal characteristics and policy preferences of the judges, the organization and procedures of the court, and cultural and psychological factors rooted in the group dynamics of the court and its decision-making process. If our interest is on legal indeterminacy alone, we may construct a simple model of the process underlying the expression of dissent in an appellate opinion. To do so, I separate indeterminacy in the legal regime from all other factors that generate or suppress dissent, and group the latter into an undifferentiated category I term "structural variables."<sup>109</sup> If legal indeterminacy and structural variables both contribute to the likelihood that a judge will dissent in a given case, then for a case containing issue  $x$ , the probability of the opinion containing a dissent on issue  $x$  may be represented as:

$$P_x = I_x \times S_c$$

where  $P_x$  represents the probability of dissent on issue  $x$ ,  $I_x$  represents the legal indeterminacy of issue  $x$ , and  $S_c$  represents the combined effects of all structural variables

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<sup>109</sup> The predominant component of  $S_c$  is likely the social acceptability of dissent at a particular court. Hettinger, Lindquist, and Martinek built a multinomial logit model including separate parameters for individual and court characteristics to explore the causes of dissent at the regional Circuit Courts of Appeals for the period 1960 to 1996. Hettinger et al., *Judging on a Collegial Court* (2006). The court's overall separate opinion rate was by far the factor contributing most significantly to the probability of dissent in a given case. See Hettinger et al at 66; 71; 67 (showing that variable representing circuit norms had greatest influence on probability of dissent or concurrence).

at a specified court  $C$ . Rearrangement of this equation yields a measure of indeterminacy for issue  $x$ :

$$I_x = \frac{P_x}{S_C}$$

With a sufficient number of cases, the probability of dissent may be estimated from the observed frequency of dissent. However, to determine  $P_x$  experimentally, we must measure the frequency at which dissents appear only in cases which  $P_x$  was considered by the appellate court. Without such a restriction, the frequency of dissent reflects both the frequency with which a judge dissented on issue  $x$ , and the frequency with which issue  $x$  appeared in the set of cases under study: regardless of indeterminacy, rare issues would generate few dissents and common issues would generate many. We may therefore compare dissent frequencies between various legal issues only if we know the number of cases in which those legal issues were in dispute.

Despite the requirement that the set of cases under study must be restricted to those presented issue  $x$ , issue  $x$  may be defined narrowly as a single issue, or broadly as a collection of legal issues, so long as we understand that our conclusions about the determinacy of legal issues are only as specific as our definition of the issues.<sup>110</sup> Likewise, court  $C$  may represent a single court or a group of courts, so long as the boundaries of that definition are respected in subsequent calculations.

We may determine the absolute magnitude of  $I_x$  only by measuring both the frequency of dissent  $P_x$ , and the contribution of structural variables  $S_C$ . However, we lack any means to measure the contribution of structural variables independently of dissent frequencies. Without quantifying  $S_C$ , it is impossible to measure the *absolute* magnitude of the indeterminacy parameter  $I_x$ .

It is nonetheless possible to measure the *relative* indeterminacy of two different legal regimes as applied by a single court, provided we make a simplifying assumption. The assumption is that  $S_C$  remains constant<sup>111</sup> and independent of  $I_x$ ; in other words, I assume that the structural variables provoking or suppressing dissent do not change

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<sup>110</sup> Because any higher-level definition of a "legal issue" allegedly common to more than one case can readily be broken down into as many "sub-issues" as there are distinct fact patterns, the boundaries of a "legal issue" are arbitrary.

<sup>111</sup> The contribution of structural variables may change over time, particularly as the personnel of a court shifts. It is therefore necessary to specify a time frame for each instance of  $S_C$ .

depending on what issues the court is considering.<sup>112</sup> If the contribution of structural variables is the same between two issues  $x$  and  $y$ , then the structural variables drop out of the comparison entirely:

$$\frac{I_x}{I_y} = \frac{P_x \times S_c}{P_y \times S_c} = \frac{P_x}{P_y}$$

Accordingly, the *relative* indeterminacy of issues  $x$  and  $y$  at the same court may be measured by comparing the frequency of dissents on issue  $x$  in cases presenting issue  $x$ , and the frequency of dissents on issue  $y$  in cases presenting issue  $y$ .

### *Dataset Selection*

I focus in this study on judicial disagreement expressed in the form of a dissenting opinion. To do so unquestionably underestimates the absolute frequency of indeterminate cases. Judicial disagreement is also expressed in concurring opinions, and a study of dissent alone will exclude instances of judicial disagreement.<sup>113</sup> Some researchers therefore include concurring opinions in measurements of judicial disagreement.<sup>114</sup> There are, however, compelling reasons to concentrate on the frequency of dissent alone. Only the dissenting opinion is an unambiguous declaration that the dissenting judge disagreed with the outcome reached by the majority. The concurring judge is not so easy to pin down: he may agree with the outcome but disagree with the reasoning adopted by the majority; he may agree that the legal regime dictates the outcome of the case but wish to express dissatisfaction with that legal regime; he may be engaged in pre-emptive exegesis of the opinion to influence future cases; he may wish

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<sup>112</sup> This assumption follows from the third condition of validity set forth in Part II. One might imagine that some judges feel more strongly about certain issues than others and thus be more likely to take the trouble to write a dissent depending on the issue. However, while the effects of such variation might be significant at the level of the individual judge, they will be submerged when  $S_c$  is calculated as the aggregate structural variable for all the judges of the court. Furthermore, to the extent the question has been examined in the literature, the data do not support issue-dependence of an individual judge's tendency to dissent. Although not focused on the precise point discussed here, Goldman's 1975 study of the United States Courts of Appeals found no correlation between voting behavior, as measured by outcome on a series of political and economic issues selected to represent a liberal-conservative axis, and tendency for a judge to dissent. See Goldman (1975) at 494-95.

<sup>113</sup> As discussed in the text accompanying notes \*\*\* supra, outcome-focused studies find evidence of conflict even in unanimously decided cases, by identifying judge-dependent discrepancies in outcomes from different panels of the same court.

<sup>114</sup> See, e.g., Unah (2001) at 71; Wasby, in Goldman & Lamb (1986). It may be particularly tempting for studies of intermediate courts to classify concurring opinions as disagreements because the absolute incidence of both opinions is low; aggregation of dissents and concurrences increases the likelihood that statistically significant conclusions may be drawn from the data.

to criticize (or expand) dictum in the majority opinion. Only the first of these possibilities represents a disagreement arising from the indeterminacy of the legal regime, and disentangling them requires subjective judgments by the researcher about the degree to which the concurring judge expresses agreement or disagreement with the majority opinion.<sup>115</sup> Moreover, given that absolute frequencies of judicial disagreement mean little,<sup>116</sup> systematic underestimation of the absolute frequency of disagreement is acceptable. In a comparative study, underestimation of the absolute frequency of disagreement due to the omission of concurrences is problematic only if the relative expression of disagreement in dissents and concurrences varies between the fields of law (or time periods) under study. If the proportion of disagreement expressed by dissents and concurrences remains constant, then changes in the frequency of dissent accurately represents changes in the frequency of disagreement. Evidence that the frequency of concurrence in the Circuit Courts of Appeals correlates tightly with the frequency of dissent<sup>117</sup> supports this proposition.

I exclude from all aspects of this study two categories of judgments: judgments rendered by the court sitting *en banc*, and judgments in which the court affirms the opinion of the lower tribunal without a written opinion. Exclusion of the *en banc* cases follows from the principal aim of this study: to assess the determinacy of the legal regimes governing ordinary patent cases. As in other Circuit Courts of Appeals, the vast majority of appealed cases at the Federal Circuit are resolved by three-judge panels rather than the court sitting *en banc*. In both instances, the court is nominally constrained by statute and by precedent of the Supreme Court. When the court sits in panels, decision-making is further constrained by precedents of the Federal Circuit, whether from earlier panels or from the court sitting *en banc*. The constraint of precedent is lifted when the court sits *en banc*, for the court is free to overrule its prior precedent of either origin. As the volume of precedent has grown, the constraint of Federal Circuit precedent is likely to be more significant than the constraint of statute or Supreme Court precedent, given the large number of factual or legal scenarios addressed by Federal Circuit precedent. Aside from the fact that *en banc* cases are by definition extraordinary (and rare), disagreement

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<sup>115</sup> See Andrew Lynch, Dissent: Towards a Methodology for Measuring Judicial Disagreement in The High Court of Australia, 24 Sydney L. Rev. 470, 487-91 (2002).

<sup>116</sup> See text accompanying notes \*\*\* supra

<sup>117</sup> See Atkins and Green, (1976).

in *en banc* cases will not reflect the determinacy of “ordinary” patent cases because the main constraint governing ordinary patent cases has been lifted. Crudely speaking, judges *en banc* are more likely disagreeing about what the law should be, rather than what it is. To be sure, disagreement *en banc* also arises from indeterminacy of statute or Supreme Court precedent, and panel opinions also confront questions of first impression. Nonetheless, the fundamental differences in the legal regime and the decision-making process in *en banc* cases render them uninformative about the general determinacy of patent cases.

I also exclude those cases in which the appellate court affirms the judgment of the tribunal below without written opinion. This exclusion is not justifiable on theoretical grounds: these appeals are likely to be the ones in which the reviewing judges perceived the resolution of the case to be so determined by the legal regime that no explication was necessary.<sup>118</sup> While exploration of the universe of summarily affirmed cases is possible, it is extremely resource-intensive.<sup>119</sup> Nonetheless, as with most other systematic sources of error in this study, distortions introduced by excluding summary affirmances are problematic if one wishes to draw conclusions from the absolute magnitude of judicial disagreement,<sup>120</sup> but interfere with a comparative study only to the extent that the factors (other than those connected with case determinacy)<sup>121</sup> influencing the court’s decision to affirm without opinion vary over time, or between the fields of law under study.

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<sup>118</sup> Some smaller proportion no doubt represents the opposite: cases in which the resolution is so difficult that judicial agreement can be achieved only by abandoning any attempt at a reasoned opinion.

<sup>119</sup> See Moore, 9 *Lewis & Clark Review* 231, 236 (2005). Ascertaining the originating tribunal would be possible by manual review of all summary affirmances, since the judgment usually reports the originating tribunal. However, determining what issues were present requires obtaining all the appellate briefs to determine what issues were presented to the court by the litigants. See *id.* Even such painstaking analysis may be incomplete if the issues actually considered by the appellate judges differ from those perceived by the researcher upon perusing the appellate briefs.

<sup>120</sup> See, e.g., *id.* at 235-36 (showing variation in district court reversal rates dependent on exclusion of summary affirmances)

<sup>121</sup> If the decision to affirm without opinion is influenced only by the degree of determinacy of the case - e.g., the court affirms without opinion all cases over a particular threshold of determinacy - then the opinions that remain will, to a first approximation, still reflect the levels of indeterminacy characteristic of each field or time period in question. The *numbers* of opinions issuing from determinate fields will of course be smaller than the numbers of opinions issuing from indeterminate fields, but the frequency of disagreement in those opinions will still reflect determinacy. Note that the validity of the preceding argument depends on the assumption that the distribution of indeterminacy is similar in shape (though not in magnitude) among the sets of cases being compared.

### *A Note on Statistical Methodology*

This study is concerned with the influence of law on judicial behavior. Its data are confined to the records of judicial behavior, judicial opinions, and its conclusions are limited to the judicial process. Within those limitations, I generally collect data on the entire population of cases meeting the time and subject criteria of interest. This does not negate the necessity of statistical analysis. The statistical question of interest is not whether observations from these cases are relevant to any other population, but whether we can make inferences about the process of judicial decision-making that produced the cases. The model of judicial behavior described above posits that both legal and structural parameters contribute to a probability of disagreement each time an appellate panel applies law to the circumstances of a case. Whether one regards this as a purely stochastic process or a judicial sampling of an underlying distribution of case facts,<sup>122</sup> we would like to know how closely the observed frequencies of judicial dissent estimate the underlying probability of dissent, and whether observed differences between dissent frequencies can be interpreted as differences in the underlying probabilities. The statistical tools applicable to such questions are logistic regression and the chi-squared test of distributions. Neither of these tools requires the assumption common to parametric methods, that a sample be normally distributed around a mean; so long as the sample is random and sufficiently large, there are no constraints on distribution. By convention, differences are deemed statistically significant at the 95% level, and such significant differences are marked with an asterisk in tables.

#### IV. DISSENT AT THE FEDERAL CIRCUIT

##### *Judicial disagreement and originating tribunal*

To begin the characterization of the Federal Circuit, the overall dissent frequency in all opinions of the Federal Circuit from 1983 through the first six months of 2005, excluding only en banc cases and summary affirmances, was determined. A text-based search strategy, followed by manual review, classified the published and unpublished

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<sup>122</sup> The choice of perspective determines how one interprets the meaning of legal indeterminacy defined by the model. The definition employed in this study is operational, meaning that it measures how often application of law to fact yields a determinate result. Whether indeterminate results are the fault of the law or the facts is a matter of perspective.

opinions reported in the LEXIS database according to originating tribunal,<sup>123</sup> and the number of dissenting opinions.<sup>124</sup> The Federal Circuit reviews cases originating from ten distinct sets of tribunals.<sup>125</sup> The number of panel opinions and dissents in cases originating from each tribunal, totaling 16,174 and 683 respectively, is shown in Table 1. The corresponding frequencies of dissent are shown in Table 2.

TABLE 1: CASES AND DISSENTS AT THE FEDERAL CIRCUIT 1983-2005

| Year | BCA   |          | CIT   |          | CFC   |          | CAVC  |          | District Courts |          | DVA   |          | ITC   |          | MSPB  |          | Senate Comm. |          | PTO   |          |
|------|-------|----------|-------|----------|-------|----------|-------|----------|-----------------|----------|-------|----------|-------|----------|-------|----------|--------------|----------|-------|----------|
|      | Cases | Dissents | Cases | Dissents | Cases | Dissents | Cases | Dissents | Cases           | Dissents | Cases | Dissents | Cases | Dissents | Cases | Dissents | Cases        | Dissents | Cases | Dissents |
| 1983 | 31    | 3        | 16    | 1        | 65    | 6        | 0     | 0        | 46              | 4        | 0     | 0        | 4     | 0        | 156   | 4        | 0            | 0        | 30    | 5        |
| 1984 | 40    | 2        | 29    | 3        | 92    | 4        | 0     | 0        | 112             | 10       | 0     | 0        | 3     | 0        | 325   | 5        | 0            | 0        | 23    | 2        |
| 1985 | 26    | 1        | 22    | 0        | 109   | 1        | 0     | 0        | 112             | 10       | 0     | 0        | 9     | 1        | 472   | 2        | 0            | 0        | 31    | 2        |
| 1986 | 32    | 0        | 24    | 2        | 81    | 2        | 0     | 0        | 129             | 6        | 0     | 0        | 10    | 0        | 487   | 6        | 0            | 0        | 51    | 1        |
| 1987 | 36    | 1        | 23    | 0        | 66    | 6        | 0     | 0        | 121             | 10       | 0     | 0        | 6     | 0        | 265   | 4        | 0            | 0        | 68    | 3        |
| 1988 | 50    | 5        | 33    | 1        | 83    | 6        | 0     | 0        | 126             | 9        | 0     | 0        | 9     | 0        | 194   | 6        | 0            | 0        | 73    | 5        |
| 1989 | 56    | 1        | 32    | 3        | 54    | 2        | 0     | 0        | 130             | 7        | 0     | 0        | 4     | 0        | 217   | 1        | 0            | 0        | 66    | 5        |
| 1990 | 53    | 4        | 32    | 1        | 84    | 6        | 1     | 0        | 142             | 2        | 0     | 0        | 4     | 0        | 252   | 2        | 0            | 0        | 82    | 3        |
| 1991 | 43    | 1        | 23    | 2        | 101   | 6        | 23    | 0        | 123             | 4        | 2     | 0        | 4     | 0        | 283   | 2        | 0            | 0        | 78    | 2        |
| 1992 | 40    | 2        | 19    | 1        | 109   | 1        | 24    | 0        | 140             | 5        | 0     | 0        | 2     | 0        | 372   | 2        | 0            | 0        | 77    | 3        |

<sup>123</sup> The search strategy took advantage of the LEXIS “posture” and “history” fields to classify opinions according to the originating tribunal, followed by the appropriate date restriction. The search terms for each category were as follows. For the agency boards of contract appeals: posture (board /5 contract) or history (board /5 contract); for the Court of International Trade: posture (court /5 trade) or history (court /5 trade); for the Court of Federal Claims: posture (“claims court” or “federal claims”) or history (“federal claims” or “claims court”); for the Court of Appeals for Veterans Claims: posture (court /5 veterans) or history (court /5 veterans); for all district courts: posture (court /5 district) or history (court /5 district); for the Department of Veterans Affairs: posture (department /5 veterans) or history (department /5 veterans); for the International Trade Commission: posture (trade /5 commission) or history (trade /5 commission); for the Merit Systems Protection Board: posture (merit /5 board) or history (merit /5 board); for the Senate Select Committee on Ethics: posture (senate) or history (senate); for the Patent and Trademark Office: posture ((patent or trademark) /5 board) or history ((patent or trademark) /5 board). District court cases arising under the Little Tucker Act (those provisions of 28 U.S.C. § 1346 specified by 28 U.S.C. § 1295(a)(2)) were identified by searching for (“little tucker” or (28 /5 “1346”) or (28 /5 “1295(a)(2)”) in the case body. The set of cases retrieved was further screened manually to eliminate spurious retrievals and instances of duplicates where the databases contain both the opinion and a document reporting the judgment. The number of en banc cases in each time period was determined by identifying cases in which more than three judges heard the appeal, and subtracting these numbers from the search results.

<sup>124</sup> Dissents were identified by the search term “(dissent! /10 judge)”.

<sup>125</sup> This study follows the classification used by the Administrative Office of the U.S. Courts in its statistical reports. Under this classification, the Federal Circuit reviews cases originating at the Boards of Contract Appeals (BCA), the Court of International Trade (CIT), the Court of Federal Claims (CFC), the Court of Appeals for Veterans Claims (CAVC), the district courts, the Department of Veterans Affairs (DVA), the International Trade Commission (ITC), the Merit Systems Protection Board (MSPB), and the Patent and Trademark Office (PTO). A few federal employee decisions originate directly from the Office of Personnel Management, which are here consolidated with cases originating from the MSPB. The court also reviews a very small number of determinations involving Congressional employees originating at the Senate Select Committee on Ethics or, since 1995, the Office of Compliance (Senate Comm.). 28 U.S.C. § 1295 vests the Federal Circuit with jurisdiction over a few miscellaneous appeals, of which there have been few or none since the court's inception.

|                     |     |    |     |    |      |     |     |    |      |     |    |   |     |   |      |    |   |   |      |    |
|---------------------|-----|----|-----|----|------|-----|-----|----|------|-----|----|---|-----|---|------|----|---|---|------|----|
| <b>1993</b>         | 53  | 3  | 26  | 0  | 141  | 10  | 20  | 0  | 161  | 9   | 0  | 0 | 3   | 0 | 353  | 2  | 0 | 0 | 79   | 5  |
| <b>1994</b>         | 56  | 3  | 34  | 1  | 112  | 7   | 21  | 2  | 153  | 9   | 0  | 0 | 2   | 0 | 326  | 2  | 1 | 0 | 43   | 2  |
| <b>1995</b>         | 40  | 2  | 40  | 2  | 119  | 9   | 9   | 1  | 173  | 21  | 1  | 0 | 4   | 0 | 411  | 8  | 2 | 0 | 57   | 4  |
| <b>1996</b>         | 29  | 2  | 36  | 5  | 109  | 4   | 14  | 0  | 196  | 16  | 0  | 0 | 6   | 1 | 392  | 4  | 1 | 0 | 38   | 3  |
| <b>1997</b>         | 61  | 1  | 44  | 5  | 101  | 7   | 19  | 0  | 217  | 9   | 0  | 0 | 9   | 0 | 249  | 4  | 0 | 0 | 54   | 4  |
| <b>1998</b>         | 44  | 0  | 49  | 4  | 112  | 7   | 41  | 2  | 208  | 14  | 1  | 0 | 4   | 0 | 225  | 4  | 0 | 0 | 24   | 1  |
| <b>1999</b>         | 29  | 1  | 42  | 3  | 113  | 6   | 60  | 2  | 210  | 16  | 1  | 0 | 4   | 0 | 262  | 3  | 1 | 0 | 43   | 3  |
| <b>2000</b>         | 24  | 0  | 23  | 4  | 104  | 5   | 90  | 2  | 222  | 10  | 3  | 0 | 1   | 0 | 288  | 3  | 0 | 0 | 35   | 1  |
| <b>2001</b>         | 24  | 0  | 30  | 0  | 96   | 7   | 71  | 3  | 254  | 19  | 2  | 0 | 7   | 0 | 279  | 6  | 0 | 0 | 49   | 2  |
| <b>2002</b>         | 34  | 4  | 28  | 6  | 116  | 7   | 43  | 2  | 222  | 22  | 4  | 0 | 1   | 0 | 222  | 7  | 0 | 0 | 50   | 4  |
| <b>2003</b>         | 26  | 1  | 39  | 6  | 114  | 6   | 52  | 2  | 223  | 25  | 5  | 1 | 2   | 1 | 238  | 7  | 0 | 0 | 43   | 4  |
| <b>2004</b>         | 29  | 3  | 44  | 6  | 109  | 11  | 46  | 2  | 211  | 28  | 0  | 0 | 6   | 0 | 226  | 1  | 0 | 0 | 42   | 2  |
| <b>Jan-Jun 2005</b> | 8   | 0  | 22  | 1  | 59   | 2   | 28  | 3  | 140  | 12  | 0  | 0 | 1   | 0 | 138  | 8  | 0 | 0 | 21   | 0  |
| <b>Total</b>        | 864 | 40 | 710 | 57 | 2249 | 128 | 562 | 21 | 3771 | 277 | 19 | 1 | 105 | 3 | 6632 | 93 | 5 | 0 | 1157 | 66 |

TABLE 2: DISSENT FREQUENCY AT THE FEDERAL CIRCUIT 1983-2005

| Year         | BCA          | CIT          | CFC          | CAVC         | District Courts | DVA          | ITC          | MSPB         | Senate Comm. | PTO          |
|--------------|--------------|--------------|--------------|--------------|-----------------|--------------|--------------|--------------|--------------|--------------|
| 1983         | 9.68%        | 6.25%        | 9.23%        | N/C          | 8.70%           | N/C          | 0.00%        | 2.56%        | N/C          | 16.67%       |
| 1984         | 5.00%        | 10.34%       | 4.35%        | N/C          | 8.93%           | N/C          | 0.00%        | 1.54%        | N/C          | 8.70%        |
| 1985         | 3.85%        | 0.00%        | 0.92%        | N/C          | 8.93%           | N/C          | 11.11%       | 0.42%        | N/C          | 6.45%        |
| 1986         | 0.00%        | 8.33%        | 2.47%        | N/C          | 4.65%           | N/C          | 0.00%        | 1.23%        | N/C          | 1.96%        |
| 1987         | 2.78%        | 0.00%        | 9.09%        | N/C          | 8.26%           | N/C          | 0.00%        | 1.51%        | N/C          | 4.41%        |
| 1988         | 10.00%       | 3.03%        | 7.23%        | N/C          | 7.14%           | N/C          | 0.00%        | 3.09%        | N/C          | 6.85%        |
| 1989         | 1.79%        | 9.38%        | 3.70%        | N/C          | 5.38%           | N/C          | 0.00%        | 0.46%        | N/C          | 7.58%        |
| 1990         | 7.55%        | 3.13%        | 7.14%        | 0.00%        | 1.41%           | N/C          | 0.00%        | 0.79%        | N/C          | 3.66%        |
| 1991         | 2.33%        | 8.70%        | 5.94%        | 0.00%        | 3.25%           | 0.00%        | 0.00%        | 0.71%        | N/C          | 2.56%        |
| 1992         | 5.00%        | 5.26%        | 0.92%        | 0.00%        | 3.57%           | N/C          | 0.00%        | 0.54%        | N/C          | 3.90%        |
| 1993         | 5.66%        | 0.00%        | 7.09%        | 0.00%        | 5.59%           | N/C          | 0.00%        | 0.57%        | N/C          | 6.33%        |
| 1994         | 5.36%        | 2.94%        | 6.25%        | 9.52%        | 5.88%           | N/C          | 0.00%        | 0.61%        | 0.00%        | 4.65%        |
| 1995         | 5.00%        | 5.00%        | 7.56%        | 11.11%       | 12.14%          | 0.00%        | 0.00%        | 1.95%        | 0.00%        | 7.02%        |
| 1996         | 6.90%        | 13.89%       | 3.67%        | 0.00%        | 8.16%           | N/C          | 16.67%       | 1.02%        | 0.00%        | 7.89%        |
| 1997         | 1.64%        | 11.36%       | 6.93%        | 0.00%        | 4.15%           | N/C          | 0.00%        | 1.61%        | N/C          | 7.41%        |
| 1998         | 0.00%        | 8.16%        | 6.25%        | 4.88%        | 6.73%           | 0.00%        | 0.00%        | 1.78%        | N/C          | 4.17%        |
| 1999         | 3.45%        | 7.14%        | 5.31%        | 3.33%        | 7.62%           | 0.00%        | 0.00%        | 1.15%        | 0.00%        | 6.98%        |
| 2000         | 0.00%        | 17.39%       | 4.81%        | 2.22%        | 4.50%           | 0.00%        | 0.00%        | 1.04%        | N/C          | 2.86%        |
| 2001         | 0.00%        | 0.00%        | 7.29%        | 4.23%        | 7.48%           | 0.00%        | 0.00%        | 2.15%        | N/C          | 4.08%        |
| 2002         | 11.76%       | 21.43%       | 6.03%        | 4.65%        | 9.91%           | 0.00%        | 0.00%        | 3.15%        | N/C          | 8.00%        |
| 2003         | 3.85%        | 15.38%       | 5.26%        | 3.85%        | 11.21%          | 20.00%       | 50.00%       | 2.94%        | N/C          | 9.30%        |
| 2004         | 10.34%       | 13.64%       | 10.09%       | 4.35%        | 13.27%          | N/C          | 0.00%        | 0.44%        | N/C          | 4.76%        |
| Jan-Jun 2005 | 0.00%        | 4.55%        | 3.39%        | 10.71%       | 8.57%           | N/C          | 0.00%        | 5.80%        | N/C          | 0.00%        |
| <b>Total</b> | <b>4.63%</b> | <b>8.03%</b> | <b>5.69%</b> | <b>3.74%</b> | <b>7.35%</b>    | <b>5.26%</b> | <b>2.86%</b> | <b>1.40%</b> | <b>0.00%</b> | <b>5.70%</b> |

(N/C, no cases)

Table 3 reports selected statistics derived from the tribunal dissent frequencies: the dissent frequencies for all Federal Circuit opinions; the dissent frequencies for all Federal Circuit opinions excepting those originating from the Merit Systems Protection Board, and the dissent frequencies for opinions originating from the district courts excepting those in which the district court's jurisdiction was based on a monetary claim against the United States under the Little Tucker Act, 28 U.S.C. 1346(a)(2). Excluding cases brought under the Little Tucker Act restricts the district court cases almost entirely to patent matters, including appeals in civil actions filed to challenge a decision of the Patent and Trademark Office on patentability, priority, or term adjustment.<sup>126</sup>

TABLE 3: SUMMARY DISSENT FREQUENCIES, 1983-2005

<sup>126</sup> See 28 U.S.C. 1295(a)(4)(C) (granting Federal Circuit exclusive jurisdiction over appeals in certain civil actions against the Director of the Patent and Trademark Office under Title 35).

| <b>Year</b>       | <b>All Cases</b> | <b>All Cases No<br/>MSPB</b> | <b>District Court<br/>Patent Cases</b> |
|-------------------|------------------|------------------------------|--|
| 1983              | 6.63%            | 9.95%                        | 8.89%                                  |
| 1984              | 4.19%            | 7.09%                        | 9.17%                                  |
| 1985              | 2.06%            | 4.59%                        | 8.33%                                  |
| 1986              | 1.75%            | 2.54%                        | 2.56%                                  |
| 1987              | 4.00%            | 6.13%                        | 8.11%                                  |
| 1988              | 5.56%            | 6.87%                        | 6.90%                                  |
| 1989              | 3.41%            | 5.29%                        | 5.47%                                  |
| 1990              | 2.63%            | 3.80%                        | 0.72%                                  |
| 1991              | 2.37%            | 3.56%                        | 2.52%                                  |
| 1992              | 1.80%            | 2.97%                        | 3.76%                                  |
| 1993              | 3.50%            | 5.67%                        | 5.84%                                  |
| 1994              | 3.36%            | 5.49%                        | 5.33%                                  |
| 1995              | 5.39%            | 8.58%                        | 11.70%                                 |
| 1996              | 4.16%            | 7.06%                        | 7.81%                                  |
| 1997              | 3.98%            | 5.15%                        | 4.15%                                  |
| 1998              | 4.53%            | 5.81%                        | 6.76%                                  |
| 1999              | 4.44%            | 6.16%                        | 7.62%                                  |
| 2000              | 3.18%            | 4.41%                        | 4.57%                                  |
| 2001              | 4.48%            | 5.71%                        | 7.32%                                  |
| 2002              | 7.27%            | 9.13%                        | 10.14%                                 |
| 2003              | 7.14%            | 9.13%                        | 11.21%                                 |
| 2004              | 7.07%            | 10.19%                       | 12.20%                                 |
| 2005<br>(Jan-Jun) | 6.31%            | 6.57%                        | 8.89%                                  |
| <b>Total</b>      | <b>4.20%</b>     | <b>6.19%</b>                 | <b>7.14%</b>                           |

Excluding the miniscule number of Congressional employee cases, dissent frequencies from the Federal Circuit's inception through mid-2005 ranged from a low of 1.40% for cases originating at the Merit Systems Protection Board, to a high of 8.03% for cases originating at the Court of International Trade. The total dissent frequency for all opinions rendered by the Federal Circuit is 4.20%, as shown in Table 3. The reader should bear in mind that this statistic is weighted by the number of cases resolved by the Circuit, as shown in Table 1. For example, over one-third of the Federal Circuit's cases are appeals on Federal employee matters originating from the Merit Systems Protection Board. Such appeals, usually resolved without oral argument, generate little disagreement. Excluding these cases from the analysis would raise the Federal Circuit's cumulative dissent frequency to 6.19%.

The originating tribunal statistics obscure a great deal of complexity, because classification by originating tribunal is a broad measure. These statistics aggregate all the disparate legal issues that may arise in cases originating from a given tribunal. We may

therefore draw conclusions only about the relative indeterminacy of the entire body of law governing such cases rather than the indeterminacy of particular legal issues. Moreover, because the distribution of legal issues among the cases remains unknown, the dissent frequencies are weighted according to the frequency with which particular issues arise. Finally, each dissent frequency reflects not only the indeterminacy of the substantive law governing cases from each tribunal, but also contributions from procedural and other matters at both the originating tribunal and the Federal Circuit.<sup>127</sup>

Within these limitations, we may represent the dissent frequencies of Table 2 as relative indeterminacy ratios,  $I_x/I_y$ , by choosing one of the legal regimes as the comparator  $I_y$ . The choice of comparator is arbitrary; Table 4 reports the indeterminacy ratios using for  $I_y$  either the Federal Circuit's total aggregate dissent frequency, or the dissent frequency in patent cases from the district courts.

TABLE 4: FEDERAL CIRCUIT INDETERMINACY RATIOS, 1983-2005

| <b>Originating Tribunal</b> | <b>Normalized to all cases</b> | <b>Normalized to District Court patent cases</b> |
|-----------------------------|--------------------------------|--|
| BCA                         | 1.10                           | 0.65   |
| CIT                         | 1.91                           | 1.12   |
| CFC                         | 1.35                           | 0.80   |
| CAVC                        | 0.89                           | 0.52   |
| District Courts             | 1.75                           | 1.03   |
| District Court Patent       | 1.70                           | (1.00)   |
| DVA                         | 1.25                           | 0.74   |
| ITC                         | 0.68                           | 0.40   |
| MSPB                        | 0.33                           | 0.20   |
| PTO                         | 1.36                           | 0.80   |
| All Cases                   | (1.00)                         | 0.59   |
| All Cases No MSPB           | 1.47                           | 0.87   |

The indeterminacy ratios vary over an approximately six-fold range, from the low of MSPB cases to the high of the CIT cases, or approximately four-fold if we exclude the

<sup>127</sup> For example, these statistics include opinions and dissents arising from motion practice before the Federal Circuit.

MSPB cases and define the ITC cases at the bottom of the range. Based on the indeterminacy ration, the indeterminacy of patent infringement actions appears approximately equal to that of cases appealed from the Court of International Trade; slightly greater than that of appeals originating from the Patent and Trademark Office, Court of Federal Claims, and Department of Veterans Affairs; somewhat greater than appeals from the Court of Appeals for Veterans Claims and the International Trade Commission; and notably greater than appeals from the Merit System Protection Board.

A basic statistical analysis (the chi-squared test) of the distribution of dissent frequencies showed that the distribution of dissents was highly non-random, both over time<sup>128</sup> and between the originating tribunals.<sup>129</sup> We may therefore conclude confidently that the frequency of dissent in Federal Circuit opinions depends on the originating tribunal, and the year in which the court decided the appeal. However, this basic test tells us only that the overall distribution of dissents differs from that expected by chance; it does not tell us which tribunal or which years are responsible for that difference.

To assess the contribution of tribunal and year to the observed dissent frequencies, more complex statistical techniques are required. Logistic regression (an analogue of linear regression) may be used to model processes in which several underlying variables contribute to the probability of a dichotomous outcome<sup>130</sup>, and has been frequently employed to analyze the influence of case or judge characteristics on the probability of dissent.<sup>131</sup> I modeled dissent at the Federal Circuit as a process in which the probability of dissent is influenced by two independent factors: a time-independent parameter representing the originating tribunal, and a time-dependent parameter which takes on the value of each year of this study.<sup>132</sup> Omitted from the analysis are opinions originating from the Department of Veterans Affairs, the International Trade Commission, and the Senate Select Committee, on account of the small number of cases originating from these tribunals.

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<sup>128</sup> Pearson's moment 107.0,  $p < 0.0001$ .

<sup>129</sup> Pearson's moment 263.7,  $p < 0.0001$

<sup>130</sup> I.e., where the outcome is described as a binary choice (dissent/unanimous; alive/dead ; etc.) rather than a continuous measurement (such as height or weight).

<sup>131</sup> See, e.g., Isaac Unah, *The Incidence and Structure of Conflict on the U.S. Court of Appeals for the Federal Circuit*, 23 *Law & Policy* 69, 85-86 (2001); Hettinger at 83-84.

<sup>132</sup> Both parameters are nominal, meaning that there is no order or relationship between values of each parameter. "2004" is simply a category of cases and has no particular relationship with "2003" or "2005" or any other year.

A model incorporating tribunal and year as contributors to the probability of dissent fit the data well, was superior in fit to a model based on tribunal alone or year alone, and the effect of both tribunal and year was significant in the model.<sup>133</sup> The estimates for each parameter in the model are shown in Table 5, along with the p-value for the Wald chi-squared statistic for each parameter.

TABLE 5: TWO-VARIABLE LOGISTIC REGRESSION MODEL OF FEDERAL CIRCUIT DISSENT FREQUENCIES

| Term                 | Parameter Estimate | p-value (Wald chi-squared) |
|----------------------|--------------------|----------------------------|
| Tribunal[BCA]        | 0.03               | 0.8574                     |
| Tribunal[CAVC]       | -0.29              | 0.1249                     |
| Tribunal[CFC]        | 0.21               | 0.0299*                    |
| Tribunal[CIT]        | 0.55               | < 0.0001*                  |
| Tribunal[DCt Patent] | 0.43               | < 0.0001*                  |
| Tribunal[MSPB]       | -1.18              | <0.0001*                   |
| Tribunal[PTO]        | 0.26               | 0.0352*                    |
| Year[1983]           | 0.62               | 0.0079*                    |
| Year[1984]           | 0.18               | 0.3855                     |
| Year[1985]           | -0.50              | 0.0346*                    |
| Year[1986]           | -0.60              | 0.0113*                    |
| Year[1987]           | 0.06               | 0.7941                     |
| Year[1988]           | 0.28               | 0.1359                     |
| Year[1989]           | -0.21              | 0.3535                     |
| Year[1990]           | -0.47              | 0.0337*                    |
| Year[1991]           | -0.51              | 0.0244*                    |
| Year[1992]           | -0.73              | 0.0017*                    |
| Year[1993]           | -0.11              | 0.5447                     |
| Year[1994]           | -0.15              | 0.4526                     |
| Year[1995]           | 0.39               | 0.0143*                    |
| Year[1996]           | 0.08               | 0.6707                     |
| Year[1997]           | -0.10              | 0.5710                     |
| Year[1998]           | 0.02               | 0.8960                     |
| Year[1999]           | 0.05               | 0.7966                     |
| Year[2000]           | -0.26              | 0.1823                     |

<sup>133</sup> For the model incorporating both tribunal and year, the whole-model chi-squared value was 357.0 ( $p < 0.0001$ ), and the chi-squared lack of fit test yielded  $p = 0.76$ . Models including tribunal alone or year alone yielded lack-of-fit chi squared values with  $p = 0.48$  and  $0.45$ , respectively. The increase in significance level for the single-factor models indicates that the goodness of fit was superior for the two-factor model. For the two-factor model, the chi-squared effect test statistics for tribunal and year were 247.1 ( $p < 0.0001$ ) and 80.6 ( $p < 0.0001$ ) respectively. In a model including a second-order term representing the interaction of tribunal and year, the effect of the second-order term on the model was not significant ( $p = 0.41$ ).

|            |      |         |
|------------|------|---------|
| Year[2001] | 0.06 | 0.7082  |
| Year[2002] | 0.53 | 0.0006* |
| Year[2003] | 0.48 | 0.0019* |
| Year[2004] | 0.51 | 0.0012* |
| Year[2005] | 0.38 | 0.0696  |

The precise interpretation of parameter estimates from logistic regressions is complex. For our purposes, it suffices to note that (1) the parameter estimate is related logarithmically to the change in outcome odds, and (2) the change in odds is relative to the mean dissent frequency for all observations, in this case the overall dissent frequency of 4.21% for the tribunals modeled. A positive parameter estimate indicates that this parameter is associated with increased odds of dissent relative to the mean, and a negative parameter is associated with decreased odds of dissent relative to the mean. Statistically significant parameters indicate that it is unlikely that the observed frequencies are a result of chance rather than an effect of the parameter on the probability of dissent.

The regression model yielded positive and significant parameters for the Court of Federal Claims, the Court of International Trade, the district courts, and the Patent and Trademark Office, indicating that origin of a case from these tribunals significantly increases the probability of dissent relative to the mean. In contrast, the negative and significant parameter associated with appeals originating from the Merit Systems Protection Board demonstrates that such origin significantly decreases the likelihood of dissent relative to the mean.

To compare specifically the likelihood of dissent in patent cases with other cases, we may perform pairwise contrast tests of the logistic regression model. These tests predict according to the regression model the change in the odds of dissent if we change the originating tribunal from one category to another. Table 6 compares the odds of dissent if the case is a patent case originating from the district courts, with the odds of dissent if the case originated from each of the other tribunals, and reports the significance of these odds ratios.

**TABLE 6: RATIOS OF DISSENT ODDS IN PATENT INFRINGEMENT CASES TO DISSENT ODDS IN OTHER CASES, 1983-2005**

|                | <b>BCA</b> | <b>CAVC</b> | <b>CFC</b> | <b>CIT</b> | <b>PTO</b> | <b>MSPB</b> |
|----------------|------------|-------------|------------|------------|------------|-------------|
| Pairwise Logit | 0.40       | 0.72        | 0.22       | -0.12      | 0.17       | 1.61        |

|                             |             |             |             |             |             |             |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Contrast                    |             |             |             |             |             |             |
| <b>Predicted Odds Ratio</b> | <b>1.50</b> | <b>2.06</b> | <b>1.25</b> | <b>0.89</b> | <b>1.18</b> | <b>5.02</b> |
| p-value                     | 0.0169*     | 0.0007*     | 0.0440*     | 0.4336      | 0.2366      | <0.0001*    |

The odds ratio shows the logistic model's prediction for the change in odds if the case changes from the indicated tribunal to a patent case from the district courts. Thus, the model predicts that the odds of dissent are 5.02 times greater in a patent case than in a MSPB cases, 2.06 times greater in a patent case than in a CAVC case, etc. The odds ratios predicted by logistic regression correspond closely with those determined simply from the ratios of the observed dissent frequencies,<sup>134</sup> reflecting the close fit of the model to the observed data. More usefully, the significance levels associated with each ratio permit us to draw firm conclusions about the indeterminacy of patent cases compared to the indeterminacy of other cases resolved by the Federal Circuit. Appeals of patent infringement actions are significantly more indeterminate than those originating from the Boards of Contract Appeals, the Court of Appeals for Veterans Claims, the Court of Federal Claims, or the Merit Systems Protection Board. We cannot state whether patent infringement cases differ in indeterminacy from those originating from the Court of International Trade or the Patent and Trademark Office.

Returning to the parameters derived from the logistic regression model, Table 5 shows that the years 1983, 1995, and 2002-2004, and (marginally) 2005 were associated with probabilities of dissent increased relative to the mean, while 1985-1986 and 1990-1992 were associated with decreased probabilities of dissent. This analysis cannot resolve whether the time-dependent changes in the probability of dissent resulted from changes in the indeterminacy of cases decided by the Federal Circuit, or changes in the structural variables that suppress or provoke dissent at the court. Dissent frequencies rose across several categories of cases commencing in 2002, as shown in Table 2. This coordinated increase might indicate that Circuit-wide norms restraining the expression of dissent began to deteriorate in 2002, i.e. that the Federal Circuit's structural parameter  $S_c$  began to increase at that time. But it is also possible that the increase in dissent reflects

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<sup>134</sup> The reciprocal of the odds ratios are: 0.67 (BCA); 0.49 (CAVC); 0.80 (CFC); 1.13 (CIT); 0.85 (PTO); 0.20 (MSPB). These correspond closely to the tribunal dissent frequencies normalized to the district court dissent frequency shown in Table 4.

not changes in structural parameters but coincident increases in indeterminacy across several categories of cases.

*Reversal and Dissent*

Studies of the Circuit Courts of Appeal report a strong association between reversal of the district court and dissent on the appellate court.<sup>135</sup> This association has been ascribed to the effect of legal indeterminacy, because both trial and appellate judges are observers of the case who may disagree when legal principles only weakly constrain outcomes.<sup>136</sup> Although this study did not measure the frequency of dissent with respect to individual case reversals or affirmances, we may compare the rates of Federal Circuit dissent and Federal Circuit reversal between tribunals to gauge the overall correlation between reversal and dissent. I derived tribunal reversal rates, for a period nearly coincident with this study, from data compiled by the Administrative Office of the U.S. Courts.<sup>137</sup> Table 7 shows the comparative reversal and dissent proportions, and the number of dissents per reversal, for the tribunals having significant numbers of dissents and reversals,<sup>138</sup> as well as the total for all tribunals reviewed by the Federal Circuit.

TABLE 7: COMPARATIVE REVERSAL AND DISSSENT RATES BY TRIBUNAL, 1997-2005

|                            | BCA   | CIT   | CFC   | CAVC  | District Courts | MSPB | PTO   | All Tribunals |
|----------------------------|-------|-------|-------|-------|-----------------|------|-------|---------------|
| Reversals<br>FY1997-FY2005 | 13.9% | 22.1% | 20.8% | 14.1% | 17.2%           | 5.8% | 11.4% | 13.8%         |

<sup>135</sup> Richardson and Vines, *The Politics of Federal Courts*(1970), at 136-35; Hettinger et al (2006), 66-71.

<sup>136</sup> Hettinger et al, at 59.

<sup>137</sup> *Judicial Business*, Report of the Director, Administrative Office of the U.S. Courts. (available at <http://www.uscourts.gov/judbususc/judbus.html>). The Administrative Office reports in Table B-8 of each report the number of appeals terminated by judges (versus by staff) and the percentage of cases reversed by tribunal for each fiscal year. The number of cases for each tribunal reversed for each year was derived from the number of the appeals and the reversal rate, and summed from fiscal year 1997 to fiscal year 2005 to determine the reversal rate over that period. Because the statistics are reported by fiscal year, the dataset defined by the Administrative Office reports covers an additional three months both prior and following the portion of this study used for comparison (October 1, 1996 - December 31, 1996 and July 1, 2005 - September 30, 2005). It seems unlikely that inclusion of this period would yield reversal rates significantly different from those computed for January 1, 1997 to June 30, 2005.

<sup>138</sup> The standard errors computed for each proportion and ratio in Table 7 were:

|           | BCA   | CIT   | CFC   | CAVC  | District Courts | MSPB  | PTO   | All tribunals |
|-----------|-------|-------|-------|-------|-----------------|-------|-------|---------------|
| Dissents  | 1.11% | 1.74% | 0.80% | 0.92% | 0.63%           | 0.31% | 1.23% | 0.28%         |
| Reversals | 1.92% | 1.80% | 1.15% | 1.13% | 0.69%           | 0.44% | 1.48% | 0.36%         |
| Ratio     | 0.09  | 0.09  | 0.04  | 0.07  | 0.04            | 0.06  | 0.13  | 0.02          |

Errors of the reversal and dissent proportions are reported as percentages because Table 7 reports those proportions as percentages; they do not represent error as a percentage of the values reported in Table 7. These errors are not corrected for the correlation between dissent and reversal, which would reduce the magnitude of the standard errors.

|                                |             |             |             |             |             |             |             |             |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Dissents 1997-2005             | 3.6%        | 10.9%       | 6.3%        | 4.0%        | 8.1%        | 2.0%        | 5.8%        | 5.3%        |
| <b>Dissents:<br/>Reversals</b> | <b>0.26</b> | <b>0.49</b> | <b>0.30</b> | <b>0.28</b> | <b>0.47</b> | <b>0.35</b> | <b>0.51</b> | <b>0.39</b> |

Because the dataset of this study and the dataset maintained by the Administrative Office were not compiled with identical inclusion criteria, the absolute value of the ratio of dissents to reversals for a particular tribunal has little meaning.<sup>139</sup> Comparisons *between* tribunals are meaningful, because the methodology of both datasets is constant over the set of tribunals. A relatively low ratio of dissents to reversals marks categories of cases that the appellate court considered "easy," in the sense that they did not provoke disagreement within the court, but where the originating tribunal more frequently reached the wrong conclusion (at least according to the Federal Circuit). Higher ratios mark regimes in which issues provoking disagreement between the Federal Circuit and the originating tribunal also provoked disagreement within the appellate court.

Legal indeterminacy ought to increase both disagreement between the originating tribunal and the Federal Circuit, and between the judges of the Federal Circuit. Therefore, variations in indeterminacy between each legal regime represented in Table 7 will increase or decrease the percentage of reversals and dissents, but should not affect the ratio of dissents to reversals. If the effect of legal indeterminacy on dissents and reversals is constant within each regime, we would expect more disagreement between the originating tribunal and the appellate panel either where the policy preferences of the appellate judges differ from those of the originating tribunal, or where the two bodies differ in their ability to discern the "correct" outcome of the case. We would thus expect a high ratio of dissents to reversals where the viewpoint or capability of the originating tribunal approaches that of the Federal Circuit, and low ratios where the viewpoint or capability of the originating tribunal diverges from that of the Federal Circuit.

Table 7 shows that rates of reversal and dissent are well-correlated.<sup>140</sup> Although the rates of reversal and dissent vary over a 4- to 5-fold range, with a low at the Merit

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<sup>139</sup> Nonetheless, the ratio across all tribunals from 1997-2005, 0.39, is similar to that derived from the database of all the cases of the regional Circuit Courts of Appeal described in Songer et al (2000). For 1970-1988, the last time period of the database, Songer et al. report a dissent rate of 9.43%, and a reversal rate of 30.83%. Songer et al., *Continuity and Change on the United States Courts of Appeals* (2000), at 105. The ratio computed from these rates is 0.31. Discrepancies between the Songer et al. dataset (which was limited to reported decisions) and the datasets of this study, and of the Administrative Office, counsel against drawing conclusions from this comparison.

<sup>140</sup> Pearson's  $r = 0.82$ ;  $p < 0.05$ .

Systems Protection Board and a high at the Court of International Trade, the ratio of dissent to reversal remains relatively constant, varying over only a 2-fold range. This correlation suggests that the originating and appellate tribunals have broadly similar policy preferences and competencies, and variation in dissent rates and reversal rates between tribunals tracks variations in the indeterminacy of the law.

The high correlation between reversal and dissents means that the differences in the dissent to reversal ratio between tribunals are not especially significant. Moreover, over a short time interval, the ratio for any one tribunal will be significantly depressed if the Federal Circuit announces a new precedent which triggers many reversals in its immediate wake. Nonetheless, it is worth noting that the district courts score high, indicating a relatively good correspondence between preferences or capabilities of the district courts and those of the Federal Circuit. The district courts' ratio is exceeded, marginally, by the Patent and Trademark Office and the Court of International Trade, but is otherwise higher than the other specialized tribunals reviewed by the Federal Circuit. Statistical comparison of the district courts' dissent: reversal ratio to those of the other tribunals showed that the ratio computed for the district courts is significantly higher than that computed for the BCA, CFC, CAVC and (marginally) the MSPB, but not significantly different from the other tribunals.<sup>141</sup>

## V. INDETERMINACY IN PATENT LITIGATION

### *Indeterminacy of Patent Cases in General*

Classifying cases by originating tribunal facilitates comparison between regimes, but it obscures more than might be supposed. The opinions contain not only opinions resolving substantive or procedural issues in an appeal, but also miscellaneous orders and opinions related to Federal Circuit appellate practice and jurisdiction, as well as petitions for rehearing or the issuance of writs. If we are interested in the indeterminacy of the underlying body of law governing case outcomes, we must restrict our consideration to those opinions addressing outcomes. To do so, we must obtain a dataset consisting only of patent cases at the Federal Circuit originating in the district courts. This category is

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<sup>141</sup> A z-score for the difference in ratios between the district courts and each other tribunal was computed from the standard errors of the ratios. The z-scores were 2.23\* (BCA), -0.20 (CFC), 2.95\* (CFC), 2.33\* (CAVC), 1.68 (MSPB) and -0.30 (PTO). The difference between the district court ratio and the MSPB ratio became significant if the standard errors of the ratios was corrected for the correlation between dissents and reversals.

comprised almost entirely of actions for patent infringement, or for declaratory judgment of noninfringement.<sup>142</sup> The initial dataset comprised all published and unpublished decisions of the Federal Circuit for the period extending from January 1st, 1983, to June 30th, 2005. *En banc* cases and summary affirmances were excluded. To more specifically assess the degree to which the legal regime constrains decision-making in patent cases, opinions devoted solely to petitions were also excluded from the dataset.<sup>143</sup> Like other federal appellate courts,<sup>144</sup> the Federal Circuit operates at its own discretion in granting petitions,<sup>145</sup> and these opinions do not provide an opportunity to assess the constraining effect of statute or precedent.

To accurately determine the number of appeals in patent actions originating in the district courts,<sup>146</sup> I employed an iterative textual screen of the LEXIS Federal Circuit databases, filtering the results with various search parameters and manually reviewing the included and excluded cases to correct for textual anomalies and database encoding errors.<sup>147</sup> The final dataset comprised 2,364 opinions resolving patent infringement appeals for the period extending from 1983 through the first six months of 2005. I then employed a similar strategy to recover all opinions in the dataset containing a dissenting

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<sup>142</sup> A very small number of cases are appeals from litigants challenging a decision of the Patent and Trademark Office by means of a civil action under 35 U.S.C §§ 145, 146, or 154(b)(4)(A).

<sup>143</sup> This category includes primarily petitions for panel rehearing and rehearing *en banc*, with a small number of petitions for a writ of mandamus and a smaller number of miscellaneous petitions. It includes the relatively small number of issued opinions that address motions made before the Federal Circuit. Some of these opinions address procedural issues (e.g., motions to dismiss an appeal for lack of a final judgment), while others deal with matters of Federal Circuit practice (e.g., motions to strike a portion of an opponent's brief for failure to comply with Federal Circuit rules).

<sup>144</sup> See, e.g., *In re Chevron U.S.A., Inc.*, 121 F.3d 163 (5th Cir. 1997).

<sup>145</sup> *In re United States*, \_\_\_ F.3d \_\_\_ (Fed. Cir. Sep. 11, 2006) (writ of mandamus).

<sup>146</sup> Included in this category are cases originating in a district court but arriving again at the Federal Circuit on remand from the Supreme Court. Excluded are district court cases that do not represent patent infringement actions, such as money claims against the United States brought under the Little Tucker Act.

<sup>147</sup> I began by searching the LEXIS CAFC database with the search terms "POSTURE (court /5 district) or HISTORY (court /5 district)" and appropriate date restrictions to define a preliminary of district court cases (4,084 opinions for all years). I then filtered this set with the search term "patent" to exclude cases definitively having no connection to patent law (2,744 opinions). From this set, I defined a preliminary subsets of opinions resolving patent cases by excluding petitions ("not(DISPOSITION(petition) or DISPOSITION(rehearing))"; 2,587 opinions) and further requiring the word "patent" in the LEXIS CORE-TERM field ("core-terms(patent)"; 2,261 opinions). From this set I subtracted *en banc* cases according to the date-specific four-judge exclusion method described in Part IV (2,240 opinions). I then, by manual review of the included and excluded opinions at each filtering step, corrected this dataset for the following errors and ambiguities in the LEXIS fields: opinions with "petition" or "rehearing" in the DISPOSITION field not actually addressing petitions; opinions lacking "petition" or "rehearing" in the DISPOSITION field but solely addressing a petition; patent infringement appeals lacking the word "patent" in the CORE-TERMS field, and appeals originating from a district court but failing the POSTURE or HISTORY criteria described above. The great majority of such anomalies were opinions in patent appeals where the LEXIS CORE-TERMS field failed to include the word "patent."

opinion,<sup>148</sup> yielding a final total of 250 panel dissents. The incidence of dissent in all appeals of patent infringement actions originating in the district courts and resolved by three-judge panels of the Federal Circuit is shown in Table 8.

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<sup>148</sup> Because of inconsistencies in the LEXIS databases, I defined separate, overlapping subsets of dissenting opinions by limiting the dataset to opinions with the word root "dissent" in the JUDGES field ("JUDGES("dissent!")), and by limiting the dataset to opinions with any judge who has served on the Federal Circuit in the DISSENTBY field. I then corrected the small number of instances where dissenting opinions were not coded in either the JUDGES or DISSENTBY field, by manually reviewing each case that failed the above criteria but nonetheless contained the word root "dissent" in the opinion text ("dissent!").

TABLE 8: DISSENT FREQUENCIES IN PATENT INFRINGEMENT ACTIONS,  
1983-2005

| Year               | Appeals of Patent Infringement Actions | Dissents | Dissent Frequency |
|--------------------|--|----------|-------------------|
| 1983               | 37                                     | 4        | 10.81%            |
| 1984               | 89                                     | 9        | 10.11%            |
| 1985               | 65                                     | 9        | 13.85%            |
| 1986               | 68                                     | 3        | 4.41%             |
| 1987               | 64                                     | 8        | 12.50%            |
| 1988               | 62                                     | 9        | 14.52%            |
| 1989               | 55                                     | 7        | 12.73%            |
| 1990               | 68                                     | 1        | 1.47% *           |
| 1991               | 80                                     | 3        | 3.75% *           |
| 1992               | 75                                     | 5        | 6.67%             |
| 1993               | 84                                     | 9        | 10.71%            |
| 1994               | 79                                     | 6        | 7.59%             |
| 1995               | 103                                    | 19       | 18.45% *          |
| 1996               | 128                                    | 14       | 10.94%            |
| 1997               | 138                                    | 8        | 5.80%             |
| 1998               | 133                                    | 12       | 9.02%             |
| 1999               | 146                                    | 14       | 9.59%             |
| 2000               | 142                                    | 10       | 7.04%             |
| 2001               | 177                                    | 17       | 9.60%             |
| 2002               | 155                                    | 20       | 12.90%            |
| 2003               | 163                                    | 25       | 15.34% *          |
| 2004               | 151                                    | 28       | 18.54% *          |
| 2005<br>(Jan- Jun) | 101                                    | 10       | 9.90%             |
| TOTAL              | 2363                                   | 250      | 10.58%            |

Logistic regression analysis<sup>149</sup>, as described above for the analysis of tribunal data, but with a single independent variable representing year, suggested that the decreased dissent frequencies observed in 1990 and 1991, and the increased dissent frequencies observed in 1995, 2003 and 2004, were statistically significant differences from the mean dissent frequency.<sup>150</sup> These minima and maxima are suggestive of fluctuations in the indeterminacy of the substantive legal regime governing patent cases, but as with the

<sup>149</sup> Whole model difference chi-squared 47.13, p = 0.0014; lack-of-fit chi square 2363.00, p = 0.3651.

<sup>150</sup> Parameter estimates and associated significance levels were for 1990: -1.92, p = 0.0045; 1992: -0.95, p = 0.05; 1995: 0.80, p = 0.0039; 2003: 0.58, p = 0.0146; 2004: 0.81, p = 0.0005.

comparison of tribunal dissent frequencies, this analysis cannot resolve fluctuations in legal indeterminacy from fluctuations in Circuit-wide norms of dissent.

The dissent frequencies reported in Table 5 provide a more accurate measure of the incidence of dissent in patent cases than do the statistics of Tables 1 to 4, because the filtration process limits the dataset to opinions actually resolving disputed patent cases. These statistics are nonetheless still crude: they reflect a weighted aggregate of all substantive, procedural, and non-patent issues arising in patent litigation, and we lack an appropriate comparator to assess the relative indeterminacy of the patent litigation regime to another legal regime. To overcome these limitations, we must disaggregate the issues presented in patent litigation and determine to what extent the legal regime constrains their decision.

#### *Indeterminacy of Claim Construction and Other Patent Issues*

To accurately assess the indeterminacy of the legal issues governing patent appeals, we must define "legal issue" at a level below that of the individual case. Following the approach of Chu,<sup>151</sup> the following five groupings of legal issues that appear in patent infringement cases were defined: claim construction, infringement, invalidity,<sup>152</sup> inequitable conduct, and all other issues. The last category, "other," is a catch-all category including not only patent issues other than the listed categories, but also issues of procedure and jurisdiction, as well as any non-patent substantive issue appearing in a patent case.<sup>153</sup>

The relative indeterminacy of particular patent law issues in the interval between *Cybor* and *Phillips* was assessed by examining every reported and unreported opinion of the Federal Circuit, in patent appeals originating at the district courts, from 1998 through the first six months of 2005, that contained a dissenting opinion. Each opinion was scored according to the issue or combination of issues addressed by the dissenting opinion. The results are shown in Table 9.<sup>154</sup>

TABLE 9: DISSENTS BY ISSUE IN PATENT CASES, 1998-2005

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<sup>151</sup> Christian A. Chu, Empirical Analysis of the Federal Circuit's Claim Construction Trends, 16 Berk. Tech. L. J. 1075, 1137-38 (2001).

<sup>152</sup> Included within this category are any decisions assessing the validity of a patent against the statutory requirements for patentability, as well as judge-made doctrines such as certain forms of double patenting.

<sup>153</sup> E.g., antitrust, contract, and trademark or copyright infringement claims.

<sup>154</sup> Some dissenting opinions disagree with the majority on more than one issue; hence, the number of dissents on each issue combined exceeds the total number of dissenting opinions

| Year             | Dissents addressing claim construction | Dissents addressing infringement | Dissents addressing invalidity | Dissents addressing inequitable conduct | Dissents addressing other issues | Total Dissents |
|------------------|--|----------------------------------|--------------------------------|---|----------------------------------|----------------|
| 1998             | 1                                      | 4                                | 2                              | 2                                       | 8                                | 12             |
| 1999             | 4                                      | 6                                | 1                              | 0                                       | 7                                | 14             |
| 2000             | 4                                      | 3                                | 2                              | 1                                       | 3                                | 10             |
| 2001             | 7                                      | 4                                | 5                              | 1                                       | 9                                | 17             |
| 2002             | 6                                      | 3                                | 10                             | 1                                       | 6                                | 20             |
| 2003             | 9                                      | 8                                | 5                              | 2                                       | 10                               | 25             |
| 2004             | 16                                     | 10                               | 4                              | 1                                       | 8                                | 28             |
| 2005 (Jan - Jun) | 4                                      | 0                                | 1                              | 0                                       | 6                                | 10             |
|                  |  |                                  |                                |   |                                  |                |
| Total            | 51                                     | 38                               | 30                             | 8                                       | 57                               | 136            |

To derive issue dissent frequencies from the dissent counts, it is necessary to estimate the number of cases in the dataset in which the tabulated issues were presented. Without this denominator, issue dissent frequencies would be skewed by the frequency with which the issues appeared in the cases. I determined the number of opinions addressing claim construction in the district court patent case dataset by a combination of text-based search and manual review of the entire dataset.<sup>155</sup> For the remaining categories, I obtained the frequency of issues in Federal Circuit appeals from the earlier study of Chu<sup>156</sup> and by manual review of a sample of the dataset.<sup>157</sup> The frequencies with

<sup>155</sup> I screened the district court dataset with the search "claim! w/5 (construction or construing or construe! or interpret!)" to obtain an initial dataset of 755 total cases. I then manually reviewed the resulting opinions to determine whether the opinion (majority, concurring, or dissenting) addressed any issue requiring the court to determine the scope of a patent's claim. Opinions were classified as addressing claim construction if the court considered the merits of the claim construction from the lower court. Included in this category are considerations of whether the district court's claim construction was sufficiently thorough, questions of compliance with § 112, p. 2 if determination required the court to interpret the claim language, classification and construction of claims drawn according to § 112, p. 6, and opinions addressing the effect of prosecution history estoppel if determination required the court to interpret the claim language. Opinions were not considered to address claim construction if the appellate court merely noted that the issue of claim construction was moot or waived, or if the court otherwise declined to address the lower court's claim construction. These criteria are significantly broader than that employed by Wagner and Petherbridge (Penn L. Rev), who scored an opinion only if the discussion of claim interpretation was sufficiently comprehensive to be classified according to the methodologies of claim construction proposed in their paper. Wagner and Petherbridge report 513 opinions for the period of this study, as compared to the 614 recovered by the broader criteria.

<sup>156</sup> Chu, 16 BERKTLJ 1075 (2001) Table G-1.

<sup>157</sup> Data for 1998 and 1999 were taken directly from the set of all Federal Circuit opinions compiled by Chu, *id.* For 2000 through June 2005, I generated a random sample of reported and unreported opinions from the dataset and reviewed each case in the sample to determine which issues it addressed. The sample size was 50 cases for 2000-2004, and 40 cases for the first six months of 2005. Because claim construction was scored both in the review of the entire dataset, and in the review of the samples, we may assess the precision of sampling by comparing the actual number of claim construction cases and the number estimated from the sampling. For the period 2000-2005, the distribution by year of actual and estimated

which issues were addressed in reported and unreported patent opinions of the Federal Circuit are shown in Table 10.

TABLE 10: PATENT ISSUE INCIDENCE FREQUENCIES, 1998-2005

|                | Claim construction | Infringement | Invalidity | Inequitable conduct | Other |
|----------------|--------------------|--------------|------------|---------------------|-------|
| 1998           | 52%                | 50%          | 31%        | 10%                 | 58%   |
| 1999           | 49%                | 54%          | 36%        | 10%                 | 49%   |
| 2000           | 51%                | 50%          | 28%        | 6%                  | 50%   |
| 2001           | 57%                | 32%          | 42%        | 8%                  | 50%   |
| 2002           | 52%                | 38%          | 34%        | 6%                  | 56%   |
| 2003           | 63%                | 58%          | 34%        | 10%                 | 42%   |
| 2004           | 54%                | 36%          | 26%        | 6%                  | 60%   |
| 2005 (Jan-Jun) | 34%                | 23%          | 33%        | 10%                 | 65%   |
| 1998-2005      | 51%                | 46%          | 33%        | 9%                  | 53%   |

From the incidence of dissent on each issue, and the frequency with which each issue was addressed in Federal Circuit decisions, I determined the frequency with which each issue provoked dissent in reported and unreported opinions of the Federal Circuit for each year of this study. I then compared the dissent frequency associated with each issue to the dissent frequency associated with claim construction to obtain  $I_x/I_{interp}$ , the relative indeterminacy of each issue as compared to the indeterminacy of claim construction.

Table 11 shows the results.

TABLE 11: PATENT ISSUE DISSENT FREQUENCIES, 1998-2005

|            | Claim construction | Infringement | Invalidity | Inequitable conduct | Other |
|------------|--------------------|--------------|------------|---------------------|-------|
| 1998       | 1.4%               | 6.0%         | 4.8%       | 15.6%               | 10.4% |
| 1999       | 5.6%               | 7.6%         | 1.9%       | 0.0%                | 9.8%  |
| 2000       | 5.5%               | 4.2%         | 5.0%       | 11.7%               | 4.2%  |
| 2001       | 6.9%               | 7.1%         | 6.7%       | 7.1%                | 10.2% |
| 2002       | 7.5%               | 5.1%         | 19.0%*     | 10.8%               | 6.9%  |
| 2003       | 8.7%               | 8.5%         | 9.0%       | 12.3%               | 14.6% |
| 2004       | 19.5%*             | 18.4%*       | 10.2%      | 11.0%               | 8.8%  |
| 2005 (J-J) | 11.8%              | 0.0%         | 3.0%       | 0.0%                | 9.1%  |
| Total      | 8.3%               | 7.5%         | 7.7%       | 8.5%                | 9.2%  |

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claim constructed cases corresponded closely. A two-sample chi-squared test did not support the hypothesis that the distributions were different (chi-squared = 6.0; p = 0.55).

|                  |               |             |             |             |             |
|------------------|---------------|-------------|-------------|-------------|-------------|
| $I_x/I_{interp}$ | <b>(1.00)</b> | <b>0.91</b> | <b>0.93</b> | <b>1.02</b> | <b>1.11</b> |
|------------------|---------------|-------------|-------------|-------------|-------------|

Table 11 shows that, over the period extending from January of 1998 through June of 2005, claim construction provoked dissent at the Federal Circuit at a frequency nearly identical to infringement, invalidity, inequitable conduct, or other issues: the value of  $I_x/I_{interp}$  is very nearly 1 for each of the issues examined. The differences observed between total issue dissent frequencies were not at all statistically significant.<sup>158</sup> In other words, there is no support for the hypothesis that, over the entire period of this study, claim construction was any more or less indeterminate than any other issue of patent law. Admittedly, the resolution of this analysis is not precise: groupings such as "invalidity" or "other" mask many different sub-issues of undoubtedly varying determinacy. Furthermore, the frequency of dissent on claim construction should show some degree of correlation with the frequency of dissent on infringement and invalidity issues, because patent infringement and patent validity both depend on the scope of the patent's claims.<sup>159</sup> Nonetheless, within the bounds of these issue definitions, the data presented here provide for the first time an accurate measure of the indeterminacy of the legal regime governing patent infringement litigation. These data suggest that between 1998 and 2005, the general categories of legal issues resolved by the Federal Circuit in patent litigation have been characterized by approximately the same degree of legal indeterminacy.

That said, the data may support the hypothesis that dissent frequencies at the Federal Circuit have changed over time within the period of this study. The distribution of dissent frequencies for claim construction and invalidity over time differs significantly from that expected by chance, and differs marginally significantly for infringement.<sup>160</sup> For inequitable conduct and other issues, the hypothesis that the distribution over time differed from that expected by chance was not supported. To explore the possibility that the significant fluctuations in dissent frequencies over time reflected a real change in the

<sup>158</sup> A two-sample chi-squared test yielded  $p = 0.87$ .

<sup>159</sup> Not all determinations of infringement or invalidity involve disputes over claim construction. There may be no disagreement about the scope of the claims, or the resolution of an invalidity issue may be the same regardless of which party's claim construction argument prevails.

<sup>160</sup> Chi-squared values by Pearson's moment test were claim construction: 18.9,  $p = 0.008$ ; infringement: 13.2,  $p = 0.07$ ; invalidity: 14.1,  $p = 0.05$ ; inequitable conduct: 3.6,  $p = 0.82$ ; other issues: 5.4,  $p = 0.61$ .

probability of dissent, I constructed for each issue independent<sup>161</sup> logistic regression models of dissent as a function of a single nominal variable, representing a parameter specific to each year. The models showed statistically significant, positive effects on the odds of dissent relative to the mean for 2002 with respect to invalidity,<sup>162</sup> and for 2004 with respect to claim construction<sup>163</sup> and infringement.<sup>164</sup> For claim construction (but not other issues), the data also fit a model in which the odds of dissent increased modestly, but significantly, for each year from 1998 to 2005;<sup>165</sup> these results are consistent with outcome-based studies suggesting increasing disparity in the Federal Circuit's claim construction methodology over time.<sup>166</sup> Because time-dependent increases in dissent probability appear for some issues but not others, the data may suggest that the increases in dissent observed for 2002 and 2004 are accounted for by an increase in issue-specific legal indeterminacy around those years, rather than an increase in the Circuit-wide structural parameter  $S_c$ .<sup>167</sup>

There seems no clear factor to account for the increased incidence of dissents on invalidity issues during 2002, other than the observation that the Federal Circuit decided several significant and controversial cases on validity issues in 2002: the written description requirement of 35 U.S.C. § 112, the invalidity of patents anticipated by an inherent disclosure in the prior art, and prosecution laches (the effect of an applicant's untoward delay in pursuing her application before the Patent and Trademark Office).<sup>168</sup>

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<sup>161</sup> We cannot assume that dissent on each issue is independent within each case, so it is not permissible to construct a single model. Obviously, dissent on claim construction will be correlated with dissent on infringement and invalidity because whether or not claims are valid and infringed depends on their scope.

<sup>162</sup> Whole-model chi-squared 13.1,  $p = 0.07$ ; Year(2004) chi squared 9.6,  $p = 0.002$ .

<sup>163</sup> Whole-model chi-squared 18.5,  $p = 0.01$ ; Year(2004) chi squared 11.8,  $p = 0.0006$ .

<sup>164</sup> Whole-model chi-squared 12.7,  $p = 0.08$ ; Year(2004) chi squared 11.8,  $p = 0.0009$ . The whole-model chi-squared implies that the entire model is significant only at the 92% level, not the 95% level.

<sup>165</sup> Treating the year of decision as a continuous variable yielded a model with a value of 0.27 for the year parameter, corresponding to an increase in the odds ratio (not probability) of dissent of 1.3:1 each year. For this model, the whole-model and year parameter chi-squared fit was 13.1,  $p = 0.0003$ . Obviously, such a model cannot be extended indefinitely in time, as it predicts that the probability of dissent would eventually approach 100%.

<sup>166</sup> See Wagner and Petherbridge, 152 Penn. L. Rev. 1105, 1151 (2004) (finding that proportion of "strong" methodologies increased in claim construction opinions from 1996 to 2002).

<sup>167</sup> but see Part VI *infra*, on the effect of normalizing the claim construction dissent frequency to the Federal Circuit's non-interpretation dissent frequency.

<sup>168</sup> Enzo (written description); Elan (inherency); Symbol-Tech (prosecution laches). Otherwise, the invalidity dissents of 2002 are notable only for the frequency with which (then-Chief) Judge Mayer dissented from rulings overturning jury verdicts holding patents invalid. 3M; Juicy Whip (anticipation); Union Carbide (enablement). Lest the reader develop the impression that Judge Mayer was hostile to patents during 2002, Judge Mayer's other dissent on invalidity during 2002 would have sustained the district court's pre-verdict grant of JMOL in favor of the patentee.

The increase in dissents on claim construction issues in 2004 certainly may explain why the Federal Circuit granted en banc review in *Phillips* in mid-2004; the significant increase in dissent frequency would convey the impression that claim construction was becoming more contentious. But there is no obvious explanation why claim construction provoked more disagreement at the Federal Circuit in 2004. Examination of claim construction dissents from 1998 to 2005 revealed no patterns other than small increases in the proportion of dissents on the proper role of dictionaries and other extrinsic evidence. The increase may be attributable in part to disagreements over dictionaries in the wake of *Texas Digital* and its progeny, a line of cases heavily emphasizing technical dictionaries as a source of meaning in claim construction.<sup>169</sup> Certainly the Federal Circuit felt so: the court took special care to disapprove of *Texas Digital* and its progeny in its en banc opinion in *Phillips*.<sup>170</sup> We might further speculate that the apparent drop in dissent frequency in the first half of 2005 reflected consensus among Federal Circuit judges that disputes over claim construction should be put on hold until the court issued its opinion in *Phillips*. However, the relatively small number of claim construction dissents renders all such explanations little more than speculation. With so few dissents, it is difficult to establish whether there was any meaningful increase or trend in disagreements over specific claim construction issues over the period of this study, or whether the increase in disagreements that apparently sparked *en banc* review in *Phillips* represented the culmination of a long-term trend or merely an effect peculiar to 2004.

## VI. COMPARING INTERPRETIVE REGIMES

### *Measuring Contract Interpretation Indeterminacy*

There is little or no evidence that claim construction is less determinate than other aspects of patent law. Nonetheless, we might ask how claim construction compares against other interpretive regimes. Some of the indeterminacy in claim construction cases may stem from the particular framework of interpretation erected by the Supreme Court and the Federal Circuit. But part of the observed indeterminacy may also arise from the difficulties inherent in linguistic interpretation. To fairly assess how well the claim construction regime operates at the appellate level, the relevant question might be

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<sup>169</sup> *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1202-03 (Fed. Cir. 2002).

<sup>170</sup> \*cite

not how claim construction compares to other aspects of patent law, but how claim construction compares to other interpretive regimes that must also grapple with the ambiguities of language.<sup>171</sup>

To assess the relative indeterminacy of interpretive regimes, I compared the interpretation of patent claims at Federal Circuit with the interpretation of contracts at the regional United States Circuit Courts of Appeals. The Circuit Courts of Appeals, obviously, are nearest to the Federal Circuit in the character of the judges, procedure, number of cases resolved, and other parameters that might influence the incidence of dissent. The choice of contract interpretation as the regime to compare claim interpretation against rests on both theoretical and practical grounds. Theoretical, because while the *effect* of a patent - to establish rights good against the world - may be more akin to a statute than a contract,<sup>172</sup> in their diversity of subject matter and authorship patents resemble contracts more than they do legislation.<sup>173</sup> Practical, because it is feasible to design relatively simple text-based strategies to recover the entire set contract interpretation cases decided by the Circuit Courts of Appeal; statutory interpretation arises in so many different contexts that the definition and isolation of all statutory interpretation cases may be impossible by textual screening.<sup>174</sup>

I began the assessment of indeterminacy in contract interpretation by measuring the frequency of dissents in reported and unreported opinions addressing the interpretation of contracts at each of the federal Circuit Courts of Appeals for the years 1998 to 2003. The dataset for this study was defined by first employing a text-based search algorithm,<sup>175</sup> and subsequent manual screening to identify opinions in which the

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<sup>171</sup> Of course, nearly every conceivable legal determination requires interpretation of *some* text.

<sup>172</sup> \*Markman/Cybor

<sup>173</sup> Patent claims emerge, like contracts, from a process of negotiation between two parties: the patent applicant and an examiner at the Patent and Trademark Office. Patent claims may attempt to capture in language any tangible or intangible process, machine, manufacture, or composition of matter. This diversity is comparable to contract language, which may attempt to capture all human economic behavior or any other relationship between persons and entities. The subject matter of statute is somewhat smaller, defining the rights and duties of citizens and the operation of government. For comparison, there have been more than seven million patents, usually with multiple claims, issued in the United States last two hundred years - a figure no doubt dwarfed by the number of contracts drafted in the same period, but exceeding the number of statutes.

<sup>174</sup> Where agency action is involved, statutory interpretation is further complicated by the question of deference to agency interpretations.

<sup>175</sup> The LEXIS Courts of Appeals databases were screened with the query "contract /s interpret! or constru! or ambigu! or defin! or mean! & not plea agreement or maritime or consent decree or name(United States)." The optimal search algorithm was developed by first obtaining a relatively complete population of cases addressing contract interpretation for defined time periods from two different courts, and then

Courts of Appeals considered the interpretation of a contract between private parties.<sup>176</sup> Given the more varied contexts in which contract interpretation issues may arise, classifying a case as one involving contract interpretation *vel non* necessarily involves more subjectivity than classifying a case as one involving claim construction.<sup>177</sup>

Table 12 reports the number of cases recovered by the textual screen, the number of cases determined to address contract interpretation issues, and the incidence of dissent on contract interpretation issues. Table 12 also shows the frequency of dissent on issues other than contract interpretation, in contract interpretation cases.

TABLE 12: CONTRACT INTERPRETATION AND DISSENTS AT THE CIRCUIT COURTS OF APPEAL, 1998-2003

| Circuit        | Cases Screened | Contract Interpretation Cases | Contract Interpretation Dissents | Other Dissents | Contract Interpretation Dissen |
|----------------|----------------|-------------------------------|----------------------------------|----------------|--------------------------------|
| <b>1</b>       | 245            | 80                            | 0                                | 2              |                                |
| <b>2</b>       | 382            | 142                           | 6                                | 2              |                                |
| <b>3</b>       | 250            | 98                            | 6                                | 2              |                                |
| <b>4</b>       | 318            | 133                           | 16                               | 7              |                                |
| <b>5</b>       | 325            | 120                           | 5                                | 4              |                                |
| <b>6</b>       | 474            | 172                           | 11                               | 4              |                                |
| <b>7</b>       | 494            | 170                           | 7                                | 0              |                                |
| <b>8</b>       | 346            | 147                           | 7                                | 1              |                                |
| <b>9</b>       | 733            | 249                           | 22                               | 8              |                                |
| <b>10</b>      | 383            | 130                           | 5                                | 2              |                                |
| <b>11</b>      | 222            | 79                            | 3                                | 1              |                                |
| <b>DC</b>      | 245            | 14                            | 0                                | 0              |                                |
| <b>Federal</b> | 204            | 27                            | 3                                | 1              |                                |

testing search algorithms against the set of all contract interpretation cases to ascertain which search algorithm best identified all the interpretation cases with the fewest number of "false positive" results. To obtain a relatively complete population of cases addressing contract interpretation, I recovered every opinion containing the word "contract" in three-month periods from the Second Circuit (7/1/1999 - 9/30/1999, 92 cases) and the Ninth Circuit (1/1/2003 - 3/31/2003, 108 cases) and manually screened these cases to establish which ones addressed contract interpretation. Several dozen different text-based search algorithms were then tested against the relatively complete population to identify which algorithm performed best, as measured by identifying all of the known interpretation cases and the fewest non-interpretation cases.

<sup>176</sup> Cases in which federal, state, or foreign governments or government agencies were named parties were excluded, in part because contracts with government agencies may be subject to defined regimes of interpretation. See, e.g., 48 CFR Ch. 1, Part 2 (defining numerous terms for use in government contracting). To keep the dataset focused primarily on opinions in which the Court of Appeals determined the meaning of contract language according to ordinary principles of interpretation, maritime contracts, opinions interpreting plea agreements or agreed-to injunctions, and opinions involving the review of an arbitrator's interpretation of a contract were also excluded.

<sup>177</sup> Opinions were classified according to the principle that interpretation cases were ones in which the court sought to derive intention or meaning from the language of the parties. Thus, for example, the familiar classroom case of *Raffles v. Wichelhaus*, though a case deciding contract formation, would have been classified as an interpretation case in this study because it was necessary for the court to determine the meaning each party subjectively attached to the term "Peerless."

|   |      |      |    |    |  |
|---|------|------|----|----|--|
|   |      |      |    |    |  |
| <b>TOTAL</b>                              | 4621 | 1561 | 91 | 34 |  |
| <b>Total exclusive of Federal Circuit</b> | 4417 | 1534 | 88 | 33 |  |

Contract interpretation questions provoked dissent in panel opinions with an incidence between a low no dissent at the First and DC Circuits, to a high of 12.03% at the Fourth Circuit. The average incidence of dissent from all reported and unreported contract interpretation cases from 1998 to 2003 was 5.83%.<sup>178</sup> Other issues arising in contract interpretation cases provoked dissent at lower frequencies, ranging from 0% to 5.26% with an average incidence of 2.18%.<sup>179</sup>

Table 12 shows that dissent frequencies on matters of contract interpretation varied considerably between the various Circuit Courts of Appeal: aside from the lack of dissents in the First and DC Circuits, there is an approximately 3-fold variation in interpretation dissent rates between the low Circuits (the Tenth and Eleventh) and the high (the Fourth). Similar patterns, though not as pronounced, may be seen in the frequency of dissent on non-interpretation issues to the extent the small number of such dissents permits analysis.

The variation between dissent rates seen in Table 12 must reflect some combination of differences in the determinacy of the cases presented to the court, differences in the court structural variables that generate or suppress dissent in all cases, and purely stochastic variation.<sup>180</sup> It is difficult to imagine sources of systematic variation in the determinacy of contract interpretation cases presented to the various Circuits, unless regional concentration of industries or variations in state law leads to regional over- or under-representation of contracts posing difficult interpretation questions.<sup>181</sup> It

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<sup>178</sup> Restricting the analysis to reported cases only depressed the overall dissent rate to 5.75%. This effect is due almost entirely to the Ninth Circuit, which selected for publication only 10 of its 22 opinions containing dissents on contract interpretation issues.

<sup>179</sup> The higher incidence of dissent on interpretation questions, as compared to non-interpretation issues in interpretation cases, does not support any meaningful conclusions about the relative determinacy of contract interpretation. Aside from the low number of dissents on non-interpretation questions, the incidence of other issues in contract interpretation is obviously highly biased towards issues that are contested when parties litigate contract disputes. Thus, if anything, the discrepancy suggests only that other legal issues arising from the same set of facts as contract disputes tend to be more constrained than interpretation issues in those disputes.

<sup>180</sup> Songer, in Goldman & Lamb, at 135.

<sup>181</sup> For example, if oil and gas contracts tended to pose particularly difficult questions of interpretation, one might expect more dissent on contract interpretation issues in the Fifth Circuit. Or perhaps the degree to which the law of contract interpretation is determinant varies between states, and therefore provokes more

seems more likely that variation in structural variables between contributes the greater portion of variation between Circuit dissent rates.<sup>182</sup>

Recall from Part III that the probability of dissent on a particular issue, at a particular court  $C$  and in a case that addresses legal issue  $x$ , may be represented by the relation  $P_x = I_x \times S_C$ .  $I_x$  represents the indeterminacy of the legal issue of interest, and  $S_C$  represents the "extra-legal" structural variables that affect the incidence of dissent at court  $C$ . Let us divide the legal issues considered by the court into two categories: interpretation issues, and all other issues. The contributions of each decision-making process to dissent are given by the relations:

$$P_{interpretation} = I_{interpretation} \times S_C$$

$$P_{other} = I_{other} \times S_C$$

where  $I_{other}$  represents the average indeterminacy of all non-interpretation issues resolved by the court.<sup>183</sup>

If the variation in the overall dissent rates between the Circuit Courts of Appeals arises primarily from variation in the structural variables between the courts, and not variation in the determinacy of cases which each Circuit hears, then the structural constant  $S_C$  is the same for interpretation and non-interpretation issues. Under these conditions, normalization of the interpretation dissent frequency to the overall dissent frequency at each court should yield the measure of the relative determinacy of interpretation issues:

$$\frac{P_{interp}}{P_{other}} = \frac{I_{interp} \times S_C}{I_{other} \times S_C} = \frac{I_{interp}}{I_{other}}$$

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or less dissent at the federal Circuit Courts of Appeal when diversity cases are resolved according to the law of those states.

<sup>182</sup> Songer, *supra*, at 135. The variables most clearly tied to variations in dissent rates in Songer's study of variation between dissent rates at the regional Circuits, were ideological diversity of the judges, urbanization of the states comprising each Circuit, and reversal of the lower court's decision. Songer, noting that dissenting judges tended to support the decision below, provides a psychological explanation for this effect: the judge who must suffer the "loneliness of dissent" by disagreeing with his colleagues may take comfort in agreement with the judge below who is being reversed. *Id.* at 128-129. Less psychologically minded observers might argue that indeterminate questions of law tend to produce both inter-court and intra-court dissent.

<sup>183</sup> If dissents on interpretation and "other" issues arise independently, then the probability of any dissent in a case presenting both interpretation and "other" issues is given by the relation  $P_{total} = P_{interpretation} + P_{other} - (P_{interpretation} \times P_{other})$ . With a large enough dataset, this relationship permits the probability of dissent on one issue to be calculated if the frequency of dissent on the second issue and the total frequency of dissent is known. Here  $P_{interpretation}$  and  $P_{other}$  are measured directly so this calculation is unnecessary.

To separate the variation arising from structural differences between the various Circuits, I measured the incidence of dissent in *all* reported<sup>184</sup> opinions of the Circuit Courts of Appeal over the time period for which we measured contract interpretation rates of dissent.<sup>185</sup> I then subtracted the number of reported contract interpretation dissents<sup>186</sup> from these measurements to yield the incidence of dissent on all issues other than contract interpretation. Table 13 shows the frequency of contract interpretation dissent ( $P_{interp}$ ), the frequency of dissent on all other issues ( $P_{other}$ ), and the ratio of contract interpretation dissent frequency to other issue dissent frequency ( $\frac{P_{interp}}{P_{other}}$ ) for the period 1998-2003.

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<sup>184</sup> Discrepancies between how the various Circuit Courts (and the corresponding databases) treat unreported dispositions - such as non-precedential opinions and summary affirmances - make accurate comparison and aggregation of dissent frequencies extremely difficult without manually tabulating each case. Exclusive reliance on reported opinions increases the apparent magnitude of dissent, because summary affirmances (which are almost always unanimous) and 'trivial' opinions are excluded from the dataset. I use this statistic only as a common denominator to compare the frequency of claim construction and contract interpretation dissents. It cannot be itself compared to other dissent frequencies reported here or from other sources. In general, much of the literature on dissent frequency is incommensurable because the parameters governing inclusion or exclusion of opinions from the datasets differ or are left undefined.

<sup>185</sup> This analysis employed the Westlaw databases containing the reported decisions of the individual U.S. Courts of Appeals (CTA1R, CTA2R, etc.). For each year the total number of opinions containing a dissent was estimated by searching each database with the field search "diss(judge)," while the total number of opinions was estimated by searching for the term "court."

<sup>186</sup> There were no interpretation cases with a dissent both on an interpretation issue and on another issue for the period in question.

TABLE 13: REPORTED DISSENTS AT THE CIRCUIT COURTS OF APPEAL, 1998-2003

| Circuit        | Reported Contract Interpretation Dissents | Reported Contract Interpretation Cases | P <sub>interp</sub> <sup>?</sup> Reported | Total Reported Dissents | Non-Interpretation Reported Dissents | Total Reported Cases | P <sub>other</sub> <sup>?</sup> Reported | P <sub>interp</sub> /<br>P <sub>other</sub> |
|----------------|---|--|---|-------------------------|--------------------------------------|----------------------|--|---|
| 1              | 0   | 78                                     | 0.00%                                     | 79                      | 79                                   | 2059                 | 3.84%                                    | <b>0.00</b>                                 |
| 2              | 6   | 102                                    | 5.88%                                     | 189                     | 183                                  | 3058                 | 5.98%                                    | <b>0.98</b>                                 |
| 3              | 6   | 63                                     | 9.52%                                     | 218                     | 212                                  | 1714                 | 12.37%                                   | <b>0.77</b>                                 |
| 4              | 12  | 97                                     | 12.37%                                    | 263                     | 251                                  | 1492                 | 16.82%                                   | <b>0.74</b>                                 |
| 5              | 5   | 105                                    | 4.76%                                     | 276                     | 271                                  | 3296                 | 8.22%                                    | <b>0.58</b>                                 |
| 6              | 8   | 67                                     | 11.94%                                    | 437                     | 429                                  | 2619                 | 16.38%                                   | <b>0.73</b>                                 |
| 7              | 7   | 145                                    | 4.83%                                     | 227                     | 220                                  | 4030                 | 5.46%                                    | <b>0.88</b>                                 |
| 8              | 6   | 141                                    | 4.26%                                     | 398                     | 392                                  | 4308                 | 9.10%                                    | <b>0.47</b>                                 |
| 9              | 10  | 89                                     | 11.24%                                    | 837                     | 827                                  | 5235                 | 15.80%                                   | <b>0.71</b>                                 |
| 10             | 2   | 59                                     | 3.39%                                     | 185                     | 183                                  | 2128                 | 8.60%                                    | <b>0.39</b>                                 |
| 11             | 3   | 79                                     | 3.80%                                     | 165                     | 162                                  | 2563                 | 6.32%                                    | <b>0.60</b>                                 |
| DC             | 0   | 13                                     | 0.00%                                     | 116                     | 116                                  | 1545                 | 7.51%                                    | <b>0.00</b>                                 |
| Federal        | 2   | 16                                     | 12.50%                                    | 223                     | 221                                  | 1554                 | 14.22%                                   | <b>0.88</b>                                 |
|                |   |  |   |                         |                                      |                      |  |   |
| TOTAL          | 67  | 1054                                   | 6.36%                                     | 3613                    | 3546                                 | 34547                | 10.26%                                   | <b>0.62</b>                                 |
|                |   |  |   |                         |                                      |                      |  |   |
| Total w/o CAFC | 65  | 1038                                   | 6.26%                                     | 3390                    | 3325                                 | 34047                | 9.77%                                    | <b>0.64</b>                                 |

These measurements show a very strong correlation<sup>187</sup> between the frequency of dissent on contract interpretation issues and the frequency of dissent on non-interpretation issues over the period 1998 to 2003. For example, the absence of interpretation dissent in the First Circuit mirrors its overall low rate of dissent on other issues,<sup>188</sup> while the relatively high rates of contract interpretation dissent observed in the Fourth and Federal Circuits seem less remarkable in light of the generally high level of dissent at those courts. It seems unlikely that the indeterminacy of contract interpretation issues and the indeterminacy of non-interpretation issues co-varies systematically between the Circuit Courts of Appeals.<sup>189</sup> Unless there is a correlation between the indeterminacy of interpretation and non-interpretation cases at each Circuit, then the correlation between contract interpretation dissent frequencies and non-interpretation dissent frequencies suggests that the variation between contract interpretation dissent

<sup>187</sup>  $r = 0.90, p < 0.01$  at the least.

<sup>188</sup> Not so for the DC Circuit, but the low number of contract interpretation cases decided by the DC circuit may make the absence of interpretation dissent misleading. Adding a single additional contract interpretation case with a dissent to the DC Circuit would raise its interpretation dissent index to the highest of all the Circuits.

<sup>189</sup> Because the bulk of contract interpretation issues at the Circuit Courts of Appeals arise in diversity cases, we would have to postulate that regional differences in the state law of contract interpretation correlate with regional variations in the determinacy of federal law.

rates reflects structural differences between the Circuits rather than variation in the determinacy of the cases presented to them.<sup>190</sup> If so, this data validates the hypothesis that the probability of dissent may be modeled by the relation  $P_x = I_x \times S_C$ , the product of legal indeterminacy and a structural constant characteristic of each court.<sup>191</sup>

If the variation in general dissent rates largely reflect structural differences between the various Circuit Courts of Appeal, we may normalize the contract interpretation dissent rates to the general dissent rates, thereby separating the contributions of structural variables and of contract interpretation indeterminacy out from the contract interpretation dissent rates. To normalize the observed contract interpretation dissent frequencies to the general level of dissent observed at the Circuit Courts of Appeal, I divided the frequency of dissent in contract interpretation cases by the frequency of dissent on all other issues. If the structural variables remain constant between interpretation and non-interpretation cases, then the incidence ratio  $\frac{P_{\text{interp}}}{P_{\text{other}}}$  will equal the indeterminacy ratio  $\frac{I_{\text{interp}}}{I_{\text{other}}}$ . This dimensionless number estimates the relative indeterminacy of contract interpretation issues as compared to the aggregate indeterminacy of all other issues resolved by the Circuit Courts of Appeal.<sup>192</sup>

The overall relative indeterminacy measure, comparing all contract interpretation dissents to all dissents from all the Circuits, is 0.62.<sup>193</sup> Roughly speaking, a judge is 62% as likely to dissent on the issue of contract interpretation in a case presenting a contract interpretation issue, as is the judge to dissent on any issue in any case. The utility of this statistic, standing alone, is limited. The universe of possible judicial decisions encompassed by "any issue" is so diverse that it would mean little to say that contract interpretation law is only 62% as indeterminate as all other law. More seriously, we do not know how many opportunities each case presents for dissent. The more issues

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<sup>190</sup> This explanation is consistent with findings that the probability of dissent is most strongly influenced by court-wide norms on the acceptability of dissenting behavior. See Hettinger et al (2006), at 111.

<sup>191</sup> Whether the remaining variation between the Circuits represents varying determinacy of the contract interpretation cases, systematic variation between the contribution of structural variables to contract interpretation dissent and to all other dissent, or simply random fluctuation, cannot be determined from the data.

<sup>192</sup> In less technical terms, it represents how often judges disagree with each other about contract interpretation, adjusted for their overall disagreeableness.

<sup>193</sup> The overall dissent index is essentially unchanged if the contract interpretation cases are restricted to reported opinions only.

present in any given case, the more likely dissent will arise.<sup>194</sup> The indeterminacy ratio measures only the relative determinacy of contract interpretation and all other issues in the aggregate, not between contract interpretation and an "average" issue. It is therefore not possible to draw significant conclusions about the determinacy of contract interpretation law from the dissent ratios alone.<sup>195</sup>

*Comparing Interpretive Indeterminacy Across Multiple Issues and Courts*

The useful comparison is not indeterminacy between an interpretive regime and everything else, but indeterminacy between two different interpretive regimes - in our case, patent claim interpretation and contract interpretation. If the same court applies two different interpretive regimes, then the comparison is as straightforward as the relative issue indeterminacies measured in Part V above. We are not so fortunate. Patent claim interpretation is performed almost exclusively by the Federal Circuit,<sup>196</sup> and, as shown in Table 12, the Federal Circuit interprets few contracts other than those with the United States as party.

If we compare how an issue  $x1$  is resolved at court A, with how an issue  $x2$  is resolved at court B, the structural variable  $S_c$  no longer drops out of the comparison:

$$P_{x1,a} = I_{x1} \times S_{Ca}$$

$$P_{x2,b} = I_{x2} \times S_{Cb}$$

$$\frac{I_{x1}}{I_{x2}} = \frac{P_{x1,a} \times S_{Cb}}{P_{x2,b} \times S_{Ca}}$$

Because  $S_c$  will vary from court to court, comparison of dissent frequencies between different courts on a particular issue aggregates the effects of legal indeterminacy and differences, if present, in structural variables between the courts. In order to compare the relative determinacy of legal regimes between different courts, it is necessary to disentangle the contributions of legal indeterminacy and structural variables

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<sup>194</sup> At the extreme, if a case presented an infinite number of issues, we would expect a dissent frequency approaching 100% assuming each issue contributes a finite probability of dissent.

<sup>195</sup> This significant point seems to have escaped notice in the political science literature. Theoretically, each case could be tabulated to determine the number of issues which it presented, and the incidence of dissent normalized to the number opportunities for dissent. The subjectivity involved in counting the number of issues presented by a case, and massive scale required, seem to render this approach impractical.

<sup>196</sup> A very small number of claim interpretations may be performed by other courts in the context of a dispute not within the Federal Circuit's jurisdiction, such as the scope of a patent license agreement in a contract case or a case in which an issue arising under the patent laws is raised only in the counterclaim.

to the probability of dissent. We have no means to independently measure the value of the structural variables  $S_{Ca}$  and  $S_{Cb}$ . If, however, courts A and B both decide a legal issue of similar determinacy,  $x_3$ , then the relative ratio of the structural variables characteristic of those courts may be determined:

$$P_{x_3,a} = I_{x_3} \times S_{Ca}$$

$$P_{x_3,b} = I_{x_3} \times S_{Cb}$$

$$\frac{P_{x_3,b}}{P_{x_3,a}} = \frac{I_{x_3} \times S_{Cb}}{I_{x_3} \times S_{Ca}} = \frac{S_{Cb}}{S_{Ca}}$$

At which point it becomes possible to compare directly the indeterminacy of issues  $x_1$  and  $x_2$  between the two courts, employing only the probabilities of dissent:

$$\frac{I_{x_1}}{I_{x_2}} = \frac{P_{x_1,a} \times S_{Cb}}{P_{x_2,b} \times S_{Ca}} = \frac{P_{x_1,a} \times P_{x_3,b}}{P_{x_2,b} \times P_{x_3,a}}$$

This procedure requires us to measure dissent frequencies at two different courts when considering issues with similar legal indeterminacy. What issue  $x_3$  will present similar levels of indeterminacy between our courts of interest? We could attempt to define  $x_3$  as a single, particular legal issue that is decided by both the Court of Appeals for the Federal Circuit and the other Circuit Courts of Appeals. While such issues do exist,<sup>197</sup> the number of cases in any single issue may well be too small to yield reliable data.

Instead, I define  $x_3$  to be the aggregate statistic of all non-interpretation cases decided by the Courts of Appeals in reported opinions over the period 1998 through June, 2005, with a unitary indeterminacy of  $I_{other}$ . Because  $I_{other}$  is a statistic averaging the individual contributions to indeterminacy made by all legal issues resolved by the court, it follows that two courts with similar dockets and similar precedent will, on the whole, be characterized by similar values of  $I_{other}$ . In other words, between two tribunals which operate under similar legal regimes, discrepancies in dissent frequencies should reflect differences in structural variables between the two courts that lead them to be more or less dissent-prone.

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<sup>197</sup> For example, the Federal Circuit follows the law of the originating Circuit when resolving non-patent issues in patent infringement cases.

I assume, therefore, that the weighted aggregate indeterminacy of all non-interpretation<sup>198</sup> issues,  $I_{other}$ , is the same in reported opinions of the Federal Circuit and (collectively) the other Circuit Courts of Appeals. This assumption is not precise. The Federal Circuit is a court of specialized jurisdiction, and, as shown in Table 2, its docket comprises a particular assortment of cases with distinct levels of legal indeterminacy. If these cases, weighted by their frequency, are more (or less) indeterminate than the diet of the non-specialized regional Circuit Courts of Appeals, our comparison will be skewed.<sup>199</sup> There are, however, centripetal factors that would counteract the pull of specialized jurisdiction and tend to conform the Federal Circuit's  $I_{other}$  with that of its sister Circuits. First, although the statutes and precedents determining the Federal Circuit's cases are different from those binding on the other Circuit Courts of Appeals, as the number of issues comprising  $I_{other}$  increases,  $I_{other}$  should approach a common level of indeterminacy associated with the linguistic and legal precision employed by the authors of those precedents - Congress, the Supreme Court, and prior judges of the Courts of Appeals. We therefore would expect variation in issue indeterminacy to flatten out if the definition of "legal issue" is sufficiently broad and diverse. Second, although the Federal and regional Circuits might differ in the proportion of "routine" and "non-routine" issues presented for their decision, this analysis is confined to reported cases with opinions. This restriction filters the raw issue input to each court, according to the perception by its judges that a case is legally significant enough to deserve publication in the Federal Reporter. While we cannot be certain that the same degree of legal indeterminacy in a case motivates each judge, panel, or court to publish an opinion, the selection of opinions for publication likely exerts a strong normalizing effect and tends to make each Circuit Court's corpus of published opinions represent cases with similar degrees of indeterminacy.<sup>200</sup>

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<sup>198</sup> More precisely, all issues at the Federal Circuit other than claim construction, and all issues at the regional Circuit Courts of Appeal other than contract interpretation.

<sup>199</sup> One might attempt to assess relative indeterminacy by comparing the rates at which the Courts of Appeal reverse decisions of the lower tribunal, on the theory that indeterminate cases are more likely to be reversed. The difficulty in assessing the meaning of reversal, and the distinct possibility that a related set of structural variables influences the probability of reversal, counsels against this approach. Whether on account of these reasons, or others, the correlation between rates of dissent and reversal for the Circuit Courts over time, or between the various Circuit Courts, is poor. See Songer, Sheehan, and Haire (2000) at 105; 109.

<sup>200</sup> An alternative method would be to construct a multinomial regression model along the lines of Hettinger et al (2006), and attempt to isolate the contribution of particular structural variables at the courts of interest

To compare the relative determinacy of claim construction cases at the Court of Appeals for the Federal Circuit and contract interpretation cases resolved by the Circuit Courts of Appeal, I first estimated the relative contribution of structural variables to dissent according to the equation introduced above:

$$\frac{P_{otherCA}}{P_{otherCAFC}} = \frac{I_{other} \times S_{CA}}{I_{other} \times S_{CAFC}} = \frac{S_{CA}}{S_{CAFC}}$$

where here I define the comparison groups *CAFC* to be the Court of Appeals for the Federal Circuit, and *CA* to be the aggregate of all the Circuit Courts of Appeal, excluding the Federal Circuit. To measure  $P_{otherCAFC}$ , for each of the years 1998 to 2005 I determined the total number of reported cases, and the number of cases containing a dissent on an issue other than claim construction. I determined the latter number, as shown in Table 14 below, by subtracting from the Federal Circuit's total number of dissents in reported cases, the number of dissents that addressed claim construction and no other issues. Dividing the number of dissents by the number of cases yielded  $P_{otherCAFC}$ , the probability of dissent on any issue other than claim construction in any reported Federal Circuit case.

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- assuming that the database contains sufficient data about each individual effect to control for the effects of docket composition. Unfortunately, the appellate database described by Songer et al (2000) omits the Federal Circuit.

TABLE 14: REPORTED NON-INTERPRETATION DISSENTS AT THE FEDERAL CIRCUIT, 1998-2005

| Year             | Total Federal Circuit Dissents (reported) | Claim Construction only dissents (reported) | Net Federal Circuit 'Other' dissents (reported) | Total Federal Circuit Cases (reported) | $P_{\text{other}}$ , Federal Circuit |
|------------------|---|---|---|--|--------------------------------------|
| 1998             | 29  | 4   | 25  | 224                                    | 11.16%                               |
| 1999             | 29  | 5   | 24  | 221                                    | 10.86%                               |
| 2000             | 29  | 3   | 26  | 246                                    | 10.57%                               |
| 2001             | 31  | 2   | 29  | 304                                    | 9.54%                                |
| 2002             | 52  | 1   | 51  | 273                                    | 18.68%                               |
| 2003             | 53  | 6   | 47  | 286                                    | 16.43%                               |
| 2004             | 45  | 8   | 37  | 266                                    | 13.91%                               |
| 2005 (Jan - Jun) | 14  | 0   | 14  | 119                                    | 11.76%                               |
| Total            | 282                                       | 29  | 253   | 1939                                   | 13.05%                               |

The choice of time frame and court for  $P_{\text{otherCA}}$ , is somewhat arbitrary, but the choice will also dictate the selection of contract interpretation cases used for comparison. There is no reason to expect  $I_{\text{other}}$  or  $S_{CA}$  to vary systematically at the regional Circuits over time, and little interest in such variations if they exist. Therefore, the largest (and presumably most reliable) dataset, the aggregate of all the other Circuit Courts of Appeals over the period 1998-2003, was selected as the comparison group.  $P_{\text{otherCA}}$  consequently remains constant at 9.77%, the value of  $P_{\text{otherCA}}$  computed in Table 13 for reported cases of all the Circuit Courts other than the Federal Circuit over the time period 1998-2003. This choice requires that  $P_{\text{kinterp}}$ , the incidence of dissent on contract interpretation issues, be defined over the same time period: the aggregate incidence of dissent in contract interpretation cases of the aggregated Circuit Courts of Appeal other than the Federal Circuit from 1998-2003. I then calculated the ratio of the indeterminacy of patent claim construction,  $I_{\text{ccinterp}}$ , to the indeterminacy of contract interpretation,  $I_{\text{kinterp}}$ , according to the relation

$$\frac{I_{\text{ccinterp}}}{I_{\text{kinterp}}} = \frac{P_{\text{ccinterp,CAFC}} \times S_{CA}}{P_{\text{kinterp,CA}} \times S_{CAFC}}$$

To explore the possibility that the measured properties of the Federal Circuit - the indeterminacy of claim construction, or the structural variables characteristic of the Federal Circuit - might change over time, I calculated the indeterminacy ratio using the values of  $P_{ccinterp}$  and  $P_{other}$  for each year at the Federal Circuit from January 1998 through June 2005. For each year, I separately calculated the indeterminacy ratio using either all patent and contract interpretation opinions, or reported opinions alone. The results, using constant values of 9.77% for  $P_{other, CA}$ , 5.74% for  $P_{kinterp, CA (total)}$  and 6.26% for  $P_{kinterp, CA (reported)}$ <sup>201</sup> are shown in Table 15. Table 15 also shows the relative indeterminacy of claim interpretation and all other legal issues at the Federal Circuit, obtained by dividing the observed frequency of claim construction dissent by the observed frequency of dissent in all non-interpretation cases.

TABLE 15: COMPARATIVE INDETERMINACY OF CLAIM CONSTRUCTION AND CONTRACT INTERPRETATION, 1998-2005

| Year                | $P_{ccinterp}$<br>(total) | $P_{ccinterp}$<br>(reported) | $P_{otherCAFC}$ | $S_{CA}/S_{CAFC}$ | $I_{ccinterp}/I_{kinterp}$<br>(total) | $I_{ccinterp}/I_{kinterp}$<br>(reported) | $I_{ccinterp}/I_{otherCAFC}$<br>(reported) |
|---------------------|---------------------------|------------------------------|-----------------|-------------------|---------------------------------------|--|--|
| 1998                | 1.45%                     | 2.56%                        | 11.16%          | 0.88              | 0.22                                  | 0.36                                     | 0.23                                       |
| 1999                | 5.56%                     | 7.89%                        | 10.86%          | 0.90              | 0.87                                  | 1.13                                     | 0.73                                       |
| 2000                | 5.48%                     | 7.32%                        | 10.57%          | 0.92              | 0.88                                  | 1.08                                     | 0.69                                       |
| 2001                | 6.93%                     | 7.81%                        | 9.54%           | 1.02              | 1.24                                  | 1.28                                     | 0.82                                       |
| 2002                | 7.50%                     | 8.16%                        | 18.68%          | 0.52              | 0.68                                  | 0.68                                     | 0.44                                       |
| 2003                | 8.74%                     | 10.45%                       | 16.43%          | 0.59              | 0.91                                  | 0.99                                     | 0.64                                       |
| 2004                | 19.51%                    | 25.00%                       | 13.91%          | 0.70              | 2.39                                  | 2.80                                     | 1.80                                       |
| 2005<br>1st<br>half | 11.76%                    | 10.71%                       | 11.76%          | 0.83              | 1.70                                  | 1.42                                     | 0.91                                       |
| Total               | 8.31%                     | 10.16%                       | 13.05%          | 0.75              | 1.08                                  | 1.21                                     | 0.78                                       |

Considering all the Federal Circuits reported opinions from January 1998 through June 2005, we obtain a value for  $\frac{S_{CA}}{S_{CAFC}}$  of 0.75, signifying that circuit-level norms of disagreement and other structural variables suppress dissent to a greater degree at the regional Circuit Courts of Appeal than they do at the Court of Appeals for the Federal Circuit. The ratio of the indeterminacy of all patent claim construction at the Federal Circuit from January of 1998 through June of 2005, to the indeterminacy of all contract interpretation at the regional Circuit Courts of Appeals, was 1.08. Put simply, over the period from *Cybor* to *Phillips*, the average indeterminacy of patent claim construction

<sup>201</sup> These values are derived from Tables 13 and 14.

was virtually indistinguishable from the indeterminacy associated with contract interpretation at the regional Circuit Courts of Appeals.<sup>202</sup> The indeterminacy ratio of claim construction cases to contract interpretation cases rises to 1.21 when only reported claim construction and contract interpretations cases are considered. Claim construction appears more indeterminate if we confine ourselves to reported cases, but the indeterminacy of claim construction remains unremarkable against that associated with contract interpretation.

The complexity of the calculations yielding the interpretation indeterminacy ratios, and the uncertainty associated with the assumption that  $I_{other}$  is constant between the Federal Circuit and its sister courts, mean that computing the statistical significance of the indeterminacy ratios is not a realistic exercise. Likewise, year-to-year fluctuations in  $P_{other}$  counsel against trying to extract much meaning from changes in the indeterminacy ratio over time. Even without the benefit of statistics, we may be relatively certain of two conclusions. First, it is highly unlikely that the small observed difference between the overall indeterminacy of patent and contract interpretation is statistically significant. There is no reason to conclude that claim construction at the Federal Circuit has been any less determinate than contract interpretation at the regional Courts of Appeals.

Second, once the Federal Circuit's structural parameter is taken into account, the picture of a uniform increase in claim construction indeterminacy suggested by the raw claim construction dissent frequencies becomes more confused. If we were to rely solely on the frequency of claim construction dissents ( $P_{ccinterp}$ ), computed in Part V and shown again in Table 15, the nearly uniform increase in dissent frequency would lead us to conclude that the indeterminacy of claim construction increased consistently during the period from the nearly uniform increase in dissent frequency would lead us to conclude that the indeterminacy of claim construction increased consistently during the period from *Cybor* to *Phillips*. However, the frequency of dissent on issues other than claim construction,  $P_{otherCAFC}$ , varied considerably during that interval, raising the possibility that part of the observed change in claim construction dissents was driven by changes in the

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<sup>202</sup> This ratio is proportionally sensitive to the ratio of the indeterminacy of noninterpretation (patent) cases at the Federal Circuit to the indeterminacy of noninterpretation (contract) cases at the regional Circuit Courts, which is assumed to equal 1 for the reported cases. If the noninterpretation issues before the Federal Circuit are more indeterminate than those before the regional Circuits, then the estimate of  $S_{CA}/S_{CAFC}$  is too low, and the calculation of  $I_{ccinterp}/I_{kinterp}$  is proportionally too low. Conversely, if the noninterpretation issues resolved by the regional Circuits are more indeterminate than those resolved by the Federal Circuit, the estimates of both ratios are too high.

Federal Circuit's structural parameter. If, according to the methodology of Part IV, we attempt to eliminate the effect of the structural parameter by calculating an indeterminacy ratio of claim construction and non-claim construction cases at the Federal Circuit ( $I_{\text{ccinterp}}/I_{\text{otherCAFC}}$ ), the trend is not so clear.<sup>203</sup> The relative indeterminacy of claim construction appeals fluctuates with little apparent pattern over the period 1998-2005, although the marked increase in of indeterminacy in 2004 remains prominent.

## VII. CONCLUSIONS

Four principal conclusions may be drawn from this study, relating not only to the Federal Circuit and patent law, but to the study of legal indeterminacy as well. We may set out first the conclusion relevant to the general study of indeterminacy: observation of the United States Courts of Appeals reveals a strong correlation between overall dissent and dissent on the issue of contract interpretation. Though not the focus of this study, this finding may be regarded as a predicate for the other conclusions here drawn; not for what it tells us about the law of interpretation, but for what it tells us about the study of legal indeterminacy. In reported cases at Courts of Appeals, overall dissent frequencies vary from court to court, and the frequency of dissent in contract interpretation cases differs from the overall rate of dissents. Despite such variation, there is a high and statistically significant linear correlation between each court's overall dissent frequency, and its frequency of dissent in contract interpretation cases. The finding of a linear correlation across multiple courts, between overall dissent and dissent on a particular issue, implies that the probability of dissent at an appellate court may be modeled mathematically as the product of only two parameters: one parameter specific to the issue or issues under consideration in a case, and a second parameter specific to each court. One cannot conclude from this data alone that the issue-specific parameter represents legal indeterminacy. Nonetheless, in light of existing empirical and theoretical work connecting legal indeterminacy with dissent, the most parsimonious explanation of this data is that the issue-specific and court-specific parameters represent  $I_x$ , the legal indeterminacy of issue  $x$ , and  $S_c$ , the extra-jurisprudential characteristics of the court that provoke or suppress the expression of dissent. The probability of dissent on issue  $x$  may

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<sup>203</sup> This approach is not rigorous, because some fraction of disagreements over infringement or invalidity are connected to disagreements about claim interpretation.

therefore be expressed by the product of these two parameters, according to the relation  $P_x = I_x \times S_c$ . It follows that if the value of  $S_c$  can be measured or held constant, the indeterminacy of any legal issue (or body of law) may be determined from the observed frequency of dissents on that legal issue in cases where that legal issue was considered by an appellate court.

Second, examination of the frequency of dissent in cases originating at the various tribunals reviewed by the Federal Circuit, and the changes in dissent frequency over time, shows significant variation in dissent frequencies between tribunals and over time. From the results of the logistic regression model, this study finds that patent infringement cases arising from the district courts are significantly more indeterminate than most other categories of cases reviewed by the Federal Circuit. While this finding may be of interest in and of itself, further study would be required to draw more specific conclusions. We might wonder, for example, whether this indeterminacy is peculiar to patent law or represents indeterminacy inherent in civil litigation at the district courts. This study finds that patent litigation before the district courts is significantly more indeterminate than litigation before certain Article I courts and administrative agencies, but cannot determine whether differences in substantive law or differences in procedure are responsible for these variations in indeterminacy. It would be necessary to compare patent infringement to another field of civil litigation at the district courts to draw such conclusions. Likewise, the tribunal data cannot identify the source of the indeterminacy characteristic of patent cases. Faults in the patent jurisprudence of the Supreme Court or the Federal Circuit might be responsible for indeterminacy in patent law, but so might the patent statutes or the nature of patent cases themselves.<sup>204</sup>

Regardless of tribunal, this study also shows significant variations over time in the Federal Circuit's dissent frequency. The time-specific parameter incorporated into the logistic regression model demonstrated that the Federal Circuit's first full year of operation, 1983, also saw the strongest incidence of dissent over the court's entire history. For most of the next decade - until 1995 - dissent frequencies tended to be depressed,

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<sup>204</sup> Theoretically, we could pinpoint the origin of indeterminacy by classifying cases and dissents according to whether the contested issues were those of fact, statute, or precedent, and calculate the indeterminacy associated with each aspect of patent litigation. One suspects that in most cases these aspects will be so intertwined that objective classification would be impossible.

although this trend was not statistically significant in all years. Following a spike in dissent in 1995, dissent frequencies exhibited no significant trend until 2002. In that year dissent frequencies were strongly and significantly elevated above their historical averages, a trend which has continued - though not necessarily increased - to the present day.

The high frequency of dissent in 1983, followed by a decade of relative quiet, fits well to a model in which the evolution of precedent decreases legal indeterminacy over time. At the Federal Circuit's founding, the slate of precedent was relatively blank. While the Federal Circuit in its first decision adopted the precedent of its predecessor courts, the Court of Customs and Patent Appeals and the Court of Claims,<sup>205</sup> many of the cases arising under the new court's expanded jurisdiction had no antecedents at the predecessor courts. In its early days the Federal Circuit was therefore relatively unconstrained by existing precedent, and it follows that more of its cases were undetermined. The model described in this study - that legal indeterminacy produces dissent - predicts that the court's early cases would generate more dissent, because judges unconstrained by precedent may exercise discretion to fashion new rules of law; in later years, as the body of case law solidified, fewer cases would present indeterminate questions of law. That such a pattern is observed in the early years of the court is consistent with the thesis that legal indeterminacy contributes to dissent.

The observed pattern of high dissent frequencies at the court's founding, followed by a period of decreased dissent, would also be consistent with a model depending solely on the court's structural parameter. The Federal Circuit's first judges were those of its two predecessor courts, and it is not improbable that 'cultural' tendencies suppressing dissent evolved as the two groups of judges became more familiar with each other and with the operation of the new court. Likewise, the era of elevated dissent – independent of tribunal – beginning in 2002 could mark either an increase in the indeterminacy of legal questions considered by the Circuit, or breakdown in the structural constraints that tended to suppress dissent in the decade preceding. While the current data and analysis do not discriminate between these possibilities, a change in court culture may seem more plausible than a coordinated increase in legal indeterminacy across the various bodies of

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<sup>205</sup> *South Corp. v. United States*, 690 F.2d 1368, 1370-71 (adopting, *en banc*, precedents of the Court of Claims and CCPA)

law overseen by the court. Further study – perhaps investigating the influence of changes in court personnel – would be necessary before crediting legal or structural factors for the current era of dissent.

The third major finding of this study is that, considering patent infringement appeals over the entire period from *Cybor* to *Phillips*, there was no statistically significant difference between the indeterminacy associated with claim construction and the indeterminacy associated with other aspects of patent infringement litigation. On the other hand, this study also finds modest but suggestive evidence that the indeterminacy of claim construction cases tended to increase over this period of time, and were significantly elevated in 2004. However, dissent frequencies in many non-patent cases decided by the Federal Circuit began to rise around the year 2002, and we cannot ignore the possibility that changes in the Federal Circuit's structural parameters contributed to this increase in dissent; once we attempt to normalize the claim construction dissent frequency to the overall dissent frequency, the trend becomes obscured. Perhaps the only certain conclusion is that drawn from the logistic regression model: 2004 saw a significant increase in dissents on claim construction, an increase that was mirrored in dissents on infringement but not on invalidity, inequitable conduct, or other issues.

The critical literature identifying “unpredictability” and “instability” in the Federal Circuit’s claim construction jurisprudence dates, for the most part, from prior to 2004.<sup>206</sup> It is possible that the critical literature was based largely on anecdotal evidence inconsistent with the actual practice of claim construction at the Federal Circuit. Likewise, the Federal Circuit’s decision to review its claim construction jurisprudence *en banc* in *Phillips* may have been a reaction to short-term conflicts over particular topics in the law of claim construction, rather than any systemic failing of the post-*Markman* regime. But it is also possible that commentators and judges perceived information that is not accessible by the methodology of disagreement employed here. Outcome-based studies - which attempt to determine whether the decisions of different panels of an appellate court are consistent with each other - have found evidence that disagreement may be manifested as inconsistencies between the decisions of unanimous panels, rather

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<sup>206</sup> See notes 4 and 5 *supra*.

than in the form of dissenting opinions.<sup>207</sup> Further, statistical analysis of judicial opinions measures only the incidence of disagreement, not the intensity of disagreement. It is possible that observers were responding to an increase in the intensity of disagreement within the Federal Circuit's claim construction opinions; perhaps increases in the type or intensity of disagreement presaged increases in the frequency of disagreement, although it is difficult to see why such an effect should be particular to claim construction and not other aspects of the Federal Circuit's jurisdiction.

Related to the finding that claim construction, on the whole, has been no less determinate than other aspects of patent law, this study also finds that claim construction has been no less determinate than another interpretive regime, that of contract interpretation. One might naively expect that the law of contract interpretation, with its much lengthier pedigree, would have attained a more determinate regime than claim interpretation – especially in light of the problems posed by the application of language to new and complex technologies.<sup>208</sup> It may be that both regimes have reached an optimum, both equally limited by the inherent indeterminacy of language. Then too, the difficulties in interpreting patent claims, relative to contracts, might not be as severe as might be supposed. Patent claims are drafted self-consciously. Even if the patent is never asserted, the drafter is aware that the claims' sole purpose is to delineate the scope of the inventor's legal rights. Claims are also usually drafted according to highly formal and stylized conventions rooted in Patent Office requirements and long-standing tradition.<sup>209</sup> The final language of the claims emerges from negotiation between the applicant and a patent examiner, both (hopefully) steeped in the conventions of claim drafting. Contract language may also be drafted self-consciously to define legal rights, but may also be intended solely for the benefit of the parties - a memorial of their transaction, rather than a communication to a future judge or jury. Likewise, while contract language may emerge from a formal and thorough negotiation between legally skilled parties, it may also be the product of laymen scribbling hurriedly on a napkin, or may rest entirely in

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<sup>207</sup> See notes \*\* supra. The study of Wagner and Petherbridge, supra note \*\*, may be regarded as an example of such an outcome-based study, though Wagner and Petherbridge measured the claim construction methodology employed by the panel rather, than the judgment reached by the panel.

<sup>208</sup> See *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 732 (2002).

<sup>209</sup> See, e.g., 37 CFR 1.75(e) (specifying tripartite structure for claim); MPEP 608.01(m) ("While there is no set statutory form for claims, the present Office practice is to insist that each claim must be the object of a sentence starting with 'I (or we) claim,' 'The invention claimed is' (or the equivalent).")

parol. Perhaps the surprising result is that contract interpretation approaches the determinacy as claim construction, rather than the other way around.

The last major conclusion, and perhaps the most prescriptive, derives from the comparison between how frequently tribunals are reversed by the Federal Circuit and how frequently cases from those tribunals generate disagreement within the Federal Circuit. Part IV showed that, for each tribunal, the frequency of reversal was correlated with the frequency of dissent, although this study did not examine the correlation between reversal and dissent at the level of the individual case.<sup>210</sup> The most parsimonious explanation for this finding is that both reversal and dissent rates are driven by legal indeterminacy; if the legal regime does not dictate a particular result on a given set of facts, then either variation in judicial characteristics between tribunals, or variation in judicial characteristics within a tribunal, would generate disagreement. Where variation is distributed similarly at the originating and appellate tribunals, the ratio of reversals to dissents for a given tribunal will hew closely to the overall ratio of reversal to dissent characteristic of the appellate tribunal.<sup>211</sup> If we observe a deviation from the general correlation between reversal and dissent - if a particular tribunal is reversed at a higher frequency than we would expect from the appellate dissent rates - then we have identified a systematic difference in judicial properties between the originating and appellate bodies. These differences would manifest if the originating and appellate decision-makers favored different policy goals, or if the originating and appellate decision makers differed in their competence to discern the 'correct' outcome of cases.

Such deviations are not observed in patent litigation. Although district courts deciding patent cases are reversed more frequently than are most other tribunals reviewed by the Federal Circuit, the same cases generate more disagreement within the Federal Circuit. The implication of these data is that the relatively high reversal rates experienced by district courts result from the indeterminate state of the patent law, and

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<sup>210</sup> Other studies of appellate courts have shown this correlation at the individual case level. See n. 144 supra.

<sup>211</sup> If, for example, personal idiosyncrasies alone cause decision-makers to reach different outcomes in indeterminate cases, those idiosyncrasies would generate disagreement between the originating and appellate bodies to the same extent they would generate disagreement between judges of the appellate body, once we adjust for the number of judges involved. The overall ratio of reversal to dissent is characteristic of each appellate body, because it depends on the value of the structural parameter associated with appellate reversal and the value of the structural parameter associated with appellate dissent.

not from any lack of competence on the part of the district courts, or systematic bias<sup>212</sup> on the part of the Federal Circuit on issues of patentability or infringement. Indeed, as shown in Table 7, once reversal rates are normalized to legal indeterminacy (as measured by appellate dissent), the district courts are reversed significantly *less* frequently than specialized tribunals such as the Boards of Contract Appeals, the Court of Federal Claims, the Court of Appeals for Veterans Claims, or the Merit Systems Protection Board.<sup>213</sup>

The perception that district courts are reversed on appeal at unusually high frequencies when trying patent cases has spurred proposals for removing patent infringement litigation from the district courts to specialized patent litigation tribunals;<sup>214</sup> a less radical version - preferentially assigning patent infringement actions to particular courts and judges - has garnered legislative support.<sup>215</sup> Specialized courts would undoubtedly improve administration of patent litigation.<sup>216</sup> However, the relatively high correspondence between inter-court and intra-court disagreement observed in this study, and the observation that the district courts fare rather well when compared to existing specialized tribunals, suggests that the indeterminacy of patent law, rather than the application of patent law by the district courts, or the Federal Circuit's review of the district courts, is responsible for the current circumstances of patent litigation.<sup>217</sup> If we

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<sup>212</sup> Bias relative to the district courts, not in any pejorative sense.

<sup>213</sup> Apart from legal indeterminacy and differences between judicial characteristics, reversal rates are of course affected by the standard of appellate review. The district courts' low reversal rates could simply reflect a more deferential standard of review, relative to that exercised over other tribunals. Quantitatively comparing the standards of review exercised over the various tribunals within the Federal Circuit's appellate jurisdiction would be a challenging task. But it is safe to say that few commentators accuse the Federal Circuit of being overly deferential to the determinations of the district courts. See, e.g., John D. Collier, *How to Win in the Federal Circuit's Patent Trial Division*, INTELL. PROP. TODAY, Jan. 2002, at 22-23 ("Scrutiny of the Federal Circuit's opinions in patent cases reveals that the court has its own patent trial division, and its name is Judge Lourie.").

<sup>214</sup> See, e.g., Note, *Toward Certainty and Uniformity in Patent Infringement Cases after Festo and Markman: A Proposal for a Specialized Patent Trial Court with a Rule of Greater Deference*, 77 S. Cal. L. Rev. 1383, 1413 (2004); Arti K. Rai, *Specialized Trial Courts: Concentrating Expertise on Fact*, 17 Berk. Tech. L. J 877, 996 (2002).

<sup>215</sup> See *supra* note 7.

<sup>216</sup> Aside from the improvements that might be expected from increased expertise, centralized patent tribunals would alleviate problems of variations between the district courts. See Kimberly A. Moore, *Forum Shopping in Patent Cases: Does Geographic Choice Affect Innovation?*, 77 N. Carol. L. Rev. 889, 932-34 (2001) (proposing specialized patent trial courts to eliminate forum shopping).

<sup>217</sup> A significant caveat to this argument is that it assumes the Federal Circuit possesses expertise in patent law comparable to that which a hypothetical specialized trial court would possess. This study shows that, in the face of the indeterminacy inherent in patent law, the district courts perform as well as specialized tribunals, *relative to the performance of the Federal Circuit*. If the Federal Circuit is not particularly competent in patent law - or is unusually competent in the other fields of its jurisdiction - then a specialized

regard the current state of affairs as unsatisfactory, then doctrinal or procedural reforms, rather than structural changes, may be the path to pursue.

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patent trial tribunal possessing that competence might perform much better than the district courts currently do. To assess this possibility we would need to compare the nature of the legal or technical advantages that might be enjoyed by a hypothetical specialized trial tribunal with those currently enjoyed by the Federal Circuit.