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The Antitrusting of Patentability

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Deciding a patent's validity is costly, and so is deciding it incorrectly. Judges and juries must expend significant resources in order to reach a patent validity determination that is properly informed by the relevant facts. At the same time, patent validity determinations reached quickly and cheaply may conserve resources today while creating future costs. Wrongly preserving an invalid patent can distort the competitive market and enable abuses, such as nuisance litigation. Meanwhile, wrongly striking down a valid patent can undermine incentives for continued investment and commercialization in knowledge assets. Courts facing patent validity issues have begun to strike this balance in favor of conserving resources today—in a manner that is strikingly similar to the per se analysis in antitrust law. A per se rule disposes of supposedly easy cases without engaging in the more fact-intensive "rule of reason" analysis. However, although antitrust jurisprudence cautions against per se rules because of the risk of error and imposes important requirements for the use of per se rules, recent patent jurisprudence has borrowed incautiously from antitrust.

This Article explains how the requirements for patentability enable the use of per se analysis, describes how the proper conditions for antitrust per se analysis would translate into patent law, and argues that the current use of antitrust-style judicial shortcuts does not satisfy these conditions in patent law. This Article concludes with a set of proposals for recalibrating the present costs of reaching informed patent validity decisions against the future costs that arise from generating decisions incorrectly.

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I. INTRODUCTION

Just as the antitrust system seeks to penalize anticompetitive conduct while leaving procompetitive conduct alone, the patent system seeks to deny patents to inventions that are not truly patentable—because they do not satisfy the various requirements of patentability—while leaving intact patents that cover meritorious inventions. Both systems grapple with the jurisprudential tension between legal standards and legal rules that is inherent in managing error costs. Only antitrust law, however, has evolved a systematic approach to managing decision costs. That approach is to evaluate conduct under the costly but more accurate rule of reason unless the risk of error is suitably low that a *per se* rule having relatively low decision costs may profitably be adopted instead. Moreover, as there is an inverse relationship between decision costs and error costs, the antitrust approach also includes a limited evidentiary compromise embodied in so-called quick look review.

Patent law has begun to borrow from this approach by using the doctrine of patent-eligible subject matter as a shorthand for the more fact-intensive and costly doctrinal inquiries into whether an invention is truly patentable. In other words, subject-matter eligibility has become a sort of *per se* rule of validity (or rather invalidity) whereas other, more finely-grained requirements of patentability reflect the usual rule of reason. This

"antitrusting" of patentability—the use of jurisprudential tools of decision from antitrust in evaluating patent validity—is relatively new in patent law.

This Article identifies that trend and critiques its current form. The management of legal decision costs through conclusive presumptions amid an otherwise fact-intensive analysis is not unique to antitrust. Still, antitrust law has a particularly well-developed history and jurisprudence in this regard, and it is fitting in some respects that evaluators of patent validity have come to rely on antitrust law to solve this problem given the close relationship between the subjects of patent and antitrust.

Whether patents are tantamount to monopolies, and should be treated accordingly, is a longstanding debate in the law. Early courts referred at times to patent rights as a form of monopoly.[1] Some, however, took pains to distinguish patents from monopolies.[2] Modern patent jurisprudence is of two minds on the subject. The Supreme Court generally continues to refer to patents as a form of monopoly.[3] By contrast, the U.S. Court of Appeals for the Federal Circuit often rejects sweeping comparisons of patents to monopolies.[4] This is significant because the Federal Circuit has exclusive appellate jurisdiction over patent-related cases[5] and, as a result, sets the large majority of precedent in patent law. Indeed, beyond the commonsense

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[1] *E.g.*, Gayler v. Wilder, 51 U.S. 477, 494 (1850) ("[T]he monopoly granted to the patentee is for one entire thing; it is the exclusive right of making, using, and vending to others to be used, the improvement he has invented, and for which the patent is granted."); Evans v. Eaton, 20 U.S. 356, 413 (1822) ("[P]atent law confers a benefit on the discoverer of any artful invention, which consists in a monopoly of his invention for a limited time.").

[2] *E.g.*, Singer v. Walmsley, 22 F. Cas. 207, 208 (C.C.D. Md. 1860) ("Patents are not monopolies . . . because a monopoly is that which segregates that which was common before, and gives it to one person or to a class, for use or profit; a patent is that which brings out from the realm of mind something that never existed before, and gives it to the country.").

[3] *See, e.g.*, Nautilus, Inc. v. Biosig Instruments, Inc., 134 S. Ct. 2120, 2124 (2014) ("Congress has enacted patent laws rewarding inventors with a limited monopoly."); Bilski v. Kappos, 561 U.S. 593, 611–12 (2010) ("Allowing petitioners to patent risk hedging would pre-empt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea."); Pfaff v. Wells Elecs., 525 U.S. 55, 63 (1998) (describing a patent as an "exclusive monopoly for a limited period of time"); Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 24 (1997) (referring to the "patent monopoly").

[4] *See, e.g.*, Jamesbury Corp. v. Litton Indus. Prods., 756 F.2d 1556, 1559 (Fed. Cir. 1985) ("[T]his court has disapproved of a challenger's characterization of a patentee by the term 'monopolist' . . . ."); Am. Hoist & Derrick Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1367 (Fed. Cir. 1984) (explaining that "patent rights are not *legal monopolies* in the antitrust sense of that word"); Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1548 (Fed. Cir. 1983) (explaining that, although a patent may colloquially be referred to as a "monopoly"—in light of the implicit power to exclude competitors from the marketplace—this usage is misdirected because "a patent is a form of property right, and the right to exclude recognized in a patent is but the essence of the concept of property"); Schenck, A.G. v. Nortron Corp., 713 F.2d 782, 786 n.3 (Fed. Cir. 1983) (noting that "[n]owhere in any statute is a patent described as a monopoly" and calling it "but an obfuscation to refer to a patent as 'the patent monopoly'").

[5] 28 U.S.C. § 1295 (2012).

expectation that a single intermediate appellate court with exclusive jurisdiction would naturally set the large majority of precedent in a given field as compared with the vanishingly small share of decisional law that comes from the Supreme Court, empirical research specifically finds that district courts also view the Federal Circuit as relatively *more authoritative* than they view the Supreme Court in matters of patent law.[6]

The importance of this ongoing debate over patents as monopolies is systemic. If patent rights and their exclusionary powers were best understood as exceptions to the legal and economic preference against monopolies, then it stands to reason that three results would follow. First, laws by which inventions are deemed patentable would tend to be construed stringently. Second, laws by which exercises of patent rights are deemed violative of antitrust laws would tend to be construed expansively. Third, the validity of individual patents would tend to be evaluated with an eye to their anticompetitive effects over and above their compliance solely with patentability rules.

This Article specifically examines the third of these implications of an antitrust-based view of patent law. The descriptive contribution of this Article is to rethink the relationship between patent law's broad threshold requirement of subject-matter eligibility and other, narrower statutory requirements in evaluating patentability as being akin to antitrust law's relationship between the *per se* rule and the rule of reason in evaluating restraints of trade. Tracing the implications of this rethinking through the processes for *ex ante* examination in the Patent Office and *ex post* reevaluation of patent validity, this Article reaches three normative conclusions for adjudicating the boundaries of patent-eligible subject matter.

First, courts that do apply the subject-matter eligibility doctrine can properly do so only after specifying the technological field of the patented invention and identifying the person of ordinary skill in that relevant field, just as the Patent Office does. Second, courts that purport to find patents invalid for claiming patent-ineligible subject matter can properly do so only after construing what invention the patent actually claims. Third, and following from the first two, the recently proposed Crouch-Merges canon of avoiding patent eligibility questions unless necessary is sound and should be adopted by the courts.[7]

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[6] *See, e.g.*, David R. Pekarek Krohn & Emerson H. Tiller, *Federal Circuit Patent Precedent: An Empirical Study of Institutional Authority and Intellectual Property Ideology*, 2012 WIS. L. REV. 1177 (2012).

[7] *See* Dennis Crouch & Robert P. Merges, *Operating Efficiently Post-Bilski By Ordering Patent Doctrine Decision-Making*, 25 BERKELEY TECH. L.J. 1673 (2010). *See also infra* Part IV.C.

This Article proceeds in three main parts. Part II situates the trade-off between error costs in individual cases and doctrinal predictability over time within the familiar framework of legal standards and rules. It also identifies the complementary framework through which antitrust law manages the trade-off between error costs and decision costs. It then explains how these frameworks apply to the relationship between the broad doctrine of patent-eligible subject matter and the other, more narrow requirements for patentability. Part III argues that *ex post* reevaluations of patent validity increasingly follow the antitrust approach to minimize decision costs but do so incompletely, without the necessary doctrinal underpinnings that even antitrust analysis requires. Part IV advocates for filling these doctrinal gaps in patent-eligible subject matter analysis by additional necessary fact-finding and offers independent support for the recently proposed Crouch-Merges canon.

II. WHY PATENT LAW NEEDED ANTITRUST LAW

This part discusses how patent jurisprudence has attempted to balance the cost of errors in individual cases against the value of predictability in the long run. It then discusses a complementary approach from antitrust law for balancing the cost of decision-making against the cost of error in those decisions. This part concludes that the antitrust approach to reducing decision costs may be particularly well suited for efficiently resolving disputes over patent validity if certain conditions are met.

A. *Error Costs in Patent Law*

The trade-off in patent law between reducing error costs and fostering predictability tracks the broader, more fundamental debate in law between standards and rules.[8] The primary instrumental aim of patent law and policy is to promote innovative activity—including invention, disclosure, and

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[8] *See generally* John F. Duffy, *Rules and Standards on the Forefront of Patentability*, 51 WM. & MARY L. REV. 609 (2009). For a discussion of the relative benefits and costs of rules and standards in general (rather than in the context of patent law), see FREDERICK SCHAUER, PLAYING BY THE RULES: A PHILOSOPHICAL EXAMINATION OF RULE-BASED DECISION-MAKING IN LAW AND IN LIFE (1991); Colin S. Diver, *The Optimal Precision of Administrative Rules*, 93 YALE L.J. 65 (1983); Isaac Ehrlich & Richard A. Posner, *An Economic Analysis of Legal Rulemaking*, 3 J. LEGAL STUD. 257 (1974); Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557 (1992); Russell B. Korobkin, *Behavioral Analysis and Legal Form: Rules vs. Standards Revisited*, 79 OR. L. REV. 23 (2000); Eric A. Posner, *Standards, Rules, and Social Norms*, 21 HARV. J.L. & PUB. POL'Y 101 (1997); Pierre J. Schlag, *Rules and Standards*, 33 UCLA L. REV. 379 (1985); Kathleen M. Sullivan, *The Supreme Court, 1991 Term—Foreword: The Justices of Rules and Standards*, 106 HARV. L. REV. 22 (1992); Cass R. Sunstein, *Problems with Rules*, 83 CAL. L. REV. 953 (1995).

commercialization—and to direct that activity to socially useful ends.[9] Flexible standards, in turn, allow the patent system to manage the constant technological and economic change that innovation necessarily represents.[10] Moreover, to the extent that strategic behavior that outpaces existing legal constraints is undesirable, standards also give decision makers valuable discretion to penalize conduct that otherwise might evade liability.[11] Thus, a standard-based approach to patentability reduces error costs in two ways. One way is to reduce the likelihood that a court will reach an incorrect conclusion about whether a particular invention is patentable under current law—incorrect in the sense that the result is unsatisfying according to some extrinsic legal criterion.[12] The other is to avoid dynamic losses from conduct that would, if permitted, stifle future innovative activity.[13] The flexibility and discretion that standards offer, however, come at a cost. Standards offer little predictability in how the law will eventually be applied and how one's present conduct will be adjudged in the future.[14]

Rules, by contrast, are more definite than standards with respect to the constraints that are imposed and the compliance that is required.[15] The principal value of a rule-based approach is that it produces case outcomes

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[9] *See* Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 79 (1999) (describing "success in stimulating the creation, disclosure, and development of inventive or creative works" as the "central instrumental goals of intellectual property"). For discussions of this instrumental view of the patent system in the economic literature, see, for example, FREDERIC M. SCHERER, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 440 (2d ed. 1980); *see also* Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, *in* THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609, 617 (Univs.-Nat'l Bureau Comm. for Econ. Research et al. eds., 1962), http://www.nber.org/chapters/c2144.pdf (describing the problem of nonoptimal allocation of resources in generating information assets that will be optimally utilized, and explaining how patent property rights in such information resolve this problem by restricting the degree to which a firm can appropriate the full value of the information that it generates).

[10] Duffy, *supra* note 8, at 611.

[11] *See* Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1639 (2003) (observing that standards, unlike rules, are flexible enough to "take situational variance into account," i.e., produce more accurate outcomes).

[12] *See* Rochelle Cooper Dreyfuss, *In Search of Institutional Identity: The Federal Circuit Comes of Age*, 23 BERKELEY TECH. L.J. 787, 798–99 (2008) (explaining the greater tendency of standards than of rules to result in more accurate outcomes).

[13] *See id.* at 798–800 (discussing the inhibitive effect of inaccurate results in the patentability determination upon future progress and innovation).

[14] *See id.* at 798 (comparing the Supreme Court's and Federal Circuit's respective patent jurisprudences as differently answering the same question of how to balance precision with accuracy in the law of patentability).

[15] *See* Michael J. Burstein, *Rules for Patents*, 52 WM. & MARY L. REV. 1747, 1771–72 (2011) (observing that rules, unlike standards, offer "ease of conforming one's conduct to that [given legal] principle" in patent law based on a variety of factors including "the uncertainty associated with individualized determinations of patentability").

that more closely align with prior judicial precedents and, by the same token, more closely align with the prior expectations of the parties.[16] Meanwhile, a more precise and predictable rule may also be consistently wrong according to some extrinsic legal criterion, especially given the inflexibility of rules for adapting to circumstances that were unforeseen and uncontemplated by prior decisions.[17] In short, the greater predictability of rules comes at the cost of potentially higher error costs.

This trade-off has differential effects for private actors in the markets for innovation as well as for legal institutions. Producers and consumers of innovation each respond differently to uncertain but more adaptable standards, and to inflexible but potentially inaccurate rules. Legal institutions respond differently to standards versus rules as well.

Producer-side actors in innovation markets—e.g., inventors, investors, and commercializers—tend to favor rules because more certainty produces higher risk-adjusted returns on the fixed costs of innovation, costs that can be substantial.[18] A particularly salient example of an innovation market with high fixed costs is biomedicine where the impact of uncertainty from standards is well-documented in the academic literature as well as in public policy circles.[19] Where this type of legal certainty (that innovation incentives such as patents will be protected and recouped as expected) is reduced or altogether absent, the resulting declines in rates of research and development also tend to be concentrated in the most socially important technologies, i.e., technologies in which the generation and disclosure of knowledge would be most valuable.[20] One may reasonably expect, for example, that clear rules about the patentability of medical diagnostic tests will tend to reduce uncertainty about *ex post* competition and thus increase *ex ante* investment in the development of such tests.[21]

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[16] Craig Allen Nard, *Legal Forms and the Common Law of Patents*, 90 B.U. L. REV. 51, 79–81 (2010).

[17] *Id.* at 81; Sullivan, *supra* note 8, at 63.

[18] Duffy, *supra* note 8, at 611; Dale A. Nance, *Rules, Standards, and the Internal Point of View*, 75 FORDHAM L. REV. 1287, 1314 n.96 (2006) ("[I]t seems likely that 'producers' in . . . a competitive system would work hard to provide definite rules and eschew vague standards, whenever that is possible.").

[19] *E.g.*, Rachel E. Sachs, *Innovation Law and Policy: Preserving the Future of Personalized Medicine*, 49 U.C. DAVIS L. REV. 1881, 1911 (2016) (arguing that "uncertainty itself affects incentives to innovate, as scientists and investors may be reluctant to move forward with product development if they cannot determine whether they will be able to protect their investment"); PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., PRIORITIES FOR PERSONALIZED MEDICINE 14 (2008), http://oncotherapy.us/pdf/PM.Priorities.pdf.

[20] Robert P. Merges, *Uncertainty and the Standards for Patentability*, 7 HIGH TECH. L.J. 1, 2–3 (1992).

[21] *E.g.*, Asher Hodes, Note, *Diagnosing Patentable Subject Matter*, 26 BERKELEY TECH. L.J. 225, 261–62 (2011).

This expected relationship among clarity of rules, competition, and investment is a straightforward application of the prospect theory of patent incentives.[22] Even if early innovators who secure broad rights are overcompensated "well beyond what the reward function would require"[23] to induce the given innovation, the patentee is better positioned to "coordinate post-patenting development and commercialization efforts among several players, reducing duplicated costs and preventing competitors' use of unpatentable information generated in the process."[24]

Accordingly, as clear rules about the very patent-eligibility of medical diagnostic tests are discarded in favor of flexible and unpredictable standards, as the Supreme Court did in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*,[25] the result is uncertainty among industry actors about whether the patented innovations that undergird their activities remain stable legal rights that can justify further investment. As one commentator has put it, "subject matter patentability has never been more uncertain than after *Mayo*. Many patents in the biotechnology, medical diagnostics, and software industries have an unpatentable concept at their core. But after *Mayo*, it is unclear whether these patents have added 'enough' to the claims to render them patent eligible."[26]

By contrast, consumer actors in innovation markets—e.g., users and implementers of technology, and, in some cases, the general public—tend to favor standards because rules may generate allocative losses for consumers of innovation. The inflexibility of rules to adapt to changing economic or technological conditions may create certainty, but substantive outcomes are more likely at the margin to be incorrect, all else being equal. The example of medical diagnostic innovation remains helpful in this regard as well. Although the criteria governing patent-eligibility were considerably more rule-like prior to the Supreme Court's recent doctrinal interventions,[27] it was far from clear that the particular legal rules in place produced outcomes that

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[22] John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439, 440 (2004); Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 266 (1977); Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 374–76 (2010).

[23] Kitch, *supra* note 22, at 267.

[24] Sichelman, *supra* note 22, at 374–75.

[25] 566 U.S. 66 (2012).

[26] Bernard Chao, *The Infringement Continuum*, 35 CARDOZO L. REV. 1359, 1386 (2014). *See also* Bernard Chao, *Moderating Mayo*, 107 NW. U. L. REV. 423, 432 (2012) (explaining that "*Mayo* has created a kind of pessimistic uncertainty").

[27] *See* Tun-Jen Chiang, *The Rules and Standards of Patentable Subject Matter*, 2010 WIS. L. REV. 1353, 1363 (2010) (arguing that subject-matter eligibility exclusions in patent law "are almost always bright-line rules"); Duffy, *supra* note 7, at 611 (characterizing the Federal Circuit's *en banc* attempt in the Bilski case to clarify the law of patent-eligibility as a "rule—not a flexible standard").

were consistently accurate.

The *Mayo* case was itself an instance where the Patent Office's application of the subject-matter eligibility doctrine—with its bright-line rule exclusions from eligibility—led the agency to issue patents that, the Court ultimately found, should not have been issued. These patents were directed to correlations between the concentration in the bloodstream of certain drug metabolites and the efficacy or toxicity of the drug.[28] The petitioners in the case argued, and the Court's unanimous opinion concluded, that the rule was problematic not only for being inflexible, but also for being the wrong rule, or at least a rule that produced the wrong outcome in the case at hand.[29] By over-inclusively allowing patent claims that preempted the use of natural correlations, which are ineligible for patent protection, the rule-like approach to patent-eligibility produced patents that the *Mayo* Court found frustrated the ability of physicians to provide medical care[30] and the ability of others in medical diagnostics to innovate further.[31]

To be sure, the dichotomy of preference between innovators and implementers as to rules and standards is not absolute. Innovators might well be "sacrificed on the altar of rules" where, for example, the inflexible application of patentability requirements leads to the invalidation of patent rights, and such innovators would prefer standards over rules.[32] Still, the incentives that the certainty and consistency of rules produce for investments in the long term are generally quite different from the incentives that the flexibility and accuracy of standards offer in the individualized short run.

Different legal institutions also confront different effects from informational asymmetry that shapes their respective tendencies toward standards versus rules. On one hand, developing rules carries high information costs,[33] and the Federal Circuit can afford these costs because of its relatively greater access to doctrinal and technical expertise.[34] Meanwhile, the Supreme Court has less access to these forms of expertise and so tends to favor standards because of their lower information costs.[35]

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[28] Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66, 73 (2012) (citing U.S. Patent No. 6,355,623 and U.S. Patent No. 6,680,302).

[29] *Id.* at 91–92.

[30] *Id.* at 91.

[31] *Id.* at 92.

[32] Schauer, *supra* note 7, at 135–66; *see also* Sullivan, *supra* note 7, at 66.

[33] Kaplow, *supra* note 7, at 627–29 (formalizing the relationship between the tendency to prefer rules versus standards and the information cost that is associated with promulgating the rule or promulgating the standard).

[34] Peter Lee, *Patent Law and the Two Cultures*, 120 YALE L.J. 2, 29–40 (2010) (discussing the Federal Circuit's use of rule-formalism in four important doctrinal contexts as a deliberate attempt to "reduce information costs associated with lay engagement with technology").

[35] *Id.* at 42.

The principal jurisprudential debate of the patent system, then, is over how to balance decreasing error costs through standards and increasing predictability through rules. Indeed, a number of other important ongoing debates in patent law reflect this tension, and the functionalism of the Supreme Court, as well as the formalism of the Federal Circuit, track the former's preference for standards and the latter's preference for rules.[36] The controversy over exceptionalism in patent doctrine is itself at least partly reducible to a choice between standards that transcend legal subject matter and rules that are tailored to patent law.[37]

Indeed, the forms of patent exceptionalism that are sensitive to the rules-standards dichotomy variously include federal jurisdiction in patent law,[38] jury review of Patent Office agency actions,[39] judicial deference to Patent Office agency actions both legal[40] as well as factual,[41] and federal civil procedure in patent cases.[42]

Importantly, this balance in patent law between reducing error costs and fostering predictability omits an additional important consideration: the costs of generating decisions under either approach. Indeed, patent law does not appear to have an internal jurisprudential consensus about how to balance decision costs with other values. For that, it has come to rely on antitrust.

B. *Decision Costs in Antitrust*

The error cost inquiry in patent law decision-making focuses on what consequences will follow from false-positive decisions (such as upholding an invalid patent) or false-negative ones (such as striking down a valid patent). By contrast, the decision cost inquiry focuses on how decision-makers reach decisions at all. Decision costs account for the collection and synthesis of relevant factual and doctrinal information by litigants as well as

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[36] *See generally* David O. Taylor, *Formalism and Antiformalism in Patent Law Adjudication: Rules and Standards*, 46 CONN. L. REV. 415 (2013).

[37] *Id.* at 490.

[38] Paul R. Gugliuzza, *The Federal Circuit As a Federal Court*, 54 WM. & MARY L. REV. 1791 (2013).

[39] John F. Duffy, *Jury Review of Administrative Action*, 22 WM. & MARY BILL RTS. J. 281 (2013); Mark A. Lemley, *Why Do Juries Decide If Patents Are Valid?*, 99 VA. L. REV. 1673 (2013).

[40] Stuart M. Benjamin & Arti K. Rai, *Who's Afraid of the APA? What the Patent System Can Learn from Administrative Law*, 95 GEO. L.J. 269 (2007); Sapna Kumar, *The Accidental Agency?*, 65 FLA. L. REV. 229 (2013); Kali Murray, *First Things, First: A Principled Approach to Patent Administrative Law*, 42 J. MARSHALL L. REV. 29 (2008); Melissa F. Wasserman *The Changing Guard of Patent Law: Chevron Deference for the PTO*, 54 WM. & MARY L. REV. 1959 (2013).

[41] Saurabh Vishnubhakat, *The Field of Invention*, 45 HOFSTRA L. REV. 899 (2017); Benjamin & Rai, *supra* note 39.

[42] Megan M. La Belle, *The Local Rules of Patent Procedure*, 47 ARIZ. ST. L.J. 63 (2015).

for the evaluation of this information by the triers of fact and law.[43] Given that patent law has no systematic approach for managing decision costs, antitrust law's longstanding approach has proven to be a ready substitute. That approach is antitrust law's distinction between conduct that is *per se* unlawful and conduct that is unlawful under the rule of reason.[44]

The use of a *per se* rule lowers decision costs, often dramatically, because simply far less remains to fight about. In antitrust, certain categories of conduct are regarded as unlawful *per se* only if they pose restraints of trade "that would always or almost always tend to restrict competition and decrease output."[45] Otherwise, and in general, restraints are unlawful only if they are shown to be unreasonable—which is to say, shown to have an overall anticompetitive rather than procompetitive effect in the particular case at hand.[46] This more intensive analysis, the rule of reason, requires information about whether the accused party had sufficient market power, and a host of other factors regarding "the restraint's history, nature, and effect."[47] As a result, the rule of reason carries high decision costs, and what these costs buy is more accurate decision-making by reducing the likelihood of accepting anticompetitive practices and of condemning procompetitive ones. Decision costs in general are inversely related to error costs.[48]

Horizontal agreements among competitors to fix prices are a canonical example of the trade-off in antitrust between the decision costs and error costs of the *per se* rule and the rule of reason.[49] All that must be established is that certain practices do, indeed, constitute horizontal price fixing—and the outcome is determined.[50] Particular agreements to fix prices may, indeed, sometimes have procompetitive effects that outweigh their anticompetitive potential.[51] Nevertheless, courts have held that such net-positive outcomes are so rare and unlikely that the costs of mistakenly condemning a price-fixing agreement that might have turned out to be beneficial is quite low, and price-fixing agreements as a category should be conclusively presumed unreasonable and unlawful, without further

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[43] Thomas A. Lambert, *The Roberts Court and the Limits of Antitrust*, 52 B.C. L. REV. 871, 877 (2011).

[44] Frank H. Easterbrook, *The Limits of Antitrust*, 63 TEX. L. REV. 1, 9–10 (1984).

[45] Leegin Creative Leather Prods., Inc. v. PSKS, Inc., 551 U.S. 877, 886 (2007) (citing Bus. Elecs. Corp. v. Sharp Elecs. Corp., 485 U.S. 717, 723 (1988)).

[46] *Id.* at 885–86 (citing State Oil Co. v. Khan, 522 U.S. 3, 10 (1997)).

[47] *Id.* at 885.

[48] Easterbrook, *supra* note 44, at 15. *See generally* Ehrlich, *supra* note 7.

[49] Arizona v. Maricopa Cty. Med. Soc'y, 457 U.S. 332 (1982).

[50] *Id.* at 344–45 (citing Standard Oil Co. of N.J. v. United States, 221 U.S. 1 (1911)).

[51] Cont'l T.V., Inc. v. GTE Sylvania Inc., 433 U.S. 36, 50 n.16 (acknowledging that "[c]ases that do not fit the generalization [underlying a *per se* rule] may arise").

analysis.[52] In other words, courts have found the *per se* rule to be a useful analytical tool for adjudicating price-fixing agreements, not merely because it has low decision costs but because those low decision costs do not come at the expense of unduly high error costs.

Of course, purporting to impose and use *per se* rules only where their associated error costs are also low is an idealized case, even in antitrust law. The underlying technical and economic facts that make a particular practice not merely potentially unreasonable, but *per se* unreasonable, may change.[53] Similarly, empirical research may reveal that the reasoning that connects underlying facts to legal conclusions is flawed.[54] Put another way, a *per se* rule by its own terms can assure only that its decision costs will be low; its error costs may rise over time or later be revealed to have been higher all along. The rule of reason, meanwhile, presents a symmetric situation: though its decision costs are high, the investment of careful scrutiny into case-specific context means that the associated error costs are likely to be low.

Given this general tension between decision cost and error cost, it is perhaps not surprising that litigants frequently focus, as an initial matter, on characterizing the disputed conduct strategically as belonging either in the category of practices that are *per se* unlawful or in the category that merits rule of reason analysis.[55] Determining the legal status of the disputed conduct has its own costs, and courts must be able to do so without unduly dissipating the decisional economy of the *per se* rule. Accordingly, a third way has emerged whereby a party accused of certain practices that the *per se* rule would cover may offer limited evidence of the procompetitive benefits of the practice.[56] If this quick look at the evidence is persuasive, then the court will proceed to evaluate the practice more fully under the rule of reason; if not, the *per se* rule will determine the outcome.[57] Thus, the quick look accepts some additional decision cost in exchange for lowering the error cost—or, more precisely, in exchange for more information about the likelihood of error.

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[52] Maricopa Cty., 457 U.S. at 351 (holding that "the anticompetitive potential inherent in all price-fixing agreements justifies their facial invalidation even if procompetitive justifications are offered for some").

[53] Easterbrook, *supra* note 43, at 6 (noting that "practices that were deleterious yesterday may yield benefits today, as the balance of advantage between contractual and market organization changes").

[54] Mark A. Lemley & Christopher R. Leslie, *Categorical Analysis in Antitrust Jurisprudence*, 93 IOWA L. REV. 1207, 1266 (2008).

[55] *See id.* at 1215.

[56] *See generally* Cal. Dental Ass'n v. FTC, 526 U.S. 756 (1999).

[57] *Id.* at 769–70.

C. *Borrowing from Antitrust*

This orientation of antitrust jurisprudence toward the balance between decision cost and error cost is strikingly and directly relevant to patent law. However, this relevance is not widely discussed or applied in patent policy debates.

1. The Decision Cost of Invalidating Patents

Determining that an invalid patent is invalid is costly. Part of the reason is that duly issued patents are legally presumed valid,[58] and a party challenging its validity bears the burden of overcoming that presumption[59] by clear and convincing evidence.[60] There are at least two rationales for presuming patents valid.

One is the premise that the decision to issue patents follows from the evaluative efforts of an expert agency whose conclusions are likely to be correct, at least more likely than inexpert courts acting later.[61] Patents are issued after substantive evaluation in the Patent Office by examiners who have education and training in the relevant scientific and technical disciplines to which the patented inventions pertain.[62] A patent examiner's evaluation compares the invention sought to be patented with the relevant prior art, which is the existing body of knowledge and commercial activity.[63] The examination process is intended to grant patents only on those inventions that are innovative enough to merit patent protection[64] and are sufficiently well-disclosed that others may benefit meaningfully from what the patent document teaches.[65] Thus, examination proceeds on the basis of expertise with the technical details of the invention and with the doctrinal

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[58] 35 U.S.C. § 282(a) (2012).

[59] *Id.*

[60] Microsoft Corp. v. i4i Ltd. P'ship, 564 U.S. 91, 95 (2011).

[61] Alan Devlin, *Revisiting the Presumption of Patent Validity*, 37 SW. U. L. REV. 323, 331 n.35–36 (2008) (citing Am. Hoist & Derrick Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1359 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 821 (1984)); Doug Lichtman & Mark A. Lemley, *Rethinking Patent Law's Presumption of Validity*, 60 STAN. L. REV. 45, 52 (2007) (noting that "the presumption of validity forces courts to defer to the expertise of the PTO, thereby avoiding redundant and possibly inferior second looks by the courts").

[62] Lichtman & Lemley, *supra* note 61, at 47 (noting further that "[t]he theoretical justification [for the presumption of validity] is that patent examiners have expertise when it comes to questions of patent validity, and if patent examiners have decided that a given invention qualifies for protection, judges and juries should not second-guess the experts.").

[63] Bhaven N. Sampat, *When Do Applicants Search for Prior Art?*, 53 J.L. & ECON. 399, 399–400 (2010). The various forms of documentary knowledge and commercial activity that constitute prior art are set forth in the various provisions of 35 U.S.C. § 102 (2012).

[64] For a discussion of the innovation-related requirements of patentability, *see infra* Part III.A.1.

[65] For a discussion of the disclosure-related requirements of patentability, *see infra* Part III.A.2.

details of patentability, expertise that courts are generally understood to lack when they revisit the Patent Office's conclusions.[66]

Another rationale for presuming patents valid is that patent rights form the basis for significant economic investments in technology development and commercialization by ensuring that the exclusionary power of patents will later help recoup those investments.[67] Without an expectation that issued patents are likely to be legally valid, the stability and security of these investments will tend to erode,[68] and rational investors will consider reducing and redirecting their investments to other legal regimes for appropriating value from innovation.[69] However, these substitute legal regimes may not be desirable from the perspective of social welfare and the dissemination of knowledge.

One particularly stark example of this effect is trade secrecy. On one hand, the mandatory disclosure requirements of patent law may well "lead to the underproduction of certain inventions, namely those inventions in which patent infringement detection would be difficult and therefore trade secrecy more valuable."[70] On the other hand, however, the lack of mandated disclosure in trade secrecy would leave inventors who are patent-averse for any reason "free to maintain inventions as trade secrets, and rational actors will do precisely that."[71] Thus, when abridging or invalidating an individual patent, the danger of doing so in ways that systemically weaken patent rights has long been a cautionary argument for courts, especially the Federal Circuit[72] and the Supreme Court.[73]

Beyond the presumption of validity and its effects, the decision cost of invalidating a patent also includes the expense of mounting the invalidity challenge. This expense is considerable for two reasons of its own.

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[66] Lichtman & Lemley, *supra* note 61, at 52 (referring to judicial reevaluations as "inferior second looks"); Devlin, *supra* note 61, at 325 (rhetorically questioning, "[w]ho are lay judges and juries, typically lacking technical and scientific knowledge in the relevant field, to second guess the PTO's expertise and informed judgment?").

[67] Lichtman & Lemley, *supra* note 61, at 52, 56–59; Devlin, *supra* note 61, at 331.

[68] Lichtman & Lemley, *supra* note 61, at 52, 56–59; Devlin, *supra* note 61, at 331.

[69] *See generally* Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)* (Nat'l Bureau of Econ. Research Working Paper No. 7552, 2000), www.nber.org/papers/w7552 (discussing a range of mechanisms for appropriating value from innovation, the relative usage of each by actors in different industries, and the motivations for these choices).

[70] J. Jonas Anderson, *Secret Inventions*, 26 BERKELEY TECH. L.J. 917, 963 (2011).

[71] *Id.* at 963–64.

[72] *E.g.*, Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 344 F.3d 1359, 1377 (Fed. Cir. 2003) (Newman, J., dissenting); Johnson & Johnston Assocs. v. R.E. Serv. Co., 285 F.3d 1046, 1064 (Fed. Cir. 2002) (Newman, J., dissenting).

[73] *E.g.*, Transparent-Wrap Mach. Corp. v. Stokes & Smith Co., 329 U.S. 637, 646 (1947).

One is simply that patent litigation demands significant material resources, and its demands have mostly increased over time. The biennial surveys of the American Intellectual Property Law Association, for example, show that among low-end patent infringement cases with less than $1 million in dispute, the median cost of litigation ranged from $600,000 to as high as $700,000 during the 2005–2015 period.[74] For high-end cases with more than $25 million in dispute, the median cost of litigation ranged from $4.5 million to as high as $5.5 million over the same period.[75] Meanwhile, a party who prevails in litigation cannot recover these costs through court-ordered fee-shifting, save for exceptional cases, making even successful patent invalidation a cost that the challenger must often simply absorb.[76]

The other reason why the expense of patent invalidation is high is that a successful challenger does not merely win the right to practice the patented invention alone.[77] A patent that is invalidated is invalid as against the world, and the successful challenger opens the door for other rivals to practice the invention as well, including a great many who contributed nothing to the expense and effort of mounting the challenge.[78] In other words, patent validity decisions are a type of public economic good and accordingly can often pose a significant collective action problem.[79]

2. The Importance of Invalidating (Bad) Patents

Still, despite the high cost, correctly determining that a patent is invalid can be quite socially valuable. Patents confer powerful rights to exclude others from making, using, selling, offering, and importing the invention protected by the patent.[80] A subset of these patents reflect meaningful economic power in their relevant markets in light of available substitutes,[81]

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[74] AM. INTELLECTUAL PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY 37 (2015).

[75] *Id.*

[76] 35 U.S.C. § 285 (2012); Octane Fitness, LLC v. Icon Health & Fitness, Inc., 134 S. Ct. 1749 (2014).

[77] *See* Blonder-Tongue Labs., Inc. v. Univ. of Ill. Found., 402 U.S. 313, 350 (1971) (holding that a finding of patent invalidity creates nonmutual defensive collateral estoppel with respect to the patent owner's assertion of the patent against all future alleged infringers).

[78] *See generally* Joseph Farrell & Robert P. Merges, *Incentives to Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Patent Review Might Help*, 19 BERKELEY TECH. L.J. 943 (2004).

[79] John A. Kidwell, *Comity, Patent Validity, and the Search for Symmetry: Son of* Blonder-Tongue, 57 J. PAT. OFF. SOC'Y 473, 488–89 (1975); Joseph Scott Miller, *Building a Better Bounty: Litigation-Stage Rewards for Defeating Patents*, 19 BERKELEY TECH. L.J. 667, 688 (2004).

[80] 35 U.S.C. § 271 (2012).

[81] The conventional wisdom, of course, is that most patents confer no such power. John R. Allison et al., *Valuable Patents*, 92 GEO. L.J. 435, 462 n.115 (2004) (citing HERBERT HOVENKAMP ET AL., IP AND ANTITRUST ch. 4 (2003); HERBERT HOVENKAMP, ECONOMICS AND FEDERAL ANTITRUST LAW § 8.3 (1985; Salem M. Katsh, Jack E. Brown, & F.M. Scherer,

and this power is justified only if the patented invention satisfies the criteria of genuine innovation and public disclosure that the law has set as the price of the patent's exclusionary power.[82]

By contrast, the issuance of patents for inventions embodying knowledge that is already available to the public or is already involved in existing commercial activity[83] would produce an economic distortion by withdrawing that knowledge from competitive use in the short term, with no corresponding social benefit in the long term.[84] Similar economic distortions would arise from patents for inventions embodying knowledge that may technically be new but is only trivially removed from the state of the art and would have come about even without the inducement of the patent.[85] In both situations, the patent owner's right to exclude would tend to raise the price of the invention to supracompetitive levels, producing static inefficiencies in the form of deadweight losses. These are static inefficiencies that patent law would otherwise tolerate if there were dynamic efficiency gains from the production of truly innovative knowledge. Without adequate innovation, however, there would be only the loss.

Panel Discussion, *The Value of Patents and Other Legally Protected Commercial Rights*, 53 ANTITRUST L.J. 535, 547 (1985) ("Statistical studies suggest that the vast majority of all patents confer very little monopoly power"); William Montgomery, Note, *The Presumption of Economic Power for Patented and Copyrighted Products in Tying Arrangements*, 85 COLUM. L. REV. 1140, 1156 (1985) ("More often than not, however, a patent or copyright provides little, if any, market power.").

[82] For a discussion of the innovation-related and disclosure-related requirements of patentability, *see infra* Parts III.A.1 and III.A.2.

[83] Knowledge already available to the public would be prior art in the form of earlier-issued patents, published patent applications, and "printed publications." 35 U.S.C. § 102(a). Knowledge already involved in commercial activity would be prior art in the form of a good or service that is "on sale." *Id.* Knowledge "in public use" would be prior art under either rubric. *Id.*

[84] The rhetoric of withdrawing information from the public domain on the basis of improperly issued patents is a recurring concern in the case law as well as the literature. *See, e.g.*, Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 6 (1966) (explaining that "Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available"). *See also* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CALIF. L. REV. 1, 25 (2011); Adam Mossoff, *Who Cares What Thomas Jefferson Thought About Patents? Reevaluating the Patent "Privilege" in Historical Context*, 92 CORNELL L. REV. 953, 1002 n.247 (2007).

[85] Pamela Samuelson, Lecture, *Enriching Discourse on Public Domains*, 55 DUKE L.J. 783, 808 n.139 (citing Graeme B. Dinwoodie & Rochelle Cooper Dreyfuss, *Patenting Science: Protecting the Domain of Accessible Knowledge in The Public Domain of Information*, *in* THE FUTURE OF THE PUBLIC DOMAIN: IDENTIFYING THE COMMONS IN INFORMATION LAW (Lucie M.C.R. Guibault & P. Bernt Hugenholtz eds., 2006)).

Further, even patents that satisfy the innovation-related requirements of patentability may result in overall inefficiency if they do not adequately disclose what the invention is,[86] how to practice it,[87] and what the boundaries of the patent right are.[88] Failure to satisfy these disclosure requirements would allow patent owners to enjoy exclusionary power in the market that is sometimes highly disproportionate to the patents' inventive contributions. The relationship of these disclosure-related requirements to the normatively desired economic balance of patent law is usually expressed as *commensurability* between what knowledge the inventor contributes and what economic power the patent confers.[89] Disclosure failures, therefore, are similar to the problem of static inefficiency that results from withdrawing already-available or already-forthcoming knowledge from public use—with one caveat. Disclosure failures further create a threat of dynamic inefficiency, the withdrawal of knowledge that may be generated tomorrow by others under the shadow of overbroad patents issued today.

The economics of inefficiency in patent law constitute a significant theoretical and empirical literature that is beyond the scope of this Article.[90] However, a unifying theme of this literature is that it is socially valuable to reach decisions about patent invalidity. The high decision cost of reaching these socially valuable decisions has, in turn, provoked a wide array of proposals for procedural and structural reform with mixed success. The use of subject-matter eligibility as a shorthand for other, more fact-intensive inquiries into whether an invention is patentable represents a doctrinal reform toward the same objective—lowering decision costs.

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[86] 35 U.S.C. § 112(a) (codifying the written description requirement).

[87] 35 U.S.C. § 112(a) (codifying the enablement requirement).

[88] 35 U.S.C. § 112(b) (codifying the claim definiteness requirement).

[89] *See, e.g.*, Jay P. Kesan, *Carrots and Sticks to Create a Better Patent System*, 17 BERKELEY TECH. L.J. 763, 797 (2002); Kevin Emerson Collins, *The Reach of Literal Claim Scope into After-Arising Technology: On Thing Construction and the Meaning of Meaning*, 41 CONN. L. REV. 493, 506, 509 (2008); Jeffrey A. Lefstin, *The Formal Structure of Patent Law and the Limits of Enablement*, 23 BERKELEY TECH. L.J. 1141, 1152–53, 1182 (2008).

[90] For an overview of this literature, see SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES (2004); Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989 (1997); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 843 (1990); William F. Baxter, *Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis*, 76 YALE L.J. 267 (1966); NAT'L BUREAU ECON. RESEARCH, THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS (Univs.-Nat'l Bureau Comm. for Econ. Research et al. eds., 1962), http://econpapers.repec.org/bookchap/nbrnberbk/univ62-1.htm; FRITZ MACHLUP, AN ECONOMIC REVIEW OF THE PATENT SYSTEM (1958), https://perma.cc/8RKE-WCGM.

II. HOW PATENT LAW NOW USES ANTITRUST LAW

The doctrine of patent-eligible subject matter is capable of reducing decision cost because various aspects of the doctrine overlap in significant ways with other criteria for patentability.[91] Those other criteria are costly to apply whereas subject-matter eligibility (in its current form) is less costly to apply. It must ultimately be determined whether this reduction in decision cost comes at the expense of unduly increasing the risk of error—simply put, whether the decision cost savings are worth it—but the decision cost savings are certainly present in most cases. The other criteria with which subject-matter eligibility overlaps may be grouped into two sets of requirements: those that promote innovation and those that promote disclosure.

A. *Patentability's Subject Matter Threshold*

1. Policing Innovation

The innovation-related requirements of patentability include novelty, nonobviousness, and utility. To be novel, an invention in all its particulars must not be patented, disclosed, or otherwise available to the public.[92] To be nonobvious, an invention must be more than a trivial advance—not only over individual prior inventions and products, but also over combinations of prior inventions and products.[93] Finally, to be useful, an invention must

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[91] For a comprehensive analytical treatment of doctrinal redundancy in patent law, *see* John M. Golden, *Redundancy: When Law Repeats Itself*, 94 TEX. L. REV. 629, 673–99 (2016). More specifically, the relationship between subject-matter eligibility and other doctrinal requirements for patentability—especially nonobviousness—has been the subject of much debate. In an important article following the *Bilski* decision, for example, Professor Josh Sarnoff argued "that both patent eligibility under section 101 and patentability under section 103 require inventive creativity, and that even newly discovered science, nature, and ideas must be treated as prior art." Joshua D. Sarnoff, *Patent-Eligible Inventions After Bilski: History and Theory*, 63 HASTINGS L.J. 53, 101–02 (2011). From this, Sarnoff concludes that "any claim to categorically excluded subject matter or any claim that lacks invention in applying such subject matter should also necessarily be obvious, that is, so long as the categorically excluded subject matter is treated as prior art for both eligibility and patentability." *Id.* at 102. Sarnoff's argument, however, depends on two further premises. One is that any inventiveness for eligibility purposes must not require claim construction, i.e., must be apparent on the face of the patent. With this he agrees, though he casts the issue as one of satisfying the written description requirement. *See id.* at 111. The other premise, however, is absent from his argument—that the court must also determine the relevant field of the invention (not merely the person having ordinary skill in that field). Sarnoff's overall argument is certainly sound in that the desirability of a shortcut varies with the difficulty of the task for which the shortcut is used; for example, resource-intensive tasks such as construing claims should not be elided. Nevertheless, the very issue at stake in this Article is how resource-intensive certain adjudicatory task *should be* in order to yield an outcome that is both adequately correct and adequately affordable.

[92] 35 U.S.C. § 102.

[93] 35 U.S.C. § 103.

fulfill a specific and substantial purpose,[94] and although that purpose must do more than merely avoid active harm to society,[95] a detailed evaluation of whether that purpose is economically, morally, or otherwise worth fulfilling is largely left to the marketplace.[96]

The subject-matter eligibility doctrine reflects each of the innovation-related requirements in some way. As an initial matter, processes, machines, manufactures, and composition of matters, as well as improvements on these, are eligible for patent protection.[97] To this broad grant of eligibility, case law has added important exceptions. Patents must not issue on laws (or products) of nature, natural phenomena, or abstract ideas,[98] and the various analyses by which courts have previously drawn analogies or distinctions between the inventions before them and these categories of patent-ineligible subject matter variously implicate novelty, nonobviousness, and utility.

The product-of-nature exception implicates all three. At times, courts have invoked the exception to invalidate patents on inventions that were merely found in nature or were only trivially different from a natural form. For example, in *Association for Molecular Pathology v. Myriad Genetics, Inc.*, the Supreme Court held that medically valuable genomic DNA sequences claimed by Myriad's patent were products of nature and were therefore ineligible for patent protection.[99] Although the DNA sequences were isolated and purified from their natural state, the Court emphasized that the "location and order of the nucleotides [that make up the DNA sequence] *existed in nature* before Myriad found them."[100] The Court's concern was that the invention, in some important sense, lacked newness.

Conversely, an invention may escape the product-of-nature exception if it does exhibit such newness. For example, in *Diamond v. Chakrabarty*, the Supreme Court held that a genetically engineered bacterium capable of breaking down crude oil was not a product of nature and was therefore eligible for patent protection.[101] Although the underlying bacterium existed naturally in the genus *Pseudomonas*, the Court emphasized that it had been modified with inserted genes that conferred the ability to degrade components of crude oil.[102] The result was "a new bacterium with *markedly*

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94 In re Fisher, 421 F.3d 1365, 1367 (Fed. Cir. 2005).

95 Brenner v. Manson, 383 U.S. 519, 533 (1966).

96 Lowell v. Lewis, 15 F. Cas. 1018 (C.C.D. Mass. 1817).

97 35 U.S.C. § 101.

98 Alice Corp. Pty. Ltd. v. CLS Bank Int'l., 134 S. Ct. 2347, 2354 (2014); Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107, 2116 (2013).

99 *Myriad*, 133 S. Ct. at 2111.

100 *Id.* at 2116 (emphasis added).

101 Diamond v. Chakrabarty, 447 U.S. 303 (1980).

102 *Id.* at 305.

different characteristics from any found in nature."[103] The Court was satisfied that the invention, in the same important sense, had newness.

At other times, courts have invoked the product-of-nature exception on the basis of whether the claimed invention derived its utility from nature's handiwork or from human ingenuity. For example, in *American Fruit Growers v. Brogdex Co.*, the Supreme Court held that fresh citrus fruit with rind or skin that had been treated with borax and which was therefore resistant to blue mold decay was a product of nature and therefore ineligible for patent protection.[104] The Court emphasized that although the borax-treated fruit was not found in nature as such, it underwent "no change in the name, appearance, or general character" and remained "fit only for the *same beneficial uses* as theretofore."[105] The Court's concern was that the invention's utility arose primarily from natural causes rather than from human intervention.

Conversely, an invention may escape the product-of-nature exception if its utility does arise from human intervention. For example, in *Parke-Davis & Co. v. H.K. Mulford Co.*, Judge Learned Hand held that adrenalin extracted from animal gland tissue and purified was not a product of nature and was therefore patent-eligible.[106] Although Judge Hand acknowledged the chemical occurred in nature, he emphasized that the very act of extracting and purifying it, as the inventor had done, rendered it "*for every practical purpose* a new thing commercially and therapeutically."[107] Similarly, in *Chakrabarty*, the Court noted that the engineered bacterium by virtue of its marked difference also had "the potential for *significant utility*."[108] In each case, the respective court was satisfied that the invention's utility arose primarily from human intervention.

Beyond products of nature, the law-of-nature and abstract-idea exceptions also implicate the patent system's concern with innovation, particularly whether the relevant aspect of an invention is truly inventive—i.e., nonobvious. For example, in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, the Supreme Court held that a method for calibrating drug dosage based on how much the drug's byproducts remained in the bloodstream was patent-ineligible because it did no more than apply "well-understood, routine, conventional activity" to the laws of nature that

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103 *Id.* at 310 (emphasis added).

104 Am. Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1 (1931).

105 *Id.* at 11–12.

106 Parke-Davis & Co. v. H.K. Mulford Co, 189 F. 95 (C.C.S.D.N.Y. 1911), *aff'd in part, rev'd in part sub nom.* Parke-Davis & Co v. H K Mulford & Co, 196 F. 496 (2d Cir. 1912).

107 *Id.* at 103.

108 *Chakrabarty*, 447 U.S. at 310 (emphasis added).

govern how drugs break down in the bloodstream.[109] Similarly, in *Alice Corporation Pty. v. CLS Bank International*, the Court extended its reasoning in *Mayo* regarding laws of nature to abstract ideas as well.[110] In *Alice*, the Court held that a system for mitigating settlement risk in financial transactions did no more than add "'well-understood, routine, conventional activit[ies]' previously known to the industry" to what the Court believed amounted to no more than the abstract idea of electronic recordkeeping and was therefore patent-ineligible.[111] In both *Mayo* and *Alice*, the Court's concern was that, beyond the law of nature or abstract idea on which the invention relied, it lacked any truly inventive concept.

In fact, the degree to which the Court's concern about the inventive concept implicates patent law's innovation function was quite explicit in the Court's previous approach for evaluating claims related to abstract ideas such as mathematic formulas and algorithms—the so-called point of novelty test. Under this approach, the underlying idea, formula, or algorithm was treated "as though it were a familiar part of the prior art," and the invention was then scrutinized to find "some other inventive concept" in order to be considered patent-eligible.[112] This fiction—of assuming the underlying ineligible natural law or idea into the body of prior knowledge—reveals that protecting innovation-related values was a key problem that the Court tried to solve through patent eligibility.

The upshot of these innovation-based views of the product-of-nature, law-of-nature, and abstract-idea exceptions is that the doctrine of patent-eligible subject matter was doing analytical work, and addressing policy concerns about the proper scope of the patent system, that the narrower doctrines of novelty, nonobviousness, or utility could have done.

2. Policing Disclosure

The disclosure-related requirements for patentability include enablement and written description. To be adequately enabled, a patent must disclose the invention that it claims with enough operational detail that a person having ordinary skill in the relevant technology could practice the invention without an undue amount of experimentation.[113] To be well-described, a patent disclosure must convey what invention the inventor actually considered herself to possess and supply adequate structural detail

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[109] Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66, 79 (2012).

[110] Alice Corp. Pty. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014).

[111] *Id.* at 2359 (alteration in original) (quoting Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66, 73 (2012)).

[112] Diamond v. Diehr, 450 U.S. 175, 204 (1981); Parker v. Flook, 437 U.S. 584, 591–95 (1978).

[113] 35 U.S.C. § 112(a); In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

for patent claims that define the invention in terms of the functions that the invention performs.[114] The subject-matter eligibility doctrine reflects both of these patentability requirements as well.

As requirements that promote the disclosure of useful technical detail, enablement and written description both guard against the same problem: patent overbreadth. There is nothing inherently problematic about broad patents or inherently desirable about narrow patents. The Patent Office may properly issue broad or narrow patents just as inventors may generate pioneering or incremental inventions to deserve such patents.[115] What is important to the innovation aims of the patent system is commensurability: the breadth of a patent's claims must not exceed the magnitude of the social contribution that the invention represents.[116]

Multiple exceptions to patent-eligibility implicate the concern with commensurability and the disclosure function of patents. With respect to abstract ideas, for example, the Supreme Court has repeatedly invalidated patents that it has found overbroad. For instance, in *O'Reilly v. Morse*, the Court rejected Samuel Morse's claim to all uses of electromagnetism for printing characters at a distance, emphasizing that Morse had invented only the particular form of telegraphy that his patent disclosed and that any future applications were beyond what his patent described.[117]

Similarly, in *Gottschalk v. Benson*, the Court rejected a bare method for converting binary-coded-decimal numbers into pure binary, emphasizing that the method claimed was so "sweeping as to cover both known and unknown uses" of the algorithm.[118] In both cases, decided more than a century apart, the Court's concern was that the patents in dispute were incommensurately broader than what they described and thus broader than what the inventor demonstrably possessed as the invention.

This concern also animated the decision in *Parker v. Flook*, where the Court rejected a method for updating limits on temperature, pressure, and other operating conditions that an industrial process should not exceed.[119] The Court held that the patent would "wholly preempt the mathematical formula" that was used for calculating the limits from being available in

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[114] 35 U.S.C. § 112(a); Ariad Pharm. v. Eli Lilly & Co., 598 F.3d 1336, 1349 (Fed. Cir. 2010) (en banc).

[115] For a thorough theoretical account of why pioneering inventions ought to receive broad patent rights, *see* Duffy, *supra* note 22.

[116] *See supra* note 88 and accompanying text. *See also* Jason Rantanen, *Patent Law's Disclosure Requirement*, 45 LOY. U. CHI. L.J. 369 (2013); Kevin Emerson Collins, *Enabling After-Arising Technology*, 34 J. CORP. L. 1083 (2009).

[117] O'Reilly v. Morse, 56 U.S. 62, 113 (1853).

[118] Gottschalk v. Benson, 409 U.S. 63 (1972).

[119] Parker v. Flook, 437 U.S. 584 (1978).

other inventive contexts.[120] As before, the concern was that the reach of the patent would exceed its inventive contribution.

Meanwhile, in *Diamond v. Diehr*, the Court expressed the same concern but was satisfied that the mathematical equation that the inventors implemented in a rubber curing process did not "preempt the use of that equation" and held the invention patent-eligible.[121]

The law-of-nature exception implicates disclosure-related concerns as well, in much the same way as the abstract-idea exception does. In *Mayo*, for example, the Court's innovation-related concerns about a missing "inventive concept" over and above the natural law that governed how a drug broke down in the bloodstream were closely aligned with the Court's further concern that upholding the patent would "too broadly preempt the use of [that] natural law."[122] The patent in dispute addressed only a specific use of the natural correlation between appropriate dosage and the level of drug byproducts in the blood, and the Court's reasoning reflects a concern that upholding the patent would foreclose *all* uses of that natural correlation and consequently frustrate commensurability in patent scope.

As was the case with the innovation-related requirements, the upshot of these disclosure-related views of the abstract-idea and law-of-nature exceptions is that the doctrine of patent-eligible subject matter ultimately performed analytical work that the narrower disclosure-related doctrines of enablement and written description could have done.

B. *Subject-Matter Eligibility As a Shortcut*

On first impression, it would seem to be a benefit that the doctrine of subject-matter eligibility can stand in for the more decision cost-intensive patentability requirements of novelty, nonobviousness, utility, enablement, and written description. Indeed, litigation data regarding motion practice in patent cases indicates that challenges based on subject-matter eligibility *do* stand in for challenges based on these other requirements early in litigation, when significant decision costs have not yet accrued.[123]

Among motions to dismiss, 83% of challenges to patent validity are based on subject-matter ineligibility; among motions for judgment on the pleadings, 93% of challenges. It is only after discovery, among motions for summary judgment, that subject-matter ineligibility supports only 7% of

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120 *Id.* at 589–90.

121 *See* Diamond v. Diehr, 450 U.S. 175, 187 (1981) (explaining that the patentee was instead, permissibly, seeking "only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process").

122 Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66, 72 (2012).

123 Litigation data is from the Docket Navigator service, which can be accessed at http://www.docketnavigator.com.

validity challenges while the other, more fact-intensive requirements begin to play a more substantial role. Figures 1-3 illustrate this trend. Meanwhile, it is almost entirely at summary judgment that any grounds other than subject-matter ineligibility are raised. Figures 4-9 illustrate this trend. In other words, the relationship in litigation between challenges based on subject-matter eligibility and argumentation in early-stage, low-decision cost procedural milestones is highly correlated in both directions.

Data from *ex ante* examination in the Patent Office further confirms the ability of the subject-matter ineligibility doctrine to stand in for the other, more decision cost-intensive patentability requirements.[124] A novel dataset of the prosecution records for 800 randomly selected patents reveals that, where the examiner rejected the claimed invention as patent-ineligible subject matter, the examiner in 86.6% of cases also rejected the invention for failing to satisfy one of the following requirements: utility, novelty, nonobviousness, enablement, written description, and definiteness.[125] That is to say, nearly seven out of every eight inventions that were challenged on subject-matter ineligibility grounds were also challenged on at least one other ground.[126] Because failing to satisfy even a single requirement is enough to defeat patentability,[127] litigation data as well as examination data suggest that most patentability disputes that are capable of being resolved on the doctrine of subject-matter eligibility are also capable of being resolved instead on a different ground.

These empirical findings indicate that *litigated* patents whose validity is challenged are subjected to subject-matter eligibility attacks as a low-decision-cost alternative to other grounds. The empirical findings also suggest that *issued* patents in general that overcome subject-matter eligibility rejections usually also overcome rejections on other grounds. Both *ex ante* and *ex post*, therefore, the subject-matter eligibility requirement in patent law is a significant doctrinal shortcut to the other requirements for patentability—and an apparently inexpensive shortcut, at least in terms of decision costs. There are significant problems, however, with this seeming

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[124] This empirical approach of comparing and correlating grounds for rejection is similar that adopted in an earlier study of administrative *appeals* of examiner rejections, focusing specifically on the correlation between rejections under the enablement requirement and rejections under the written description requirement. Dennis Crouch, *An Empirical Study of the Role of the Written Description Requirement in Patent Prosecution*, 104 NW. U. L. REV. 1665 (2010).

[125] Prosecution records are publicly available data obtained from the Patent Office website. The random sample consisted of 800 patents issued during the 10-year period of 2004 to 2013, inclusive. The prosecution records of these 800 patents contained 1,771 non-final and final rejections issued by examiners. These examiner rejections were reviewed by hand and coded as to the grounds for rejection contained within them.

[126] The specific findings underlying this conclusion are summarized in Table 1.

[127] 35 U.S.C. § 282(b)(2) (2012).

benefit.

C. *Problems with the Shortcut*

Using the doctrine of patent-eligible subject matter as a sort of cheap *per se* rule of unpatentability is problematic because of how its decision cost savings arise. All of the more fact-intensive requirements for patentability can properly be adjudicated only after two interrelated tasks have been completed. One task is to specify the person having ordinary skill in the art to which the invention pertains. Like the reasonably prudent person in tort law, the person having ordinary skill in the art is a hypothetical perspective from which novelty, nonobviousness, utility, enablement, and written description are explicitly or implicitly evaluated.[128] In turn, properly specifying the person of ordinary skill requires identifying the art itself, the technological field in which the invention is situated.[129] The other necessary task is to construe the itemized claims of the patent in order to characterize precisely what invention is patented.[130] The need for resolving these issues before adjudicating the novelty, nonobviousness, utility, enablement, and written description requirements is the very thing that makes each of these inquiries so fact-intensive.[131]

The Patent Office, for its part, determines the field of invention right from the start[132] and assigns the patent application to an appropriately trained patent examiner,[133] who is the agency's stand-in for the person having ordinary skill in the relevant art.[134] The patent examiner, meanwhile, evaluates the patent application only after construing the applicant's claims, giving the claims their "broadest reasonable construction."[135] Courts, however, have generally applied the subject-matter eligibility doctrine without regard to the person having ordinary skill in the art to which the

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[128] For discussion of how pervasively the person having ordinary skill in the art informs patentability requirements, see Brenda M. Simon, *The Implications of Technological Advancement for Obviousness*, 19 MICH. TELECOMM. & TECH. L. REV. 331 (2013); Jonathan J. Darrow, *The Neglected Dimension of Patent Law's PHOSITA Standard*, 23 HARV. J.L. & TECH. 227 (2009); Rebecca S. Eisenberg, *Obvious to Whom? Evaluating Inventions from the Perspective of PHOSITA*, 19 BERKELEY TECH. L.J. 885 (2004).

[129] Vishnubhakat, *The Field of Invention*, *supra* note 40, at 929–31 (discussing the overlooked but normatively desirable practice of specifying the field of invention prior to a PHOSITA analysis).

[130] *Id.* at 925–34 (tracing the doctrinal need for claim construction prior to each of the innovation-related and disclosure-related requirements for patentability).

[131] *See supra*, note 74 and accompanying text.

[132] Vishnubhakat, *The Field of Invention*, *supra* note 40, at 903–04.

[133] *Id.* at 906–07.

[134] *Id.* at 906. *Cf.* Eisenberg, *supra* note 128, at 888 (arguing that examiners skill "may provide a proxy for the tacit knowledge of PHOSITA, but examiners are at best former practitioners whose practical technological skills inevitably decline with time").

[135] Phillips v. AWH Corp., 415 F.3d 1303, 1316 (Fed. Cir. 2005).

patented invention pertains—indeed, without specifying the art at all—and without construing the claims of the patent.[136]

These lapses in the judicial use of subject-matter eligibility as a *per se* shortcut is problematic for two reasons. First, in antitrust law, the content of the *per se* rule is to be determined and applied only sparingly: such caution is recognized by the literature[137] and by the courts.[138] The specific types of conduct that should be considered so clearly and consistently anticompetitive as to be conclusively presumed unreasonable are the result of long experience with anticompetitive practices.[139] By contrast, the doctrine of patent-eligible subject matter has been applied unevenly throughout its history, with little empirical basis for presuming that certain requirements for patentability in certain contexts will produce results that are so consistent that a more fact-intensive inquiry such as novelty, nonobviousness, enablement, etc. would be superfluous.[140]

Second, and perhaps more importantly, even the *per se* rule requires an initial characterization of the relevant market and of the allegedly anticompetitive conduct. For example, fixing prices may conclusively be presumed illegal,[141] but one must still establish the market in which price fixing is said to occur.[142] Self-evidently, one must also demonstrate that what the accused party did was, in fact, tantamount to price-fixing. By contrast, the inquiry into subject-matter eligibility proceeds without identifying the field of the invention,[143] and frequently without characterizing through claim construction what the patent actually claims.[144]

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[136] *See* Timothy R. Holbrook & Mark D. Janis, *Patent-Eligible Processes: An Audience Perspective*, 17 VAND. J. ENT. & TECH. L. 349, 363–76 (2015).

[137] Thomas A. Piraino, Jr., *Sharp Dealing: The Horizontal/Vertical Dichotomy in Distributor Termination Cases*, 38 EMORY L.J. 311, 364 (1989); Scott G. Crowley, Note, *Antitrust: Business Electronics Corp. v. Sharp Electronics Corp.—A Better Rule For Vertical Restraints, But Is It Legal?*, 1987 B.Y.U. L. REV. 1035, 1035 n.2 (1987); William J. Sims, Note, *NCAA v. Board of Regents and a Truncated Rule of Reason: Retaining Flexibility Without Sacrificing Efficiency*, 27 ARIZ. L. REV. 193, 198 (1985).

[138] Cont'l T.V., Inc. v. GTE Sylvania Inc., 433 U.S. 36, 49–51 (1977).

[139] White Motor Co. v. United States, 372 U.S. 253 (1963). *But see* Arizona v. Maricopa Cty. Med. Soc'y, 457 U.S. 332, 349 (1982) (distinguishing between the creation of new *per se* prohibitions and the application of existing ones).

[140] Duffy, *supra* note 7, at 623–38 (discussing the historical record of judicial failures in crafting stable, durable rules of patentability).

[141] Arizona v. Maricopa Cty. Med. Soc'y, 457 U.S. 332, 344–45 (1982); Standard Oil Co. of N.J. v. United States, 221 U.S. 1, 65 (1911).

[142] *See* Bogan v. Hodgkins, 166 F.3d 509, 515 (2d Cir. 1999) (explaining that "it is an element of a *per se* case to describe the relevant market in which we may presume the anticompetitive effect would occur").

[143] Vishnubhakat, *The Field of Invention*, *supra* note 40, at 906–08 (discussing the rarity with which courts make any initial taxonomic determinations at all on their way to more substantive conclusions about patent validity).

[144] Holbrook & Janis, *supra* note 136, at 363–64.

Thus, the supposed judicial efficiency of evaluating patent validity on the basis of subject-matter ineligibility comes at the risk of making an incorrect evaluation. Decision costs may be lower, but error costs are likely higher. For this reason, the way in which courts currently use the doctrine of subject-matter ineligibility as an inexpensive shortcut for other, more precise doctrinal patentability requirements is unsound.

IV. BORROWING MORE RESPONSIBLY FROM ANTITRUST

The inappropriateness of the current practice, however, is not to say that subject-matter eligibility may never be used to avoid more judicially costly doctrinal inquiries. The example of antitrust is itself a lesson that approaches for lowering decision cost are not to be disregarded lightly—so long as they are not employed lightly, either. Just as the rule of reason can give way to *per se* simplifications, costlier patentability doctrines can also give way to a simpler subject-matter eligibility analysis, where certain antecedent requirements have been satisfied in order to minimize error and where the resulting subject-matter eligibility analysis still presents a lower decision cost.

A. *Defining the Market: The Field of Invention*

One antecedent requirement before evaluating whether an invention constitutes patent-eligible subject matter is defining the field of the invention. The field of invention is a long-overlooked inquiry in how the courts assess patentability, and not only in subject-matter eligibility issues. Every major requirement for patentability implicates an underlying taxonomic choice about how to define the field of a given invention.[145] The Patent Office makes these taxonomic choices regularly, informedly, and systematically in accordance with express statutory authority,[146] but courts ignore, assume, or improvise this important inquiry.[147]

What courts do instead, at least implicitly, is adjudicate patentability questions such as novelty, nonobviousness, enablement, etc., from the perspective of the person having ordinary skill in the art.[148] This is a step toward resolving a given patentability issue more accurately by defining the scope of the inquiry more precisely—just as defining the relevant market in antitrust does. Identifying only the person having ordinary skill in the art, however, is insufficient for this purpose in two ways. One is that the inquiry is litigated between adversarial parties who have a direct and partisan interest

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145 *See supra* notes 125–27 and accompanying text.

146 *See supra* notes 129–32 and accompanying text.

147 *See supra* note 133 and accompanying text.

148 *See supra* note 125 and accompanying text.

in the substantive effects of how to define the person of ordinary skill in the art. As a result, the evidence that parties present to courts and the conclusions that courts ultimately reach may bear little relation to the actual field of a given invention.[149]

Another reason is that resolving this question in the courts at all presents a significant structural bias based on hindsight, even apart from the private biases of the litigants.[150] When the Patent Office classifies an invention according to its technological taxonomy and assigns the invention to a patent examiner trained in that field as a stand-in for the person having ordinary skill in the relevant art, the determinations of the agency are much closer in time to the actual state of science and technology within which the invention was developed.[151] By the time patents have been issued, have been asserted, and are being litigated in court years later, the state of technology will have changed, sometimes dramatically.[152] The result is that even courts that are willing and able to look beyond the self-interested arguments of litigants confront significant difficulties in accurately recapturing a past state of affairs from scratch.

For these reasons, courts evaluating whether a given patentability requirement, such as nonobviousness or enablement, has been satisfied should defer to the taxonomic classifications made by the Patent Office during examination.[153] Under ordinary principles of administrative law, these agency classifications are informal adjudications of fact that should survive except where courts find them arbitrary and capricious.[154] Disputes in litigation over Patent Office classifications may, indeed, increase in the short run as courts begin to give this appropriate deference. However, the

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[149] This criticism has much in common (though is not congruent) with broader criticisms of the "adversarial legalism" in American civil litigation. The adversarial legalism critique, too, emphasizes the cost and uncertainty generated by relying on individual partisan lawsuits as a mode of social governance. *E.g.*, ROBERT A. KAGAN, ADVERSARIAL LEGALISM: THE AMERICAN WAY OF LAW (2003).

[150] Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1523–27 (1998); Jeffrey J. Rachlinski, *A Positive Psychological Theory of Judging in Hindsight*, 65 U. CHI. L. REV. 571, 613–14 (1998). Hindsight bias in patent law is most commonly discussed in the context of the nonobviousness requirement. *E.g.*, Gregory N. Mandel, *Patently Non-Obvious: Empirical Demonstration That the Hindsight Bias Renders Patent Decisions Irrational*, 67 OHIO ST. L.J. 1391 (2006). As the broader discussion by Professors Jolls, et al., and Rachlinski show, however, there is no reason to expect that hindsight bias is not a risk in any number of patentability-related inquiries, both legal and factual.

[151] Vishnubhakat, *The Field of Invention*, *supra* note 41, at 939–40.

[152] *Id.* at 45.

[153] *Id.* at 43–50 (discussing the general case for judicial deference, articulating the legal standard by which judges ought to practice deference, and the operational form that deference should take where technological taxonomy is concerned).

[154] *Id.* at 46.

early resolution of the field of the invention will also offer greater up-front clarity about downstream issues, such as who the person having ordinary skill in that field might be and what scope the patent should be interpreted as having.

The same logic and the same benefits apply to the subject-matter eligibility doctrine as well. The policies that have animated judicial development of what ought to be patent-eligible are broadly concerned with innovation and disclosure.[155] Thus, inventions must be truly innovative in the sense of having sufficient human intervention to differentiate them and render them more useful as compared to what nature already provides.[156] They must also be sufficiently well disclosed in the sense that patents must teach everything that they claim and describe everything that they exclude.[157] In short, patents must not preempt products of nature or principles of nature, nor the knowledge that these represent, for the use and application of these natural products and principles should remain available for others to build and innovate upon. This anxiety over preemption, and the Court's use of the subject-matter eligibility doctrine to address it, is reflected in cases as old as *Morse*[158] and as recent as *Mayo*.[159]

What such judicial uses of the eligibility doctrine have lacked thus far, however, is a rule of decision for defining the technological domain within which a patent can be evaluated as overbroad and therefore preemptive—or else not overbroad and therefore eligible. That is to say, before a court can determine that a patent preempts an entire field, the court must know what the relevant field is. This is precisely the taxonomic exercise that the Patent Office conducts at the outset of every patent examination in accordance with its statutory authority and agency expertise.[160] Thus, a court that sets out to define the relevant technology within which to scrutinize the preemptive breadth of a patent need only defer to the Patent Office classification of the field of invention under ordinary principles of administrative law, adding little decision cost but considerably reducing potential error cost.

B. *Defining the Conduct: Claim Construction*

The other antecedent requirement before evaluating whether an invention constitutes patent-eligible subject matter is construing the patent claims to determine what they actually encompass. Claim construction is a

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155 *See supra* Part III.A.

156 *See supra* Part III.A.1.

157 *See supra* Part III.A.2.

158 *See supra* note 117 and accompanying text.

159 *See supra* note 122 and accompanying text.

160 Vishnubhakat, *The Field of Invention*, *supra* note 41, at 903–04.

key inquiry both in patent examination[161] and patent litigation,[162] such that judges who handle even a modest caseload of patent disputes quickly become familiar with it.[163] Nevertheless, this familiarity is rarely synonymous with expertise, sometimes even for judges who see large numbers of patent cases.[164] Claim constructions by trial courts are reversed on appeal at notoriously high rates in the Federal Circuit.[165]

As a result, claim constructions in district courts pose particularly acute problems of uncertainty in the contours of patent rights. At one side is vertical certainty, the assurance that a patent that is construed one way in the district court will likely be construed the same way on appeal, reducing the need for protracted and expensive litigation.[166] The Federal Circuit can offer this assurance by evaluating lower-court claim constructions under a deferential standard of appellate review.[167] The cost of this deferential review, however, is less horizontal certainty, the assurance that a patent that is construed one way in a given litigation will be construed the same way in other litigations.[168] To defer to lower courts, after all, is to allow inconsistent outcomes to coexist unless they are so indefensible that they must be overturned.[169] The Federal Circuit can ensure horizontal certainty only by reviewing patent claim constructions *de novo*, and in that framework, the

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[161] Joel Miller, *Claim Construction at the PTO—The "Broadest Reasonable Interpretation. . .*", 88 J. PAT. & TRADEMARK OFF. SOC'Y 279 (2006).

[162] Peter S. Menell, Matthew D. Powers & Steven C. Carlson, *Patent Claim Construction: A Modern Synthesis and Structured Framework*, 25 BERKELEY TECH. L.J. 711, 714–15 (2010).

[163] Andrew T. Zidel, Comment, *Patent Claim Construction in the Trial Courts: A Study Showing the Need for Clear Guidance From the Federal Circuit*, 33 SETON HALL L. REV. 711, 746 n.283 (2003) (citation omitted) (indicating that federal trial court judges are "quite familiar with the analytical rules of claim construction").

[164] *See* David L. Schwartz, *Practice Makes Perfect? An Empirical Study of Claim Construction Reversal Rates in Patent Cases*, 107 MICH. L. REV. 223, 223 (2008) (finding that there is no significant relationship between judges' cumulative experience with claim construction and the likelihood of having their claim construction rulings reversed on appeal in the Federal Circuit).

[165] *See, e.g., id.*; J. Jonas Anderson & Peter S. Menell, *Informal Deference: A Historical, Empirical, and Normative Analysis of Patent Claim Construction*, 108 NW. U. L. REV. 1 (2013); Christian A. Chu, *Empirical Analysis of the Federal Circuit's Claim Construction Trends*, 16 BERKELEY TECH. L.J. 1075 (2001); W. Michael Schuster, *Claim Construction and Technical Training: An Empirical Study of the Reversal Rates of Technically Trained Judges in Patent Claim Construction Cases*, 29 QUINNIPIAC L. REV. 887 (2011); David L. Schwartz, *Courting Specialization: An Empirical Study of Claim Construction Comparing Patent Litigation Before Federal District Courts and the International Trade Commission*, 50 WM. & MARY L. REV. 1699 (2009).

[166] *See* Saurabh Vishnubhakat, *An Intentional Tort Theory of Patents*, 68 FLA. L. REV. 571, 595 (2016) (discussing the trade-off between the costs of decision and error in a given lawsuit versus the costs of decision and error as to the same patent across many lawsuits).

[167] *Id.*

[168] *Id.*

[169] *Id.*

result is necessarily that district courts' claim constructions in a given case will receive less appellate deference and so will be reversed more often, producing high vertical uncertainty.[170] Indeed, this is precisely the choice with which the Supreme Court was recently confronted.

The Supreme Court held over twenty years ago that the enterprise of claim construction is not wholly a question of law, nor of fact, but instead is a "mongrel practice."[171] Only recently, in 2015, did the Supreme Court further clarify that the subsidiary factual findings that a court makes in the course of construing patent claims are not to be reviewed *de novo,* but under a "clear error" standard.[172] In other words, the Court favored vertical certainty in a nod toward the decision costs that district courts invest into construing claims. However, these claim construction investments are not a systematic part of determining whether a patent is directed to eligible subject matter. Instead, courts have mixed local practices regarding whether motions to dismiss—which overwhelmingly rely on subject-matter eligibility challenges[173]—are indeed permitted to make a subject matter-based challenge prior to claim construction.[174]

Although these local practices differ based on the varying weight that judges give to efficiency considerations—i.e., to their decision costs as individual courts—the availability of subject-matter eligibility challenges without claim construction ignores the considerable potential for error in making broad generalizations about the boundaries of the patent system itself without any precise understanding of the individual patents whose claimed subject matter is deemed eligible or not. Just as *per se* analysis in antitrust, for all its categorical severity, still requires characterizing the allegedly unlawful economic conduct, so also should *per se*-style analysis of patentability require characterizing the allegedly patent-ineligible subject matter.

There are at least two ways in which to structure this inquiry without incurring the fact-discovery costs of a full-blown claim construction. One is to require a proposed claim construction by the patent owner itself and to take that construction as true for purposes of the subject-matter eligibility evaluation. This method is well in line with the general pleading-stage rule that, for motions to dismiss for failure to state a claim upon which relief can be granted, courts must accept factual matters as true and draw all reasonable

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170 *Id.*

171 Markman v. Westview Instruments, Inc. (Markman II), 517 U.S. 370, 372, 378 (1996).

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

173 *See infra* Figure 1.

174 Divergent local practices as to *Alice* motions in the pleading stage are also the subject of a work in progress by Professor Paul Gugliuzza.

inferences in favor of the nonmoving party—here, the patent owner.[175]

The second method is to allow limited discovery of only those fact questions that bear on subject-matter eligibility, especially defining the field of invention and the person of ordinary skill in that art. This, too, would be in line with the common pleading-stage practice of allowing matters outside the pleadings, thereby converting a motion to dismiss into a motion for summary judgment.[176]

Under both approaches, the additional decision costs can be limited so that the gains of quickly adjudicating patents that clearly constitute patent-ineligible subject matter are not dissipated. A patent that fails even under these generous circumstances may reliably be invalidated without a high risk of error. A patent that survives a subject-matter eligibility challenge, meanwhile, may still face more detailed scrutiny about patentability. This outcome, too, has a clear analog in the antitrust approach to decision costs and error costs. Accused antitrust violators can avoid *per se* condemnation if they survive so-called quick look review, a tentative evaluation of facts that tend to show procompetitive effects from the accused conduct.[177] Surviving quick-look review does not establish *per se* legality, but merely escapes *per se* illegality and invites a more detailed analysis under the rule of reason.[178] Similarly, patents that survive a subject-matter eligibility challenge on the pleadings or after limited fact discovery would not be held *per se* valid, but would merely escape *per se* invalidation and proceed to a more detailed review under narrower, more specific patentability doctrines such as novelty, nonobviousness, utility, and so on.

C. *Avoiding the Question: The Crouch-Merges Canon*

The preceding discussion of antecedent requirements for a proper subject-matter eligibility inquiry argues for a robust rethinking of current patent practice, but these proposed reforms are not unbounded. Satisfying these requirements merely takes proper account of error costs, and the resulting subject-matter eligibility analysis may sometimes still present a decision cost that is low enough to warrant *per se* or quick look-style adjudication. At other times, however, the resulting analysis may prove to be no cheaper than a narrower patentability analysis such as novelty or nonobviousness would have been. In these cases, there is good reason to

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175 Bell Atl. Corp. v. Twombly, 550 U.S. 544 (2007); 5B CHARLES A. WRIGHT & ARTHUR R. MILLER, FEDERAL PRACTICE AND PROCEDURE § 1357 (3d ed. 2015).

176 Fed. R. Civ. P. 12(d).

177 Cal. Dental Ass'n v. FTC, 526 U.S. 756, 769–71 (1999).

178 United States v. Brown Univ., 5 F.3d 658, 677–78 (3d Cir. 1993) (finding from a quick look that a full inquiry under the rule of reason was necessary because the university financial aid agreements in question had sufficiently procompetitive potential).

avoid the subject-matter eligibility doctrine and instead to decide the question on narrower grounds for patentability.

This avoidance doctrine has been advanced by Professors Crouch and Merges based on pragmatic policy concerns and on empirical findings that avoidance would be meaningfully available.[179] Specifically, they find that "a substantial number of patent claims lacking subject matter eligibility under of [sic] § 101 also fail to satisfy at least one other validity test."[180] By one estimate, some 84% of patent applications that are rejected for subject-matter ineligibility are also rejected for failing either novelty or nonobviousness.[181] By another estimate, conducted by Crouch and Merges, in 94% of administrative appeals from examiner rejections, claims that examiners reject on subject-matter eligibility grounds are also rejected on at least one other ground.[182] The novel dataset and study presented above on grounds for rejection found in the prosecution records of 800 randomly selected patents, similarly finds that about 87% of patent applications that are rejected for subject-matter eligibility are also rejected as lacking either utility, novelty, nonobviousness, enablement, written description, or definiteness.[183]

However, an empirical view of patent-eligible subject matter as a meaningful *per se* shortcut to other validity criteria additionally raises the reverse question: how frequently do patent claims that raise validity concerns under one of the narrower patentability requirements (of utility, novelty, nonobviousness, enablement, written description, or definiteness) also implicate the broader issue of subject-matter eligibility? Analysis of the same novel dataset reveals that this occurs in only 9.4% of patents. Moreover, only in 1.5% of patents is subject-matter eligibility observed as a validity concern without any of the other identified requirements.

Thus, avoiding subject-matter eligibility by relying on a narrower ground is feasible for a large majority of patents (estimated by various measures as 84%, 87%, or 94%). Avoiding subject-matter eligibility is unlikely to leave otherwise invalid patents in force, for only in relatively few patents (9.4%) does a narrow validity concern also implicate the broad problems of subject-matter eligibility. And for only a very small subset of patents (1.5%) does the subject-matter eligibility doctrine do validity-determinative work that no other doctrine does. This data independently

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179 Dennis Crouch & Robert P. Merges, *Operating Efficiently Post-Bilski by Ordering Patent Doctrine Decision-Making*, 25 BERKELEY TECH. L.J. 1673 (2010).

180 *Id.* at 1686.

181 Christopher A. Cotropia, Mark A. Lemley & Bhaven Sampat, *Do Applicant Patent Citations Matter?*, 42 RES. POL'Y 844 (2013).

182 Crouch & Merges, *supra* note 179, at 1686.

183 *See supra* note 123 and accompanying text.

corroborates, therefore, that the Crouch-Merges proposal would be an apt avoidance canon by filtering most cases with little risk of error and leaving relatively few difficult cases in which the avoided doctrine plays a truly useful, outcome-determinative role.

V. CONCLUSION

This Article argues to re-conceptualize the relationship between patent law's subject-matter eligibility requirement and the other major requirements for patentability as akin to the relationship in antitrust law between the *per se* rule and the rule of reason in evaluating restraints of trade. Courts' use of subject-matter eligibility as a shortcut to other patentability requirements appears to offer significant savings in decision cost, but these savings likely come at the expense of higher error costs because courts currently fail to answer necessary underlying questions about the nature of the invention and the technological field in which the invention is situated. Engaging in a subject-matter eligibility analysis without answering these questions is no more sensible than condemning an economic activity as *per se* anticompetitive without defining the relevant market and characterizing the economic activity in antitrust law.

The remedy for this ill-conceived reduction in decision cost while ignoring error cost is threefold. First, courts should evaluate the subject-matter eligibility of patented inventions only after specifying the technological field of the patented invention and identifying the person of ordinary skill in that relevant field, just as the Patent Office does. Second, courts that purport to find patents invalid for claiming patent-ineligible subject matter should do so only after construing what invention the patent actually claims. Finally, courts should adopt a canon of avoiding questions of patent eligibility altogether in favor of deciding patentability on narrower statutory grounds whenever possible. These measures offer a more jurisprudentially disciplined way for courts to balance their competing obligations to resolve patent cases both efficiently and accurately.

TABLES AND FIGURES

Table 1. The Use of Subject Matter Eligibility with Other Grounds for Rejection in Patent Office Examination

Ground for Rejection Made Together with Subject-Matter Eligibility	**Share**
Utility	0.00%
Novelty	56.10%
Non-obviousness	68.29%
Enablement	8.54%
Written Description	8.54%
Definiteness	43.90%
Cumulative share (at least one of the above)	86.59%

Each individual share is calculated by reference to the total number of rejections on a given ground.

For example:

$$\text{share for novelty} = \frac{\text{\# of examiner rejections that contained } \textbf{both} \text{ a novelty challenge } \textbf{and} \text{ a subject matter eligibility challenge}}{\text{total \# of examiner rejections that contained a subject matter eligibility challenge}}$$

The cumulative share is calculated by combining the individual shares as follows:

$$\text{cumulative share} = \frac{\text{\# of examiner rejections that contained } \textbf{both} \text{ a novelty challenge } \textbf{and} \text{ at least one of the above grounds}}{\text{total \# of examiner rejections that contained a subject matter eligibility challenge}}$$

Figure 1. Patent Invalidity Grounds Asserted in Motions to Dismiss

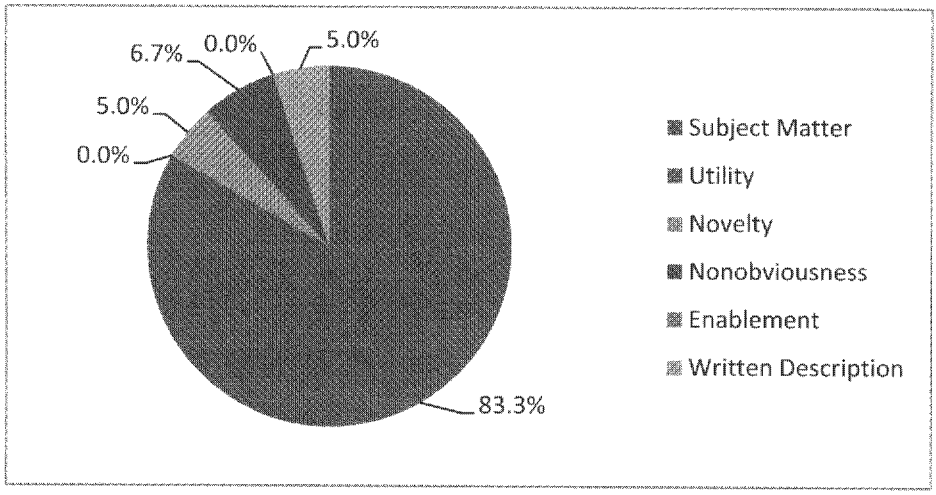

Figure 2. Patent Invalidity Grounds Asserted in Motions for Judgment on the Pleadings

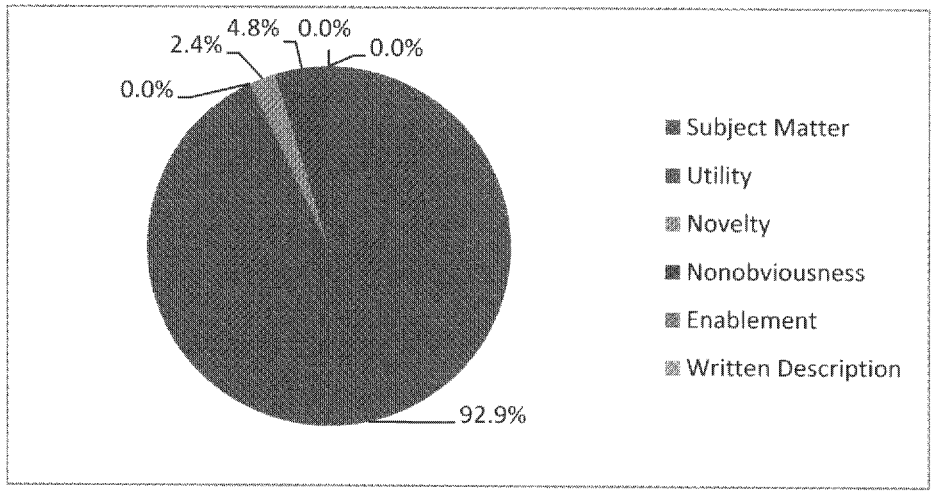

Figure 3. Patent Invalidity Grounds Asserted in Motions for Summary Judgment

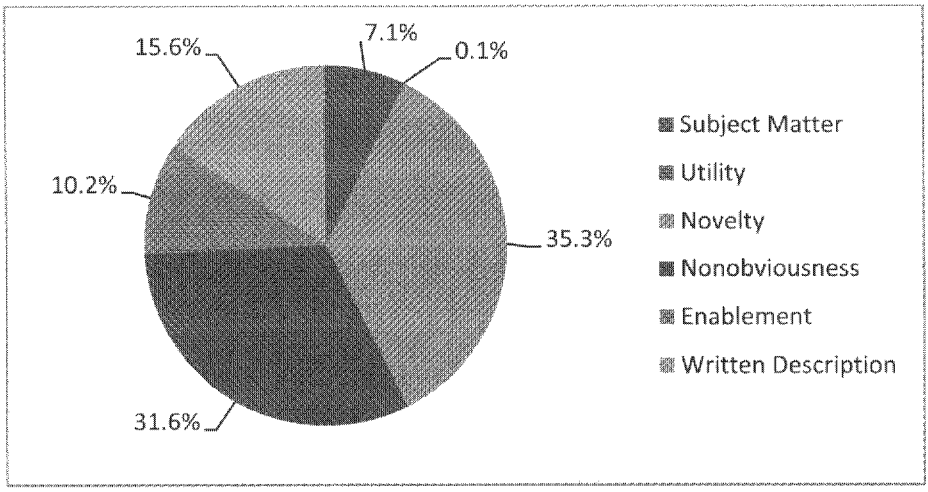

Figure 4. Stages of Litigation at Which Subject-Matter Ineligibility Is Asserted

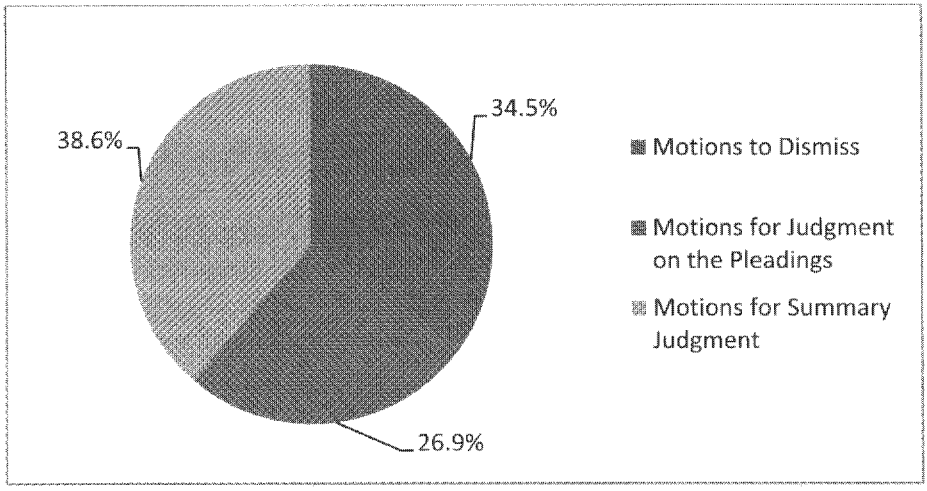

Figure 5. Stages of Litigation at Which Lack of Utility Is Asserted

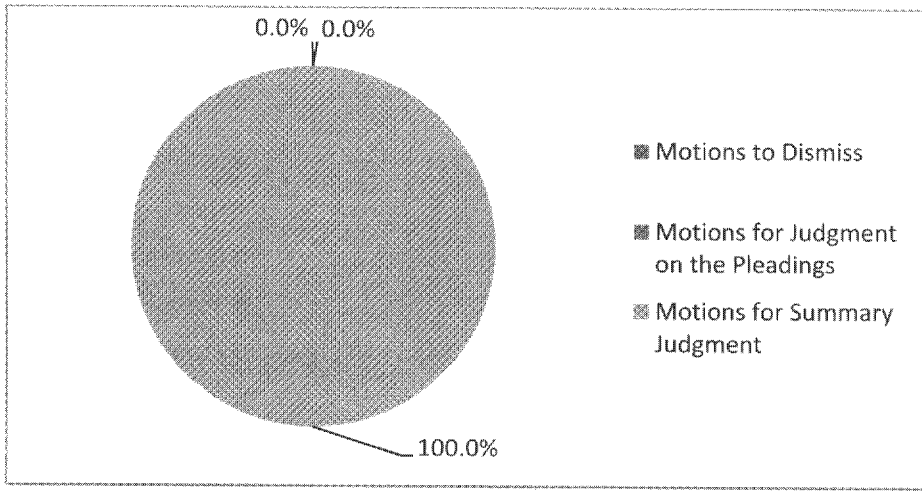

Figure 6. Stages of Litigation at Which Anticipation Is Asserted

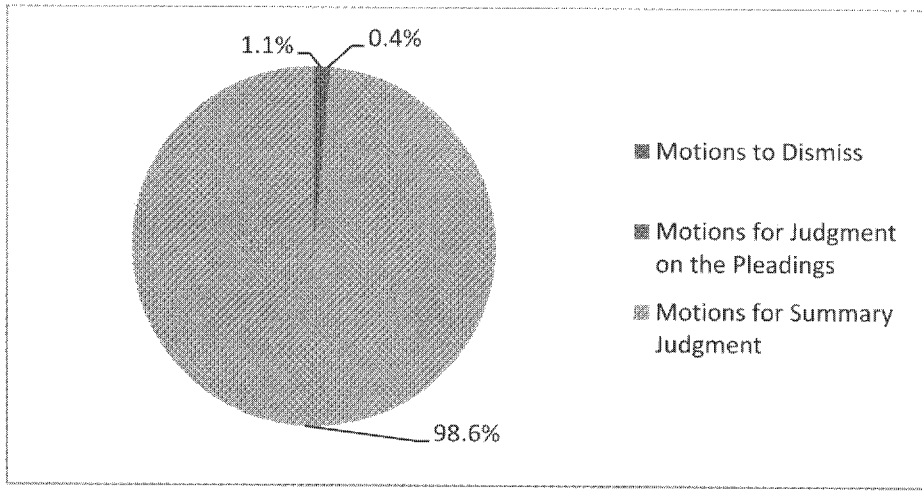

Figure 7. Stages of Litigation at Which Lack of Obviousness Is Asserted

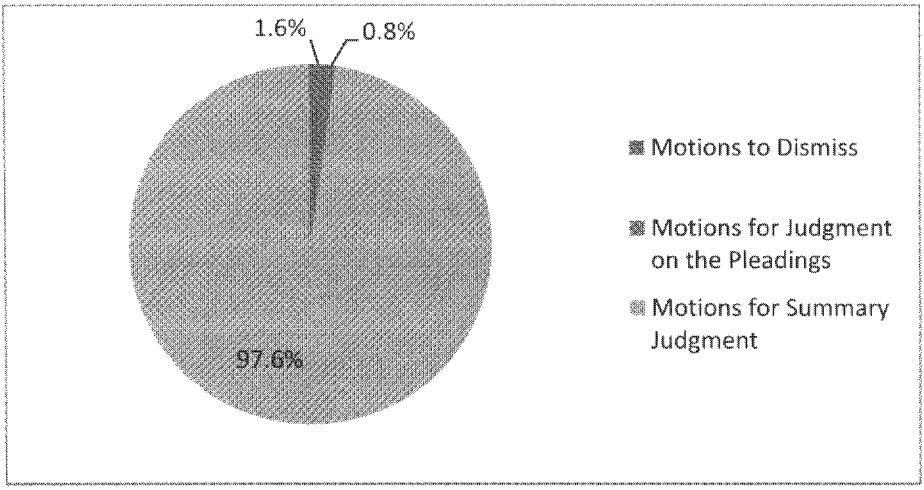

Figure 8. Stages of Litigation at Which Lack of Enablement Is Asserted

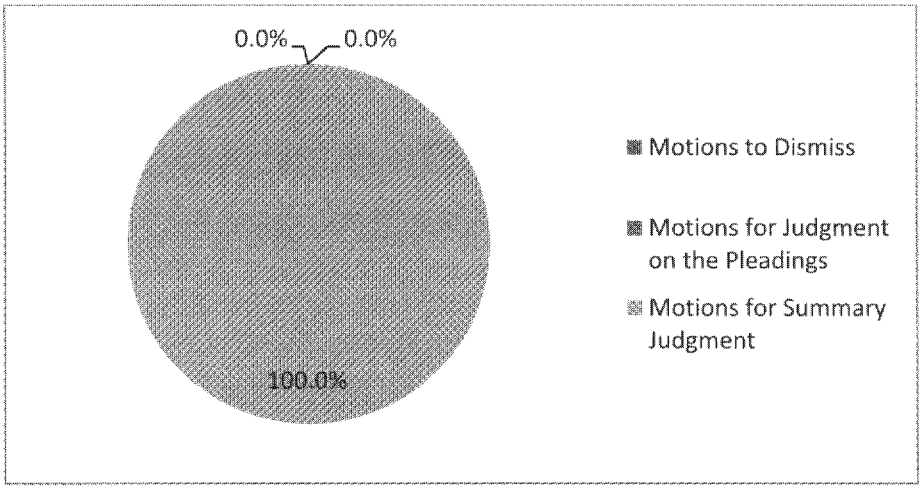

Figure 9. Stages of Litigation at Which Lack of Written Description Is Asserted