Draft: Comments welcome

Patent Institutions: Shifting Interactions Between Legal Actors

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Introduction

As demonstrated by multiple relevant contributions in Volumes I and II, the literature on patent institutions is voluminous. To keep the inquiry tractable, this contribution covers only research on actors responsible for the development and implementation of U.S. patent *law*. Moreover, because Part II of this Volume addresses in detail the empirical literature on several very important legal actors – most notably the Court of Appeals for the Federal Circuit ("Federal Circuit") and the U.S. Patent and Trademark Office ("USPTO") – I focus on *interactions* between legal actors. I consider both legalist and strategic perspectives on these interactions.

I turn to this topic about a decade after having written several articles (Rai 2003; Rai 2001) making a strong normative claim that Congress missed the mark when it decided in 1982 to enhance expertise solely at the appellate court level. I argued that under conventional legal process principles (Hart & Sacks 1958), many of the most important inquiries associated with determinations of patent validity and infringement involve relatively technical adjudicative facts, and that this reality counseled in favor of deploying greater expertise and resources at the administrative and trial court levels. With deployment of such expertise and resources, the Federal Circuit would have no cause to act as a fact-finder in its review of the PTO and trial courts. Further, the Federal Circuit's predisposition towards a rule-formalism that was largely insensitive to policy goals – previously justified by the limited competence of inferior actors in the patent system –would lose its justification.

Over the intervening years, some of this "devolution" has arguably occurred. Congressional intervention, intervention by the Supreme Court that allocates power to lower tribunals, and even aggressive "competition" for patent cases by certain district courts have taken power away from the Federal Circuit. But devolution has not necessarily been accompanied by fortification of expertise and resources. And even where devolution has been accompanied by such fortification, such as through the creation of the USPTO Patent Trial and Appeals Board, the results have been controversial. Meanwhile, many questions persist regarding whether

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current interactions between patent institutions are creating not only appropriate results in individual cases but also appropriate policy for the system as a whole. A review of interactions between legal actors in the system is thus quite timely.

Although my prior work, and this contribution, focus on the period after the creation of the Federal Circuit, the Constitution of course mentions patents and Congress saw fit to create a patent system as early as 1790. Through the centuries, however, Congressional involvement on central substantive matters has often been limited to articulation of some very basic language. (Nard 2010). Given the many gaps in statutory law, Congress has arguably delegated authority to other institutions. (Rai 2003; Burk and Lemley 2003; Nard 2010). In any event, these other institutions have either implicitly or explicitly developed patent law beyond the statutory text not only by applying it to particular contexts but also more broadly.

Particularly since the creation of the Federal Circuit in 1982, the primary institution has been the courts (Nard 2010). Although the PTO has been conducting examination since 1836, the PTO's very longevity as an institution means that the agency substantially predates the rise of the modern administrative state. (Duffy 2000). As discussed below, path-dependence from the PTO's original limited role, a suite of concerns surrounding administrative regulation of "property rights," aggressive review by the Federal Circuit, and persistent problems in managing workflow that undermine its reputation have often kept the agency from exercising significant control over questions of law and policy.

The PTO's limited power vis a vis other institutional actors has had a number of follow-on effects. In general, because the courts rather than the PTO have maintained the standards by which applications are judged, concerns about PTO workload have not entered the calculus for these standards. The resulting influx of new, and repeat, applications has further taxed the PTO's already limited and uncertain financial resources.

That said, the PTO, together with other executive agencies, have in recent years had some influence over the powerful Office of the Solicitor General. The net result has been some recent PTO influence over the Supreme Court. The PTO also has a first-mover advantage that it is sometimes able to exploit. Finally, the powers, and additional resources, conferred on the agency by the America Invents Act of 2011 may give it broader authority going forward. This broader authority has already raised, and will continue to raise, a plethora of interesting research questions.

Within the court system, the Federal Circuit was the predominant player from 1982 through the early 21st century. The elimination of appeals to regional circuits did not, however, eliminate litigants' desire to seek out particular district courts. (Moore 2001). Litigants' predilection for forum shopping has only accelerated in recent years (Lemley 2010), with the evidence indicating that non-practicing entities in particular seek out the Eastern District of Texas. (Anderson 2015; Klerman and Reilly 2015). With district courts of course come the

institution of juries, and many have questioned the considerable power given to juries. (Lemley 2014)

In the last decade, the Federal Circuit has also shared the spotlight with the Supreme Court. The emergence of the Supreme Court as a relevant actor has begun to generate research on its role and also on strategic interactions between the Federal Circuit and the Supreme Court.

As the preceding discussion may suggest, the relevant descriptive and normative literatures are quite rich. To keep the normative discussion tractable (and in keeping with the focus of this volume), I adopt a parsimonious account of patent law's goals that focuses solely on economic efficiency. On this account, the ultimate efficiency goal is innovation. From an institutional and procedural standpoint, achieving innovation requires that relevant institutions promote both accuracy and predictability. Accuracy, in turn, represents both a system level goal – is the system as a whole designed to produce law that promotes innovation – and a goal to be achieved at the level of the individual case. At the level of the individual case, efficiency and accuracy map directly on to the more general goal of minimizing the sum of litigation and error costs emphasized by standard economic analyses of legal procedure. (Kaplow and Shavell 1994, 1996).

Finally, I address what I view as the most pressing open research questions. Some of these questions have been addressed in part, but more research needs to be done. In other cases, the events in question are of recent vintage, and a full institutional account must await further developments.

Part I reviews descriptive accounts of patent law's institutional actors. Part II reviews normative accounts. Part III presents open research questions.

Part I

In 1982, Congress set up the Court of Appeals for the Federal Circuit to hear all appeals in patent cases. The current institutional debate continues to focus heavily on the Federal Circuit. Discussions of other important patent institutions, such as the Supreme Court, the USPTO, other agencies, and trial courts often refer to the Federal Circuit. For purposes of the historical and descriptive account, the creation of the Federal Circuit in 1982 thus serves as a useful point of demarcation.

A. *The Era of Federal Circuit Supremacy, 1982-2002*

As Ryan Vacca's contribution to Volume II discusses in detail, momentum to create the Federal Circuit emerged in part from a more general project on reducing appellate court caseload and improving legal consistency undertaken by the Hruska Commission. (See references cited in Vacca, pp. 2-6) Although the Commission's main recommendation of a new appellate court to handle cases referred by the Supreme Court was rejected, and the Commission itself rejected

creating a specialized court for patent appeals, the policy community paid substantial attention to the Commission's determination that existing regional appellate courts had particular difficulty with patent law.

The Congressional decision to create the Federal Circuit was driven by arguments that regional appellate courts had created highly undesirable levels of unpredictability and inconsistency in patent law. Congress also found persuasive claims that "strong" patents – that is, patents that were easy to acquire and enforce – were critical for national competitiveness and economic growth (references in Vacca 2-6).

The Federal Circuit was quick to make a number of changes to strengthen patent and unify patent law. Within the first five years of its formation, the court adopted a strong presumption of validity for issued patents. The Court also made clear its view that, contrary to certain Supreme Court suggestions, inventions that represented combinations of prior art did not create any need for a special non-obviousness standard. Further, the Court quickly adopted a strong presumption of validity for issued patents. (Dreyfuss 1989).

For its part, the Supreme Court largely withdrew from the patent field for almost two decades. To the extent the Court intervened, it did so primarily not on substantive patent law but on allocation of power questions. (Janis 2001) Perhaps not surprisingly, the Congressional attempt to concentrate all expertise – on questions on fact as well as law and policy – at the appellate level produced some challenges for conventional legal process principles regarding allocation of power.

Indeed, the first Federal Circuit decision reviewed by the Supreme Court, the 1986 case *Dennison Manufacturing v. Panduit*, 475 U.S. 809 (1986), involved a complaint that the Federal Circuit was exercising plenary power over the non-obviousness determination. The Supreme Court vacated the Federal Circuit's decision and remanded the case to the Federal Circuit with instructions to the court to explain why FRCP 52(a) did not mandate deference to the trial court's factual determinations regarding nonobviousness. However, this rebuke by the Supreme Court did not appear dramatically to change Federal Circuit practice.

Although commentators discussed the Federal Circuit's aggressive review of trial court fact-finding in many areas of patent law (Rooklidge & Weil 2000, Rai 2003), the focal point for scholarly criticism was the Federal Circuit's aggressive review of district court claim construction. Because claim construction is critical for purposes of determining both patent validity and infringement, aggressive review can have many follow-on effects. For example, if appellate reversal on claim construction occurs after a full district court determination of validity and infringement, the district court must once again determine validity and infringement. (Rai 2003).

In fairness to the Federal Circuit, most district courts were not necessarily constituted to handle patent cases. District courts were particularly problematic because, as various Federal

Circuit court judges lamented, district court judges frequently turned complex and important exercises like claim construction over to lay juries. (Michel 1994) Notably, rates of jury trial use, which had begun to rise in the 1970s, had reached over 70% by the early 1990s. (Anderson & Menell 2014).

In *Markman v. Westview Instruments*, 52 F.3d 967 (Fed. Cir. 1995) (en banc), the Federal Circuit determined that claim construction was a question of law for the judge and that such constructions should therefore be reviewed *de novo*. The next year, in another one of the "allocation-of-power" interventions that the Supreme Court conducted during this period, the Court agreed with the Federal Circuit's conclusion that claim construction was a question for the judge. (*Markman v. Westview Instruments*, 517 U.S. 370 (1996). However, the Court explicitly stated that claim construction represented a mixed question of law and fact and relied on functional considerations rather than the fact/law distinction to assign the inquiry to judges.

Despite the Supreme Court's statements, the Federal Circuit's *en banc* 1998 decision in *Cybor Corp. v. FAS Technologies*, 138 F.3d 1448 (Fed. Cir. 1998) once again declared claim construction a pure question of law to be reviewed *de novo*. Invoking the Supreme Court among other authorities, scholars vigorously challenged this view, arguing that patent law's reference to the "person having ordinary skill in the art" required attention not only to text but also to context and industry custom. (Nard 2000)

Controversies over claim construction leading to *Cybor,* as well as the *Cybor* decision itself, generated several empirical studies of the Federal Circuit's reversal rate on claim construction. (Moore 2001; Chu 2001). These studies found that for the subset of cases in which parties elected to go through the full appeal process (and thus subject to any selection bias for this subset of cases), *de novo* review appeared to operate not only in theory but also in practice – about one-third of all claim decisions appealed to the Federal Circuit were reversed.

Henry and Turner (2006) provided a perspective on Federal Circuit interaction with trial courts that focused not on particular doctrines but on whether the court was more "pro-patent" than its predecessors. As it happened, the question of pro-patent bias had implications not only for assessment of the Federal Circuit but also for interactions between the district court and the Federal Circuit. Based on a large-scale empirical analysis of district and appellate court opinions from 1953-2002, Henry and Turner found that the Federal Circuit was significantly more reluctant than its predecessors to affirm district court findings of invalidity. However, it was not more reluctant to affirm "not infringed" decisions. Henry and Turner argued that because of the CAFC's tendencies, district courts decided patents to be invalid significantly less often, patentees appealed decisions of invalidity significantly more often, and infringement frequently became the dispositive inquiry at the trial court.

Scholars have not conducted large-scale studies comparing Federal Circuit review of the USPTO with that of its predecessor, the Court of Customs and Patent Appeals (CCPA). In any event, because the Federal Circuit adopted the decisions of the CCPA and included many of its judges (Lefstin 2010), the Federal Circuit's creation did not represent a structural break vis a vis

the PTO. Scholars have noted, however, that during the era of Federal Circuit supremacy, the court's direct review of PTO patent decision making generally took place in the context of patent denials. Thus Federal Circuit reversal of the USPTO necessarily expanded the bounds of patentability. (Rai 1999, Masur 2011, Wasserman 2011)

Through the 1990s, this dynamic played out in both biotechnology and software. Specifically, as detailed in Rai (1999), in the area of gene sequence patents, the Federal Circuit repeatedly overruled the PTO's view that, for the average scientist working in the area, knowing a general method for selecting genes through the use of nucleotide probes, as well as the complete or partial amino acid of the protein for which a gene of interest coded, would render the DNA base sequence for the gene obvious. The Federal Circuit also repeatedly overturned the PTO's position that an algorithm run on a general purpose computer was not patent-eligible subject matter. The latter set of decisions laid the foundation for *State Street Bank v. Signature Financial Group, Inc.,* 149 F.3d 1368, 1373 (1998), in which the Federal Circuit essentially equated the patentable subject matter requirement of patentability with the utility requirement.

While Rai (1999) focused on repeated reversals, some commentators deployed strategic models to argue that patent expansion could happen even without actual reversal of the PTO by the Federal Circuit. Specifically, such expansion could occur if the PTO's incentives led it primarily to fear reversal by the Federal Circuit, with the consequence that the PTO denied patents only in cases where the most "pro-patent" Federal Circuit judge would agree with the denial. (Masur 2011, Wasserman 2011).

As these analyses would suggest, Federal Circuit supremacy had particularly concentrated effects on the PTO. Hall (2005) deployed rigorous empirical analysis to argue that the creation of the Federal Circuit was in part responsible for the surge in patent applications that occurred in the 1980s. Federal Circuit decisions through the 1990s lowering the non-obviousness standard and essentially eliminating patentable subject matter as a separate requirement of patentability may have prompted yet more patent applications. From 1990 to 2000, the number of applications increased by almost 80% (as contrasted with about 58% from 1980 to 1990). At the same time, about $750 million in fee-based revenue that could have been used to hire additional examiners was diverted by Congress from PTO coffers. Application backlog thus increased through the 1990s (Long 2010).

Of course, as discussed in Volume II, backlog and other challenges were also exacerbated by various longstanding structural features of the PTO system for managing workflow. One of these structural features – the ability of applicants before the PTO (uniquely among patent offices around the globe) to file an unlimited number of repeat, or continuation, applications (Moore and Lemley 2004) -- directly implicates the institutional interaction and power questions on which this contribution focuses. Although the PTO attempted in 2007 to place limits on continuations, the agency ultimately backed down in the face of a vigorous litigation challenge asserting that the limits represented improper expansion of the PTO's relatively narrow rulemaking authority. (Rai 2009)

Another axis of "court-watching" assessed the court's jurisprudential approach. A number of scholars noted the court's predilection for rule formalism (Rai (2003), Thomas (2003)). While

some of these bright-line rules were specific to particular technologies, Thomas (2003) emphasized a trans-technological bright-line rule on non-obviousness imposed by many three-judge panels of the Federal Circuit. This requirement moved well beyond the modest statement made in the early years of the Federal Circuit that combination inventions didn't have to comply with a higher standard of non-obviousness. Rather, under this requirement, the PTO examiner (and trial courts) had to identify a specific documentary "teaching, suggestion, or motivation" to combine prior art references when using these references for purposes of demonstrating obviousness.

While noting that Federal Circuit language often abjured policy considerations, Burk and Lemley (2003) argued that some of its decisions were implicitly driven by policy concerns relevant to particular areas of technology. For example, the rule reducing the non-obviousness standard in biotechnology essentially to a test of novelty emerged from the court's view that patents needed to be available for gene sequences that encode therapeutic proteins. Without these patents, the biopharmaceutical sector would not be able to secure the patents necessary to drive investment through the very expensive regulatory approval processes. Burk and Lemley did note, however, that the Federal Circuit was not transparent about its policy-based reasoning.

Yet another axis of Federal Circuit "court-watching," particularly relative to other institutions, focused not on rules vs. standards debate, or on the Federal Circuit's consideration of policy issues, but on uniformity and clarity in its jurisprudence. For example, based on extensive coding of opinions, Wagner & Petherbridge (2003) argued that the court's claim construction jurisprudence depended heavily on the panel that rendered the claim construction.

In contrast, Nard and Duffy (2007) argued that the court had shown very significant (and, in their view, undesirable) uniformity. In response to the descriptive claim made by Nard and Duffy, other scholars used frequency of dissents and frequency of *en banc* opinions to argue that diversity of opinion was apparent within the Federal Circuit, both on particular issues such as the doctrine of equivalents (Petherbridge 2009) and also as compared to other appellate courts. (Vacca 2011, Cotropia 2010).

Notably, the 2007 publication of the Nard and Duffy article happened just as the Federal Circuit was beginning to take more cases *en banc*. For example, as a comprehensive listing by Vacca (2011) shows, the court took 28 cases en banc during the 21 years after its creation – an average of about 1.3 cases a year. During the 5 year period from 2007 to 2011, by contrast, it took 13 cases en banc – an average of 2.6 a year. This ramp up may have a response to emerging interest in the patent system by other legal actors, including the Supreme Court. Indeed, Golden (2009) explicitly nominated Supreme Court as the "prime percolator" – an institution well suited for the purpose of dislodging any stagnation on the part of the Federal Circuit.

I turn next to the prominent role that the Supreme Court and the executive branch (including, but not limited to, the PTO) have played over the last 10-15 years.

B. *The Supreme Court, and Executive Branch, Strike Back*

Although Federal Circuit supremacy in patent law obviously did not end on a date certain, by the 2001 Term an increase in Supreme Court interest in patent law was clear. (Duffy 2010) Additionally, by this time, the emergence of large numbers of patent applications and grants on inventions such as business methods (software-enabled and otherwise) and scientific research tools had attracted policy and scholarly criticism. The Federal Trade Commission (FTC) conducted an inquiry focused in significant part on institutional challenges, and on interactions between institutions. (FTC 2003). It criticized the Federal Circuit's holding that patent challengers marshal clear and convincing evidence to overturn granted patents as well as its formalist directive that inferior institutions that examined patents for nonobviousness – whether PTO examiners or district courts -- show a specific teaching, suggesting, and motivation (TSM) to combine prior art references. The FTC also recommended the creation of a robust administrative system to review granted patents. A prominent report by the National Academies of Sciences (NAS 2004) also criticized the TSM test and discussed in detail the rationale for administrative review as a robust alternative to patent litigation.

By the end of the first decade of the 21st century, the Supreme Court had issued opinions rejecting a bright-line TSM approach (*KSR v. Teleflex*, 550 U.S. 398 (2007)); holding that injunctive relief was not mandatory upon a finding of validity and infringement (*EBay v. MercExchange*, LLC, 547 U.S. 338 (2006); and stating that patentable subject matter doctrine in fact excluded certain categories of invention (*Bilski v. Kappos* (2010)). The Supreme Court's decisions to take certiorari, and its substantive positions, usually reflected intervention by the Solicitor General. (Duffy (2010). The Solicitor General, in turn, was influenced both a number of agencies in the executive branch, including but not limited to, the PTO. Rai (2012). In general, the Supreme Court moved the case law away from bright-lines and towards more flexible standards (Lee 2011).

One of the most important Supreme Court decisions, not only for purposes of substantive patent law, but also for purposes of institutional interaction, was *KSR International Co. v. Teleflex Inc*. According to Rantanen (2013), in the 10 years prior to the grant of certiorari in *KSR*, the Federal Circuit found 54% of patent claims on appeal nonobvious. Since then, it has found 43% nonobvious. Notably, the shift was driven by greater reluctance on the part of the Federal Circuit to reverse district court findings of obviousness. Indeed, according to Nock & Gadde (2011), during the 2.5 year period immediately after *KSR* that they studied, the Federal Circuit did not reverse a single lower tribunal determination that a patent was obvious.

As the Nock and Gadde study suggests, *KSR* was quite significant not only for Federal Circuit review of trial courts but also of the PTO. In *KSR*, the government had filed an amicus brief detailing the ways in which a rigid requirement that examiners show "teaching, suggestion, or motivation"—particularly in documentary form—posed an unnecessary burden and was contrary to accepted administrative law principles of official notice. In its unanimous opinion, the Supreme Court agreed.

KSR's embrace of conventional principles of administrative review was consistent with its 1999 decision in *Dickinson v. Zurko*, 527 U.S. 150 (1999). In that decision, the Court held that the PTO was an agency under the Administrative Procedure Act and thus the Federal Circuit's review of PTO fact-finding was subject to a standard of review even more deferential than appellate review of trial court fact-finding. The Supreme Court's approach stood in significant contrast to the approach to administrative law taken by the Federal Circuit. (Nard 1995; Benjamin & Rai 2007)

Similarly, in contrast to the Federal Circuit, the Supreme Court's decision in *eBay Inc. v. MercExchange, LLC*, 547 U.S. 338 (2006) purported to embrace ordinary principles of remedies law. And in two recent cases respectively involving attorneys' fees and claim construction, *Highmark Inc. v. Allcare Health Mgmt. Sys. Inc., 572* U.S. __ (2014) and *Teva Pharm. USA, Inc. v. Sandoz Inc.*,135 S.Ct. 831 (2015), the Court emphasized conventional principles of deferential appellate review with respect to discretionary findings and findings of fact by lower tribunals. These cases indicate that the Supreme Court not only prefers standards to rules but also prefers standards that are not specific to patent law.

D. *The Role of Congress*

As Supreme Court interest in the patent system grew, so did Congressional interest. Starting in 2005, Congress began holding a series of hearings on legislative patent reform. As the literature on Congressional veto gates would have predicted, the process of legislative reform was blocked at many turns by confrontation between rent-seeking interest groups large and small. By the time the America Invents Act of 2011 finally passed, many of the substantive patent law recommendations made by bodies like the FTC and the National Academies, ended up being addressed through Supreme Court opinions and also by *en banc* determinations by the Federal Circuit. (Burk and Lemley 2009).

Congress did, however, ultimately pass legislation – the America Invents Act of 2011 (AIA) – that had the effect of changing institutional structure significantly. Congress did not follow the conventional modern model of conferring on the administrative agency in question (i.e. the PTO) broad rulemaking authority. But it did create a relatively robust system of post-grant review within the PTO (Matal 2012). As I discuss further in the normative analysis, to the extent the PTO Patent Trial and Appeals Board (PTAB) can correct the PTOs initial errors in a manner that is both accurate and relatively inexpensive, it should fulfill well the standard economic goal of minimizing the sum of litigation costs and error costs. (Kaplow and Shavell 1994).

E. *The Role of Inferior Tribunals: Article III, Trial Courts, the ITC, and the PTAB*

As scholars have noted (Anderson 2015), even when substantive law is uniform, differences in norms and procedures among district courts as well as local differences in the composition of prospective jury pools can motivated litigants to shop for favorable district court

fora. Indeed, a study conducted during the period of Federal Circuit supremacy (Moore 2001) found significant clustering of cases outside traditional technology centers. This clustering has increased substantially in recent years (Lemley 2010), and several scholars have argued that certain district courts, particularly the Eastern District of Texas, actively compete for patent plaintiffs. (Anderson 2015; Klerman and Reilly 2015).

How these trial courts, which have presumably watched closely Supreme Court decisions that confer more power upon trial courts, will respond to these decisions remains to be seen. While some of these decisions apply only to Article III trial courts, the *Teva v. Sandoz* decision will also confer power on the International Trade Commission, which has recently become a popular venue for seeking exclusion orders of imported goods based on alleged patent infringement. (Chien 2008; Schwarz 2009; Kumar 2011). As for the PTO's Patent Trial and Appeals Board, it will be affected not only by *Teva v. Sandoz*, but also in all likelihood by future Supreme Court decisions allocating power between it, the trial courts, and the Federal Circuit.

II. *Normative Analysis*

The literature noted in Part I generally includes normative conclusions and recommendations. As noted in the Introduction, patent scholars typically view accuracy and predictability as the normative criteria against which the institutional and procedural features of the system should be evaluated. As Coase famously emphasized, even though reallocation of rights is possible, such reallocation can be quite costly. Accuracy in the initial determination of rights obviates the need for reallocation. That said, clarity and predictability are also important goals. When initial allocation errors occur, clarity and predictability reduce the cost of reallocating rights. At the level of the individual case, the patent scholars' frame of accuracy and predictability maps squarely onto the frame of minimizing the sum of error costs and litigation costs emphasized by economic analysts of legal procedure. Accuracy means low error costs and predictability means low, or no, litigation costs (and, indeed, presumably relatively low transaction costs associated with contractual reallocation).

Normative challenges can arise, however, when institutional and procedural mechanisms for producing accuracy in an individual case conflict with mechanisms for improving accuracy in the system over time. Additionally, although accuracy and predictability are not always in tension, the well-rehearsed rules vs. standards debate reminds us that predictability tends to be promoted by bright-line rules that may produce errors of over-inclusion and under-inclusion

Against this general background, I survey normative recommendations, stressing those recommendations that focus on interactions between legal actors. I first address interactions between the Federal Circuit with lower tribunals. I then address the Supreme Court.

A. The Federal Circuit and Lower Tribunals

In an early assessment, Dreyfuss (1989) evaluated Federal Circuit decisions on the metrics of accuracy and predictability. While she acknowledged potential tensions between these goals, she used examples like the Federal Circuit's elevation of secondary considerations in the area of non-obviousness to argue that, at least on questions of patent validity, the court had largely achieved both goals.

Within a decade or so of this early assessment, the court's success in achieving either goal was questioned. As with the descriptive analysis, claim construction served as a focal point for the normative discussion. Scholars questioned whether the Federal Circuit's often high reversal rates on claim construction (and attendant consequences for vertical predictability) were consistent with the Congressional desire to create predictability and efficiency in patent law. (Moore 2001). Empirical studies noting inconsistencies among Federal Circuit panel decisions on claim construction methodology (Petherbridge and Wagner 2003) also called into question whether the Federal Circuit was creating predictable law.

In contrast to the standard view favoring uniformity and perceiving insufficient levels of uniformity, other scholars equated uniformity not with desirable predictability and certainty but with undesirable stagnation. (Nard & Duffy 2007) The critique alleging excess Federal Circuit rule-formalism (Rai 2003; Thomas 2003) also viewed the Federal Circuit as sacrificing accuracy on the altar of predictability.

Although the rule-formalism and stagnation critiques agreed that the system had failed to achieve accuracy, their prescriptions pointed in different directions. After conceding that rule-formalism might be justified by the Federal Circuit's desire to give clear instructions to inferior actors of questionable competence, Rai (2003) called for a "first-best" (if politically challenging) solution in which inferior actors were endowed with considerable competence in technical fact-finding, including through limits on juries. At that point, the Federal Circuit's rule-formalism would no longer be justified, and other actors, such as the Supreme Court, could intervene to dislodge the Federal Circuit's formalism.

In contrast, Nard and Duffy (2007) prescribed a regime in which the Federal Circuit would be forced to compete with a few additional appellate courts. On this view, while the earlier system in which all regional appellate courts could hear patent cases was too unpredictable, and a single court was too uniform, a few courts would be just right. The availability of a few appellate courts would not only introduce appropriate levels of competition in post-issuance litigation, but it would also remove the Federal Circuit's monopoly control over PTO determinations.

In Rai (2003), I also suggested a regime in which an expert, specialized trial court – and appropriate deference thereto on questions of fact-finding – be used to generate vertical predictability, Empirical work by Schwartz (2008, 2011) strikes a cautionary note about the extent to which specialization in the form of repeated exposure to patent cases at the trial level will improve such vertical predictability. Schwartz's data on claim construction indicate that, at least when the standard of review is *de novo* (as it was during the time period studied by

Schwartz), there is little correlation between a trial judge's prior experience with claim construction and the judge's reversal rate at the Federal Circuit. Kesan and Ball (2010) report similar results on claim construction but do find that a judge's increased patent-specific experience lowers reversal rates on a number of other issues, such as preliminary injunctions, judgments as a matter of law, and infringement. The Kesan and Ball data suggest that for purposes of understanding institutional interactions in the patent arena, claim construction, though very important, may not necessarily be representative.

In the wake of recent Supreme Court decisionmaking, the patent system has moved towards employing fact-intensive standards and to greater deference to lower tribunals. As Holbrook (2010) observes, however, because fact-intensive standards decrease notice and predictability, they might best be viewed as a check on the presumption created by legalistic rules. Also worrisome is the reality that devolution to lower tribunals has not necessarily been accompanied by fortification of the actual capacity of these tribunals. To the contrary, in the case of patent-heavy tribunals such as the Eastern District of Texas and perhaps the District of Delaware, any expertise acquired by attracting very large number of patent cases may be overwhelmed by the judicial bias that arguably caused plaintiffs to file in that tribunal. (Anderson 2015).

Some scholars have suggested that restricting venue to districts where the defendant has its primary place of business, arguing that such venue restriction would not only reduce forum shopping but would also create technology-specific expertise within particular trial courts (Fromer 2010). As noted, others have discussed creation of a single specialized trial court. Still others have suggested that more incremental measures like randomization of judge selection within a district or the existing Patent Pilot Program, under which judges can volunteer for patent cases, may have salutary effects. (Anderson 2015)

Scholars have also discussed whether Article III litigation represents the best mechanism for addressing errors in individual cases, particularly with respect to erroneously granted patents. While some have argued that most erroneous grants are not commercially significant, and endorsed litigation as a good mechanism for targeting the small percentage of erroneous grants that are commercially significant (Lemley 2001), others have emphasized collective action and other barriers to socially optimal use of Article III litigation by defendants. (Merges & Farrell 2004; Benjamin and Rai 2007). On the latter view, even if the USPTO does not, or cannot, do more to ensure that erroneous grants don't occur, these errors should be corrected through an *ex post.*administrative process. As discussed in Part III, the emergence of a robust *ex post* administrative process as a major competitor to Article III litigation is a development that needs close monitoring.

Scholars have also discussed how to evaluate accuracy in patent law decision making. Beyond the difficulty of ensuring that the system reaches the correct result in a particular case lies the larger question of whether the system as a whole is set up to develop law and policy accurately. While Burk and Lemley (2009) are optimistic about the capacity of courts, Wagner

(2010) articulates the oft-cited tension between doing justice in the individual case and a policymaking role. More generally, the conventional legalist view that courts have limited resources to make policy, and can only do so in the context of litigation that arises *ex post*, has led various scholars to advocate that Congress consider a standard administrative approach to patents – delegating rulemaking authority to an agency, presumably but not necessarily the PTO. (Burstein (2011), Masur (2010)).

The Federal Circuit's recent interest in *en banc* decisionmaking, and the policy-oriented questions it has asked in some of its recent *en banc* orders, lead Vacca (2011) to argue that policymaking by the Federal Circuit is not only normatively desirable but actually happening. Nard (2010) and Burk and Lemley (2009), both writing before the passage of the AIA, stress the PTO's alleged capture by patent applicants as a reason to favor courts. Vertinsky (2010) focuses on transition costs associated with patent reform, arguing that policymaking by courts is desirable because changes implemented by courts are likely to be smaller and more specific than changes implemented by other institutions.

Congressional creation of a strong system of administrative review for granted patents – the Patent Trial and Appeals Board (PTAB) – has also begun to generate normative discussion. The creation of the PTAB, which can be reversed not only when it rejects patents but also when it uphold them, responds in part to the concerns of Masur (2011) and Wasserman (2011) regarding asymmetric review.

Wasserman (2013) further argues that the PTAB's procedures are best seen as formal adjudications. Thus, under *Chevron v. Natural Resources Defense Council*, 467 U.S. 837 (1984) and its progeny, the Federal Circuit should defer not only to PTAB fact-finding (as it is already required to do) but also to the PTAB's findings on ultimate legal questions. On an optimistic read, the result would be a significant PTAB role in improving accuracy not only in the individual case but also system wide.

Golden (2014) argues that even without formal deference, the PTO has a first mover advantage that it has sometimes been able to exploit to shape law and policy, particularly in the context of patent denials. (Golden 2014) Rai (2013) argues that the AIA gives the PTAB the power to exercise this first mover advantage in the context of both patent grants and denials.

Finally, prior to recent interventions by the Supreme Court, some commentators on the Federal Circuit stressed that its review of inferior actors, as well as its behavior more generally, were motivated by an undesirable "pro-patent" bias. (Jaffe & Lerner 2004) On this view, the Federal Circuit listened primarily to patent lawyers, and a pervasive role for patents in the national economy enhanced the court's power and prestige. However, the Federal Circuit's tendency to read patent scope narrowly – indeed, even more narrowly than the Supreme Court (Rai 2003) – does call into question a simple bias narrative. Allegations of bias also pose familiar baseline problems. In the case of the Federal Circuit, the baseline problem may be

particularly severe given that the legislation establishing the court was arguably motivated by a "pro-patent" view.

B. The Supreme Court

Scholars have delivered mixed assessments of the Supreme Court's recent activism in the patent arena. Some early assessments tended to be relatively favorable. Duffy (2010) argued that the Court is highly influenced by the Solicitor General and that this influence could be beneficial so long as executive branch views were not subject to significant election-related shifts. Dreyfuss (2010) concluded that the interaction between the two tribunals (Supreme Court and Federal Circuit) was "highly salutary."

Lee (2010) cautioned, however, that the Supreme Court's embrace of fact-intensive standards over bright-line rules might impose significant cognitive burden on inferior actors. Rai (2012) noted that the highly *ex post* nature of Supreme Court decision making had the potential to impose significant retroactive changes. Eisenberg (2013) observed that the Supreme Court's extended foray into questions of patentable subject matter appears likely to have a particularly dramatic impact.

III. *Future Research Questions*

The highly dynamic institutional ecosystem that has emerged in the last decade raises numerous questions for further research. One area ripe for further inquiry includes further research on the institutional dynamics that shape patent law at the Supreme Court. Another ripe target for research is the Patent Trial and Appeals Board created by the AIA. A third area of research might compare institutional interactions and power relationships in other technically complex areas.

A. *The Supreme Court*

As scholars have discussed, Supreme Court review of the Federal Circuit has often followed the recommendations of the Solicitor General and has generally emphasized standards and "standard law." Future work on the Supreme Court, and on the relationship between the Supreme Court and the Federal Circuit, might engage further the enormous legal and political science literature on Supreme Court decision making.

One potential axis of engagement, ideology, may not be immediately fruitful. Although political scientists and legal scholars agree that ideology often plays a significant role at the Supreme Court (Epstein, Landes, and Posner 2013), the Court's patent decisions have not generally split along obvious ideological lines. Indeed, many of the decisions have been unanimous, or nearly unanimous. The exception to this general statement may lie in cases that operate at the patent-antitrust intersection, such as *FTC v. Actavis*, 133 S.Ct. 2223 (2013) and *Kimble v. Marvel Entertainment, LLC.,* 576 U.S. __ (2015).

Unanimity or near unanimity is coupled with a heavy emphasis on showing the internal coherence and external dominance of the Court's own prior case law on patents. In the Court's view, its case law (including case law from the 19th century) has either not been affected by, or has in fact been adopted by, legislative enactments. Scholars might explore whether these phenomena obtain because the Court wishes its message of power over the Federal Circuit to be clear; because individual members of the Court don't have particularly differentiated views on patents and are therefore not interested in expending the effort and political capital necessary to write dissents; or for other reasons.

B. *PTAB*

The first decisions from the PTAB post-grant proceedings set up by Congress in the AIA have now made their way to the Federal Circuit. The PTAB's enormous popularity also ensures that, at least in the near term, the PTAB will be a major source of appeals to the Federal Circuit. Thus far, the PTO has not argued for *Chevron* deference to the substantive results of its post-grant validity determinations. However, it has successfully argued for *Chevron* deference for procedural rules, such as its controversial rule requiring PTAB judges to conduct claim construction under a "broadest reasonable interpretation" standard that is different from that used by the district courts. PTO assertions that certain decisions of the PTAB are not subject to judicial review have also been controversial. Questions about allocation of power between the PTAB, Article III district courts, and the Federal Circuit are likely to make their way to the Supreme Court and represent a fruitful area of study.

Another area ripe for study is the empirical question of whether PTAB proceedings are in fact improving the system by serving as an efficient and accurate substitute for Article III litigation over validity and/or by allowing appropriate challenges to validity that would simply not occur in Article III courts. In Volume II, my co-authors and I present empirical data that may help inform such analysis.

C. Comparison With Other Technically Complex Areas

A third area of research might compare institutional interactions in patent law with such interactions in other technically complex areas. To the extent scholars (myself included) have engaged this question, they have generally argued that the administrative model of decision making should apply. Because a full-fledged administrative model is likely to be a political non-starter, however, scholars should consider how models short of strict application of the Administrative Procedure Act work in other technically complex areas.

Finding the appropriate comparison area may also require further thinking about why patent law represents such a profound institutional challenge. To what extent does complexity emerge because of law, because of scientific or technological facts, or because findings of law and fact need to serve as imperfect proxies for promoting the economic goal of innovation. Even more fundamentally, to the extent the proxies we choose can involve different combination of

law and facts, can other complex areas give us insight into how to create proxies that are imperfect institutions can implement.

References

Anderson, Jonas, "Court Competition for Patent Cases," 163 *U. Penn. L. Rev*. 631 (2015).

Anderson, Jonas and Peter S. Menell, "Informal Deference: A Historical, Empirical, and Normative Analysis of Patent Claim Construction," 108 *Northwestern Law. Review* 1 (2013)

Chu, Christian. 2001. "Empirical Analyis of the Federal Circuit's Claim Construction Trends," 16 *Berkeley Tech.L.J.* 1075.

Burk, Dan, and Lemley, Mark. 2003. "Policy Levers in Patent Law," 89 Virginia Law Review 1575.

Burk, Dan and Lemley, Mark. 2009. *The Patent Crisis and How Courts Can Solve It.* University of Chicago Press.

Burstein, Michael. 2011. "Rules for Patents," 52 *William & Mary Law Review* 1747.

Duffy, John F. 2000. "The FCC and the Patent System: Progressive Ideals, Jacksonian Realism, and the Technology of Regulation," 71 *University of Colorado Law Review* 1071 (2000)/

Duffy, John F. 2010. "The Federal Circuit in the Shadow of the Solicitor General," 78 *George Washington Law Review* 518.

Eisenberg, Rebecca. 2013. "Prometheus Rebound: Diagnostics, Nature, and Mathematical Algorithms." 122 *Yale L.J. Online* 341.

Dreyfuss, Rochelle. 1989. "The Federal Circuit: A Case Study in Specialized Courts," 64 *N.Y.U..L.Rev.* 1.

Fromer, Jeanne 2010. "Patentography," 85 *N.Y.U. L. Rev.* 1444.

Golden, John. 2009. "The Supreme Court as "Prime Percolator": A Prescription for Appellate Review of Questions in Patent Law." 56 *UCLA L.Rev.* 657.

Golden, John. 2014. "The USPTO's Software Power: Who Needs Chevron Deference?" 66 *Southern Methodist University Law Review* 541.

Hall, Brownyn. 2005. "Exploring the Patent Explosion," 30 *Journal of Technology Transfer* 35.

Jaffe, Adam and Lerner, Josh. 2004. *Innovation and its Discontents.* Princeton: Princeton University Press.

Janis, Mark. 2001. "Patent Law in the Era of the Invisible Supreme Court," 2001 *University of Illinois Law Review* 387.

Lee, Peter. 2010. *Patent Law and the Two Cultures*, 120 Yale L.J. 2.

Lefstin, Jeffrey. "The Constitution of Patent Law: The Court of Customs and Patent Appeals and the Shape of the Federal Circuit's Jurisprudence," 43 *Loyola of Los Angeles* 843 (2010).

Lemley, Mark A. 2010. "Where To File Your Patent Case," 38 AIPLA Q.J. 401

Lemley, Mark A. 2001. "Rational Ignorance at the Patent Office," 95 Nw. U .L .Rev. 1495.

Lemley, Mark and Bhaven Sampat, "Examiner Characteristics and Patent Office Outcomes," 94 *Rev. Econ. & Stat*. 817 (2012).

Long, Clarisa, "The PTO and the Market for Influence in Patent Law," 157 *University of Pennsylvania Law Review* 1965 (2009).

Masur, Jonathan. 2010. "Regulating Patents," 2010 Supreme Court Review 275

Masur, Jonathan. 2011. "Patent Inflation," 121 *Yale L.J.* 470.

Matal, Joseph. 2012. "A Guide to the Legislative History of the America Invents Act," AIPLA L..J.

Merges, Robert. 1999. "As Many as Six Impossible Patents Before Breakfast," Berkeley Technology Law Journal.

Moore, Kimberly A. 2001. "Are District Court Judges Equipped to Resolve Patent Cases?" 15 *Harv. J. L. & Tech*. 1.

Moore, Kimberly A. Forum Shopping in Patent Cases: Does Geographic Choice Affect Innvation? 79 N. C. L. Rev. 889

Moore, Kimberly A. and Mark Lemley. 2004. "Ending Abuse of Patent Continuations," 84 *Boston University Law* Review 63.

Nard, Craig Allen. 1995. "Deference, Defiance, and the Useful Arts," 56 *Ohio State Law Journal* 1415.

Nard, Craig Allen. 2000. "A Theory of Claim Interpretation," 14 *Harvard Journal of Law and Technology* 1.

Nard, Craig Allen and Duffy, John F. 2007. "Rethinking Patent Law's Uniformity Principle," 101 *Northwestern University Law Review* 1619.

Nard, Craig Allen. 2010. "Legal Forms and the Common Law of Patents," 90 *Boston University Law Review* 51 (2010).

Rai, Arti K. 2000. "Addressing the Patent Gold Rush: the Role of Deference to PTO Patent Denials," 2 *Washington University Journal of Law and Public* Policy 199.

Rai, Arti K. 2003. "Engaging Facts and Policy: A Multi-Institutional Approach to Patent System Reform," *Columbia Law Review* 1035.

Rai, Arti K. 2009. "Growing Pains in the Administrative State: The Patent Office's Troubled Quest for Managerial Control," 157 *University of Pennsylvania Law Review* 2051.

Rai, Arti K. 2012. "Patent Validity Across the Executive Branch: Ex Ante Foundations for Policy Development," 61 *Duke Law Journal* 1237.

Rantanen, Jason. 2013. "The Federal Circuit's New Obviousness Jurisprudence: An Empirical Study," 16 *Stanford Tech.L. Rev.* 709.

Rooklidge, William C. and Matthew F. Weil, 2000. "Judicial Hyperactivity: The Federal Circuit's Discomfort with its Appellate Role," 15 *Berkeley Tech. L.J.* 725.

Schwartz, David L. 2008. "Practice Makes Perfect: An Empirical Study of Claim Construction Reversal Rates in Patent Cases," 107 *Michigan Law Review* 223.

Schwartz, David L. 2009. "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.

Thomas, John R. 2003. Formalism at the Federal Circuit. 52 *American University Law Review* 771.

Vacca, Ryan. 2011. "Acting Like an Administrative Agency: The Federal Circuit En Banc," 76 *Missouri Law Review* 733.

Wagner, R. Polk and Lee Petherbridge. 2004. "Is the Federal Circuit Succeeding?: An Empirical Assessment of Judicial Performance," 152 *University of Pennsylvania Law Review* 1105.

Wasserman, Melissa F. 2011. "The USPTO's Asymmetric Incentives: Pressure to Expand Substantive Patent Law," 72 *Ohio St. L.J.* 379).