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Leveled odds? Attorney capability, team litigation, and outcomes in administrative patent cases

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Abstract
We examine the impact of legal representation in an administrative setting. Focusing on adversarial proceedings within the United States Patent and Trademark Office and employing new data on patent litigation, we investigate patent rights—a legal area dominated by specialized, upper-hemisphere litigation teams that generally represent parties with ample resources. Even in an environment with substantial parity in representational capability, we find that litigation team quality matters. Perceived firm quality and litigation team size both enhance the likelihood of victory; these findings are robust under a number of different approaches used to account for the ability of attorneys to select their clients.

How much do attorneys matter for case outcomes? This question is asked routinely in scholarship on courts and adjudication. The general answer seems to be that attorney quality matters (e.g., Abrams & Yoon, 2007; Corley, 2008; Eagly & Shafer, 2015; Galanter, 1974; Haynie & Sill, 2007; Miller et al., 2015; Nelson & Epstein, 2022), yet much remains to be learned about how and under what circumstances lawyers affect case outcomes. Here we fill several gaps in the attorney capability literature by analyzing corporate lawyers in an increasingly important context: administrative adjudications. Relying on data on the review of patent validity by an administrative tribunal within the United States Patent and Trademark Office (PTO), the Patent Trial and Appeal Board (PTAB), we shift the focus from individual attorneys to litigation teams and address endemic selection issues that have dogged many studies of attorney effects. Even in an environment where litigants are well-resourced and substantial parity in the quality of representation should be anticipated (e.g., Posner & Yoon, 2010, p. 317), we find that litigation team quality impacts outcomes. Perceived quality of the firm with which a team is affiliated significantly elevates a party's probability of success, as does the litigation team's numerical size. On the other hand, we find little evidence that attorney experience matters in our team litigation context.

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1 | LEGAL REPRESENTATION IN AN ADMINISTRATIVE CONTEXT

Previous studies on attorney effects have largely focused on generalist judges in appellate contexts (but see Eagly & Shafer, 2015; Miller et al., 2015), leaving the influence of attorney quality on outcomes in more specialized settings unexplored. Adversarial hearings in agencies routinely involve "complicated and broadly important public policy issues" (Phillips & Raso, 2020), and even as such specialized settings grow in terms of both the volume and importance of the matters they adjudicate (Barnett & Wheeler, 2018), the dearth of attorney capability studies that focus on them has become increasingly obvious.[1] Whether or how lawyers may matter differently in these contexts compared with the traditional court context is unknown and, especially because adversarial administrative hearings concern major topics (e.g., Phillips & Raso, 2020), there is an acute need for such an investigation.[2]

Examining attorney capability in PTAB proceedings, we seek to enhance knowledge about the influence of legal representation in an important administrative setting. Relatedly, we consider representational capability in a context dominated by specialized litigation teams who generally represent affluent clients. Beyond this central issue of attorney capability, our study makes two secondary advances in the specific area of patent rights. First, existing empirical studies of patent litigation have focused squarely on the judiciary (see, e.g., Cotropia et al., 2018; Henry & Turner, 2016; Lemley & Zyontz, 2021; Miller & Curry, 2009). Second, although leading scholars have noted that variations in attorney quality are pertinent to patent litigation—Lemley and Zyontz (2021, p. 89), for example, note that "[i]ndividual inventors may hire worse lawyers to enforce patents . . and may lose because those lawyers are not as good at navigating the shifting and inconsistent patentable subject matter precedent"—we are not aware of studies that have attempted to take systematic account of such variations.

We rely on data concerning the PTAB's adjudication of patent validity through the process of inter partes review (IPR) from 2012 through early 2021. IPR is an adversarial process that is conducted before a panel of three administrative patent judges (APJs) "of competent legal knowledge and scientific ability" to adjudicate the matter at hand.[3] Focusing on IPR enables us to capture the ultimate administrative outcomes of patent validity adjudications and to account for both the firms and the individuals that comprise the legal teams for the parties involved in IPR litigation.[4]

We begin by highlighting important findings from the scholarship on attorney capability, and structure that discussion around several themes. Then we describe IPR proceedings and explain why a focus on patent litigation is an appropriate lens through which to examine agency adjudication. We then describe our data and methods. Next, we present traditional regression results and demonstrate the robustness of those results to the perils of selection bias by utilizing matching. We conclude by discussing the implications of our findings and suggesting several potential directions for future research.

2 | ATTORNEY CAPABILITY

Theories about the ability of lawyers to influence case outcomes arise from work on the stratification of the legal profession (e.g., Heinz et al., 2005; Heinz & Laumann, 1994); this, in turn, is traceable to Galanter's (1974) dichotomy about repeat players versus one-shotters and haves versus have-nots. It was Galanter (1974, p. 114) who first described lawyers themselves as "repeat players" in the legal system, and more recent scholarship has characterized the nature of that status in different contexts. Scholars have described legal practice as operating within two unique hemispheres: an "upper hemisphere" consisting of elite corporate lawyers, and a "lower hemisphere" populated by ordinary practitioners (Heinz & Laumann, 1994). As Haire, Hartley, & Lindquist (1999, p. 667) put it, "the higher compensation and prestige associated

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with employment in elite law firms suggest that this stratification is related to the quality of representation." These authors go on to note that legal specialization varies across the two sectors, with the former being characterized by significantly higher levels of specialization than the latter (Haire et al., 1999, p. 669).

Studies have sought to capture the influence of quality representation in a range of settings. However, as noted, such treatments have tended to eschew administrative fora in favor of generalist courts. Regardless of the specific context, demonstrating that influence conclusively can be challenging. As an abstract theoretical matter, it is not hard to grasp the idea that "better" legal representation somehow *ought* to enhance a party's likelihood of prevailing in litigation (McGuire, 1995). Clear though it may be, this idea soon encounters several related complications: How exactly should attorney quality be measured? What are the specific mechanisms by which attorney quality impacts outcomes? And to what extent might those mechanisms differ across contexts?

In unpacking these factors, we think it is important to underscore that all governmental decision-makers—including APJs—face an informational problem of some sort. They are motivated to reach the best or "correct" decision but inherently operate in environments of bounded rationality due to the limitations of what they can conceivably know (see, e.g., Simon, 2000). Though not always explicitly stated that way, this problem has manifested itself in the attorney capability literature via a focus on several ways in which the relevant decision-maker(s) may acquire useful information. For convenience, we refer to these as heuristic signaling, experience, and the related notion of expertise.

2.1 | Litigator experience and expertise

Perhaps the most straightforward path by which attorney quality might influence adjudicatory decisions is experience. For example, McGuire (1995) concludes that, all else being equal, the presence of more experienced litigators enhances the probability of victory in the United States Supreme Court. His study, much like others that tackle aspects of attorney influence before the Supreme Court (e.g., Black & Owens, 2012; Corley, 2008; Haire et al., 1999; Wahlbeck, 1997), suggests that credible attorneys may be better positioned to craft stronger and more persuasive arguments before the Court's justices. Miller et al. (2015) study of the relationship between immigration attorneys and asylum case outcomes builds on this idea, advancing the notion that a litigator's judge-specific reputation is a primary driver of outcomes in United States immigration courts. Abrams and Yoon (2007) arrive at a similar conclusion in a study of criminal litigation. Examining a variety of background characteristics in public defenders, they find that experienced attorneys achieve more satisfactory outcomes for their clients than do less experienced public defenders.

From one perspective, it should be more reputationally costly for a litigator who repeatedly appears before the same court or judge to provide misleading or unreliable information than for an attorney who will never be there again (e.g., Galanter, 1974). McGuire and Caldeira (1993, p. 719) effectively capture this point in their investigation of how certain professional litigators exert important influence on the Supreme Court's agenda: "The Court rewards with attention those who repeatedly demonstrate credibility, and payoffs of attention for faithful claims of importance reinforce truthfulness. . . . [But f]or a lawyer who files . . . only once in his or her professional life, it is sensible to misrepresent the importance of a case." In effect, repeated interactions before a judge or court establish a litigator's reputation—"a costly and valuable asset" (McGuire, 1995; McGuire & Caldeira, 1993, p. 719).

Though the dividing line between general experience and subject-matter specialization is not always bright, it is worth remembering that much of what attorneys do to benefit their clients is rooted in relational and procedural experience as opposed to substantive specialization or

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expertise. Substance is hardly immaterial, but procedural or relational familiarity brings with it "greater knowledge of the rules of the game," which can amplify one's persuasiveness to a decision-maker (Sandefur, 2015, p. 910). This familiarity is presumably an advantage that more experienced litigators tend to have over their less seasoned counterparts.

Kritzer's (1998) examination of legal advocacy demonstrates the value of relational and procedural expertise in the specific context of administrative adjudication. Drawing on observations about Social Security disability proceedings, he concludes that experienced litigators do well because they know people in the system—especially, in the context he examines, the administrative law judges—and how to interact with them most effectively. This allows more experienced advocates to "play to the reputational expectations of individual judges" and to effectively "know when a particular judge has heard enough" (Kritzer, 1998, p. 136). In other words, the superior experience of these lawyers does not stem from legal substance so much as it represents an outgrowth of the advantages that repeated experience and reputational considerations can bestow (see Sandefur, 2015, p. 926).

The specialized nature of the agency adjudication we analyze leads us to suspect that, to the extent that experience or expertise enhances attorney capability before the PTAB, this is more likely to be driven by relational or procedural factors rather than by considerations rooted in substantive patent law expertise. This strikes us as being the case for two reasons. First, the specialization required to practice before the PTO, which we address in the next section, probably serves to establish a solid baseline of substantive expertise for all attorneys who would be available to challenge or defend patents in IPR. Second, unlike judges on courts of general jurisdiction, administrative adjudicators are assumed (with an important caveat, which we will discuss shortly) to possess greater levels of substantive expertise. This is not to say that we expect experience per se to be unimportant or even that substantive specialization will be entirely irrelevant. Rather, we think that its effects on outcomes are probably more likely to stem from experience's relational and procedural dimensions than from differences in knowledge about legal substance.

2.2 | Heuristic signaling

Heuristic signaling represents a second way in which attorneys may influence outcomes. We can conceive of several pieces of information that decision-makers like APJs might find to function as useful mental shortcuts as they operate within their environments of bounded rationality. To begin, it is plausible that the mere presence of certain attorneys on a case can act as an endorsement of that case's merits (Sandefur, 2015). Here again, McGuire and Caldeira's (1993) assessment of Supreme Court agenda setting proves illuminating. They conclude that the presence of prominent litigators from what they term the "obscenity bar" represents a strong proxy for both a particular case's importance as well as the seriousness of those requesting the Court's attention (McGuire & Caldeira, 1993, p. 719). Although the Court's discretion over its docket is unique—and other factors also serve as important heuristics in filling out that docket (e.g., Pacelle, 2003)—the notion that a litigator's identity may communicate a client's commitment to or investment in the litigation's success has been validated in both international contexts (e.g., Chesterman, 2020) and in the context of other federal courts (Haire et al., 1999, p. 672).

Another potential cue—litigation team size—has emerged as a signal or proxy for the resources that a client is prepared to invest in litigation (e.g., Chesterman, 2020). Multiple studies have found that a litigation team's size is associated with an enhanced probability of success before non-US high courts (e.g., Chesterman, 2020; Szmer et al., 2007). In effect, the larger a litigation team's size, the stronger the signal of seriousness or commitment to the litigation's success that gets transmitted to those tasked with deciding the cases. Chesterman (2020), for example, finds that larger and better-resourced firms tend to do better in the Singapore Supreme Court

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than their smaller and less-elite counterparts. However, his study finds no evidence that litigation experience or relational expertise impacts case outcomes in anticipated ways.

In assessing medical malpractice litigation, Hyman et al. (2016) identify an additional factor that can provide a signal to adjudicators: a firm's reputation. These authors emphasize the importance of a law firm's standing, noting that "cases handled by lower tier lawyers would be worth more if they were handled by higher tier firms" (Hyman et al., 2016, p. 604). This suggests that, apart from factors such as the experience or educational pedigree of particular attorneys in a firm, the mere involvement of some firms—like the presence of some litigators (see McGuire & Caldeira, 1993)—can serve as a form of shorthand conveying to adjudicators' seriousness about and commitment to a given case, and ultimately the merits of the litigation itself.

Though these heuristics should be generalizable across different types of administrative hearings, there is an additional reason to expect them to be influential in the context of patent litigation. If, as the literature suggests, factors like team size or firm or attorney reputation signal a party's seriousness about or commitment to the lawsuit itself, that effectively represents a surrogate for the underlying importance of the patent or patents in dispute—their inherent economic value or importance to a business or industry. And, in patent law, the commercial success or viability of a patent can itself help to demonstrate validity in the face of a challenge on obviousness grounds.

2.3 | Application to litigation teams in administrative patent adjudication

Applying these considerations to the context of adversarial administrative hearings, we expect to find that legal teams that are more experienced (e.g., McGuire, 1995), larger (e.g., Chesterman, 2020), and that come from more highly ranked firms (e.g., Hyman et al., 2016) are likely to win more frequently than their less experienced, smaller, and less prestigious colleagues. As we have said, one of our goals is to determine whether the theoretical considerations frequently discussed in reference to attorney capability extend beyond the individual to teams of litigators. The importance of this question is self-evident. Teamwork among lawyers is on the rise, owing to factors as diverse as "client demands, the complexity of issues, and changing practice conditions" (Rogers, 2017, p. 483); this is true for both litigation and transactional work (Weinstein et al., 2013). Some have suggested that this is a natural result of law's—especially "big law's"—transformation from a profession to more of a business (e.g., Cutler & Daigle, 2002).

In any event, adversarial adjudications[5] involving patent rights (or environmental law, securities, or antitrust issues, to name but a few) unfold in contexts where the potential advantages of teamwork—specialization, flexibility, and innovation—are at their highest. These sorts of complex legal issues are difficult for a single attorney to handle effectively, and they are disproportionately handled by more elite segments of the bar. Their complexity increases the probability that, at some point, issues will arise that fall outside of any one attorneys' core competencies. Enter the legal work team, where "pooled intellectual resources can summon fresh insights into complex legal problems and juridical issues; give rise to inspired solutions; and lead to efficiencies by concentrated work effort" (Cutler & Daigle, 2002, p. 217). At that point, team members with distinct portfolios can contribute their individual strengths to the group effort.

This approach characterizes important aspects of "upper-hemisphere law" and fits naturally with it: "The team's legal specialists spend most of their time working for a number of particular clients and concentrate their efforts in their specialty area" (Cutler & Daigle, 2002, p. 219). The need for teams in patent litigation is intuitive, given the fact that intense focus on a particular factual issue or piece of prior art is often critical to the overall outcome of the case; in such instances, effective lead counsel will likely want individual attorneys to specialize or devote their attention to a particular part of the broader "trial outline" (McCormick, 2010, pp. 50–51). This

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tendency is reflected in our dataset ($N = 2123$), where only 5% of the cases saw one of the parties being represented by a single attorney. There were no cases in our dataset in which both the patent owner and the patent challenger were represented by just one attorney.

3 | PATENT ATTORNEYS AND ADMINISTRATIVE CHALLENGES TO VALIDITY

Patent law falls under the umbrella of intellectual property litigation, and there is a consensus that—along with commercial litigation—intellectual property consistently has the highest quality of legal representation among sections of the bar (Posner & Yoon, 2010, p. 343). Attorneys must hold a technical degree, typically in engineering or the hard sciences, in order to sit for the patent bar and practice before the PTO (Matich, 2013; Miller & Curry, 2009).[6] These points suggest that those involved with PTAB litigation are likely to be of high-quality, to be opposed by litigation teams of similar quality, and to have specialized knowledge of important issues relevant to the case.

Created by the America Invents Act (AIA),[7] the PTAB began operating in 2012 and quickly became central to US patent litigation. The AIA also established a process within the PTAB called inter partes review (IPR), a quicker and cheaper alternative to the federal courts for challenging the validity of existing patents.[8] Given the scope and complexity of patent litigation, virtually all cases in IPR involve representation by multiple attorneys working as a team (e.g., McCormick, 2010, p. 48).

Before a ruling can be made on any patents in dispute, the PTAB must "institute" IPR. Once instituted, other filings, responses, and limited discovery can occur; written decisions are issued about months after oral argument (Cohen, 2014, pp. 8, 20–21). IPR is streamlined, and its claim construction standard is broader than that used in Article III litigation (Motl, 2015, p. 1976).[9] The PTAB does have a penchant for invalidating patents—early in its existence, it was striking down more than three out of every four patent claims in IPR (Allen, 2015; Sterne & Quinn, 2014).

The vast majority of IPRs are conducted before a panel of three APJs, all of whom are appointed by the Secretary of Commerce in consultation with the USPTO Director. The Director or a designee controls panel assignment, and assigners are to match an APJ's technology background with the technical substance of a case whenever possible.[10] While this fulfills the statutory requirement that APJs possess "competent legal knowledge and scientific ability," it does not mean that they necessarily have "*competent* scientific *educations or experiences in the technologies they judge*" (Shifley, 2016; emphasis in original). As a result, APJs may sometimes judge patents in technological areas outside their formal training. PTAB adjudication is technically not "formal adjudication" under the Administrative Procedure Act, because APJs are "non-ALJ agency personnel." This makes IPR akin to the bulk of federal administrative hearings—most are held before some version of a "non-ALJ" such as an administrative appeals judge, immigration judge, or APJ (Walker & Wasserman, 2019, p. 153). These non-ALJs "have largely worked in the shadows as the federal bureaucracy's 'hidden judiciary'" (Barnett & Wheeler, 2018, p. 6), and, as we have noted, the work they do in administrative hearings—particularly those that are adversarial in nature (see Phillips & Raso, 2020)—tends to involve "complicated and important issues."

4 | DATA, VARIABLES, AND MODELING

We rely on data from *Lex Machina*, a data analytics platform affiliated with Lexis Nexus that has been utilized by other patent litigation studies (e.g., Lemley & Zyontz, 2021) to examine

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attorney capability.[11] Utilizing *Lex Machina* searches, we identified 2123 instances, from September 16, 2012 (when PTAB entered operation), through February 20, 2021, in which PTAB instituted IPR. This is equivalent to a case clearing preliminary hurdles before progressing to a fully considered adjudication. We gathered data from cases from four technological areas as classified by the USPTO: Biotechnology and Organic Chemistry; Chemical and Materials Engineering; Transportation, Construction, Electronic Commerce, Agriculture, National Security, and License & Review; and Mechanical Engineering, Manufacturing, and Products.[12] Overall, petitioners and patent owners in our sample prevailed at roughly equivalent rates. The dichotomous variable **patent owner win** is our key dependent variable in the analyses that follow. As noted earlier, we followed *Lex Machina's* coding protocols for classifying petitioner wins and patent owner wins.[13] Finally, what *Lex Machina* calls "mixed cases" represent situations in which some claims are upheld and others are invalidated. In these instances, we coded the case 1 as favoring the patent owner if a majority of challenged claims were upheld, and 0 otherwise. We assigned a value of 1 to an independent variable called **mixed findings** for these "mixed-case situations," which comprised 10% of the cases in our data, and 0 otherwise.[14] In the Appendix, we check the robustness of our results by including a model that excludes all mixed cases, and we find substantially similar results to those presented below.

We then created variables to capture features related to the capability of the litigation teams as well as the parties in each IPR. For the measures of firm rank, attorney count, and attorney experience described below, we create a differenced measure that is included in the models, with challenger characteristics subtracted from owner characteristics. We created the measures Owner Firm Rank and Challenger Firm Rank based on information obtained from the *U.S. News* Practice Areas Rankings. Specifically, we created these variables by factor analyzing rankings in three pertinent intellectual property practice areas: Law; Litigation—Patent; and Litigation—Intellectual Property. In creating these variables, we treated any firm not included in one of *U.S. News*'s three tiers as being in a fourth, unranked tier. We used national rankings and did not include regionally ranked firms. Higher values for this variable signify higher average tier-rankings across the *U.S. News* categories. We discuss *U.S. News's* ranking methodology in greater detail in the Appendix. We then subtracted the challenger's firm rank from the owner's firm rank to create a difference measure in the rankings for any given case. We call this variable **Firm Rank**.

In addition to these variables, we include Owner Attorney Count and Challenger Attorney Count variables to denote the size of the respective litigation teams. Finally, with respect to litigation team–related considerations, we include a measure of the amount of experience each side's attorneys possess by quantifying the average number of previous appearances before PTAB. Again, we construct this measure for both Owner Attorney Experience and Challenger Attorney Experience. As we did with firm rankings, we create a measure for **Attorney Count** and a measure for **Attorney Experience**, each of which involves subtracting the challenger's values from those of the owners.

With respect to client characteristics, we include two dummy variables indicating whether either the patent owner or the challenger is a Fortune 500 Company, coded 1 if the company was in either the Global Fortune 500 or the US Fortune 500. We also include an **Owner NPE** variable to denote instances where a patent owner is a non-practicing entity (NPE) or so-called "patent troll." To construct this variable, we utilized Stanford University's NPE Litigation Database and coded entities identified by the database as having "acquired patents" 1, and 0 otherwise.[15] We also incorporate several additional controls. We code the **technology category** into which the challenged patent falls. This is a multinomial variable coded based on the technological area or "tech center" in which a patent falls (either 1600, 1700, 3600, or 3700). We code **time-to-grant**, which captures the length of time (in days) between the submission of the challenged patent's application and its approval, normalized by the issue area of the patent and the **number of claims** included in the patent (and also normalized by technology area)

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(Squicciarini & Criscuolo, 2013). In addition, we capture the year the case was filed (**year filed**) with the PTAB. As mentioned above, we expect "better" litigation teams to enhance a party's likelihood of prevailing in IPR. In light of the variables described above, this leads to three specific expectations for both the legal teams representing the patent owners and the teams representing the challengers:

> **Hypothesis 1.** *All else being equal, parties with an advantage in attorney experience will have higher rates of success in IPR.*
>
> **Hypothesis 2.** *All else being equal, parties who are represented by larger litigation teams will have higher rates of success in IPR.*
>
> **Hypothesis 3.** *All else being equal, parties who are represented by more highly ranked firms will have higher rates of success in IPR than those represented by lower ranked firms.*

We estimate logit equations focused on the dependent variable: whether the patent owner won her case before the PTAB. Descriptive statistics for all of the included variables are provided in the Appendix.

5 | RESULTS

To begin, we will estimate and describe results from what we call a "naïve" regression, which is a traditional logit model that does not account for the possible selection effects between attorneys and clients. In the following section we check the robustness of these naïve results against a series of regressions on matched data. The results of several models are presented in Table 1 below; Model 1 contains the naïve results, while Models 2 and 3 are estimates based on matched data, to which we return in the section on robustness below.

The key results in Model 1 are for the difference in firm rank between the patent owner and the challenger and for the difference in attorney count between the patent owner and the challenger. Both measures are statistically and substantively significant predictors of the likelihood that a patent owner prevails. The results hold in all of the subsequent models estimated on matched data. Also important is the insignificance of the difference in attorney experience, confirmed in subsequent models using matched data.

Figure 1 illustrates how changes in firm ranking differentials affect the likelihood that a patent owner will survive a challenge in IPR (using results from Model 1). Vertical lines represent 95% confidence intervals. Moving across the range of the data, there is an 18 percentage point increase in the probability that the patent owner prevails as the firm ranking differential changes to favor the owner. But even a more restricted comparison can illuminate the powerful effect of firm reputation. In a situation in which there is parity in firm rankings (0 on the x-axis), there is a 43% likelihood of the patent owner winning. But moving one-standard deviation above parity to 1.5 on the x-axis increases the chances of a patent owner win to 48%, a difference that is highly statistically significant ($\chi^2 = 12.50$ [0.00]). This represents about a 12% increase in the likelihood of patent owner victory. This is strong support for H2.

A similar substantive effect exists for the difference in attorney counts, as shown in Figure 2 below. Across the range of the data, the increase in the likelihood of patent owner success is tremendous, ranging from about 10% when the owner's team is outnumbered by 15 to almost 80% when the patent owner has nine more attorneys on the case. Focusing on a smaller change in the data, moving from parity in the number of attorneys to an owner advantage of two (an increase of one standard deviation) increases the likelihood of an owner win from 47% to

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TABLE 1 Regression results

	Model 1: Naïve regression		Model 2: Owner top-half CEM		Model 3: Challenger top-half CEM	
Litigant charac.	**Coeff.**	**Robust S.E.**	**Coeff.**	**Robust S.E.**	**Coeff.**	**Robust S.E.**
Firm rank	0.15[b]	0.04	0.22[b]	0.05	0.23[b]	0.05
Atty. count	0.15[b]	0.03	0.20[b]	0.04	0.20[b]	0.04
Atty. exp.	0.02	0.04	−0.02	0.04	0.03	0.04
Owner client charac.						
Owner Fortune 500	−0.01	0.15	0.08	0.22	−0.38	0.20
Owner NPE	−0.09	0.21	0.10	0.30	0.23	0.29
Chall. client charac.						
Chall. Fortune 500	−0.26[a]	0.12	−0.29	0.16	−0.01	0.15
Controls						
Tech category	−0.01	0.05	0.01	0.06	0.00	0.00
Time-to-grant	−0.55	0.35	−1.00[a]	0.50	−0.69	0.45
Number of claims	0.24	0.63	−0.89	0.97	−0.27	0.90
Mixed findings	−1.11[b]	0.18	−1.29[b]	0.23	−1.13[b]	0.22
Year filed	0.12[b]	0.03	0.14[b]	0.04	0.17[b]	0.04
Constant	−249.82	59.84	−282.71	74.89	−350.61	72.21
N	1936		1477		1516	
Patent clusters	1573		1260		1284	
Wald χ^2	83.44 (0.00)		70.77 (0.00)		82.55 (0.00)	
Pseudo R^2	0.04		0.06		0.06	

[a]Significant at $p < 0.05$;
[b]Significant at $p < 0.01$; both tests two-tailed.

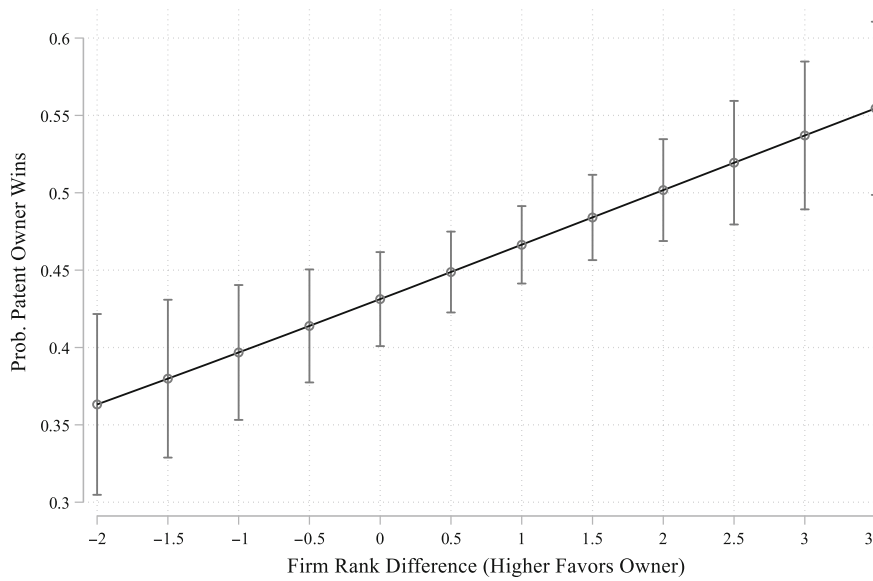

FIGURE 1 Difference in firm rank.

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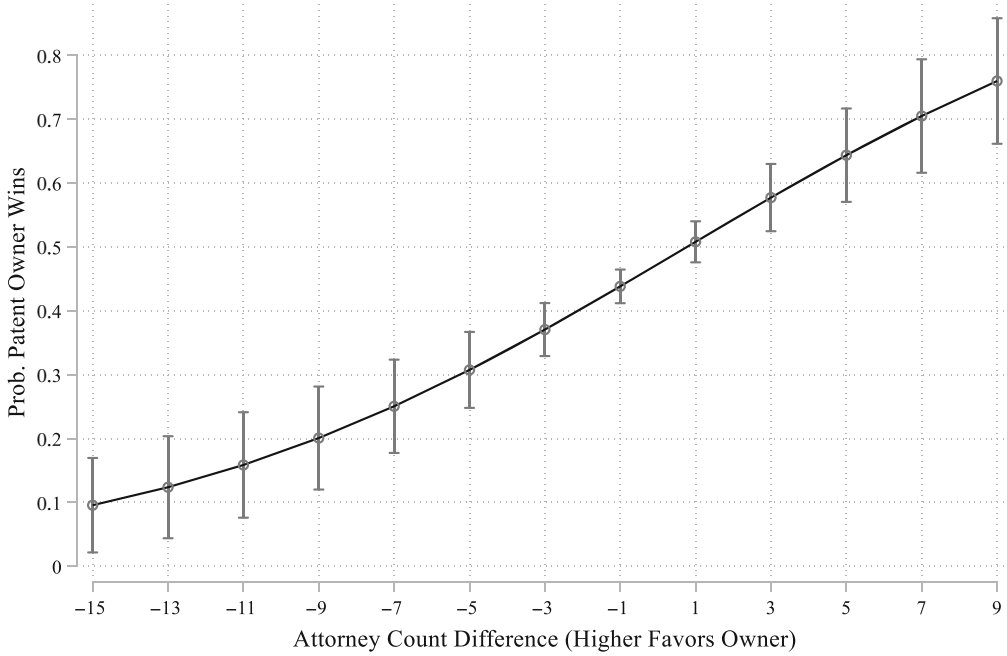

FIGURE 2 Difference in attorney count.

54%, a change that is also highly statistically significant ($\chi^2 = 24.46$ [$p = 0.00$]). This is significant evidence in support of H3.

Perhaps APJs see a highly-ranked firm's presence on a case as an endorsement of that side's merits (Haire et al., 1999), or interpret larger litigation teams the same way. In addition, as referenced earlier, the fact that a party enlists legal help from a highly regarded firm or retains a large litigation team may also convey to APJs the importance that a litigant ascribes to the patent rights in dispute. At the same time, we may be looking at an area of law and at a category of administrative proceeding that make attorney experience particularly unlikely to be relevant, as the litigators are already likely to be of high quality and the adjudicators are substantive experts.[16]

In Model 1, the perceived resources of the challenger (i.e., whether the challenger is a Fortune 500 company) is also a significant predictor of the likelihood of a patent owner victory, reducing the probability by 6 percentage points (−12, −1). Caution is necessary in interpreting this result for challenger resources because it is not robust across different specifications, as in Models 2 and 3. Regardless of specification, two control variables are always significant predictors. First, cases that have mixed findings tend to strongly favor the challenger. A case with mixed findings across patent claims is one in which the patent owner is significantly less likely to prevail on the majority of claims, by about 26 percentage points. In the Appendix we present a model that omits these mixed cases to ensure that their inclusion is not driving our results. A second important control variable is the year in which the case is filed. Essentially, for each year after 2012 (when the IPR system was created), the likelihood of a patent owner victory increases by 3 percentage points. This amounts to a 36% chance of victory in 2012 and a 61% chance in 2021. This is consistent with research on patent litigation in the courts (e.g., Lemley & Zyontz, 2021) and reflects the common understanding among patent practitioners that there was a glut of poor patents to be cleared when the IPR process started. As these poor patents were cleared, the USPTO became less likely to invalidate patents (Jablon, 2020).

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6 | ROBUSTNESS CHECKS

As noted frequently in the literature on attorney effects, there is a problem that makes inference for causal effects difficult: attorneys select the cases they work, and as such any effect for attorney quality we observe may simply be a result of this selection process (e.g., Abrams & Yoon, 2007; Nelson & Epstein, 2022). This problem can be ameliorated by using experimental data and randomly assigning treatment, but this is difficult when studying attorneys since such experimental opportunities are infrequent and likely to be limited to only certain kinds of litigation. As an alternative, we use matching, and specifically the approach advocated by Ho et al. (2007), to pre-process our data before we analyze it using more traditional regression approaches. We conceive of our treatment here as the assignment of a high-quality litigation team to a case. This raises some complications, such as how to operationalize high quality and how to account for the fact that both the challenger and the owner may have quality litigation teams. We use the reputational ranking of the law firms working for the parties to define quality—more specifically, we assign as treated with a high-quality litigation team those cases in which the average law firm ranking was in the top-half of our data (although we use a different cut-off in the Appendix, with similar results). We use the reputation ranking because it is likely to simultaneously account for individual attorney quality and for the resources likely devoted by a team to litigation. The *U.S. News* rankings have this characteristic because of the ranking methodology used by the publication, a point we address in greater detail in the Appendix.

To account for the fact that both the challenger and the owner can have high-quality teams, we execute the matching routine described in the Appendix for both the challenger's and the owner's litigation teams. Our analytical strategy is to then compare results using both approaches to ensure that our decision to match on the owner or the challenger does not bias our results. In essence, we can view the treatment as being applied to the owner or the challenger, but not to both simultaneously. Rather than pick between them, we estimate two matched samples and compare the results.

Results for models using the data that is matched based on the rank of the owner's firm (with treatment considered ranking in the top half of the data) are presented as Model 2 in Table 1. Substantively, there is essentially no difference (aside from a reduction in N) from the results for the naïve model presented as Model 1. The standard errors are a bit larger because of the reduced N, and this makes the effect of the Challenger Fortune 500 variable no longer statistically significant. Model 3 in Table 1 uses the ranking of the challenger's firm rather than the owner's, with treatment again considered to occur when the firm is ranked in the top half. These results are highly similar to those presented in Model 2. Taken together, the results of Models 2 and 3 suggest that the ability of attorneys to select their clients is not driving our findings with respect to firm rankings and litigation team size.

7 | DISCUSSION AND CONCLUSION

Our aim in this project was to better understand the influence of attorneys on outcomes in an important yet poorly understood context: adversarial administrative adjudications. Our particular focus was on patent rights and IPR, and we found larger litigation teams and those associated with more highly ranked firms to be more successful than their counterparts. We also demonstrated the robustness of those results to the possibility of bias in client selection. The sheer impact of patent rights on the American national economy makes that topic indisputably important as an economic policy matter—according to estimates, patent-intensive industries accounted for nearly 40 million jobs and $9 trillion in GDP in 2019 alone (Toole, Miller, & Rada, 2022). Of greater consequence for our contribution's generalizability, the adversarial

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adjudication we examine is, in important respects, representative of the types of settings that frequently confront parties embroiled in other types of adversarial administrative processes, ranging from securities or antitrust matters to environmental enforcement or Equal Employment Opportunity Commission enforcement actions (Asimow, 2015; Harrington & Sheffner, 2021, pp. 12–15).

Federal judges and administrative adjudicators face at least one problem in common: they have incomplete information. The scope of that problem may differ between them, but its basic existence does not. Here we provide strong evidence that, in the context of adversarial adjudication, the factors that comprise what we call "litigator experience" do not condition decision-making. Litigation team quality matters, but the lack of support for H1 suggests that factors such as procedural familiarity, relational knowledge, and even substantive legal expertise are not the mechanisms by which APJs rely on legal counsel to navigate their bounded rationality. Instead, what matters is the *signal* of quality, what seems to be conveyed about the legal strength of a litigant's position by the mere presence of larger teams of lawyers or representation by a well-regarded firm about.

This result differs some from conclusions drawn by studies of generalist courts, where the importance of credibility and the potential for more persuasive argumentation have suggested that greater levels of experience are consequential (e.g., Abrams & Yoon, 2007; McGuire & Caldeira, 1993; Sandefur, 2015). It is also at odds with some of the conclusions Kritzer (1998) draws in his study of administrative adjudication, which emphasize relational and procedural expertise. At first blush, this seems contradictory. However, we think it probably stems more naturally from the fact that his study assessed an inquisitorial adjudication—Social Security disability proceedings—as opposed to those of the adversarial variety that we analyze (Harrington & Sheffner, 2021). This underscores the need to take context, even context within the important realm of administrative adjudication, into account. Different theoretical mechanisms may underpin attorney capability in adversarial hearings than the ones that structure its influence in inquisitorial settings; if this is so, scholars must be careful not to treat the two settings as theoretically equivalent.

Although more research is needed to establish the generalizability of our findings, we do expect, despite some inevitable heterogeneity, that the heuristic mechanisms we have uncovered linking litigation teams with outcomes in IPR operate similarly in other adversarial administrative proceedings. At a minimum, our operationalization of quality as a team-level construct should be instructive in these other contexts in which team-based litigation is the clear norm (e.g., McCormick, 2010). Our focus on the litigation team and our attention to the context of administrative adjudication is also timely. As issues grow more complex and corporate practice adapts by encouraging enhanced specialization, limiting assessments of attorney capability to the individual level becomes harder to justify.

Finally, we think our contribution suggests several avenues for future investigation. We have focused on the role of litigation teams in an administrative setting, but litigants who lose at this adjudicatory stage may appeal to the Court of Appeals for the Federal Circuit—a semi-specialized court that (aside from the US Supreme Court) is the only appellate body with jurisdiction over patent cases. We are not aware of studies that have examined attorney capability in that setting, and it would be useful to gauge the extent to which the results we have reported in this specialized administrative context transfer to that semi-specialized Article III setting.

In addition, there is the possibility that APJs react differently to litigation teams depending on their own narrower subject matter specialization. For instance, it is common for there to be a mixed degree of subject matter expertise on most PTAB panels: one APJ may have expertise in chemical processes used in manufacturing, one in mechanical engineering, and one in computer engineering. If this imaginary panel is considering a patent on how chemicals are layered to create a television, then we would expect one APJ to have more relevant knowledge than the

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others. This difference in relative expertise may translate to noticeably different patterns of reliance on the attorneys and patterns of deference among the APJs.

Aspects of the US administrative apparatus have attracted increasing attention as their relevance to everyday activity grows more pronounced. This has certainly been true of the PTAB. In June 2021, the Supreme Court held that, because APJs are not appointed and confirmed by the Senate, the USPTO Director must have discretion to review APJ decisions (United States v. Arthrex, 2021). This Court-created remedy affords opportunities for inquiry into the PTAB, and specifically into the conformity of APJ decisions with the perspectives of politically appointed leadership, the frequency with which the Director utilizes this newly bestowed discretionary review, and whether the presence of factors such as technology area, particular APJs, or even the particular litigation teams on a case may influence the Director's propensity to overrule APJs. We hope our focus on the role of litigation teams in this adversarial administrative context catalyzes others to grapple with issues related to the importance of attorney quality in other administrative proceedings.

ENDNOTES

[1] The greater insulation of administrative proceedings from legislative and executive oversight—and the fact that agency adjudicators are generally not tasked with considering the broader implications of their decisions (see Rosenbloom, 2015, p. 99)—would seem to supply additional motivations for studying the role of attorneys in this context.

[2] To illustrate the significance of these hearings, consider the following: In 2020, an administrative judge with the Securities and Exchange Commission imposed civil penalties upwards of $1 million against the CEO of an assisted living company for violating the SEC Act of 1934 (https://www.sec.gov/alj/aljdec/2020/id1401jsp.pdf); in 2018, a judge with the Environmental Protection Agency ordered Spartan Diesel Technologies to pay a penalty of more than $4 million for violating the Clean Air Act (https://yosemite.epa.gov/oarm/alj/alj_web_docket.nsf/Dockets/CAA-HQ-2017-8362). Thousands of additional examples could be summoned to show the pervasiveness and importance of these hearings.

[3] https://www.uspto.gov/web/offices/pac/mpep/s1202.html.

[4] As we discuss, IPR's creation was motivated by Congress's recognition of the increasing centrality of patents to the national economy and its belief that a quicker and cheaper alternative to traditional litigation was necessary to process challenges to patent validity. According to one study, between 2014 and 2019, IPR's streamlining of this process saved businesses $2.95 billion and created 13,500 job-years of employment (Perryman Group, 2020).

[5] Administrative adjudication exists in many unique permutations across governmental agencies, but it is most often described as being either adversarial or inquisitorial in nature. Inquisitorial processes are characteristically used in hearings on matters such as the availability of disability or Social Security benefits (e.g., Dubin, 1997). Adjudication that is adversarial in nature—like the adjudicative context we examine—is more complicated and involves issues of broader importance (see Phillips & Raso, 2020, and endnote ii). We largely view our contribution as one that speaks to the influence of litigation team capability within the adversarial context of adjudication; because of the differences that tend to exist across adversarial and inquisitorial processes (e.g., Asimow, 2015), we are reluctant to conclude that our findings are robust within more inquisitorial contexts.

[6] Interestingly, those who litigate patents in federal court are not required to be members of the patent bar (Hubbard, 2017, p. 388). Buccafusco and Curtis (2019, p. 263) flag the technical degree requirement as having a disparate impact on the access of female attorneys to an especially lucrative, high-status part of the legal profession.

[7] The America Invents Act ushered in the most extensive changes to US patent law in decades (see Armitage, 2012).

[8] A key motive for IPR's establishment was Congress's view that patent litigation had become too burdensome and expensive. Having an administrative mechanism for challenging patent validity was not new, but IPR injected greater finality and efficiency into the process. For example, parties cannot pursue any issues that "were raised or could have been raised" via IPR in future federal litigation (Stach & Strickland, 2014).

[9] Its efficient nature makes IPR "attractive to defendants in patent litigation and other parties seeking to invalidate low-quality and potentially threatening patents" (Motl, 2015, p. 1978).

[10] https://www.uspto.gov/sites/default/files/documents/SOP%201%20R15%20FINAL.pdf. The USPTO refers to these categories as "technology centers."

[11] *Lex Machina* scrapes USPTO data every 24 h. It then uses a natural language processing and machine learning engine to extract a range of information about each case, including documents, personnel and issues involved, and outcomes. See https://lexmachina.com/how-it-works/.

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[12] The USPTO classifies these four broad areas, respectively, as Technology Center 1600; Technology Center 1700; Technology Center 3600; and Technology Center 3700. These are the four highest-level classifications in the USPTO system.

[13] The modal outcome for cases *Lex Machina* categorizes as petitioner wins is "all claims unpatentable," with "all claims amended" and "patent owner disclaimed" outcomes also coded as petitioner wins. Settled cases—cases in which all claims were upheld, as well as a small number of procedural dismissals—represent patent owner wins in *Lex Machina's* protocol. This approach, which we adopt, treats any outcome that formally disturbs the original patent rights (whether via amendment, disclaiming, or unpatentability) as a challenger win.

[14] To better grasp the mixed findings variable's construction and its relationship to the dependent variable, consider an IPR in which 23 claims of a given patent are at issue. If all 23 of those claims are upheld as valid in IPR, the case is coded 1 as a patent owner win. If all 23 of those claims are deemed unpatentable, the dependent variable is coded 0 as a patent owner loss. In each of these two scenarios—which characterize 90% of the observations in our data—the value for the **mixed findings** independent variable is 0. If, however, three claims are upheld and 20 claims are declared unpatentable, this would be coded 0 as a patent owner loss and also coded 1 as a mixed-findings case.

[15] Broadly speaking, patent trolls are corporate entities that acquire patents without any intention of using them to invent new products. Instead, these entities derive profit from suing others who might infringe the patent portfolio. For our purposes, patent trolls should be less interested in extended litigation on a patent, since this costs money and could potentially result in the invalidation of the patent. As careful work by Cotropia et al. (2018) makes clear, there can be considerable heterogeneity within this category. Given our purposes here, we thought it most appropriate to operationalize this variable along this basic dimension.

[16] Out of curiosity, we checked three leading patent firms to investigate whether they might use IPR proceedings as a sort of training ground for young patent attorneys. While our conclusions are impressionistic, this does not appear to be the case. The average patent litigation team member at Fish & Richardson ($N = 123$), Jones Day ($N = 154$), and Ropes & Gray ($N = 64$) received her JD between 2006 and 2007; the mean graduation year for associates in these three firms was between 2015 and 2017; partners at Jones Day and Ropes & Gray had the same average graduation year—1999—while those holding an analogous position at Fish & Richardson ("principal") were a bit less experienced, with an average graduation year of 2003. These figures appear to be broadly in line with the profession's wider demographics (Galanter & Henderson, 2008; Grenardo, 2014). In our data, attorneys in these firms have an average number of prior appearances working for patent owners of 4.9; for those not in these firms, the average is 3.1. Similar differences can be observed for those working for clients challenging a patent. We therefore find no empirical evidence that large firms are using IPRs solely as a proving ground for young attorneys.

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APPENDIX A

Table A1 below lists descriptive statistics for all included variables prior to data processing.

As noted in the text, we use *U.S. News* law firm rankings in three categories: IP litigation, patent litigation, and patent law. *U.S. News* compiles its national and regional rankings using the same methodology. We counted only nationally ranked firms in our measure because the PTAB is a national forum. Eligibility to be ranked by *U.S. News* is premised on whether the firm has at least one lawyer in the issue area ranked in the previous edition of *U.S.* News Best Lawyer Guide. Rankings are based on surveys from eligible law firms as well as surveys completed by clients of the law firms. Each lawyer in a firm is sent a survey asking them to rate other lawyers and firms on responsiveness, expertise, whether they would refer a matter to a given firm, and whether they consider a given firm a worthy competitor. *U.S. News* then compiles all the lawyer and client data and groups law firms into tiers within each practice area. The response rate to this survey is generally high—in 2021, of 15,587 eligible participants, 15,130 responded (U.S. News, 2021).

We use rankings from 2021, as these are the only available *U.S. News* rankings that include multiple tiers of rankings for each area of interest. However, in order to confirm that these 2021 rankings are not overly affected by the very thing we are trying to measure—performance in IPR cases before the PTAB—we were able to recover tier-one rankings for each area of interest for 2013 (which was measured in 2012, when IPR had just been initiated). For firms across the three practice areas covered by *U.S. News*, we found that 81% of those ranked in tier one in 2013 were also ranked in tier one in 2021. Indeed, most of those that were ranked in tier one in 2012 that were not ranked in tier one in 2021 were ranked in tier two in 2021. We take this as

TABLE A1 Descriptive statistics

Variable	Mean	Std. dev.	Min.	Max.
Patent owner win	0.47	0.50	0	1
Firm rank	1.00	1.50	−5.25	5.76
Atty. count	−0.17	2.29	−15	10
Atty. experience	0.13	1.93	−8	10.4
Owner Fortune 500	0.17	0.38	0	1
Owner NPE	0.09	0.28	0	1
Chall. Fortune 500	0.31	0.46	0	1
Tech category	1.69	1.15	0	3
Time-to-grant	−0.24	−0.17	−0.99	−0.02
Number of claims	−0.14	0.14	−0.99	0
Mixed findings	0.10	0.30	0	1
Year filed	2015	1.83	2012	2020

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evidence that the rankings are highly stable and unlikely to have been significantly affected by IPR performance. The fact that we incorporate three sets of rankings from *U.S. News*—IP litigation, patent litigation, and patent law—into our factor analysis likely adds to the measure's relative stability, as it makes it more robust to even minor variations within a particular category.

Finally, to create the measures used in the paper, we undertake a principal component analysis of the ranking for owners and for challengers. Table A2 below displays the factor loadings and regression coefficients for each of the factors we use. For the owner principal component analysis, we retain the only factor with an eigenvalue above one (which explains 87% of the variance in the factors); for the challenger component analysis, we again retain the only factor with an eigenvalue above one (which explains 82% of the variance). These scores are then reversed to reflect the fact that higher numerical rankings reflect worse, not better, reputations. Lastly, it is clearly possible to use a simple additive index across the rankings. Such an additive measure is highly correlated with our factor score ($r = 0.99$), and we prefer the factor analysis since it allows each set of rankings to vary in importance. For example, we do not know a priori whether patent litigation or patent law rankings are more important than IP litigation rankings. The factor analysis allows the data to tell us, at least in principle. Given the high correlation between an additive measure and the one we use, and the high factor loadings for each measure, it turns out that in practice each ranking seems to be measuring roughly the same reputation.

Our indicators of patent quality are derived from work on multiple patent systems in OECD nations (Squicciarini et al., 2013). Based on this work, we normalize the time-to-grant and the number of patent claims by issue area to account for potential unobserved technological shocks within a technology area. Data on patent claims itself is calculated using the information provided to the USPTO in the filing for a patent, while the time taken to grant a patent is calculated using data from *Lex Machina*. With respect to the time taken to grant, studies have found that longer grant times are associated with more controversial patents (Squicciarini et al., 2013, p. 18). With respect to patent claims, multiple works, summarized by Squicciarini et al. (2013, p. 30), suggest that patents with higher numbers of claims have greater technical breadth and higher expected market values.

Readers might be concerned that our results are driven by our inclusion of a set of cases in which the judgments on patent validity were mixed. In other words, these are cases in which we make a judgment call about whether the challenger or the patent owner won the case based on the number of claims invalidated as compared with the number challenged. Table A3 below displays the results of a model in which we exclude all of the mixed cases in our data. The results show essentially no difference from those presented in Model 1 in the paper.

TABLE A2 Factor analysis for firm rank measure

Owner scores	Factor loading	Scoring coefficients
Patent law	0.91	0.35
Patent litigation	0.95	0.36
IP litigation	0.94	0.36
Challenger scores	**Factor loading**	**Scoring coefficients**
Patent law	0.87	0.35
Patent litigation	0.93	0.38
IP litigation	0.92	0.37

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TABLE A3 Model excluding mixed cases

	No mixed cases	
Litigant charac.	**Coeff.**	**Robust S.E.**
Firm rank	0.16**	0.04
Atty. count	0.16**	0.03
Atty. exp.	0.03	0.04
Owner client charac.		
Owner Fortune 500	−0.036	0.16
Owner NPE	−0.15	0.22
Chall. client charac.		
Chall. Fortune 500	−0.24	0.13
Controls		
Tech category	−0.00	0.00
Time-to-grant	−0.63	0.37
Number of claims	−0.00	0.00
Mixed findings	---	---
Year filed	0.13**	0.03
Constant	−259.17	62.59
N	1728	
Patent clusters	1419	
Wald χ^2	56.52 (0.00)	
Pseudo R^2	0.03	

** is significant at $p < .01$.

Using a matching approach requires identifying a set of covariates that occur before the application of the treatment of interest. In our data, the pre-treatment covariates of interest are the characteristics of the client and the characteristics of the patent. If attorney selection of cases leads to the observation that quality attorneys enhance case outcomes simply because of attorney selection effects, then we should observe better attorneys selecting clients who can better afford to support the case and better patents to defend (or lower quality patents to attack). To account for client resources, we denote the case-level average of clients involved in a case (owner or challenger) who appeared in either the Global Fortune 500 or the US Fortune 500. Further, we include an indicator variable for whether the patent owner is a non-practicing entity (NPE); such entities are sometimes referred to derisively in the literature as "patent trolls." We expect that these entities will be particularly unlikely to want to spend money in defense of a patent. To account for patent quality, we include three measures: the technology area in which the patent was filed, the length of time between when the patent application was filed and when it was approved, and the number of claims made in the patent. The last two are normalized for the patent's technology area to account for technological differences (see Allison et al., 2010; Dreyfuss, 2015; Lefstin et al., 2018). Each of the three variables can be considered an indicator of patent quality. The ability to objectively assess the quality of the case, before assignment of the litigation team, is a major advantage in our data, as it allows us to carefully control for the effects of case selection by attorneys.

Finally, we use a matching process known as coarsened exact matching (CEM) (Iacus et al., 2012). The goal of CEM is to reduce the imbalance across pre-treatment covariates after the matching algorithm is executed. To show how this works in our data, we display balance

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TABLE A4 Balance statistics for matching analysis

Owner CEM balance statistics (Model 2)			
	Before match	**After match**	**Percent improvement**
Time-to-grant	0.113	0.081	28%
Claims	0.124	0.053	57%
Tech category	0.131	0.000	100%
Owner Fortune 500	0.070	0.000	100%
Owner NPE	0.031	0.000	100%
Chall. Fortune 500	0.034	0.000	100%
Challenger CEM balance statistics (Model 3)			
	Before match	**After match**	**Percent improvement**
Time-to-grant	0.091	0.048	47%
Claims	0.106	0.089	16%
Tech category	0.065	0.000	100%
Owner Fortune 500	0.014	0.000	100%
Owner NPE	0.008	0.000	100%
Chall. Fortune 500	0.036	0.000	100%

statistics (L1) (Iacus et al., 2012) in Table A4 below. Larger values for L1 indicate greater imbalance. It turns out that matching on the owner-firm treatment induces a slightly better match than does matching on the challenger-firm treatment. Across four of the six pre-treatment variables, the matching process improves the balance on the covariates by 100%, meaning there is no remaining imbalance on these variables. The improvement is less than 100% on the number of claims and time-to-grant, although the improvement is still considerable.

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