

ARTICLE

WHAT DO PATENTS PURCHASE? IN SEARCH OF OPTIMAL IGNORANCE IN THE PATENT OFFICE

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I. INTRODUCTION

Reports of the U.S. Patent and Trademark Office (USPTO) granting absurd patents are rampant. Peanut butter sandwiches,¹ pet toys on a stick,² hammocks for cats,³ and one-click shopping⁴ have each been the subject of a newspaper or magazine story, and each serve as evidence of how “patently absurd” the work of the USPTO is. Reform proposals are also prevalent, ranging from more careful scrutiny of patent applications by the USPTO to scrapping the patent system altogether.⁵ The current understanding is that the wrong works are being patented, and that the USPTO is granting the patent

1. Gary L. Reback, *Patently Absurd: Corporations Are Increasingly Converting the Shield of Patent Protection into the Sword of Unfair Competition*, FORBES, June 24, 2002, at 44 (showing a drawing from U.S. Patent No. 6,004,596 of a crustless peanut butter and jelly sandwich as a nomination for the most ridiculous patent).

2. See U.S. Patent No. 4,712,510 (issued Dec. 15, 1987) (describing “[a] pet toy comprising a stuffed play object disposed at the end of a tether secured to a flexible telescoping wand”).

3. See U.S. Patent No. D431,695 (issued Oct. 3, 2000).

4. *Patently Absurd?*, ECONOMIST, June 23, 2001, at 40 (noting Amazon’s “one-click” shopping patent).

5. See, e.g., Rebecca S. Eisenberg, *Analyze This: A Law and Economics Agenda for the Patent System*, 53 VAND. L. REV. 2081, 2083, 2096–98 (2000) (proposing that a better understanding of the economic effects of patentability mechanisms can create a better patent system); Mark D. Janis, *Patent Abolitionism*, 17 BERKELEY TECH. L.J. 899, 900, 902, 904, 930–31, 948–49, 951–52 (2002) (encouraging patent reformers to look at past considerations of patent abolition for insight into current reform proposals); Jay P. Kesan, *Carrots and Sticks to Create a Better Patent System*, 17 BERKELEY TECH. L.J. 763, 769–70 (2002) (outlining five tactics that could achieve a better patent system, including increasing prior art disclosure and implementing a third-party opposition program); Arti Rai, *Addressing the Patent Gold Rush: The Role of Deference to PTO Patent Denials*, 2 WASH. U. J.L. & POL’Y 199, 202, 216, 218 (2000) [hereinafter Rai, *Patent Gold Rush*] (arguing that USPTO reform, specifically proper application of the nonobviousness requirement and greater deference within the courts to USPTO denials of patents, together will provide remedies to current problems); Kurt M. Saunders, *Patent Nonuse and the Role of Public Interest as a Deterrent to Technology Suppression*, 15 HARV. J.L. & TECH. 389, 397, 451 (2002) (recommending several changes in the patent system, such as requiring annual submission by patent holders of their patent’s use, in order to discourage patent nonuse and technology suppression); John R. Thomas, *The Responsibility of the Rulemaker: Comparative Approaches to Patent Administration Reform*, 17 BERKELEY TECH. L.J. 727, 730, 744, 757, 761 (2002) (suggesting better use of the resources available to patent agents, such as increased prior art disclosure by applicants and purloining positive processes of foreign patent systems, in order to create a better domestic patent system).

privilege to works that are not the product of nonobvious innovation.⁶

Enter Professor Mark Lemley who, in a stimulating article,⁷ has suggested that if there is a problem, expanding the USPTO is not the answer. In this Article, we respond to Professor Lemley's argument and show that his analysis fails to fully assess the benefits and costs of patents.⁸ Professor Lemley does not necessarily think there is a problem with how the USPTO handles patent applications; the agency does the best it can. To use his phrase, the USPTO is "rationally ignorant."⁹ The agency is not omniscient; it cannot ensure that every patent is truly novel, useful, and nonobvious.¹⁰ As Professor Lemley puts it, "The basic idea of rational ignorance is that any person will spend only a certain amount of time or money to obtain a piece of information. If obtaining that information costs more than the information is worth, an individual will (or should) rationally choose to remain ignorant of it."¹¹ Consequently, if one is to correct the patent system, the only truly feasible solution is for the courts to more closely scrutinize the patents that come before them. In short, the main patent reform we need is to remove the presumption of patent validity that is currently codified in the Patent Act.¹²

Professor Lemley's argument actually consists of two parts. The first is that the USPTO is rationally ignorant in its granting of patents.¹³ The second is a back-of-the-envelope cost-benefit

6. James Gleick, *Patently Absurd*, N.Y. TIMES, Mar. 12, 2000 (Magazine), at 49 (quoting an entrepreneur who proposes different people within the same areas of technology will often brainstorm to the same inventions if given the opportunity); Rai, *Patent Gold Rush*, *supra* note 5, at 202, 216 (proposing greater deference to the nonobviousness prong of patentability will eliminate substantial numbers of biotechnology and computer program patent applications).

7. Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495 (2001).

8. See Arti Rai, *Facts, Law and Policy: An Allocation-of-Powers Approach to Patent System Reform*, 103 COLUM. L. REV. 1035, 1080-84 (2003) (agreeing with Lemley that the PTO should not be turned "into a full-fledged administrative agency," but disagreeing with him on other points and also supporting the more extensive use of opposition procedures).

9. Lemley, *supra* note 7, at 1496 n.3, 1497 n.6, 1496-97 (defining rational ignorance and discussing how it applies to the PTO).

10. *Id.* at 1510-11, 1513 (suggesting that society ought to come to terms with the fact that bad patents will be issued by the PTO and that we should primarily use additional resources not to decrease the number of bad issuances, but for litigation purposes in testing validity).

11. *Id.* at 1497 n.6.

12. 35 U.S.C. § 282 (2000).

13. Lemley, *supra* note 7, at 1497, 1510-11 (proposing that because there is a limit to the amount of time that can be spent on examining applications and that bad patents

analysis demonstrating that increasing the time spent on patent review does not provide adequate benefits.¹⁴ In some ways, the two arguments are independent of each other. If the USPTO is in fact rationally ignorant, then expanding its budget does not ensure that better, more appropriate patents will issue.¹⁵ A patent examiner, like a consumer looking for the best deal, is engaged in a search. Just as a consumer must weigh the benefits of looking for a lower price with the costs of a search, so must a patent examiner balance the costs of obtaining more information about prior art versus the benefits of obtaining the additional information.¹⁶ Expanding the budget of the USPTO does not remove this balancing problem. Therefore, to paraphrase Professor Lemley, we have to deal with the fact that bad patents will issue and should focus patent reform on mitigating the adverse effects of bad patents.¹⁷

Professor Lemley's back-of-the-envelope cost-benefit analysis is not introduced as evidence of his rational ignorance argument.¹⁸ Rational ignorance is an assumption in his argument, not something that is ever proven.¹⁹ As an assumption, it is perhaps accurate. But his cost-benefit analysis is an argument of a different stripe and does not depend on his rational ignorance argument. Based on a careful investigation of existing statistical studies of patent prosecution and litigation, Professor Lemley obtains the following numbers that are central to his cost-benefit analysis:

Total annual cost of prosecution: \$4.33 billion

Total annual returns from licensing: \$525 million

Total annual litigation expenditure: \$2.1 billion

will issue regardless, the determination should really be based on the amount of time and money spent on prosecuting patents).

14. *Id.* at 1496 & n.5 (noting that Professor Lemley's goal is to use some rough calculations to support his idea of spending more time and money on validity determinations in litigation than increasing funds to the USPTO).

15. *Id.* at 1508–10 (estimating that doubling the amount of time patents are scrutinized will raise prosecution costs and result in only ten percent fewer patents issuing, and thus with this increase in time and substantial cost, that bad patents will issue).

16. *Id.* at 1496 n.3, 1497, 1500, 1511 (describing the process examiners must go through in denying or granting a patent).

17. *Id.* at 1510–11.

18. *Id.* at 1496 n.3, 1497 n.5, 1496–97, 1500 (showing that the cost-benefit analysis is used to support Professor Lemley's proposed general policy of concentrating on validity determinations in litigation, while the rational ignorance statement is supported by human nature, USPTO policies, and incentives).

19. *Id.* at 1499–1500 nn.3–5 (justifying rational ignorance on the basis of human nature and the environment of the PTO).

Total annual impact of patents (sum of licensing and litigation): \$2.625 billion²⁰

Professor Lemley uses these numbers as a basis for the following exercise: Suppose we double the amount of time that the USPTO spends on reviewing patents.²¹ This increase will result in a higher cost for prosecuting every patent but also result in a reduction in the number of patents issued.²² Professor Lemley assumes that a doubling of time would result in a ten percent drop in the number of issued patents.²³ This change would result in a net increase of \$1.52 billion in the cost of prosecution and a net saving of \$262 million in litigation costs and licensing costs.²⁴ An extra dollar spent on prosecution results in less than a dollar saved in litigation and licensing. The extra benefits are outweighed by the extra costs. Notice that this argument has very little to do with the rational ignorance argument; Professor Lemley has shown that the numbers do not support extra expenditure on prosecution.²⁵

Because Professor Lemley is engaged in a back-of-the-envelope calculation, we really cannot quibble with his numbers. The more meaningful criticism is that Professor Lemley has not really measured costs and benefits. Actually, Professor Lemley's argument rests on a measurement of private cost and social cost.²⁶ The total annual cost of prosecution is largely borne by the patent applicant.²⁷ For the most part, the litigation and licensing fees measure some of the social cost associated with the patent system.²⁸ To call this reduction of social cost a benefit understates the benefits that could result from an increase in resources spent on patent prosecution. Furthermore, if there is a disparity between private cost and social cost, economic theory tells us that we need to allocate the social cost onto the right party through

20. *Id.* at 1499, 1502, 1507, 1509.

21. *Id.* at 1508.

22. *Id.* at 1508–09 (explaining that doubling the examination time will not double the prosecution cost because not all of that cost is attributable to examination time and fewer patents will issue because of increased examination and fewer applications due to the increased cost).

23. *Id.*

24. *Id.* at 1509–10.

25. *Id.*

26. *Id.* at 1515, 1521 (describing the different social costs of a bad patent and explaining that the cost of patent prosecution is largely internalized by the patent applicant, but the cost of litigation and licensing accrues costs to patent holders, alleged infringers, and society).

27. *Id.* at 1521 (explaining that the cost of prosecution derives from legal fees for the attorney and application fees to the USPTO).

28. *Id.* (expressing that licensing and litigation costs impact potential infringers and the public as well as patent holders).

some system of rights and remedies.²⁹ Professor Lemley has demonstrated that an increase in patent prosecution may shift the costs of the patent system from society to the private patent applicant.³⁰ This result may not be an undesirable move, as Professor Lemley describes in his quasi-cost-benefit analysis, but may actually be desirable according to economic theory.³¹ The desirability of this result depends on who should efficiently bear the cost in order to minimize transaction costs.³²

Even though the rational ignorance and cost-benefit arguments are largely independent, the two arguments share a common theme, as can be seen if we address the following question: What is it that the USPTO is ignorant of? To understand this question, consider the following hypothetical. Suppose an inventor comes to a private company and makes the following offer: "In this envelope I have a novel, useful, and nonobvious invention. I will sell it to you for \$2.6 billion." Sight unseen, the company would not accept the offer; at the same time, the inventor is wary of telling the company elements of the invention for fear of letting the cat out of the bag.³³ In this context, is the company rationally ignorant of the benefits and costs of acquiring the invention? Certainly, the company cannot obtain all the information about the invention before purchasing it. What investments must the company make before accepting the offer?

The USPTO's job in granting patents is, in part, to answer many of the questions faced by the private company in the previous example. In fulfilling its mission of protecting the

29. See, e.g., ROBERT COOTER & THOMAS ULEN, *LAW & ECONOMICS* 41 (2d ed. 1997) (discussing how Pareto improvements allow for gainers to compensate losers and still retain a surplus for themselves); R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 1-2 (1960) (suggesting that instead of there being a divergence between private and social interests when dealing with a harmful event, the problem is more reciprocal in nature); see also generally ARTHUR C. PIGOU, *THE ECONOMICS OF WELFARE* (4th ed. 1932).

30. Lemley, *supra* note 7, at 1521-22, 1530.

31. *Id.* at 1522 (stating his agreement "that one factor to consider in deciding how to allocate costs is that determining validity *ex ante* imposes fewer costs on third parties than waiting to determine validity *ex post*").

32. Unintentionally, Professor Lemley is making the same error that Coase accused Pigou of making. See Coase, *supra* note 29, at 1-2, 29-31. Pigou concluded that if there is a disparity between private cost and social cost then tax policy should be used to tax the party creating the social cost in the amount of the difference between social cost and private cost. Coase pointed out that this form of tax policy rested on an assumption of legal rights and remedies that could be reallocated among freely bargaining parties. Professor Lemley, in his back-of-the-envelope calculation, undertakes a Pigouvian assessment of costs without considering what is the appropriate set of legal entitlements.

33. This example illustrates the problems of revelation and appropriation recognized by Professor Kenneth Arrow. See KENNETH J. ARROW, *Economic Welfare and the Allocation of Resources to Invention*, in *ESSAYS IN THE THEORY OF RISK-BEARING* 144, 151-52 (1970) (stating that information as a commodity has the uncomfortable legal properties of not knowing the value of information until it is attained, but after it is disclosed the information has been permanently acquired without cost).

purchasers of new inventions, the USPTO must make the types of inquiries that a company would make.³⁴ This statement does not mean that the USPTO's sole goal is to aid business entities. Rather, in assessing the requirements of novelty, utility, and nonobviousness, the USPTO is certifying, by a grant of exclusivity in exchange for public disclosure, that the invention may be worth investing in.³⁵ As Professor Lemley in the *Rational Ignorance* article and Professor Kieff in another article point out, the USPTO must ration its information in making its determination; it cannot be perfect in gathering and processing information.³⁶ However, Professor Lemley seems to ignore the broader goals of the USPTO in determining when the agency is being rationally ignorant. As we argue, the real issue is not of rational ignorance, but optimal ignorance. In other words, society should be concerned with assessing both the costs and benefits of the patent system on *all* actors, as opposed to just worrying about the USPTO's collection and assessment of information about novelty, usefulness, and nonobviousness.³⁷

A simple example illustrates the difference between rational ignorance and optimal ignorance. One strategy that patent applicants adopt is to overwhelm the patent examiner with information in the hopes that a patent application will slip through the review process.³⁸ Because the USPTO is subject to rational ignorance, this response is rational from the standpoint of the patent applicant. Patent examiners cannot be expected to review every bit of the record that is before them; instead, they

34. See Kesan, *supra* note 5, at 770–74 (generalizing that the relevant art could be found by either the USPTO or the applicant, but if the latter fails to supply the relevant art, it will create difficulties within the USPTO in their attempt to make the same inquiry due to generally having less particularized knowledge of the technical field, particularly in the area of nonpatent prior art).

35. Thomas, *supra* note 5, at 739 (stating as proof of the commercial significance of patented inventions “that about 34% of independent inventors made patent-based profits,” which is in line with the percentage of small business successes).

36. Lemley, *supra* note 7, at 1496 n.3, 1496–97, 1500, 1510, 1513 (discussing the conditions at the patent office, the decisions, processes, and time constraints that a patent examiner is exposed to, and that it would be impossible to have a perfect patent prosecution system unless as much time were put into prosecution as it is in litigation); F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 713 n.76 (2001) (“[T]he Patent Office is not malfunctioning when it issues such patents. Indeed . . . the system is not operating grossly out of tune with its design.”).

37. See, e.g., Thomas, *supra* note 5, at 729–30 (“[I]n an era where the patent system has become the ultimate regulatory regime, patent quality does matter.”).

38. See, e.g., *Pegasus Dev. Corp. v. Directv, Inc.*, No. CIV.A.00-1020-GMS, 2003 WL 21105073, at *3 (D. Del. May 14, 2002) (noting that the defendant accused the plaintiff of “burying” the USPTO with claims and prior art references in order to conceal the most relevant references through information overload).

ration their time and knowledge in reviewing patents.³⁹ While this may be a rational strategy, the outcome is not optimal. The situation would be improved in terms of the quality of patents if applicants submitted more precise and circumscribed applications and the patent examiner reviewed the applications more closely.⁴⁰ Focusing on rational ignorance would justify the status quo; a shift to optimal ignorance would force us to consider policy responses such as basing application fees on the number of claims in the application or otherwise streamlining the application process.⁴¹

We develop our argument for optimal ignorance through the following four Parts. Part II focuses on the rational ignorance argument and addresses the questionable structure of Professor Lemley's cost-benefit analysis. Part III turns to the questions of political constraints on patent law reform. Part IV provides a constructive analysis of how the USPTO can better serve its purpose. Part V presents a brief conclusion.

II. DO THE OPTIMAL THING

In pointing to the rational ignorance of the USPTO, Professor Lemley emphasizes the private incentives of the agency and its agents in carrying out their duties in granting patents.⁴² From a policy perspective, however, costs and benefits of the agency's actions are equally relevant. Professor Lemley seems to be assuming that judicial review of granted patents serves as an important check on the excesses of the USPTO.⁴³ However, courts can only review the validity of a patent application if it is the subject of an opposition or an infringement action.⁴⁴ In Part II.A,

39. See Lemley, *supra* note 7, at 1496 n.3 ("Examiners have astonishing little time to spend on each application . . . [and] are rewarded for getting applications out the door.")

40. Thomas, *supra* note 5, at 730 (arguing the patent system would be improved if the applicants were required to submit more thorough information and work more closely with the examiner allowing them to scrutinize the applications more closely).

41. See Sabra Chartrand, *Patents: The Patents Commissioner Seeks to Reinvent a Notoriously Backlogged Office and Process*, N.Y. TIMES, Sept. 23, 2002, at C2 (noting Patent Commissioner James E. Rogan's proposal to charge an extra \$1250 for the patent process and additional fees for applications with more than twenty claims listed).

42. Lemley, *supra* note 7, at 1496 n.3, 1496–97 (describing the atmosphere of the USPTO, the incentives they give to examiners to get patents out the door, and the time management decisions an examiner must make during the application process).

43. *Id.* at 1510 (proposing that any extra funds are more efficiently spent determining validity in court cases, because that is when validity really matters, due to the fact that bad patents will issue no matter what improvements are made to the prosecution process).

44. See *id.* at 1502–03 (discussing the issues that surround a suit of patent infringement and the amount of time and money that is spent in litigating the validity

we demonstrate the persistence of bad patents even with judicial review. In Part II.B, we address the second problem with Professor Lemley's argument—his focus on rational ignorance rather than optimal ignorance.

A. *Social Costs, Private Costs, and the Persistence of Bad Patents*

The social and private costs of improvidently granted patents are numerous.⁴⁵ They include the following:

- (a) "opportunistic licensing royalties/fees (including cross licensing) collected from licensors who may rationally settle for a license instead of resorting to protracted litigation";⁴⁶
- (b) "the disincentive to downstream [or improvement] innovation, i.e., the social cost of abandoned research activities by the patentee's competitors who may fear [possible] infringement";⁴⁷
- (c) "the cost of wasteful designing-around activities by competitors" who are left to contend with dubious patents;⁴⁸
- (d) "the cost of rent-seekers, such as venture capital financiers, who may choose to invest in start-up companies based on bad patents, thereby taking away resources from genuine entrepreneurs";⁴⁹
- (e) "the social cost of supra-competitive pricing, in the absence of noninfringing product substitutes, based on bad patents";⁵⁰ and
- (f) "the filing and prosecution costs and the subsequent cost of having the courts fix the USPTO's oversights."⁵¹

issue).

45. See, e.g., 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, 592-94 (1999) [hereinafter Merges, *Six Impossible Patents*] (noting that it is difficult to assess the cost-benefit of the patent system, and that the existence of invalid patents involves direct costs such as filing and prosecution and indirect costs such as foregone research opportunities).

46. Kesan, *supra* note 5, at 767.

47. *Id.*

48. *Id.*

49. *Id.*

50. *Id.* at 767-68.

51. *Id.* at 768.

Without significant empirical research,⁵² it is difficult to quantify meaningfully the magnitude of the total social costs of bad patents.⁵³ Even the simpler category of estimating unnecessary licensing fees is difficult because “the value of a license is dependent upon factors such as flat payments, reasonable royalties for direct use and subsequent derivative use of the patented technology,” cross-licensing, and grant-back clauses.⁵⁴ Nevertheless, momentarily setting aside the diminution in public confidence about the integrity of an administrative system that issues bad patents, in a capitalist economy grounded on efficient uses of resources and strong property rights, improvidently granting extravagant patent rights presents a real concern that is worthy of careful consideration.

When the USPTO wrongly grants a patent, the patentee nevertheless obtains exclusive rights and the possibility of monopoly power,⁵⁵ which can generate various inefficiencies.⁵⁶

52. There is a significant and burgeoning body of empirical work in the patent area. See, e.g., John R. Allison & Mark A. Lemley, *Who's Patenting What? An Empirical Exploration of Patent Prosecution*, 53 VAND. L. REV. 2099, 2100–03 (2000) (reporting an empirical study on patent technology use, country of origin, average prosecution time, patent holder characterization, and other aspects of issued U.S. patents); Jean O. Lanjouw & Mark Schankerman, *Characteristics of Patent Litigation: A Window on Competition*, 32 RAND J. ECON. 129, 129–30 (2001) (suggesting that empirical data confirm that the frequency of legal disputes is strongly correlated with factors such as whether the patent is a first or second generation patent and whether the patent holder is a corporation or individual); Josh Lerner, *Patenting in the Shadow of Competitors*, 38 J.L. & ECON. 463, 463–65 (1995) (reporting patenting patterns in 419 new biotechnology firms and observing that litigation cost is correlated to patenting behavior); Kimberly A. Moore, *Judges, Juries, and Patent Cases—An Empirical Peek Inside the Black Box*, 99 MICH. L. REV. 365, 408 (2000) (comparing empirical results and recoveries in patent cases tried before juries and judges and observing that patent holders generally prevail more frequently before the jury than before the judge, and that juries award higher damages).

53. Kesan, *supra* note 5, at 768.

54. *Id.* Professor Lemley attempts to tackle this issue and estimates the maximum social cost of licensing holdups to be \$443 million, and hence, these social costs are smaller than the annual patent prosecution costs. See Lemley, *supra* note 7, at 1517–19.

55. See, e.g., James R. Atwood, *Securing and Enforcing Patents: The Role of Noerr/Pennington*, 83 J. PAT. & TRADEMARK OFF. SOC'Y 651, 651 (2001) (discussing the application of the *Noerr/Pennington* doctrine to the intersection of patent and antitrust law as good and bad patents both enjoy exclusive rights); David A. Balto & Andrew M. Wolman, *Intellectual Property and Antitrust: General Principles*, 43 IDEA 395, 469 (2003) (quoting FTC Commissioner Thomas Leary that “there is always a risk of collusive agreement to share monopoly profits from an invalid patent”); David L. Stewart, *Inter Partes Reexam—On Steroids*, 85 J. PAT. & TRADEMARK OFF. SOC'Y 656, 659 (2003) (noting that issuing an invalid patent based on prior art grants unconstitutional exclusive rights to the patent holder). *But see* Lemley, *supra* note 7, at 1500–02 (pointing out that the assumption of people seeking patents for exclusive rights is incorrect because most patents are neither litigated or licensed; moreover, the issue of invalidity is even a smaller portion of those litigated patents).

56. Dan L. Burk, *Patenting Transgenic Human Embryos: A Nonuse Cost Perspective*, 30 HOUS. L. REV. 1597, 1618 (1993) (noting that patents are similar to

The patent system provides other firms and inventors recourse in the judicial system to correct the situation.⁵⁷ Nonetheless, the existence of high transaction costs, including high litigation costs,⁵⁸ ensures that many wrongly granted patents continue to survive in the market.⁵⁹

In order to analyze how these patents can survive in the market, even when they should never have been granted in the first instance, we present the following model. Let us assume the USPTO wrongly grants a patent to a given firm. As a result, a competitor who was using, planning to use, or otherwise interested in this technology before the USPTO granted the patent, now has to decide how to deal with this mistake.

If firm i decides to resort to court action, the expected payoff to the firm is the following,

$$P = \delta(\alpha\pi_i - CT_w^i) - (1 - \delta)(CT_1^i) \quad (1)$$

where, δ is the probability of winning at trial;

CT_w^i is the cost of going to court, given that the firm wins the trial;

CT_1^i is the cost for the firm, if the court favors the patentee;

monopolies in that they generate inefficiencies such as higher prices, restricted supplies, and inefficient allocation of resources). *But see* Lemley, *supra* note 7, at 1517–22 (noting that although inefficiencies exist because of some invalid patents, the cost is too small to outweigh the benefits; moreover, the current distribution of litigation and prosecution cost has efficiency consequences as well).

57. William Lynch Schaller & Robert V. Schaller, *Applying the Wilko Doctrine's Anti-Arbitration Policy in Commodities Fraud Cases*, 61 CHI.-KENT L. REV. 515, 532 (1985) (discussing various cases regarding challenges to invalid patents and noting that courts encourage such challenges for furtherance of the federal policy of free competition). Refer to Part III *infra*.

58. *See* Lemley, *supra* note 7, at 1498–1511 (estimating that annual cost of patent prosecution is \$4.33 billion, of litigation is \$2.1 billion—half is attributable to invalidity or unenforceability even though only a small portion of patents go to trial, and in addition to the other costs, licensing outside of litigation is \$525 million).

59. *See id.* at 1500 (noting that issued patents have been held invalid forty-six percent of the time in litigation). Professor Lemley also points out that the existence of holdup licensing allocates resources inefficiently, and invalid patent holders collect approximately \$443 million in licensing fees annually. *Id.* at 1515–20. *See, e.g.*, Kevin J. Arquit, *Patent Abuse and the Antitrust Law*, 59 ANTITRUST L.J. 739, 742 (1991) (noting that patent law imposes the burden of establishing validity on the party asserting invalidity, which thus may impose disproportionate litigation costs on the challenging party); David Hricik, *Aerial Boundaries: The Duty of Candor as a Limitation on the Duty of Patent Practitioners to Advocate for Maximum Patent Coverage*, 44 S. TEX. L. REV. 205, 221–22 (2002) (suggesting that improvidently granted patents “create duplicative, deal-killing transaction costs” and thus discourage socially productive behavior).

$\alpha\pi_i$ is the fraction of the firm profits lost because of the existence of the new patent. We assume $\alpha < 1$.

Equation (1) tells us that firm i 's expected payoff of going to court is equal to the expected benefit in case the court favors its claim (the firm's lost profits minus the total costs of going to trial) minus the expected cost if the court's decision favors the patentee (the costs of going to trial and losing the challenge). The expected payoff can be either positive or negative, depending on the size of the litigation costs, but more importantly, on the probability of success in court.

If the firm decides not to go to trial and lets the patent stand, thereby forgoing some fraction of its profits, then the payoff to the firm would be,

$$P = -\alpha\pi_i \quad (2)$$

As a result, if the firm decides not to go to court, then the payoff is represented by the lost benefits due to the existence of the new patent. Accordingly, from equations (1) and (2), this firm will decide to go to court when the expected payoff from going to trial is greater than or equal to the payoff received by letting the patentee exploit her monopoly.

$$\begin{aligned} (1 + \delta)\alpha\pi_i &\geq \delta CT_w^i + (1 - \delta)CT_l^i && \text{(Goes to court)} \\ (1 + \delta)\alpha\pi_i &\leq \delta CT_w^i + (1 - \delta)CT_l^i && \text{(Does not go to court)} \end{aligned} \quad (3)$$

In the first case, when the expected benefits from contesting the patent are greater than the expected costs of resorting to the judicial system, then firm i will take the matter to court. In the second case, when the benefits are too small compared with the expected costs, then firm i will prefer to forgo its profits or change its technology in order to avoid patent infringement. In this case, the wrongly granted patent continues to survive and to produce inefficient economic results. Furthermore, the high transaction costs of the patent enforcement system and the imperfect patent granting system permit such an improvidently granted patent to continue to survive.⁶⁰

Now, let us assume that, according to equation (3), the optimal decision for firm i is to let a court decide the patent case,

60. Refer to Part II.A *infra*; see also Lemley, *supra* note 7, at 1499–1500 (suggesting that the patent prosecution process is imperfect and that patent examiners have too little time to fully assess a patent).

because the expected benefits from doing so are greater than the expected costs. Even in this case, the patentee can still prevent this firm from going to court and litigating to invalidate the patent, once again, allowing the patent to survive. For the patentee to achieve this outcome, she has to exchange with firm i some compensation, θ , such that,

$$(1 + \delta)\alpha\pi_i - \theta \leq \delta CT_w^i + (1 - \delta)CT_l^i \quad (4)$$

As a result, the patentee is reaching a settlement with firm i in order to induce it to change its choice and refrain from going to court. This exchange, θ , is not necessarily a money payment to the complainant, but it should be interpreted as any arrangement between the patentee and the alleged infringer (or plaintiff in a declaratory judgment action) regarding the rights related to the patent. For example, the parties could reach an agreement about modest licensing terms in return for the use of the patented technology, sharing specific rights and the like. In terms of the payoff, the transfer increases the cost of going to court by changing the inequality sign in equation (3) in such a way that now, the optimal behavior for firm i is to not go to court (or continue litigating in court), but to instead accept a private agreement. As a result, in some cases firm j can generate a payoff for firm i in order to change the optimal result from litigating in court to reaching an agreement privately. Solving equation (4) for θ , we obtain the minimum value of the payment needed to avoid initiating or continuing court proceedings,

$$\theta \geq (1 + \delta)\alpha\pi_i - \delta CT_w^i - (1 - \delta)CT_l^i \quad (5)$$

In order to evaluate if exchanging this amount is optimal for the patentee, let us analyze the situation of firm j , which possesses a wrongly granted patent. In this case, the payoffs of going or not going to court are given by,

$$P = \beta\pi_j \quad (\text{Patent is not contested in court}) \quad (6)$$

$$P = (1 - \delta)(-CT_w^j) - \delta(CT_l^j + \beta\pi_j) \quad (\text{Patent is contested by firm } i)$$

where, $\beta\pi_j$ is the supra-competitive profits received by the patentee firm j from the patent;

$(1-\delta)$ is the probability of winning the trial;

CT_w^j are the court costs when the patentee wins the trial; and

CT_l^j are the court costs when the patentee loses the trial.

This equation tells us that if the patent is not contested, firm j will receive an increase in profits as a result of the wrongly granted patent. However, if the validity of the patent is evaluated by a court, then the expected payoff will be the patent benefits minus the costs of going to court and winning the lawsuit, minus the benefits from the patent plus the costs of going to court and losing the trial. As a result, firm j will be willing to pay firm i the amount θ , as long as,

$$(1 + \delta)\beta\pi_j + (1 - \delta)CT_w^j + \delta CT_l^j \geq \theta + TC \quad (7)$$

where, TC represents the transaction costs of reaching an out-of-court settlement among the parties. Equation (7) tells us that firm j will be able to exchange compensation θ as long as this compensation plus the private transaction costs (TC) are less or equal to the difference between the expected payoffs of not going and going to court. If $\theta+TC$ is greater than this difference, then it is optimal for firm j to let firm i initiate or continue the court action, because the expected payoff would be greater than the net profit after paying the private compensation.

By placing equation (5) into equation (7), and assuming that the court costs are the same for both parties, we obtain:

$$(1 + \delta)(\beta\pi_j - \alpha\pi_i) + (CT_w + CT_l - TC) \geq 0 \quad (8)$$

Accordingly, from equation (8), we can see that firm j will be able to exchange compensation θ with firm i as long as the patent profit gains for firm j are bigger than the patent losses for firm i and the costs of going to court are larger than the transaction costs of reaching a private agreement. From equation (8), we can solve for the patentee's profits, π_j , in terms of the challenger's profits, π_i .

In order to appreciate how the costs and benefits determine the different results, let us graph the reaction curves for the patentee and the claimant. Figure 1 shows the relationship between the patentee and challenger's (or alleged infringer's) profits and defines the different incentives for the players. In the horizontal axis, we show the level of profit for the challenger (or

alleged infringer) firm, firm i (π_i), which increases as we move to the right. In the vertical axis, we represent the patentee's profits (π_j), which increases as we move up the axis. The vertical line separating Areas I and II from Areas III and IV represents equation (3), showing the minimum level of profit that firm i needs in order to render it profitable to initiate or continue court action. Accordingly, to the left of this line, it is optimum for firm i not to resort to judicial action and let the bad patent survive without challenge. Meanwhile, to the right of this line, it is optimal to resort to judicial review of the patent. For the patentee, the positive sloping line separating Areas II and III from Areas I and IV represents equation (8). In the area below this line, it is optimal (i.e., profitable) for the patentee not to exchange compensation θ with firm i in order to avoid court action. However, above this line, it is optimal to exchange such compensation with the challenger/alleged infringer in order to reach a private agreement. Therefore, we have four well-defined areas in this figure. In Area I, the patentee cannot exchange compensation with firm i , but it is not optimal for firm i to go to court. As a result, the patent is not challenged, and it survives in the market. In Area II, the patentee is able to exchange compensation with firm i , but the optimal strategy for firm i is to not resort to the judicial system. Consequently, in this area the patentee retains her rights without any validity challenge. In Area III, the patentee can offer a private settlement in order to avoid a court decision regarding validity. For firm i , then it is not optimal to litigate and let the court decide the validity of the patent. As a result, in Area III, it is optimal for both parties to reach a private agreement, in which the patentee can convince firm i to not go to court, thereby retaining the patent. Finally, in Area IV, the patentee is not able to reach a private agreement, and it is optimal for firm i to go to court. Hence, in this area, we observe claims filed and litigated in the courts, and the wrongly granted patent's validity is subject to judicial review. From our analysis, we can conclude that judicial action is likely in just one of the four possible scenarios. Furthermore, in all the other cases, we observe that the improvidently granted patents stand and continue producing inefficient results in the economy. As a consequence, the costs of litigation create an environment in which wrong patents can survive, producing private costs for the firms that now have to pay for the patent and the social costs for its aggregate effect on the economy.

In order to match our results to a real life situation, let us assume that the profits for both firms i and j are always positive, i.e., they both need positive profits in order to be participating in

the market. Accordingly, Figure 2 shows the possible outcomes of an improvidently granted patent. As we can see, Area I of Figure 1 is not a possible outcome because the profit of the patentee is negative. Therefore, firm *j* can always provide compensation in order to avoid being confronted in court when the profits of firm *i* are low enough to make a private agreement possible. Nonetheless, if the loss for firm *i* is big enough, then this compensation is not possible and the case will end up in court. As a result, we have three possible outcomes flowing from our model. First, the bad patent can survive because it does not pay for firm *i* to go to court (Area II of Figure 2). In this case, the patent stays effective and the patentee earns profits from licensing or selling products. It is also true that the patentee is able to reach a private agreement with the claimant, but it is not necessary to do this given the disincentive for firm *i* to litigate. Second, firm *i* is willing to go to court, but firm *j* can offer a settlement with firm *i* in order to avoid going to court (Area III of Figure 2). As a result, the bad patent still survives in the market, but the costs to firm *i* will be lower due to the private agreement. Finally, firm *i*'s optimal behavior is to go to court, and firm *j* cannot pay the required amount to avoid it (Area IV of Figure 2). As a result, in this scenario a court has to decide the validity of the patent, and the patent could be invalidated with probability δ .

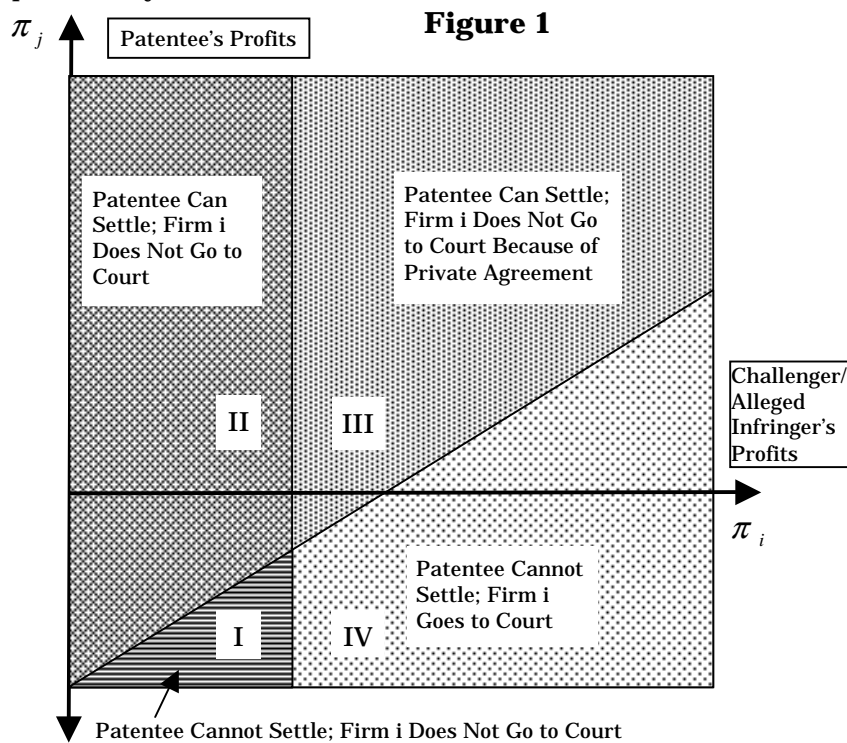
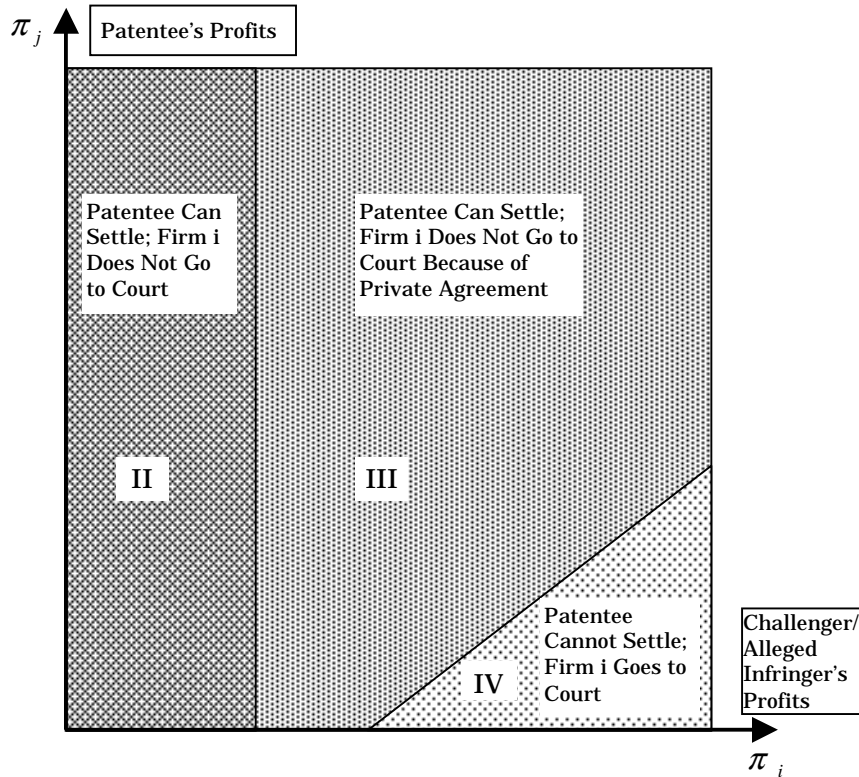


Figure 2



B. Distinguishing Between Rational and Optimal Ignorance

Professor Lemley's argument is optimistic about the role of the courts as the screener of bad patents.⁶¹ More broadly, by focusing solely on the USPTO's rational ignorance, he ignores the broader question of institutional design and statutory drafting. Put another way, what is important for patent policy is not the USPTO's rationality but the optimality of the system for patent granting and protection. When it comes to ignorance in the

61. Refer to Part II.A *supra*. Professor Lemley recognizes that the current system allows bad patents to slip through the USPTO undetected, but states that we should "strengthen the validity inquiry made by trial courts." See Lemley, *supra* note 7, at 1527–32 (suggesting that simple changes in existing law such as abolishing the presumption of validity of issued patents and shifting some of the burden of proof away from the accused infringers will reduce the negative impact of bad patents). Professor Lemley also discusses the "distributional effects" of relying on the courts to deter invalid patents. *Id.* at 1521–22 (stating that although there is "one fundamental difference" between the cost of prosecution and the cost of licensing/litigation, litigation cost is inevitable and third parties will have to bear some cost; moreover, such distributional effect must be a factor in considering allocating costs between litigation and prosecution).

patent system, the key question is not the rational ignorance of the agency, but rather it is optimal ignorance. As policy makers, we can be ignorant of the prior art to the extent that we set the marginal investment in information gathering by the USPTO to be equal to the marginal reduction in social cost from granting better patents.⁶²

1. *The Case for Optimal Ignorance.* What is the difference between rational ignorance and optimal ignorance? An example from the economics literature of criminal enforcement illustrates this point. Professor Gary Becker pointed out in his early work on the economics of crime that a society seeking to deter crime faces a tradeoff between enforcement and the size of the penalty.⁶³ Enforcement, from the perspective of a potential criminal, is the probability of being apprehended.⁶⁴ The size of the penalty, again from the perspective of a potential criminal, is what he must pay if caught. A rational criminal, according to Professor Becker, cares about the expected penalty.⁶⁵ Therefore, society can reduce the costs of criminal enforcement (expenditure on police force, etc.) by lowering the enforcement rate and raising the penalty.⁶⁶ A rational criminal will be just as deterred if faced with a ten percent chance of apprehension and a one thousand dollar penalty as with a one percent chance of apprehension and a ten thousand dollar penalty. In a subsequent work, A. Mitchell Polinsky and Steven Shavell showed that while this may be rational, the policy is not optimal.⁶⁷ Specifically, Mr. Becker ignored the adverse effects of deterrence of criminal activity on socially desirable activity.⁶⁸ For example, exceedingly high fines for speeding may in fact reduce the amount of speeding, but such fines may also deter driving among risk-averse people who might

62. Kesan, *supra* note 5, at 768 (presenting proposals to implement this theoretical approach).

63. Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169, 170 (1968) ("The optimal of enforcement is shown to depend on . . . the cost of catching and convicting offenders, the nature of punishment . . . and the responses of offenders to changes in enforcement.").

64. *Id.* at 174–81.

65. *Id.* at 176–80.

66. *Id.* at 184–88.

67. A. Mitchell Polinsky & Steven Shavell, *The Optimal Use of Fines and Imprisonment*, 24 J. PUB. ECON. 89, 98 (1984).

68. Professor Becker recognizes that there is an asymmetry in the law, using the patent system as an example, and states that his analysis assumes consensus on damages and benefits of crimes. Becker, *supra* note 63, at 201–09; *see also* Cass R. Sunstein et. al, *Assessing Punitive Damages (With Notes on Cognition and Valuation in Law)*, 107 YALE L.J. 2071, 2084–85 (1998) (noting that in the context of optimal deterrence and punitive damages, large jury awards may indeed deter socially beneficial activities).

be concerned with accidentally being caught for speeding.⁶⁹ Optimal ignorance, as with optimal deterrence, focuses on the incentive effects throughout society, not just on specific agents—whether patent examiners or criminals.

Similarly, in assessing the effectiveness of the USPTO, more is at stake than the rational allocation of a single agency's budget and time. The granting of an improper patent—one that does not meet society's standards of novelty, utility, and nonobviousness⁷⁰—can be significant. Professor Lemley focuses on the costs of litigation and prosecution,⁷¹ but granting an exclusive right to an inventor when the inventor has not actually produced something new, useful, and nonobvious has other effects on the market and the process of innovation.⁷² Invention is a process of accumulation through which one inventor builds on existing knowledge that is in the public domain as well as on knowledge that is proprietary because of patent law.⁷³ Granting

69. Sunstein et. al, *supra* note 68, at 2084–85; see also Pierre-Hugues Verdier, *Cooperative States: International Relations, State Responsibility and The Problem of Custom*, 42 VA. J. INT'L L. 839, 860 (2002) (explaining that under the optimal-deterrence theory, a rational and risk neutral person will choose not to violate the rule if the punishment is greater than the benefit).

70. Elisa Rives, Comment, *Mother Nature and the Courts: Are Sexually Reproducing Plants and Their Progeny Patentable Under the Utility Patent Act of 1952?*, 32 CUMB. L. REV. 187, 212 (2002) (stating that the requirements of enablement and disclosure—novelty, utility, and nonobviousness—reflect the value that the American patent system has on free markets).

71. See Lemley, *supra* note 7, at 1498–1510. Professor Lemley recognizes that his discussion around patent cost seemed to have ignored the social cost of issuing bad patents, and pointed out that “[t]he social cost of issuing bad patents is different than the social cost of the patent system itself.” *Id.* at 1515. Professor Lemley subsequently analyzed the social cost of bad patents from the perspectives of in terrorem effects, holdup licensing, treating patents in isolation, and facilitating collusion. Moreover, Professor Lemley points out that social costs between patent prosecution and licensing/litigation are fundamentally different. In addition, he notes that additional costs of the validity issue include “costs of delay and uncertainty.” See Lemley, *supra* note 5, at 1515–21 (noting that although inefficiencies exist because of some invalid patents, the overall cost is too small to outweigh the benefits).

72. See, e.g., Atwood, *supra* note 55, at 651 (noting that “[a]n invalid patent can deter innovation by others, intimidate competitors or customers, or be used as a fig leaf to cover improper market-allocation agreements”); Peter C. Ku & William L. LaFuze, *Mooting Patent Invalidity: Justiciability and the Case of Cardinal Chemical*, 20 RUTGERS COMPUTER & TECH. L.J. 539, 540–41 (1994) (stating that not only would the cost of litigation over noninfringement/patent invalidity issues affect end consumers, but the court docket would also be overloaded); Merges, *Six Impossible Patents*, *supra* note 45, at 595–96 (noting that invalid patents cause patent litigations which have a negative effect on innovation; moreover, rent-seeking instead of innovation becomes the main goal of obtaining patents).

73. See, e.g., Richard P. Burgoon, Jr., *Silk Purses, Sows Ears and Other Nuances Regarding 35 U.S.C. § 287(C)*, 4 U. BALT. INTELL. PROP. L.J. 69, 70 (1996) (noting that public disclosure of a patent allows an opportunity for the patent to be improved); Rochelle Cooper Dreyfuss, *Trade Secrets: How Well Should We Be Allowed to Hide Them?*

an exclusive property right in knowledge that should be public creates potential bottlenecks and wastes resources diverted towards activity spent on inventing around improper patents.

The case of the one-click patent is one example of how improperly granted patents can be misused.⁷⁴ While the U.S. Court of Appeals for the Federal Circuit eventually raised significant doubts about the validity of the patent,⁷⁵ a result supporting Professor Lemley's argument,⁷⁶ the sole purpose of the patent seemed to be as a tool to raise the costs of a business rival.⁷⁷ Even if patents are eventually invalidated, the costs of challenging a patent go beyond litigation costs. Professor Lemley does recognize these "in terrorem" and other adverse effects but dismisses them too quickly.⁷⁸ We do not know the size of these effects, and they are difficult to measure. But the potential exists and should not be dismissed without further investigation. An optimal ignorance approach would consider all of these effects, unlike Professor Lemley's rational ignorance approach that focuses narrowly on one player, namely the USPTO, in isolation.⁷⁹

The Economic Espionage Act of 1996, 9 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 1, 5 (1998) (stating that "knowledge builds upon itself; [and that] . . . existing works are not only output that can be exploited, but also the input on which innovators of the future depend").

74. *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1347 (Fed. Cir. 2001) (finding that defendant Barnesandnoble.com presented substantial challenge to the validity of Amazon.com's One-Click shopping patent, thus vacating the district court's preliminary injunction against Barnesandnoble.com).

75. *Id.* The court noted, however, that its findings do not resolve the "ultimate question of invalidity." *Id.* at 1360.

76. Professor Lemley believes that we should "strengthen the validity inquiry made by trial courts." Lemley, *supra* note 7, at 1527-32 (suggesting that simple changes in existing law such as abolishing the presumption of validity of issued patents and shifting some of the burden of proof away from the accused infringers will reduce the negative impact of bad patents).

77. *Amazon, Inc.*, 239 F.3d at 1359-60, 1362-66 (stating that Barnesandnoble.com has presented valid arguments against Amazon.com's One-Click patent).

78. Professor Lemley analyzed the social cost of bad patents from the perspectives of in terrorem effects, holdup licensing, treating patents in isolation, and facilitating collusion; Professor Lemley also notes that an additional cost of the validity issue includes "costs of delay and uncertainty." See Lemley, *supra* note 7, at 1516-21 (noting that although inefficiencies exist because of some invalid patents, the effect is likely to be quite small and strongest when the patent is "objectively invalid").

79. Professor Lemley analyzes what changes the USPTO should make to improve its current patent issuing practice under the rational ignorance theory. *Id.* at 1495-97, 1510-11, 1523-27 (noting that under the rational ignorance theory, the USPTO does not need to spend much time to examine each patent; moreover, possible improvements to the current USPTO process and system are discussed). But see Neil K. Komesar, *Exploring the Darkness: Law, Economic, and Institutional Choice*, 1997 WIS. L. REV. 465, 466-73 (suggesting that institutional choice should be the focus of analysis of law and rights because "economic analysis is less about goals and more about institutions," and that

Professor Lemley's argument also considers the USPTO in isolation from industries.⁸⁰ But the costs of improperly granted patents may be borne disproportionately by certain industries and particularly by industries that may be vital for economic development and innovation.⁸¹ Professor Rebecca Eisenberg has written about the bottlenecks produced in research and development because of patents granted in the area of biotechnology on the fruits of basic research.⁸² While such bottlenecks could be resolved by courts through expensive litigation, they can directly, and arguably at lower cost, be addressed through stringent application of the concepts of novelty, usefulness, and nonobviousness by ensuring that the USPTO does not grant such patents in the first place.⁸³ However, a recent research report finds that "the social system . . . has appeared to develop a robust combination of working solutions for dealing with these problems" of bottlenecks in patented research tools.⁸⁴ The authors also caution that "[w]e cannot . . . rule out future problems resulting from patents currently under review, new shifts in technology or in court decisions, or even assertions of patents on foundational

"[o]ptimal ignorance . . . lead[s] to choices which may be individually rational, but . . . harmful to the individual and society as a whole").

80. Lemley, *supra* note 7, at 1503–08, 1517–20 (discussing the cost of patents and the effects of invalid patents on industry such as holdup licensing, noting that the negative cost of bad patents do not justify additional social cost to strengthen the patent prosecution system).

81. See C. Joel Van Over, *Collateral Estoppel and Markman Rulings: The Call for Uniformity*, 45 ST. LOUIS U. L.J. 1151, 1179–81 (2001) (suggesting that resources allocated to litigation may be better spent on research and development, and noting that the extraordinarily high cost of patent litigation could deter new, smaller firms from entering the market).

82. See, e.g., Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1666–68 (1996) (discussing the trend of licensing technologies initially supported by federal funding, and presenting issues around the public funding of basic versus commercial research); Rebecca S. Eisenberg, *Re-examining the Value of Patents in Appropriating the Value of DNA Sequences*, 49 EMORY L.J. 783, 784–85 (2000) (discussing the difficulty presented by the human genome project to patent law including DNA sequence patent applications that have accumulated in the USPTO while the law is not clear on the new technology, drawing the line between computer readable and molecular forms of DNA, and balancing between attracting investment and providing important genetic information to the public).

83. See, e.g., *Brenner v. Manson*, 383 U.S. 519, 537 (1966) (Harlan, J., concurring in part, dissenting in part) (noting that invention does not meet utility requirement if sole use claimed is for research purposes).

84. John P. Walsh et al., *Research Tool Patenting and Licensing and Biomedical Innovation*, at 48–54 (Feb. 21, 2003) (working paper) (stating that the increase in patents has not negatively affected scientific research even though evidence suggests that patents may be interfering with research in universities), available at <http://sippi.aas.org/utt/WalshetalAAAS.pdf>.

discoveries.”⁸⁵

For example, software patents affect many industries other than the software industry. Countless sectors of the economy are dependent on basic software applications for control and production activities; accordingly, practitioners and scholars are concerned with the potential bottlenecks that can be created through improper patents,⁸⁶ particularly through patent protection granted for a pure mathematical algorithm or for plainly obvious software advancements.⁸⁷ Finally, patent scope has been an important source of debate in the semiconductor industry, especially given the double protection accorded by *sui generis* protection for semiconductor mask works and utility patents.⁸⁸ Similar concerns of overlapping intellectual property protection are raised for agricultural biotechnology inventions.⁸⁹ An assessment of the effectiveness of patent law needs to be understood at the industry-specific level to fully assess whether the USPTO is fulfilling its mandate.

The goal of optimal ignorance is illustrated with an example from the work of another federal agency, the Environmental Protection Agency (EPA). Like the USPTO, the EPA is faced with a morass of scientific information that it must process into a legal

85. *Id.* at 53.

86. *See, e.g.*, Wayne M. Kennard, *Software Patents and the Internet*, 610 PLI/Pat. 311, 335 (2000) (explaining that start-up companies often obtain software patents for defensive purposes by letting the competitors know they are operating under protected software); Wayne M. Kennard, *Software Patents as a Weapon: Are You Ready to Rumble?*, 547 PLI/Pat. 1123, 1151 (1999) (discussing how large and medium companies obtain software patents to use for settlement purposes if they are sued for patent infringement); Russell Moy, *A Case Against Software Patents*, 17 SANTA CLARA COMPUTER & HIGH TECH. L.J. 67, 93–94, 97 (2000) (discussing how computer software patents have an interoperability requirement that may act as a barrier to entry if the claims are means-plus-function or step-plus function).

87. *See* State St. Bank & Trust Co. v. Signature Fin. Group, Inc., 149 F.3d 1368, 1373 (Fed. Cir. 1998) (holding that the transformation of data by a machine using mathematical calculations may be patentable if it produces “a useful, concrete and tangible result”); *In re Alappat*, 33 F.3d 1526, 1543 n.19 (Fed. Cir. 1994) (explaining that even though some mathematical subject matter may be patented, the Supreme Court has not clearly defined how to distinguish between unpatentable and patentable mathematical subject matter).

88. *See* Terril G. Lewis, Comment, *Semiconductor Chip Process Protection*, 32 HOUS. L. REV. 555, 573 (1995) (explaining how patent law protects circuitry and the Semiconductor Chip Protection Act of 1984 protects mask works); Rafael X. Zahralddin, Note, *The Effect of Broad Patent Scope on the Competitiveness of United States Industry*, 17 DEL. J. CORP. L. 949, 972 (1992) (quoting an industry CEO as stating that “[t]he creation of legal barriers to competition and outright abuse of the legal system are currently rampant in the semiconductor industry”).

89. *See* Mark D. Janis & Jay P. Kesan, *U.S. Plant Variety Protection: Sound and Fury . . . ?*, 39 HOUS. L. REV. 727, 730–45 (2002) (discussing the emergence of *sui generis* systems for plant variety protection).

standard.⁹⁰ If the USPTO is not expected to review all the prior art, but instead to parse the prior art in a cost-benefit effective manner, then the same case is to be made for the EPA. The agency cannot review every environmental study; it must choose. How does it do so and what are the implications for the activities of the USPTO?

The process of rulemaking by the EPA is subject to notice and comment and, hence, is an open process unlike the USPTO's review of patent applications.⁹¹ The notice and comment process allows for the introduction of many perspectives and of information that can be parsed through a process of information exchange, critique, and democratic review. The EPA is not informationally constrained like the USPTO, which must rely on the information-gathering process of a sole agent and the agent's staff.⁹² The USPTO is much more like a single consumer searching for the best price, which must make decisions of how long and how deep to search in a cost-effective manner.

Furthermore, when agencies like the EPA engage in rulemaking, they must engage in cost-benefit analysis.⁹³ Because of this difference, rulemaking by the EPA is limited by a broader cost-benefit calculus: the regulations must be justified in terms of maximizing benefits to society at the lowest cost.⁹⁴ The USPTO's decision to grant or deny a patent application is limited by the

90. See Stephanie Tai, *Friendly Science: Medical, Scientific, and Technical Amici Before the Supreme Court*, 78 WASH. U. L.Q. 789, 822–26 (2000) (discussing the necessity of scientific amici in environmental cases).

91. See Thomas, *supra* note 5, at 743 (noting that “[u]nfortunately, the foundational norm of notice and opportunity for comment rulemaking has not worked well [for the USPTO]”). He suggests that “[m]ore full-fledged rulemaking of this sort appears not to solve [the] fundamental problem, may be impractical given the sheer volume of USPTO operations, and taken to its fullest extent, might even violate the TRIPS Agreement.” *Id.*

92. See *id.* at 742 (lamenting that “[d]espite recent reforms that call for the publication of pending applications, interested parties possess no opportunity to comment upon them”).

93. Exec. Order No. 12,291, 46 Fed. Reg. 13,193 (1981) (further requiring an explanation of the legal reasons why alternate approaches could not be adopted); Exec. Order No. 12,498, 50 Fed. Reg. 1036 (1985) (commanding every agency head to follow Executive Order 12,291; see also David M. Driesen, *The Societal Cost of Environmental Regulation: Beyond Administrative Cost-Benefit Analysis*, 24 ECOLOGY L.Q. 545, 549 (1997) (explaining that support for the use of cost-benefit analysis in regulatory decision making has grown over the last decade from all three branches of government).

94. See Robert W. Hahn & Cass R. Sunstein, *A New Executive Order For Improving Federal Regulation? Deeper and Wider Cost-Benefit Analysis*, 150 U. PA. L. REV. 1489, 1493 (2002) (proposing that cost-benefit analysis of a regulation should be balanced with the promotion of social goals); Jason Scott Johnston, *A Game Theoretic Analysis of Alternative Institutions for Regulatory Cost-Benefit Analysis*, 150 U. PA. L. REV. 1343, 1345–46 (2002) (describing a proposal by Justice Breyer that would create a super-agency that would prioritize regulations according to their social benefits after performing a cost-benefit analysis).

requirements of the Patent Act to grant exclusive rights to novel, useful, and nonobvious inventions.⁹⁵ The USPTO has some discretion in how it determines what counts as an invention and what it means for an invention to be novel, useful, and nonobvious, but this discretion is not open ended.⁹⁶ Though the agency must make choices about how much to know and how to apply what it knows, it can be rationally ignorant insofar as it acts within its mandate. Because of the statutory and constitutional mandates that undergird patent law, the agency needs to act in a manner that is socially optimal and not just simply rational. As Professor Lemley points out correctly, the USPTO is not expected to be omniscient.⁹⁷ But it needs to collect and parse information in a socially optimal way. The difficult question, then, is what should the USPTO be ignorant of? Returning to the analogy with the EPA, if environmental standards are set subject to a social cost-benefit calculus, what calculus should the USPTO follow in determining whether an invention is novel, useful, and nonobvious? Put another way, what types of information and how much of it should the USPTO be expected to collect?

An assessment of optimal ignorance requires an understanding of the benefits of patent law. The rational ignorance argument rests on the model that a patent agent acquires as much information as is necessary to determine whether an invention meets the requirements of patentability.⁹⁸ This determination rests on the costs and benefits to the patent

95. See 35 U.S.C. § 103 (2000).

A patent may not be obtained . . . if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Id.

96. See R. Carl Moy, *Subjecting Rembrandt to the Rule of Law: Rule-Based Solutions for Determining the Patentability of Business Methods*, 28 WM. MITCHELL L. REV. 1047, 1065–66 (2002) (explaining that because some of the members of the Examining Corps of the USPTO have “relatively little experience and no formal training. . . [i]t is . . . entirely appropriate—in fact, it is probably necessary—to use decisional criteria that limit the discretion of the individual examiners strongly” (footnote omitted)).

97. Lemley, *supra* note 7, at 1497 (explaining that although the USPTO does not carefully examine patents and “we probably don’t want it to” because the costs of gathering the necessary information to make detailed validity determinations outweigh the benefits).

98. See *id.* at 1510–11 (contending that it would be inefficient to expend additional resources improving the USPTO because “ninety-five percent of patents . . . will either never be used, or will be used in circumstances that don’t crucially rely on the determination of validity”).

agent of granting a patent.⁹⁹ The optimal ignorance argument rests on the model that a patent agent acquires as much information as is necessary to ensure that socially desirable patents are granted. Viewed in statistical terms, the optimal ignorance inquiry is one of balancing the risks of granting patents to undeserving inventions versus denying patents to deserving ones. As a problem of statistical decisionmaking, when the USPTO sets standards, it must gather sufficient information regarding novelty, utility, and nonobviousness to balance the risks of Type I (false rejections) and Type II (false acceptances) errors. In turn, measuring the scope of these errors requires an understanding of the benefits of granting a valid patent.

2. *Assessing the Benefits of Patents.* Professor George Priest is often cited for his statement that economists have very little to say about patent law.¹⁰⁰ His assessment rests on an observation that there is very little empirical study of patents and on the belief that the normative criteria for determining patent policy are unclear.¹⁰¹ Professor Lemley addresses the first of Priest's criticisms head on in this and other papers.¹⁰² However, the second criticism is still a salient one. We believe that Professor Priest overstates the case. There are many areas of law where economics cannot provide a normative assessment of policy. Economics, for example, cannot state what is the socially optimal length of a criminal sentence. Our response would be, nor should it. There are several value determinations that underpin criminal sentencing beyond economic efficiency and utilitarian calculus. Nonetheless, economic analysis can tell us something about the role of deterrence in criminal sentencing and the effect of criminalization on a range of activity. Similarly, economics cannot tell us whether the optimal duration of a patent is fourteen or twenty years; nor can it answer broad questions of

99. See *id.* at 1496 n.3 (describing the personal cost-benefit analysis a patent examiner goes through).

100. See George L. Priest, *What Economists Can Tell Lawyers About Intellectual Property: Comment on Cheung*, 8 RES. L. & ECON. 19, 21 (1986).

101. See *id.* at 19–20. Professor Priest states that “[i]n the entire history of the literature there seem to have been only two key empirical questions,” and he suggests that the literature has “consisted of little more than assumptions.” *Id.* He also asserts that generally there has been a “fail[ure] to consider the specifications of patentability” other than the “nonobviousness” standard. *Id.* at 20.

102. See Lemley, *supra* note 7, at 1496 n.4 (citing to recent evidence indicating that many prosecuted patents are adjudged invalid); see also John R. Allison & Mark A. Lemley, *The Growing Complexity of the United States Patent System*, 82 B.U. L. REV. 77, 81–87 (2002) (discussing in detail the focus of scholarly work focusing on the function and impact of the patent system and declaring that Professor Priest’s “complaints have less force today”).

how broad patent scope should be. But economics can aid in understanding what would be the implications of increasing patent life or expanding scope of protection in a qualified and useful way.

While Professor Priest's critique of economics is often cited, his article was a response to an equally important piece by Professor Stephen Cheung.¹⁰³ Reviewing the economic literature on patents from Ricardo to Machlup, Cheung divides up economic theories into four camps: (1) those who argue that patents buy society something for something,¹⁰⁴ (2) those who argue that patents buy society nothing for something,¹⁰⁵ (3) those who argue that patents buy society something for nothing,¹⁰⁶ and finally (4) those who argue that patents buy society nothing for nothing.¹⁰⁷ Professor Lemley is in the first camp: patents do have societal benefits at some cost to society.¹⁰⁸ The problem is that he never explains what is the something that is gained by society, and this something is important in assessing the optimality of the USPTO and the effects of patent reform. By focusing on rationality rather than optimality, Professor Lemley misses both an important dimension of patent reform and an appreciation of why so many people are upset with what the USPTO is doing.

So, what is this "something" that we gain from the granting of valid patents? For most people, this something is a private reward for the creation of something truly innovative in exchange for an enabling disclosure of the invention to the public.¹⁰⁹ By granting patents to trivial things like toys on a

103. See generally Steven N.S. Cheung, *Property Rights and Invention*, 8 RES. LAW & ECON. 5 (1986).

104. See *id.* at 8 (summarizing Arnold Plant's thesis that the patent system "achieves certain ends only at certain costs").

105. See *id.* at 10-11 (citing Kenneth Arrow, who postulated that investment in invention would be better served by expanded government investment in innovative activities than it is by the patent system).

106. See *id.* at 6 (explaining that the early views of the patent system rested on the assertion of Jeremy Bentham that "the patent system costs nothing" and that "instituting property rights over ideas enables society to gain something for nothing" (internal quotation marks omitted)).

107. See *id.* at 7 (referencing the work of F.W. Taussig who wrote that the need to invent is an "inborn and irresistible impulse" and that inventors will invent with or without a patent system (internal quotation marks omitted)).

108. See Lemley, *supra* note 7, at 1499. "The cost of 196,900 regular applications prosecuted through to issuance or rejection at \$20,000 per patent totals \$3.94 billion. An additional 78,100 continuing patent applications at \$5000 per patent costs \$391 million. This gives us a total annual cost of \$4.33 billion for domestic patent prosecution." *Id.*

109. See, e.g., BLACK'S LAW DICTIONARY 1147 (7th ed. 1999) (explaining a patent as "[t]he exclusive right to make, use, or sell an invention for a specified period . . . granted by the federal government to the inventor if the device or process is novel, useful, and nonobvious"). *But see* EARL W. KINTNER & JACK LAHR, AN INTELLECTUAL PROPERTY LAW

string or a method for exercising cats with a laser pointer,¹¹⁰ the USPTO creates incentives for small ticket inventors to pursue patents that neither expand our knowledge nor increase the scope of useful arts. Nothing is obtained for something, namely, the expense of running the USPTO. The policy response of these critics is to beef up the USPTO to ensure that only the truly deserving obtain a patent.¹¹¹ Critics of current USPTO practices suggest that standards should be increased for obtaining the government grant, and that the USPTO should be expanded to ensure that standards are upheld and met.¹¹²

Professor Lemley's response to this is that the USPTO can only do so much and that nothing can effectively be done to ensure that bad patents will not be granted.¹¹³ There is no denying that the system cannot be made perfect and foolproof against bad patents. But it is not entirely clear where Professor Lemley sees the problem from the perspective of optimal ignorance. There are three possible implications for the lack of perfection of the patent system, each of which has different implications for policy. Furthermore, each has implications for the "something" that the patent system buys.

First, the lack of perfection may stem from an inability to determine what is a bad patent and what is a good patent. Looking at a patent granted to a toy on a stick makes many laugh, but is such a patent truly frivolous? What is the relevant prior art for such an invention? Perhaps such an invention is in fact novel. Furthermore, the notion of nonobviousness is not entirely objective.¹¹⁴ Cases abound in which members of the

PRIMER 7-11 (2d ed. 1982) (describing a patent as "a limited monopoly, designed not primarily to reward the inventor").

110. Gleick, *supra* note 6, at 44 (reprinting a picture from U.S. Patent No. 5,443,036 issued in 1995 to Kevin Amiss and Martin Abbott).

111. *Id.* (quoting an I.B.M. software engineer who explained that many patented ideas are obvious and easily generated and arguing that "[p]atents should be the exception, not the rule").

112. See Thomas, *supra* note 5, at 730-31 (arguing that there is value and good reason to maintain a high level of patent quality and offering several proposals for patent administration reform). Thomas presents several criticisms of Professor Lemley's "Rational Ignorance" theory and states "[t]hat so many diverse observers of the patent system have concluded that patent quality matters suggests that the job of the USPTO is not only worth doing, it is worth doing well." *Id.* at 740.

113. See Lemley, *supra* note 7, at 1512-13. Lemley postulates various cost-benefit analysis models increasing the front end expenditures investigating validity and decreasing litigation expenses and finds that the benefits do not outweigh the costs. He suspects that bad patents would issue even if the USPTO's resources were doubled. *Id.* at 1513.

114. See, e.g., *In re Dillon*, 919 F.2d 688 (Fed. Cir. 1990). The majority judge and dissenting judge, both holding Ph.D.s in chemistry, disagreed on what constituted nonobviousness of a chemical process patent.

Federal Circuit with expertise in a particular field of hard science disagree about whether an invention is nonobvious based on the prior art in the field.¹¹⁵ Like originality in copyright, nonobviousness is in the eye of the beholder and does implicitly involve some judgment calls.¹¹⁶

If this is what Professor Lemley means by lack of perfection, then in some ways the patent system can never be perfected. Bad patents will always issue unless we either clarify the standards for patentability so they are less subjective or develop other objective criteria to make patentability more predictable and in greater conformity with our notions of good and bad. Simply expanding the size of the USPTO is not enough, but then again neither is relying on more stringent judicial review of patents.

Second, the lack of perfection may arise not from imprecise standards but from their imprecise application by the agency. Consequently, the agency grants too many patents as a result of internal incentives or the lack of internal checks. In statistical terms, the agency produces too many Type II errors (false acceptances). If this description is accurate, then patent reform once again is more complicated than simply expanding the size of the USPTO. Internal checks and better incentives need to be created to ensure that bad patents are not granted. An example of such reform is provided by reviewing how the USPTO has changed in its treatment of software patents. Until recently, patent agents with a software engineering background have been rare.¹¹⁷ By expanding agents with such expertise, some of the problems posed by software patents have been addressed (although such an approach has been far from complete). Furthermore, as a statistical matter, lowering Type II errors runs the risk of increasing Type I errors (false rejections). Some judgment has to be made as to whether it is worse for the USPTO to grant too many bad patents or to deny good ones. Finally, the role of judicial review is complicated if the source of the problem is poor application of the standards by the agency. Although poor application supports the argument against deference to the

115. *Id.* A majority of the judges concluded that “the claims to compositions of a hydrocarbon fuel and a tetraorthoester were *prima facie* obvious,” and affirmed the Commissioner’s position. *Id.* at 692. On the other hand, the dissent opined that “a *prima facie* case of obviousness of a new chemical compound or composition requires consideration of not only the chemical structure but also the newly discovered properties, in light of the teachings and suggestions of the prior art,” and would have rejected the Commissioner’s position. *Id.* at 719 (Newman, J., dissenting).

116. *Compare id.* at 690–98, with *id.* at 699–720 (Newman, J., dissenting).

117. *See* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CAL. L. REV. 1, 12 & n.39 (2001) (reporting that “until recently computer scientists were not even eligible to sit for the patent bar”).

agency by the courts, it does not necessarily support stronger judicial review—as opposed to internal agency reforms—as a solution to the problem. Appropriately administered, structural reforms of the agency may be the cheaper alternative to expansive judicial review of patents.

Third, the lack of perfection of the USPTO review of applications may simply reflect the low social costs of bad patents. The key to Professor Lemley's argument against expanding the time devoted to review by patent agents is that very few patents are litigated, and the impact of patents is relatively minimal.¹¹⁸ Although cautious in this conclusion, Professor Lemley does imply that the social costs of patents are small, and that there really is no problem with the issuance of bad patents.¹¹⁹ In some ways this misses the point. If there is a disparity between private and social costs of patents, then the system should be revised so that the social cost is internalized by the correct party. Litigation-centered reform, such as more extensive judicial review, would increase the costs both to private patent applicants and to society.¹²⁰ Solutions centered on the USPTO could more effectively shift social cost to the private patent applicant.¹²¹ Consequently, even if the social costs are ostensibly lower than many expect, agency-based reforms would be more appropriate because such reforms would internalize the social costs to the private patent applicant.

But a more pertinent criticism of Professor Lemley's position is that he does not adequately state the "something" that the patent system is supposed to purchase. In fact, he states that the costs of patent prosecution buy very little.¹²² He measures the "something" in terms of licensing fees for patents and litigation costs.¹²³ As stated before, these figures are measures of the social

118. See Lemley, *supra* note 7, at 1497 (stating that "the overwhelming majority of patents are never litigated or even licensed. Because so few patents are ever asserted against a competitor, it is much cheaper for society to make detailed validity determinations in those few cases than to invest additional resources examining patents that will never be heard from again").

119. *Id.* at 1516–20 (analyzing the social costs of bad patents).

120. See Thomas, *supra* note 5, at 735 (explaining that "Rational Ignorance at the Patent Office largely limits the social costs of improvidently granted patents to litigation-related expenses in striking them down").

121. See *id.* at 743–44. Although patent fees increased significantly in the last two decades, filing rates remained stable or increased indicating that private patent applicants are willing to absorb more of the social costs. *Id.*

122. See Lemley, *supra* note 7, at 1501–03 (making several assumptions, Lemley estimates that the cost of patent litigation may be \$1.05 billion per year and that half may be "attributable to disputes over the validity or enforceability due to inequitable conduct of the patents in suit").

123. *Id.* (noting that roughly half of the estimated \$1.05 billion annual patent

cost of the patent system as opposed to measures of private or social benefits.¹²⁴ Furthermore, if we take Professor Lemley's word at face value, and patents actually purchase very little given their cost, then perhaps the honest response is to scrap the patent system altogether and rely either on trade secret protection or perhaps a registration system as Professor Kieff has urged¹²⁵ without administrative review (as we have for copyrights).¹²⁶ Most people would agree (especially members of the patent bar!) that this solution goes too far. But if patents do buy so little, why should society bother with a patent system at all?

The answer is that Professor Lemley does not adequately state the benefits of a patent system. Consequently, he does not adequately state why the patent review process is not perfect. To say that patent agents are subject to rational ignorance is not helpful. The appropriate inquiry is "what is the optimal amount of ignorance from a society's perspective?"

3. *The Problem of Bounded Rationality.* Professor Lemley assumes that the USPTO's ignorance in identifying the prior art and determining novelty and nonobviousness stems from a rational choice.¹²⁷ But the observed result could just as likely be caused by bounded rationality on the part of the USPTO. Bounded rationality arises when an actor, constrained through lack of information or cognitive limits, fails to act in a fully rational way.¹²⁸ In other words, the USPTO's ignorance is not a choice but a constraint on its behavior.¹²⁹

litigation costs are "for infringement, license, antitrust, damages, willfulness, and the related non-patent issues that are often litigated in patent cases").

124. Refer to notes 26–32 *supra* and accompanying text.

125. See F. Scott Kieff, *The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules* (Apr. 1, 2003) (working paper) (proposing a registration model for patents with much less scrutiny than the current system), available at <http://ssrn.com/abstract=392202>.

126. See Dennis T. Rice, *Building a Strategic Internet IP Portfolio in a "Down" Economy*, 754 PLI/Pat. 391, 425 (2003) ("Copyrights . . . are easier and cheaper to perfect than patents or trademarks. All that is required for statutory protection is filing of the copyrighted material in the Copyright Office—with no administrative review or acceptance of the content required.").

127. See Lemley, *supra* note 7, at 1497, 1511 (admitting that the USPTO chooses not to spend extra money when examining patents because it is not economically worth it, thus the USPTO is rationally ignorant).

128. See ARIEL RUBINSTEIN, *MODELING BOUNDED RATIONALITY* 7–16 (1998) (discussing limitations of rationality assumption); HERBERT A. SIMON, *ADMINISTRATIVE BEHAVIOR: A STUDY OF DECISION-MAKING PROCESSES IN ADMINISTRATIVE ORGANIZATIONS* 92–97 (4th ed. 1997) (analyzing the rationality and psychology of administrative agencies).

129. See SIMON, *supra* note 128, at 94.

The problem is that it is not possible to distinguish between the hypothesis of rational ignorance and the hypothesis of bounded rationality,¹³⁰ at least with the data that Professor Lemley examines.¹³¹ But it makes a difference which hypothesis is true for patent policy. If it is rational ignorance, then deference is not due to the agency, and judicial review may be the cure. If the source of the problem is bounded rationality, then the case against deference is strengthened but the argument in favor of judicial review is weakened unless courts are less cognitively constrained or more informed than agencies. Furthermore, the case of bounded rationality would support a restructuring of the agency to address the informational and cognitive limitations.

An optimal ignorance approach may suggest why it is more likely that the USPTO is subjected to bounded rationality rather than to rational ignorance. Optimal ignorance requires the USPTO to assess the full social benefits of acquiring more information and weigh them against the social costs. For the reasons we have suggested, the social benefits of a patent may be amorphous, resting on understandings of progress and nonobviousness.¹³² For this reason alone, we might expect the USPTO to be subjected to cognitive and information limitations with respect to its role in distinguishing between deserving and undeserving patents.

If the USPTO is, in fact, subject to bounded rationality for the complex problems in assessing benefits, Professor Lemley's arguments against administrative reform and in favor of judicial review are weakened.¹³³ Professor Lemley's arguments lead to the following problem. If the USPTO is engaging in rational

Rationality implies a complete, and unattainable, knowledge of the exact consequences of each choice. In actuality, the human being never has more than a fragmentary knowledge of the conditions surrounding his action, nor more than a slight insight into the regularities and laws that would permit him to induce future consequences from a knowledge of present circumstances.

Id.

130. See RUBINSTEIN, *supra* note 128, at 16–21, for a discussion of experimental evidence to distinguish between rational behavior and behavior that is boundedly rational.

131. See generally Lemley, *supra* note 7, at 1497–1532 (containing data that ranges from the number of U.S. patents issued per year, the cost of patent prosecution and litigation, to the percent of patents for which maintenance fees were actually paid).

132. See *id.* at 1500–01 (discussing how it is hard to obtain hard data on what patentees do with their patents, yet concluding that an “overwhelming majority” of patents are never licensed or litigated).

133. See *id.* at 1531–32 (recognizing that the USPTO is rationally ignorant in its decision making process to grant patents; therefore, it would be more efficient to maintain the current system and defer to the courts because such a small percentage of patents are ever litigated).

ignorance, then it is not satisfying its mandate and reforms that ensure that optimal ignorance is desirable. If the USPTO is acting out of optimal ignorance, then the case exists that the agency is subject to bounded rationality, supporting reforms to cure it of its cognitive and informational limitations. Either way, the case for administrative-level reforms is justified and needs to be more fully and properly addressed.

4. *Doing the Optimal Thing: The Realities of Patent Policy.* In this section, we have taken apart the limitations of viewing the USPTO as engaging in rational ignorance. We have concluded that Professor Lemley is overly optimistic about the ability of the courts to weed out bad patents. Because of the incentives for litigation and settlement, it is likely that many bad patents will never be subjected to the scrutiny of the court. Furthermore, the rational ignorance of the USPTO is the wrong foundation for patent policy. It is true that information is a scarce resource and that the USPTO is constrained in its ability to review all the prior art.¹³⁴ But the relevant question is to consider what the optimal amount of ignorance the patent system—which consists of courts, legislators, inventors, competitors, improvers and users, in addition to the USPTO—is willing to tolerate?

Given the history of the concept of rational ignorance, it is surprising that Professor Lemley gives it so much stock.¹³⁵ First developed by Anthony Downs, the concept of rational ignorance was used to explain why voters may not expend much effort in finding out what political candidates and elected officials are doing.¹³⁶ Consequently, because of rational ignorance, legislators and agencies can be subject to powerful interest groups free from the monitoring and scrutiny of the citizens.¹³⁷ Professor Lemley shifts the locus of rational ignorance from the citizens to the government itself.¹³⁸ This move is not completely illogical. After all, many government agencies, like citizens, are engaged in the process of information gathering and are constrained in how

134. See *id.* at 1499–1500 (declaring that not only do patent applicants not supply all relevant prior art, but that much of it “isn’t easy to find”).

135. See *id.* at 1497 & n.6, 1531–32 (concluding that rational ignorance is actually needed to maintain efficiency and hold down costs).

136. See ANTHONY DOWNS, *AN ECONOMIC THEORY OF DEMOCRACY* 243, 258 (1957) (“Therefore it is irrational for him to acquire many costly bits unless they have either large expected values or high variance relative to his original party differentials.”).

137. See DENNIS C. MUELLER, *PUBLIC CHOICE II* 268–71 (rev. ed. 1989).

138. See Lemley, *supra* note 7, at 1497 (summarizing how a governmental agency, like the USPTO, is rationally ignorant in that it does not do a very detailed job in examining patents because the cost in obtaining the information would be outweighed by extra benefits).

much information they can process. But what is strange is that Professor Lemley has used a concept which was developed to explain why government may not function in a desired manner to support a position about why a government agency is doing the best it can.¹³⁹ He seems to ignore the question of why the USPTO is in the business of information gathering in the first place and the question of how the USPTO is to fulfill its role in a way that is optimal for society.

Professor Lemley's use of rational ignorance disregards the question of rational ignorance among the citizens.¹⁴⁰ According to the traditional view of rational ignorance, it is the citizens who are rationally unaware of what government agencies like the USPTO are doing to the detriment of economic efficiency and policy.¹⁴¹ To understand optimal policy for the USPTO, we need to recognize the political influences on patent law in the United States. Many citizens are expected to be rationally ignorant of such influences. Once we identify these influences, it should be clear that Professor Lemley's consideration of the rational ignorance of the USPTO is far from satisfactory and his conclusions about patent reform far from sanguine. These political influences are the focus of the next Part.

III. THE STRUCTURE OF THE POLITICAL INCENTIVES FOR THE USPTO

In this Part, we provide an analysis of the different factors that define the incentives structure of the USPTO. The USPTO cannot be regarded as a completely independent agency because many pressure groups directly and indirectly affect its behavior.¹⁴² Figure 3 depicts the relationship between the

139. *Id.* ("In short, the PTO doesn't do a very detailed job of examining patents, but we probably don't want it to. It is 'rationally ignorant' of the objective validity of patents, in economic lingo, because it is too costly for the PTO to discover those facts." (footnote omitted)).

140. *See generally id.* at 1497, 1511, 1531–32 (positing that rational ignorance serves as the excuse for why the USPTO is allowing bad patents to slip through the system).

141. Refer to note 136 *supra* and accompanying text.

142. *See* United States Patent and Trademark Office, *Patent Public Advisory Committee Members*, at <http://www.uspto.gov/web/offices/com/advisory/notices/memberstext.html> (last visited Oct. 18, 2003) [hereinafter USPTO, *PPAC Members*] (organizing members from all types of organizations, ranging from law firms to large corporations to Associations and Unions, that have a direct influence on the USPTO); *see also* Jeroen van Wijk, *Broad Biotechnology Patents Hamper Innovation*, *Biotechnology & Dev. Monitor*, No. 25, at 15–17 (1995), available at <http://biotech-monitor.nl/2506.htm> ("For a number of years pressure groups in both the USA and Europe have been trying to stop the patenting of living materials.").

USPTO and various actors in our system. Congress is in charge of defining the laws that establish and regulate the patent system.¹⁴³ Accordingly, the USPTO, created by Congress, is in charge of granting patents for nonobvious inventions.¹⁴⁴ These patents have an impact on the markets and on the economy in general.¹⁴⁵ The results from the market will generate winners and losers. These groups of people, especially the losers, can resort to the courts to challenge a patent granted by the USPTO.¹⁴⁶ If they succeed, then the patent is invalidated; otherwise, the patentee can enjoy the exclusive rights granted by the patent statute.¹⁴⁷

In addition, groups of inventors and competitors in different markets and industries can form pressure groups that participate in the political process. These groups directly influence the USPTO and Congress in order to obtain better mechanisms through which patents can be examined and enforced, thereby improving the system. Accordingly, the patent system is not fixed; rather, it is determined by the interaction between different groups, such as Congress, the USPTO, the courts, and numerous pressure groups. As a result, the structure of our patent system is a result of political and economic forces.

Referencing Figure 3, let us begin with the situation where the USPTO decides to grant a patent. This new patent generates diverse market results. On one hand, the owner of the patent

143. See U.S. CONST. art I, § 8, cl. 8 (“The Congress shall have Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Rights to their Writings and Discoveries . . .”); 35 U.S.C. § 1(a) (2000) (establishing the USPTO).

144. See 35 U.S.C. § 103(a).

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Id.

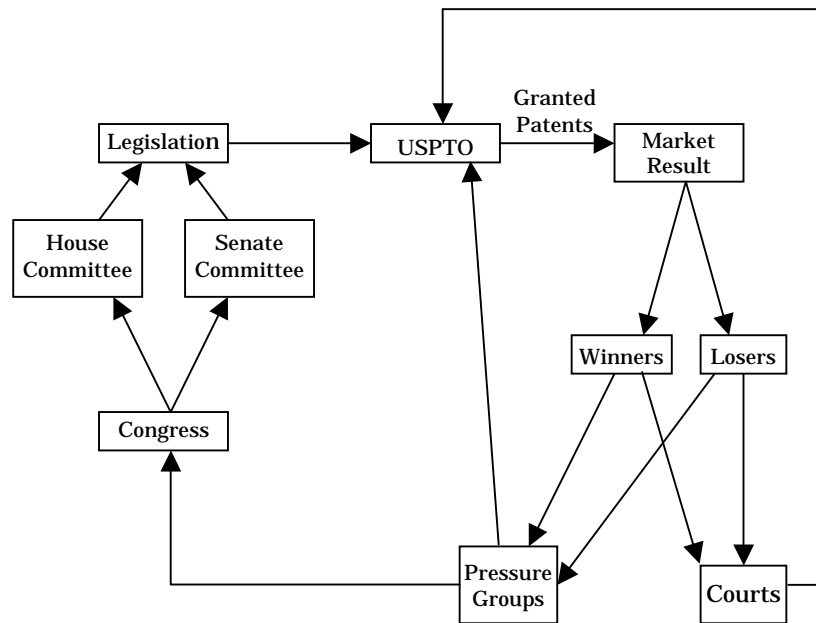
145. Fla. Prepaid Postsecondary Educ. Expense Bd. v. Coll. Sav. Bank, 527 U.S. 627, 650 (1999) (Stevens, J., dissenting) (“Federal interests are threatened, not only by inadequate protection for patentees, but also when overprotection may have an adverse impact on a competitive economy.”).

146. See 35 U.S.C. § 141 (granting a person dissatisfied with a decision of the Board of Patent Appeals the right to appeal the decision to the United States Court of Appeals for the Federal Circuit).

147. See *id.* §§ 154(a)(1)–(2), (d)(1), 261 (creating the ownership rights that a patent owner possesses, such as the right to assign and the right to exclude others from using the patent for a term of twenty years); *id.* § 316 (discussing how the director can issue a certificate of patentability, unpatentability, or claim cancellation after an inter partes reexamination proceeding).

could benefit from the newly acquired property rights by obtaining market power through the use of his patent.¹⁴⁸ This monopoly will also generate incentives for further investments in obtaining new patents or further improvements on those already granted. On the other hand, the patentee's competitors may be worse off because of the grant of the patent to the patentee and perhaps because of their own failed efforts. Firms or industries interested in the patented invention must either refrain from using it or pay license fees to obtain the permission to do so.¹⁴⁹ Furthermore, consumers may have to pay higher prices for the goods and services that employ patented technologies.¹⁵⁰ Additionally, if the patent were wrongly granted, these negative effects, such as market losses, would be higher, because there is no offsetting increase in consumer welfare through new innovation and technological change. Instead, we are simply left with the costs of wrongly granted property rights. In short, we have groups of both winners and losers from the simple action of granting a new patent.

Figure 3



148. See generally *id.* §§ 154(a)(1)–(2), (d)(1), 261.

149. Refer to note 143 *supra*.

150. See Lisa C. Pavento et al., *International Patent Protection for HIV-Related Therapies: Patent Attorneys' Perspective*, 17 EMORY INT'L L. REV. 919, 920 (2003) ("There is no question that patent systems enable a patent owner to charge a higher price for a patented invention than an invention not patented.")

Winners and losers can resort to the courts both to enforce patent rights and to challenge the USPTO decisions.¹⁵¹ Accordingly, patent owners will resort to the courts in order to make patent users pay for the use by enforcing their rights in the invention. In addition, those firms who do not obtain the rights they seek from the patenting process can also go to court to get these decisions reversed.¹⁵² As a result, the courts can have an important impact on USPTO policies—as shown in Figure 3 by the arrow pointing from the courts to the USPTO—because their decisions can be affirmed, reversed, or modified by the courts. But this judicial process is not costless, and the inefficiencies in the system ensure that many wrongly granted patents are identified. Even so, these winners and losers can organize into more structured political groups in order to exert influence on the patent system. In Figure 3, these pressure groups can apply political pressure directly over the USPTO or indirectly through Congress. Firms or industries that comprise these pressure groups usually depend on patents to support their research and development projects and sustain their market positions.¹⁵³ It is difficult to find consumer groups sufficiently well organized to defend consumers from the excessive monopoly power of patentees.¹⁵⁴ Accordingly, we should expect these firms and industries to influence the USPTO directly in order to change the system to their benefit or through Congress in order to get new legislation passed, which fashions major changes in the patent system.

The direct influence of industry and firms over the USPTO is aimed to create changes in the system both by administrative changes that the USPTO can directly implement and by the influence the USPTO has over congressional legislation. For example, the USPTO has a Patent Public Advisory Committee that generates policy recommendations for the agency.¹⁵⁵ Firms,

151. See 35 U.S.C. §§ 281, 291 (allowing owners of patents, including those who own interfering patents, to go to the courts for resolution).

152. *Id.* §§ 141, 145 (describing the avenues that a person, dissatisfied with the decision of the Board of Patent Appeals, can take, such as appealing the decision to a federal circuit court).

153. *Cf.* Lemley, *supra* note 7, at 1504–07 (discussing what patents are commonly used for, such as “defensive patenting,” maximizing revenue, or as a resume builder).

154. See, e.g., Lawrence Wittenberg et al., *Probing the Human Genome: Who Owns Genetic Information?*, 4 B.U. J. SCI. & TECH. L. 2, 62 (1998) (observing that consumer groups are gaining strength in their resistance against the patenting of human genes).

155. See United States Patent and Trademark Office, *Information for Nominees to the Patent Public Advisory Committee and the Trademark Public Advisory Committee of the United States Patent and Trademark Office*, at <http://www.uspto.gov/web/offices/com/advisory/notices/nomineeinfo.html> (last visited Oct. 23, 2003) (“The Advisory Committees will review the policies, goals, performance, budget, and user fees of the patent and

lawyers, and independent inventors, who have an important role and interest in the characteristics of the patent system, compose this Committee.¹⁵⁶ The USPTO is well aware of industries' and inventors' preferences, which comprise their "customer" base. In 1996, the commissioner of the USPTO expressed that "[t]he focus of this entire reengineering effort is on the customer as a full partner in the process. To support this commitment, we have embarked upon a series of roundtable discussions with our customers to learn their interests and concerns, and to seek their input on reengineering plans."¹⁵⁷

Accordingly, the USPTO's main objective is to design an efficient system in order to fulfill customers' demands.¹⁵⁸ However, the definition of "customer" is limited to industry and inventors, but the impact of the patent system includes many other players, including consumers and citizens.¹⁵⁹ By granting new patents, the USPTO is affecting not just the investment strategy of some firms and inventors, it is also shaping market structure. The objectives of the USPTO do not include the goals of affecting markets and consumers, but they should be among

trademark operations, respectively, and will advise the Director of these matters.").

156. The 2003 voting members of the Committee were Margaret A. Boulware (Chair) (Shareholder, Jenkins & Gilchrist, Houston, Texas), James L. Ferguson (Independent Inventor, Redwood City, California), Stephen P. Fox (General Counsel and Director of Intellectual Property, Hewlett-Packard Company, Palo Alto, California), Andy Gibbs (CEO, PatentCafe Intellectual Property Resource Network, Yuba City, California), Patricia Wallace Ingraham (Professor of Public Administration and Political Science, Syracuse University, Syracuse, New York), Albert L. Jacobs, Jr. (Shareholder and Chair, Intellectual Property Department, Co-Chair, National Biotechnology Practice, Greenburg Traurig, LLP, New York, New York), William L. LaFuze (Partner and Co-Chair of Intellectual Property/Technical Litigation, Vinson & Elkins, LLP, Houston, Texas), Gerald J. Mossinghoff (Senior Counsel, Oblon, Spivak, McClelland, Maier & Neustadt, Arlington, Virginia), and Ronald E. Myrick (Chief Intellectual Property Counsel, General Electric Company, Weston, Connecticut). See USPTO, *PPAC Members*, *supra* note 142.

157. *Patent System and Modern Technology Needs: Meeting the Challenge of the 21st Century: Before the House Subcomm. on Tech. of the Comm. on Sci.*, 104th Cong. 11 (1996) (statement of Bruce A. Lehman, Assistant Secretary of Commerce and Commissioner of Patents and Trademarks).

158. See USPTO Business Plan, Feb. 2002, at 5–6, available at <http://www.uspto.gov/web/menu/fin03/budg1.pdf>.

The USPTO's mission is to promote industrial and technological progress in the United States and strengthen the economy by:

- Administering the laws relating to patents and trademarks while ensuring the creation of valid, prompt, and proper intellectual property rights; and
- Advising the Administration on all domestic and global aspects of intellectual property.

Id. at 5.

159. See *id.* at 6. "The USPTO has many different customers and stakeholders. Individual inventors, as well as those affiliated with small businesses, corporations, government agencies, and academia file applications with the USPTO to obtain valuable intellectual property protection." *Id.*

the considerations of those designing the system.¹⁶⁰ As a result, it would be desirable that the objectives of the USPTO not be limited to providing expeditious and efficient service to inventors, but also to minimizing the negative effects of wrongly granted patents on both markets and the economy as a whole.

As Figure 3 shows, Congress is directly influenced by pressure groups. Legislators, whose constituents have interests in the structure and performance of the patent system, usually occupy positions in the relevant House and Senate Committees.¹⁶¹

Table 1

Subcommittee on Courts, the Internet, and Intellectual Property House of Representatives, 108th Congress			
	Seats	Number of Patents (1996-2002)	Percentage of total patents (1996-2002)
Alabama	1	2834	0.4%
California	4	120,314	19.8%
Florida	2	20,178	3.3%
Illinois	1	28,442	4.6%
Indiana	1	10,874	1.7%
Massachusetts	2	24,273	4.0%
Michigan	1	26,560	4.3%
New York	1	46,021	7.5%
Pennsylvania	1	25,281	4.1%
Tennessee	1	6157	1.0%
Texas	2	40,593	6.6%
Virginia	3	7950	1.3%
Wisconsin	2	13,158	2.1%

Sources: House of Representatives, 108th Congress, 2nd Session, <http://www.house.gov/>; USPTO patent database, <http://www.uspto.gov>.

It is interesting to note that the Subcommittee on Courts, the Internet, and Intellectual Property in the House of Representatives is mostly dominated by states with high

160. See United States Patent and Trademark Office, Our Business: An Introduction to the PTO, at <http://www.uspto.gov/web/menu/intro.html> (last visited Oct. 26, 2003) (stating that "[t]hrough the issuance of patents, we encourage technological advancement by providing incentives to invent, invest in, and disclose new technology worldwide").

161. See Table 1 *infra*.

inventive activity. For example, California, with nearly twenty percent of total patents granted from 1996 to 2002, has four seats in the Subcommittee, the most of any state.¹⁶² It is equally illuminating to analyze the last modification to the patent laws in 1999, i.e., the American Inventors Protection Act of 1999 (AIPA).¹⁶³ The AIPA introduced several reforms to the patent system. First, it provided the USPTO with more independence from the government by transforming it into a Performance-Based Organization (PBO).¹⁶⁴ Second, it changed the rules for publication and review of patent applications, patent term adjustments, and third-party examination of patents.¹⁶⁵ Accordingly, Congress sought to detach the USPTO from congressional influence and to make it more aware of industries' and inventors' necessities.¹⁶⁶ Nonetheless, moving in this direction does not ensure that the USPTO is more efficient since inventors' and industries' preferences are not necessarily aligned with maximizing total welfare. Furthermore, it renders the USPTO more vulnerable to greater direct manipulations by these customer pressure groups.

In order to see how Congress behaved during the passage of the AIPA, we must analyze the support the bill received in Congress. Representative Howard Coble initially introduced this bill in the House of Representatives on May 24, 1999 as House Report 1907.¹⁶⁷ Many Representatives from different states quickly supported the bill, as we can see in Table 2.

162. *Id.*

163. See Gregory J. Lavorgna, *The Intellectual Property and Communications Omnibus Reform Act of 1999*, SF84 ALI-ABA 1, 3 (2000) (describing the main issues of the Act).

164. See Anne H. Chasser, *Developments at the United States Patent and Trademark Office*, 19 TEMP. ENVTL. L. & TECH. J. 27, 29 (2000) (describing the changes introduced by the Act).

165. See *id.* at 30.

166. See *id.* at 29 ("What this means, in part, is that Congress, the President, and the Department of Commerce have entrusted us with significantly increased responsibility. . . . [T]he PBO structure provides us with greater autonomy over the management and administration of our day-to-day operations, our budget and our hiring practices.").

167. American Inventors Protection Act of 1999, H.R. 1907, 106th Cong. (1999). Rep. Howard Coble from North Carolina's 6th Electoral District was the Chairman of the Subcommittee on Courts, the Internet, and Intellectual Property from the Committee of the Judiciary.

Table 2

Support for Bill 1907 in the House of Representatives			
State	Number of Patents (1996-2002)	Percentage of Total Patents (1996-2002)	Co-sponsors of the Bill
California	120,314	19.8%	14
North Carolina	13,105	2.1%	4
Virginia	7950	1.3%	4
Florida	20,178	3.3%	3
Maryland	10,211	1.6%	3
Tennessee	6157	1.0%	3
Washington	13,122	2.1%	3
Connecticut	13,495	2.2%	2
Georgia	9812	1.6%	2
Illinois	28,442	4.6%	2
Massachusetts	24,273	4.0%	2
New Jersey	27,887	4.5%	2
New York	46,021	7.5%	2
Arizona	10,631	1.7%	1
Delaware	2947	0.4%	1
Indiana	10,874	1.7%	1
Michigan	26,560	4.3%	1
Minnesota	18,301	3.0%	1
Missouri	6637	1.0%	1
Montana	998	0.1%	1
Ohio	25,926	4.2%	1
Oklahoma	3802	0.6%	1
Pennsylvania	25,281	4.1%	1
Texas	40,593	6.6%	1
Utah	5025	0.8%	1
Wisconsin	13,158	2.1%	1
Total	531,700	87.7%	59
Rest	74,726	12.3%	0

As we can see, those representatives from states with high levels of patenting were more willing to support this bill. For example, California, where the development of new technologies in computing and the Internet generates new inventions that are suitable for patent protection, is more concerned about the passing of laws protecting and favoring inventors. As a result, our patent system is clearly determined by the political and economic interests of industry and individual inventors. Furthermore, it is determined by Congress and the USPTO, which is where the political bargain takes place. Then, as the USPTO incentives for helping its constituency become focused on providing swift approval of patents, there is a greater probability of wrongly granted patents without any penalty for inadequate examination and review by the USPTO. Accordingly, we should think of different mechanisms to protect other industries and other players in the market from the negative consequences of wrongly granted patents and preserve market competition to offset the excessive control of interest groups in the political process that defines the USPTO's policies.

IV. UNDERSTANDING OPTIMAL IGNORANCE

Given the constraints on the USPTO's time and budget, the problem of the persistence of bad patents, and the political influences on patent law and policy, where do we go from here? We have suggested that, contrary to Professor Lemley, the focus should be on optimal ignorance rather than rational ignorance.¹⁶⁸ But optimal policy rests on recognizing both the benefits and the costs of patents. What is the something that patents buy? We suggest two possible answers: the promotion of progress and the cure to the appropriation and revelation problems.

A. *Promoting Progress?*

We have argued so far that Professor Lemley incorrectly focuses on rational ignorance as opposed to optimal ignorance, the latter being more appropriate for addressing patent policy.¹⁶⁹ An assessment of optimal ignorance, in turn, rests on an understanding of the benefits of a patent system, or as we put it, understanding the "something" that patents purchase. In this section, we explore how the constitutional requirement of

168. Refer to Part II.B *supra*.

169. *Id.*

promoting “the Progress of Science and useful Arts” aids in assessing the optimal level of ignorance.¹⁷⁰

Equating the purpose of the patent system with the promotion of progress underscores the subjective dimension of the benefit of patents. Progress is in many ways in the eyes of the beholder, and if the USPTO is vested with the task of promoting something so amorphous, there is no question that it will be the subject of criticism for failure to do its job.¹⁷¹ If defining and pursuing progress is the source of the problem, then simply putting more patent agents to the task is not going to be satisfactory; neither is more extensive judicial review. Instead, the solution rests on clarifying the standards by providing more objective criteria for how the USPTO is to collect and assess information about patentability.

For example, Congress could adopt standards for patentability that are akin to the standards that the National Science Foundation (NSF) has for the granting of funds for research.¹⁷² A critique of the NSF system is itself worthy of a paper and response,¹⁷³ but our point is that Congress could conceivably limit the grant of patents to inventions that are clearly cutting edge in a field of study. In this way, the USPTO would be promoting progress of a sort and would have guidelines for how to pursue its mandate. Furthermore, the scope of optimal ignorance for the USPTO would be given structure; the agency and its examiners would know what to look for and what to ignore within the scope of the mandate. As another option, the USPTO could borrow from the concept of peer review and permit third-party oppositions to published patent applications prior to grant.¹⁷⁴ Notice that such solutions are at the administrative

170. U.S. CONST. art. I, § 8, cl. 8.

171. There has been little attempt to develop an objective measure of the benefits of innovation that takes into account all the effects of innovation on society. Some theoretical measures have been suggested, however, that take into consideration the effects of innovation not only on growth but on markets and consumer welfare. See, e.g., Pankaj Tandon, *Innovation, Market Structure, and Welfare*, 74 AMER. ECON. REV. 394 (1984) (arguing that limiting entry into the “R&D game” is actually “socially preferable”).

172. National Science Foundation, *Grant Proposal Guide* (Oct. 2003), available at http://www.nsf.gov/pubs/2004/nsf042/nsf04_2.pdf (listing the following characteristics: novel and untested ideas, emerging and potentially transformative ideas, new approaches to established topics, research for quick response to natural disasters, and innovative advances).

173. For a discussion of the NSF and other institutions including the USPTO as they relate to innovation and information policy, see generally Brett Frischmann, *Innovation and Institutions: Rethinking the Economics of U.S. Science and Technology Policy*, 24 VT. L. REV. 347 (2000).

174. Kevin M. Baird, *Business Method Patents: Chaos at the USPTO or Business as Usual?*, 2001 U. ILL. J.L. TECH. & POL'Y 347, 363–64 (proposing that the combination of a

level.¹⁷⁵ They can also be accompanied by the removal of the presumption of validity.¹⁷⁶ But the scope of judicial review is also cabined by the guidelines provided by Congress through its statutory mandate.

B. Resolving the Problem of Appropriation and Revelation

If the task of defining progress proves daunting or politically intractable, another approach is to recognize that the USPTO, in assessing novelty, utility, and nonobviousness, is given the task of helping to resolve the problems of appropriation and revelation that are part of the Arrow paradox.¹⁷⁷ Consider, once again, the problem described in Part I. An inventor walks into a private company with a sealed envelope and makes the following offer: "I will sell you this novel, useful, and nonobvious invention described in this envelope for \$2.1 billion." Before buying the envelope, the company would want to know what's in it. But opening the envelope before a sale is adverse to the inventor's interests. How can the inventor reveal (and resolve the company's problem) without the fear of appropriation by the company or someone else (the inventor's problem)? There are several possible legal solutions to this problem, and patent law is one of them. Understanding the patent system from the perspectives of the potential buyer and seller of an invention may help in identifying the benefits purchased by a patent while assessing a policy of optimal ignorance.

The company essentially wants to know what the inventor is selling and whether it is in fact worth the price asked. A patent examiner, of course, does not assess the value of an invention in light of what is being asked for it.¹⁷⁸ Instead, a patent examiner must assess the value of the invention in light of what benefits

central database for business method prior art with the USPTO general requirement of publication of applications eighteen months after filing would create a peer review mechanism useful to those opposing certain applications).

175. *Id.*

176. Kesan, *supra* note 5, at 770–75 (proposing to either maintain the presumption of validity for properly disclosed prior art or, in the alternative, eliminate the presumption of validity); Lemley, *supra* note 7, at 1529; *see also* 35 U.S.C. § 282 (2000) (providing that patents shall be presumed valid); *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1360 (Fed. Cir. 1984) (summarizing that the burden of proving patent invalidity remains constantly on the one who alleges invalidity, and can only be met by clear and convincing evidence of invalidity).

177. Refer to notes 33–37 *supra* and accompanying text.

178. Patent examiners must determine whether the invention is "useful." 35 U.S.C. § 101; PATENT AND TRADEMARK OFFICE, U.S. DEP'T OF COMM., MANUAL OF PATENT EXAMINING PROCEDURE §§ 706.03(a), 2107 (2003) [hereinafter PTO MANUAL] (setting forth how patent examiners should examine the usefulness of inventions claimed in patent applications).

might accrue to the market for the invention.¹⁷⁹ In this way, by granting a patent, a patent examiner creates a potential market transaction into which parties must enter if they seek to use the patented invention. When viewed from this perspective, the patent examiner is acting as an agent for the hypothetical purchaser of the invention and must discover the information that such a purchaser would need to make the decision. Once the patent is granted, the requisite information is disclosed, and actual purchasers can turn to the disclosure to assess whether to purchase or license the invention. At the same time, the patent examiner's job is to address the appropriability problem by assuring that disclosure does not destroy exclusivity once a patent application is filed.¹⁸⁰ In this way, we see the source of the problem: the patent examiner is balancing the revelation problem with the appropriation problem. Once the agency has correctly established property rights over the invention, Coasean bargaining can occur. Absent such property rights, Coasean bargaining would be impeded by the inventor's fear of appropriation and the difficulties of revelation.¹⁸¹

A rational ignorance approach, as described by Professor Lemley, would suggest that the patent examiner will search in the manner of least cost for the information necessary to make a determination of novelty, usefulness, and nonobviousness. An optimal ignorance approach, on the other hand, would imply that a patent examiner would obtain enough information as is necessary to resolve the revelation problem while ensuring against the appropriation problem. From the perspective of information gathering and processing, an optimal ignorance approach would not necessarily imply the same level of ignorance as would a rational ignorance approach. In fact, without consideration of the invention and the field, it is not possible to say which approach would predict more ignorance.

179. See PTO MANUAL, *supra* note 178, § 2107.

180. See JOHN GLADSTONE MILLS III ET AL., PATENT LAW FUNDAMENTALS § 2.30 (2d ed. 2003) (explaining that public disclosure of an invention unaccompanied by the timely filing of a patent application can lead to the loss of patent rights); *id.* § 1.36 (explaining that unless U.S. patent applicants meet an exception, patent applications are generally published eighteen months from their filing dates).

181. See, e.g., Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CAL. L. REV. 805, 805 (1988) (explaining that non-invention-related matters can increase the value of patent property rights); Robert P. Merges, *Contracting into Liability Rules: Intellectual Property and Collective Rights Organizations*, 84 CAL. L. REV. 1293, 1293–94 (1996) (discussing how various industry players bargain for patent licenses and other intellectual property); see also Yochai Benkler, *Intellectual Property and the Organization of Information Production*, 22 INT'L REV. L. & ECON. 81, 81–82 (2002) (discussing how property rights affect production, licensing, and dissemination of information).

We agree with Professor Lemley that the USPTO cannot be omniscient. But we question his basis for determining how much the USPTO should be expected to know and not know. This inquiry rests on an assessment of the social benefits of patents, not just on the private decision of the USPTO and its examiners. We would agree with Professor Lemley that simply devoting more time to patent review is not the solution. But Professor Lemley frames the debate as a choice between administrative restructuring and more extensive judicial review.¹⁸² He opts for the latter because so few patents are actually litigated, and therefore the benefits from reduced litigation are not justified by the increased costs in administrative review.¹⁸³ We contend that such an argument ignores (in neither a rational nor an optimal way) the benefits of a patent system. It is far from clear that more extensive judicial review is more effective than some restructuring of the USPTO in terms of more careful scrutiny or more rigorous assessment and accumulation of the prior art. The judicial option is more dubious in light of the USPTO's mandate of promoting progress and its practical purpose in resolving the revelation and appropriation problem. Professor Lemley provides an assessment of the private and social costs without proper attention to private and social benefits.

V. CONCLUSION

Professor Lemley has written a provocative and important article that may be misunderstood by many members of the intellectual property community. He is certainly not defending the current system that seems to produce seemingly absurd patents; he is saying that putting more money into the agency may not be the answer.¹⁸⁴ This message may be disturbing in a time of looming budget cuts, but his point rests on recognizing the constraints on the agency in processing the vast quantities of information necessary to assess patents.¹⁸⁵ He is correct in recognizing these constraints. However, his assessment is questionable. The constraints on information must be assessed within what is the best patent policy for society, not what is best for the USPTO in isolation. Designing an optimal patent system requires understanding the role of patents and the role of the USPTO and courts in granting patents and policing their use. The USPTO may very well be rational in its ignorance, but if we

182. Lemley, *supra* note 7, at 1531–32.

183. *Id.*

184. *Id.*

185. *Id.*

are to be thoughtful policy makers and legislators, we need to do more than rationalize what one institutional player does and instead chart the optimal course based on an assessment of the social costs and benefits of the patent system for all affected actors. In short, Professor Lemley's suggested route may very well be misguided.