

PATENT EXAMINATION PRIORITIES

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INTRODUCTION

The United States Patent and Trademark Office (PTO) faces a massive and growing backlog of patent applications.¹ The PTO cannot seem to increase its staffing fast enough to keep up with an explosion of applications, especially given problems with examiner morale and retention.²

At the same time, the PTO struggles to improve examination quality.³ A decade or more of criticism pushed the agency to start experimenting with new examination methods.⁴ One experiment, called the “second pair of eyes” review, required a second examiner to review an application that had been allowed by the original examiner.⁵ The experiment was introduced in 2000 to improve the quality of certain kinds of business method patents.⁶ A Federal Trade Commission report praised this program and endorsed its expansion.⁷ The difficulty, of course, is that a second look at a patent application absorbs examiner time that could instead be used to address the application backlog.

1. See generally *Hiring Efforts Are Not Sufficient To Reduce the Patent Application Backlog: Testimony Before the Subcomm. on Courts, the Internet, and Intellectual Property of the H. Comm. on the Judiciary*, 110th Cong. (2008) (statement of Robin M. Nazzaro, Director, Natural Resources and Environment), available at <http://www.gao.gov/new.items/d08527t.pdf>. Jaffe and Lerner note that the number of applications per examiner is growing in recent years and is much higher than the ratio at the European Patent Office, ADAM B. JAFFE & JOSH LERNER, *INNOVATION AND ITS DISCONTENTS* 131 (2004), but Wagner notes the ratio is actually lower than the ratio in Japan, R. Polk Wagner, *Understanding Patent Quality Mechanisms* 25 (Jan. 6, 2009), <http://www.ftc.gov/bc/workshops/ipmarketplace/apr17/docs/rwagner2.pdf>.

2. See *infra* notes 80-81 and accompanying text.

3. See, e.g., Wagner, *supra* note 1, at 1 n.1.

4. See, e.g., *id.* at 10.

5. See Press Release, U.S. Patent & Trademark Office, USPTO Announces Action Plan Targeted To Improve Quality and Respond to Customer Needs for Biotech Patent Applications (Oct. 6, 2003), available at <http://www.uspto.gov/web/offices/com/speeches/03-26.htm>. The PTO's second pair of eyes program was expanded as part of the agency's Patent Quality Improvement program, which is part of its 21st Century Strategic Plan. See United States Patent and Trademark Office, *Patent Quality Improvement: Expansion of the Second Pair-of-Eyes Review*, <http://www.uspto.gov/web/offices/com/strat21/action/q3p17a.htm> (last visited Oct. 21, 2009).

6. See Patent Quality Improvement, *supra* note 5.

7. See FED. TRADE COMM., *TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY* ch. 6, at 19-20 (2003), available at <http://www.ftc.gov/os/2003/10/innovationrpt.pdf>.

Mark Lemley vividly commented on the resource constraint facing the PTO and its implications for patent quality.⁸ He noted that patent examiners devote an average of eighteen hours to each patent they examine.⁹ This compares unfavorably to what I expect of my students when they write research memos. Eighteen hours certainly is not much time, and thus, we should not be surprised if low quality patents sometimes issue.

Lemley defended “rational ignorance” at the PTO and argued against investing heavily in more examination hours as a method of improving patent quality.¹⁰ Few patents are ever asserted, licensed, or litigated.¹¹ Thus, it would be bad policy to exert much effort to perfect the bulk of patents because they go unused.¹² Lemley contended the better choice is to continue the current practice of a relatively cursory review and save a more resource-intensive review for litigation, if and when litigation arises.¹³

The PTO has tentatively embraced two other paths out of this dilemma: shift some examination responsibilities to other parties, and stem the explosion of patent applications. In 2007 the agency initiated Community Patent Review, also known as the Peer to Patent program.¹⁴ The goal of this experiment is to improve the quality of technical information available to patent examiners by enlisting volunteers to search for and share relevant “prior art” with examiners.¹⁵ Prior art is patent jargon that refers to patents,

8. Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495 (2001); see also F. Scott Kieff, *The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules*, 45 B.C. L. REV. 55, 70-72 (2003) (proposing a model that would lower the scrutiny level the PTO gives to an application); Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 590 (1999) (stating that the volume of patent applications causes low quality examination).

9. See Lemley, *supra* note 8, at 1500; Merges, *supra* note 8, at 602 (observing that “[i]n theory” there is approximately \$3000 per patent available for examination).

10. Lemley, *supra* note 8, at 1496, 1510-11.

11. *Id.* at 1497.

12. See *id.*

13. *Id.* at 1510-11.

14. For an overview of Peer to Patent, Community Patent Review, see Peer to Patent, Community Patent Review, http://www.peertopatent.org/getting_started (last visited Oct. 21, 2009); see also The Peer to Patent Project: Community Patent Review, <http://dotank.nyls.edu/communitypatent/about.html> (last visited Oct. 21, 2009).

15. See Peer to Patent, *supra* note 14.

publications and other information that can be used to limit or invalidate patent claims because, for example, they lack novelty or are obvious.¹⁶ Commentators and patent officials are also considering outsourcing patent searches to for-profit companies and relying more heavily on searches and other examination activities by the Japanese and European Patent Offices.¹⁷ All of these programs have potential to improve patent quality without consuming additional examiner time.

The PTO recently proposed a complementary set of regulatory changes that could have reduced the workload on examiners.¹⁸ One proposed change would have limited the number of continuing applications that an inventor could submit.¹⁹ There is evidence that one cause of the explosion of patent applications is a surge in the use of a string of related “continuing” applications that are linked through a shared disclosure contained in a single initial application.²⁰ This regulatory change was successfully challenged on the grounds that the reform was substantive and the PTO does not have substantive rule-making authority.²¹ Other proposed changes would directly or indirectly limit the set of claims contained in a patent.²² Reforms that successfully reduce workload could free up resources that could be used to improve examination quality.

16. See, e.g., Trilateral, Glossary of Patent Related Terms, <http://www.trilateral.net/glossary.html> (last visited Oct. 21, 2009).

17. See, e.g., K.C. Jones, *Patent Examiners Oppose Patent Reform Proposal*, INFORMATIONWEEK, Sept. 5, 2007, http://www.informationweek.com/news/mobility/showArticle.jhtml?articleID=201804307&cid=RSSfeed_TechWeb (stating that patent examiners opposed a proposed reform that would effectively outsource the patent search). The PTO, the Japan Patent Office (JPO), and the European Patent Office (EPO) formed Trilateral to promote cooperation between the three largest patent offices in the world. Trilateral, About Us, <http://www.trilateral.net/about.html> (last visited Oct. 21, 2009). Several projects are underway to facilitate work-sharing. For example, Project Share aims to reduce redundancy in search and examination by coordinating priority of applications across the three offices. See Trilateral, Strategic Handling of Application for Rapid Examination (SHARE), <http://www.trilateral.net/projects/worksharing/share.html> (last visited Oct. 21, 2009).

18. Changes to Practice for Continued Examination Filings, 72 Fed. Reg. 46,716 (Aug. 21, 2007) (to be codified at 37 C.F.R. pt. 1).

19. See *Tafas v. Doll*, 559 F.3d 1345, 1349-50 (Fed. Cir. 2009).

20. See Mark A. Lemley & Kimberly A. Moore, *Abolishing Patent Continuations*, 84 B.U. L. REV. 63, 71-83 (2004).

21. See *Tafas*, 559 F.3d at 1352, 1359-62.

22. See *id.* at 1350.

Measures that discourage excessive patenting and claiming, propose shared examination responsibilities, and increase staffing all have potential to raise examination quality and alleviate the patent application backlog. So far these measures have been too limited to have much impact, and there is insufficient evidence to reliably judge their effectiveness. In this Article, I consider a different approach to examination reform. I take as given a significant scarcity of examiner time, and I ask how the PTO should set examination priorities. In other words, how much of their eighteen hours should examiners devote to the various tasks they are expected to conduct before allowing a patent to issue?²³

It is vital to recognize that examiners will make mistakes given the time constraints that they face.²⁴ Thus, good patent policy requires much thought be given to minimizing the expected social cost from those mistakes. Part I of this Article sketches a model of patent examination errors and explores the social costs associated with various types of errors. The model supposes that patent examination leads to three possible outcomes: rejection of a patent application, allowance of a patent with narrow claims, or allowance of a patent with broad claims. Errors arise when the examination outcome for some reason departs from the proper outcome.

The remaining sections of the Article add complications to the basic model. Part II considers strategies that might be used by patent applicants in response to various choices of examination priorities. Good examination policy must anticipate how patent lawyers respond to examination practice. Part III discusses human relations management within the PTO. Any employer who wants to successfully implement a reform in an organization's core processes needs to think carefully about how to monitor and reward employees for advancing reform—the PTO is no different in this regard. Part IV notes that examination priorities should depend on the cost

23. About ten years ago, Rob Merges expressed his disappointment that so little attention has been paid to this issue. Merges, *supra* note 8, at 591 (“It is curious that in all the vast economic literature on patents, virtually nothing has been written about the functioning of a patent office.”). The literature has not moved very far since then.

24. JAFFE & LERNER, *supra* note 1, at 172-73 (“[M]istakes [w]ill [a]lways [b]e with [u]s.”); Doug Lichtman & Mark A. Lemley, *Rethinking Patent Law's Presumption of Validity*, 60 STAN. L. REV. 45, 61 (2007) (stating that examination errors are unavoidable because of budgetary and informational constraints).

of performing various examination tasks. Part V replaces the assumption of Part I that claim scope is determinate with the assumption that claim scope is fuzzy. Finally, Part VI takes a quick look at policy issues presented by various examination reforms.

The goal of this Article is to identify policy issues that must be addressed by analysts who want to set examination priorities and to help guide empirical research that will be needed to make good policy judgments. At present, patent scholars know very little about patent examination errors.

I. A MODEL OF PATENT EXAMINATION ERRORS

A. *Introduction to the Model*

Inventors who want to patent their inventions normally hire a patent agent or attorney who drafts a patent application and submits it to the PTO. (Hereafter, I will call the patent agent or attorney the “prosecutor” in keeping with patent law jargon.) The key features of a regular utility application are the written description of the invention and the claims.²⁵ At a minimum, the written description teaches people skilled in the art how to make and use the invention.²⁶ The claims articulate patent-based exclusionary rights over the invention. Patent law commentators often speak of a hypothetical bargain between the inventor and the public in which the inventor discloses technical information to the public in exchange for exclusionary rights.²⁷ The scope of the rights corresponds to the quality of the disclosure; more valuable disclosures entitle the inventor to broader claim scope.

Patent prosecution and examination is an *ex parte* administrative proceeding that is often described as a bargaining session.²⁸

25. See *infra* notes 96-97 and accompanying text.

26. See *infra* note 116 and accompanying text.

27. See, e.g., Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY TECH. L.J. 1009, 1010 (2008) (“The rationale for patenting long favored in judicial opinion is the ‘quid pro quo’ theory: that patents are a bargain of sorts, between the inventor and the public, exchanging public disclosure of the claimed invention in return for the grant of a period of exclusive rights.”).

28. ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW AND POLICY: CASES AND MATERIALS* 51 (2007).

Initially, the prosecutor typically asks for broad rights, broader than justified in light of the disclosure. The examiner responds by objecting to or rejecting aspects of the application,²⁹ and the prosecutor comes back with arguments or changes to the application that are responsive to the concerns of the examiner.³⁰ The examiner is supposed to serve the needs of the inventor-applicant, but also assure that the application complies with the requirements of the Patent Act.³¹ When this bargain reaches an impasse and the examiner will not allow the patent to issue despite arguments or amendments by the prosecutor, then some inventors will abandon their application, and others will appeal within the agency to the Board of Patent Appeals and Interferences (BPAI).³²

I will model certain aspects of the prosecution and examination process to uncover the role of various examination tasks in generating examination errors that degrade examination quality. I assume that there are three possible outcomes of examination: no patent issues, a patent with narrow claim scope issues, or a patent with broad claim scope issues. For the time being I will ignore appeal and litigation. I will assume that the standards of patentability are well-conceived, and therefore, I will speak about the proper outcome of examination as an outcome in which an applicant gets the broadest rights it is entitled to. Table One displays the proper outcome of an examination in the three rows. The columns of the table display the outcome chosen by the examiner. Naturally, there are three choices, and thus nine entries in the table.

Correct examination outcomes fall on the diagonal where the proper outcome and the examination outcome match. The off-diagonal entries represent different kinds of mistakes. The three italicized entries in the southwest part of the table represent false

29. "The refusal to grant claims because the subject matter as claimed is considered unpatentable is called a 'rejection.' The term 'rejected' must be applied to such claims in the examiner's action. If the form of the claim (as distinguished from its substance) is improper, an 'objection' is made." U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINATION AND PROCEDURE § 706.01 (rev. 2008), available at http://www.uspto.gov/web/offices/pac/mpep/mpep_e8rb_0700.pdf [hereinafter MPEP].

30. For example, the MPEP explains how to overcome a rejection based on a printed patent or publication in § 706.02(b). *See id.* § 706.02(b).

31. *See id.* § 706.

32. *See id.* § 1201, available at http://www.uspto.gov/web/offices/pac/mpep/mpep_e8r5_1200.pdf.

negatives—the examiner should have allowed a patent to issue, but did not, or should have allowed a broader patent. The three underlined entries in the northeast part of the table represent false positives—the examiner should have rejected or narrowed the application.

Examination Errors

Exam Outcome \ Proper Outcome	No Patent	Narrow Scope	Broad Scope
No Patent		<u>Narrow Grant</u>	<u>Broad Grant</u>
Narrow Scope	<i>Narrow Rejection</i>		<u>Too Broad</u>
Broad Scope	<i>Broad Rejection</i>	<i>Too Narrow</i>	

Table One

I have further divided the errors in a natural fashion. Perhaps the most egregious errors are the rejection of an application when the proper outcome was the grant of a patent with broad scope (a kind of false negative), and allowance of a patent with broad scope when the proper outcome was rejection (the counterpart false positive). I label the egregious false negative as a broad-rejection mistake and the egregious false positive as a broad-grant mistake.

The other false negatives consist of a too-narrow mistake, when the examiner should have allowed broader claims, and a narrow-rejection mistake, when the examiner rejected narrow claims that should have been allowed. Similarly, the other false positives consist of a too-broad mistake, when the examiner should have insisted on narrower claims, and a narrow-grant mistake, when the examiner allows a patent with narrow claims to issue, but where the patent should have been rejected.

Table Two offers a numerical illustration of my account of examination errors. For purposes of illustration, I consider an interval of time in which 100 patents are examined. In the far left column I show that by assumption, 30 of the applications would properly be rejected, 60 would properly receive claims with narrow scope, and the remaining 10 would properly receive claims with broad scope. In this illustration there are 25 false positives and 19 false negatives. The magnitudes reflect my conjecture about what actual examination outcomes might look like, but I hasten to emphasize that this conjecture has a tenuous connection with reality.³³

Numerical Illustration

Exam Outcome Proper Outcome	No Patent	Narrow Scope	Broad Scope
30 No Patent	20	<u>8</u>	<u>2</u>
60 Narrow Scope	15	30	<u>15</u>
10 Broad Scope	1	3	6

Table Two

33. DAN L. BURK & MARK A. LEMLEY, *THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT* 25 (2009) (stating that the PTO manages to “reject a small but nontrivial percentage of the applications it receives and to narrow the scope of the claims in many of the patents it does issue”); Mark Lemley & Bhaven N. Sampat, *Is the Patent Office a Rubber Stamp?*, 58 *EMORY L.J.* 181, 188-89 (2008) (stating that about one quarter of patent applications filed in January 2001 were abandoned by June 2008).

B. The Source of Errors

In theory, an analyst could populate the table above with useful numbers if the analyst could estimate the frequency of proper outcomes across the three possible outcomes, and if the analyst understood why examination mistakes occur. Estimates of the frequency of proper outcomes can possibly be derived through surveys, case studies, cross-national comparisons of examination outcomes, and from BPAI and litigation data. I set that project aside for now and ask instead: What process generates examination errors?

Examiners check patent applications to see whether they comply with the statutory subject matter, utility, novelty, nonobviousness, disclosure requirements, and assorted other statutory and agency requirements. To keep life simple, I will suppose for now that examiners make only one mistake. Let me illustrate how the six different types of errors illustrated in the tables might arise.

As a first example, consider mistakes involving the utility or subject matter standards. Suppose that a prosecutor submits an application for a patent on an invention that should not be patented because the invention lacks utility or because it is an abstract process and therefore not proper subject matter. Suppose further that the invention is technically significant and that the disclosure supports broad claim scope.³⁴ Correct examination would result in no patent. An error in applying the utility or subject matter requirement would result in a broad-grant mistake. I record this sort of error in the northeastern-most entry of Table Three.

If I simply reverse the assumption about utility/subject matter and assume that a broad patent is proper, then a mistaken rejection on utility or subject matter grounds causes a broad-rejection mistake as indicated in the southwestern-most entry of Table Three.

Let me put some flesh on these rather skeletal examples with the aid of two cases addressing the subject matter requirement. In *Parker v. Flook*, the applicant invented an improved process for

34. An invention that lacks utility might be technically quite impressive. The utility requirement in patent law is not about utility, conventionally defined. Instead, the requirement usually relates to the question of whether the inventor has actually completed an invention or instead seeks a patent as a "hunting license" to cut off research competition by others in a promising field of invention. See *Brenner v. Manson*, 383 U.S. 519, 536 (1966).

refining petroleum.³⁵ A key feature of the process was a mathematical formula that was implemented using a computer.³⁶ The Supreme Court invalidated the patent on subject matter grounds and denied the patent owner the benefit of “claims [that] cover a broad range of potential uses of the method.”³⁷ In this case, the Court of Customs and Patent Appeals (CCPA) (rather than the examiner) committed a broad-grant type of error by insisting the PTO issue this patent.

Three years later, in *Diamond v. Diehr*, the Supreme Court again addressed the subject matter eligibility of a process invention featuring software.³⁸ The examiner rejected claims to a method of curing synthetic rubber on the grounds that the invention was not patentable.³⁹ The Court backtracked from *Flook* and upheld a broad claim to the use of a formula (called the “Arrhenius equation”) to automate the curing process.⁴⁰ Thus, the examiner committed a broad-rejection error.

35. Parker v. Flook, 437 U.S. 584, 585-86 (1978).

36. *Id.*

37. *Id.* at 586, 594-96.

38. 450 U.S. 175, 177-78 (1981).

39. *Id.* at 179-80.

40. *Id.* at 177, 190-91.

Examination Tasks

Exam Outcome Proper Outcome	No Patent	Narrow Scope	Broad Scope
No Patent		Obviousness	Utility Subject Matter
Narrow Scope	Obviousness		Enablement
Broad Scope	Utility Subject Matter	Enablement	

Table Three

Recall that for now I take as given the correctness of the two decisions, thus labeling the decision of the CCPA in *Flook* and the examiner in *Diehr* as errors is appropriate. The more important point to notice is that I have described a scenario with extreme errors. If the examiner makes a mistake, it is a broad-rejection or a broad-grant.

Now suppose that a prosecutor submits an application for a patent on an invention that should receive a patent with narrow claim scope. Suppose that broader scope would not intrude on the prior art, but it is not justified by the quality of the disclosure. Correct examination would result in allowance of a patent with narrow scope. An error in applying the enablement standard would allow the inventor to get broad scope and lead to a too broad mistake, as indicated in the middle right of Table Three.⁴¹

Reversing my assumption about the proper scope, let me now assume that broad scope is proper. If the examiner mistakenly

41. Instead of an enablement mistake, a novelty mistake would work well here too. If the examiner misses some relevant prior art, he or she might allow claims that are too broad.

rejects an application with broad claims on enablement grounds but allows an application with narrow claims, then the result is a too-narrow mistake as indicated in the center bottom entry.

Next suppose that a prosecutor submits an application for a patent on an invention that should not be patented because the invention is obvious. Correct examination would result in rejection of the application. Suppose the disclosure in the application is consistent with narrow rather than broad scope. An error in applying the nonobviousness standard would allow the inventor to get a patent with narrow scope. The error thus causes a narrow-grant mistake. This is indicated in the top-center entry of Table Three. The final case is indicated in the left-center entry. It is a narrow-rejection mistake that results from mistakenly rejecting an application on grounds of obviousness.

These stories are meant to illustrate how different types of examination errors are likely to be generated, but certainly other patterns are also possible. For example, an examiner might make a subject matter mistake concerning an application that makes a disclosure worthy of claims with a narrow scope. A false negative would then fit into the narrow-rejection region of the tables and a false positive would fit into the narrow-grant region.

Nevertheless, I believe the scenarios involving nonobviousness and enablement are quite realistic. Examiners can make mistakes when deciding whether an applicant has enabled anything at all, but I believe that the hard examination issue is whether a broad claim has been enabled given that a narrow claim has been enabled.⁴² Thus, enablement mistakes tend to fall into the too narrow and too broad categories rather than the narrow-reject or narrow-grant categories. Furthermore, though it might seem surprising to nonpatent lawyers, it is possible for a narrow claim to be nonobvious and a broader claim to be obvious. This happens when the broader claim includes species that are “too close” to the prior art, and the narrow claim excludes those species.⁴³ It seems un-

42. Speaking about the enablement standard, Sean Seymore said, “[t]ime pressures and the PTO’s incentive system makes it nearly impossible for an Examiner to rigorously examine a complex generic claim.” Sean B. Seymore, *Heightened Enablement in the Unpredictable Arts*, 56 UCLA L. REV. 127, 147 (2008).

43. Patent lawyers use the word *species* to refer to a member of a set of technologies that is covered by a generic claim.

likely, though, that an examiner would mistakenly find an invention obvious when it properly deserved a patent with broad scope. At any rate, these are questions for future empirical research.

My last task in this Section is to consider what happens when examiners make mistakes when applying more than one standard. The reader should quickly see that the possibility of multiple mistakes shifts the mix of mistakes toward false negatives and away from false positives. A patent application must comply with all of the standards of patentability and thus a mistaken finding of noncompliance with any standard will result in a rejection. For example, an application that properly should get broad scope might be granted narrow scope instead if an examiner mistakenly decided either that broad scope was not enabled or that the broad claims did not comply with the written description requirement.

I do not want to overstate the effect of this bias toward false negatives. First, the ease of compliance with certain patentability standards is likely to be negatively correlated. Notably, when an invention is arguably obvious, it is unlikely that an applicant would have difficulty enabling the invention.⁴⁴ Therefore, the odds of mistake on enablement may be low when the odds of mistake on obviousness are high. Second, there is a powerful force arising from the *ex parte* nature of examination that biases examination in the opposite direction—toward false positives. I will discuss that bias in Part II.

C. The Social Cost of Examination Errors

Legal scholars often seek policies that minimize the expected social cost from legal errors. This approach is quite familiar in the context of antitrust policy⁴⁵ and has also been applied to patent scholarship analyzing the standard of nonobviousness.⁴⁶ Scholars have noted its relevance to patent examination policy, but it has not been developed in this context yet.⁴⁷

44. A similar point is made in BURK & LEMLEY, *supra* note 33, at 61-62.

45. See, e.g., KEITH N. HYLTON, *ANTITRUST LAW: ECONOMIC THEORY AND COMMON LAW EVOLUTION*, at xv (2003).

46. See, e.g., Michael J. Meurer & Katherine J. Strandburg, *Patent Carrots and Sticks: A Model of Nonobviousness*, 12 LEWIS & CLARK L. REV. 547, 548-51 (2008).

47. See Shubha Ghosh & Jay Kesan, *What Do Patents Purchase? In Search of Optimal*

The easiest way to understand what kind of social costs are generated by examination errors is to study some extreme policies. For example, an extremely pro-patent policy would direct examiners to issue patents unless an application clearly falls short of patentability standards *and* it does not take much time to show this. Besides avoiding false negatives, this policy would conserve examiner time and help the PTO whittle down the application backlog. The social cost, of course, flows from frequent false positives—there would be many improperly granted patents. If patent litigation were costless, and private parties could effortlessly distinguish narrow from broad, and valid from invalid patents, then false positives would not generate social cost—they would simply be ignored. As these conditions do not hold, the extreme pro-patent policy generates social cost from the successful assertion of over-broad and invalid patents, and the associated cost of litigation.⁴⁸

The complementary extremely antipatent policy would direct examiners to issue patents only when an application clearly meets the patentability standards *and* it does not take much time to learn this.⁴⁹ This policy would avoid false positives and conserve examiner time, but it would also generate social cost from many false negatives. The innovation incentives and other social benefits from patents would be significantly undercut.⁵⁰

Ignorance in the Patent Office, 40 Hous. L. Rev. 1219, 1246 (2004) (discussing false positives and false negatives in patent examination); Merges, *supra* note 8, at 592-93 (describing social costs of mistakes during patent examination).

48. See, e.g., JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 120-45 (2008) (providing evidence on the cost of patent litigation); James Bessen & Michael J. Meurer, *The Private Cost of Patent Litigation* 26 (Boston Univ. Sch. of Law, Law and Economics Working Paper Series, No. 07-08, 2008), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=983736.

49. There is a slight asymmetry between the pro-patent and the antipatent policy because the examiner needs to articulate a suitable basis for rejecting an application, but not for patent allowance. For example, the MPEP and 37 C.F.R. § 1.104 provide:

In rejecting claims for want of novelty or for obviousness, the examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, the particular part relied on must be designated as nearly as practicable. The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified.

37 C.F.R. § 1.104(c)(2) (2008); MPEP, *supra* note 29, § 706. Hence, allowance should use fewer resources, even before we consider applicant appeals which are discussed in the next Section.

50. See BESSEN & MEURER, *supra* note 48, at 95-119 for a discussion of the value of

I did not use my model of errors when I articulated the social costs of errors from these first two policies. The nature of the errors and associated social costs are clear. I developed the model because I want to consider other kinds of examination policies that are based on patent standards, rather than patent grant outcomes.

Consider a policy that achieves perfect examination of all standards except the nonobviousness standard codified at 35 U.S.C. § 103.⁵¹ In other words, the only examination errors arise from improperly rejecting patents on nonobvious inventions and improperly granting patents on obvious inventions. I will assume that when an invention presents a close question of obviousness, the proper outcome is either no patent or a narrow patent. Thus, I assume that it is easy for the examiner to judge that the “best inventions” with the broadest disclosure are patentable.

Table Four illustrates the pattern of errors associated with this policy. The numbers in this table continue the numerical illustration from Table Two. By assumption, there are no errors when the proper scope is broad. Furthermore, when the proper scope is narrow and when an examiner should not issue a patent, my assumptions mean that the examiner will not mistakenly grant a patent with broad scope. In contrast to the first two policies, the policy illustrated in Table Four, which allows only § 103 errors,⁵² generates both false positives and false negatives. It has the desirable property of avoiding mistakes involving broad scope. I will comment later on what demands this type of policy makes on examination resources.

patents to their owners.

51. 35 U.S.C. § 103 (2006) (providing the condition for patentability of nonobvious subject matter).

52. *Id.*

Section 103 Errors

Exam Outcome Proper Outcome	No Patent	Narrow Scope	Broad Scope
30 No Patent	15	<u>15</u>	0
60 Narrow Scope	30	30	0
10 Broad Scope	0	0	10

Table Four

Consider next a policy that achieves perfect examination of all standards except the 35 U.S.C. § 112 enablement standard,⁵³ in particular, I assume that examination errors arise only from mistakes concerning claim scope. The enablement doctrine polices the hypothetical bargain between the patent applicant and society—the grant of a patent in exchange for the disclosure of an invention. Broad claims are permitted only if a person having ordinary skill in the art can practice the claim without undue experimentation.⁵⁴ Thus, a broad claim must be supported by a higher quality disclosure than the disclosure required for a narrower claim. Likewise, a narrow claim is not valid unless the applicant teaches how to practice what is claimed.

I will assume that enablement issues are usually easy to resolve when the question is whether the applicant has enabled a narrow claim, but it may be difficult to resolve the question of whether the

53. 35 U.S.C. § 112 (2006).

54. See, e.g., *In re Wands*, 858 F.2d 731, 736-37 (Fed. Cir. 1988).

applicant has enabled a broad claim. I draw this distinction because examination for enablement of a narrow claim often depends simply on whether the applicant made a good disclosure of a particular embodiment of the invention that it previously “reduced to practice” (patent jargon that for my purpose here I will equate to “prototype”). Thus, I am assuming an examiner can easily read the disclosure of a prototype in an application and determine whether a person skilled in the art could make and use the prototype (and closely related technologies) without undue experimentation. The problem with broad claims is that patent law occasionally rewards inventors of important inventions with claim scope that extends far beyond any prototype actually made by the inventor. Assessment of enablement in this context is likely to be significantly more difficult.

Table Five illustrates the pattern of errors associated with this policy. The numbers in this table continue the numerical illustration from Tables Two and Four. By assumption, there are no errors when the proper outcome is no patent. Furthermore, examiners do not make a mistake by rejecting a patent application for lack of enablement when a patent should be issued. Errors are made when examiners improperly grant broad patents to applicants who should receive patents with narrow scope, and when examiners improperly reject broad claims and instead grant a patent with narrow claims. Comparison of Tables Four and Five suggests some important questions about expected social cost from errors created by different examination priorities.

Section 112 Errors

Exam Outcome Proper Outcome	No Patent	Narrow Scope	Broad Scope
30 No Patent	30	0	0
60 Narrow Scope	0	30	<u>30</u>
10 Broad Scope	0	5	5

Table Five

Two of the more difficult tasks facing examiners are determining: (1) whether minor inventions meet the nonobviousness standard, and (2) whether applications on patentable inventions contain disclosures that are rich enough to satisfy the enablement requirement in relationship to broad claims in those applications. Table Five displays the consequences of an examination policy that avoids mistakes on the first task, and Table Four displays the consequences of an examination policy that avoids mistakes on the second task. Both policies lead to false positives and false negatives. The policy that permits nonobviousness errors limits mistakes to claims with narrow scope. The policy that permits enablement errors concentrates mistakes on claims with broad scope. If the social cost from both types of errors is greater for broad claims, as seems likely, then weak examination of enablement is especially problematic. But that conclusion must be tempered by consideration of the frequency of various types of inventions and patent applications.

Comparing the pattern of errors reported in Tables Four and Five, the reader should notice that Table Four displays more errors and a higher ratio of false negatives to false positives. This pattern arises because of the assumption that there are relatively few inventions that properly get broad claims and the assumption that the difficult enablement cases involve distinguishing inventions that properly get patents with broad scope from those that get narrow scope. Because there are relatively few cases of inventions that properly get broad scope, there cannot be many false negatives in which the examiner mistakenly limits an applicant to narrow scope when it should have received a patent with broad scope. In contrast, there are many cases of inventions that properly get patents with narrow scope and many associated false negatives by examiners who mistakenly judge those inventions to be obvious.⁵⁵

II. STRATEGIC PROSECUTION

I have explored the role that different examination tasks play in generating patterns of examination errors. Now I explore the effect of strategic decisions by patent prosecutors in response to examination policies. Good examination policy must be crafted only after careful thought about how prosecutors may strategically respond to new policies. First, prosecutors can appeal mistakes to the BPAI and on to the courts.⁵⁶ Appeal patterns must be considered to judge the final effect of examination reform on errors. Second, prosecutors can change the mix of proper examination outcomes by changing the content of patent applications, or changing the frequency with which they file patent applications on problematic inventions.⁵⁷ This in turn affects the pattern of errors.

55. Notice that I also assumed that errors are symmetric—the tables display a 50 percent probability of false negative and false positive error.

56. Erin M. Dunston & R. Danny Huntington, *Actions: Tips for Obtaining the Best Second Bite at the Same Apple*, 91 J. PAT. & TRADEMARK OFF. SOC'Y 272, 272-73 (2009).

57. See Juan Alcácer & Michelle Gittelman, *Patent Citations as a Measure of Knowledge Flows: The Influence of Examiner Citations*, 88 REV. ECON. & STAT. 774, 779 (2006). Prior art search varies across industries, and this variation is probably explained mostly by strategy choices of applicants, not intrinsic technological differences. It appears that more search is done in pharmaceuticals and related industries and less is done in information and communication technologies. Juan Alcácer et al., *Applicant and Examiner Citations in U.S. Patents: An Overview and Analysis*, 38 RES. POL'Y 415, 417 (2009).

Appeal of rejected patent claims is common and often successful.⁵⁸ The impact of appeal on error is obvious—prosecutors are not public spirited enough to appeal false positives. Therefore, only false negatives are corrected through the appeal process. If appeals were costless and mistake-free, there would not be any false positives emerging from the PTO.

I am not sure whether strategic patent filing, disclosure, and claim drafting is common; it is more difficult to measure than appeals. Patent lawyers often speak about patents as if the contents of patent documents were dictated strictly by technology and law. According to this view, if patents in a particular technological classification tend to be long and have many citations and claims, that is simply because the technology is complicated. If patents have grown more complex over time, that is simply because technology has grown more complicated, or maybe because courts or the PTO have insisted on more detailed disclosures. Allison and Lemley studied issued patents and they found that technology does explain some of the variation in patent documents, but business considerations are also important and prosecutors do think strategically about prosecution.⁵⁹ Bessen and Meurer developed more evidence on

58. Stuart Minor Benjamin & Arti K. Rai, *Who's Afraid of the APA? What the Patent System Can Learn from Administrative Law*, 95 GEO. L.J. 269, 316-17 (2007) (“[A] patent denial diverges from a patent grant in that it goes through significant appellate review even before it reaches the Federal Circuit.... Notably, review by BPAI judges, who are familiar with the relevant law and frequently have some skill in the relevant science, is far from a rubber stamp for examiner denials. To the contrary, in fiscal year 2004, the BPAI affirmed examiner denials in only 37.1% of cases. Moreover, even those denials that were actually reviewed by the BPAI represent only a very select subset of all patent denials. In fiscal year 2003, examiners from most technology classes reopened the case, or simply allowed the application, more than 50% of the time after an appeal brief to the BPAI had been filed.”) (citations omitted).

59. See John R. Allison & Mark A. Lemley, *The Growing Complexity of the U.S. Patent System*, 82 B.U. L. REV. 77, 81 (2002) (“[W]e speculate on explanations for the dramatic increase in the complexity of patents. We reject a number of possible explanations, including both changes in the quality of PTO examination and changes in the nature of technology, as inconsistent with the data. The hypothesis that best fits the data is that patents are increasingly valuable to businesses, and that companies that expect to use patents in licensing or litigation are willing to spend more time and effort in the PTO to get a better patent.”); see also John R. Allison et al., *Valuable Patents*, 92 GEO. L.J. 435, 455 (2004) (noting that patent applicants file more claims and cite more prior art to increase the value of their patents in litigation).

this point.⁶⁰ We conducted some exploratory regressions that suggest that the number of claims and the number of citations to patent prior art are both determined in part by characteristics of the applicant.⁶¹ We found that citations and claims are positively correlated with the applicants' cash flow and capital intensity.⁶² We also found that large firms, foreign firms, and firms with large patent portfolios refine their patents less, after controlling for other factors.⁶³

Besides general evidence that prosecutors behave strategically, there is one study that discusses prosecutor response to a particular examination reform. Allison and Hunter examined the success of the Second Pair of Eyes Review (SPER) program.⁶⁴ This program was implemented because of concern about improper grants of business method patents, and a more general concern about the quality of these patents.⁶⁵ The program required a second review of business method patents after their initial allowance.⁶⁶ For purposes of this program, business method patents were defined as those falling within Class 705 of the PTO patent classification system.⁶⁷

Naturally enough, prosecutors were not keen to have their applications subjected to a second review. But as the PTO controlled the classification decision, it might seem that there was little a prosecutor could do to avoid the program. Allison and Hunter were not so sure. They observed that in the 1980s and early 1990s prosecutors "strategically drafted software patents to make them appear to be something else (such as hardware) when there was still doubt about the patentability of software; consequently, it was highly likely that the SPER initiative would likewise lead to

60. James Bessen & Michael J. Meurer, *Lessons for Patent Policy from Empirical Research on Patent Litigation*, 9 LEWIS & CLARK L. REV. 1, 20-22 (2005).

61. *Id.* at 21-22.

62. *Id.* at 21.

63. *Id.*

64. See John R. Allison & Starling D. Hunter, *On the Feasibility of Improving Patent Quality One Technology at a Time: The Case of Business Methods*, 21 BERKELEY TECH. L.J. 729, 734 (2006).

65. *Id.*

66. *Id.*

67. See USPTO, Class 705 Data-Processing: Financial, Business Practice, Management, or Cost/Price Determination, <http://www.uspto.gov/web/patents/classification/uspc705/defs705.htm> (last visited Oct 28, 2009).

strategic drafting to avoid SPER.”⁶⁸ At the time of their study there was too little data on post-SPER applications to assess the skill of prosecutors in avoiding a 705 classification.⁶⁹ But their data did show that the PTO apparently was diverting applications away from Class 705, perhaps to avoid the increased workload.⁷⁰

Shifting from observed strategic behavior to hypothetical cases will allow me to make more definite conclusions. Recall the examination policy depicted in Table Five eliminates all examination errors except enablement mistakes that result in patents that are too broad or too narrow. How would prosecutors respond to such a policy? First, they would appeal improperly narrow scope, and second, they would cut back on applications on inventions that should not be patented. If appeals were costless and if prosecutors could easily identify unpatentable inventions, then Table Five would need to be revised as shown below in Table Six. The number of applications and examinations would fall from 100 to 70. There would be 5 appeals of false negative errors that would be corrected, and 30 false negatives would remain (of the too broad type).

68. Allison & Hunter, *supra* note 64, at 786.

69. *Id.*

70. *See id.* at 760-63.

Section 112 Errors
70 exams, 5 appeals

Exam Outcome Proper Outcome	No Patent	Narrow Scope	Broad Scope
0 No Patent	0	0	0
60 Narrow Scope	0	30	<u>30</u>
10 Broad Scope	0	<i>5 → 0 Appeal</i>	5

Table Six

Next consider the effect of strategic prosecution on the examination policy that tolerated nonobviousness errors as depicted in Table Four: that policy allowed only narrow-rejection and narrow-grant mistakes. Notice that strategic prosecution does not change the number of applications. Prosecutors have the same incentive to submit applications for unpatentable inventions and hope for a false positive mistake. When a false negative mistake occurs, prosecutors will appeal and get the mistake corrected. Thus, there would be 100 applications and examinations and 30 appeals—more work for the PTO compared to the alternative policy. Still the policy depicted in Table Four might be socially preferred. It leads to fewer false positives, and the false positive mistakes generate patents with narrower scope.

III. INCENTIVES AND MONITORING

Patent examination policy should minimize the expected social cost of error. There are enormous gaps in our knowledge of examination and patent policy that limit our ability to formulate an effective policy. But if we forge ahead based on our limited knowledge, the next challenge is implementing the policy. It would be unwise to assume that the PTO, as currently constituted, would rush to implement an optimal examination policy.

The culture of the agency and incentives of administrators and examiners may work against many beneficial reforms. At the outset, one should worry about agency capture.⁷¹ The PTO has a close, long-standing relationship with the patent bar and with large patent holders.⁷² It would not be surprising if the agency favored the interests of these parties over general social welfare.⁷³ The PTO has endorsed a “customer service” orientation that stresses the importance of meeting the needs of patent applicants.⁷⁴ This orientation may be motivated in part by the dependence of the agency on fees to fund its operation.⁷⁵

If the administrators favor the reform, there is still the issue of encouraging examiners to embrace it. A possible danger is that examiners are so poorly motivated that they would make little or no effort to implement a reform. I have heard no reports of such extreme shirking; instead, it seems more likely that well-intentioned examiners may pursue their own notions of what constitutes a good examination. Convincing empirical research indicates that

71. BURK & LEMLEY, *supra* note 33, at 106-07 (stating that the PTO is subject to capture by patent applicants).

72. See Wagner, *supra* note 1, at 19 (describing the many “repeat players” in patent law).

73. JAFFE & LERNER, *supra* note 1, at 136-37 (noting the incentives to process patents quickly and grant too easily); Benjamin & Rai, *supra* note 58, at 316 (“The current structure of patent examination makes PTO denials sufficiently difficult that there is strong reason to believe that false positives (patent grants that should be denials) are much more common than false negatives (denials that should be grants).”); Wagner, *supra* note 1, at 2 (“[T]he modern patent system affirmatively encourages low patent quality.”).

74. Michael R. Taylor & Jerry Cayford, *American Patent Policy, Biotechnology, and African Agriculture: The Case for Policy Change*, 17 HARV. J.L. & TECH. 321, 355-56 (2004).

75. Wagner, *supra* note 1, at 17-19 (noting that the PTO has incentives to issue too many patents).

idiosyncratic features of individual examiners are important in explaining examination outcomes.⁷⁶ Part of the variation may be explained by differences in effort devoted to prior art search. Lemley and Sampat obtained evidence that effort directed to prior art search appears to decline as examiner seniority increases.⁷⁷ Perhaps more junior examiners exert greater search effort because they are monitored more closely.⁷⁸ The generally loose monitoring and heterogeneous approaches to examination could make it difficult to tailor incentive schemes to promote widespread adoption of reform.⁷⁹

Good examination practices and acceptance of reform requires the design of appropriate incentives and monitoring, and possibly reform of the agency's culture. Successful reform would also be facilitated by more stable, experienced, and well trained examination corps.⁸⁰ "A recurring theme in the assessment of PTO performance is poor examination quality due to high examiner turnover. This boils down to two specific problems: (1) too few senior examiners; and (2) inadequate training for the revolving cast of inexperienced examiners."⁸¹

76. Iain Cockburn, Sam Kortum & Scott Stern, *Are All Patent Examiners Equal? Examiners, Patent Characteristics, and Litigation Outcomes*, in PATENTS IN THE KNOWLEDGE-BASED ECONOMY 46-47 (Wesley M. Cohen & Stephen A. Merrill eds., 2003) (evincing that the identity of examiners accounts for a significant portion of the variation in characteristics of patents and litigation outcomes); Douglas Lichtman, *Rethinking Prosecution History Estoppel*, 71 U. CHI. L. REV. 151, 155 (2004) (arguing that examiners vary significantly in terms of their propensity to induce amendments to patent claims).

77. Mark Lemley & Bhaven N. Sampat, *Examiner Characteristics and the Patent Grant Rate* 21 (Stan. Law Sch. John M. Olin Program in Law & Econ., Working Paper No. 369, 2009), available at <http://ssrn.com/abstract=1329091>.

78. Lemley and Sampat note that junior examiners are supervised by senior examiners, but senior examiners have tenure and significant discretion with little direct monitoring. *Id.* at 6.

79. Cockburn, Kortum, and Stern conclude with a warning:

While idiosyncratic behavior of examiners can be controlled to some extent by formal processes such as supervision, selection of examiners, training, incentives, the institution's cultural norms necessarily play an important role in their exercise of discretion in awarding patent rights. Policy changes that impact the organizational structure and internal culture of the USPTO should be careful to take this into account.

Cockburn, Kortum & Stern, *supra* note 76, at 53.

80. JAFFE & LERNER, *supra* note 1, at 136 (discussing retention problems at the PTO; the turnover rate is six times as high as that in the EPO).

81. Merges, *supra* note 8, at 606.

IV. EFFORT COST

Conceptually, the simplest relevant consideration when setting examination priorities is the cost of various exam tasks, usually measured in terms of examiner time and effort. Some kinds of information are more readily available to patent examiners. All else equal, examiners should pursue tasks in which they have an advantage compared to decision makers at later stages during appeals, interferences, reissue, reexamination, licensing, and litigation.

Incorporating effort cost into optimal examination policy is difficult because there has been no attempt to measure these costs. Intuition suggests certain kinds of obscure prior art that parties in litigation can obtain is mostly hidden from examiners.⁸² In contrast, examiners can get patent and publication based prior art at relatively low cost.⁸³ The scientific and engineering expertise of examiners gives them a comparative advantage relative to lawyers and judges in understanding patent disclosures.⁸⁴ On the other hand, patent standards that require policy judgment may implicate economic facts and theories that are not within easy reach of examiners.⁸⁵

V. FUZZY BOUNDARIES

The model of Part I assumes that claim scope is clear and that it is easy to distinguish narrow patent scope from broad patent scope.

82. For example, the use of an invention that qualifies as prior art under 35 U.S.C. §§ 102(a), 102(b), or 102(g) might be very difficult for an examiner to find. See Margo A. Bagley, *Internet Business Model Patents: Obvious by Analogy*, 7 MICH. TELECOMM. & TECH. L. REV. 253, 280 (2001).

83. See Thomas F. Cotter, *Toward a Functional Definition of Publication in Copyright Law*, 92 MINN. L. REV. 1724, 1790-91 (2008).

84. Arti K. Rai, *Engaging Facts and Policy: A Multi-Institutional Approach to Patent System Reform*, 103 COLUM. L. REV. 1035, 1068-75 (2003) (discussing the greater expertise of the PTO in biotechnology compared to the Federal Circuit).

85. BURK & LEMLEY, *supra* note 33, at 107, 168-69 (arguing that courts should defer to fact-finding by the PTO, but the agency is not well suited to setting legal standards because it does not have easy access to much relevant policy information).

In truth, claim scope is often ambiguous.⁸⁶ When claim scope is ambiguous and the examiner mistakenly reads the claim too broadly, then there is a danger of improper rejection—or a false negative.⁸⁷ If the examiner reads the claim scope too narrowly, there is a corresponding danger of improper allowance—or a false positive.⁸⁸ Claim ambiguity disrupts examination, but it has a varied impact on different examination tasks.⁸⁹

Novelty examination is especially harmed by ambiguous claim scope. Novelty analysis requires an examiner to interpret the scope of each claim in an application. If the examiner finds any species in the prior art that falls within the bounds of a claim, then the examiner must reject the claim. If this sounds like infringement analysis—it should! The basic identity test required in novelty analysis states, “That which infringes, if later, would anticipate, if earlier.”⁹⁰

Bessen and Meurer argue that the U.S. patent system is in crisis today because it fails to provide good *patent notice*.⁹¹ Courts and lawyers have trouble determining whether a potentially infringing technology falls inside or outside the scope of patents with ambiguous claims. Poor notice harms innovators who inadvertently infringe others’ patents and have to pay a “patent tax” on innovation.⁹² Unfortunately, a similar notice problem afflicts examiners because novelty analysis parallels infringement analysis.

The PTO tries to alleviate the fuzzy boundaries problem through a policy that directs examiners to give claims their broadest reasonable interpretations.⁹³ This sensible policy runs contrary to the general tendency of the U.S. patent system to worry more about

86. See BESSEN & MEURER, *supra* note 48, at 54-62 for a discussion of the difficulty assessing patent scope; see also WAGNER, *supra* note 1, at 16 (arguing that patent applicants have inadequate incentive to describe their invention or claim it clearly).

87. See BESSEN & MEURER, *supra* note 48, at 163.

88. *Id.*

89. *Id.*

90. *Peters v. Active Mfg. Co.*, 129 U.S. 530, 537 (1889).

91. See BESSEN & MEURER, *supra* note 48, at 46-47.

92. See James Bessen & Michael J. Meurer, *What’s Wrong with the Patent System? Fuzzy Boundaries and the Patent Tax*, FIRST MONDAY, June 4, 2007, <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1867/1750>.

93. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316-17 (Fed. Cir. 2005); MPEP, *supra* note 29, § 2111, available at http://www.uspto.gov/web/offices/pac/mpep/mpep_e8r6_2100.pdf.

false negatives than false positives. An important open question is how effective this policy is. If an examiner does not perceive the broad reading of a claim, then the policy is ineffective.

At the other end of the spectrum from novelty, satisfaction of the utility standard normally does not turn on interpretation of the claims. Consider two leading utility cases in which no utility was found. The process for making a type of steroid in *Brenner v. Manson*,⁹⁴ and fragments of the maize gene in *In re Fisher*,⁹⁵ did not meet the utility requirement because the inventions were merely of research interest and did not have real world application. This sort of judgment should be possible even if the precise scope of the claims is unclear.

The fuzzy boundaries problem sabotages novelty analysis but not utility analysis; how does this problem affect other examination tasks? I am not sure. Written description analysis is probably affected severely. Written description problems usually arise when an inventor amends a claim and changes its scope. The written description requirement asks whether the inventor “possessed” the invention at the time of patent application.⁹⁶ Perhaps enablement, obviousness, and subject matter are in the middle ground. Examination of a generic claim for enablement requires the examiner to gauge whether disclosure in the application is commensurate to breadth of the claim. In some cases this analysis should be feasible even if the examiner is not sure of the precise scope of the claim. Similarly, because obviousness analysis calls for a rough judgment, it often should not matter whether the examiner has claim scope precisely correct. Claim construction is the first step in subject matter analysis. This suggests potential notice trouble, but there was no claim construction dispute in the Federal Circuit’s most recent subject matter case, *In re Bilski*.⁹⁷

94. 383 U.S. 519, 535-36 (1966).

95. 421 F.3d 1365, 1378 (Fed. Cir. 2005).

96. See *Vas-Cath v. Mahurkar*, 935 F.2d 1555, 1561 (Fed. Cir. 1991).

97. 545 F.3d 943, 951 (2008). Going forward, the Federal Circuit requires examiners to look for meaningful limits on process claim scope and distinguish between significant and insignificant pre- or post-solution activity. *Id.* at 961, 965.

VI. EXAMINATION REFORM

Today, patent examination is fundamentally decentralized. Examiners have enormous discretion about how they perform their mission. The most significant general directive is that examiners should avoid piecemeal examination. The policy of compact prosecution states: "The examiner ordinarily should reject each claim on all valid grounds available, avoiding, however, undue multiplication of references."⁹⁸ This policy is complemented by a culture in which "all patents are created equal"⁹⁹ and an incentive system that favors speed and customer satisfaction.¹⁰⁰

In this environment, the PTO has not thought creatively about how to deploy its scarce resources to improve examination outcomes. To its credit, the agency has responded to particular substantive controversies in patent law and issued examination guidelines to guide both examiners and applicants.¹⁰¹ And as I mentioned above, Community Patent Review is a clever experiment that may improve prior art search,¹⁰² and the Second Pair of Eyes Review program directs extra resources to examination of business method patents.¹⁰³ Otherwise, not much has been done to tailor examination.

I can think of four dimensions along which the PTO might usefully tailor patent examination: (1) the expected value of examining a particular patent; (2) the technology or industry of the invention; (3) a particular patentability standard; and (4) examination tasks such as prior art search, claim construction, and evaluation for compliance with patentability standards. I will briefly consider each in turn.

98. See MPEP, *supra* note 29, § 707.07(g).

99. Merges, *supra* note 8, at 597.

100. See *supra* notes 71-81 and accompanying text.

101. See, e.g., MPEP, *supra* note 29, § 2106, available at http://www.uspto.gov/web/offices/pac/mpep/mpep_e8r6_2100.pdf (guidelines pertaining to the patentability of software); *id.* § 2107 (application of the utility requirement); *id.* § 2141 (application of the nonobviousness requirement); *id.* § 2163 (application of the written description requirement).

102. See *supra* note 14.

103. See *supra* notes 64-70 and accompanying text.

Because relatively few patents are ever licensed, litigated, or even asserted, tremendous gains could be realized if the PTO could identify valuable patents early in prosecution and devote most of their resources to those patents. The trick, of course, is to determine at an early stage which patents are valuable. Litigated patents are a subset of valuable patents, and research shows that litigated patents differ significantly from nonlitigated patents. For example, litigated patents have more claims, more citations to prior art, and are more likely to be part of a family of patents claiming priority from a common predecessor.¹⁰⁴ Perhaps the PTO should devote more resources to the examination of applications with these characteristics. It should not be too hard to implement, but it is not clear that this policy would have much value. Strategic prosecutors could avoid more intense examination by limiting the number of claims, citations, and family size,¹⁰⁵ and even without strategic prosecution, these sorts of indicators are likely to miss most valuable patents.

A possibly more reliable approach would sort patent applications based on applicants' choices. The PTO is studying whether applicants should have the option to defer examination.¹⁰⁶ Applicants with patents with less expected value could retain their priority date but defer examination, save PTO examination resources, and avoid prosecution costs if the applicant later learns the expected patent value is too low to justify further prosecution. Another proposal getting serious attention is to let applicants with high expected value opt into a "gold-plated" patent examination system.¹⁰⁷ Lichtman and Lemley would eliminate the clear and convincing evidence presumption of patent validity for normal examination but

104. See Allison et al., *supra* note 59, at 456-59.

105. There may not be much harm to the prosecutor from citing less prior art. Allison and Lemley find that the amount of prior art cited is not correlated with validity. John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 230-31 (1998). There could be an indirect advantage from encouraging smaller family size and fewer claims. But it probably makes more sense to achieve this benefit directly by imposing an appropriate fee structure or directly regulating these attributes.

106. See Stephen Albainy-Jenei, Patent Barristas, <http://www.patentbaristas.com/archives/2009/01/30/deferred-examination-does-putting-things-off-lesson-your-workload> (Jan. 30, 2009).

107. Mark Lemley, Doug Lichtman & Bhaven Sampat, *What To Do About Bad Patents?*, 28 REG. 10, 12-13 (2005).

retain it for patents that undergo more rigorous examination.¹⁰⁸ They recognize incentive problems that exist in the PTO and warn that examiners in the gold-plated unit “should not be paid based on the number of patents reviewed or (worse) approved, nor should their tenure turn on ‘customer’ satisfaction, given that patent applicants all clearly want just one thing.”¹⁰⁹ The value of either of the schemes is unclear—one reason is that we do not have good evidence that patent applicants are well informed about the value of their potential patents at the date of application.¹¹⁰

Besides linking examination policy to some measure of the expected value of an application, the PTO can link examination to the technology class of the invention or the industry in which the patent is likely to be used. This is precisely the sort of tailoring embraced in the SPER program.¹¹¹ This kind of tailoring also occurs as the byproduct of patent jurisprudence on utility and subject matter. On its face, the utility standard is technology neutral, but in practice the utility standard is usually an issue for only chemical inventions.¹¹² Thus, examiners in other technology classes will rarely need to pause to examine an application for compliance with the utility requirement. Most of the controversy today about subject matter concerns software and business method inventions. Examiners reviewing other types of technology are not likely to issue a rejection based on subject matter. Burk and Lemley argue that a path out of the current “patent crisis” requires the courts to apply patent law in a technology-specific fashion, but they do not see much of a role for the PTO in this endeavor.¹¹³ They worry that tailored examination will invite harmful public choice problems and that the agency does not have the needed policy-relevant information to tailor examination.¹¹⁴ I see merit to these criticisms as applied to SPER and subject matter tests in the PTO (though I am not persuaded), but they do not have much force when applied to the

108. Lichtman & Lemley, *supra* note 24, at 60-61.

109. *Id.* at 69.

110. Another reason is that it is not clear that sorting on *private* patent value is a good way to reduce the expected *social* cost of examination errors.

111. See Allison & Hunter, *supra* note 64, at 734.

112. See, e.g., *Brenner v. Manson*, 383 U.S. 519, 532 (1966).

113. See BURK & LEMLEY, *supra* note 33, at 167-68.

114. *Id.* at 168.

passive tailoring involving the utility standard. If a public choice problem exists it is in the courts, and patent examiners should have access to the information they need to successfully apply the utility standard to chemical inventions.

The third dimension of tailoring takes me back to the beginning of this Article. The PTO could tailor examination by departing from the default position of treating all patentability standards as equal. It might be true that certain standards are relatively easy to apply in the PTO. Or it might be true that mistakes involving certain standards cause greater expected social cost. Then we would want examiners to pay special attention to the easy or important standards.

Suppose, for sake of illustration, we want to reform examination to minimize the risk of mistakes concerning patent scope.¹¹⁵ Perhaps this goal could be advanced by instructing examiners to devote more time to review of compliance with the enablement standard (at the cost of time devoted to other standards). There is a plausible argument that examiners have a comparative advantage in reviewing this standard because technical questions are prominent. The Federal Circuit indicated that enablement is not satisfied if undue experimentation is required before a person of ordinary skill in the art can practice the invention.¹¹⁶ Undue experimentation is judged by reference to the following, mostly technical, factors:

- (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.¹¹⁷

115. The best case for this policy might be that the greatest social cost arises from *too broad* examination errors, and rigorous examination for enablement is an effective way to reduce the frequency of these types of mistakes. Seymore advocates adoption of a “prima facie case of nonenablement for patent applications in the unpredictable arts.” Seymore, *supra* note 42, at 154.

116. See *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988); MPEP, *supra* note 29, § 2164.01, available at http://www.uspto.gov/web/offices/pac/mpep/mpep_e8r6_2100.pdf.

117. *In re Wands*, 858 F.2d at 737. The initial burden is on the examiner to show lack of enablement even if there is no evidence that the invention works; the examiner must provide references to support an enablement rejection. See Seymore, *supra* note 42, at 141.

The comparative advantage of examiners is strengthened because third parties often cannot test enablement after a patent grant without running the risk of an infringement suit.¹¹⁸

Such a policy could face implementation obstacles at both the agency and examiner level. Possibly this reform would reduce average patent value or increase patent prosecution costs, causing harm to certain patent holders and the patent bar. These parties may be able to subvert such a reform unless the PTO is better sheltered from their influence, perhaps by funding the agency out of general federal revenue. Regarding examiners, the agency would need to better train and retain examiners with the technical skills necessary to evaluate enablement questions and other questions bearing on proper patent scope. Senior examiners should be rewarded for improving the examination of scope questions and training junior examiners to do the same.¹¹⁹ In addition, financial incentives could be provided by conducting audits that measure enablement error rates using court proceedings, reexaminations, or outside expert review.¹²⁰

The final dimension for examination reform is in terms of examination tasks. Community Patent Review is an example of a reform designed to improve prior art search. This sort of reform could be implemented for any sort of technology, but in its current form, it is targeted at software patents. Bessen and Meurer argue that patent examiners should direct more effort to improving the clarity of patent scope, by rejecting more claims on grounds of indefiniteness and by creating a richer administrative record about how the examiner and applicant parse claim language.¹²¹ Again, this sort of reform could be targeted toward certain technologies or industries that are especially plagued by fuzzy patent claims such as information and communications technologies.¹²²

118. Seymore, *supra* note 42, at 150. *But see* Kieff, *supra* note 8, at 102-04 (arguing that patent applicants have incentives to “keep their own patent scope ‘just right’ from a social perspective”).

119. Merges, *supra* note 8, at 607 (stating that senior examiners are not rewarded for training junior examiners); *see also* Lemley & Sampat, *supra* note 77, at 21-22.

120. *See* Merges, *supra* note 8, at 609.

121. *See* BESSEN & MEURER, *supra* note 48, at 239-40.

122. *See id.* at 152-54.

CONCLUSION

Rob Merges recognized a critical question of patent policy: “how thorough should patent examinations be?”¹²³ Some scholars have argued that the current level of scrutiny is appropriate because costs can be saved by delaying intense review until litigation.¹²⁴ Others have argued the quality of examination needs to be improved to alleviate harms caused by low quality patents.¹²⁵

My tack in this Article is different. Assuming total effort is fixed, I ask how examiner effort should be allocated across patent applications, examination tasks, and patentability standards. Perhaps I have short-changed the reader because I do not strongly advocate a particular examination reform. Instead, I explain how patent examination priorities should be set—I have identified policy issues that must be addressed, and I have commented in passing about the paucity of empirical research relevant to setting an optimal examination policy.

Good patent examination policy requires more empirical research. Researchers need to learn more about patterns of examination error, about strategic responses to examination policy, about the opportunity costs of various examination tasks, and much more. The PTO should facilitate this research by gathering, analyzing, and disseminating more data about how examination works (and does not work). Perhaps, the agency's recent willingness to experiment with Community Patent Review signals a new era of more imaginative policy formulation and closer cooperation with academic researchers.

123. Merges, *supra* note 8, at 591.

124. See generally Kieff, *supra* note 8; Lemley, *supra* note 8.

125. See 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, 948 (2004) (arguing that “litigation is an unreliable tool for assessing patent validity” because successful defense is a public good that will be underprovided and the patentee may care more about the outcome because of pass-through problems); Jay P. Kesan & Andres A. Gallo, *Why “Bad” Patents Survive in the Market and How Should We Change?—The Private and Social Costs of Patents*, 55 EMORY L.J. 61, 71 (2006) (“Our empirical data on dual invalidation processes in Japan from 2000-2003 demonstrate that there are sound economic and institutional reasons for maintaining the ability to raise patent validity challenges in both the Patent Office and the courts.”).