

If You Can't Beat 'Em, Join 'Em? How Sitting by Designation Affects Judicial Behavior¹

Mark A. Lemley² & Shawn P. Miller³

Abstract

Judges, lawyers, and scholars have long decried the high reversal rate district judges 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 paper, we investigate the impact of a novel measure of experience – 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 50 percent. This decrease is not fully 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 suggest a simple way to reduce the reversal rate in patent and perhaps other sorts of cases. However, 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.

Introduction

Patent claim construction – the act of figuring out in court what a patent covers – has proven an enormous source of frustration for lawyers, courts, and policymakers over the past two decades. Most have lamented the high claim construction reversal rate and the uncertainty it creates.⁴ Scholars have offered various explanations, and even suggested that

¹ © 2014 Mark A. Lemley & Shawn P. Miller.

² William H. Neukom Professor, Stanford Law School; partner, Durie Tangri LLP.

³ Fellow, Stanford Program in Law, Science, and Technology; Ph.D. in economics, George Mason University. Thanks to Rose Hagan, David Schwartz, Ted Sichelman, and participants in the Works in Progress-Intellectual Property and PatCon4 conferences for comments on an earlier draft and to Madeleine Laupheimer for research assistance.

⁴ 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*

the entire project of peripheral claiming is a failure. 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 them from being reversed by the Federal Circuit.⁵

In this paper, we find that one single act – a district judge spending a week 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 individual judges themselves are treated differently after they sit by designation. We also offer some evidence suggesting 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,⁶ for *Teva v. Sandoz*, a pending Supreme Court case that considers explicit deference to district judges in construing patent claims, and for the practice of sitting by designation in the federal courts more generally.

Court Judges Equipped to Resolve Patent Cases?, 15 HARV. J.L. & TECH. 1, 38 (2001) (hereinafter Moore (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."); David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 225-27 (hereinafter Schwartz (2008)) (describing some aspects of unpredictability); and 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."). *But see* Jeffery A. Lefstin, *Claim Construction, Appeal, and the Predictability of Interpretive Regimes*, 61 U. MIAMI L. REV. 1033 (2007) (questioning scholarly emphasis on predictability in claim construction); and J. Jonas Anderson & Peter S. Menell, *Informal Deference: A Historical, Empirical, and Normative Analysis of Patent Claim Construction*, 108 NW. U. L. REV. 1 (2013) (hereinafter Anderson & Menell) (finding that the reversal rate has decreased in recent years).

⁵ Schwartz (2008), *supra* note 4, at 254-56.

⁶ Anderson & Menell, *supra* note 4.

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.⁷ Courts construe claims before trial at “*Markman* hearings,” and almost always do so before any consideration of dispositive pretrial motions such as summary judgment.⁸ And because claim construction must resolve any substantial dispute between the parties over the scope of the patent,⁹ it resolves the vast majority of the infringement disputes, paving the way for summary judgment¹⁰ or even stipulations that the defendant does or does not infringe.¹¹ It can also have effects on seemingly unrelated doctrines.¹²

⁷ Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 **U. Pa. L. Rev.** 1743 (2009). As the former Chief Judge of the Federal Circuit, Giles Rich, put it, “the name of the game is the claim.” Giles S. Rich, *Extent of Protection and Interpretation of Claims—American Perspectives*, 21 **Int’l Rev. Indus. Prop. & Copyright L.** 497, 499 (1990).

⁸ 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).

⁹ See, e.g., *Advanced Fiber Techs. Trust v. J & L Fiber Servs.*, 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.

¹⁰ John R. Allison & Mark A. Lemley, *The (Unnoticed) Demise of the Doctrine of Equivalents*, 59 **Stan. L. Rev.** 955, 958 (2007).

¹¹ John R. Allison, Mark A. Lemley, & David L. Schwartz, *Understanding the Realities of Modern Patent Litigation*, __ **Tex. L. Rev.** __ (forthcoming 2014).

¹² See, e.g., Lee Petherbridge, *The Claim Construction Effect*, 15 **Mich. Telecomm. & Tech. L. Rev.** 215, 231-36, 261 (2008).

Claim construction is a question of law decided by the judge, not the jury.¹³ As a result, the Federal Circuit held in *Cybor* that district court claim construction decisions are reviewed without deference in the appellate court.¹⁴ The Federal Circuit recently reaffirmed that conclusion en banc in *Lighting Ballast* over a vigorous dissent by four judges,¹⁵ but the Supreme Court granted review in 2014 in a case that gives it an opportunity to revisit that question.¹⁶

Claim construction decisions have traditionally been reversed at very high rates. Kimberly Moore, David Schwartz, and others found claim construction error rates through the mid-2000s of close to 40%, with most of those errors resulting in a reversal of the case as a whole.¹⁷ Unsurprisingly, the high reversal rate prompted great frustration among district judges. In a period shortly after *Markman* when the reversal rate neared 50%, for example, one judge noted that a 50% reversal rate – a coin flip – was the worst of all possible worlds; even a higher reversal rate would give more certainty.¹⁸ Scholars too have worried about the high reversal rate,¹⁹ and some have offered possible explanations for the high reversal rate.²⁰

¹³ *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 384-5 (1996).

¹⁴ *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454-55 (Fed. Cir. 1998) (en banc).

¹⁵ *Lighting Ballast Control LLC v. Philips Elecs. N. Am. Corp.*, 744 F.3d 1272, 1292 (Fed. Cir. 2014) (en banc).

¹⁶ *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 134 S. Ct. 1761, 1761 (Mar. 31, 2014).

¹⁷ See, e.g., Kimberly A. Moore, *Markman Eight Years Later: Is Claim Construction More Predictable?*, 9 **Lewis & Clark L. Rev.** 231, 239 (2005) (hereinafter Moore (2005)); Moore (2001), *supra* note 4, at 11-13; Schwartz (2008), *supra* note 5, at 248-49; 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, 1708-09, 1718-19 (2009); Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 **Berkeley Tech. L.J.** 1075, 1104 (2001).

¹⁸ *Cybor Corp.*, 138 F.3d at 1476 (Rader, J. dissenting).

¹⁹ Ted Sichelman, *Myths of (Un)Certainty at the Federal Circuit*, 43 **Loyola (L.A.) L. Rev.** 1161 (2010); Moore, *District Judges*, *supra* note 17, at 27-28.

²⁰ Richard 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 **Loyola (L.A.) L. Rev.** 981, 1003-21 (2010). Sichelman persuasively challenges that story, however. Sichelman, *supra* note 19, at 1172-78.

Most worrisome, Dave Schwartz finds no 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.²¹ One of the authors has even suggested that the entire process of claim construction is inherently indeterminate.²²

Interestingly, the claim construction reversal rate appears to have declined in the last ten years. Anderson and Menell and Miller both find significant drops in the claim construction reversal rate beginning in 2005;²³ since that year only about 25% of claim construction decisions have been reversed.²⁴ They tie the drop to the Federal Circuit's en banc decision in *Phillips*,²⁵ which revisited the substantive standards for claim construction. While *Phillips* did not create a formal deference regime or even change the substantive standards for claim

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).

Chris 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, *Is Patent Claim Interpretation Review Deference or Correction Driven?* (working paper 2013), available at <http://ssrn.com/abstract=2265962>.

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 Boundaries and High Claim Construction Reversal Rates*, 17 **Stan. Tech. L. Rev.** ____ (forthcoming 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, Lawyers, and Bureaucrats Put Innovation at Risk** (2008); Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 **Wis. L. Rev.** 905, 929-931; Peter S. Menell & Michael J. Meurer, *Notice Failure and Notice Externalities*, 5 **J. LEGAL ANAL.** 1,32-33 (2013).

Mark 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 (Shyamkrishna Balganesh ed., 2013).

²¹ Schwartz (2008), *supra* note 5, at 254-56.

²² Burk & Lemley, *supra* note 7, at 1745.

²³ Anderson & Menell, *supra* note 4, at 6; Shawn P. Miller, *supra* note 20.

²⁴ Anderson & Menell, *supra* note 4, at 6.

²⁵ *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

construction,²⁶ 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.²⁷

II. Design and Methodology

In this paper, we explore the relationship between a district judge’s experience, relationships, and the outcome of claim construction cases. We take advantage of a common mechanism in the courts of appeals: district judge sitting “by designation” as an appellate judge for a short period of time (usually a week, but sometimes less). 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.²⁸ Because the Federal Circuit has nationwide jurisdiction, they 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.²⁹

Our conversations with then-Chief Judge Rader suggest that selection of judges is not random. 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 and the Eastern

²⁶ See *id.* at 1330-31 (Mayer, J., dissenting) (criticizing the court on both grounds).

²⁷ Anderson & Menell, *supra* note 4.

²⁸ See 28 U.S.C. § 292(a); 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); Richard B. Saphire & Michael E. Solimine, *Diluting Justice on Appeal?: An Examination of the Use of District Court Judges Sitting by Designation*, 28 **U. Mich. J.L. Ref.** 351, 357, 359-60 (1995). See also Statistics Div., Admin. Office of the U.S. Courts, *Annual Report of the Director 2013*, Table V-2 (2013)

<http://www.uscourts.gov/uscourts/Statistics/JudicialBusiness/2013/appendices/V02Sep13.pdf> (compiling statistics on visiting judges); Nicholle Stahl-Reisdorff, *The Use of Visiting Judges in the Federal District Courts: A Guide for Judges & Court Personnel*, FEDERAL JUDICIAL CENTER,

[http://www.fjc.gov/public/pdf.nsf/lookup/visijud3.pdf/\\$file/visijud3.pdf](http://www.fjc.gov/public/pdf.nsf/lookup/visijud3.pdf/$file/visijud3.pdf) (outlining a model visiting judge program, to be used by individual courts when creating their own).

²⁹ Conversation with Federal Circuit Chief Judge Rader, January 2014.

District of Texas.³⁰ 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 142 cases between 2000 and early 2014 for judges who sit by designation compared to 72 cases for judges that do not).³¹ But not all active patent judges are invited; 37 judges in our data set heard more than 142 patent cases during that period but have not been invited to sit by designation.

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 1058 Federal Circuit opinions between January 2002 and January 2014 reviewing at least one district court claim construction decision.³² The opinions we identify include all precedential and non-precedential opinions, as well as all Rule 36 decisions that lack a written opinion.³³

To complete our analysis, we determined: 1) whether a district judge's claim construction was reversed in each Federal Circuit opinion; and 2) whether the district judge whose claim construction was reviewed in each opinion had sat by designation on an earlier

³⁰ *Id.*

³¹ Data from Lex Machina, www.lexmachina.com.

³² To identify these decisions, we replicated the methodology of David Schwartz. For a complete explanation of Schwartz' method of selection and coding, see Schwartz (2008), *supra* note 4, at 269-74.

³³ 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 (2005), *supra* note 17, at 234.

Federal Circuit panel reviewing claim construction. To determine the first, we reviewed each opinion to determine if the majority of the Federal Circuit panel found the district had erred in the construction of at least one claim term. This is a broad definition of “reversal” which we use for our entire analysis.³⁴ 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 1058 opinions, the Federal Circuit reversed in 338 (31.9%) according to our definition.

To determine the second, we 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 1058 opinions and the date of the district court’s claim construction. Finally, we created a dummy variable equal to “1” in a given opinion where the judge whose claim construction was reviewed had sat by designation before the date of district claim construction in that opinion. 172 of the 1058 opinions reviewed claim construction decisions rendered by judges who sat with the Federal Circuit by designation at one point during the period of our data set. 63 of those reviewed constructions made by district judges after having sat by designation on at least one appellate panel that ruled on claim construction.

³⁴ 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., Schwartz (2008), *supra* note 4, at 240, and Moore (2005), *supra* note 17, at 239.

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 non-practicing entity, 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 each district judge sat on panel with, and determined which particular Federal Circuit judges decided each of the 1058 decisions in our data set.

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. We used as our basis for study all 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 0.005.³⁵

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	Chi square
# of Claim Construction Decisions	63	995	$\chi^2(1) = 7.96, p = 0.005^{***}$
# of Decisions with Error	10	328	
Error Rate	15.9%	33.0%	

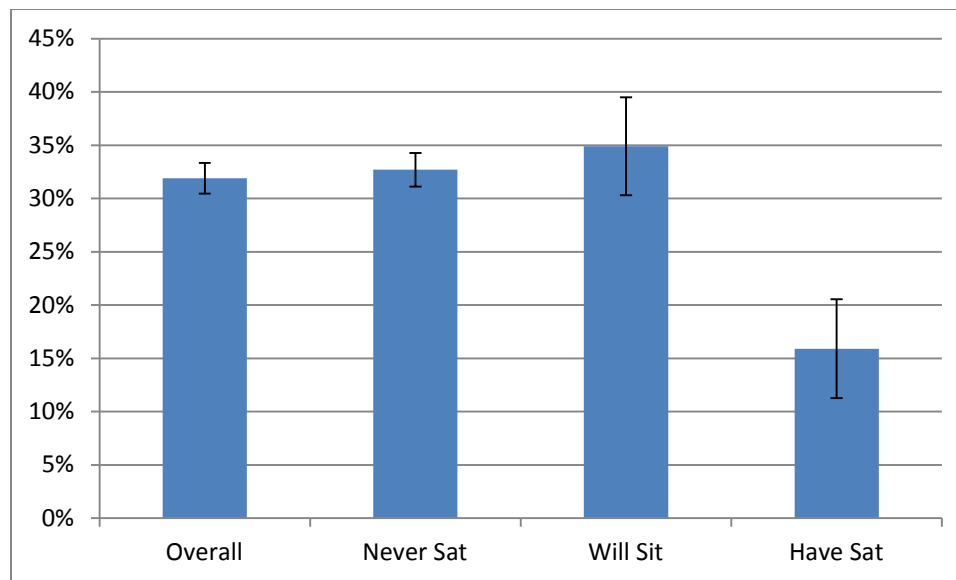
NOTE.—Significant differences in rates designated: * $p < .10$. ** $p < .05$. *** $p < .01$.

In Figure 1, we can see that the rate at which judges who have sat by designation on a panel deciding claim construction have been reversed (15.9% of 63 appeals) is far lower than: 1) the overall reversal rate for all appellate opinions in the population (31.9% of 1058 appeals); 2) the reversal rate of judges who had not and never would sit by designation (32.7% of 886 appeals); and 3) the reversal rate of judges who would but had not yet sat by designation on a claim construction appeal (34.9% of 109 appeals). Further, it is interesting to note that the raw reversal rate of judges who never sat by designation is actually slightly lower than the rate of judges who had not but would sit by designation. However, the latter difference is not significant.

Figure 1

RATE OF CLAIM CONSTRUCTION APPEALS REVERSED

³⁵ In the bivariate comparisons reported in Tables 1, 3, 5 and 6 we include the results of Chi-square tests of the null hypothesis that there is no difference in the compared claim construction error rates.



NOTE.—“Overall” denotes the reversal rate for all appeals in the population ($n=1058$). “Never Sat” denotes the reversal rate for appeals from decisions by judges who never sat by designation on a claim construction appeal ($n=886$). “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 ($n=109$). “Have Sat” denotes the reversal rate for appeals from decisions by judges who had sat by designation on prior a claim construction appeal ($n=63$). Standard error bars included.

2. Multivariate Analysis

But does this basic result hold in multivariate analysis? 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 2.³⁶ 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.

³⁶ 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).

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.³⁷ 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.³⁸ 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. While the magnitude is slightly smaller in Specification 1 (sitting by designation makes one 14 percentage points less likely to suffer reversal rather than 17 percentage points), the results are still highly significant ($p=0.003$) and extremely large (judges who have not sat by designation are almost twice as likely to be reversed as those who are).

³⁷ Appeal Month is a count variable ranging from 1 for January 2002 to 145 for January 2014. Specifically, the variable indicates the month within the range of our data set that the appeal was decided.

³⁸ *Phillips v. AWH Corp.*, 425 F.3d 1303 (Fed. Cir. 2005) (en banc).

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 the reversal rate for individual judges decline. To some extent we have already addressed this concern by clustering standard errors on individual judges, but we also decided to add a metric for judicial experience. We measure years on the bench at the time of the appellate decision.³⁹ 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.

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 non-practicing entity (“NPE”) or “patent troll” suits, and 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.⁴⁰

³⁹ Ideally we would measure this from the date of the district court’s 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.

⁴⁰ 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 business found in court pleadings, firm websites and media coverage of their litigation. NPEs include all owners except those we

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.⁴¹ To account for the possibility that this explains our results, we create another variable indicating whether or not the patents whose claims were reviewed in each appellate opinion covered software.⁴² 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 the result might be explained by less risk-averse NPEs making weaker claim construction appeals.⁴³ 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 were 15 percentage points more likely to be affirmed in this specification, and the result remained highly significant ($p=0.000$).

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

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.

⁴¹ Miller, *supra* note 20.

⁴² 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.

⁴³ Miller, *supra* note 20.

(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 twenty district courts with the largest patent dockets. We present the results in Specification 4.

Table 2

PROBIT ESTIMATION OF LIKELIHOOD OF FEDERAL CIRCUIT AFFIRMING CLAIM CONSTRUCTION

	1	2	3	4	5
After Designation?	.136*** (.040)	.149*** (.036)	.150*** (.036)	.124** (.048)	.121** (.048)
Timing of Opinion:					
Appeal Month	.0009** (.0004)				
After <i>Phillips</i> ?		.099*** (.032)	.107*** (.032)	.109*** (.033)	.117*** (.034)
District Judge Experience					
Years a Judge		-.0008 (.0017)			-.0004 (.0019)
Patent Characteristics:					
NPE Owner			.120*** (.031)		.119*** (.032)
Software			-.172*** (.036)		-.169*** (.037)
Appeal after					
Prelim. Injunction				-.126 (.109)	-.104 (.109)
Summary Jgmt.				-.109** (.053)	-.095* (.054)
Jury Trial				-.173** (.073)	-.156** (.072)
JMOL				-.192** (.101)	-.172* (.104)
Dt Court Judgment:					
CACD				-.134* (.077)	-.126* (.078)
CAND				.034 (.049)	.062 (.045)
CASD				.090 (.099)	.094 (.097)
CO				.052 (.070)	.040 (.085)
DE				.061 (.045)	.089* (.044)
FLSD				.128 (.100)	.134 (.100)
ILND				.040 (.062)	.042 (.060)
MA				.029 (.084)	.022 (.089)
MIED				.051 (.075)	.028 (.075)
MN				-.124 (.130)	-.093 (.135)
NJ				.057 (.067)	.053 (.067)
NYS				.023 (.065)	.057 (.063)
OHND				.126 (.107)	.096 (.120)
PAED				.258** (.066)	.249* (.070)
TXED				.080 (.078)	.106 (.075)
TXND				-.090 (.119)	-.071 (.116)
TXSD				.138 (.081)	.125 (.085)
VAED				-.108 (.085)	-.059 (.087)
WAWD				.069 (.069)	.086 (.069)
WIWD				.025 (.044)	.050 (.056)
Log-likelihood	-655	-653	-638	-636	-621

Observations	1058	1058	1058	1058	1058
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NOTE.—Population of 1058 Federal Circuit decisions between January 1, 2002 and January 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.

* $p < .10$. ** $p < .05$. *** $p < .01$.

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. 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.

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 12 percentage points less likely to be reversed than those who hadn't, and the result remained statistically significant ($p=0.021$).

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 ($p=0.026$). 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 designation on a panel of the Federal Circuit reviewing claim construction decisions.

B. Selection Effects

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 EVER OR NEVER SAT BY DESIGNATION ON A PANEL DECIDING A CLAIM CONSTRUCTION APPEAL

	Sit By Designation	Never Sit By Designation	Chi square
# of Claim Construction Decisions	172	886	$\chi^2(1) = 1.54, p = 0.214$
# of Decisions with Error	48	290	
Error Rate	27.9%	32.7%	

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

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 ever 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 1058 observations in the full data set and only 172 in this restricted data set. But because the restricted data set includes only the 33 judges who sat by designation during the period of our study, we can directly compare the reversal rates of the same judges before and after they sit by designation.

We find that even controlling for many of the same factors as in the full sample, 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

PROBIT ESTIMATION OF LIKELIHOOD OF FEDERAL CIRCUIT AFFIRMING CLAIM CONSTRUCTION — RESTRICTED SAMPLE

	1	2	3
After Designation?	.175** (.079)	.167*** (.059)	.159** (.074)
District Judge Experience			
Years a Judge	.0005 (.0052)		
Total # of Patent Cases		.00007 (.00005)	
# of Prior Patent Cases			-.00001 (.00031)
Patent Characteristics:			
NPE Owner	.164* (.074)	.175** (.076)	.186** (.077)
Software	-.163** (.069)	-.161** (.068)	-.163** (.069)
Appeal after			
Prelim. Injunction	-.168 (.270)	-.146 (.274)	.074 (.184)
Summary Jgmt.	-.028 (.105)	-.015 (.110)	.059 (.108)
Jury Trial	-.160 (.120)	-.153 (.122)	-.084 (.126)
JMOL	.090 (.219)	.096 (.217)	.131 (.157)
Log-likelihood	-93	-93	-78

Observations	172	172	151
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NOTE.—Population of 172 Federal Circuit decisions between January 1, 2002 and January 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.

* $p < .10$. ** $p < .05$. *** $p < .01$.

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 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 significant indicator of the likelihood of claim construction reversal.⁴⁴

Notably, however, the specifications reported in Table 4 do not include our variable for the Federal Circuit's *Phillips* decision. When we add the *Phillips* variable to the regression, it is extremely significant, but the after-designation variable is no longer significant. We think that is a function of two factors. First, the restricted sample 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 naturally occur later in our data set to ones that naturally occur earlier. Indeed, we find our after-designation and after-*Phillips* variables strongly correlated, $r(170) = 0.46$, $p <$

⁴⁴ Schwartz (2008), *supra* note 4 at 254-56.

0.01. Nonetheless, it is worth emphasizing that in this restricted sample we cannot exclude the possibility that it is the reduction in claim construction reversals after the Federal Circuit's *Phillips* decision explains the results.

C. Mechanisms

The data, then, strongly (although not unequivocally) supports 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 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. 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 two additional tests with our restricted sample. 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. We present the results in Table 5.

Table 5

RATE THAT FEDERAL CIRCUIT PANEL REVERSED CLAIM CONSTRUCTION OF DISTRICT JUDGES WHO HAD SAT BY DESIGNATION WHEN THE PANEL INCLUDED APPELLATE JUDGES THE DISTRICT JUDGES HAD AND HAD NOT SAT WITH

	Not Same Panel Judge	Same Panel Judge	Chi square
# of Claim Construction Decisions	44	19	$\chi^2(1) = 2.29, p = 0.130$
# of Decisions with Error	9	1	
Error Rate	20.5%	5.3%	

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

The data suggest that district judges are less likely to be reversed on claim construction by one or more of the very judges they sat with by designation (a 21% reversal rate with entirely different judges, compared with a 5% reversal rate with at least one of the same panel judges). Indeed, we found only one case out of the 63 post-designation decisions in which a district judge was reversed by a panel that included a judge they sat with on the Federal Circuit.

Nonetheless, because of the small number of observations, the results are not statistically significant.⁴⁵

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. 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.

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	Chi square
Claim Construction Judges:			
# of Claim Construction Decisions	109	63	$\chi^2(1) = 7.16$, p = 0.007***
# of Decisions with Error	38	10	
Error Rate	34.9%	15.9%	
Non-Claim Construction Judges:			
# of Claim Construction Decisions	64	6	$\chi^2(1) = 2.44$, p = 0.118
# of Decisions with Error	19	0	
Error Rate	29.7%	0.0%	

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

Both judges who heard claim construction cases on appeal and those who didn't benefitted from the after-designation effect. 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

⁴⁵ Notably, however, the p value has declined as we have added more observations, suggesting that a larger number of observations might result in a finding of statistical significance. We intend to keep collecting data over time, and will update our results.

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 the results are accordingly not statistically significant.

Because of small sample size, then, we cannot say anything definitive about why district judges are less likely to be reversed on claim construction after they sit by designation on the Federal Circuit. But all available evidence seems 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.

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. While we cannot say with certainty why this is true, 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 just reaffirmed

en banc the principle that claim construction decisions are reviewed de novo.⁴⁶ The Supreme Court has granted certiorari and will consider the issue in 2015.⁴⁷ At the same time, 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.⁴⁸ 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.

⁴⁶ *Lighting Ballast Control LLC v. Philips Elecs. N. Am. Corp.*, 744 F.3d 1272, 1292 (Fed. Cir. 2014) (en banc).

⁴⁷ *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 134 S. Ct. 1761, 1761 (Mar. 31, 2014).

⁴⁸ *Anderson & Menell*, *supra* note 4, at 6.

A second implication of our results has to do with judicial specialization in patent cases. In recent years Congress has endorsed district judge specialization in patent law, passing the Patent Pilot Project, which allows judges in 14 test districts to become “patent pilot judges.”⁴⁹ Other judges in that district can choose to transfer patent cases to those judges. In some districts, the result has been to consolidate a substantial number of patent cases before relatively few judges.⁵⁰ One of us has found in prior work that district judges with more experience in patent cases behave differently in some systematic ways.⁵¹ The non-random 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.⁵²

Finally, our results may have implications beyond patent claim construction cases. Given our (limited) data regarding judges who did not hear claim construction cases, it is likely that the same result would obtain 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.

⁴⁹ 28 U.S.C. § 137 note (2012) (Pilot Program in Certain District Courts).

⁵⁰ Mark A. Lemley, Su Li, & Jennifer Urban, *Does Familiarity Breed Contempt Among Judges Deciding Patent Cases?*, 66 **Stan. L. Rev.** 1121 (2014) (finding that only twenty-four federal judges finally resolved validity and infringement of a patent in more than ten cases between 2002 and 2010).

⁵¹ *Id.*

⁵² See Jonathan S. Masur & Lisa Larrimore Ouellette, *Deference Mistakes*, 82 **U. Chi. L. Rev.** ____ (forthcoming 2015).

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 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.⁵³ 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.

IV. 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

⁵³ Compare Statistics Div., Admin. Office of the U.S. Courts, *Annual Report of the Director 2013*, Table B-5 (6.7% reversed by the regional circuits), <http://www.uscourts.gov/uscourts/Statistics/JudicialBusiness/2013/appendices/B05Sep13.pdf>, with Statistics Div., Admin. Office of the U.S. Courts, *Annual Report of the Director 2013*, Table B-8 (13% reversed by the Federal Circuit) <http://www.uscourts.gov/uscourts/Statistics/JudicialBusiness/2013/appendices/B08Sep13.pdf>

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.