

ARTICLES

PARTIAL PATENTS

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In this Article, we propose a way to improve the workings of the patent system. Unlike most extant reform proposals that focus on the USPTO and the Federal Circuit and the procedures they employ, our proposal is conceptual in nature. We introduce two new intellectual property forms—“quasi-patents” and “semi-patents.” Both forms are designed to mitigate the social costs of traditional patents by increasing the use and availability of new inventions and research information. Quasi-patents, as we define them, would avail only against direct business competitors of the inventor, but not against anyone else. Semi-patents would have the same scope as traditional patents, but their grant would be conditioned on an applicant’s consent to publish all research information pertaining to the protected invention. These two new forms would complement, and not replace, traditional patents. They would impose minimal administrative costs and would be compatible with most extant proposals to reform the patent system. Together, quasi-patents and semi-patents could mitigate the costs of traditional patents on subsequent inventors and thus open the path for more innovation.

INTRODUCTION	208
I. THE PUSH TO SCALE BACK PATENTS	213
A. The Overbreadth of Patents	213
B. Extant Proposals for Reform	219
II. INTRODUCING QUASI-PATENTS AND SEMI-PATENTS	223
A. Background Property Theory	224
B. Quasi-Patents	226
C. Semi-Patents	229
III. INCORPORATING QUASI-PATENTS AND SEMI-PATENTS INTO COMMUNITIES OF INNOVATION	233
A. Background	233

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B. Genetics	236
C. Software	238
D. The Environment and Public Health	241
IV. INCORPORATING QUASI-PATENTS AND SEMI-PATENTS INTO THE PATENT SYSTEM.....	244
A. Political Goodwill	244
B. Reshaping Inventors' Preferences	247
1. Ideology	247
2. Monetary Incentives	249
CONCLUSION	252

INTRODUCTION

In this Article, we introduce two new legal constructs—"quasi-patents" and "semi-patents"—that are uniquely designed to spur innovation through information sharing. A "quasi-patent" is a form of intellectual property that avails only against direct competitors. Unlike a standard patent, which grants the holder absolute exclusivity and avails against the rest of the world, a quasi-patent permits the owner to take legal action only against direct competitors who utilize the invention without permission, but not against other entities. In contrast to quasi-patents, "semi-patents," as we define them, are similar in scope to traditional patents. However, the grant of a semi-patent is conditioned on the applicant's agreement to publish all the research results and information that pertain to the relevant application.

Both concepts offer more limited protection than standard patents, albeit in different ways. Relative to traditional patents, quasi-patents are more limited in scope or, more precisely, in their enforceability. The holder of a quasi-patent would be able to bring infringement suits only against direct competitors who produce, use, or sell¹ the underlying invention without permission. Other entities, commercial and noncommercial alike, would be at liberty to practice the invention without risking legal liability.

As a result, inventions protected by quasi-patents could be put into a much broader range of uses relative to inventions subject to traditional patents. To illustrate, consider a patent held by Nike on environmentally friendly compositions of rubber and related production methods.² The invention could conceivably be useful for manufacturing a variety of products unrelated to sneakers—for example, toothbrushes, which cur-

1. See 35 U.S.C. § 271(a) (2006) ("Except as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.").

2. See U.S. Patent No. 7,211,611 (filed Dec. 11, 2003).

rently clog landfills by the million.³ This potential will remain untapped, however, if Nike and toothbrush makers lack sufficient economic motivation to explore licensing agreements. In contrast, under a quasi-patent regime, the rubber compositions and related methods could be freely practiced by all firms that do not directly compete with Nike—including the entire toothbrush industry. Likewise, nonrival companies from other industries and academic research institutions would be at liberty to use the technology and improve upon it. In the aggregate, such expansive use privileges could bring new benefits to entire industries, and would likely increase the rate and reduce the cost of generating future innovation in our society.

Semi-patents differ from traditional patents in the threshold requirement—they are subject to an additional requirement of full information sharing punishable by loss of protection. At present, patent law imposes a very minimal disclosure requirement: It requires patentees to state how their inventions are enabled by existing technology.⁴ As several commentators have noted, under the existing regime, patentees have every incentive to disclose as little as possible.⁵ A precondition for obtaining a semi-patent, by contrast, would be mandatory disclosure of all the research associated with the invention. The comprehensive disclosure we envision would include both positive (successful) and negative (failed) results. Such disclosure can dramatically reduce research and development costs for other inventors. It can help them avoid unnecessary pitfalls and obviate duplicative research. Indeed, it is widely accepted among both researchers and policymakers that information sharing is the key to more innovation.⁶ Yet, currently, the legal mechanism capable of inducing knowledge sharing is wanting. Semi-patents are intended to fill the void.

3. See *Cleaning Up With Eco-Friendly Hygiene*, USA Today (Magazine), Jan. 2005, at 76, 76 (noting toothbrush disposal produces approximately 50 million pounds of landfill waste each year); *Recycle Your Toothbrush*, Environment, May 2000, at 5, 5 (same).

4. See 35 U.S.C. § 112 (“The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.”).

5. See, e.g., R. Polk Wagner, *Understanding Patent-Quality Mechanisms*, 157 U. Pa. L. Rev. 2135, 2150–51 (2009) [hereinafter Wagner, *Patent-Quality*] (discussing factors that may motivate patentees to limit or defer clarity of their disclosures).

6. See, e.g., Dave A. Chokshi et al., *Data Sharing and Intellectual Property in a Genomic Epidemiology Network: Policies for Large-Scale Research Collaboration*, 84 Bull. World Health Org. 382, 382–85 (2006) (discussing data sharing policies for genetic research, and relationship between data and patenting in genomic science); Rebecca S. Eisenberg, *Patents and Data-Sharing in Public Science*, 15 Indus. & Corp. Change 1013, 1020–29 (2006) (discussing importance of data sharing in public science and related challenges); Rebecca S. Eisenberg & Arti K. Rai, *Harnessing and Sharing the Benefits of State-Sponsored Research: Intellectual Property Rights and Data Sharing in California’s Stem Cell Initiative*, 21 Berkeley Tech. L.J. 1187, 1189 (2006) (“[Data] sharing and aggregation facilitate observations that would otherwise be impossible”); see also The White House, *Open Government Initiative*, at <http://www.whitehouse.gov/open> (on file

The implementation of quasi-patents and semi-patents can be best accomplished through a two-step approach. First, quasi-patents and semi-patents can be readily implemented in innovation-sharing collectives where they can be introduced and enforced via licensing agreements. In recent years, a variety of cooperative efforts based on knowledge and patent sharing have developed across national and industrial borders. Such “communities of innovation,” as we term them, already use private licenses to limit patent rights. Evidence suggests that these settings would be ideal test beds for the models introduced in this Article. Members of such communities could contractually agree to refrain from seeking full patent protection, and settle instead for the more limited protection offered by quasi- or semi-patents.

The second phase would be to introduce quasi- and semi-patents outside of the context of communities of innovation—namely, into the general patent system. Here, of course, one might ask why any inventor would opt into less protection than the maximum degree accorded by the law—that is, full patent protection. One reason inventors prefer lesser protection may be purely ideological. If the emergence of Creative Commons in the area of expressive works is to teach us anything, it is the importance of ideological preference. In the context of copyright law, a multitude of creators have voluntarily agreed to cede many of the exclusionary powers bestowed upon them by copyright law out of an ideological belief in the importance of sharing. We assume that, like creators, at least some inventors value sharing highly enough to sacrifice some protection in order to further this goal.⁷ With that said, we are not so naïve as to believe that quasi- and semi-patents can compete against traditional patents based on ideology alone. Hence, we propose that policymakers employ various incentives to induce inventors to select quasi- or semi-patents over traditional ones. Policymakers have a wide range of tools that can be used toward this end, including lower examination fees for quasi- and semi-patent applications, shorter review periods, fewer and smaller renewal fees, extended protection terms, preferable tax treat-

with the *Columbia Law Review*) (last visited Jan. 21, 2011) (collecting and publishing wealth of raw data in accordance with new government initiative).

7. One might respond that we should not expect inventors to act in a similar fashion because most expressive works are valueless whereas inventions are valuable. We address this argument in detail in Part IV, *infra*. At this point, suffice it to say that this argument is predicated on the false assumption that all inventions are valuable. In fact, most patented inventions are of little to no value. See John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 *AIPLA Q.J.* 185, 205 (1998) (deducing that large percentage of litigated patents are eventually held invalid); Yochai Benkler, *Coase's Penguin, or, Linux and The Nature of the Firm*, 112 *Yale L.J.* 369, 435 (2002) (noting “relatively small independent value” of “fine-grained contributions” to large-scale peer-produced works); Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 *Nw. U. L. Rev.* 1495, 1507 (2001) [hereinafter Lemley, *Rational Ignorance*] (estimating only five percent of issued patents are litigated or licensed for royalty); see also Kimberly A. Moore, *Worthless Patents*, 20 *Berkeley Tech. L.J.* 1521, 1545–52 (2005) (suggesting means of identifying patent value).

ment, or any combination thereof. While the provision of such incentives would carry institutional costs, we posit that these costs would be outweighed by the benefits that partial patents could bring, both in the form of increased innovation and diminished burdens on our patent system as a whole.

Put in the broader perspective of patent law scholarship, the introduction of quasi- and semi-patents constitutes a different way to reform the patent system and improve its workings. Our proposal is consistent with the reform-focused tenor of contemporary patent scholarship.⁸ But most reform proposals in the extant academic literature focus on the workings of two institutions: the U.S. Patent and Trademark Office (USPTO) and the Federal Circuit. The USPTO has been faulted for approving applications too leniently, while the Federal Circuit has been criticized for upholding seemingly invalid patents. Hence, several leading commentators have called on both institutions to adopt stricter interpretations of the threshold requirements for receiving patent protection, thereby making it harder to obtain patents.⁹ Another group of theorists has argued that a better way to improve the quality of patents is to raise private costs for patentees by increasing patent examination and renewal fees. Raising the price of patent protection, so the argument goes, would induce applicants to give up on low-value applications that are of relatively low importance to society.¹⁰

Our proposal differs from other reform proposals in two important respects. First, it is voluntary in nature. Second, it relies on “carrots,”

8. See generally James Bessen & Michael J. Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* 3–4 (2008) [hereinafter Bessen & Meurer, *Patent Failure*] (providing “first comprehensive empirical evaluation of the patent system’s performance”); Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents* 2 (2004) [hereinafter Jaffe & Lerner, *Discontents*] (“[T]he patent system—intended to foster and protect innovation—is generating waste and uncertainty that hinders and threatens the innovative process.”); Nat’l Research Council of the Nat’l Acads., *A Patent System for the 21st Century* 81–129 (Stephen A. Merrill et al. eds., 2004) [hereinafter NRC, *21st Century*], available at <http://www.nap.edu/books/0309089107/html> (on file with the *Columbia Law Review*) (recommending improvements to current patent system).

9. See, e.g., Jaffe & Lerner, *Discontents*, supra note 8, at 171, 178–81 (discussing ways to improve patent quality); John H. Barton, *Non-Obviousness*, 43 *IDEA* 475, 492–93 (2003) (suggesting stricter nonobviousness standard in some industries); Nancy T. Gallini, *The Economics of Patents: Lessons from Recent U.S. Patent Reform*, *J. Econ. Persp.*, Spring 2002, at 131, 147–48 (2002) (indicating weak review standards are to blame for prevalence of patent thickets).

10. This argument assumes a strong positive correlation between private and social value. For a persuasive defense of this assumption, see Jonathan S. Masur, *Process as Purpose: Costly Screens, Value Asymmetries, and Examination at the Patent Office*, 2 *J. Legal Analysis* (forthcoming 2011) (manuscript at 40–41), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1105184 (on file with the *Columbia Law Review*) (distinguishing argument that higher prices will buy stricter review from argument that higher prices themselves work to filter out less valuable patents).

rather than “sticks.”¹¹ Essentially, all other proposals aim at making it harder for applicants to obtain patent protection either directly, by levying higher fees on applicants, or indirectly, by requiring them to undergo a stricter review process. Our proposal, by contrast, seeks to induce applicants to opt for less protection voluntarily by offering them a richer menu of protection options and making full patent protection less attractive *relative* to quasi- and semi-patents. We achieve this by offering more favorable treatment to quasi- and semi-patent applicants in order to reward them for giving up some of the protection afforded to them by the law. Second, implementation of our proposal does not require a major reform of the current regime. In fact, in the context of communities of innovation, the concepts of quasi- and semi-patents may be introduced and implemented contractually without external intervention. Admittedly, a full-scale implementation would require the USPTO to recognize two new categories of protection and provide incentives for applicants to select them. But these changes are quite minor and do not require a massive investment of resources.

As a result of these two differences, our proposal is unlikely to meet with strong opposition from any of the interest groups that shape patent policies. Our proposal does not erode inventors’ rights; on the contrary, it gives them more choices and the possibility of better-tailored protection. Likewise, our proposal does not require an overhaul of the USPTO. It does not require patent examiners to undergo special training or modify the review process. Finally, it does not necessitate significant expenditures, and hence it is unlikely to be opposed by politicians—especially if inventors will endorse it. Consequently, from a practical standpoint, our proposal is much more likely to be passed than other reform proposals.

A short caveat is in order here. Our proposal is not a panacea, and its implementation will not remedy all the ailments of the patent system. We see it as a modest first step in the right direction. Our proposal is intended to complement, rather than substitute, other proposals. Our goal is to redesign the basic concepts, or building blocks, of which our innovation system is made. Other theorists have focused on ways to improve the workings of the institutions that operationalize those concepts, namely the USPTO and the Federal Circuit. Hence, there is no rivalry nor even conflict between our proposed system and other designs; there are in fact opportunities for synergies. For instance, existing proposals to raise patent application fees could heighten the draw of quasi- and semi-patents for some applicants.

This Article unfolds in four parts. In Part I, we discuss the main scholarly criticisms of the patent system and address the principal proposals for reform. In Part II, we introduce the concepts of quasi-patents and

11. See generally Ian Ayres, *Carrots and Sticks: Unlock the Power of Incentives to Get Things Done* 24–28 (2010) [hereinafter Ayres, *Carrots and Sticks*] (discussing effectiveness of contingent rewards and punishments in various contexts).

semi-patents and review their theoretical underpinnings. In Part III, we explain how quasi- and semi-patents can enhance research in communities of innovation. In Part IV, we explore possible ways of implementing the concepts more broadly by offering these modes of protection as alternatives to traditional patent protection. A brief conclusion follows.

I. THE PUSH TO SCALE BACK PATENTS

In this Part, we commence our analysis by reviewing the theoretic literature on the U.S. patent system. Since a comprehensive discussion of the topic could fill volumes, we will confine our review to the main criticisms of the patent system and the principal reform proposals. As we will show, most contemporary theorists are of the opinion that our patent system is ill designed to support innovation, and some even suggest that it has become a drag on innovation.

Most scholarly accounts have placed the blame for the sorry state of the patent system on two institutions: the USPTO and the Federal Circuit.¹² The USPTO, for its part, has lowered the threshold for securing patent protection, making it possible to obtain patents over almost any invention, including many dubious ones.¹³ The Federal Circuit has complemented the USPTO by protecting patents from legal challenges, extending the reach of patent protection to such realms as business methods, and awarding patentees excessive remedies against infringers.¹⁴ These changes have rendered patent protection overbroad and cumbersome. Not surprisingly, the USPTO and the Federal Circuit have thus become the targets of most reform proposals. In the following paragraphs, we will elaborate on the criticisms of the patent system and discuss the chief proposals for rekindling innovation.

A. *The Overbreadth of Patents*

Patent scholarship can be divided into two developmental stages. In the first stage, theorists focused on the static efficiency cost of patents on consumers. From this perspective, patent protection represented a trade-off between dynamic and static efficiency.¹⁵ Patents spurred innovation and hence enhanced dynamic efficiency. However, they only did so at the cost of a social deadweight loss. Drawing on economic analysis of monopolies, commentators have argued that the exclusivity afforded by patents invariably leads patentees to restrict output and thereby charge

12. See *supra* notes 8–9 and accompanying text.

13. See *infra* notes 24–27 and accompanying text (noting recent rise in number of patents and concerns over rigor of patent review process).

14. See *infra* notes 32–36 and accompanying text (reviewing recent scholarship faulting Federal Circuit for making patents easier to enforce and harder to invalidate).

15. See Ian Ayres & Gideon Parchomovsky, *Tradable Patent Rights*, 60 *Stan. L. Rev.* 863, 867 (2007) (discussing shift in scholarly focus from static to dynamic efficiency costs).

supracompetitive prices for patented inventions.¹⁶ As a consequence, some consumers who would have been willing to pay competitive prices for patented products could not obtain them. The foregone transactions represented an efficiency loss that preoccupied the minds of patent scholars.

Not surprisingly, this line of analysis led patent scholars to search for mechanisms that would maximize research incentives while lessening the short-term static efficiency costs patentees can generate. The main mechanism scholars considered was compulsory licenses.¹⁷ The idea was to take away from patentees the power to set the price of patented products and processes and, instead, to vest this power in some third party—typically, an administrative agency, a specialized tribunal, or a court.¹⁸ Other proposals called for the empowerment of consumers via organization into purchase groups, which, in turn, would improve their bargaining position vis-à-vis patentees. Another option that received consideration was to abandon patents altogether and replace them with a system of government-sponsored prizes,¹⁹ or even auctions.²⁰

16. See, e.g., Arti K. Rai, *The Information Revolution Reaches Pharmaceuticals: Balancing Innovation Incentives, Cost, and Access in the Post-Genomics Era*, 2001 U. Ill. L. Rev. 173, 177–78 (explaining patented drugs “are often sold in limited quantities at supracompetitive prices” because “standard economic theory predicts that a profit-maximizing producer with monopoly power will charge more and produce less than a producer in a competitive market”).

17. See generally Martin J. Adelman, *Property Rights Theory and Patent-Antitrust: The Role of Compulsory Licensing*, 52 N.Y.U. L. Rev. 977, 1001–02 (1977) (discussing patent compulsory licensing scheme); Pankaj Tandon, *Optimal Patents with Compulsory Licensing*, 90 J. Pol. Econ. 470, 470–74 (1982) (same); Cole M. Fauver, *Comment, Compulsory Patent Licensing in the United States: An Idea Whose Time Has Come*, 8 Nw. J. Int'l L. & Bus. 666, 668–74, 683–85 (1988) (same).

18. Effectively, the introduction of compulsory licenses substitutes a patentee's property rule protection for liability rule protection. For more on property and liability rules, see Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 Harv. L. Rev. 1089 (1972); see also Abraham Bell & Gideon Parchomovsky, *Pliability Rules*, 101 Mich. L. Rev. 1 (2002).

19. See John F. Duffy, *The Marginal Cost Controversy in Intellectual Property*, 71 U. Chi. L. Rev. 37, 39, 41–51 (2004) (analyzing proposed intellectual property subsidies within broader theoretical framework of public utility regulation); Steven Shavell & Tanguy Van Ypersele, *Rewards Versus Intellectual Property Rights*, 44 J.L. & Econ. 525, 525 (2001) (concluding “intellectual property rights system does not enjoy any fundamental advantage over the reward system”).

20. See Michael Kremer, *Patent Buyouts: A Mechanism for Encouraging Innovation*, 113 Q.J. Econ. 1137, 1146–48 (1998) (describing system in which auction process would be employed to determine value of patent buyout price); see also Michael Abramowicz, *Perfecting Patent Prizes*, 56 Vand. L. Rev. 115, 148–58 (2003) (discussing, inter alia, Kremer's auction-based proposal); Michael Abramowicz, *The Uneasy Case for Patent Races over Auctions*, 60 Stan. L. Rev. 803, 844–53 (2007) (discussing various patent auction designs); Oren Bar-Gill & Gideon Parchomovsky, *A Marketplace for Ideas?*, 84 Tex. L. Rev. 395, 419 (2005) (suggesting system in which right to develop registered idea is auctioned to highest bidder); Chris J. Katopis, *Perfect Happiness?: Game Theory as a Tool for Enhancing Patent Quality*, 10 Yale J.L. & Tech. 360, 397 (2008) (“The auction helps weed out those patents of foreseeably little economic value or industrial importance.”).

Stage two, as we call it, was marked by an important shift in scholarly focus. Over time, commentators turned their attention away from the deadweight loss of patents and concentrated instead on the impact of patents on subsequent innovation.²¹ The core question was starkly simple: Does our patent system, in its current design, spur or hinder innovation? To answer this question, scholars began to closely examine the patent system at large, its institutions, and their practices. A sharp increase in patent application and issuance rates prompted concerns about the rigor of review at the USPTO,²² and a rise in patent litigation rates led some to believe that Federal Circuit jurisprudence had inspired more litigation than innovation.²³

Between 1990 and 2009, the number of U.S. patent filings nearly tripled from 176,264 to 482,871, and the number of patents grew from 99,077 to 191,927.²⁴ Careful studies have concluded that the USPTO's examination process may be partly responsible for this dramatic increase. Recent studies estimate that the percentage of applications that mature into patents is higher than seventy percent, with some commentators suggesting that the rate is actually as high as eighty-five percent.²⁵ This high approval rate, combined with the fact that, on average, examiners spend about eighteen hours on each patent application, has led scholars to discern a lack of rigor in the USPTO's review process.²⁶ But the evidence

21. See Ayres & Parchomovsky, *supra* note 15, at 867 (discussing this broad shift in focus of patent scholarship).

22. See, e.g., Arti K. Rai, *Growing Pains in the Administrative State: The Patent Office's Troubled Quest for Managerial Control*, 157 U. Pa. L. Rev. 2051, 2057–59 (2009) [hereinafter Rai, *Growing Pains*] (discussing recently increased workload and patent backlog at USPTO).

23. See Gideon Parchomovsky & R. Polk Wagner, *Patent Portfolios*, 154 U. Pa. L. Rev. 1, 56 (2005) (noting that, although patent litigation rates do not appear to have increased overall, “the rate of such litigation is rising among small firms and firms with smaller total patents”). But see Jean O. Lanjouw & Mark Schankerman, *Enforcing Intellectual Property Rights 3* (Nat'l Bureau of Econ. Research, Working Paper No. 8656, 2001), available at <http://nber.org/papers/w8656.pdf> (on file with the *Columbia Law Review*) (“[T]he growth in patenting has been comparable to the growth in litigation . . .”).

24. U.S. Patent & Trademark Office, *U.S. Patent Statistics Chart, Calendar Years 1963–2009* (2010), at http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm (on file with the *Columbia Law Review*).

25. See Mark A. Lemley & Bhaven Sampat, *Is the Patent Office a Rubber Stamp?*, 58 Emory L.J. 181, 201 (2008) (noting USPTO “grants patents to more than 70% of those who apply”); Cecil D. Quillen, Jr., Ogden H. Webster & Richard Eichmann, *Continuing Patent Applications and Performance of the U.S. Patent and Trademark Office—Extended*, 12 Fed. Cir. B.J. 35, 38 (2002) (discussing different methods of estimating grant rate and estimating adjusted grant rate in which patents were granted on both parent and continuing applications at eighty-five percent).

26. See, e.g., Lemley, *Rational Ignorance*, *supra* note 7, at 5–6 (citing average figure of eighteen hours); cf. *Patent Nonsense*, *Economist*, Apr. 8, 2000, at 78 (citing average figure of eight hours); Amit Asaravala, *Dodgy Patents Rile Tech Industry*, *Wired*, Apr. 5, 2004, at <http://www.wired.com/techbiz/media/news/2004/04/62930> (on file with the *Columbia Law Review*) (quoting Brigid Quinn, USPTO spokesperson, as stating that patent examiners spend average of thirty hours reviewing software patents).

goes beyond statistics alone; the issuance of dubious patents has also become a common topic of discussion in popular media.²⁷

Critics note the USPTO's funding structure has undoubtedly contributed to the high levels of patent issuance. Legislation in the early 1990s switched the office's source of funding from taxpayer dollars to fees paid by applicants.²⁸ As economists Adam Jaffe and Josh Lerner explain, by adopting this system, the USPTO developed new financial incentives to issue more patents.²⁹ In effect, patent applicants went from being "candidates" to "customers."³⁰ Contemporary scholarship portrays the USPTO as overworked, underfunded, and understaffed.³¹

But responsibility doesn't fall on the shoulders of the USPTO alone: The Federal Circuit has attracted criticism from legal scholars for expanding/broadening patent rights to a degree that has contributed to the rising tide of filings. Critics often cite decisions that extended the range of eligible subject matter to include, inter alia, business methods, software, and human genes.³² Similarly, the court has been faulted for narrowing the standards of obviousness,³³ broadening the ways patentees

27. See, e.g., Leslie Kaufman, Amazon Sues Big Bookseller Over System for Shopping, *N.Y. Times*, Oct. 23, 1999, at C1 (discussing suit over Amazon's "one-click" shopping patent, U.S. Patent No. 5,960,411 (filed Sept. 12, 1997)); Pete Williams, Smuckers in Legal Jam Over PB&J Patent, *Nightly News* (NBC television broadcast Apr. 6, 2005), available at <http://msnbc.msn.com/id/7408857> (on file with the *Columbia Law Review*) (discussing potential patent for "sealed crustless" peanut butter and jelly, U.S. Patent No. 6,004,596 (filed Dec. 8, 1997)).

28. See Jaffe & Lerner, *Discontents*, supra note 8, at 11 (discussing USPTO funding changes).

29. See *id.* ("[T]he PTO views itself as an organization whose mission is to serve patent applicants. And, of course, what applicants want is for their applications to be granted.").

30. See U.S. Dep't of Commerce, *Working for Our Customers: A Patent and Trademark Office Review* 1, 3 (1994), at http://www.uspto.gov/about/stratplan/ar/1994/annualreport_pg1-5.pdf (on file with the *Columbia Law Review*) (referring to applicants as "customers").

31. See Jaffe & Lerner, *Discontents*, supra note 8, at 131 (discussing rising number of patents per examiner); see also Jay P. Kesan & Andres A. Gallo, Why "Bad" Patents Survive in the Market and How Should We Change?—The Private and Social Costs of Patents, 55 *Emory L.J.* 61, 67–68 & n.29 (2006) (discussing incentives within USPTO that lead to issuance of low quality patents). Consistent descriptions are legion in the press. See, e.g., Simson L. Garfinkel, *Patently Absurd*, *Wired*, July 1994, at 104, 108 (discussing examiner quotas and job burnout); Lawrence D. Maloney, *Patent Office Faces Backlog Crisis*, *Design News* (Mass.), Jan. 10, 2005, at 27 (discussing increasing workload examiners face and common practice of working unpaid overtime).

32. See, e.g., *State St. Bank & Trust Co. v. Signature Fin. Grp., Inc.*, 149 F.3d 1368, 1375 (Fed. Cir. 1998) (establishing "useful, concrete, and tangible result" test (quoting *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994))); cf. *Bilski v. Kappos*, 130 S. Ct. 3218, 3226 (2010) (stating satisfying "machine-or-transformation" test is not sole indicium of patentability and refusing to categorically exclude business method or software patents).

33. See, e.g., Brief of Intellectual Property Law Professors as *Amici Curiae* in Support of Petitioner at 10–11, *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007) (No. 04-1350) (arguing Federal Circuit has made obviousness standard too strict); Rebecca S. Eisenberg, *Obvious to Whom? Evaluating Inventions from the Perspective of PHOSITA*, 19 *Berkeley*

can prove nonobviousness,³⁴ and expanding the awards available to patentees.³⁵ On balance, recent scholarship posits that the Federal Circuit has made patents easier to enforce and harder to invalidate. And so, the practices of two governmental bodies have fueled what many scholars call a patent “crisis.”³⁶

But is there truly a cause for such alarm? After all, it may be argued that stronger patent rights a fortiori lead to more innovation, and that the spike in the number of filings is living proof of this hypothesis.³⁷ Unfortunately, studies indicate that the recent rise in patenting does not stem from greater investments in research and development, or more significant innovations, but rather, from a deliberate effort on the part of firms to maximize the size of their patent holdings.³⁸ Recent examinations show that under the USPTO’s lax review standards, applicants extract value from the patent system by filing high numbers of low-quality applications.³⁹ Among other things, this lowers the usefulness of patents as “screens” for important innovations.⁴⁰

Furthermore, it has been suggested that the recent strengthening of patent rights has created a financial drag on innovation. Patent litigation, once a modest concern for many firms, has developed into a significant business cost for corporations over the past thirty years.⁴¹ The num-

Tech. L.J. 885, 888–89 (2004) (documenting and critiquing diminished consideration of PHOSITAs in Federal Circuit obviousness determinations and suggesting new approach); John R. Thomas, Formalism at the Federal Circuit, 52 Am. U. L. Rev. 771, 773 (2003) (explaining why, although lenient nonobviousness standard holds some immediate advantages for patent applications, it allows for greater number of low-quality patents).

34. See *Teleflex*, 550 U.S. at 426–27 (changing focus of obviousness determinations to knowledge and abilities of persons of ordinary skill in the art); In re Dembiczak, 175 F.3d 994, 998–1000 (Fed. Cir. 1999) (setting forth that obviousness can be defeated by “suggestion, teaching, or motivation to combine,” now commonly known as the “teaching-suggestion-motivation” (TSM) test); see also Dan L. Burk & Mark A. Lemley, Courts and the Patent System, Regulation, Summer 2009, at 18, 21 (discussing *Teleflex* decision).

35. See *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1555 (Fed. Cir. 1995) (extending range of lost profits available in cases of infringement).

36. See, e.g., Dan L. Burk & Mark A. Lemley, The Patent Crisis and How Courts Can Solve It (2009).

37. Jaffe & Lerner, Discontents, supra note 8, at 11–12 (explaining and refuting this argument); see also Bessen & Meurer, Patent Failure, supra note 8, at 145–46 (explaining and refuting related or analogous arguments that patent system is working).

38. See, e.g., Ayres & Parchomovsky, supra note 15, at 868 (discussing conscious effort by firms to “maximize the number of patents per R&D dollar”).

39. Parchomovsky & Wagner, supra note 23, at 17, 52 (“[F]irms patent heavily *not* to realize the value of individual patents, but to purchase the advantages of the aggregation of these individual patents into patent portfolios.”); Wagner, Patent-Quality, supra note 5, at 2138 (presenting question of why patentees increasingly follow a high-volume, low-quality approach to patenting).

40. See Ayres & Parchomovsky, supra note 15, at 865 (discussing scholarly focus on reforming patent system to act as better screen).

41. Different methodologies place the average cost of litigation within a wide range. According to the AIPLA, the direct legal costs of a typical patent lawsuit are about \$5 million. See Bessen & Meurer, Patent Failure, supra note 8, at 132 (explaining that cases

ber of patent lawsuits nearly doubled between 1988 and 2001.⁴² Corporations in the pharmaceutical, computer software, and semiconductor industries frequently set aside annual litigation budgets of millions of dollars—funds that arguably would be better spent on research and development of drugs or other useful technologies.⁴³ The human toll of patent litigation has also not gone ignored by scholars.⁴⁴ When scientists and engineers are compelled to serve as witnesses, they are often removed from pursuing their professional endeavors for weeks, months, and sometimes years.⁴⁵

The costs of litigation reach beyond plaintiffs and defendants. Surveys and practitioner accounts show that the risks of litigation and the potentially high costs of investigating existing patents deter many firms from pursuing certain lines of research and development in the first place.⁴⁶ The deterrent is strongest for small fledglings that cannot risk the chance of a lawsuit.⁴⁷ Similar anecdotal evidence, supported by some limited empirical evidence, suggests that the rate of settlement in patent

that go to trial typically cost several million dollars for each side); Lemley, *Rational Ignorance*, supra note 7, at 1502 (estimating total annual amount spent on patent litigation to be \$2.1 billion); Bart Showalter, Presentation at AIPLA Mid-Winter Conference: Cost of Patent Litigation (Jan. 25, 2008), available at http://www.aipla.org/Content/ContentGroups/Speaker_Papers/Mid-Winter1/20083/Showalter-slides.pdf (on file with the *Columbia Law Review*) (citing median 2007 cost figure of \$5 million when more than \$25 million is at stake in a patent suit). Experts note that costs can sharply rise when more money is at stake, especially during discovery stages. Stuart J.H. Graham & Dietmar Harhoff, *Can Post-Grant Reviews Improve Patent System Design? A Twin Study of US and European Patents* 5 (Ctr. for Econ. Policy Research, Discussion Paper No. 5680, 2006), available at www.cepr.org/pubs/dps/DP5680.asp (on file with the *Columbia Law Review*).

42. NRC, *21st Century*, supra note 8, at 32; cf. Jean O. Lanjouw & Mark Schankerman, *Enforcement of Patent Rights in the United States*, in *Patents in the Knowledge-Based Economy* 145, 145–46 (Wesley M. Cohen & Stephen A. Merrill eds., 2003) (noting increase in patent lawsuits, but overall rate of suit filings per issued patent has been constant).

43. See 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 (1999) [hereinafter *Merges, Impossible Patents*] (citing “foregone research opportunities” among indirect costs of patent litigation).

44. See, e.g., James W. Brady, Jr. & Edward A. Meilman, *Questions Boards of Directors Should Ask the Head of Their Intellectual Property Operation*, *Intell. Asset Mgmt.*, available at http://www.buildingipvalue.com/n_us/106_109.htm (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011) (“The toll on human resources and disruption of the company’s business when attention is diverted to discovery and other litigation tasks also can be significant.”).

45. See Bessen & Meurer, *Patent Failure*, supra note 8, at 132 (2008) (discussing such business costs).

46. See Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 *Science* 698, 699 (1998) (discussing how “specter of rights” surrounding patent may discourage risk-averse product developers and investors); Lanjouw & Schankerman, supra note 42, at 146 (noting small firms avoid research and development in areas where litigation risk is high).

47. Lanjouw & Schankerman, supra note 42, at 159 (explaining why large firms are better suited to weather patent litigation as compared to small firms).

cases is heightened by this deterrent effect.⁴⁸ While litigation is a necessary and important aspect of any privately enforced property regime, the view prevails in academia and in mass media that the frequency and scale of patent lawsuits have become cause for concern.⁴⁹

A final and less obvious consequence of the overbreadth of patents stems from their potential for strategic misuse. For example, today it is common for multiple firms to hold overlapping patents that cover a single product or technology. The power of such “patent thickets” to discourage competition in important industries, such as computer software and pharmaceuticals, and the related issue of predatory “patent trolls” have become common themes in patent policy discourse.⁵⁰

B. *Extant Proposals for Reform*

Like global climate change, the scope and causes of the patent problem are difficult to precisely measure, but experts generally agree that solutions are needed quickly. Tracing the problem back to its roots, many scholars believe that innovation can be repaired through institutional reforms in the USPTO and Federal Circuit. The most common proposals typically fall into three categories: improving the quality of review at the USPTO, charging patent holders higher fees, and encouraging stricter standards within the Federal Circuit.

Scholars generally agree that stricter review of patent applications would not only yield better patents, but would also likely discourage the filing of dubious applications. More precise review could be achieved by tightening threshold standards for patentability,⁵¹ and by having examiners spend more time reviewing fewer applications. Easing these pressures would require hiring more examiners and improving the USPTO’s processing capabilities—measures that would require significant funds. As a result, a rich body of scholarship has developed on what additional resources the USPTO needs.⁵²

48. *Id.*

49. Michael Fitzgerald, *A Patent Is Worth Having, Right? Well, Maybe Not*, N.Y. Times, July 15, 2007, at B3 (discussing litigation costs exceeding patent profits).

50. Ayres & Parchomovsky, *supra* note 15, at 867–76 (2007) (discussing patent thickets); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, in *1 Innovation Policy and the Economy* 119, 120 (Adam B. Jaffe et al. eds., 2001), available at <http://faculty.haas.berkeley.edu/shapiro/thicket.pdf> (on file with the *Columbia Law Review*) (same).

51. See Bessen & Meurer, *Patent Failure*, *supra* note 8, at 248 (discussing tightening standard for obviousness in USPTO).

52. See, e.g., John R. Allison & Starling D. Hunter, *On the Feasibility of Improving Patent Quality One Technology at a Time: The Case of Business Methods*, 21 *Berkeley Tech. L.J.* 729, 785 (2006) (analyzing how USPTO initiative to improve review required substantial resources); Rai, *Growing Pains*, *supra* note 22, at 2066 (suggesting additional “[c]ompensatory benefits in the form of higher salaries or substantially improved information-technology tools”); Carl Shapiro, *Patent System Reform: Economic Analysis and Critique*, 19 *Berkeley Tech. L.J.* 1017, 1036 (2004) (evaluating funding based on USPTO’s “production function”); Mark Lemley, Douglas Lichtman & Bhaven Sampat,

Other proposals focus on the amount of information available to examiners. Studies show that examiners working in isolation are often unable to locate and analyze every possible prior art reference that might render a patent invalid.⁵³ One innovative solution to this information deficit is Professor Noveck's "Peer to Patent Project," a pilot program at the USPTO which enlisted the general public to collect and rate prior art with the aid of a collaborative website.⁵⁴ In a similar vein, economists Adam Jaffe and Josh Lerner propose a system of "pre-grant opposition" in which the public would submit evidence of invalidating prior art before any patent is granted.⁵⁵

An opposing school of thought holds that patents should be scrutinized *ex post*. Post-grant reexamination procedures are available in the United States in two forms: (1) *ex parte* reexaminations in which third-party challengers are removed from the process (even if they initiate the proceedings), and (2) *inter partes* reexamination, in which challengers are permitted to participate.⁵⁶ However, existing reexaminations are limited in several ways: They can only be initiated if new prior art is discovered, or if a substantial new question concerning old prior art comes up, and only some kinds of evidence can be used to prove invalidity.⁵⁷ Academics and policymakers have recently proposed new post-grant review mechanisms that would allow for more meaningful scrutiny. For example, the FTC has proposed permitting post-grant challenges based on issues of novelty, nonobviousness, written description, enablement, and utility.⁵⁸ Recent academic and legislative proposals echo these suggestions.⁵⁹ Legal and economic experts believe that a post-grant system with

What to Do About Bad Patents?, Regulation, Winter 2005–2006, at 10, 10 (2005) ("The obvious solution would be to throw money at the problem."). But see Lemley, Rational Ignorance, *supra* note 7, at 1510 (arguing it may be economically optimal to address low quality "ex post, [when] the patent is asserted in litigation"). Recent reform proposals in Congress support this idea as well. See Patent Reform Act of 2009, S. 515, 111th Cong. § 5 (2009) (proposing expansion of post-grant review).

53. Beth Simone Noveck, "Peer to Patent": Collective Intelligence, Open Review, and Patent Reform, 20 Harv. J.L. & Tech. 123, 135–38 (2006) (discussing information deficit in patent office).

54. The Peer to Patent project was carried out as a USPTO pilot project. Peer to Patent, at <http://www.peertopatent.org> (last visited Jan. 21, 2011).

55. Jaffe & Lerner, Discontents, *supra* note 8, at 180.

56. 35 U.S.C. §§ 301–307 (2006) (*ex parte* reexaminations); 35 U.S.C. §§ 311–318 (*inter partes* reexamination).

57. 35 U.S.C. § 301 (limiting prior art eligible for consideration during reexamination to patents or printed publications); 35 U.S.C. § 304 (requiring substantial new question of patentability to be raised).

58. Fed. Trade Comm'n, To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy 8 n.26 (2003), available at <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (on file with the *Columbia Law Review*).

59. NRC, 21st Century, *supra* note 8, at 101; see also Patent Reform Act of 2009, S. 515, 111th Cong., § 5 (2009) (allowing for evidence of prior use or prior sale in addition to evidence of prior art in a post-grant challenge).

such features could reduce the need for costly litigation, as well as the number of patents that draw undeserved licensing fees.⁶⁰

Shifting focus from examiners to applicants, reformers believe that increasing the cost of patenting would also help to stem the patent tide. A direct way to discourage overly zealous patenting would involve raising threshold application fees. Proponents of this approach believe that a steep application fee would act as a “costly screen,” forcing applicants to consider, *ex ante*, whether the expected benefits of their idea exceed the costs.⁶¹ However, others note that this approach could unfairly block small firms from obtaining patents in the first place.⁶² A popular alternative proposal solves this problem by keeping application fees low, but raising renewal costs.⁶³ The main advantage of this approach is that it has the potential to eliminate “deadwood” without discouraging new entrants with valuable inventions.⁶⁴

There are numerous suggestions that the Federal Circuit scale back the range of subject matter eligible for patentability. Patents covering software and abstract business methods have long been a focal point in such proposals. Citing software patents as uncertain in scope, often vague, obvious, sometimes profoundly difficult to analyze for infringement, and yet frequently litigated, critics have called on the Federal Circuit to dictate tighter standards for software patentability, or to abolish software patents altogether.⁶⁵ Genetic patents have received similar criticisms.⁶⁶ Many basic tools of genetic research are locked up in patents, a situation that many believe continues to impede medical research.⁶⁷

60. Graham & Harhoff, *supra* note 41, at 4 (concluding that post-grant review would “allow for large welfare gains”). But see Bessen & Meurer, *Patent Failure*, *supra* note 8, at 223–25 (agreeing that expanded post-grant review system would raise social welfare, but questioning degree to which it would reduce drag of costly litigation).

61. See Masur, *supra* note 10 (manuscript at 17–18) (discussing potential upside to increased costs).

62. See Rochelle Dreyfuss, *Pathological Patenting: The PTO as Cause or Cure*, 104 *Mich. L. Rev.* 1559, 1577 (2006) (arguing “application fees should be low enough to attract patenting by all inventors”).

63. Bessen & Meurer, *Patent Failure*, *supra* note 8, at 247.

64. *Id.*

65. See Pamela Samuelson, *Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 *Emory L.J.* 1025, 1135–40 (1990) (proposing sole reliance on copyrights, not patents, to protect software). Some critics say the Federal Circuit has improperly disregarded restrictions on abstract claims. See Bessen & Meurer, *Patent Failure*, *supra* note 8, at 187, 201, 210–13 (“Unfortunately, the Federal Circuit has set software-specific precedents that essentially remove most restrictions on abstract claims in software.”).

66. See, e.g., Jon. F. Merz, *Discoveries: Are There Limits on What May Be Patented?*, in *Who Owns Life?* 99, 99–101 (David Magnus et al. eds., 2002) (discussing who can and should rightfully own genetic discoveries).

67. See Heller & Eisenberg, *supra* note 46, at 698 (“A proliferation of intellectual property rights upstream may be stifling life-saving innovations further downstream in the course of research and product development.”).

Some commentators also believe the Federal Circuit should ease the standards of obviousness. Obvious inventions, so the argument goes, will always be produced regardless of whether they are patentable. So, patents should be reserved only for nonobvious ideas.⁶⁸ There is reason to believe that a tighter nonobviousness standard would also lower the number of trivial patents, thus making it easier for innovators to conduct clearance searches.⁶⁹ Once again, computer software and gene-based patents feature prominently in the campaign for such reforms. Studies show that prior art in the realm of software is often unavailable to examiners, suggesting that software patents are not accurately screened for obviousness.⁷⁰ In the field of genetic science, the Federal Circuit has developed special rules that make obviousness particularly difficult to prove.⁷¹

A final standard cited as ripe for reform is the Federal Circuit's presumption that issued patents are valid. Under current law, any challenger must prove "by clear and convincing evidence" that a patent is invalid.⁷² By contrast, patentees can establish infringement "by a preponderance of the evidence"—a lower standard.⁷³ Thus, at trial, the evidentiary balance falls in favor of patent holders. Scholars reason that, given the USPTO's extremely lax review standards, this level of deference for issued patents is unwarranted. Many believe that the playing field should be leveled, by courts either abandoning the presumption of validity or lowering the necessary standard of proof.⁷⁴ To the same end, scholars have proposed new rules that would expand the range of evidence that could be used to prove invalidity.⁷⁵

In sum, it can be said that although there is a wide range of opinions about precisely how to reform the patent system, there is virtual consensus that at least some reform is needed. Viewed together, extant propos-

68. Bessen & Meurer, *Patent Failure*, supra note 8, at 248.

69. *Id.* at 236.

70. See Merges, *Impossible Patents*, supra note 43, at 589–90 (discussing unavailability of prior art in software industry).

71. NRC, *21st Century*, supra note 8, at 91–95 (“[A]n invention is only obvious and unpatentable when the obvious route to try is coupled with a ‘reasonable expectation of success.’”); see also Barton, supra note 9, at 492–93 (suggesting nonobviousness standard should be raised in certain industries); cf. Robert M. Hunt, *Nonobviousness and the Incentive to Innovate: An Economic Analysis of Intellectual Property Reform 37–38* (Dep’t of Research & Statistics, Fed. Reserve Bank of Phila., Working Paper No. 99-3, 1999), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=160674 (on file with the *Columbia Law Review*) (proposing different nonobviousness standards for different industries).

72. See, e.g., *Al-Site Corp. v. VSI Int’l*, 174 F.3d 1308, 1323 (Fed. Cir. 1999).

73. See, e.g., *Seal-Flex, Inc. v. Athletic Track & Court Constr.*, 172 F.3d 836, 842 (Fed. Cir. 1999).

74. But see Mark D. Janis, *Reforming Patent Validity Litigation: The “Dubious Preponderance,”* 19 *Berkeley Tech. L.J.* 923, 925–41 (2004) (calling into question arguments for altering standards associated with presumption of validity).

75. See Jaffe & Lerner, *Discontents*, supra note 8, at 188 (arguing parties to reexamination “should be able to bring forward any relevant factual evidence”).

als for reform are, by and large, “sticks” rather than “carrots”:⁷⁶ They address the patent problem by placing additional burdens on patent applicants. In some cases, the burdens are direct, as in the proposals for increasing application and renewal fees. In other proposals that call for stricter standards on the issuance and judicial review of patents, the burdens are less direct but potentially just as powerful. In the following Part, we advance a fundamentally different approach to rekindling the embers of innovation.

II. INTRODUCING QUASI-PATENTS AND SEMI-PATENTS

In this Part, we wish to highlight a different way of improving the workings of the patent system and, consequently, the rate and quality of innovation in our society. Instead of focusing on institutions—namely, the USPTO and the Federal Circuit—or the procedures they employ—particularly, the examination process and the appropriate standard of appellate review—we put the premium on the concepts, or legal constructs, that underlie our patent system.

At present, our patent system is predicated on a binary, one-size-fits-all, design. Inventors can choose between no protection and full patent protection. The Patent Act provides no intermediate positions. Of course, patentees can privately create intermediate protection contractually. But as Thomas Merrill and Henry Smith famously demonstrated, standardization is a critical element in the world of property.⁷⁷ Since property rights are rights in rem that avail against the rest of the world, the formalization and protection of property rights imposes costs on multiple third parties.⁷⁸ Standardization reduces information costs for third parties and hence economizes on valuable resources. Merrill and Smith used this insight to explain the closed enumeration (*numerus clausus*) principle that characterizes property systems.⁷⁹ Moreover, Merrill and Smith have shown the importance of optimal standardization—that is, of fashioning optimal menus of rights and duties.⁸⁰

While we do not presume to know what the optimal standardization of patent rights is, we posit that the current binary design that employs uniform protection is socially suboptimal. We further submit that the introduction of new protection modes to the menu of options available to patentees can improve social welfare. Giving inventors more choice can help reduce the drag patents create on future innovation. As we will show, a richer menu of protection modes can better align private and

76. See Ayres, *Carrots and Sticks*, supra note 11, at 24–26 (discussing economic theory of contingent reward and punishment).

77. Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 *Yale L.J.* 1, 8 (2000) (“[U]nusual property rights increase [] the cost of processing information about all property rights.”).

78. *Id.*

79. *Id.* at 26–35.

80. *Id.* at 38–40.

social welfare. Naturally, the precise effect of a richer protection menu depends on the design of the new protection options.

We propose adding two new categories of legal protection, which we dub quasi-patents and semi-patents. Although these options are mutually distinct, both models are designed to allow for more expansive uses of inventions and better information sharing. Viewed from the vantage point of potential patentees, the two new options we seek to add to the menu offer more limited protection than standard patents.

As Yair Listokin, who studied menus in the context of corporate law, has demonstrated, legal defaults and menus have an important effect on actors' choices. Listokin found that actors tend to adopt default arrangements provided by the legislature, even though they can modify them contractually. He particularly noted that the inclusion of an opt-in arrangement in a statutory menu increases the likelihood that it will be adopted relative to a purely contractual regime.⁸¹ Likewise, Ian Ayres has argued that "[l]awmakers . . . might affect contractual equilibria" through the use of menus.⁸² Like Listokin, Ayres posited that the provision of "an express statutory menu" can be used to channel actors' behavior and concluded emphatically that "menus matter."⁸³ There is good reason to expect, therefore, that the creation of a statutory menu consisting of traditional patents, as well as quasi-patents and semi-patents, will alter the existing equilibrium in the patent world. But before we fully specify how this change is to take place, we first need to present the concepts of quasi- and semi-patents.

A. *Background Property Theory*

In facing the challenge of calibrating patent protection to the most socially desirable level, policymakers can find valuable guidance in property theory. Changing the scope of the holder's rights or reconfiguring the asset to which the rights apply can often address problems of optimal protection.⁸⁴ The various changes in a property owner's right to exclude constitute a useful illustration and a potential blueprint for patent law. The exclusion rights of real property owners have been contracted in various ways in response to changing social needs. For example, the exclusion powers of land owners have been restricted with respect to workers

81. Yair Listokin, *What Do Corporate Default Rules and Menus Do? An Empirical Examination* 6 (Yale Law Sch., Research Paper No. 335, 2007), available at <http://ssrn.com/abstract=924578> (on file with the *Columbia Law Review*) (reporting fifty percent of corporations in Georgia, which has a menu statute, opt-in to fair price protection, as opposed to twenty percent in states that allow this option but do not include it in a statutory menu).

82. Ian Ayres, *Menus Matter*, 73 *U. Chi. L. Rev.* 3, 3 (2006).

83. *Id.* at 3, 5.

84. Abraham Bell & Gideon Parchomovsky, *Reconfiguring Property in Three Dimensions*, 75 *U. Chi. L. Rev.* 1015, 1017 (2008) [hereinafter Bell & Parchomovsky, *Property in Three Dimensions*] ("[T]he overall concept of the property right must be adjusted accordingly in order to maintain maximum benefit from property rights.").

of relief organizations⁸⁵ and law enforcement agencies.⁸⁶ Furthermore, lawmakers in the United Kingdom and Norway have recognized a right to roam in the general public, and have thereby restricted the exclusion powers of property owners.⁸⁷

Similarly, both lawmakers and rights-holders can reconfigure or redefine assets when they deem it socially desirable. Assets are continuously reconfigured to fit the complexities of a dynamic economy with changing preferences. For example, the optimal size of a residential parcel in large metropolitan areas is very different today than it was in the past. Likewise, zoning and height restrictions have become commonplace.⁸⁸ Finally, the government may reconfigure parcels for preservation purposes by taking various interests, ranging from easements to fee simple absolute, in private land.⁸⁹

To facilitate asset reconfiguration, lawmakers often employ the strategy of creating fictional assets.⁹⁰ A prime example of this is the “reification” of property rights in Anglo-American law as manifested by the estate system. Indeed, from a legal standpoint, “X” does not own the proverbial Blackacre, but rather owns a *fee simple* interest in Blackacre.⁹¹ In the area of intellectual property that deals with intangible and abstract subject matter, effectively all assets are fictional. The use of “fictional asset[s]” permits adherence to the ideal package of ownership, asset, and dominion by configuring the asset into a form amenable to the standard property package.⁹² More importantly for our purposes, it also permits adding or subtracting features from the definition of the right.

It bears emphasis that our goal is not to mount a facial attack on traditional patents. Indeed, we do not seek to redefine the package of rights and powers associated with a patent grant. Rather, our goal is to

85. See, e.g., *State v. Shack*, 277 A.2d 369, 371–72 (N.J. 1971).

86. See generally Joseph William Singer, *No Right to Exclude: Public Accommodation and Private Property*, 90 Nw. U. L. Rev. 1283, 1450 (1996) (“[A]ll rights—even the basic right to exclude—are limited by the rights of others and by social interests.”).

87. See Jerry L. Anderson, *Britain’s Right to Roam: Redefining the Landowner’s Bundle of Sticks*, 19 *Geo. Int’l Envtl. L. Rev.* 375, 404 (2007) (discussing right to roam in Britain, and referring to similar rights in Sweden, Finland, and Norway).

88. See generally William A. Fischel, *The Economics of Zoning Laws: A Property Rights Approach to American Land Use Controls* 21–23 (1985) (“Virtually every general-purpose local government in the United States has the authority to adopt zoning and related police power regulations.”); Georgette C. Poindexter, *Light, Air, or Manhattanization?: Communal Aesthetics in Zoning Central City Real Estate Development*, 78 *B.U. L. Rev.* 445, 454–67 (1998) (discussing building height restrictions in various cities).

89. See, e.g., Bell & Parchomovsky, *Property in Three Dimensions*, *supra* note 84, at 1018 (discussing government takings and related reconfigurations of property rights).

90. *Id.* at 1046–49.

91. *Id.* at 1048 (“Under the estate system, an owner of real property never owns the underlying realty, but rather an estate in the realty.”).

92. *Id.* at 1047.

give inventors more choice by crafting two additional opt-in regimes, the first of which can be dubbed a quasi-patent.

B. *Quasi-Patents*

A quasi-patent, as we define it, is a form of property protection that avails only against competitors. The holder of a quasi-patent will have all the rights (and duties) the Patent Act accords, but she may only enforce them against businesses and individuals that directly compete with her. Accordingly, a quasi-patent limits the list of potential defendants against whom infringement actions can be brought. The narrowing down of the group of potential infringers can be thought of as a restriction of the owner's dominion, or alternatively, as a reconfiguration of the bundle of rights and powers known as a patent right. Either way, it leads to the same outcome: More people will be able to use the underlying invention free of charge and without fearing legal sanctions. By conferring the same rights and powers as a regular patent, while limiting the number of people subject to those rights and powers, a quasi-patent largely preserves inventors' incentives to innovate, and at the same time, enables widespread use of the invention by noncompetitors.

Quasi-patents can be thought of as a form of quasi-property, a concept introduced by the Supreme Court in the classic case of *International News Service v. Associated Press*.⁹³ That case involved a dispute between two large agencies in the waning days of World War I. The plaintiff, Associated Press (AP), a cooperative network of newspapers based in the East, sued the International News Service (INS) for extracting the underlying facts of AP news reports and sending them by telegraph to Western affiliates as original news articles.⁹⁴ In essence, the Court faced the same challenge that is presented to us by the contemporary patent system: how to balance incentives to create against the anticompetitive effects of traditional intellectual property protection (in this case, copyright). Writing for the majority, Justice Pitney refused to grant AP full copyright protection in its news. Nevertheless, the majority ruled in AP's favor based instead on a concept that it called "quasi-property"—a federal common law right of exclusion to fresh news that may only be exercised against competitors, but not against the general public.⁹⁵ The Court maintained that the use of quasi-property in this case would preserve AP's—and other news agencies'—incentive to gather news without unduly restricting the dissemination of news to the public at large.⁹⁶

It is important to emphasize that quasi-patents will allow noncompetitors far more expansive use privileges than the "experimental use" exception currently provides. This exception was born out of the judicial

93. 248 U.S. 215 (1918).

94. *Id.* at 229–31.

95. *Id.* at 236 (introducing concept of quasi-property with respect to news).

96. *Id.* at 235 (recognizing "the added profit so necessary as an incentive" to encourage commercial news gathering).

interpretation of the concept of infringement in the Patent Act.⁹⁷ It was meant to permit limited noncommercial uses of patented inventions.⁹⁸ Over time, though, the courts restricted the applicability of the exception so much that it can no longer be treated as a meaningful policy tool. As Katherine Strandburg explained, “the experimental-use exemption has been reduced to a mere *de minimis* exception that bears little relation to the implications of a particular experimental use for the public benefits of follow-on innovation.”⁹⁹ Quasi-patent protection, by contrast, will give the public and, more importantly, other inventors significantly more breathing room. It will permit not only study and experimentation, but also improvements on the underlying invention. Thus quasi-patents have the potential to bring about considerable follow-on innovation.

Allowing noncompetitors to patent follow-on innovation raises the concern that such improvement patents could conceivably be used later on to exclude the original quasi-patent holder. This, in turn, may undermine the entire quasi-patent model. This concern, however, can be addressed by requiring all noncompetitors to freely license any new related patents (e.g., continuations, divisionals) to all downstream users.¹⁰⁰ Furthermore, in order to increase the number of quasi-patents and turn this option into an attractive default, it is possible to legally stipulate that all improvements of quasi-patents must be protected by quasi-patents themselves.¹⁰¹ Adoption of this requirement could lead to the creation of net-

97. 35 U.S.C. § 271(a) (2006); Richard E. Bee, *Experimental Use as an Act of Patent Infringement*, 39 J. Pat. Off. Soc’y 357, 363–64 (1957) (discussing historical evolution of experimental use exception).

98. See Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. Chi. L. Rev. 1017, 1034–36 (1989) (discussing historical development of distinction between commercial and noncommercial uses). The timing of the disclosure of patents suggests that patent holders’ rights are not absolute, even during a patent term. See *id.* at 1022 (“If the public had absolutely no right to use the disclosure without the patent holder’s consent until after the patent expired, it would make little sense to require that the disclosure be made freely available to the public at the outset of the patent term.”).

99. Katherine J. Strandburg, *What Does the Public Get? Experimental Use and the Patent Bargain*, 2004 Wis. L. Rev. 81, 87; see also *Madey v. Duke Univ.*, 307 F.3d 1351, 1362–63 (Fed. Cir. 2002) (“On remand, the district court will have to significantly narrow and limit its conception of the experimental use defense.”); *Embrex, Inc. v. Serv. Eng’g Corp.*, 216 F.3d 1343, 1349 (Fed. Cir. 2000) (refusing to apply experimental use exception to tests performed “expressly for commercial purposes”).

100. A similar “viral licensing” mechanism is used in the GNU General Public License—likely the most popular free software license in use today. See Free Software Found., *GNU General Public License § 10* (version 3) (June 29, 2007) [hereinafter *GNU General Public License*], available at <http://www.gnu.org/licenses/gpl.html> (on file with the *Columbia Law Review*).

101. The nonprofit corporation, Creative Commons, has developed a public copyright license, now in wide use, that enforces a similar “share alike” scheme. For Creative Commons’ “human-readable summary” of the license, see Creative Commons, *Attribution-ShareAlike 3.0 Unported*, available at <http://creativecommons.org/licenses/by-sa/3.0/> (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011) (“If you alter,

works of quasi-patents under certain circumstances.¹⁰² Moreover, this feature could enhance inventors' motivations to opt for quasi-patent protection in the first place; they would know their selection would contribute to the future proliferation of quasi-patents.

We are aware of the fact that the introduction of quasi-patents as an opt-in regime is not without a cost. The inclusion of quasi-patents in the menu of legal options would necessitate courts to determine which defendants are competitors of the quasi-patent holders. In most cases, this determination will be straightforward. In some cases, however, it will be more complex.¹⁰³ The challenge is not insurmountable, however, and the difficulty involved in distinguishing between competitors and non-competitors should not be exaggerated. In addressing this task, courts could aid themselves by turning to the definitions developed in antitrust law. The definitions developed to define product and service markets for antitrust purposes could be readily applied to disputes involving quasi-patents.¹⁰⁴ It should also be remembered that although the judicial cost of resolving quasi-patent cases may be slightly higher than the cost of deciding patent cases, the *overall* number of cases will be lower, owing to the fact that quasi-patents restrict the group of potential defendants. Conse-

transform, or build upon this work, you may distribute the resulting work only under the same or similar license to this one.”).

102. The “viral” potential for quasi-patents may be limited, however, if downstream users of improvements are competitors of the original inventor. For example, assume a market with three actors: Alpha, Beta, and Gamma. Assume that Alpha and Beta are not competitors, while Alpha and Gamma are competitors. If Alpha obtains a quasi-patent on an invention, then in this scenario, Beta may use the invention freely, while Gamma must pay a royalty. However, a problem may arise if Beta and Gamma are not mutual competitors: If Beta were to devise an improvement on Alpha’s invention, then under a “viral” quasi-patent scheme, Gamma, as a noncompetitor of Beta, might automatically have royalty-free use of that improvement. This result may be undesirable to Alpha, and could discourage adoption of the quasi-patent form. One solution to this problem would be for networks of quasi-patents to always exclude downstream competitors of upstream inventors.

103. Indeed, this was one of the concerns raised by Justice Brandeis in his dissent in *INS v. AP*. Among other things, Justice Brandeis argued that the practical administration of a quasi-property system would be far more nuanced and complex than the majority seemed to appreciate. *Int’l News Serv. v. Associated Press*, 248 U.S. 215, 262–63 (1918) (Brandeis, J., dissenting). For discussion of the majority opinion, see *supra* notes 93–96 and accompanying text.

104. Antitrust experts have developed sophisticated methods to define competitive and noncompetitive markets and firms across a variety of industries. See Fed. Trade Comm’n, *Antitrust Guidelines for Collaborations Among Competitors* 16 (Apr. 2000), available at <http://www.ftc.gov/os/2000/04/ftcdojguidelines.pdf> (on file with the *Columbia Law Review*) (discussing identification and assessment of competitive effects in product and geographic markets). A variety of factors may be relevant to identifying competitors, including consumers’ willingness to purchase substitute products. See U.S. Dep’t of Justice & Fed. Trade Comm’n, *Commentary on the Horizontal Merger Guidelines* 5–15 (Mar. 2006), available at <http://www.ftc.gov/os/2006/03/CommentaryontheHorizontalMergerGuidelinesMarch2006.pdf> (on file with the *Columbia Law Review*) (discussing mechanics of defining competitive markets).

quently, quasi-patents may lower the *total* cost of dispute resolution, even though the average cost per case will be somewhat higher.

C. *Semi-Patents*

A second opt-in regime we wish to introduce may be termed a semi-patent. The underlying design is predicated on the idea that lawmakers can expand or contract property rights by adjusting the rules that govern the *initial* acquisition of the relevant right.¹⁰⁵ Specifically, lawmakers can make it easy or difficult to acquire rights in different assets by setting lax or strict prerequisites for securing protection. Indeed, differential acquisition rules pervade our intellectual property law. Copyright poses the lowest barrier of all—protection springs into existence when original expression is fixed in a tangible medium of expression.¹⁰⁶ Trademark law sets the bar a little higher by conditioning protection on the use of a mark in commerce.¹⁰⁷ Finally, patent law goes even further by conditioning protection on the substantive requirements of novelty,¹⁰⁸ usefulness,¹⁰⁹ and nonobviousness.¹¹⁰

To arrive at the concept of a semi-patent, we add one more precondition: disclosure of all research results—both positive and negative—that led to the claimed invention. Suppression of relevant information would be punishable by loss of protection. Accordingly, if at any point during the review process or after the issuance of the patent, it can be proven that a semi-patent applicant withheld information from the USPTO, she will lose her protection immediately and retroactively. Unlike quasi-patents, semi-patents offer the same panoply of rights and powers as regular patents, and moreover, they protect these rights against the rest of the world. What differentiates semi-patents from both quasi-patents and regular patents is the prerequisite of full information disclosure.

But why focus on information sharing? It is widely agreed that information sharing can dramatically reduce the cost and improve the rate of innovation in our society.¹¹¹ Indeed, in recent years, there have been several interesting attempts to induce better information sharing.¹¹² Su-

105. Cf. Gideon Parchomovsky & Alex Stein, *Originality*, 95 Va. L. Rev. 1505, 1509–16 (2009) (discussing acquisition of copyright and patent rights).

106. See 17 U.S.C. § 102(a) (2006) (providing copyright eligibility for any original work of authorship “fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device”).

107. See, e.g., Robert P. Merges et al., *Intellectual Property in the New Technological Age* 635 (rev. 4th ed. 2007) (“Rather, trademark protection is awarded merely to those who were the first to use a distinctive mark in commerce.”).

108. 35 U.S.C. § 102 (2006).

109. 35 U.S.C. § 101.

110. 35 U.S.C. § 103.

111. See *supra* note 6 and accompanying text (discussing benefits of data sharing).

112. See, e.g., Jorge L. Contreras, *Timing is Everything: Latency Analysis and the Design of the Genomic Commons* 16–20 (Feb. 20, 2010) (unpublished manuscript),

perior access to research information can alleviate the problem of duplicative research efforts, and moreover, can help point subsequent researchers in the right direction. This is true not only for positive research results, but also for negative ones. Information about failed research attempts can be just as valuable to fellow researchers as the details of successes. Sharing postmortems of failed experiments can help others avoid potential pitfalls and point them in the right direction.¹¹³ It should be borne in mind that information about failed research in a particular industry may be useful to inventors in other industries as well.

At present, however, there is no incentive to offer broad disclosure. On the contrary, there is a strong incentive to disclose as little as possible and thereby let competitors squander valuable resources. This strategy is known in the economic literature as “raising rivals’ costs.”¹¹⁴ In light of the natural tendency of inventors to suppress information, one might have expected the Patent Act to incorporate a broad disclosure requirement. Yet, no such broad requirement exists. The Patent Act imposes a very modest enablement requirement according to which the written specification must “enable any person skilled in the art to which it pertains . . . to make and use the same,” and must include the inventor’s best mode of doing so.¹¹⁵ Semi-patents represent an opt-in form that man-

available at http://works.bepress.com/Jorge_contreras/1/ (on file with the *Columbia Law Review*) (discussing temporal aspects of data release policies in collaborative genetic research initiatives and explaining primacy of timing and “latency analysis” in various informational commons); see also U.S. Dep’t of Health & Human Servs., Final NIH Statement on Sharing Research Data (2003), available at <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-03-032.html> (on file with the *Columbia Law Review*) (“[D]ata sharing is essential for expedited translation of research results into knowledge, products and procedures to improve human health.”); Eric Campbell & David Blumenthal, *The Selfish Gene: Data Sharing and Withholding in Academic Genetics*, *Science Careers*, May 31, 2002, at http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2002_05_31/noDOI.5822398718525511595 (on file with the *Columbia Law Review*) (advocating expanded data sharing policies in field of genetics and enumerating ways in which data sharing benefits science—namely, by preventing needless duplicative efforts, enabling peers to fully review and test claims, and providing future generations of scientists with the tools they need); Steve Lohr, *Bringing Data Mining into the Mainstream*, *N.Y. Times Bits Blog*, July 26, 2010, <http://bits.blogs.nytimes.com/2010/07/26/bringing-data-mining-into-the-mainstream> [hereinafter Lohr, *Data Mining*] (on file with the *Columbia Law Review*) (discussing growing importance of data availability and analysis in corporations).

113. See, e.g., William J. Broad, *Taking Lessons From What Went Wrong*, *N.Y. Times*, July 20, 2010, at D1 (“Disaster, in short, can become a spur to innovation.”).

114. Steven C. Salop & David T. Scheffman, *Raising Rivals’ Costs*, 73 *Am. Econ. Rev.* (Special Issue) 267, 267 (1983).

115. 35 U.S.C. § 112; *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993) (explaining specification “must teach those skilled in the art how to make and use the full scope of the claimed invention without ‘undue experimentation’”); see also *Scripps Clinic Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1578–80 (Fed. Cir. 1991) (revealing limitation of best mode requirement by finding no best mode violation where antibodies used by inventors of patents in suit were different from those obtainable by following process set forth in specification). But see *Abbott Labs. v. Sandoz*, 566 F.3d 1282, 1291–95 (Fed. Cir.

dates much broader disclosure. It would force applicants to expose the entire body of research that culminated in the invention.

As to the disclosure date, we propose that the relevant data be released to the public immediately after the approval of the application. Making disclosure conditional on the issuance of the patent would strike the right balance between the interest of the applicants, on the one hand, and the interest of the public, on the other. Requiring applicants to disclose before the approval date might constitute a serious disincentive to select this mode of protection. Inventors might fear that if, at the end of the day, the application is not approved, they would have to divulge valuable knowledge without getting anything in return. And while it is true that, from the vantage point of the public, the sooner disclosure occurs, the better, since we are dealing with an opt-in regime, we must provide applicants with sufficient incentives to select it.

The addition of semi-patents to the list of intellectual property forms will give rise to two related concerns. The first is that of selective disclosure—or, more accurately, nondisclosure. Inventors who select this form of protection may conceal crucial findings from the public or even distort certain results in order to harm competitors.¹¹⁶ This problem arises under all disclosure regimes and it is impossible to root it out entirely.¹¹⁷ Typically, the law employs penalties to deter selective disclosure.¹¹⁸

In our case, the proposed penalty is loss of protection. It should be noted that a similar penalty is employed under current patent law against patent applicants who make false representations to the USPTO.¹¹⁹ It is also used in cases of patent misuse.¹²⁰ From a theoretical standpoint, the penalty should be tailored to the probability of detection. If applicants believe that there is a very low probability that selective disclosure will be

2009) (limiting scope of product-by-process claims and thus potentially encouraging, but not mandating, broader disclosure with respect to some claim types).

116. We use “selective disclosure” as an umbrella term to describe the many ways that a patent applicant could conceal helpful results (e.g., hiding valuable results amidst thousands of pages of useless data, distorting the importance of certain results). We also acknowledge that useful results may take different forms depending on the nature of the underlying research. For example, genetic research data may be written in a laboratory notebook, while research data in the field of software may exist in the form of log files, crash reports, or usability test results. As the semi-patent model develops, so too might a body of industry-specific disclosure standards.

117. See, e.g., Zohar Goshen & Gideon Parchomovsky, *On Insider Trading, Markets, and “Negative” Property Rights in Information*, 87 Va. L. Rev. 1229, 1236, 1268–73 (2001) (discussing prohibition of selective disclosure in context of insider trading).

118. See, e.g., *id.* (discussing legal sanctions in context of insider trading).

119. See Robert J. Goldman, *Evolution of the Inequitable Conduct Defense in Patent Litigation*, 7 Harv. J.L. & Tech. 37, 52–53 (1993) (discussing use of 35 U.S.C. § 282 (1952) as vehicle for infringement defense when applicant engaged in “inequitable conduct,” including fraudulent misrepresentations to USPTO).

120. See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 Va. L. Rev. 1575, 1662 (2003) [hereinafter Burk & Lemley, *Policy Levers*] (“Under a long-standing common law doctrine, patents are unenforceable if they have been misused by their owner.”).

detected, they may choose to conceal information notwithstanding the risk of losing their intellectual property rights.¹²¹ In this case, it may be necessary to augment the basic sanction of loss of protection with monetary penalties. However, the likelihood of detection may not be as low as it may seem at first blush. Other researchers who are skilled in the relevant field of invention may infer that the data shared with the public is incomplete or inaccurate. The same way a careful peer review may uncover errors in scientific publications, thorough analysis of the research records can reveal holes and inconsistencies.¹²² In addition, attempts at concealment may be inferred from academic publications and other documents of the inventing firm.¹²³

The second concern relates to the judicial cost of enforcing the proposed disclosure regime. If recognition of quasi-patents would require courts to determine who is a competitor and who is not, the introduction of semi-patents would require courts to face the challenge of deciding which research data is related to the claimed invention and which is not. Inventors who suppress data would invariably claim that the unpublished data is not part of the body of research that led to the semi-patent. All challenged inventors would raise this claim—whether it is true or not—and a pooling equilibrium would result. In this case, we cannot offer courts any shortcuts. Tribunals would have to carefully examine the data and seek assistance from scientific experts in deciding what data relates to what project. If the inventor had a single research project, courts could look at the date of the disputed research data and easily resolve the problem. If, on the other hand, the inventor had multiple simultaneous projects, the court's task would be considerably more complex. It is difficult to predict in the abstract how prevalent such disputes would be. It appears fairly certain, though, that some conflicts will arise and courts will have to deal with them.

121. This statement finds support in the classic work of Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 *J. Pol. Econ.* 169, 176 (1968) (emphasizing deterrence value of certainty of punishment).

122. The ability of expert communities to detect inaccurate or biased information and to effectively self-police is well documented. For example, Wikipedia, the online encyclopedia, relies on devoted volunteers guided by community norms to produce accurate written content and to detect undesired conduct. See, e.g., Jonathan Zittrain, *The Future of the Internet—And How to Stop It* 127–48 (2008) (describing success of Wikipedia's self-governed community). Similarly, there are notable examples of experts successfully detecting and reporting flawed scientific research in scientific communities. See, e.g., Brian Vastag, *Cancer Fraud Case Stuns Research Community, Prompts Reflection on Peer Review Process*, 98 *J. Nat'l Cancer Inst.* 374, 375 (2006) (describing how fabrications in widely published cancer study were detected and reported by doctor familiar with the subject matter). Similarly, accurate disclosure in the semi-patent context may be meaningfully encouraged through professional norms and an atmosphere of civic duty.

123. Granted, often there are no such publications in the case of individual inventors, but individual inventors may not be as adept as firms at concealing information or tampering with data.

It bears emphasis, however, that even if some information will be suppressed from competitors—a scenario we readily recognize—the introduction of semi-patents would lead to considerably more disclosure than exists under traditional patent protection. In the final tally, the addition of semi-patents to the menu of intellectual property forms would dramatically improve our understanding of inventive processes—an improvement that would likely be translated into more innovation. And while the disclosure the public receives might not always be complete, it would still be a marked improvement over the current enablement requirement.

III. INCORPORATING QUASI-PATENTS AND SEMI-PATENTS INTO COMMUNITIES OF INNOVATION

In this Part, we explain how semi-patents and quasi-patents can initially be introduced within technology cooperatives, which we term “communities of innovation.” Such a “pilot” stage would serve to substantiate quasi- and semi-patents for interested stakeholders and, in the process, benefit important research and development efforts. The discussion that follows demonstrates why communities of innovation are ideal platforms for the introduction and refinement of our semi-/quasi-patent proposal.

A. *Background*

Although semi-patents and quasi-patents are functionally dissimilar, both capitalize on the fact that innovation is often a cumulative process. Quasi-patents allow noncompetitors to build on existing inventions; semi-patents aggregate know-how by requiring research data sharing. Thus, both forms of protection inherently contemplate multiple actors working toward common goals. This is not a central feature of extant proposals to alter patent rights, such as varying the time span of protection,¹²⁴ or creating a technology-specific patent system.¹²⁵ Importantly, this “social” characteristic makes semi-patents and quasi-patents particularly well suited to certain types of technology-sharing collectives.

The sharing of technological know-how within some industries dates back centuries. An early example can be found in the mineral mines of Cornwall, England during the late 1700s. At the time, underground

124. See NRC, 21st Century, *supra* note 8, at 44 n.11 (noting “a contemporary proposal to limit the term of business method patents to three or five years” attracted attention of some policymakers). For prior examples of patent term extensions, see 35 U.S.C. § 155A (2000) (extending term of protection for some types of patents); Drug Price Competition and Patent Term Restoration (Hatch-Waxman) Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585 (codified at 15 U.S.C. §§ 68b–68c, 70b (1994), 21 U.S.C. §§ 301 note, 355, 360cc (1994), 28 U.S.C. § 2201 (1994), 35 U.S.C. §§ 156, 271, 282 (1994)) (permitting term extensions on new drugs of up to five years under some circumstances).

125. See Burk & Lemley, Policy Levers, *supra* note 120, at 1630–33 (providing examples of various proposals to “legislate different patent standards for different industries”).

flooding frequently interfered with mining operations, costing mine owners considerable time and money.¹²⁶ The problem was so serious that many mines hired outside engineers that specialized in designing water pumps. Although a good pump design could have given any single mine a competitive advantage, a group of “mine captains” established a monthly trade journal for the purpose of publicizing pump designs.¹²⁷ This journal, which was called *Lean’s Engine Reporter*, not only contained detailed designs, but also valuable data describing pump performance and efficiency.¹²⁸ Historians believe that this early example of invention sharing was motivated by two forces: First, many mine operators held interests (both financial and strategic) in the aggregate performance of all of the mines;¹²⁹ second, the science of fluid dynamics during this period was not well understood.¹³⁰ As a result, innovative pump designs were often the product of trial and error, rather than the direct application of scientific theory.¹³¹ The mine owners of Cornwall allowed pump designs to be publicized because doing so lessened the total amount of trial and error needed to advance the industry as a whole.¹³² Through this limited form of cooperation, business adversaries placed long-term gains over immediate payoffs.

Over one hundred years later, during the fierce trials of the First World War, a similar community of innovation formed in the United States. Airplanes, still a new technology at the time, offered important new strategic advantages over traditional modes of combat. To prevail, the U.S. government needed to quickly assemble a large fleet of aircrafts. However, because many individual firms held the patents covering aircraft technology, there was a risk that precious time would be lost while a multitude of individual licenses were negotiated.¹³³ A novel plan solved this problem: Through a special corporation called the Manufacturer’s Aircraft Association (MAA), all necessary patents were pooled and collec-

126. Alessandro Nuvolari, *Collective Invention During the British Industrial Revolution: The Case of the Cornish Pumping Engine*, 28 *Cambridge J. Econ.* 347, 352–53 (2004).

127. *Id.* at 354.

128. *Id.*

129. *Id.* at 356 (discussing unique characteristics of “cost book system,” a mode of industrial organization present in Cornish mining economy during this period).

130. *Id.* (discussing fact that scientific understanding at the time lagged behind state of technology).

131. *Id.* (“Thus, the design of the Cornish engine always remained in what we might call a fluid state, and this probably facilitated a more thorough exploration of the space of technological opportunities, avoiding the risk of remaining trapped in a local optimum configuration.”).

132. *Id.* (“By pooling all the accumulated experience, it was possible to focus the search process on the most promising directions.”).

133. Michael J. Madison et al., *Constructing Commons in the Cultural Environment*, 95 *Cornell L. Rev.* 657, 660–61 & n.5 (2010) (citing Harry T. Dykman, *Patent Licensing Within the Manufacturer’s Aircraft Association (MAA)*, 46 *J. Pat. Off. Soc’y* 646, 648–50 (1964)); see also Shapiro, *supra* note 50, at 127–28 (discussing MAA).

tively licensed—largely on royalty-free terms.¹³⁴ As with the miners of Cornwall, a common goal took precedence over individual competitive interests. Ultimately, this instance of patent sharing contributed to America's victory in the conflict.

In the past ten years, similar types of patent sharing and knowledge sharing initiatives have appeared in a variety of contexts. For example, leading computer software makers have begun collaborating to openly license patents within closed pools, as well as to the public at large. Donors to such open licensing initiatives include industry giants like HP, IBM, Ericsson, Nokia, Novell, Red Hat, Oracle, Philips, and Sony.¹³⁵ Beyond the software industry, other organizations have begun collecting and licensing patents that benefit the environment and disadvantaged communities. Participants in these efforts include the likes of Xerox, IBM, Sony, Yahoo, and Nike. Yet another field that has spawned the sharing of patents and data is genetics. Today, biobanks—shared collections of tissue samples and associated data—play an important role in the ongoing quest to cure human illnesses.

Although contemporary technological collectives have arisen in vastly different contexts, they all share important similarities: Each privately reorders default intellectual property rights vis-à-vis licenses; each has rules of conduct that members must obey; each is organized around neutral principles—that is to say, each community strives to balance the rights of patent donors against those of patent users. As we noted at the outset, we refer to such organizations as “communities of innovation.”

The examples above reveal an important point: Communities of innovation are not limited to patent pools. While patent pools like the MAA serve to reduce licensing transaction costs that would otherwise impede the development of a specific technology,¹³⁶ communities of innovation capture a broader set of cooperative activities—for example, the collective sharing of patents and know-how in order to broadly encourage research and experimentation within certain industries.

The basic institutional structure described above makes communities of innovation ideally suited for quasi- and semi-patents. For example, the license agreements that legally bind communities of innovation can easily be adapted to incorporate quasi- and semi-patent rights. As Thomas Merrill and Henry Smith cogently demonstrated, an important difference between private contracts and traditional in rem property rights is the ability of contracts to be highly customized.¹³⁷ Unbound by precedent or

134. Madison, *supra* note 133, at 660–61.

135. The examples mentioned briefly in this paragraph are discussed in greater detail later in this Part.

136. See generally Shapiro, *supra* note 50, at 121–22, 127–29, 134–42 (discussing economic basis for cross-licensing and patent pools, with particular focus on standards-setting). The MAA is a prime historical example of a patent pool, and modern-day analogs are abundant—particularly in the realm of standards-setting collectives.

137. Merrill & Smith, *supra* note 77, at 3.

politics, the private contracts used by communities of innovation can be finely tuned to optimize the semi-patent and quasi-patent forms during the initial pilot phase of our proposal.

In another aspect, communities of innovation can serve to insulate semi-patents and quasi-patents from external market forces, thus facilitating careful evaluation of these new property forms. Just as scientists can more easily observe natural phenomena that are isolated from outside disruptions, policymakers could more easily measure the success of quasi- and semi-patents that are sheltered within closed communities.¹³⁸

Beyond these advantages, we believe that quasi- and semi-patents can confer real, measurable benefits on communities of innovation that will help pave the way to widespread adoption of these new property forms. And, because many such collectives are still in early stages of development, we believe our suggestions stand a good chance of being adopted. In the remainder of this Part, we discuss how the goals of communities of innovation would be well served by quasi- and semi-patents.

B. *Genetics*

Today, genetic researchers across the globe are working to develop new preventions, diagnoses, and cures for deadly diseases. Increasingly, the research driving this ambitious work relies on biobanks—repositories of shared biological materials and associated data. These facilities allow researchers to draw insights from massive amounts of raw genomic information. Many such facilities are in operation at universities, hospitals, private corporations, and nonprofit entities worldwide.¹³⁹

Biobank policymakers continue to face vexing questions in their ongoing quest to serve researchers: How can patents incentivize, and not frustrate research? To the extent that data sharing among researchers is helpful, to what degree should biobanks mandate it? Many biobanks in operation today have experimented with a variety of measures designed to balance these tensions, but there have been no widely adopted solutions with respect to patents and data sharing.¹⁴⁰ Rulemaking remains in flux.

Quasi-patents and semi-patents provide new solutions to these challenging problems. Quasi-patents have the ability to balance two competing forces that lie at the heart of biobanking: the frequent need for re-

138. See, e.g., Heidi L. Williams, Intellectual Property Rights and Innovation: Evidence from the Human Genome 3 (Nat'l Bureau of Econ. Research, Working Paper No. 16213, 2010), available at <http://www.nber.org/papers/w16213> (on file with the *Columbia Law Review*) (demonstrating case in which closed IP regime facilitated careful study in genomics context).

139. For an informative overview of the intellectual property issues that pertain to biobanks, see generally Brenda M. Simon, How to Get a Fair Share: IP Policies for Publicly Supported Biobanks, 1 *Stan. J.L. Sci. & Pol'y* 65 (2009).

140. See generally Christopher Heaney et al., The Perils of Taking Property Too Far, 1 *Stan. J.L. Sci. & Pol'y* 46 (2009) (exploring various approaches to biobank governance).

searchers to practice patented processes, and the importance of commercial incentives that fuel further research.¹⁴¹ Simply put, researchers will not sow unless they stand to reap. By permitting only noncompetitors to use genetic patents on a royalty-free basis, the quasi-patent form would allow basic research to advance unfettered while preserving commercial incentives that draw investments of time, capital, and expertise.¹⁴²

Semi-patents present equally compelling possibilities for genomic collectives. Like geographic maps revealing the location of buried treasure, genome maps include valuable information (e.g., raw research data and findings), as well as specific applications of that information in the form of patents. And, just as the utility of a treasure map as a navigational guide can be divorced from its use to locate and extract hidden riches, so too can the information produced in the course of genetic research be separated from the commercial application of that information defined by patents. Semi-patents facilitate this beneficial division of genetic assets.¹⁴³ Ultimately, this would be a boon for biobanks. As the director of the NIH and former director of the Human Genome Project wrote in a recent *Nature* article, “free and open access to genome data has had a profoundly positive effect on [the] progress” of genetic research.¹⁴⁴

Viewed from another angle, semi-patents encourage communal benefit sharing that has long existed in other areas of property law. For example, the Rule of Prior Appropriation in water rights—sometimes called the “Colorado Rule”—grants senior rights to the first owner who uses a source of water for beneficial purposes, such as farming or municipal use.¹⁴⁵ In a semi-patent regime, genetic researchers would be free to assert their patents against any infringer, but their right to exclude would be contingent on cooperation with a mandatory data-sharing policy. Failure to share relevant data would result in invalidity of a member’s patent rights—in effect, making data sharing a requirement of semi-patent validity. Thus, like the Rule of Prior Appropriation, semi-patents only confer patent ownership upon those who put research data to good use through sharing.

141. See Simon, *supra* note 139, at 67 (discussing need to balance “transparency and non-monetary benefit[s]” at biobanks “against potential diminished incentives for research and development”).

142. Moreover, a standard licensing rate could be included in privately ordered quasi-patent arrangements to avoid transaction costs that might otherwise arise from license negotiations.

143. For a deeper discussion of the division of property assets, see generally Bell & Parchomovsky, *Property in Three Dimensions*, *supra* note 84.

144. Francis Collins, *Has the Revolution Arrived?*, 464 *Nature* 674, 675 (2010).

145. See *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443, 447 (1882) (establishing Colorado Rule, also known as Colorado doctrine of first appropriation); see also David B. Schorr, *Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights*, 32 *Ecology L.Q.* 3, 64 (2005) (discussing Colorado Rule).

In sum, quasi-patents, which can only be enforced against one's competitors, respect the importance of basic research. Semi-patents, which are conditioned on compliance with a data-sharing policy, attempt to place patents and data sharing in complementary roles. Together, these new forms of intellectual property protection may have the power to increase knowledge sharing and research in biobanking communities.

C. *Software*

Semi-patents and quasi-patents can also benefit software patent collectives. The roots of community-based software patent licensing stretch back to when the open source movement was founded in the 1980s. At that time, the introduction of affordable home computers to the consumer market inspired a generation of hobbyists to explore the art and utility of writing software.¹⁴⁶ However, the risk of liability for copyright infringement discouraged many hobbyists from working together to develop programs of substantial depth or complexity.¹⁴⁷

It was in this environment that the open source movement was born. Part method and part philosophy, the movement sought to reduce licensing transaction costs and the threat of copyright infringement vis-à-vis public copyright licenses that attached to original computer code as well as any derivative works.¹⁴⁸ During the late 1980s and 1990s, open source took root with a large number of programmers. Using special licenses and the Internet as a collaboration and distribution medium, open source communities produced software on which businesses and consumers have since come to depend, such as the Linux operating system, the Firefox web browser, and the Apache web server.

But during the past ten years, the stakes and the players have changed. After the Federal Circuit established the patentability of software methods in the late 1990s, there was a steep rise in the level of software patenting.¹⁴⁹ The growing importance of software patents was a clear matter of concern to open source advocates: Most of the public licenses that open source projects were founded upon contemplated copyright infringement, but did not address the issue of software patents.¹⁵⁰

146. See, e.g., Zittrain, *supra* note 122, at 14–15 (discussing development of computer programming as hobby during 1980s).

147. See Siva Vaidhyanathan, *Copyrights and Copywrongs: The Rise of Intellectual Property and How it Threatens Creativity* 154 (2001) (discussing Richard Stallman's belief that copyright "impeded the development of the best possible software").

148. See GNU General Public License, *supra* note 100, pmb1. (creating "a free, copyleft license for software and other kinds of works").

149. See *supra* notes 24–25 and accompanying text (discussing recent increased levels of patenting).

150. See, e.g., Free Software Found., GNU General Public License (version 1) (Feb. 1989), available at <http://www.gnu.org/licenses/gpl-1.0.html> (on file with the *Columbia Law Review*) (lacking reference to patents). In part, the designers of open source licenses may have been slow to include patent terms because the licensing of patents differs greatly from the licensing of copyrighted works. For example, defining the scope of patents

Not surprisingly, the issue also did not escape the attention of competitors. In the early 2000s, several leading software vendors contacted open source projects expressing the view that their patents were being infringed.¹⁵¹ Open source advocates took these expressions of concern seriously: Damages for patent infringement could be high, courts generally seemed to favor patentees, and at least some of the patent infringement concerns expressed seemed to have legal merit.¹⁵² The future viability of open source became an open question.

Motivated by these concerns, stakeholders in the open source movement have recently assembled defensive software patent sharing collectives. An example often cited in the press is the Open Invention Network (OIN)—a corporation that gathers software patents and licenses them at no cost to participants.¹⁵³ While the OIN bears some similarity to the Manufacturer's Aircraft Alliance, discussed earlier, its goals are primarily defensive.¹⁵⁴ As the group's website explains, "Patents owned by Open Invention Network® are available royalty-free to any company, institution or individual that agrees not to assert its patents against the Linux System."¹⁵⁵ The company, which was founded in 2005, has the backing of leading stakeholders in open source projects, including I.B.M., Novell, Philips, Red Hat, and Sony.¹⁵⁶

The quasi-patent model presents new possibilities for organizations like OIN. Currently, the group licenses its patents only to entities that promise not to assert their patents against the Linux platform. While this policy is focused on defending the Linux operating system, it does not take into account potentially undesirable behavior between the members of the collective itself. For example, under the model used by OIN, a firm's patents could be used by a competing member of the network to erode the patent-holding firm's market share. The quasi-patent model

necessary to practice a particular embodiment of an invention may require careful investigation and legal analysis. Likewise, useful patent licensing can require sharing of related know-how.

151. See, e.g., Laurie J. Flynn, *New Economy: A Unix Company Hopes a Microsoft Deal Will Strengthen Its Legal Case Against Linux*, N.Y. Times, May 26, 2003, at C3 (discussing legal controversy involving Utah-based firm called SCO, which at one time owned key patents to Unix operating system and believed these patents were infringed by Linux). Follow-up accounts of this dispute include Barnaby J. Feder, *I.B.M. Files Countersuits in a Dispute Over Linux Licensing*, N.Y. Times, Aug. 8, 2003, at C4 (describing Microsoft counterattack against SCO); Steve Lohr, *No Concession from I.B.M. in Linux Fight*, N.Y. Times, June 14, 2003, at C1 (describing Microsoft's refusal to settle).

152. See sources cited *supra* note 151; see also *supra* Part I.A (discussing patentee-friendly attitudes in Federal Circuit).

153. See Open Invention Network, at <http://www.openinventionnetwork.com> (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011) ("Open Invention Network® is an intellectual property company that was formed to promote the Linux system by using patents to create a collaborative ecosystem.").

154. See *supra* notes 133–134 and accompanying text (discussing MAA).

155. Open Invention Network, *About OIN*, at <http://www.openinventionnetwork.com/about.php> (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011).

156. *Id.*

cures this risk by forbidding the unlicensed use of patents between competitors. By eliminating the risk of having patents used against their owners' commercial interests, the quasi-patent model could encourage greater participation in open software collectives.

We are cognizant of the often subtle and dynamic nature of competition. Indeed, scholars in the field of behavioral economics have devoted deep study to the myriad ways that firms can simultaneously compete and cooperate.¹⁵⁷ In the context of introducing quasi-patents to open software collectives, this fact presents definitional challenges, but ones that can be overcome. For example, it may be desirable in some applications of the quasi-patent principle to limit the definition of "competitor" to only specific markets. Here, the quasi-patent form would allow two large firms to treat one another as "competitors" with respect to certain families of quasi-patents, and "noncompetitors" with respect to others. As discussed earlier, fine tuning of this sort is quite possible through the private license agreements that bind communities of innovation.

The semi-patent form can also benefit software communities. At first blush, writing code may not seem like a research-driven activity. Unlike genetic science, which is focused on studying the natural world, software development is aimed entirely toward building a functioning product. As the famous software engineer, Frederick P. Brooks, eloquently said, "Scientists build to learn; Engineers learn to build."¹⁵⁸

Although the goals and methods of software developers and research scientists differ, both fields often rely heavily on trial and error. Indeed, "debugging" software, one of the most costly aspects of software engineering, is often a brute force, hit-and-miss process.¹⁵⁹ As a result, the generation and study of performance data is often critical. Surprisingly though, the industry has traditionally viewed such testing data as a byproduct of little value—the detritus of creation.¹⁶⁰ But recently, software developers have begun appreciating the fact that raw data can be a valuable asset.¹⁶¹ For instance, some programmers have begun collecting and sharing data describing the performance of third-party tools.¹⁶² Likewise, others have

157. See, e.g., Robert Axelrod, *The Complexity of Cooperation: Agent-Based Models of Competition and Collaboration* 3–8 (1997).

158. Daniel Page, *A Practical Introduction to Computer Architecture* 43 (David Gries & Fred B. Schneider eds., 2009) (quoting Frederick P. Brooks).

159. Janusz Laski & William Stanley, *Software Verification and Analysis: An Integrated, Hands-On Approach* 14 (2009).

160. See Lohr, *Data Mining*, *supra* note 112 (reporting that, in opinion of one expert, "data was [traditionally] regarded as a byproduct of doing business, often a backward-looking record of little value").

161. *Id.* (providing accounts of growing importance of data management).

162. See, e.g., Lenny Rachitsky, *A Proposal for New Community Focused on Web Performance*, *Transparent Uptime Blog* (Apr. 30, 2010, 8:45 AM), <http://www.transparentuptime.com/2010/04/proposal-for-new-community-focused-on.html> (on file with the *Columbia Law Review*) (proposing community based around sharing data on third-party web services). Notably, some web-based services have stepped in to provide up-to-the-minute useful performance-related data to user communities. See Amazon Web Services

begun documenting “postmortem” accounts of failures, in order to help others avoid similar missteps.¹⁶³ These instances of research data sharing appear to be valuable, but are not yet widespread. Semi-patents could add valuable new incentives for such data sharing within software communities of innovation. By making error reports and postmortems more common, this new form of property protection could encourage a greater spirit of collective endeavor and shed light on valuable information that would otherwise be lost.

It bears mention that patent sharing has recently made inroads in a closely related industry: hardware. Like software, hardware designs can be protected by both copyright and patent law.¹⁶⁴ Unlike intangible software processes though, hardware designs are often more rooted in the physical world, potentially making hardware an even more certain and steady platform for patent sharing collectives.¹⁶⁵ While still an undeveloped practice, hardware patent sharing marks another avenue in the computer technology market where semi-patents and quasi-patents could take hold.

As in the field of genetics, software communities of innovation can benefit from the quasi- and semi-patent forms. Quasi-patents can draw software patent holders that are reluctant to share their property with competitors; semi-patents have the potential to facilitate a valuable new “data commons” in the software industry. Together, these forms of protection can enhance and strengthen existing software patent sharing initiatives.

D. *The Environment and Public Health*

The success of the open source movement has inspired new initiatives with goals that reach beyond the domain of computer software. Some recent efforts are organized not around specific technologies, but around broad goals, such as reducing industrial pollution and improving the health of poor communities. Here too, quasi-patents and semi-patents could play a beneficial role.

Service Health Dashboard, at <http://status.aws.amazon.com/> (last visited Jan. 21, 2011) (displaying real-time status of Amazon’s cloud computing services worldwide).

163. See, e.g., Mike Champion, Downtime Postmortem, Graysky Blog (Feb. 8, 2010), <http://graysky.org/2010/02/downtime-postmortem> (on file with the *Columbia Law Review*) (documenting causes of service disruption at small startup web service).

164. See Semiconductor Chip Protection Act of 1984, 17 U.S.C. §§ 901–906 (2006) (prescribing protection of “mask works”).

165. The degree of physicality or tangibility required of patentable subject matter has long been a topic of debate. The Federal Circuit’s 1998 *State Street* decision is often cited as having significantly expanded the scope of business method and software patents eligible for patentability. *State St. Bank & Trust Co. v. Signature Fin. Grp., Inc.*, 149 F.3d 1368 (Fed. Cir. 1998). In the past year, highly publicized Federal Circuit and Supreme Court decisions have drawn new attention to the issue. See, e.g., *Bilski v. Kappos*, 130 S. Ct. 3218 (2010); see also *supra* note 32 (discussing *Bilski* and *State Street*).

Biological Innovation for an Open Society (BiOS) was launched by a nonprofit organization called Cambia in early 2005.¹⁶⁶ With the goal of aiding disadvantaged communities around the world through technology sharing, the organization developed and promoted a new open patent license. Since its inception, the group has facilitated the sharing of valuable patents related to agriculture and medical care.¹⁶⁷ In 2008 and 2009, two similar patent-sharing initiatives appeared: In 2008, The World Business Council for Sustainable Development launched the Eco-Patent Commons with the backing of I.B.M., Nokia, Pitney Bowes, and Sony.¹⁶⁸ Drawing on this effort's experiences, the legal nonprofit Creative Commons, in collaboration with Nike and Best Buy, announced a project called GreenXchange in early 2009.¹⁶⁹ Both projects seek to aid the environment by facilitating the licensing of a wide variety of technologies. For instance, Nike contributed patents to GreenXchange that describe new types of environmentally friendly rubber,¹⁷⁰ and Yahoo contributed a patent that reduces the energy consumption of data centers.¹⁷¹ The Eco-Patent Commons has collected methods developed by Xerox for decontaminating groundwater, and methods developed by IBM for cleansing semiconductor wafers.¹⁷²

166. Biological Innovation for Open Society, at <http://www.bios.net> (last visited Jan. 21, 2011); see also The CAMBIA BiOS Initiative: Implementation Phase, 2006–2008, at 2–9 (2006) [hereinafter BiOS], available at <http://www.patentlens.net/daisy/bios/2029/version/default/part/AttachmentData/data/BiOS%20Initiative%20Phase%202006-2008.pdf> (on file with the *Columbia Law Review*) (discussing development of BiOS project).

167. See BiOS, *supra* note 166, at 10–13 (describing BiOS initiative); BiOS Licensed Patents Inventory, Cambia.org, at <http://www.cambia.org/daisy/cambia/4285.html> (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011) (listing patents available for nonexclusive use); see also BiOS-Compatible Agreement Listing, Cambia.org, at <http://www.cambia.org/daisy/bios/mta/agreement-patented.html> (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011) (describing benefits of BiOS-compatible agreement).

168. See World Business Council for Sustainable Development, Eco-Patent Commons, at <http://www.wbcasd.org/templates/TemplateWBCSD5/layout.asp?type=p&MenuId=MTQ3NQ&doOpen=1&ClickMenu=LeftMenu> (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011); see also Mary Tripsas, Everybody in the Pool of Green Innovation, *N.Y. Times*, Nov. 1, 2009, at N5 (discussing, *inter alia*, GreenXchange and Eco-Patent Commons).

169. Press Release, Kaitlin Thaney, Creative Commons, GreenXchange—A Project of Creative Commons, Nike and Best Buy (Feb. 10, 2009), at <http://creativecommons.org/weblog/entry/12734> (on file with the *Columbia Law Review*); see also The GreenXchange, at <http://greenxchange.force.com> (last visited Jan. 21, 2011).

170. See Search Results: Rubber, GreenXchange.force.com, at <http://greenxchange.force.com/vGXSearch?keywords=rubber> (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011) (listing rubber patents Nike has contributed to GreenXchange).

171. See Search Results: Energy Efficiency, GreenXchange.force.com, at <http://greenxchange.force.com/vGXSearch?keywords=energyefficiency> (on file with the *Columbia Law Review*) (last visited Jan. 21, 2011) (listing patents relating to energy efficiency offered by Yahoo).

172. See Tripsas, *supra* note 168.

Gathering a wide range of technologies presents a wide variety of challenges. For example, while some inventions may not have great market value—such as an I.B.M. patent for a recyclable cardboard insert that cuts down on shipping costs¹⁷³—many patents that would be valuable to these collectives have great commercial value to their owners. Indeed, patents can often be a corporation's crown jewels. Convincing firms to license such highly valued assets is not an easy task. Creative Commons prudently addressed this challenge by crafting an open patent license that permits patent owners to collect royalty fees and impose field-of-use limitations.¹⁷⁴ Explaining the strength of this approach, Creative Commons' VP of Science, John Wilbanks, told the *New York Times*, "We don't depend on altruism."¹⁷⁵

Quasi-patents reflect a similar pragmatism. By allowing patent holders to charge their rivals licensing fees while ensuring that noncompetitors pay nothing, the quasi-patent form could encourage participation in communities of innovation. While the GreenXchange license allows competing uses to be defined through field-of-use restrictions, the definition of "competitors" in our proposal is decided by the neutral administrators of the community itself. In this way, quasi-patents are finely tuned to the economic motivations of patentees.

As in the fields of genetics and software, environmental and public health collectives can also benefit from the sharing of research data that semi-patents encourage. In fact, the BiOS project literature explicitly discusses why sharing not only patents, but also non-patented data, can benefit fields as diverse as animal breeding, crop husbandry, and resource conservation.¹⁷⁶ Thus, the semi-patent model would be a valuable addition to the menu of protections available in environmental and public health patent collectives.

Unlike software or gene patent sharing collectives, initiatives like BiOS, GreenXchange, and the Eco-Patent Commons are organized around conceptual goals, rather than specific subject matter. We believe that the addition of semi-patents and quasi-patents would help to bind these efforts and attract new and valuable partners. These accomplishments would not only help make the case for broader adoption of our proposals, but could help mark the way forward for disadvantaged communities and the global environment as a whole.

173. *Id.*

174. *Id.*

175. *Id.*

176. BiOS, *supra* note 166, at 5, 29 (discussing importance of sharing know-how as well as "how-not-to").

IV. INCORPORATING QUASI-PATENTS AND SEMI-PATENTS INTO THE PATENT SYSTEM

In this Part, we explain how quasi-patents and semi-patents should be implemented outside of the context of communities of innovation. The implementation of our proposal would give rise to two principal challenges: The first challenge would be to generate the goodwill necessary to prompt Congress to adopt our proposal; the second challenge would be to convince inventors to prefer quasi-patents and semi-patents over traditional patent protection. As should be clear to the reader, virtually every legal reform involves similar challenges. In the remainder of this Part, we show that both hurdles may be cleared in our case with relative ease.

A. *Political Goodwill*

No legal reform can pass unless it is supported by the interest groups that influence the legislative (or regulatory) process. Furthermore, it is easier to block legislation than to pass legislation. Consequently, proposed reforms that can benefit the public may often falter on account of opposition by a powerful interest group. We are fully cognizant of these political realities. Yet, we believe that our proposal can generate the necessary political goodwill to become law. Our guarded optimism is based on the fact that our proposal neither threatens nor unduly burdens any of the interest groups that shape patent law and policy. It is relatively modest in its scope and effect and may be perceived as benign and desirable by all the groups that shape patent policy, per the following analysis.

The two principal groups that influence patent law and policy are inventors and the USPTO. The third relevant actor in the patent arena is the public at large.¹⁷⁷ The influence of the public on patent policy, however, is much more limited than that of either of the first two groups we mentioned. Nevertheless, we will also address the interest of the public. Let us begin, though, by analyzing the likely reaction of inventors and the USPTO to our proposal. Neither inventors nor the USPTO have a strong reason—or even a weak one—to oppose the introduction of quasi-patents and semi-patents. The formalization of these intellectual property forms and their incorporation into an opt-in menu will increase inventors' choices without creating real cost for them. If our proposal is adopted, inventors will have a choice among three protection regimes. The choice among the three options would be very straightforward and would not require inventors to invest any real or cognitive resources. Since quasi-patents and semi-patents would be added as opt-in regimes, they would not erode the status of traditional patents. Inventors would

177. See, e.g., John R. Allison et al., *Valuable Patents*, 92 *Geo. L.J.* 435, 467 n.138 (2004) (noting power and success of small inventor lobby in altering patent legislation to suit its goals). For a discussion of the influence of the USPTO on patent policy, see *supra* notes 24–31 and accompanying text.

be able to obtain patent protection with the same ease as today, and without facing any additional obstacles. Those inventors would be *no* worse off if our proposal were adopted. At the same time, inventors who prefer more limited protection and cannot get it today would be better off under our proposal. This is especially true since, as we explain below, inventors who opt for quasi-patent or semi-patent protection would receive benefits in the form of reduced fees, faster examination, and in some cases, even tax concessions.

The USPTO too has little reason to oppose our proposal. Administrative agencies are likely to oppose changes that erode their status or increase their work burden without adequate compensation.¹⁷⁸ This is not the case here. Our proposal does not diminish the significance of the USPTO, nor does it increase or complicate the work of patent examiners. Because our proposal does not eliminate, or even modify, any of the existing patentability criteria, it should have no effect on the operations of the USPTO. Both quasi-patents and semi-patents retain the basic patentability requirements of novelty, usefulness, and nonobviousness. Hence, quasi-patent and semi-patent applications will be subject to the same examination process as traditional patents. The addition of these protection forms should have no effect on the workload of patent examiners.

Nor will the introduction of the two proposed forms require any internal restructuring of the USPTO. In this sense, our proposal is very different from the introduction of, say, a new subject matter. For example, the introduction of business methods as a patentable subject matter in the late 1990s¹⁷⁹ forced the USPTO to hire new examiners with the requisite background to review the applications and to establish a prior art database. This transition not only cost the USPTO serious funds, but also led to harsh criticism,¹⁸⁰ cynicism,¹⁸¹ and a tarnished public im-

178. For an analysis of the actions of administrative agencies, see generally Richard A. Posner, *The Behavior of Administrative Agencies*, 1 J. Legal Stud. 305 (1972). For a contemporary analysis of the behavior of the USPTO, see generally Lemley, *Rational Ignorance*, *supra* note 7.

179. For an informative description of the rise of software and business method patents, see Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 Calif. L. Rev. 3, 7–14 (2001); see also Sabra Chartrand, *Federal Agency Rethinks Internet Patents*, N.Y. Times, Mar. 30, 2000, at C12 (discussing “Group 705,” a department within USPTO created during the late 1990s to process patents for software and business methods).

180. See generally Lemley, *Rational Ignorance*, *supra* note 7 (discussing criticism lodged at USPTO and proposing new explanation for agency’s actions).

181. See Sabra Chartrand, *Patents: Ideas, Advice and Criticism Spring Forth on How, and Whether, to Grant Patents Involving Software*, N.Y. Times, Feb. 14, 1994, at D2 (reporting that in course of USPTO hearings concerning establishment of prior art database and hiring new examiners, commentators expressed skepticism and lack of confidence in agency’s ability to make this transition); Evan Ratliff, *Patent Upending*, Wired, June 2000, at 208, 210 (portraying website called Patnews, which gained attention among academics, industry players, and patent examiners for its often cutting critiques of patent system).

age.¹⁸² Our proposal, by contrast, does not raise any such concerns. Giving inventors the option to choose quasi- and semi-patents will not present the USPTO with any new challenges and will not necessitate any meaningful transition. Moreover, it will not increase the agency's workload. It is important to understand that because quasi- and semi-patents incorporate the same substantive criteria as traditional patents, there will be *no* increase in the number of applications. There will only be a substitution effect: Some applicants who would otherwise apply for patents will instead apply for quasi-patents or semi-patents.¹⁸³

Our proposal will also benefit the public at large. As we explained in Parts II and III, *supra*, the addition of quasi-patents and semi-patents to the list of intellectual property forms should lead to more innovation and superior information sharing, which, in turn, would bring new products and processes to consumers. The new protection forms do not exacerbate the deadweight loss problem associated with patent protection, nor do they chill future innovation. Relative to traditional patents, quasi-patents and semi-patents improve the public's lot in its hypothetical bargain with inventors relative to the current baseline of standard patents.¹⁸⁴

It is important to emphasize that we view our proposal as a first step along the way to a more comprehensive patent reform. Our personal view is that additional measures should be undertaken to improve the workings of the patent system. Other proposals seeking to overhaul the review process at the USPTO,¹⁸⁵ shorten protection periods,¹⁸⁶ change

182. See Sabra Chartrand, *What's in a Name? A Sign of Other Changes at the United States Patent and Trademark Office*, N.Y. Times, Apr. 3, 2000, at C6 (discussing plans for substantive and "cosmetic" changes at Patent Office in response to criticism concerning agency's handling of software and business method patents); Garfinkel, *supra* note 31, at 104 (providing in-depth look at problems in USPTO stemming from software and business method patents).

183. The only difference our proposal makes for the USPTO is that it would be required to make some very minor and technical adjustments in its protocols to induce inventors to select quasi- and semi-patents, per our discussion in Part IV.B, *infra*. For example, the USPTO would be required to adopt differential examination and renewal fees for the three prototypes. Likewise, the USPTO may be required to give temporal priority to quasi- and semi-patent applications in order to guarantee quicker review of such applications. While we do not mean to underestimate the possible effect of even minor changes on the operations of a large agency such as the USPTO, at the end of the day, the expected impact should be very small.

184. There is one possible objection one might raise against our analysis, nevertheless. It could be argued that some of the inducements we suggest to veer inventors to choose quasi- and semi-patents—specifically, tax benefits—may marginally harm the public even relative to the patent baseline. We will deal with this argument in greater detail in Part IV.B, *infra*. Suffice it to say here that we propose that tax breaks should be used very circumspectly and only in special cases. Hence, the cost for the public is likely to be minimal, and, in any case, it is likely to be far outweighed by the benefit.

185. See *supra* Part I.B.

186. See *supra* note 124 and accompanying text.

patentability requirements,¹⁸⁷ or make patent law more technology specific,¹⁸⁸ have considerable merit in our opinion and should receive serious consideration. At the same time, such proposals are likely to generate staunch opposition either on the part of inventors and industry participants or on the part of the USPTO. The more extreme a proposal is, the more likely it is to meet with opposition from one interest group or another. In that sense, the modest nature of our proposal is probably one of its virtues.

B. *Reshaping Inventors' Preferences*

In the previous section, we explained why our proposal stands a chance of being enacted. However, the legal formalization of quasi- and semi-patent rights will not accomplish anything unless inventors would select these intellectual property forms over standard patents. Hence, it is important to convince inventors to opt into our proposed regimes. But why would any inventor prefer limited protections over more expansive ones? In the proceeding discussion, we explore two important reasons that may lead inventors to choose quasi- or semi-patents over standard patents: ideology and monetary incentives. We discuss each motivation in turn.

1. *Ideology*. — Monetary rewards are not the sole impetus for human action.¹⁸⁹ In some contexts, ideology may be an equally powerful motivation. The successes of the nonprofit organization, Creative Commons, and the open source movement are testaments to this fact. Both projects are predicated on the view that “information wants to be free.”¹⁹⁰ Thousands have subscribed to this view and have contributed content to both projects without receiving any monetary rewards. The same ideological or personal preference can prompt inventors to select quasi- or semi-patent protection—or even no protection at all—over standard patents.

An argument can be made that the success of the open source movement and Creative Commons is of limited usefulness to the realm of innovation. This is because contributions to these projects are often relatively small¹⁹¹ and of little independent value.¹⁹² The production of patentable innovations, by contrast, often requires considerable invest-

187. See, e.g., Gideon Parchomovsky & R. Polk Wagner, A Patent Commercialization Requirement (Apr. 30, 2009) (unpublished prospectus) (on file with the *Columbia Law Review*).

188. See *supra* note 125 and accompanying text.

189. See Benkler, *supra* note 7, at 423–34 (discussing diverse motivations behind human action).

190. R. Polk Wagner, Information Wants to Be Free: Intellectual Property and the Mythologies of Control, 103 *Colum. L. Rev.* 995, 1029–33 (2003).

191. See Benkler, *supra* note 7, at 379 (emphasizing importance of breaking up projects into small assignments).

192. See *id.* at 435 (noting “relatively small independent value” of “fine-grained contributions” to large-scale peer productions).

ment of time and money. Accordingly, one could argue that it is unrealistic to expect inventors to cede any protection voluntarily.

Although we do not deny the fact that the average open source or Creative Commons contribution is more limited in scope and scale than the effort necessary to produce a patentable invention, we posit that this does *not* spell doom for quasi- and semi-patents. It must be borne in mind that some of the contributors to the open source movement have expended considerable resources on the projects. Linus Torvalds, for one, invested large amounts of time and money to produce and supervise development of the Linux kernel.¹⁹³ The fact that all contributions to the Linux operating system are currently covered by a license that includes patentable inventions is indicative of this.¹⁹⁴ Many other pioneers of both the open source and Creative Commons movements, such as Richard Stallman and Larry Lessig, have shared the same philosophy that motivated Torvalds.¹⁹⁵ We believe that a similar spirit will attract many inventors to adopt quasi- and semi-patents.

Furthermore, it should be emphasized that choosing a quasi- or semi-patent does not imply complete loss of protection. The sacrifice involved in selecting either protection form over a traditional patent is much smaller than the sacrifice made by the founders of open source projects. Inventors who opt for a quasi- or semi-patent should be able, in most cases, to recoup their investments and even make a profit.

One possible way to further motivate inventors to choose quasi- and semi-patent protection is to adopt a rule that all follow-on inventors will have to choose the same protection form. Under this rule, if inventor A chose to protect her invention by a quasi-patent and years later, inventor B came up with an improvement to the original invention, B would not be able to seek traditional patent protection for the improvement. Instead, B would have to file for a quasi-patent. Under this regime—which mirrors the basic principle of open source¹⁹⁶—each quasi- or semi-patent will serve as a kernel or seed capable of sprouting many additional quasi- or semi-patents. The adoption of this rule will increase the attractiveness

193. Steven Weber, *The Success of Open Source* 99–101 (2004) (describing how Linus Torvalds developed first working kernel of Linux Operating System in late 1990 and early 1991, and went on to shepherd the project for years—importantly, making key decision to adopt the GNU General Public License in January 1992).

194. The latest version of the GNU General Public License—likely the most popular free software license in use today—conveys a broad scope of patent rights to licensees. In fact, the agreement extends to patent claims that have not yet issued. See *supra* note 100 and accompanying text (discussing “viral licensing” mechanism of GNU General Public License).

195. See, e.g., Lawrence Lessig, *The Future of Ideas* 53–54 (2001) (describing how Torvald and Stallman’s individual creations were combined to create free GNU/Linux operating system).

196. See *supra* note 100 (discussing viral nature of GNU General Public License); see also *supra* note 102 (discussing potential limitations of this concept in domain of quasi-patents).

of quasi- and semi-patents to inventors who ponder the possibility of choosing one of the regimes since it assures them that by restricting their own protection, they will force all follow-on inventors to be subject to the same restrictions. The creation of a network of quasi- and semi-patents will thus generate two salutary effects: First, it will increase the ideological gratification inventors receive from selecting these modes of protection; second, it will guarantee inventors who chose quasi- or semi-patent protection broader use privileges with respect to future improvements of their own inventions.¹⁹⁷

2. *Monetary Incentives.* — It is of course possible that ideology alone will not produce an adequate number of quasi- and semi-patents. In the absence of real world experimentation, it is impossible to predict how many inventors will voluntarily choose quasi- or semi-patent protection. We believe some will. But how many is not a question that can be answered in the abstract. We are fully aware some may be skeptical that ideology alone can underwrite a successful launch of quasi- and semi-patents. Ideology, however, should not be relied on as the only incentive to choose either of the two new forms of intellectual property protection. It is possible to complement ideological motivations with direct and indirect monetary incentives. The measures we discuss in the paragraphs that follow are intended to increase the attractiveness of quasi- and semi-patents relative to standard patents. Such measures may include lower filing fees, shorter examination periods, fewer renewal requirements, longer protection periods, and even tax benefits. It is also possible to offer inventors various combinations of these measures.

The simplest and most straightforward incentive that may be offered to inventors is lower filing fees. The basic filing fee currently stands at \$330.¹⁹⁸ However, various additional fees may be tacked on if the examination process does not go smoothly and the application does not get approved on the first attempt.¹⁹⁹ Moreover, if an application is ultimately

197. The latter effect is not strictly ideological and should be thought of as an indirect monetary incentive. Essentially, the effect is analogous to a limited form of insurance. See Rebecca S. Eisenberg, *Reaching Through the Genome*, in *Perspectives on Properties of the Human Genome Project* 209, 225 (F. Scott Kieff ed., 2003) (discussing power of grant-back provisions in patent licenses to facilitate exchanges between patent holders and downstream innovators).

198. U.S. Patent & Trademark Office, *Fee Schedule: Effective October 2, 2008* [hereinafter *Fee Schedule*], at <http://www.uspto.gov/web/offices/ac/qs/ope/fee2009september15.htm> (on file with the *Columbia Law Review*) (requiring small entities to pay only one-half of this amount—i.e., \$165); cf. *Revision of Patent Fees for Fiscal Year 2009*, 73 Fed. Reg. 47,534, 47,537–38 (Aug. 14, 2008) (codified at 37 C.F.R. pts. 1, 41) (listing slightly lower rates for FY2009).

199. The patent application process often resembles a dialogue between examiner and inventor, rather than a single definitive ruling by a tribunal. After receiving and comparing a new patent application against known prior art, an examiner may supply the applicant with an “office action” explaining the reasons for rejecting certain claims. These reasons may include, for instance, failure to meet the statutory requirements of novelty and nonobviousness, as required under 35 U.S.C. §§ 102–103 (2006). The applicant may then

approved, the applicant must pay an issue fee of \$1,510.²⁰⁰ Waiving—or at least lowering—these fees for quasi- and semi-patent applications may induce inventors to prefer these forms of protection. Admittedly, the savings to inventors from the adoption of this measure would be quite insignificant relative to the total cost of protection.²⁰¹ Yet, even minor savings can make a difference especially for small and academic inventors since the cost saving occurs at a very early stage when inventors do not yet know whether their inventions will achieve commercial success.

A different, yet related, measure that may be used to steer inventors toward quasi- and semi-patents is to guarantee shorter examination periods for these forms of protection relative to standard patents. Presently, it takes the USPTO between 14 months and 4 years to complete the examination process,²⁰² with an average time of 34.6 months.²⁰³ Expediting the examination of quasi- and semi-patent applications may provide a useful and cost-effective way to influence inventor choices. For example, if the USPTO were to adopt a rule under which the examination of all quasi- and semi-patent applications would be completed in 12 months, it could significantly increase the number of quasi- and semi-patent applications. Like the rest of us, inventors are eager to see the examination process come to an end. In addition, receiving the protection earlier should increase revenues from licensing and litigation.

A third measure that may boost the relative attractiveness of quasi- and semi-patents to inventors concerns renewal fees. Standard patents are subject to renewal fees. Patentees must renew protection three times during the life of a patent. The first renewal fee at the amount of \$980 is due 3.5 years after the issuance of the patent, the second at the amount of \$2,480 is assessed 7.5 years after the date of the grant, and the third at the amount of \$4,110 is levied 11.5 years after the date of issuance.²⁰⁴ Requiring quasi- and semi-patentees to renew only once during the protection term and lowering the one-time fee to a few hundred dollars may,

amend the offending claims or portions of the specification, and resubmit the revised application to the examiner for review. This back and forth may continue for some time before a final decision is rendered.

200. See Fee Schedule, supra note 198 (requiring small entities to only pay one-half this amount—i.e., \$755).

201. There is some disagreement as to the total cost of obtaining a patent, but the average amount is placed between \$10,000 and \$30,000. See Lemley, Rational Ignorance, supra note 7, at 1498–99 (placing total cost of prosecution at \$20,000); Masur, supra note 10 (manuscript at 2) (“[A]n inventor will spend approximately \$22,000 to obtain a patent.”).

202. U.S. Patent & Trademark Office, On Line Chat Transcripts FAQs, at http://www.uspto.gov/inventors/independent/chats/faq/transcripts_f_m.jsp (on file with the *Columbia Law Review*) (last modified July 31, 2010).

203. U.S. Patent & Trademark Office, Performance and Accountability Report 14 (2009), available at <http://www.uspto.gov/about/stratplan/ar/2009/2009annualreport.pdf> (on file with the *Columbia Law Review*).

204. Fee Schedule, supra note 198.

at the margin, lead inventors to forgo full patent protection and suffice themselves with more limited intellectual property rights.

A fourth way to prod inventors in the direction of quasi- and semi-patents is to offer a longer protection term to inventions protected in either manner. Utility patents currently enjoy a protection term of twenty years from the date of filing.²⁰⁵ It is possible, therefore, to attach a protection term of twenty-five years to quasi- and semi-patents to compensate inventors for the loss of protection in the case of quasi-patents, or to reward them for their willingness to share information in the case of semi-patents. Ian Ayres and Paul Klemperer have shown that it may be socially desirable to prolong the patent protection terms and simultaneously restrict the scope of protection.²⁰⁶ The economic intuition behind this result is that a longer but less socially harmful protection is superior to a shorter but more harmful one. Hence, Ayres and Klemperer suggested that we should chip away at patentees' exclusivity and compensate them by granting them longer protection.

Although neither quasi- nor semi-patents reduce the deadweight loss associated with patent protection,²⁰⁷ both protection modes generate other beneficial social effects in the form of additional innovation and improved information sharing. Depending on the magnitude of those benefits and the size of the cost of prolonged protection, it may be socially desirable to accord longer protection to quasi- and semi-patents. Given the current state of knowledge (or more precisely, lack thereof) we cannot recommend with confidence that quasi- and semi-patents should be given longer protection. We only wish to flag this possibility and would advise policymakers to proceed with caution.

A fifth and final way to influence inventors' choices is to offer tax breaks to inventors who select to protect their inventions by a quasi- or semi-patent. Tax benefits are often used to induce socially desirable behavior. The case of conservation easements is instructive. To encourage preservation of important environmental amenities on private land, almost all states allow private property owners to restrict their use of the land by granting a nonpossessory negative easement in the land to the government—or, more typically, an environmental nonprofit organiza-

205. 35 U.S.C. § 154 (2006).

206. See Ian Ayres & Paul Klemperer, *Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies*, 97 Mich. L. Rev. 985, 986–88 (1999) (contending social welfare may be improved under legal regime that grants patentees longer protection periods but denies patentees ability to secure injunctions and forces them to share a certain percentage of their markets with competitors).

207. This is because neither form has any effect on production levels of patented products and processes. Hence, neither form has an effect on the price charged to consumers.

tion—in exchange for tax benefits.²⁰⁸ By granting the easement, the owner voluntarily restricts the scope of her property protection, committing not to harm certain socially valuable characteristics of the property.²⁰⁹ Similarly, it is possible to use tax benefits to reward inventors who choose to restrict the scope of their intellectual property protection in a way that benefits third parties.

Yet, we posit that tax benefits should be sparsely used in the present context. Granting tax breaks to all inventors who opt in to quasi- and semi-patent protection may induce inventors, depending on the size of the tax break, to file for quasi- or semi-patent protection for valueless or even spurious inventions in order to receive the tax benefits. The upshot will be a net social loss: Society will be deprived of valuable tax revenues without getting anything in return. Hence, tax breaks should be reserved only for inventors with multiple quasi- and semi-patents over inventions that achieved commercial success.²¹⁰

CONCLUSION

Somewhat ironically, in recent years, we have witnessed a great deal of innovation in the area of copyright law and none at all in the field of patent law. The rise of Creative Commons and the open source movement allowed copyright owners to choose among multiple forms of copyright protection, and to a large degree, tailor legal protections to their specific needs. Copyright owners can select among full legal protection, no protection, and multiple intermediate positions, such as protection against commercial users only. No such choice currently exists with respect to patent protection. Inventors have to suffice themselves with a binary all-or-nothing choice; at present, there is no legal mechanism that affords inventors more tailored protection.

In this Article, we sought to rectify this problem by offering two new opt-in regimes—quasi- and semi-patents—to inventors. We designed both regimes with the ultimate goal of increasing the rate of innovation in our society. Our first regime, a quasi-patent, would offer inventors protection only against direct competitors, allowing the rest of the world to use the invention with impunity. The second, a semi-patent, retains the same scope of protection as regular patents; however, it conditions the grant of protection on disclosure of all research information pertaining to the claimed invention. Although the two proposed regimes differ in their design, both aim at facilitating subsequent innovation by reducing the taxing effect of patents on future inventors. Quasi-patents achieve this goal by restricting the enforcement rights of their holders. Semi-

208. See Bell & Parchomovsky, *Property in Three Dimensions*, *supra* note 84, at 1054–55 (discussing use of conservation easements to bar socially undesirable uses of land).

209. *Id.*

210. Although commercial success is not a perfect proxy for social value, it is the best proxy we have.

patents advance it by dramatically improving the available information about existing inventions.

As this Article shows, both opt-in regimes may be readily introduced privately via broad licensing agreements that govern collaborative research enterprises. This implementation model largely tracks the evolutionary path of the open source movement. Yet, to achieve maximum effect, it would be necessary to complement private implementation with public recognition. One of the functions of the state is to provide ideal “property packages,” and to redefine existing property rights in order to adjust them to changing social needs.²¹¹ Formalization of quasi- and semi-patents and their incorporation into a tripartite menu of protection forms may, on its own, prompt inventors to select either form over standard patent protection. Supplementing formal recognition with simple incentives, such as lower examination fees and fewer renewal requirements for quasi- and semi-patents, may induce their wide-scale adoption and turn them into viable alternatives to standard patents. The introduction of quasi- and semi-patents clearly will not solve all the problems of our patent system. This much is granted. But our analysis of quasi- and semi-patents indicates that they present a real opportunity to improve the workings of the patent system at a very low cost to society.

211. See Bell & Parchomovsky, *Property in Three Dimensions*, *supra* note 84, at 1030–33 (discussing importance of public orderings of property in circumstances where transaction costs associated with private orderings of property are prohibitively high).