Articles

If You Can't Beat 'Em, Join 'Em? How Sitting by Designation Affects Judicial Behavior*

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Judges, lawyers, and scholars have long decried the high reversal rate district courts face in patent cases. Many have suggested greater district court specialization as a solution, and Congress in 2011 enacted legislation to promote such specialization. In this Article, we investigate the impact of a novel measure of a judge's experience with patent cases—whether a district court judge has sat by designation on a Federal Circuit panel in a patent claim construction appeal—on the likelihood a district judge's subsequent claim constructions are reversed. Before sitting by designation, judges who later do so actually have a slightly higher claim construction reversal rate than judges who never do so. After sitting by designation, the reversal rate of district court judges on subsequent claim construction appeals decreases by over 50%. This decrease is not explained by other measures of experience, including the number of prior patent cases or years on the bench. Nor is it fully explained by the timing of the appeal, the particular district court judge, or various other characteristics of the patents, the parties, and the litigation.

Our results might be thought to suggest a simple way to reduce the reversal rate in patent and perhaps other sorts of cases. But there is a catch: our evidence suggests this increased agreement is due to increased Federal Circuit trust in the decisions of individual judges who have sat by designation and not increased district judge understanding of claim construction. Personal relationships, not learning patent law, seem to explain why the reversal rate drops.

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Introduction

Patent claim construction—the act of figuring out in court what a patent covers—is the central inquiry in patent law.[1] But it has also proven an enormous source of frustration for lawyers, courts, and policy makers over the past two decades. Most have lamented the high claim construction reversal rate and the uncertainty it creates.[2] Scholars have offered various explanations and even suggested that the entire project of peripheral claiming is a failure.[3] One of the particular sources of frustration for district judges is the fact that even substantial experience with patent cases doesn't seem to prevent their claim constructions from being reversed by the Federal Circuit.[4]

In this Article, we find that one single act—a district judge spending a few days sitting by designation on the Federal Circuit as an appellate judge—is associated with a dramatic reduction in that judge's claim construction reversal rate. Our finding is robust to a variety of different controls. And while there are clearly selection effects at work in deciding who sits by designation on the Federal Circuit, our data suggest that

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1. *See, e.g.*, Giles S. Rich, *Extent of Protection and Interpretation of Claims – American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 497, 499 (1990) ("To coin a phrase, *the name of the game is the claim*.").

2. *See, e.g.*, William F. Lee & Anita K. Krug, *Still Adjusting to* Markman*: A Prescription for the Timing of Claim Construction Hearings*, 13 HARV. J.L. & TECH. 55, 67 (1999) ("Although, according to the Federal Circuit and the Supreme Court, *Markman* should have ushered in greater uniformity, predictability, and certainty in patent litigation, many believe that the holding has had the opposite effect. This is largely because Federal Circuit review of claim interpretation is de novo."); Kimberly A. Moore, *Are District Court Judges Equipped to Resolve Patent Cases?*, 15 HARV. J.L. & TECH. 1, 38 (2001) ("The 33% reversal rate of district court claim constructions . . . infuses the patent system with a high degree of uncertainty until the Federal Circuit rules on claim construction."); Lee Petherbridge, *The Claim Construction Effect*, 15 MICH. TELECOMM. TECH. L. REV. 215, 221 (2008) ("[A]s claim construction becomes at once more unpredictable *and* more *prominently involved* in other areas of the patent law, the court's treatment of other areas of law might, by association, also become more unpredictable."); David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 225–27 (2008) (describing some aspects of unpredictability). *But see* J. Jonas Anderson & Peter S. Menell, *Informal Deference: A Historical, Empirical, and Normative Analysis of Patent Claim Construction*, 108 NW. U. L. REV. 1, 4–6 (2014) (finding that the reversal rate has decreased in recent years); Jeffrey A. Lefstin, *Claim Construction, Appeal, and the Predictability of Interpretive Regimes*, 61 U. MIAMI L. REV. 1033, 1037–42 (2007) (questioning scholarly emphasis on predictability in claim construction).

3. *See generally* Dan L. Burk & Mark A. Lemley, *Fence Post or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PA. L. REV. 1743 (2009) (contending that the current system of peripheral claiming is indefinite and advocating instead a system of central claiming).

4. *See* Schwartz, *supra* note 2, at 254–56 (showing that overall judicial experience and patent law experience are not correlated to reversal rates). Jay Kesan and Gwendolyn Ball similarly find that total prior patent experience has no impact on the probability of claim construction reversal. Jay P. Kesan & Gwendolyn G. Ball, *Judicial Experience and the Efficiency and Accuracy of Patent Adjudication: An Empirical Analysis of the Case for a Specialized Patent Trial Court*, 24 HARV. J.L. & TECH. 393, 443–44 (2011). However, they do find evidence suggesting recent patent experience may reduce the chance of reversal. *Id.*

individual judges themselves are treated differently after they sit by designation. We also demonstrate that this result is not a function of learning by the district judge but rather reflects a personal connection between the judge and the members of the reviewing court. Our results have interesting implications for the current regime of "informal deference" in claim construction,[5] for *Teva v. Sandoz*[6]—a 2015 Supreme Court case that considered explicit deference to district judges in construing patent claims[7]—and for the practice of sitting by designation in the federal courts more generally. They suggest that the legal realists may have had it right all along—that judges are people, and their personal relationships can have more influence than legal doctrine on legal outcomes.

In Part I we discuss the doctrine of claim construction and the scholarly literature on claim construction reversal rates. In Part II we present our study design and methodology. In Part III we present our findings. Finally, in Part IV we offer some thoughts about the implications of our results.

I. Claim Construction and Its Discontents

Claim construction is the central feature of most patent lawsuits.[8] Courts construe claims before trial at "*Markman*[9] hearings," and almost always do so before any consideration of dispositive pretrial motions such as summary judgment.[10] And because claim construction must resolve any substantial dispute between the parties over the scope of the patent,[11] it resolves the vast majority of the infringement disputes, paving the way for

5. *See generally* Anderson & Menell, *supra* note 2 (examining Federal Circuit claim construction jurisprudence from 2001 to 2011 and finding reversal rates of district court constructions to have decreased over time).

6. Teva Pharm. USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831 (2015).

7. *Id.* at 838.

8. Burk & Lemley, *supra* note 3, at 1748–49. As the former Chief Judge of the Federal Circuit, Giles Rich, put it, "the name of the game is the claim." Rich, *supra* note 1, at 499 (emphasis omitted).

9. Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996).

10. *See* Peter S. Menell, Matthew D. Powers & Steven C. Carlson, *Patent Claim Construction: A Modern Synthesis and Structured Framework*, 25 BERKELEY TECH. L.J. 711, 792–93 (2010) (explaining case-management considerations involved in deciding when to hold a *Markman* hearing).

11. *See, e.g.*, Advanced Fiber Techs. Trust v. J & L Fiber Servs., Inc., 674 F.3d 1365, 1372–73 (Fed. Cir. 2012) (holding that judges can construe the construction of claims); O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., 521 F.3d 1351, 1360–63 (Fed. Cir. 2008) (holding that claim construction—the interpretation of terms used to construe patent claims—is an issue for the judge, not the jury). After *O2 Micro*, "[w]hen the parties present a fundamental dispute regarding the scope of a claim term, it is the court's duty to resolve it." *Id.* at 1362.

summary judgment[12] or even stipulations that the defendant does or does not infringe.[13] It can also have effects on seemingly unrelated doctrines.[14]

Claim construction is a question of law decided by the judge, not the jury.[15] As a result, the Federal Circuit held in *Cybor*[16] that district court claim construction decisions are reviewed without deference in the appellate court.[17] The Federal Circuit reaffirmed that conclusion en banc in *Lighting Ballast*[18] over a vigorous dissent by four judges,[19] but the Supreme Court recently revisited that question in *Teva v. Sandoz*.[20]

Claim construction decisions have traditionally been reversed on appeal at very high rates. Kimberly Moore, David Schwartz, and others found claim construction error rates through the mid-2000s close to 40%, with most of those errors resulting in a reversal of the case as a whole.[21] Unsurprisingly, the high reversal rate prompted great frustration among district judges.[22] For example, shortly after *Markman* when the reversal rate neared 50% one judge noted that such a coin flip was the worst of all

12. John R. Allison & Mark A. Lemley, *The (Unnoticed) Demise of the Doctrine of Equivalents*, 59 STAN. L. REV. 955, 958 (2007).

13. John R. Allison, Mark A. Lemley & David L. Schwartz, *Understanding the Realities of Modern Patent Litigation*, 92 TEXAS L. REV. 1769, 1790 n.74 (2014).

14. *See, e.g.*, Allison & Lemley, *supra* note 12, at 958 (studying the significant impact of claim construction on the "doctrine of equivalents"); Petherbridge, *supra* note 2, at 231–36, 261 (same).

15. Markman v. Westview Instruments, Inc., 517 U.S. 370, 384–91 (1996).

16. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448 (Fed. Cir. 1998) (en banc).

17. *Id.* at 1454–55.

18. Lighting Ballast Control LLC v. Phillips Elecs. N. Am. Corp., 744 F.3d 1272, 1292 (Fed. Cir. 2014) (en banc).

19. *Id.* at 1296 (O'Malley, J., dissenting) (joined by Chief Judge Rader and Circuit Judges Reyna and Wallace).

20. Teva Pharm. USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831, 835 (2015).

21. *E.g.*, Moore, *supra* note 2, at 11–13 (determining the district court claim constructions were incorrect 28% of the time and district court judges decided at least one claim construction issue incorrectly in 33% of patent cases that were appealed from 1996 to 2000); Kimberly A. Moore, Markman *Eight Years Later: Is Claim Construction More Predictable?*, 9 LEWIS & CLARK L. REV. 231, 239 (2005) [hereinafter Moore, Markman *Eight Years Later*] (finding "the Federal Circuit held at least one term was wrongly construed in 37.5% of the cases" analyzed from 1996 to 2003); David L. Schwartz, *Courting Specialization: An Empirical Study of Claim Construction Comparing Patent Litigation Before Federal District Courts and the International Trade Commission*, 50 WM. & MARY L. REV. 1699, 1716 (2009) (finding the average reversal rate for the five busiest patent district courts was 30.7% and the reversal rate for the International Trade Commission was 31% between 1996 and 2008); Schwartz, *supra* note 2, at 248–49 (finding 38% of cases between 1996 and 2007 had at least one term that was incorrectly construed, and 29.7% of the cases were reversed, vacated, and/or remanded because of a claim construction error); *see also* Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 BERKELEY TECH. L.J. 1075, 1104 (2001) (finding the Federal Circuit modified claim interpretations in 44% of the cases it decided between 1998 and 2000, and in total the Federal Circuit reversed 29.6% of cases that involved an express review of claim construction).

22. Moore, *supra* note 2, at 29.

possible worlds—even a higher reversal rate would give more certainty.[23] Scholars too have worried about the high reversal rate,[24] and some have offered possible explanations.[25] Most worrisome, Dave Schwartz finds no

23. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1476 (Fed. Cir. 1998) (en banc) (Rader, J., dissenting). Some have suggested that a 50% reversal rate might be driven by selection effects. *E.g.*, George L. Priest & Benjamin Klein, *The Selection of Disputes for Litigation*, 13 J. LEGAL STUD. 1, 16–17 (1984) (suggesting that because parties with strong or weak cases are more likely to settle before a judicial outcome, disputes that are actually litigated "lie close to the decision standard" and thus outcomes will approach a 50% win rate). But we are not persuaded that selection effects necessarily drive outcomes toward a 50% win rate. Steve Shavell, for instance, has argued that Priest and Klein are wrong and that any plaintiff win rate is possible. Steven Shavell, *Any Frequency of Plaintiff Victory at Trial Is Possible*, 25 J. LEGAL STUD. 493, 494 (1996) (suggesting that it is possible in a simple, frequently employed model of litigation "for the cases that go to trial to result in plaintiff victories with any probability"). Others have criticized the relevance of the strong Priest–Klein theory to patent litigation. *See, e.g.*, David L. Schwartz, *Pre*-Markman *Reversal Rates*, 43 LOY. L.A. L. REV. 1073, 1101–07 (2010) (describing several reasons to be doubtful that selection effects are the primary cause of high claim construction reversal rates); Jason Rantanen, *Why Priest-Klein Cannot Apply to Individual Issues in Patent Cases* 3–8 (Univ. Iowa Legal Studies Research Paper, No. 12-15, 2013), http://ssrn.com/abstract=2132810 [https://perma.cc/XN9V-EBNM] (arguing the Priest–Klein hypothesis applies only to the selection of dispute outcomes, not individual issues, and thus when patent cases include more than one issue on appeal "there is no reason to expect an appellant to have a 50% expectation of success on each issue").

24. Moore, *supra* note 2, at 27–28; Ted Sichelman, *Myths of (Un)certainty at the Federal Circuit*, 43 LOY. L.A. L. REV. 1161, 1171 (2010).

25. Gruner, for instance, suggests selection bias may be at work. Richard S. Gruner, *How High is Too High?: Reflections on the Sources and Meaning of Claim Construction Reversal Rates at the Federal Circuit*, 43 LOY. L.A. L. REV. 981, 1003 (2010). Sichelman persuasively challenges that story, however. *See* Sichelman, *supra* note 24, at 1172–78 (arguing that while a portion of the high reversal rates are due to selection bias, it is unlikely to explain the entirety of the high rates).

Petherbridge and Wagner suggest that claim construction disputes are traceable to philosophical differences among the Federal Circuit judges. R. Polk Wagner & Lee Petherbridge, *Is the Federal Circuit Succeeding? An Empirical Assessment of Judicial Performance*, 152 U. PA. L. REV. 1105, 1170–71 (2004).

Similarly, Krause and Auyang find some Federal Circuit judges are consistently more likely to give claims broader interpretations while others are more likely to give them narrower interpretations. Thomas W. Krause & Heather F. Auyang, *What Close Cases and Reversals Reveal About Claim Construction at the Federal Circuit*, 12 J. MARSHALL REV. INTELL. PROP. L. 583, 594–95 (2013). Further, they find that in two-thirds of appeals finding claim construction error, the Federal Circuit concluded the district court had construed the claims too narrowly. *Id.* at 600–01.

Cotropia argues that claim construction review is substantively focused, with judges affirming claim construction rulings adverse to the patentee but reversing claim construction rulings that favor the patentee. Christopher A. Cotropia, *Patent Claim Interpretation Review: Deference or Correction Driven?*, 2014 BYU L. REV. 1095, 1099.

Lefstin argues that reversal is a natural result of the difference in the timing and process by which appellate and district court judges receive information relevant to claim construction. Lefstin, *supra* note 2, at 1036–37.

Miller finds that software patent claim construction is much more likely to be reversed than other sorts of claim construction. Shawn P. Miller, *"Fuzzy" Software Patent Boundaries and High Claim Construction Reversal Rates*, 17 STAN. TECH. L. REV. 809, 812 (2014). This is consistent with prior work suggesting that software patent claims are less determinate than other kinds of patents. JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES,

evidence that judicial experience with patent cases affects the reversal rate: district judges who have handled lots of claim constructions are no more likely to be affirmed than those with less experience.[26] One of the authors has even suggested that the entire process of claim construction is inherently indeterminate.[27]

Interestingly, the claim construction reversal rate appears to have declined in the last ten years. Anderson and Menell, as well as Miller, find significant drops in the claim construction reversal rate beginning in 2005;[28] since that year only about 25% of claim construction decisions have been reversed.[29] They tie the drop to the Federal Circuit's en banc decision in *Phillips*,[30] which revisited the substantive standards for claim construction.[31] While *Phillips* did not create a formal deference regime or even change the substantive standards for claim construction,[32] Anderson and Menell suggest that it ushered in a regime of "informal deference" in which the Federal Circuit began affirming rather than reversing in close cases.[33]

But the law of claim construction has changed again very recently. In January 2015, the Supreme Court held in *Teva v. Sandoz* that the court of appeals must defer to district court claim construction when the district court made factual findings, but need not do so if the claim construction was based merely on the construction of the patent language and the record before the Patent and Trademark Office.[34] *Teva* offers the promise of even greater deference to district courts, but whether that will happen will depend quite a bit on the importance the Federal Circuit attaches to fact evidence as opposed to the patent document itself. Early cases suggest that review will often remain de novo and hence subject to the prior post-*Phillips* regime of informal deference.[35]

BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 187–88 (2008); Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WIS. L. REV. 905, 928–31; Peter S. Menell & Michael J. Meurer, *Notice Failure and Notice Externalities*, 5 J. LEGAL ANALYSIS 1, 32–33 (2013).

Lemley argues that an explanation for the high reversal rate is the fact that courts must resolve a large number of claim construction issues, and getting even one wrong can prompt a reversal of the whole case. Mark A. Lemley, *The Fractioning of Patent Law*, *in* INTELLECTUAL PROPERTY AND THE COMMON LAW 504, 508–09 (Shyamkrishna Balganesh ed., 2013).

26. Schwartz, *supra* note 2, at 254–56.

27. Burk & Lemley, *supra* note 3, at 1745.

28. Anderson & Menell, *supra* note 2, at 6; Miller, *supra* note 25, at 835.

29. Anderson & Menell, *supra* note 2, at 6.

30. Phillips v. AWH Corp., 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

31. *Id.* at 1312.

32. *See id.* at 1330–31 (Mayer, J., dissenting) (criticizing the court on both grounds).

33. Anderson & Menell, *supra* note 2, at 6–7.

34. Teva Pharm. USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831, 840–41 (2015).

35. *See, e.g.*, *In re* Papst Licensing Dig. Camera Patent Litig., 778 F.3d 1255, 1261 (Fed. Cir. 2015) ("[W]e review the district court's claim constructions de novo, because intrinsic evidence fully determines the proper constructions.").

II. Design and Methodology

In this Article, we explore the relationship between a district judge's experience and relationships, and the outcome of claim construction cases. We take advantage of a common mechanism in the courts of appeals: district judges sitting "by designation" as appellate judges for a short period of time (usually a few days, but sometimes as much as a week). Sitting by designation is a common practice in the regional circuits, though the judges who sit in the regional circuits are selected almost exclusively from district judges within that circuit.[36] Because the Federal Circuit has nationwide jurisdiction, its judges could theoretically select any district judge in the country to sit with them. The chief judge of the Federal Circuit issues the invitations. Notably, no district judge has ever turned down an invitation to sit with the Federal Circuit.[37]

Our conversations with then-Chief Judge Rader suggest that selection of judges is not random.[38] Rather, the court tends to invite judges from districts with substantial patent dockets, often including relatively new appointees to courts like the District of Delaware or the Eastern District of Texas.[39] Our data confirm that district judges who sit by designation with the Federal Circuit hear more patent cases as district judges than those who do not (an average of 171 cases per judge from 2000 through 2013 for the 43 judges in our data set who sat by designation compared to 64 cases per judge for the 468 judges that did not).[40] But not all active patent judges are

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36. *See* 28 U.S.C. § 292 (2012) (granting power to the chief judge of a circuit to select a district judge from within the circuit to sit by designation, and to the Chief Justice of the United States to designate a judge from outside the circuit when necessary); Todd C. Peppers et al., *Random Chance or Loaded Dice: The Politics of Judicial Designation*, 10 U. N.H. L. REV. 69, 74–75 (2012) (detailing how designation decisions are left to the chief judge's discretion); Richard B. Saphire & Michael E. Solimine, *Diluting Justice on Appeal?: An Examination of the Use of District Court Judges Sitting by Designation on the United States Courts of Appeals*, 28 U. MICH. J.L. REFORM 351, 357, 359–60 (1995) (noting circuit court reliance on district judges sitting by designation and outlining the history of the practice). *See generally* ADMIN. OFFICE OF THE U.S. COURTS, OTHER JUDICIAL BUSINESS tbl.V-2 (2013), http://www.uscourts.gov/uscourts/Statistics/JudicialBusiness/2013/appendices/V02Sep13.pdf [http://perma.cc/BK9U-N3UQ] (compiling statistics on visiting judges by circuit during a twelve-month period); NICHOLLE STAHL-REISDORFF, FED. JUDICIAL CTR., THE USE OF VISITING JUDGES IN THE FEDERAL DISTRICT COURTS: A GUIDE FOR JUDGES & COURT PERSONNEL (2001), http://www.fjc.gov/public/pdf.nsf/lookup/visijud3.pdf/$file/visijud3.pdf [http://perma.cc/696J-QG79] (outlining a model visiting-judge program to be used by individual courts when creating their own).

37. Telephone interview by Mark A. Lemley with Randall R. Rader, then Chief Judge, U.S. Court of Appeals for the Federal Circuit (Jan. 2014).

38. *Id.*

39. *Id.*

40. We used proprietary data from Lex Machina. LEX MACHINA, https://lexmachina.com/. Lex Machina's litigation analytics website enables searches of all patent lawsuits heard by a particular district court judge. However, coverage begins with lawsuits filed in 2000. We ran a separate litigation search for each judge we determined had at least one claim construction appealed and for each determined the total number of patent lawsuits Lex Machina identifies as being presided over by that judge between the beginning of 2000 and the end of 2013. We then

invited; the median number of cases heard by judges that sat by designation is 94, and 71 judges in our data set heard 94 or more patent cases during that period but were never invited to sit by designation.[41]

In this study, we test whether judges who sit by designation on the Federal Circuit on at least one case in which claim construction is at issue are less likely to be reversed by the Federal Circuit thereafter. We use as our data set all 1,151 Federal Circuit opinions between January 2002 and December 2014 reviewing at least one district court claim construction decision.[42] The opinions we identify include all precedential and nonprecedential opinions, as well as all Rule 36 decisions that lack a written opinion.[43]

To complete our analysis, we determined whether the district judge whose claim construction was reviewed in each appellate opinion had sat by designation on an earlier Federal Circuit panel reviewing claim construction. We then reviewed each opinion to determine if the majority of the Federal Circuit panel found the district court had erred in the construction of at least one claim term. This is a broad definition of "reversal" which we

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averaged the totals for the 43 district judges who sat by designation during the period of our study and separately averaged the totals for the 468 judges who did not.

According to the Federal Circuit, 47 different district court judges sat by designation from 2006 through 2014. *U.S. Court of Appeals for the Federal Circuit Visiting Judges*, U.S. COURT OF APPEALS FOR THE FED. CIRCUIT (2015), http://cafc.uscourts.gov/sites/default/files/judicial-reports/vjchartforwebsite2006-2015.pdf [http://perma.cc/3HXL-EXFG] [hereinafter *Federal Circuit Visiting Judges*] (listing judges who have sat by designation on the Federal Circuit since September 2006). In creating our data set, we identified appeals where each of these 47 district judges was a member of the reviewing panel. However, four of these judges did not have any of their district-level claim constructions reviewed by the Federal Circuit during the period of our study. These judges are Elaine Bucklo of the Northern District of Illinois, Wiley Daniel of the District of Colorado, Liam O'Grady of the Eastern District of Virginia, and James Robertson of the D.C. District. We excluded them from our analysis.

41. LEX MACHINA, *supra* note 40.

42. To identify these decisions, we replicated the methodology of David Schwartz. For a complete explanation of Schwartz's method of selection and coding, see Schwartz, *supra* note 2, at 269–74.

43. Kimberly Moore explains that

> [w]hen the Federal Circuit resolves an appeal, it can issue a precedential opinion, a non-precedential opinion, or a summary affirmance. Precedential opinions . . . are published and create citable precedent on the issues of law to which they pertain. Non-precedential opinions are law of the case in which they are issued, but do not create citable precedent. [Fed. Cir. R. 47.6(b).] . . . The court may also resolve a case by a Rule 36 summary affirmance. [Fed. Cir. R. 36.] This is an affirmance of the district court without opinion. These affirmances leave intact and affirm the judgment of the district court . . . . A case is not summarily affirmed because it is unimportant and should not be considered. It is summarily affirmed because the district court got it right, and there is no new law that needs to be explained, defined, clarified or established. There are no summary reversals. Whenever the Federal Circuit reverses, it issues an opinion explaining how and why the district court was wrong.

Moore, Markman *Eight Years Later*, *supra* note 21, at 234–35 (footnotes omitted).

use for our entire analysis.[44] However, we believe it is the best measure of determining district judge performance, as a strict measure of reversal would exclude cases of harmless but real claim construction error. Given this definition of reversal in our analysis, "affirmed" means that the Federal Circuit panel found no error in the district court's claim constructions. Of the 1,151 opinions, the Federal Circuit reversed in 371 (32.2%) according to our definition.

We also identified the judges on the Federal Circuit panel in each of our opinions. Where a judge was a district judge sitting by designation, we separately recorded the date of the opinion. We then determined the district judge whose claim construction was reviewed in each of the 1,151 opinions and the date of the district court's claim construction. Finally, we created a dummy variable equal to "1" for an opinion where the judge whose claim construction was reviewed had sat by designation before the date of district claim construction in that opinion. Of the 1,151, 190 opinions reviewed claim construction decisions rendered by judges who sat with the Federal Circuit by designation on at least one claim construction appeal during the period of our data set. Of those, 79 reviewed constructions made by district judges who had already sat by designation on at least one appellate panel that ruled on claim construction.

To move beyond simple bivariate comparison of the reversal rates of judges who have and have not sat by designation, we collected a variety of other information. We collected data on each judge's prior patent experience at the time of decision, including time on the bench, total number of patent cases, and total number of claim construction decisions to that point. We also include controls for district, area of technology, whether the plaintiff was a nonpracticing entity (NPE), the year of decision, and whether the decision was made before or after the Federal Circuit's *Phillips* decision. To further investigate why judges who have sat by designation have been less likely to be reversed, we also identified district judges who sat with the Federal Circuit but did not decide any claim construction cases, collected information about which Federal Circuit judges sat with each district judge, and determined which particular Federal Circuit judges decided each of the 1,151 decisions in our data set.

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44. It is also one of the measures of reversal most frequently used in prior claim construction work, thus allowing comparison of results. *See, e.g.*, Moore, Markman *Eight Years Later*, *supra* note 21, at 239 (analyzing reversal rates based in part on the finding that the Federal Circuit held that at least one term was wrongly construed in 37.5% of cases); Schwartz, *supra* note 2, at 240 (using the percentage of cases with at least one wrongly construed term as one of three methods to calculate reversal rates).

III. Findings

A. All Claim Construction Decisions

1. Basic Bivariate Results.—We began our analysis by asking the simple question whether district judges were more or less likely to be reversed on claim construction after they had sat by designation on a panel deciding claim construction. We used as our basis for study all appellate claim construction decisions in our data set. The answer is clear: as Table 1 illustrates, decisions by judges who have previously sat by designation are less than half as likely to be reversed by the Federal Circuit on claim construction. Those results were highly statistically significant, with a *p* value (the probability of finding this result by random chance) of 0.001.[45]

Table 1

Rate that Federal Circuit Reversed Claim Construction of District Judges Who Had or Had Not Previously Sat by Designation on a Panel Deciding a Claim Construction Appeal

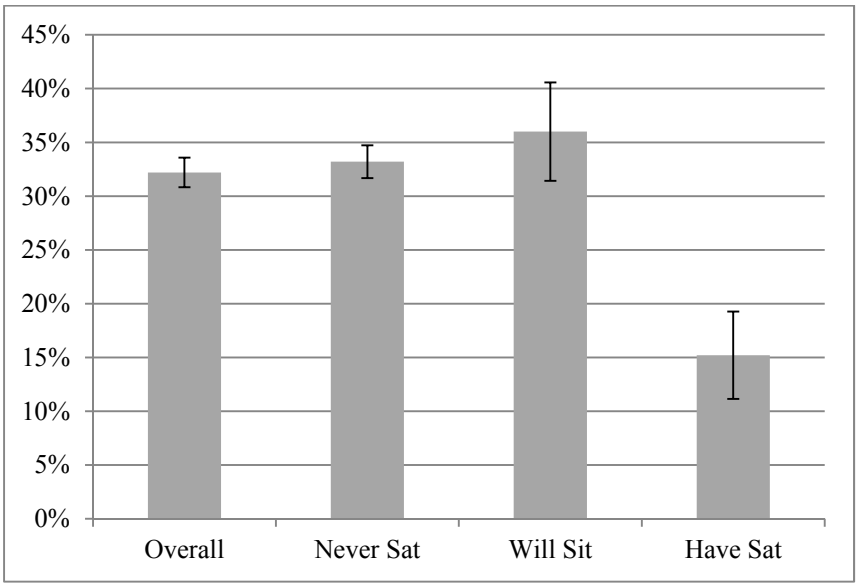
	Sat by Designation	Had Not Sat by Designation	Test Result
# of Claim Construction Decisions	79	1072	$\chi^2(1) = 11.28$, $p = 0.001$***
# of Decisions with Error	12	359	
Error Rate	15.2%	33.5%	Fisher's Exact, $p = 0.001$***

NOTE.—Significant differences in rates designated:
* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.

45. In the bivariate comparisons reported in Tables 1 and 3 we include the results of Chi-square and Fisher's exact tests of the null hypothesis that there is no difference in the compared claim construction error rates. Both of these tests calculate the probability value for the relationship between two dichotomous variables. However, Fisher's is the preferred test when sample sizes are small, or the data are very unequally distributed among contingencies. This is the case for the data in Tables 5 and 6. Thus, we only report Fisher's exact test results in those tables.

In Figure 1, we can see that the rate at which judges who have sat by designation on a claim construction appeal have been reversed (15.2% of 79 appeals) is far lower than: (1) the overall reversal rate for all appellate opinions in the population (32.2% of 1,151 appeals); (2) the reversal rate of judges who had not and never would sit by designation (33.2% of 961 appeals); and (3) the reversal rate of judges who would later but had not yet sat by designation on a claim construction appeal (36.0% of 111 appeals). Indeed, the raw reversal rate of judges who never sat by designation is actually slightly lower than the rate of judges who had not yet but would sit by designation. However, the latter difference is not statistically significant.

Figure 1: Rate of Claim Construction Appeals Reversed



NOTE.—"Overall" denotes the reversal rate for all appeals in the population (n = 1,151). "Never Sat" denotes the reversal rate for appeals from decisions by judges who never sat by designation on a claim construction appeal (n = 961). "Will Sit" denotes the reversal rate for appeals from decisions by judges who would but had not yet sat by designation on a claim construction appeal (n = 111). "Have Sat" denotes the reversal rate for appeals from decisions by judges who had sat by designation on a prior claim construction appeal (n = 79). Standard error bars included.

2. Multivariate Analysis.—But does this basic result hold when we consider other possible explanatory factors? To test this we controlled for various characteristics of the district court judge, the district court adjudication pre-appeal, the patents subject to claim construction appeal, and the appeal. We report the results of five different specifications in Table 2.[46] In each, the dependent variable is whether the Federal Circuit panel affirmed all of the appealed district court claim constructions, and the primary independent variable is whether the district judge who construed the appealed claims had sat by designation on a panel reviewing claim construction.

46. In Table 2 and subsequent reported regressions, we report the marginal effects for each independent variable using Stata's *dprobit* command. Further, because the likelihood of reversal may be driven by who the district judge construing the claims was, we cluster standard errors on individual judges. This allows us to weed out results that might be driven by particular judges being especially likely to be affirmed (or reversed).

Table 2

Probit Estimation of Likelihood of Federal Circuit Affirming Claim Construction

	1	2	3	4	5
After Designation?	.162***(.046)	.166***(.045)	.169***(.046)	.148**(.053)	.149**(.054)
Timing of Opinion:					
Appeal Month	.0006** (.0003)				
After *Phillips*?		.091***(.031)	.104***(.031)	.098***(.032)	.113***(.033)
District Judge Experience:					
Years a Judge		–.0010(.0016)			–.0008(.0017)
Patent Characteristics:					
NPE Owner			.095***(.030)		.089***(.031)
Software			–.167***(.034)		–.166***(.035)
Appeal after:					
Prelim. Injunction				–.117 (.106)	–.096 (.106)
Summary Judgment				–.097* (.051)	–.074 (.053)
Jury Trial				–.156**(.073)	–.133* (.072)
JMOL				–.216**(.094)	–.190**(.097)
District Court Judgment:					
C.D. Cal.				–.118*(.072)	–.107 (.073)
N.D. Cal.				.037 (.049)	.069 (.045)
S.D. Cal.				.107 (.092)	.113 (.090)
D. Colo.				.057 (.071)	.048 (.085)
D. Del.				.036 (.043)	.062 (.043)
S.D. Fla.				.091 (.104)	.095 (.103)
N.D. Ill.				.049 (.060)	.051 (.058)
D. Mass.				.033 (.086)	.035 (.089)
E.D. Mich.				.070 (.075)	.055 (.077)
D. Minn.				–.107 (.129)	–.087 (.133)
D.N.J.				.027 (.071)	.022 (.072)
S.D. N.Y.				.019 (.059)	.049 (.057)
N.D. Ohio				.092 (.109)	.056 (.120)
E.D. Pa.				.210*(.084)	.204*(.084)
E.D. Tex.				.064 (.073)	.098 (.073)
N.D. Tex.				–.061 (.113)	–.040 (.110)
S.D. Tex.				.111 (.103)	.104 (.105)
E.D. Va.				–.111 (.090)	–.053 (.089)
W.D. Wash.				.045 (.067)	.067 (.066)
W.D. Wis.				.021 (.047)	.047 (.056)
Log-likelihood	–716	–713	–698	–698	–685
Observations	1151	1151	1151	1151	1151

NOTE.—Population of 1,151 Federal Circuit decisions between January 1, 2002 and December 31, 2014 that included explicit review of claim construction. Marginal effects reported with discrete change of dummy variables from 0 to 1. Standard errors clustered on district judge included in parenthesis.

* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.

a. Timing of Appellate Decision.—Perhaps the basic result that judges sitting by designation were less likely to be reversed was driven by changes in claim construction practice overall. If the likelihood of any reversal in claim construction is declining over time, then our result might simply be an artifact of the fact that decisions after sitting by designation naturally occur later in our data set than opinions before sitting by designation. To test this, we added in a variable for the month in which the decision was made.[47] We also tested an alternative formulation which focused on whether the Federal Circuit's decision was rendered before or after the en banc opinion in *Phillips*, which Anderson and Menell find to have been a trigger in reducing the claim construction reversal rate.[48] We report the results using "Appeal Month" in Specification 1 and "After *Phillips*" in Specification 2 through 5.

We do indeed find that claim construction reversal rates have declined over time and that *Phillips*, which is highly significant, appears to be the trigger. But even after including either of these variables, the result for sitting by designation remains robust and statistically significant. For example, in Specification 1 where we control for Appeal Month, the marginal effect of sitting by designation is a 16% decline in the likelihood of reversal ($p = 0.003$).

b. District Judge Experience.—The passage of time could have another effect: judges gain more experience over time. So even if changes in overall claim construction reversal trends cannot explain the sitting-by-designation effect, perhaps the answer has to do with changes in the judges themselves. If judges get better at claim construction with experience, we would expect to see individual judges' reversal rates decline.[49] Accordingly, we also decided to add a metric for judicial experience. We measure years on the bench at the time of the appellate decision.[50] We present the results in Specification 2. The number of years a judge has spent on the bench has no significant effect on the likelihood of claim construction reversal. However, previously sitting by designation on a claim construction appeal remains highly significant ($p = 0.002$).

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47. "Appeal Month" is a count variable ranging from 1 for January 2002 to 156 for December 2014. Specifically, the variable indicates the month within the range of our data set that the appeal was decided.

48. Anderson & Menell, *supra* note 2, at 6.

49. One study found a modest *negative* effect of judicial experience with patent cases—that district judges with more patent experience were less likely to be affirmed. Charlie Stiernberg, Note, *Science, Patent Law, and Epistimic Legitimacy: An Empirical Study of Technically Trained Federal Circuit Judges*, 27 HARV. J.L. & TECH. 279, 294, 294 tbl.2 (2013).

50. Ideally we would measure this from the date of the district court's decision rather than the date of the appellate decision. However, except for judges sitting by designation, we have not yet gathered complete data on that point. In any event, there should not be a systematic variation between when a district judge decides the case and when the appellate decision comes down.

c. Patent Characteristics.—Next, we were concerned that the characteristics of the patents and the parties who assert them might vary systematically in ways that affected our results. First, if some judges saw more NPE or "patent troll" suits, and if it was the case both that decisions in NPE cases were more or less likely to be reversed and that those judges were more or less likely to be selected to sit by designation, that combination of factors could confound our results. To address this concern, we added a variable for whether the patent owner was a NPE or a firm that actually makes products.[51]

Second, prior work by one of the authors finds that the Federal Circuit has been significantly more likely to reverse construction of claims in patents covering software.[52] To account for the possibility that this explains our results, we created another variable indicating whether or not the patents whose claims were reviewed in each appellate opinion covered software.[53] We present the results adding both of these variables in Specification 3.

Claim construction rulings involving patents owned by NPEs were significantly more likely to be affirmed. This is consistent with Miller's results, and he argued that it might be explained by NPEs being less risk averse or facing lower litigation cost such that they pursue relatively weaker claim construction appeals.[54] In contrast, and again consistent with Miller's findings, claim construction rulings involving software patents were significantly less likely to be affirmed. But neither of these results shook the significance of our core finding that sitting by designation has an effect. Decisions by judges after they sat by designation on a claim construction appeal were nearly 17 percentage points more likely to be affirmed in this specification, and the result remained highly significant ($p = 0.003$).

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51. We created this variable by first obtaining the names of owners of the patents whose constructions were appealed from Lex Machina. We then reviewed descriptions of their businesses found in court pleadings, firm websites, and media coverage of their litigation. NPEs include all owners except those we identified as selling products or services. Most NPEs in our data set are individual inventors or patent-licensing firms, but a few are universities and other not-for-profit research institutions.

52. Miller, *supra* note 25, at 825–27.

53. We used Allison et al.'s definition of a software patent as one where "at least one claim element in the patent consists of data processing—the actual manipulation of data—regardless of whether the code carrying out that data processing is on a magnetic storage medium or embedded in a chip." John R. Allison, Mark A. Lemley & Joshua Walker, *Extreme Value or Trolls on Top? The Characteristics of the Most-Litigated Patents*, 158 U. PA. L. REV. 1, 6–7 (2009). In every appellate opinion that reviewed the construction of claims of multiple patents, we found that either all or none of the patents were software according to this definition.

54. Miller, *supra* note 25, at 830 (explaining that NPEs have "less aversion to litigation" and as a result "will appeal more often"); *see also* Mark A. Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117, 2163–66 (2013) (arguing that NPEs may be less concerned about reputational harm than practicing entities).

d. District Court Characteristics.—Finally, we added two types of variables capturing differences in the district court adjudication. First, from Lex Machina and LexisNexis we determined whether the latest stage of the case reached before appeal was the grant or denial of a preliminary injunction, the grant (but not the denial) of summary judgment, a bench trial, a jury trial, or a ruling of judgment as a matter of law (JMOL). Second, to account for the effects of localization, we included dummies for each of the 20 district courts with the largest patent dockets. We present the results in Specification 4.

Compared to bench trials (the omitted variable in the procedural test), claim construction rulings appealed after summary judgment, jury trial, and JMOL were all significantly more likely to be reversed, though only to a 90% confidence level for summary judgment. Regarding district dummies, only the Central District of California was significantly more likely to be reversed on claim construction (and only to a 90% confidence level). Only the Eastern District of Pennsylvania was significantly less likely to be reversed (and only to a 90% confidence level).

The addition of so many variables did reduce the sitting-by-designation effect somewhat. We think that is an artifact of the number of variables included, coupled with the fact that we are including both individual-judge standard errors and variables based on district that are naturally related to those standard errors. Nonetheless, even in this specification, judges who had previously sat by designation were nearly 15 percentage points less likely to be reversed than those who hadn't, and the result remained statistically significant ($p = 0.017$).

In Specification 5, our full specification, we include all variables in Specifications 2 through 4. Our results are consistent with prior specifications. And most importantly, judges who had previously sat by designation remain significantly less likely to be reversed than those who hadn't ($p = 0.020$).

Finally, to confirm that particularly active district court judges with extremely high or low reversal rates do not explain the effect of sitting by designation, we reran our specifications in Table 2 with additional controls for individual judges whose district court constructions were reviewed in six or more appellate opinions in the population.[55] These results are reported in Appendix Table A.1. The results are very similar to those in

55. In that alternative specification we only include indicator variables for active judges with at least one Federal Circuit opinion reversing and one affirming their district court constructions. There are two district court judges with six or more appellate opinions in the population affirming all of their claim constructions—Kent A. Jordan (D. Del.) with seven and William G. Young (D. Mass.) with six. As a statistical matter, however, we cannot include indicator variables for these judges without their appeals being dropped from our regressions.

Table 2. Only two judges were significantly more or less likely to be affirmed than their peers. Judges who had previously sat by designation were significantly less likely to be reversed in each of the five specifications.

The results of our survey of all claim construction decisions, then, are unambiguous: even after controlling for a myriad of variables, judges are significantly less likely to be reversed on claim construction rulings after sitting by designation on a panel of the Federal Circuit reviewing claim construction decisions.

B. Selection of Judges Who Sit

We can't stop there, however. As noted above, the selection of district judges to sit by designation is not random. This raises the potential problem of selection bias. If the Federal Circuit is selecting only particularly good judges to sit by designation, we might expect their claim construction reversal rates to be lower than those of the judges not chosen to participate. If so, that fact might explain our data.

To account for this problem, we did two things. First, we tested the full data set to see whether judges who ever sit by designation are significantly less likely to be reversed than judges who never sat by designation. If it is the quality of the judge rather than something about sitting by designation that is driving the results, we should expect to see that show up in the test that divides judges into those two groups. But we don't. Table 3 shows that being one of the judges who had already been or would eventually be selected to sit by designation (rather than a judge who never sat by designation) had no significant effect on the likelihood of reversal on claim construction.

Table 3

Rate that Federal Circuit Reversed Claim Construction of District Judges Who Would or Had Sat Versus Never Sat by Designation on a Panel Deciding a Claim Construction Appeal

	Would or Had Sat by Designation	Never Sat by Designation	Test Results
# of Claim Construction Decisions	190	961	$\chi^2(1) = 2.47$, $p = 0.116$
# of Decisions with Error	52	319	
Error Rate	27.4%	33.2%	Fisher's Exact, $p = 0.126$

NOTE.—Significant differences in rates designated:

* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.

Thus, there seems to be nothing inherently different about the claim construction decisions of judges who are chosen to sit by designation.

To further eliminate the possibility of selection bias, we constructed a second, more restricted data set composed only of decisions by district judges who sat by designation on a claim construction appeal during the period covered by our data set. By excluding from the second data set appellate opinions reviewing decisions of judges who never sat by designation, we lose a lot of observations; there were 1,151 observations in the full data set and only 190 in this restricted data set. But because the restricted data set includes only the 33 judges who sat by designation on a claim construction appeal during the period of our study, we can directly compare the claim construction reversal rates of the same judges before and after they sit by designation.[56]

We find that even controlling for many of the same factors as in the full data set (including judicial experience, the procedural posture of the case, whether the plaintiff was an NPE, and whether the patents covered software) the individual judges who sat by designation were significantly less likely to be reversed on claim construction issues after sitting by designation than they were before sitting by designation. We report the results in Table 4.

Table 4 includes three specifications that control for three alternative measures of the district judge's experience. In Specification 1, we measure judicial experience as in Table 2—the number of years the district judge served on the bench at the time of the appellate decision. In Specification 2, we measure judicial experience as the total number of patent cases assigned to the district judge. Finally, in Specification 3, we measure experience as the number of patent cases to which the district judge was assigned prior to

56. Of the 33 judges who sat by designation on a claim construction appeal, 23 made claim construction decisions as district judges after that experience which were subsequently reviewed by the Federal Circuit.

the filing date of the case that is the subject of the appellate decision. Consistent with Schwartz's findings, none of these three measures of judicial experience is a statistically significant indicator of the likelihood of claim construction reversal.[57] Further, it is interesting to note that the marginal effect of sitting by designation in each of these specifications is larger than in any of our specifications in Table 2. In other words, the reversal rate drops even more after sitting by designation in our restricted set, which supports the conclusion that sitting by designation really has decreased the subsequent reversal rate of the judges who have had that experience.

Table 4

Probit Estimation of Likelihood of Federal Circuit Affirming Claim Construction—Restricted Set

	1	2	3
After Designation?	.207** (.085)	.201*** (.068)	.234*** (.070)
Timing of Opinion:			
After *Phillips*?			
District Judge Experience:			
Years a Judge	–.0012 (.0051)		
Total # of Patent Cases		–.00001 (.00005)	
# of Prior Patent Cases			–.00058 (.00035)
Patent Characteristics:			
NPE Owner	.110 (.068)	.109 (.070)	.145* (.075)
Software	–.105* (.065)	–.106* (.064)	–.119* (.063)
Appeal After:			
Prelim. Injunction	–.119 (.258)	–.120 (.264)	–.122 (.242)
Summary Judgment	–.000 (.107)	–.002 (.112)	.021 (.102)
Jury Trial	–.095 (.122)	–.096 (.123)	–.079 (.121)
JMOL	.107 (.187)	.109 (.188)	.119 (.148)
Log-likelihood	–104	–104	–88
Observations	190	190	172

NOTE.—Population of 190 Federal Circuit decisions between January 1, 2002, and December 31, 2014, that included explicit review of claim construction by district judge who had or would sit by designation on a claim construction appeal. Marginal effects reported with discrete change of dummy variables from 0 to 1. Standard errors clustered on district judge included in parenthesis.

* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.

To confirm that particularly active district court judges with extremely high or low reversal rates do not explain the effect of sitting by designation, we reran our specifications in Table 4 with additional controls for those designated judges whose district court constructions were reviewed in six or more appellate opinions in our restricted set.[58] These results are reported in

57. Schwartz, *supra* note 2, at 254–56.

58. Again, as in Appendix Table A.1, we can only include controls for active judges with at least one Federal Circuit opinion reversing and one affirming their district court constructions.

Appendix Table A.2 and are consistent with our results in Table 4. None of the individual district judge controls are significant in any of the three specifications.

Notably, however, the specifications reported in Table 4 and Appendix Table A.2 do not include our variable for the Federal Circuit's *Phillips* decision. When we add the *Phillips* variable to these regressions, it is extremely significant in most specifications, but the after-designation variable is no longer significant in most specifications. This is a function of two factors. First, the restricted set is much smaller than the full data set, so finding statistical significance is harder. However, the direction and magnitude of the effect is similar even though the result isn't significant. Second, there is naturally a very strong relationship between the after-designation and after-*Phillips* variables because both compare events that occur later in our data set to ones that naturally occur earlier. Specifically, *Phillips* was decided in July 2005,[59] and the first judge in our data set to sit by designation sat with the Federal Circuit in early September 2006.[60] Not surprisingly, we then find our after-designation and after-*Phillips* variables strongly correlated, $r(188) = 0.48$, $p < 0.01$, and every one of the 47 pre-*Phillips* opinions in our restricted data set reviewed claim constructions of judges who would but had not yet sat by designation. Despite this, among the 143 post-*Phillips* opinions in our data set the reversal rate of district judges who had already sat by designation is 15.2% (12 of 79 opinions), while the rate for judges who would, but had not yet, sat is 29.7% (19 of 64 opinions). Further, the difference in the reversal rates is statistically significant ($p = 0.043$). Thus, while the Federal Circuit's *Phillips* decision explains some of the impact of sitting by designation on claim construction reversal, it cannot explain all of it, even in our restricted set.

C. Mechanisms

The data, then, strongly support the hypothesis that district judges who sit by designation on the Federal Circuit are thereafter significantly less likely to have their claim construction decisions reversed by that court. The next question is why? We can imagine three possible explanations.

First, it might be that district judges who sit by designation with the Federal Circuit learn the substantive law of claim construction from their experience there and are thereafter rendering better decisions. If so, sitting by designation is unambiguously a good thing, and we ought to expand the sitting-by-designation program to improve substantive decisions. Alternatively, it might be that when a district judge sits with the Federal Circuit, the Federal Circuit judges come to know and respect that district

59. Phillips v. AWH Corp., 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

60. *Federal Circuit Visiting Judges*, *supra* note 39.

judge and are thereafter less likely to reverse her decisions, either because of subconscious favoritism or because the judges are informally deferring to the decisions of a district judge whose opinions they give substantial weight.[61] An intermediate possibility is that district judges who sit by designation get a better sense of how to write an opinion the appellate courts will approve of—that they learn the "tricks" of writing a persuasive claim construction decision. If either of these latter two explanations is correct, district judges might well line up to sit by designation with the court, but we don't necessarily get better decisions. Indeed, from a societal perspective we might worry about the arbitrariness of an appeals court deferring to some judges more than others.

To try to distinguish these explanations, we ran three additional tests with our restricted set. First, we collected data on the particular Federal Circuit judges with whom the district judge sat on panels reviewing claim construction. We then determined whether the subsequent claim construction decisions those district judges made were decided by one or more of the same Federal Circuit judges. If personal connections are the mechanism that is reducing the reversal rate, we should expect that effect to be more pronounced when the decision was reviewed by Federal Circuit judges who actually knew the district judge. But if learning is going on, that learning should apply regardless of which appellate judges later review the district court's decisions.[62] We present the results in Table 5.

61. Some evidence from other courts suggests that appellate judges are less likely to reverse or criticize the decisions of people with whom they interact outside of that case. *E.g.*, Jordi Blanes i Vidal & Clare Leaver, *Bias in Open Peer-Review: Evidence from the English Superior Courts*, 31 J.L. ECON. & ORG. 431 (2015).

62. Some commentators have suggested to us that the Federal Circuit's claim construction jurisprudence is sufficiently judge specific that there could be a learning effect that was limited only to learning the predilections of particular Federal Circuit judges, rather than the court as a whole. We acknowledge this as a possible alternative explanation for this data, though it is not consistent with our second mechanism test described below.

Table 5

Rate that Federal Circuit Panel Reversed Claim Construction of District Judges Who Had Sat by Designation When the Panel Included Appellate Judges with Whom the District Judges Had and Had Not Sat

	No Same Panel Judge	At Least One Same Panel Judge	Fisher's Exact
# of Claim Construction Decisions	52	27	$p = 0.050$**
# of Decisions with Error	11	1	
Error Rate	21.2%	3.7%	

NOTE.—Significant differences in rates designated:
* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.

The results show that district judges have been significantly less likely to be reversed on claim construction when one or more of the very judges they previously sat with by designation is deciding the appeal (a 21% reversal rate with entirely different judges, compared with a 4% reversal rate with at least one of the same panel judges) ($p = 0.050$). Indeed, we found only one case out of the 79 postdesignation decisions in which a district judge was reversed by a panel that included a judge they sat with on the Federal Circuit.[63]

Second, we distinguished between those district judges who heard at least one claim construction case while sitting on the Federal Circuit and judges who sat by designation but never heard a claim construction appeal while there.[64] If the after-designation effect was driven by learning, it should not benefit judges who spend time at the Federal Circuit but never encounter a claim construction question while there. In fact, however, as we report in Table 6, we find that both judges who heard claim construction questions on appeal and those who didn't benefit from the after-designation reduction in their claim construction reversal rate.

63. Notably, this *p* value has declined as we have added more observations, suggesting that a larger number of observations would result in even greater significance. However, no additional judges sat by designation on the Federal Circuit from the end of 2013 through the middle of 2015, and some of the judges who previously sat have assumed senior status or retired. Thus, the number of new observations is currently decreasing over time.

64. We identified ten district court judges who sat by designation but never on a panel reviewing claim construction. Of the 1,151 Federal Circuit opinions in our data set, 75 reviewed claim constructions these judges made at the district court level.

Table 6

Rate that Federal Circuit Panel Reversed Claim Construction of District Judges Who Sat by Designation When the District Judge Had and Had Not Sat on a Claim Construction Appeal

	Before Sitting	After Sitting	Fisher's Exact
Claim Construction Judges:			
# of Claim Construction Decisions	111	79	$p = 0.002$***
# of Decisions with Error	40	12	
Error Rate	36.0%	15.2%	
Non-Claim Construction Judges:			
# of Claim Construction Decisions	65	10	$p = 0.053$*
# of Decisions with Error	21	0	
Error Rate	32.3%	0.0%	

NOTE.—Significant differences in rates designated:
* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.

Both judges who heard claim construction cases on appeal and those who didn't benefitted from the after-designation effect in their subsequent claim construction appeals. Indeed, no judge who sat by designation and never heard a claim construction case was thereafter reversed on claim construction. This suggests that neither substantive learning about claim construction nor even learning what Federal Circuit judges like to read in a claim construction opinion are at work, giving further credence to the personal-relationship explanation. But because claim construction is such a common issue, the number of judges who never heard even one claim construction dispute while sitting by designation is quite small, and that result just misses a 95% confidence level. However, it is significant to a 90% confidence level ($p = 0.053$).[65]

Finally, we determine whether the likelihood of reversal is related to the substantive direction of the district court decision—"pro-patentee" or "pro-defendant."[66] From this information we are able to compare the rates at which district judges and Federal Circuit panels ruled for the patentee in different groups of appeals within our population. We summarize the results in Figure 2.

65. Again, however, the *p* value has steadily declined as we have added more observations, suggesting that increased confidence in the results would likely come with additional observations.

66. For each appeal in our data set, we count the district judge's constructions as pro-patentee if the alleged infringers appealed claim construction. We count the Federal Circuit panel reviewing each appeal as pro-patentee if the district judge was pro-patentee and it found no claim construction error, and if the district judge was not pro-patentee and it found error.

Prior research has investigated whether the Federal Circuit or district courts tend to be pro-patentee.[67] Our data is consistent with this literature. In our unrestricted population of 1,151 appeals ("All" in Figure 2), 25% were from district court claim constructions that were pro-patent owner and 75% were from those that were pro-alleged infringer. These percentages are nearly identical to those of Moore, who found that 76% of claim construction appeals were made by patent owners.[68]

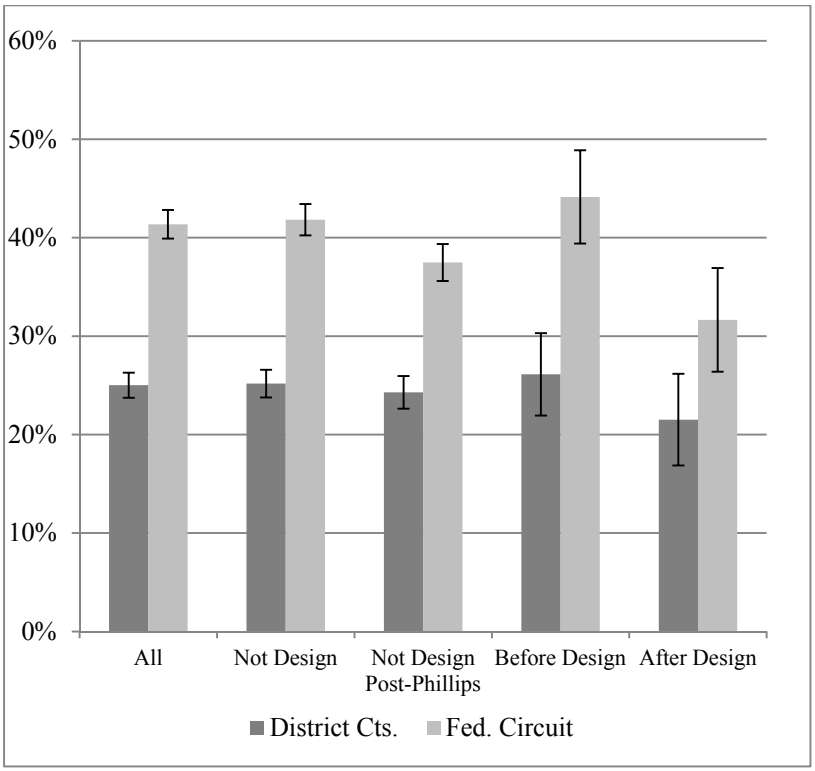
In Figure 2, we also report pro-patentee rates for the 961 appeals from constructions by judges who never sat by designation on a claim construction appeal (Not Design), for the 667 of these decided by the Federal Circuit after *Phillips* (Not Design Post-*Phillips*), for the 111 appeals from constructions by judges who had not yet but later would sit by designation on a claim construction appeal (Before Designation), and for the 79 appeals from constructions by judges who had previously sat by designation (After Designation).

67. Krause & Auyang, *supra* note 25, at 596; Moore, Markman *Eight Years Later*, *supra* note 21, at 240.

68. Moore, Markman *Eight Years Later*, *supra* note 21, at 240; *cf.* Allison et al., *supra* note 13, at 1787 (finding an overall patentee win rate on the merits of 26%); Paul M. Janicke & LiLan Ren, *Who Wins Patent Infringement Cases?*, 34 AIPLA Q.J. 1, 8 (2006) (finding a 24.4% win rate).

Moore also found that the Federal Circuit was just as likely to reverse constructions won by patent owners as it was to reverse those won by alleged infringers at the district court. Moore, Markman *Eight Years Later*, *supra* note 21, at 241. Again, we find the same to be true in our data, with the Federal Circuit finding error in 32.4% of appeals from pro-infringer constructions and 31.6% of pro-patent owner constructions. Because district courts so frequently construe claims in favor of infringers, the Federal Circuit is pro-patent owner in comparison—deciding 41.4% of appeals in favor of owners. That doesn't indicate a pro-patentee bias, however, but rather the fact that because most appeals are by patent owners, most reversals are also in favor of patent owners.

Figure 2
Rate of Pro-Patentee Decisions—
District Court Judges and Federal Circuit



NOTE.—"All" denotes the pro-patentee rate for all appealed claim constructions in the population (n = 1,151). "Not Design" denotes the pro-patentee rate for appealed constructions made by judges who never sat by designation (n = 961). "Not Design Post-Phillips" denotes those "Not Design" appeals decided by the Federal Circuit after *Phillips* (n = 667). "Before Design" denotes the pro-patentee rate for appealed claim constructions made by judges who would sit by designation (n = 111) and "After Design" those made by judges who had (n = 79). "District Cts." represents the rate alleged infringers appealed claim construction in each group. "Fed. Circuit" represents the rate the Federal Circuit either affirmed appeals brought by alleged infringers or reversed appeals brought by patent owners. Standard error bars included.

While many factors influence these pro-patentee rates, we find it suggestive that the pro-patentee rate for district judges across these groups is uniform—ranging from 26% for Before Designation to 22% for After Designation ($p = 0.496$). In contrast, the pro-patentee rate for the Federal Circuit drops from 44% for constructions of judges who would sit by designation (Before Designation) to 32% for constructions of judges who had sat by designation (After Designation).[69] This supports the idea that it is the Federal Circuit that is shifting its behavior towards district judges who have sat by designation and not the other way around. However, the difference between the Federal Circuit's pro-patentee rates before designation and after designation is only significant to a 90% confidence level ($p = 0.097$).[70]

Despite the small population size, then, all of our mechanism test results have some significance and all are consistent with the idea that the Federal Circuit is informally deferring to district judges, and they are inclined to defer more to the judges they know personally and have worked with rather than the ones who have learned the most about claim construction.

D. Does the Sitting-by-Designation Effect Fade Over Time?

Before turning to our discussion of the implications, we briefly investigate whether the impact of sitting by designation fades over time. We certainly appear to have sufficient variation in our data set to test this, as the length of time between a judge last sitting by designation on a claim construction appeal and the next Federal Circuit opinion reviewing their district court constructions ranges from 14 to 2,819 days.

Are designated judges more or less likely to be reversed when more time has elapsed since their last sitting with the Federal Circuit? For subsequent reversals of judges who have sat by designation on a claim construction appeal, the mean number of years since that judge last sat is 4.55, while it is 3.94 for subsequent affirmances. These raw numbers suggest the beneficial effect of sitting could fade over time. However, the difference between them is not statistically significant ($p = 0.282$).

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69. Comparing the Federal Circuit's pro-patentee rate in the Not Design group (41.8%) to its rate in the Not Design Post-*Phillips* group (37.5%), we can infer that some, but probably not all, of the drop between Before Designation and After Designation may be attributable to *Phillips* itself.

The fact that these numbers are higher than the district court pro-patentee rate is in some tension with Chris Cotropia's finding that the Federal Circuit is more likely to reverse district court findings that favored the patentee than district court findings that favored the accused infringer. *See* Cotropia, *supra* note 25, at 1099.

70. Comparing the long error bars for Before Designation and After Designation to the shorter ones for other groups in Figure 2, we believe the lack of statistical significance is again explained by the small number of observations in the population of appeals reviewing claim constructions of judges who have sat or would sit by designation.

Slicing the data another way, in Appendix Table A.3 we report that the reversal rate of designated judges who had sat by designation on a claim construction appeal less than three years before an opinion reviewing their construction is 5%, while it is 19% when the gap is greater than three years. However, the difference is again insignificant ($p = 0.163$).

These results lead us to believe that the impact of sitting by designation may fade over time. That might make sense either because of changes in claim construction law or because judges' memories fade over time. However, we are unlikely to be able to confirm or reject this hypothesis given the pause in sitting by designation and, thus, decline in the number of new observations. But even if it does fade, that fact is unlikely to help us identify the mechanism driving the impact of sitting by designation. If the mechanism is district court learning, we would expect the knowledge gained by designated judges to become less relevant over time, leading to a gradual increase in their reversal rate. And if the mechanism is Federal Circuit familiarity with the designated judge, we would expect the effect to fade as Federal Circuit judges retire and are replaced.

IV. Implications

Sitting by designation seems to have a significant effect on appellate review of district court decisions. District judges who sit by designation on the Federal Circuit are thereafter significantly less likely to be reversed in their claim construction decisions. All available evidence suggests that the most likely explanation is not a learning effect, but a consequence of the personal relationships district judges develop with appellate judges while sitting at the court.

Our finding has several implications, not just for patent law but for the judicial process as a whole. First, the level of deference appellate courts give to district court claim construction decisions is a matter of considerable dispute. The Federal Circuit has long held that claim construction decisions are reviewed de novo because they are constructions of legal documents.[71] The Supreme Court held in January 2015 that the appeals court must defer to subsidiary fact findings in claim construction, but need not defer to the interpretation of "intrinsic evidence"—the patent itself and its supporting documents in the public record.[72] It is not clear *Teva* will lead to significant deference, because the Federal Circuit generally prefers to use the intrinsic record, not fact evidence, to resolve claim construction disputes.[73] But even

71. Lighting Ballast Control LLC v. Philips Elecs. N. Am. Corp., 744 F.3d 1272, 1292 (Fed. Cir. 2014) (en banc).

72. Teva Pharm. USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831, 841 (2015).

73. *See, e.g.*, *In re* Papst Licensing Dig. Camera Patent Litig., 778 F.3d 1255, 1261 (Fed. Cir. 2015) (applying de novo review notwithstanding *Teva*).

if *Teva* does not lead to express deference, scholarly work has suggested that since 2005 the Federal Circuit has been operating under a regime of "informal deference" in which the court says it is conducting de novo review but is in practice giving greater credence to district court opinions in rendering its decisions.[74] Our data are certainly consistent with that informal deference regime.

Our results offer some insight into how an informal deference regime might operate in practice. If, as our evidence suggests, informal deference draws on the personal relationships of knowledge and trust between judges, society should care about how those relationships form and under what circumstances. District judges might want to sit by designation on the Federal Circuit or at least have some insight into the process by which judges are selected to sit by designation. Lawyers might reasonably worry that their chances on appeal will be influenced by whether or not the Federal Circuit judges know and trust the work of the district court judge. A regime of informal deference may be more idiosyncratic than a regime of explicit deference, so those worried about the implications of our finding might support an official deference regime in cases like *Teva v. Sandoz*, viewing it as fairer than deference that might vary based on personal connections. On the other hand, even an explicit rule of deference is likely to be differentially applied in practice; judges are naturally going to give more credence to people and decisions they believe are smart and trustworthy, and that might not be a bad thing.

Our results also cast some doubt on the arguments made by some that district and appellate judges will necessarily see claim construction differently because of the different ways in which they approach the process.[75] District court approaches to claim construction do not appear to be immutable; we show that how district judges approach claim construction (and how appellate judges view their efforts) can be affected by the experiences district and appellate judges share. By contrast, our data are not inconsistent with the claim that claim construction is inherently indeterminate.[76] Judges may be modifying their behavior based on experience, not because they are learning how to construe claims better, but simply because they are learning what will get their decisions affirmed.

A second implication of our results has to do with judicial specialization in patent cases. The Federal Circuit itself is an experiment in

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74. Anderson & Menell, *supra* note 2, at 6.

75. *See* Lefstin, *supra* note 2, at 1036–37 (arguing that reversal is a natural result of the difference in the timing and process by which appellate and district court judges receive information relevant to claim construction).

76. *See, e.g.*, Burk & Lemley, *supra* note 3, at 1745 (suggesting that claim construction "may simply be impossible"). For a contrary claim that (rather implausibly) argues that the meaning of claims is not very uncertain, see Tun-Jen Chiang & Lawrence B. Solum, *The Interpretation-Construction Distinction in Patent Law*, 123 YALE L.J. 530, 534 (2013).

judicial specialization, though it was controversial when adopted.[77] In recent years Congress has endorsed district judge specialization in patent law by passing the Patent Pilot Program, which allows judges in fourteen test districts to become "patent pilot judges."[78] Other judges in that district can choose to transfer patent cases to those judges.[79] In some districts, the result has been to consolidate a substantial number of patent cases before relatively few judges.[80] One of us has found in prior work that district judges with more experience in patent cases behave differently in some systematic ways.[81] The nonrandom selection of judges to sit by designation naturally favors those judges who decide a large number of patent cases; they are both the ones the Federal Circuit is most likely to think it important to invite and the ones most likely to be interested in sitting with the Federal Circuit. If those judges make decisions in ways that differ systematically from other judges, and if the Federal Circuit is more likely to defer to those judges, the result may be a systematic deviation between the results reached by some judges and others.[82]

Finally, our results may have implications beyond patent claim construction cases. Given our (limited) data regarding designated judges who did not hear claim construction cases, it is likely that we would obtain the same result for other patent-law issues. Further work could confirm that hypothesis and might shed some light on whether the result we find is a function of an informal deference regime or is true across all patent issues.

Indeed, our findings have potential implications beyond patent law. We hope in future work to test whether district judges who sit by designation in the regional circuits see a similar reduction in their reversal rates. Regional circuits operate somewhat differently than the Federal Circuit. Because they see the mill run of appeals from district judges within their circuit, and because regional circuits have regular conferences that include district judges, regional circuit judges may have less need for information to build networks of trust and respect. So it is possible that

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77. *See generally* Rochelle C. Dreyfuss, *Percolation, Uniformity, and Coherent Adjudication: The Federal Circuit Experience*, 66 SMU L. REV. 505 (2013) (examining thirty years of Federal Circuit jurisprudence in the context of the reasons for its creation and the goal of national uniformity); Rochelle Cooper Dreyfuss, *The Federal Circuit: A Case Study in Specialized Courts*, 64 N.Y.U. L. REV. 1 (1989) (analyzing, in part, the Federal Circuit's creation as a specialized patent court and urging instead for it to be conceived as a court of general competition law).

78. 28 U.S.C. § 137 (2012).

79. *Id.*

80. Mark A. Lemley, Su Li & Jennifer M. Urban, *Does Familiarity Breed Contempt Among Judges Deciding Patent Cases?*, 66 STAN. L. REV. 1121, 1128, 1137 tbl.3 (2014) (finding that only 24 federal judges finally resolved validity and infringement of a patent in more than ten cases between 2002 and 2011).

81. *Id.* at 1124–25.

82. *See* Jonathan S. Masur & Lisa L. Ouellette, *Deference Mistakes*, 82 U. CHI. L. REV. 643, 725 (2015) (asserting that judges making deference mistakes deviate even further from optimal decisions than judges making errors "absent a deference mistake").

sitting by designation on the regional circuits doesn't have the same differential effect; regional circuit judges may already have the information they need to engage in informal deference from their other interactions. If so, that fact might even offer a partial explanation for the fact that the Federal Circuit reversal rates are higher than those of the regional circuits.[83] If not, it suggests that the phenomenon we have identified is not endemic to patent law or the Federal Circuit, but has profound implications for legal procedure and the relationship between district and appellate courts. The legal realists argued in the last century that law is not a self-executing discipline, but one that involves real people making personal judgments and is accordingly bound up with personal feelings, relationships, and the moral and political discourse of the time.[84] Our data suggest that personal feelings and relationships may play a role even in the seemingly unemotional issue of patent claim construction. As John Golden notes in his comment on this Article, that is probably not a good thing.[85]

83. *Compare* ADMIN. OFFICE OF THE U.S. COURTS, U.S. COURT OF APPEALS JUDICIAL BUSINESS tbl.B-5 (2013), http://www.uscourts.gov/uscourts/Statistics/JudicialBusiness/2013/appendices/B05Sep13.pdf [http://perma.cc/34PW-KB9X] (showing 6.7% reversed by the regional circuits), *with* ADMIN. OFFICE OF THE U.S. COURTS, U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT JUDICIAL BUSINESS tbl.B-8 (2013), http://www.uscourts.gov/uscourts/Statistics/JudicialBusiness/2013/appendices/B08Sep13.pdf [http://perma.cc/D8GS-DBBA] (showing 13% reversed by the Federal Circuit).

84. *See, e.g.*, MORTON J. HORWITZ, THE TRANSFORMATION OF AMERICAN LAW 1870–1960: THE CRISIS OF LEGAL ORTHODOXY 193 (1992) (discussing early-twentieth-century legal-realist critiques of the supposedly "self-executing" legal system); L. L. Fuller, *American Legal Realism*, 82 U. PA. L. REV. 429, 443 (1934) (emphasizing legal realists' skepticism regarding the practical applicability of rules in the messy context of reality).

85. John M. Golden, *Too Human? Personal Relationships and Appellate Review*, 94 TEXAS L. REV. SEE ALSO 70 (2016).

Conclusion

Sitting by designation has dramatic effects on how a district judge's rulings are treated in the Federal Circuit. District judges who have sat by designation are thereafter far less likely to be reversed on patent claim construction, even holding constant a host of explanatory variables. And the result seems to be driven by the personal connections the judges make with the appellate court, not by any learning effect. Our results offer an important insight not only into patent claim construction decisions, but into the judicial process as a whole and how a regime of informal deference operates in practice.

Appendix

Table A.1

Probit Estimation of Likelihood of Federal Circuit Affirming Claim Construction

	1	2	3	4	5
After Designation?	.160** (.055)	.160** (.054)	.161** (.054)	.163** (.053)	.170** (.054)
Timing of Opinion:					
Appeal Month	.0004 (.0003)				
After *Phillips*?		.084***(.032)	.098***(.032)	.083***(.032)	.099***(.033)
District Judge Experience:					
Years a Judge		–.0009(.0018)			–.0005(.0018)
Patent Characteristics:					
NPE Owner			.094***(.031)		.093***(.031)
Software			–.182*** (.034)		–.176***(.034)
Appeal after:					
Prelim. Injunction				–.175* (.108)	–.157 (.108)
Summary Judgment				–.113**(.052)	–.090 (.054)
Jury Trial				–.164**(.071)	–.141**(.071)
JMOL				–.241***(.091)	–.210**(.093)
District Judge:					
Alsup (N.D. Cal.)	.064(.123)	.061 (.121)	.084 (.114)	.066 (.115)	.077 (.115)
Clark (E.D. Tex.)	–.192(.175)	–.217 (.176)	–.171 (.176)	–.181 (.176)	–.148 (.176)
Fogel (N.D. Cal.)	–.071(.182)	–.056 (.178)	.009 (.154)	–.053 (.177)	–.002 (.157)
Illston (N.D. Cal.)	.075(.146)	.080 (.144)	.098 (.136)	.082 (.140)	.096 (.133)
Patel (N.D. Cal.)	.152(.152)	.150 (.155)	.127 (.180)	.139 (.161)	.127 (.179)
Robinson (D. Del.)	–.032(.088)	–.029 (.087)	–.029 (.088)	–.047 (.090)	–.042 (.092)
Saris (D. Mass.)	.142(.157)	.152 (.150)	.147 (.153)	.162 (.138)	.156 (.141)
Ward (E.D. Tex.)	.031(.119)	.020 (.121)	.028 (.125)	.039 (.118)	.041 (.123)
Ware (N.D. Cal.)	.120(.168)	.138 (.158)	.166 (.144)	.142 (.156)	.168 (.143)
Whyte (N.D. Cal.)	.054(.196)	.056 (.196)	.068 (.200)	.043 (.196)	.057 (.200)
Coar (N.D. Ill.)	.171(.140)	.163 (.148)	.147 (.157)	.179 (.134)	.164 (.143)
Cohn (E.D. Mich.)	.062(.162)	.068 (.167)	.014 (.180)	.041 (.172)	.004 (.181)

Crabb (W.D. Wis.)	.071(.091)	.072 (.094)	.082 (.084)	.061 (.093)	.088 (.086)
Davis (E.D. Tex.)	.247***(.055)	.240** (.057)	.261***(.046)	.245***(.053)	.261***(.045)
Farnan (D. Del.)	–.003 (.104)	.014 (.102)	.040 (.096)	–.000 (.102)	.041 (.096)
Folsom (E.D. Tex.)	–.026 (.143)	–.035 (.147)	–.048 (.150)	–.040 (.144)	–.054 (.149)
Friedman (E.D. Va.)	–.220 (.190)	–.224 (.190)	–.195 (.210)	–.204 (.197)	–.188 (.215)
Thynge (D. Del.)	.165 (.144)	.158 (.150)	.164 (.131)	.171 (.144)	.176 (.126)
Pfaelzer (C.D. Cal.)	–.121 (.149)	–.107 (.151)	–.077 (.151)	–.129 (.153)	–.075 (.157)
Rakoff (S.D.N.Y.)	.054 (.166)	.070 (.161)	.062 (.169)	.098 (.149)	.085 (.152)
Selna (C.D. Cal.)	.202 (.111)	.192 (.120)	.209 (.112)	.204 (.109)	.214 (.106)
Shabaz (W.D. Wis.)	.020 (.185)	.030 (.183)	–.026 (.195)	.029 (.184)	–.013 (.193)
Sleet (D. Del.)	–.019 (.114)	–.021 (.115)	–.007 (.113)	–.006 (.111)	.006 (.109)
Taylor (C.D. Cal.)	–.491**(.169)	–.503**(.161)	–.527**(.151)	–.507**(.160)	–.530**(.150)
Log-likelihood	–703	–700	–684	–696	–680
Observations	1151	1151	1151	1151	1151

NOTE.—Population of 1,151 Federal Circuit decisions between January 1, 2002, and December 31, 2014, that included explicit review of claim construction. Marginal effects reported with discrete change of dummy variables from 0 to 1. Robust standard errors included in parenthesis.

* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.

Table A.2

Probit Estimation of Likelihood of Federal Circuit Affirming Claim Construction—Restricted Set

	1	2	3
After Designation?	.208** (.082)	.195*** (.069)	.272** (.099)
District Judge Experience:			
Years a Judge	–.0038 (.0069)		
Total # of Patent Cases		.0019 (.0011)	
# of Prior Patent Cases			–.0012 (.0007)
Patent Characteristics:			
NPE Owner	.115 (.074)	.115 (.073)	.164** (.065)
Software	–.088 (.077)	–.111 (.078)	–.117 (.080)
Appeal after:			
Prelim. Injunction	–.190 (.292)	–.195 (.299)	–.139 (.278)
Summary Judgment	–.028 (.117)	–.042 (.117)	.021 (.128)
Jury Trial	–.084 (.148)	–.113 (.150)	–.069 (.154)
JMOL	.069 (.183)	.061 (.187)	.095 (.159)
District Judge:			
Alsup (N.D. Cal.)	.046 (.128)	–.066 (.169)	.110 (.099)
Clark (E.D. Tex.)	–.095 (.193)	–.356 (.262)	–.006 (.153)
Fogel (N.D. Cal.)	–.068 (.188)	–.048 (.176)	.115 (.135)
Illston (N.D. Cal.)	.109 (.111)	–.027 (.180)	.118 (.095)
Patel (N.D. Cal.)	.168 (.125)	.148 (.132)	.120 (.136)
Robinson (D. Del.)	.016 (.095)	–.969 (.053)	.175 (.090)
Saris (D. Mass.)	.159 (.104)	.161 (.101)	.139 (.096)
Ward (E.D. Tex.)	.035 (.129)	–.702 (.278)	.152 (.092)
Ware (N.D. Cal.)	.122 (.139)	.049 (.183)	.059 (.165)
Whyte (N.D. Cal.)	.087 (.154)	.026 (.185)	.075 (.151)
Log-likelihood	–102	–101	–86
Observations	190	190	172

NOTE.—Population of 190 Federal Circuit decisions between January 1, 2002, and December 31, 2014, that included explicit review of claim construction by district judge who had or would sit by designation on a claim construction appeal. Marginal effects reported with discrete change of dummy variables from 0 to 1. Robust standard errors included in parenthesis.

* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.

Table A.3

Rate that Federal Circuit Panel Reversed Claim Construction of District Judges Who Had Sat by Designation on a Panel Reviewing Claim Construction More and Less than 3 Years Before

	< 3 Years	> 3 Years	Fisher's Exact
# of Claim Construction Decisions	22	57	$p = 0.163$
# of Decisions with Error	1	11	
Error Rate	4.5%	19.3%	

NOTE.—Significant differences in rates designated:
* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$.