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Rethinking the Concept of Exclusion in Patent Law

OSKAR LIIVAK*

Patent law's broad exclusionary rule is one of its defining features. It is unique within intellectual property because it prohibits acts of independent creation. Even if a second inventor had no connection or aid from an initial inventor, patent law allows the first inventor to stop the second. Though a number of pressing problems can be traced to this rule, it remains untouchable; it is thought to be essential for incentivizing invention. But is it really our only choice? And why is it so different from our otherwise widespread reliance on free entry and competition in markets? The current rule and its anti-competitive stance are defended as being economically necessary as well as being administratively manageable. This Article questions both of these justifications. As an alternative, the Article explores a narrower type of exclusion suggested by Learned Hand some fifty years ago. The Article finds that his reform ideally could provide for the same set of inventive projects (if not more) as the current rule does but could avoid many of the pitfalls bedeviling the current system. Learned Hand's suggested rule models itself on copyright where infringement extends only to copyists and thus allows generally free entry and competition by independent inventors. Interestingly, despite the competitive pressures and their reduction in the magnitude of the reward to the initial inventor, this "free entry system" can provide for the same set of inventive projects as the current rule, and because of the competitive pressures, it can do so with improved social welfare. Furthermore, as to administration, though there are surely difficulties in both monitoring and adjudicating such a copying-based patent rule, there are important unappreciated self-enforcement benefits. Though far from supporting an immediate doctrinal change, these results suggest at least a conceptual reorientation wherein prevention of copying and its resulting economic undercutting—and not the per se prevention of competition—become the goals of the patent system. Rather than being a necessary economic feature, patent law's broad conceptualization of exclusion may be an administrative artifact that we would jettison if only we could.

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INTRODUCTION

In 1785, the Commonwealth of Massachusetts granted a charter to a group of private businessmen to undertake a new, risky technological feat that, if successful, would certainly be of "great public utility."¹ As described in their charter, the businessmen were to attempt to construct and then maintain a bridge across the Charles River connecting Charlestown to Boston.² In return the Commonwealth granted them the exclusive limited-time right to collect tolls.³ The Charles River Bridge was built, and it benefited both the public and the

1. *Proprietors of the Charles River Bridge v. Proprietors of the Warren Bridge*, 36 U.S. (11 Pet.) 420, 542 (1837) (internal quotation marks omitted).

2. See STANLEY I. KUTLER, *PRIVILEGE AND CREATIVE DESTRUCTION: THE CHARLES RIVER BRIDGE CASE 1* (1971).

3. See *id.*

businessmen.⁴ This apparent win-win situation soured in following years, as the public continued to pay the tolls while the proprietors continued to profit.⁵

Public sentiment, though, did not call for shortening or nullifying the original charter. Instead, perhaps attracted by the impressive profits, another group of businessmen, soon to be known as the Proprietors of the Warren Bridge, petitioned the Commonwealth to allow them to build their own bridge next to the existing bridge.⁶ The Commonwealth granted this second charter and the Warren Bridge was built.⁷

The incumbents sued arguing that their exclusive grant prohibited later grants to direct competitors.⁸ The upstart entrants did not deny that investors needed some type of exclusivity to recoup their initial, risky investments. Rather, the controversy centered over the *type* of exclusivity that was needed.⁹ Ultimately, the Supreme Court sided with the upstarts,¹⁰ but in a strong dissent, Justice Story argued for what had been until that time the standard view that such risky projects needed broad protection. He felt such projects needed to be protected from competition and, therefore, the grant to build the second bridge had to be invalid.¹¹ In contrast, the majority broke from that traditional view and instead favored competition by interpreting the initial grant's exclusivity narrowly. The majority viewed the entry of the Warren Bridge as fair and productive, not ruinous. The case signaled an important change in attitude toward the role of competition in such exclusive grants.¹²

Reading the opinion, I, like others, cannot but help think of patent law.¹³ The

4. See *id.* at 1–2.

5. See *id.* at 18–24.

6. See *id.* at 2, 18–19. But in contrast to the relatively long period of exclusivity granted before, the Proprietors of the Warren Bridge only asked for a period of exclusivity long enough for them to recoup their expenses, and in no case would their exclusivity last more than six years. See *Charles River Bridge*, 36 U.S. (11 Pet.) at 427–28. The shareholders of the Charles River Bridge, many of whom had recently become members, certainly did not wish to see the new Warren Bridge built, and they saw that, at the very least, the profitability of their shares would plummet in six years if not earlier. See KUTLER, *supra* note 2, at 2; see also HERBERT HOVENKAMP, *ENTERPRISE AND AMERICAN LAW, 1836–1937*, at 111 (1991).

7. See KUTLER, *supra* note 2, at 2.

8. *Charles River Bridge*, 36 U.S. (11 Pet.) at 420–21.

9. See *id.* at 474–514.

10. *Id.* at 583.

11. *Id.* at 609–50 (Story, J., dissenting).

12. HOVENKAMP, *supra* note 6, at 111–12 (1991); see also Gregory S. Alexander, *Property as Propriety*, 77 NEB. L. REV. 667, 679–85 (1998) (discussing the political forces that exposed the bridge franchise to competition).

13. See, e.g., F. SCOTT KIEFF ET AL., *PRINCIPLES OF PATENT LAW* 164 (2008) (noting Justice Taney's pro-competitive view in the *Charles River Bridge* case); THOMAS W. MERRILL & HENRY E. SMITH, *PROPERTY: PRINCIPLES AND POLICIES* 1160 (2007) (stating that “[m]any of [the issues raised by the *Charles River Bridge* case] surface in current debates over the ‘monopoly’ rights of intellectual property”); John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439, 479 n.126 (2004) (recognizing similarities between patent law and exclusive bridge construction franchises); Adam Mossoff, *Who Cares What Thomas Jefferson Thought About Patents? Reevaluating the Patent “Privilege” in Historical Context*, 92 CORNELL L. REV. 953, 1000 (2007) (arguing that the distinction

focus of the *Charles River Bridge* case is, as is the focus of patent law, on the recovery of fixed costs. Interestingly, the *type* of exclusion currently granted by a modern patent, and even the rhetoric used to justify it, look much like the broad anti-competitive exclusionary grant favored by Justice Story. In particular, a modern patent excludes not only those that use the inventor's creation but also those that independently invent the same subject matter.¹⁴ If the proprietors of the Charles River Bridge had been granted a charter modeled on modern patent law, the Warren Bridge would have never been built. Other areas of intellectual property, though, do not use this broad anti-competitive type of exclusion. A copyright grants a different type of exclusivity that falls more in line with the views of the pro-competition majority from the *Charles River Bridge* case, because it excludes others only from using copies of the author's work.¹⁵ Thus, if others want to expend their own time and resources to independently recreate some subject matter, then an existing copyright holder cannot stop them.¹⁶ That type of exclusivity inherently allows more competition and free entry than a system that forbids independent invention. Perhaps patent law's exclusionary choice is a relic of archaic economic thinking? This Article explores whether patent law needs its characteristic broad exclusive grant. Others have asked the same question.¹⁷

In 1955, the Senate Subcommittee on Patents, Trademarks, and Copyrights convened to discuss patent reform.¹⁸ Committee members heard from many of the leading experts. For the afternoon session, the Committee made special room to hear from Judge Learned Hand who, at the time, was eighty-three-years old¹⁹ and had served as a federal judge for over forty-six years.²⁰ He was, and continues to be, one of the most venerated judges to ever preside over a patent case.²¹ Before proceeding, Judge Hand made sure he understood the purpose of his testimony. He reaffirmed that the Committee sought to "consider [patent

between treatment of patents and business franchises revolves around the contract nature of franchises versus the natural right origins of patent right); Robert P. Merges, *Who Owns the Charles River Bridge? Intellectual Property and Competition in the Software Industry* (Apr. 2, 1999) (unpublished manuscript), <http://www.law.berkeley.edu/institutes/bclt/pubs/merges/criver.pdf>.

14. See ROBERT P. MERGES ET AL., *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE* 28 (4th rev. ed. 2007).

15. See *id.* at 29.

16. *Id.*

17. See *infra* notes 18, 33–34 and accompanying text.

18. See *The American Patent System: Hearings Before the Subcomm. on Patents, Trademarks, and Copyrights of the S. Comm. on the Judiciary*, 84th Cong. (1956) (testimony of Judge Learned Hand) [hereinafter *Hand on Patent Reform*].

19. See GERALD GUNTHER, *LEARNED HAND: THE MAN AND THE JUDGE* 1 (1994).

20. *Id.* at 133. The Committee took pains to make sure that Judge Hand could speak at length, excusing him at 3:41 p.m. so that he could still catch his four o'clock train back to New York. See *Hand on Patent Reform*, *supra* note 18, at 132, 135.

21. GUNTHER, *supra* note 19, at 306–15 (describing Judge Hand's unique skills in handling patent cases). His fame extended well beyond patent law. At the time, *The New York Times* called him "the most revered of living American judges." *Id.* at 653 (internal quotation marks omitted).

law] anew from the bottom up.”²² With that charge, Judge Hand proceeded to give his advice for patent reform. He “suggest[ed] to an incredulous patent bar”²³ that he would “make patents like copyrights. [He felt] that a man is entitled to what he contributed . . . and unless [others] used what he did, he could not stop it.”²⁴ He suggested, contrary to the current patent rule, that patent infringement be limited “to those who could be shown to have copied what the inventor did.”²⁵ As a judge, he thought such a system not only would be constitutionally permissible and judicially workable but could also “avoid a great deal of the animosity that has surrounded patents nearly always.”²⁶ In the intervening fifty years, few have even noted his remarks, much less taken them seriously.²⁷ But we should.

In suggesting a copyright-styled patent system, Judge Hand stated that “it would be very profitable to . . . get all the light you could possibly get on how that system would work.”²⁸ Likely signaling the underlying merits of his proposal, recently, others have independently suggested similar, though somewhat narrower, reforms.²⁹ In general, these recent proposals maintain the current patent system while advocating a defense for independent inventors,³⁰ prior user rights,³¹ or co-ownership of patents between independent inventors.³² The

22. *Hand on Patent Reform*, *supra* note 18, at 111.

23. BENJAMIN KAPLAN, *AN UNHURRIED VIEW OF COPYRIGHT* 44 (1967).

24. *Hand on Patent Reform*, *supra* note 18, at 117.

25. *Id.* at 114.

26. *Id.* at 114–15.

27. The one exception is Benjamin Kaplan. See KAPLAN, *supra* note 23, at 44.

28. *Hand on Patent Reform*, *supra* note 18, at 114.

29. In recent years, both economists and legal scholars have advocated the benefits of an independent inventor defense for patent law. These proposals generally advocate either providing independent inventors with a defense against charges of patent infringement, see Stephen M. Maurer & Suzanne Scotchmer, *The Independent Invention Defence in Intellectual Property*, 69 *ECONOMICA* 535, 535 (2002) (discussing “industrial environments in which the best rule is to allow a defence of independent invention”); Samson Vermont, *Independent Invention as a Defense to Patent Infringement*, 105 *MICH. L. REV.* 475, 479 (2006) (proposing to “bestow a defense to patent infringement on the independent inventor(s)”), with use rights, see Carl Shapiro, *Prior User Rights*, 96 *AM. ECON. REV.* 92, 95 (2006) (describing the “attractive properties” of granting independent inventors use rights), with their own patent rights, see Manfredi La Manna, Ross Macleod & David de Meza, *The Case for Permissive Patents*, 33 *EUR. ECON. REV.* 1427, 1437 (1989) (advocating a “permissive” patent regime where the PTO would “accept[] all applications up to the date of the award of a patent to the earliest inventor of a given class of new products/processes”), or even with co-ownership of the initial inventor’s patent, see John S. Leibovitz, Note, *Inventing a Nonexclusive Patent System*, 111 *YALE L.J.* 2251 (2002). See also Oskar Liivak, *Maintaining Competition in Copying: Narrowing the Scope of Gene Patents*, 41 *U.C. DAVIS L. REV.* 177 (2007) (discussing independent invention in the narrower confines of patents claiming purified and isolated naturally occurring gene sequences). For the narrow applicability of these reforms, see, for example, Roger D. Blair & Thomas F. Cotter, *Strict Liability and Its Alternatives in Patent Law*, 17 *BERKELEY TECH. L.J.* 799, 813 (2002) (finding that “the limitations imposed by [the assumptions made in Maurer and Scotchmer’s model demonstrating the effects of an independent discovery defense] suggest extreme caution in deriving any practical policy recommendations from it”).

30. See Maurer & Scotchmer, *supra* note 29; Vermont, *supra* note 29.

31. See Shapiro, *supra* note 29.

32. See Leibovitz, *supra* note 29.

response to these proposals has ranged from healthy, cautious skepticism³³ to outright hostility.³⁴ For example, one of these proposals has been criticized as “eviscerating” a patent’s right to exclude.³⁵ Other proposals built around specific economic models have been criticized as too specific to provide any guidance.³⁶ There have been more universal criticisms, too. Some commentators worry that anything that allows entry by competitors risks reducing the incentive that patent law is meant to protect.³⁷ Further, some worry that allowing independent invention would present insolvable administrative difficulties.³⁸ Despite these criticisms, this Article generally finds many useful insights in each of these proposals. However, the specific nature of these proposals has created specific obstacles to each. In contrast, Judge Hand suggested a more general re-examination of patent law. Patent law’s broad grant of exclusivity is one of its defining features. If we are to use it, it must be well-justified, and Judge Hand was not convinced that the case for our current type of exclusion had yet been made. He suggested an alternative type of exclusion that, at the very least, would be an illuminating foil against which the current system could be compared.

To examine the necessity of the current broad exclusivity, this Article employs a comparative analysis between two model patent systems.³⁹ One system, based on the current patent system, provides what I call exclusion over *the* invention. Exclusion over *the* invention allows the patentee to stop anyone, even independent inventors, from using the invention. The other system, based on Judge Hand’s proposal, grants exclusion only over *my* invention. As in copy-

33. See Mark A. Lemley, *Should Patent Infringement Require Proof of Copying?*, 105 MICH. L. REV. 1525, 1526–28 (2007).

34. Roger Milgrim, *An Independent Invention Defense to Patent Infringement: The Academy Talking to Itself: Should Anyone Listen?*, 90 J. PAT. & TRADEMARK OFF. SOC’Y 295, 296 (2008) (suggesting that such academic proposals are in need of “adult supervision”).

35. See *id.* at 303. Milgrim’s criticism is not surprising because Leibovitz titles his proposal a “nonexclusive” patent system. Leibovitz, *supra* note 29, at 2251. Leibovitz suggests implementing his system by “allow[ing] defendants in patent litigation to invoke an ‘independent invention’ defense,” *id.* at 2273, or by making independent inventors “joint owners,” *id.* at 2280. As this Article shows, similar competitive benefits advocated by Leibovitz can be generated while still maintaining an exclusive patent system. We just need to re-conceptualize the thing over which patent law grants sole and despotic dominion.

36. See, e.g., Blair & Cotter, *supra* note 29.

37. See Lemley, *supra* note 33, at 1529, 1535–36 (arguing that the independent invention defense may interfere with patent law’s incentive structure); Clarisa Long, *Information Costs in Patent and Copyright*, 90 VA. L. REV. 465, 528 (2004) (arguing that “an independent creation privilege in patent law would too drastically reduce incentives to create”); see also John F. Duffy, *Inventing Invention: A Case Study of Legal Innovation*, 86 TEX. L. REV. 1, 9 (2007) (“A narrow right that allows for independent creation and protects only the precise details of a particular embodiment of the invention is unlikely to give sufficient protection, as a practical matter, to encourage the type of investments and work that society wants to encourage.”).

38. See, e.g., Duffy, *supra* note 37, at 9 (“An independent-invention defense would also present difficult administrative problems because courts would have a difficult time distinguishing between true and false claims of duplication.”).

39. See *infra* Part II.

right, the exclusionary reach of this second patent system does not reach independent inventors and, as a result, it allows greater entry by competitors. Importantly, such a free entry system, just like copyright, still provides exclusive rights over something.⁴⁰ The Article only seeks to closely examine which *thing*, which *type* of exclusivity is best. In this regard the proposal underscores that “[t]he fundamental issue . . . is neither political nor legal, but conceptual.”⁴¹

The Article explores a comparative analysis of these systems in two parts, addressing first the economic criticisms that have generally been leveled at these proposals, and second the administrative criticisms.⁴² For its economic discussion, the Article assumes an ideal world where a patent system can be administered at zero cost, and it explores the main normative rationales that are used to justify patent law’s broad exclusion. It asks whether the economic analysis of incentives or concerns over redundancy can justify patent law’s broad exclusivity. Within the confines of its assumptions, the Article ultimately finds that patent law’s current exclusionary rule cannot be justified as an economic feature. A copyright-styled patent system with its entry and competition can generate at least the same set of inventive projects as can the current patent system, and it can likely do so with improved social welfare.

The Article then turns from this idealized world to the practical world, and it considers the comparative administrative costs of running these two systems.⁴³ Though there are some widely acknowledged administrative difficulties with a copyright-styled patent rule, the Article finds that there are also some critically under-appreciated administrative benefits. Ultimately, the Article cannot conclude which system is administratively superior. Nonetheless, having shown the economic advantages of a copyright-styled rule and absent markedly superior administrative benefits for the current rule, a copyright-styled patent system demands, at the very least, further study and consideration.

Lastly, in light of the mixed practical issues, this Article concludes with a proposed hybrid system that provides the competition-based benefits of a copyright-styled rule while avoiding some of its administrative difficulties.⁴⁴ Even though further investigation is needed, all of these results at least suggest a conceptual reorientation wherein prevention of copying and its resulting economic undercutting, and not the per se prevention of competition, may become the ideal goal of the patent system. Likewise, these results, suggesting compatibility between patent law and free entry, open the door for reorienting

40. If the rights granted by copyright are consistent with the U.S. Constitution, then patent law should similarly be able to adopt that exact same type of exclusion.

41. Adam Mossoff, *Is Copyright Property?*, 42 SAN DIEGO L. REV. 29, 32 (2005). Along similar lines, Justin Hughes warns: “[B]e careful that the terminology you use does not become the master of your thinking process.” Justin Hughes, *Copyright and Incomplete Historiographies of Piracy, Propertization, and Thomas Jefferson*, 79 S. CAL. L. REV. 993, 995 (2006) (emphasis omitted).

42. See *infra* Part II.

43. See *infra* Part III.

44. See *infra* Part IV.

patent law not as some unique exception to competition but rather as just another example of it.

I. A COPYRIGHT-STYLED, FREE ENTRY PATENT SYSTEM

A. EXCLUDING OTHERS FROM *THE* INVENTION OR ONLY FROM *MY* INVENTION

In order to conceptualize the scope of a modern patent, one must distinguish between the invention and an embodiment of that invention. The embodiment of an invention is the actual physical product created by the inventor. Certainly patent law grants exclusive rights over the actual embodiment, but it has long been argued that patent law must protect more.⁴⁵ It is argued that exclusionary rights that were limited to the actual embodiment would be nearly worthless, as pirates could copy the embodiment but then evade the patent by making some relatively minor change. For that reason, patent law grants exclusionary rights more broadly, giving the inventor exclusive rights over a technological swath that generally surrounds the actual embodiment. In modern patent law, the requirements of patentable subject matter, utility, novelty, obviousness, and disclosure together determine the ultimate extent of a patent's exclusionary reach, and, often, that reach extends beyond just the actual embodiment. As shown in Figure 1A, in modern patent law, this outer technological boundary allowed by patent law defines *the* invention⁴⁶ and a patentee's right to exclude.

Two things are worth emphasizing. First, infringers—those who make, use, or sell claimed subject matter—need not make identical embodiments to the inventor's. The invention covers the actual embodiment, but it may also cover other slightly different embodiments which may even be superior to the inventor's own embodiment. In other words, infringement is measured by a technological metric defined by the patent claims. Second, under the current rule, “[p]ut simply, copying is irrelevant to the issue of liability.”⁴⁷ As shown, when others make, use or sell embodiments that fall within the boundary of the invention, the issue of copying does not impact the infringement analysis.⁴⁸ The current rule, protecting *the* invention, conceptualizes the invention as a broad construct that stands apart from the inventor and is defined as existing, as shown in Figure 1A, as a plane determined by technological distance alone. When two inventors

45. See Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 268 (1977).

46. Although I am using for convenience the modern patent law short-hand that the invention is just the claimed subject matter, there is great mischief that has arisen because modern patent law no longer conceptualizes the invention as an entity that exists apart from the claims. See Oskar Liivak, *Finding Invention* (March 11, 2010) (unpublished manuscript, on file with the author).

47. Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1425 (2009).

48. See Lemley, *supra* note 33, at 1525 (“Patent infringement is a strict liability offense. Patent law gives patent owners not just the right to prevent others from copying their ideas, but the power to control the use of their idea—even by those who independently develop a technology with no knowledge of the patent or the patentee.”).

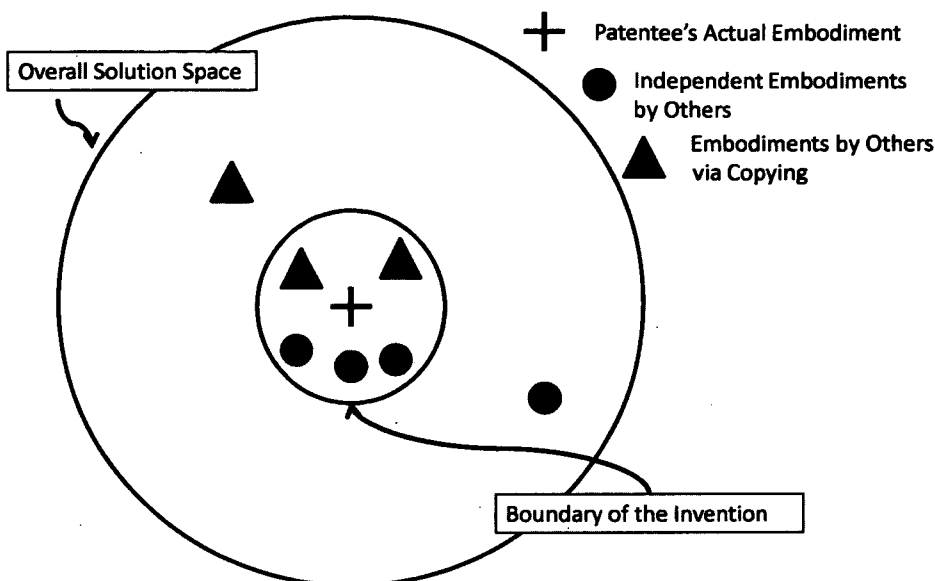


Figure 1A. Exclusion over the Invention

Exclusion over the invention ensnares copied and independently created embodiments as long as they are within the technological boundary defined by the claims.

independently create devices that fall within the claims of a first inventor, patent law finds that they have created the *same* invention, and patent law grants the exclusive rights in *the* invention only to the first inventor.⁴⁹ Such a rule does prevent piracy⁵⁰ and therefore is not a wholly unreasonable choice for patent's exclusionary rule but such a rule also ensnares independent inventors. This system will be referred to alternatively as the current patent system or the single entrant system.

This Article proceeds by comparing the current, single entrant system against a free entry system, a system that provides exclusionary rights not over *the* invention but instead over *my* invention. Both systems center on exclusion relating to the inventor's invention, but they differ in the way that the exclusionary *thing* is conceptualized.

Figure 1B outlines how exclusion over *the* invention differs from exclusion over *my* invention. Such a system provides another dimension beyond the technological dimension upon which to delineate the inventor's creation. *My*

49. See 35 U.S.C. § 102 (2006).

50. This Article presumes that, in order to function, a patent system must at the very least prevent piracy. It must prevent overt copying by others that go on to subvert sales that would have gone to the initial inventor. *But see* Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 293–302 (1970) (arguing that copyright law may not be needed where lead time advantage can adequately protect authors).

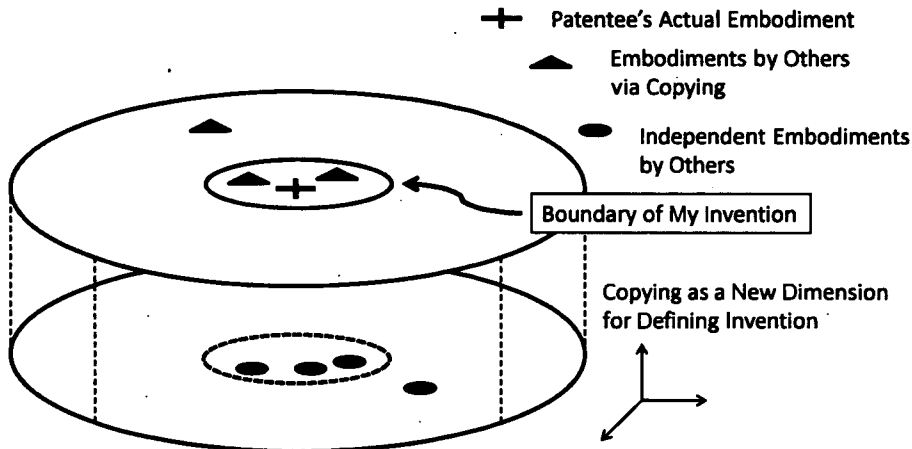


Figure 1B. Exclusion over My Invention

Exclusion over my invention only ensnares copied embodiments. Independently created embodiments exist in other planes, they do not infringe my invention.

invention is always tied to its creator—its inventor. In other words, when a first inventor creates some new device, she has invented *her* invention, and she can claim exclusive rights in *her* invention. Such exclusive rights still prevent copying and piracy.

But when a second inventor *independently* creates a physically identical device, he creates not the same invention; rather, he creates *his* invention.⁵¹ As opposed to the broader rule currently used, this narrower conception does not impede competition and entry from independent inventors. In such a system, independent inventors would not infringe exclusive rights in another's invention because they are not "mak[ing], us[ing] . . . or sell[ing]"⁵² the first inventor's invention even when their actual devices or processes are physically identical. As shown in Figure 1B, conceptually, exclusion over *my* invention opens a new dimension, the amount of copying or amount of independence of embodiments for defining the exclusionary reach of a patent.⁵³ In comparison to the current system, others who create embodiments that fall within the technological

51. An interesting question relates to patent law's novelty requirement and whether this second inventor could ever patent *his* invention. See *infra* section III.B.

52. 35 U.S.C. § 271(a) (2006).

53. For this Article and for purposes of simplicity, the "independence" dimension is explored as a binary variable: either others copied or they did not. But one could already envision alternative systems that define the copying variable as continuous rather than binary. The exclusionary reach of a patent would then define a three-dimensional shape in Figure 1B where increased copying leads to greater technological breadth. Furthermore, as used here, copying focuses on technological copying. The question is whether a later arriving developer has substantially relied upon the technological solution provided by an earlier inventor. Reverse engineering technological details would be copying while inferring market data would not.

boundary of the invention, but have not copied, do not infringe and are free to enter. Although later sections of the Article make the point in more detail, most of the economic benefits of this system derive from free entry and competition. This system will be referred to as the “free entry patent system.”

Under either rule, piracy is forbidden. Copyists cannot simply follow the lead of the initial inventor and copy and then sell the invention. In addition, neither rule prohibits the practice of designing around the initial patent.⁵⁴ This allows inventors to learn from previous inventions and then create their own new and different embodiments outside the technological boundary of the invention despite copying.⁵⁵ The difference between the two rests on the different treatment of independent inventors. Exclusion over *my* invention does not exclude independent inventors while exclusion over *the* invention does. As the rest of this Article shows, significant differences hang on that toggling of the exclusionary rule.

B. THE ATTRACTIVE FEATURES OF EXCLUDING OTHERS ONLY FROM *MY* INVENTION

A free entry patent system could help to solve problems relating to patent trolls, anti-commons deadlocks, and emerging problems with the open source movement in patentable subject matter. But most importantly, a free entry patent system could begin moving patent law away from its current anti-competitive stance and instead towards a pro-competition foundation. Such a move could begin integrating patent law into the general economy.

The first problem that a free entry system would help solve is the patent troll problem. These are “entities that do not manufacture products or transfer technology, but instead assert patents against successful companies that independently develop and manufacture technology without knowledge of those patents.”⁵⁶ Perhaps most famous was NTP, a non-practicing entity that owned a group of patents relating to wireless email devices and systems.⁵⁷ NTP sued Research in Motion, the maker of the ubiquitous Blackberry email device.⁵⁸ In order to avoid an injunction that would have forced Research in Motion to shut down its Blackberry network, Research in Motion agreed to settle the litigation for \$612.5 million despite the fact that Research in Motion developed its products without any assistance or reliance on NTP’s patented technology.⁵⁹ The troll issue has been called “[t]he most significant problem facing the patent

54. See *Slimfold Mfg. Co. v. Kinkead Indus., Inc.*, 932 F.2d 1453, 1457 (Fed. Cir. 1991); see also Craig Allen Nard, *A Theory of Claim Interpretation*, 14 HARV. J.L. & TECH. 1, 40–41 (2000) (“The practice of designing-around extant patents creates viable substitutes and advances, resulting in competition among patented technologies. The public clearly benefits from such activity.” (citations omitted)).

55. For a discussion of blocking patents, see MERGES ET AL., *supra* note 14, at 126–27.

56. Lemley, *supra* note 33, at 1526.

57. *NTP, Inc. v. Research in Motion, Ltd.*, 397 F. Supp. 2d 785, 786 (E.D. Va. 2005).

58. *Id.*

59. See Jim Balsillie, *Patent Abuse*, WALL ST. J., Dec. 19, 2005, at A16; Yuki Noguchi, *BlackBerry Patent Dispute Is Settled*, WASH. POST, Mar. 4, 2006, at A1.

system today,”⁶⁰ and a free entry patent system “would eliminate the troll problem.”⁶¹

A related problem that has attracted attention is the tragedy of the anticommons.⁶² In his recent book on the subject, Michael Heller describes the robber barons on the Rhine during the thirteenth century.⁶³ Each baron demanded tolls along the river and the sum of these sequential tolls needed to transit the river ultimately “made shipping impracticable,” and, as a result, “[w]ealth disappeared”⁶⁴ and “everyone suffered.”⁶⁵ In economic terms, this behavior is linked to sequential monopolies and double (or multiple) marginalization.⁶⁶ There are some concerns that today patent law allows patent holders to act like the robber barons of the Rhine.⁶⁷ “Just as boatmen on the Rhine had to pay each baron’s toll, the company developing Compound X need[s] to pay every owner of a patent relevant to its testing.”⁶⁸ In some areas of technology, there appear to be reasons for concern. For example, the WCDMA (Wideband Code Division Multiple Access) and CDMA2000 standards that are widely used in cellular telephones have been reported to involve at least 700 and 500 patents respectively.⁶⁹ And the royalties (tolls) for licenses to these patents reportedly account for over 20% of the total cost of the phones.⁷⁰

One suggested solution is to reduce the number of patents.⁷¹ If the tolls on the river are dampening trade, then remove some of the tolls. But there is an alternative, rather counterintuitive solution: reduce deadlock by adding more tolls. The key is to add the tolls in the proper way so that the topology of the toll network is changed.⁷² An anticommons arises not necessarily from a multitude of tolls but from multiple, sequential tolls, all of which are needed to achieve

60. Lemley, *supra* note 33, at 1526.

61. *Id.*

62. See generally Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998).

63. MICHAEL HELLER, *THE GRIDLOCK ECONOMY* 3 (2008).

64. *Id.*

65. *Id.*

66. See DENNIS W. CARLTON & JEFFREY M. PERLOFF, *MODERN INDUSTRIAL ORGANIZATION* 523–27 (2d ed. 1994).

67. See HELLER, *supra* note 63, at 5. But see John P. Walsh, Ashish Arora & Wesley M. Cohen, *Working Through the Patent Problem*, 299 SCIENCE 1021, 1021 (2003) (reporting that survey respondents rarely experienced patents on research tools preventing worthwhile projects).

68. HELLER, *supra* note 63, at 5.

69. See Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2026 (2007).

70. *Id.* at 2026–27.

71. See Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698, 698 (1998) (warning that “more intellectual property rights may lead paradoxically to fewer useful products for improving human health”).

72. Staying with the bridge example from the Introduction, see Euler’s discussion of the seven bridges of Königsberg in 1736. LEONHARD EULER, *THE SOLUTION OF A PROBLEM RELATING TO THE GEOMETRY OF POSITION* (1736), *reprinted translation in* NORMAN L. BIGGS ET AL., *GRAPH THEORY* 1736–1936, at 3 (Oxford University Press 2d ed. 1986).

some productive goal.⁷³ If new tolls are added such that they horizontally compete with existing tolls, then competitive pressures can reduce the deadlock. Each tollbooth is less likely to exhibit hold-out behavior because they would then risk losing business to the substitute tollbooths. Thus, by allowing for more patents (and more varied patent holders), the patent system creates competition by increasing the potential paths that consumers can use to achieve some ends. Indeed, a patent system that only prevents piracy and allows for independent invention may allow for more, rather than fewer, patents—but critically, those additional patents would appear as substitutes. In addition, though the substitutes would be related, they would not be identical, and this added diversity of (even closely related) solutions can have an important beneficial impact. In this way, a patent system premised on free entry and one that ultimately increases the number of patents can reduce holdout behavior.

Furthermore, another development favors a free entry system. There has been a tremendous surge in interest in non-market modes of production.⁷⁴ Through the success of Linux and Wikipedia, peer production has provided an interesting counterpoint to the traditional focus on market-centric production. These early examples deal with copyrightable subject matter, but recently there has been increasing interest in developing similar peer-produced commons in various areas of patentable subject matter like biomaterials or patented computer software.⁷⁵ One stumbling block for expanding peer production to patentable subject matter is the difference between the reach of copyright versus patent claims. Because copyright claims cannot reach beyond copyists, as long as the pooling authors themselves create the works they put into their commons, that peer-produced commons cannot be hampered by outside copyright claims. As has been discussed above, modern patent claims reach beyond just copyists. Thus, members using a commons of independently created patentable subject matter cannot be sure that they can in fact use their commons. If their pooled materials infringe someone's patent, then that patent holder can prevent the use of the pooled resources. This defeats the purpose of the pooling. But if patent law curbs the reach of its claims, then this worry substantially disappears. Where patent law grants exclusion only over *my* invention, then an independently created pool of patentable subject matter cannot be impaired by third party patent claims. The creators of the pool are free to use their common resource.⁷⁶ This is not to say that peer production is necessarily better or worse

73. See generally Richard A. Epstein, *Steady the Course: Property Rights in Genetic Material*, in PERSPECTIVES IN PROPERTIES OF THE HUMAN GENOME PROJECT (F. Scott Kieff ed., 2003) (discussing the topology of the toll network for genetic resources and downstream applications).

74. See, e.g., YOCHAI BENKLER, *THE WEALTH OF NETWORKS* (2006); LAWRENCE LESSIG, *THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD* (2001).

75. See Peter Lee, *Contracting to Preserve Open Science: Consideration-based Regulation in Patent Law*, 58 EMORY L.J. 889 (2009) (describing institutions that are aiming to build biomedical research commons).

76. In the free entry system there would be far fewer blocking patents: they could occur only when an inventor explicitly copies from an earlier patented invention and then tries to improve upon it.

than market production; under different conditions and for different business models, each mode can likely outperform the other. But by designing the patent system carefully, we can let inventors and innovators, not the legal system, choose which to use.

Lastly, and most importantly, a free entry system can begin moving patent law away from its current position as an exception to the mainstream economy and begin aligning it with the broader general principles of free entry and competition. As the Federal Trade Commission has stated, “Competition through free enterprise and open markets is the organizing principle for most of the U.S. economy.”⁷⁷ But patent law does not follow this rule. In fact, it stands diametrically opposed to competition. Although there are differing theories explaining patent law, they are all predicated on the assumption that competitive markets will not produce optimal amounts of inventive activity, and all too often it is assumed that the patent system therefore must correct for this underproduction by preventing competition. As has been argued, “[F]ree competition is the norm. Intellectual property [including patent] rights are an exception to that norm”⁷⁸ Patent law is “an artificial deviation from competition.”⁷⁹ It is a “limited island[] of monopoly” surrounded by a “free-enterprise economy dedicated to competition.”⁸⁰ It has been argued that there is a “basic economic inconsistency”⁸¹ between patent law and the rest of the economy. “[P]atents are deliberate government interventions in the market—a sort of mercantilist economic policy for artificially stimulating innovation.”⁸² But patent law does not need to be—in fact should not be—viewed in this way. Competition can and should be as important for the proper design of patent law as it is for the rest of the economy. This Article emphasizes the importance of entry as the central means by which “competitive pressure is enforced.”⁸³ As suggested by the Court in the *Charles River Bridge* case, if we grant broad exclusion that prevents competition then:

77. See FED. TRADE COMM’N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY 1 (2003).

78. Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1031 (2005).

79. Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 267 n.33 (2007).

80. SUBCOMM. ON PATENTS, TRADEMARKS, AND COPYRIGHTS OF THE S. COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENT SYSTEM iii (Comm. Print 1958) (Professor Fritz Machlup).

81. *Id.* (“This inconsistency [between patents and free competition] has been rationalized in various ways. It is pointed out that the patent monopoly is limited both in scope and time; that this monopoly is more than balanced by the inventive contribution; that patented inventions are not actually monopolistic in fact because they are subject to competing alternatives and substitutes; that such monopoly as does result is unobjectionable because the public is deprived of nothing it had previously possessed; and so on. Such explanations may render the conflict less serious, but they do not resolve it.”).

82. DAN L. BURK & MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT 8 (2009).

83. LYNNE PEPALL ET AL., INDUSTRIAL ORGANIZATION: CONTEMPORARY THEORY AND PRACTICE 247–48 (3d ed. 2005) (stating that “[e]ntry is a key part of the market’s success story as an allocative mechanism”).

We shall be thrown back to the improvements of the last century, and obliged to stand still, [waiting] until the claims of the old turnpike corporations shall be satisfied; and [waiting until the claim holders] consent to permit [us] to avail [ourselves] of the lights of modern science, and to partake of the benefit of those improvements which are now adding to the wealth and prosperity, and the convenience and comfort, of every other part of the civilized world.⁸⁴

As long as the competitive pressure from a free entry system does not prevent inventors from inventing, then competition should be integrated into patent policy so that patent law promotes, rather than stifles, fast and effective technological progress. In addition, as our economy depends more on technology, patent law must be seen as a central, integral part of economic growth as opposed to some unique exception.

II. ECONOMIC COMPARISON: SINGLE ENTRANT VERSUS FREE ENTRY

Both in response to some of the proposals relating to independent invention defenses⁸⁵ and in separate justifications for the current broad patent rule,⁸⁶ a number of arguments have been raised against a narrower copyright-styled rule. These rationales can be grouped as economic and practical. Economically, commentators worry that a free entry patent system will not provide proper incentives. They worry that a narrower rule means a lower reward that in turn leads to fewer inventions. Second, it is also argued that such a system, with multiple entrants, encourages inefficient and redundant research and development.⁸⁷ Practically, many have argued that a free entry patent system would create significant administrative difficulties because evidence of copying and independent invention would be hard to adjudicate.⁸⁸

This section will undertake a reassessment of these economic arguments while the next section will address the practical, administrative concerns. In making this comparative economic assessment, the Article initially makes a few simplifying assumptions. First, the Article assumes that incumbents and entrants have perfect market information and that they act rationally with that information. In other words, incumbents and entrants all know the demand curve for some invention, they know how many incumbents have already entered the market, and they all know beforehand what type of competition will ensue upon entry. Similarly, the Article assumes that entrants do not make mistakes; seeing an opportunity for profit, they enter instantly and others immediately know about the entry and its impact on the market. Second, this Article assumes that

84. *Proprietors of the Charles River Bridge v. Proprietors of the Warren Bridge*, 36 U.S. (11 Pet.) 420, 553 (1837).

85. See Lemley, *supra* note 33, at 1526.

86. See Duffy, *supra* note 37, at 8 (finding "good justifications for the different scope of rights in patent and copyright").

87. See *infra* note 127.

88. See *infra* section III.A.

all entrants have identical fixed costs to recoup.⁸⁹ Lastly, this Article assumes that competitors respect each others' patent rights and that licensing does not occur. In other words, if an inventor is given a broad patent right, then no one will infringe that right or approach the inventor for a license.⁹⁰ These assumptions are later relaxed and are considered below in section III.C.

First, this section will rebut the concerns that a free entry system cannot provide sufficient private incentives, and it will show that under the assumptions made, such a system will not adversely change the inventive projects that are undertaken.⁹¹ In particular, in a world where entrants have not copied from the incumbent and where entrants have their own comparable fixed costs to recoup, then entry will not drive anyone's profits below average cost. Thus, despite reducing profits for incumbents, entry by independent inventors will not cause any projects to be abandoned. All inventive projects undertaken under the current system will be undertaken in a free entry system. Furthermore, and perhaps surprisingly, because a free entry system allows multiple inventors to coexist whereas the current system allows only one, a free entry system may well *lower* the private reward but it may *increase* the number of inventive projects created.

Following that discussion, the Article will address more sophisticated normative critiques that question whether a free entry system—where each entrant incurs his own, arguably redundant, fixed costs—can be efficient. The key criticism is that a free entry system that permits independent inventors will spend too many societal resources on wasteful, redundant research and development. In contrast, it is argued that in a monopoly-styled system, only one firm, the firm that procures the patent, will expend resources on researching and developing the invention. The Article addresses those criticisms and will show that once patent racing is considered, under reasonable conditions, a free entry system is socially superior to a monopoly system. In particular, even if we assume that the added research and development costs in a free entry system are redundant, a monopoly system will in fact waste more resources in the struggle to obtain the patent.

A. FREE ENTRY AND PRIVATE INCENTIVES

First, it is thought that a free entry patent system cannot adequately incentiv-

89. Such costs include research and development costs, risk-adjusted premiums on capital, and opportunity costs.

90. In a sense, this Article envisions an explicitly non-Coasian world where transaction costs are so high that no voluntary transactions take place. Others have modeled the effects of such licensing for both the modern patent system and something akin to the free entry patent system. *See, e.g.,* Kitch, *supra* note 45 (discussing coordination with broad patent rights using the modern rule); *see also* Maurer & Scotchmer, *supra* note 29 (discussing licensing where there is an independent invention defense that would then avoid redundant research and development).

91. Here, incentives must be distinguished from profit or reward. Incentives focus on actions while profit or reward simply focus on monetary return. When profit or reward do change but rational actors do not change their actions, this Article argues that incentives have not changed.

ize invention. In other words, from the perspective of the private inventor, such a system could not work as a private incentive system because it risks “reduc[ing] the incentive to invest in important technologies.”⁹² The general notion is that a system that allowed for competition from independent inventors would result in a smaller reward to the initial inventor and risks “undermin[ing] incentives to develop the invention at all.”⁹³ This rationale has impeccable, long-standing credentials. As described in the Introduction, this is exactly Justice Story’s concern in the *Charles River Bridge* case. He felt that government charters for inducing investment had to be broadly construed and that a copyright-styled rule that allowed independent entry would prevent investment in risky activities. He could “conceive of no surer plan to arrest all public improvements, founded on private capital and enterprise” than to make the grant narrow enough to allow entry by others.⁹⁴ He felt such entry would “destroy [the original] grant.”⁹⁵

Generally, this worry is tied to the notion that lower profits must lead to lowered amounts of invention. It is deeply ingrained into patent law that “reward is assumed to induce inventive activity”⁹⁶ and thus less reward must mean less inventive activity. It is instructive to consider the origins of this notion.

The current patent system strives to grant private incentives so that private individuals, driven by a profit motive, will undertake socially beneficial projects.

92. Cotropia & Lemley, *supra* note 47, at 1439. See also Samson Vermont, *The Angel Is in the Big Picture: A Response to Lemley*, 105 MICH. L. REV. 1537, 1539 (2007) (“Some inventions . . . [like] pharmaceuticals . . . may require the extra incentive provided by our current winner-take-all patent system.”).

93. Lemley, *supra* note 33, at 1529; *id.* at 1535 (suggesting that an independent invention defense might “interfere with incentives”); *id.* at 1536 (suggesting that an independent invention defense may “creat[e] risks to the incentive structure of the patent system”); see Long, *supra* note 37, at 528 (arguing that “an independent creation privilege in patent law would too drastically reduce incentives to create”); see also Duffy, *supra* note 37, at 9 (“A narrow right that allows for independent creation and protects only the precise details of a particular embodiment of the invention is unlikely to give sufficient protection, as a practical matter, to encourage the type of investments and work that society wants to encourage.”).

94. *Proprietors of the Charles River Bridge v. Proprietors of the Warren Bridge*, 36 U.S. (11 Pet.) 420, 608 (1837) (Story, J., dissenting). Justice Story went on to quote Kent from *Ogden v. Gibbons*:

Any narrower construction . . . in favor of the grantor, would render the deed a fraud upon the grantee. It would be like granting an exclusive right of ferriage between two given points, and the setting up a rival ferry, within a few rods of those very points, and within the same course of the line of travel. The common law contained principles applicable to this very case, dictated by a sounder judgment, and a more enlightened morality. If one had a ferry by prescription, and another erected a ferry so near to it as to draw away its custom, it was a nuisance, for which the injured party had his remedy by action [. . .]. The same rule applies, in its spirit and substance, to all exclusive grants and monopolies. The grant must be so construed so as to give it due effect by excluding all contiguous and injurious competition.

Id. at 627 (quoting *Ogden v. Gibbons*, 4 Johns. Ch. 150, 161–62 (1819)).

95. *Charles River Bridge*, 36 U.S. (11 Pet.) at 630.

96. Louis Kaplow, *The Patent–Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813, 1816 (1984).

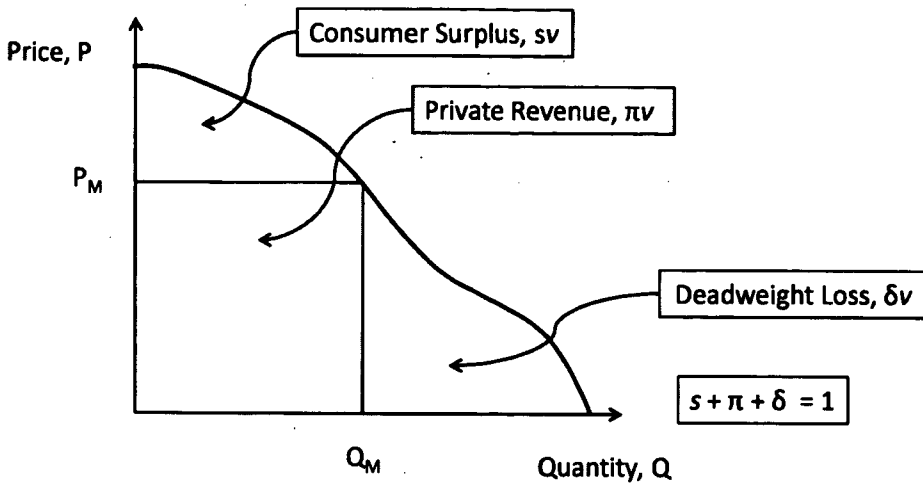


Figure 2. The Private Incentive

Ideally, society would want to undertake all projects where the total discounted social benefit of the project, S , exceeds its cost, c .⁹⁷ It achieves this by allowing inventors to retain some fraction of the total social benefit of their inventions. As shown in Figure 2, the demand curve per period for any given invention with area v , can be divided into three sections based on the monopoly price, P_M , as established by the patent system: the consumer surplus, s , private surplus, π , and the deadweight loss, δ , such that $(s + \pi + \delta) = 1$. Of the total discounted social benefit S from an invention, the current patent system grants private inventors a fraction of the total social benefit equal to $\pi T v$ where T is the discounted time for a patent term of N years.⁹⁸ In other words, a patent holder can capture a fraction π of the social benefit per period, v , and can reap that fraction for a *discounted* time of T years.

Figure 3 shows how those choices for private reward then determine which projects will be undertaken. The figure maps all innovative projects based on their cost, c , and their per-period social benefit, v , where the total discounted social benefit, S , is given by $S = v/r$.⁹⁹ The line $c = v/r = S$ divides projects socially worth undertaking from those that are not. A project lying above the line like project (v_1, c_1) is not worth it (it may become worthwhile later as its cost drops) while projects below the line like (v_2, c_2) , (v_3, c_3) , (v_4, c_4) , and (v_5, c_5) are socially worth undertaking. The solid line $R = \pi T v$ divides privately profitable projects (i.e. projects falling below the line like projects (v_3, c_3) , (v_4, c_4) , and (v_5, c_5)) from projects that are not privately profitable (projects falling

97. Much of the following discussion follows the notation from SUZANNE SCOTCHMER, *INNOVATION AND INCENTIVES* 98–103 (2004).

98. See *id.* at 59 for a discussion of discounted time. Given discount rate, r , $T = \int_0^N e^{-rt} dt$. Over discrete units of time, this integral can be Taylor-expanded into $T = \sum_{t=1}^N 1/(1+r)^t$.

99. Here v/r is the discounted present value of the invention.

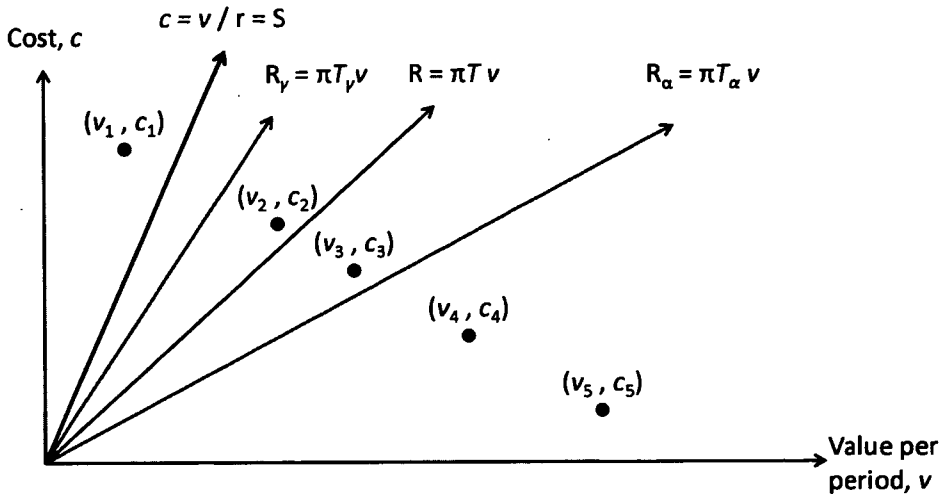


Figure 3. The Standard Access Versus Incentive Compromise
The three reward lines show three different patent terms ($T_\gamma > T > T_\alpha$).

above the line like projects (v_1, c_1) and (v_2, c_2)). Note that project (v_1, c_1) is not socially beneficial and therefore we, as society members, are glad it is not undertaken, but project (v_2, c_2) is different. It is a socially beneficial project because it lies in the region where the discounted social benefit exceeds the cost ($v_2/r > c_2$); however, the private incentive provided by this example patent system is not enough to induce private individuals to undertake that project. It is socially beneficial but not privately profitable under this example patent system. In order to make project (v_2, c_2) privately viable, patent law could modulate the patent term.

Figure 3 also shows two more lines representing two other choices for patent terms. As the patent term is extended from T_α to T to T_γ , more projects become privately profitable. With the patent term set to T_γ , project (v_2, c_2) has now become a viable private project.¹⁰⁰ Thus, extending the patent term makes more socially beneficial projects privately viable. This result could tempt us to just extend the patent term infinitely, but the trouble is that as we extend the patent term we are increasing the deadweight loss for all viable projects.¹⁰¹ The discounted present value of the deadweight loss per project is given by $\delta v T$. Thus, as we increase the patent term, we make more projects viable, but as we do so, *every* project incurs greater deadweight losses. In short, more inventive projects will be undertaken, but those who cannot afford to pay the monopo-

100. If we allowed the patent term to extend to infinity, then T would reach $1/r$. Similarly, if we allowed perfect price discrimination, then $\pi = 1$. The private incentive would equal S , the social benefit for an invention. By granting the patentee the total benefit of an invention, all socially viable projects would be undertaken. See *infra* note 143 for discussion of costs of price discrimination.

101. See SCOTCHMER, *supra* note 97, at 99 (citing Nordhaus's famous analysis of patent economics).

lists' price for any one project will have to wait longer to be able to enjoy it.

This tradeoff between encouraging more socially beneficial projects and deadweight loss is the access versus incentives compromise that is at the heart of most policy discussions about patents and about intellectual property more generally.¹⁰² We can encourage more projects to be undertaken but will make all projects more costly, or we can make all projects less costly but will inevitably cause the projects on the margin to become privately unattractive. The actual patent reward is therefore thought of as a compromise between the added projects that are incentivized against the added deadweight losses. Once the conventional wisdom has internalized this tradeoff, it becomes easy to see why a free entry patent system might appear problematic and even untenable. This incentive versus access view makes it reflexive to think that as the monetary reward is reduced, we will necessarily lose some socially desirable projects in the process, and any reform that reduces the reward must then account for the social costs of these lost projects. We mistakenly assume that a free entry system is the same as simply reducing the patent term. We assume that both just reduce the overall private reward.

But this is not entirely correct because it conflates the reward with the actual actions taken. The reward focuses on the profit an inventor will realize while we really only care about the actions that an inventor will take. It is possible to reduce the reward while not changing someone's actions. In Figure 3, the inventions that are actually created and commercialized are those where inventors forecast non-zero economic profits.¹⁰³ In other words, if a patent system provides a positive profit of X when the inventor's next-best option (say, opening a shoe store) provides a lesser profit of Y, then an institutional designer can lower the patent reward from X to some small increment above Y, and the inventor will still choose to invent. Reward has been changed but actions have not. Furthermore, since the rate of return on most other business opportunities like Y are governed by free entry and competition, the designer of a patent system can allow the rate of return for patents to also drop to the level defined by free entry without worrying that incentives have changed.

This Article claims that, generally, if a particular invention can generate positive economic profits under the current patent system, then it will still generate non-zero economic profits under a free entry system.¹⁰⁴ As a result, all the inventions created under the current system will still be created under the

102. See *id.* See generally WILLIAM D. NORDHAUS, *INVENTION, GROWTH, AND WELFARE: A THEORETICAL TREATMENT OF TECHNOLOGICAL CHANGE* (1969); Glynn S. Lunney, Jr., *Reexamining Copyright's Incentives-Access Paradigm*, 49 *VAND. L. REV.* 483, 485 (1996).

103. Here, positive economic profits means revenue that equals or exceeds all project costs, such as fixed, marginal, and opportunity costs. For the sake of simplicity, marginal cost is assumed to be zero for inventions.

104. John Leibovitz offers one of the best accounts of the benefits of competition in patent law. He argues that entry reduces deadweight loss, reduces dynamic costs, and reduces rent-seeking costs. Leibovitz, *supra* note 29, at 2255; see also Liivak, *supra* note 29, at 201-22 (outlining similar economic benefits from narrower patent claims to naturally occurring gene sequences).

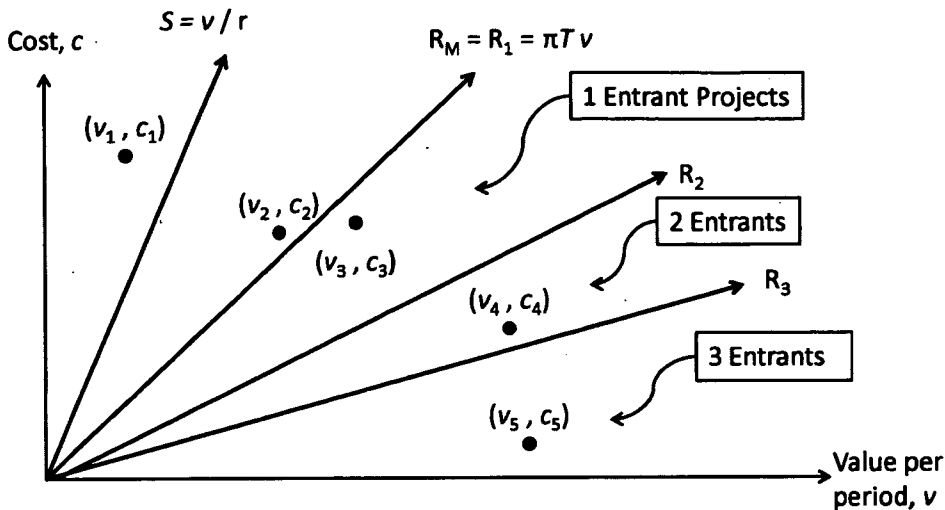


Figure 4. Free Entry Modulates Reward According to Cost
With free entry, all projects remain profitable.

free entry system. It may well be that profits are smaller with a competitive system than with the current system, but as long as there are profits and not losses, then a rational inventor that moves forward under the current system would do so under a competitive system. As long as all entrants have similar fixed costs to recoup, even “[i]f firms enter the industry whenever positive profits are available, each firm makes zero economic profits in the long run.”¹⁰⁵ As long as a company stands to make a non-negative economic profits, it will proceed with that project. And since a free entry system just changes the size of the profit but not its sign, no projects are lost.

In particular, we might worry most about marginal projects that are just barely profitable. In Figure 4, assume a monopoly reward R_M where project (v_3, c_3) is just barely privately profitable. For such projects, we might assume that even a modest reduction in reward will make projects like (v_3, c_3) privately unprofitable, and thus a free entry system cannot incentivize such narrowly profitable projects. But that is where the misconception creeps in. A free entry system is not the same as simply decreasing the patent reward unilaterally.¹⁰⁶ It does not necessarily modulate the reward for every project. It is a noted defect of the current monopoly-styled patent system that “rewards” are not “tailored to

105. CARLTON & PERLOFF, *supra* note 66, at 281.

106. Figure 3 is a stylized account of a free entry system. The actual reward depends on the type of competition between entrants. Furthermore, the number of entrants and the prices as a function of the number of entrants depend on the shape of the demand curve for each project. Thus, even with two projects with identical costs and identical per period social benefits, depending on the details of their demand curves, these similar projects may allow for different numbers of entrants.

expected costs."¹⁰⁷ But that is exactly what a free entry system could enable.¹⁰⁸ It reduces profitability only for those projects where the reward of a monopoly system exceeds the costs by a large enough margin that entrants (who incur their own comparable fixed costs) can still profit by entering. Generally, projects with a higher ratio of private revenue to cost will allow for more entrants (see lines R_1 , R_2 and R_3 delineating regions that can support 1, 2 or 3 entrants). For projects where the monopoly system over-rewards the first inventor, entrants are attracted by the abnormal profits and will enter until entry is no longer profitable. For projects like (v_3, c_3) that are just barely profitable under a monopoly system, their meager profitability makes them relatively unappealing targets for entrants. That project and its associated demand curve may only profitably support the first entrant. In other words, for such projects the free entry system may effectively be a monopoly system; only one entrant will undertake that particular project. But for other projects like (v_5, c_5) that are relatively high profit and relatively low cost, many entrants may be attracted to it. Multiple entrants drive down profitability, but they will not drive profits to become negative for any entrant or incumbent.

At least among the leading models of competition, this is a general result because the incumbent's revenue is never less than the entrant's revenue.¹⁰⁹ In other words, incumbents retain at least the same revenue as entrants. In Cournot competition, all market players sell at the same price and produce the same quantity; therefore, both incumbents and entrants have exactly the same revenue.¹¹⁰ In Stackelberg competition, incumbents have an advantage over entrants and earn revenue in excess of entrants.¹¹¹ Lastly, even with Bertrand competition, assuming marginal costs of zero, both incumbents and entrants earn the same revenue.¹¹² Even if the model of competition drives prices to marginal cost (zero in this case), as long as entrants know beforehand that this will ensue, no rational person would enter. As long as entrants only enter when they forecast recovering their costs, all the incumbents must also be able to recover their costs. This guarantees that incumbents stay profitable despite free entry by others.¹¹³ A project that is profitable under the monopoly system will

107. SCOTCHMER, *supra* note 97, at 59.

108. See Shapiro, *supra* note 29, at 95 (describing how for similar reasons "[p]rior user rights automatically reduce the rewards" (emphasis omitted)).

109. For a discussion of the three leading models of competition—Cournot, Bertrand, and Stackelberg—see CARLTON & PERLOFF, *supra* note 66, at 233–52. There are other models in which this assumption may not hold. See, e.g., Nirvikar Singh & Xavier Vives, *Price and Quantity Competition in a Differentiated Duopoly*, 15 RAND J. ECON. 546, 546 (1984).

110. See CARLTON & PERLOFF, *supra* note 66, at 237 (showing that firm output and price are the same for all industry participants).

111. *Id.* at 250.

112. *Id.* at 244–45. Furthermore, though Bertrand competition is often associated with price being set to marginal cost, Bertrand competition may have more complex results where the entry decision also involves recouped fixed costs.

113. It is assumed that in whichever model of competition prevails, the incumbent will enjoy at least the same revenue as each successive entrant. And thus, if costs are comparable and the entrant by

still be profitable (just less so) despite free entry by independent inventors.

As a result, a free entry system encourages at least the same projects as would a monopoly-based system. But because it is a competitive system that fosters entry, the competitive system will likely generate more than just the inventive projects generated by the current system. Some independent inventors might create inventive projects very similar to the first inventor's actual embodiment, but others will not. Such a diversity of closely related yet not identical inventions is a product of the competitive patent system and is one that is missing from the current system (at least absent low transaction costs). Interestingly, this result seems quite odd from the standard reward viewpoint of patent law. A free entry patent system delivers to the public, at equal or lower prices, all the projects the public would have received from the current system plus all the slightly different substitute projects created by the varied entrants. By lowering the reward, society actually gets at least the same, and likely more, projects than with the current system.

B. DOES A FREE ENTRY PATENT SYSTEM IMPROVE WELFARE?

The second normative criticism argues that a free entry system that permits independent inventors will in the aggregate spend too many societal resources on wasteful, redundant research and development.¹¹⁴ Why should we ever want others to reinvent what has already been invented? Such redundant reinvention appears wasteful. A monopoly-styled system appears to avoid such redundancy because there only one firm (the firm that procures the patent) will spend time and money researching and developing that invention.¹¹⁵ After all, even those that favor entry and competition cannot help but look at the Warren Bridge built right next to the Charles River Bridge and ask "Did we really need (as a society) to expend resources on building another bridge so close to the first one?"¹¹⁶

To decide which type of exclusion benefits society, we must account for the benefits and costs of both systems.¹¹⁷ The economic analysis of the patent system focuses on a number of costs:¹¹⁸ deadweight costs, rent-seeking costs, dynamic costs, and, as with all institutions, administrative costs. In this section, this Article assumes that there are no administrative costs; they will be discussed in detail in the next section. The deadweight costs relate to the unsatis-

definition forecasts revenue in excess of costs, then this guarantees that the incumbents will still manage positive profits despite the price reduction and loss of market share due to entrants. This does not even account for the first-mover advantage.

114. See Duffy, *supra* note 37, at 9 ("[P]ermitting independent creation as a defense in patent law would encourage unproductive duplication.").

115. See Kitch, *supra* note 45, at 278.

116. See HOVENKAMP, *supra* note 6, at 114.

117. Trying to account for the costs and benefits of the patent system can be difficult. Here, the goal is more modest. It is simply a comparative analysis of costs and benefits between the current patent system and a patent system modeled on a copyright style of exclusion.

118. See Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 263 (1994); Lemley, *supra* note 78, at 1058.

fied consumer demand arising from pricing above marginal cost. There are consumers who would pay above marginal cost for the good but cannot pay above the price set by the inventor.¹¹⁹ The rent-seeking costs are costs that rival inventors expend in trying to win the race for the patent.¹²⁰ Lastly, the dynamic costs refer to the impact that the broad patent right can have on improvements and subsequent uses.¹²¹ A broad patent grant (with its injunctive relief) may allow an initial inventor to control substitutes and improvements. As a result, decisions that serve an inventor's self-interest may not serve the public's interest.¹²² This cost is closely tied to the previous discussion of the anticommons.¹²³ Most economic criticisms of the patent system focus on one or more of these costs. Under reasonable assumptions, the Article will show that the competitive patent system is superior, from the public's perspective, relative to the current monopoly-based system.¹²⁴

First, the Article compares the deadweight losses between the two systems. The analysis mirrors the comparative analysis between oligopolistic competition and simple monopoly.¹²⁵ With such competition, "there is free entry and each firm faces a downward sloping residual demand curve."¹²⁶ As entries from competitors drop prices and expand output, the deadweight losses are reduced in a free entry system. More consumers are able to buy the invention either from the initial inventor or from later entrants.

But this reduction in deadweight loss comes at a price. As all the entrants have their own (possibly) redundant investments in research and development, in total a competitive system spends more resources on research, development, and commercialization. A monopoly system expends only once on research and development while a free entry system will incur that same cost for each independent inventor. Many have worried a great deal about such expenditures.¹²⁷ However, this Article argues that those worries are misplaced. First, such potentially redundant spending does not concern us in the broader economy.

119. See Liivak, *supra* note 29, at 210.

120. See *id.* at 215.

121. See Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 843 (1990).

122. *Id.* at 844.

123. See *supra* note 62, and accompanying text.

124. Administrative costs are addressed later in the Article. See *infra* section III.A.

125. See Leibovitz, *supra* note 29, at 2263 ("As a result [of allowing entry by independent inventors], patent holders may face pricing pressure throughout the term of their patents even though they have exclusive rights to a specific design or process. Competition between very narrowly differentiated patented technologies thus resembles monopolistic competition more than it does a full-fledged monopoly."); see also Christopher S. Yoo, *Copyright and Product Differentiation*, 79 N.Y.U. L. REV. 212, 276-78 (2004) (arguing along similar lines in copyright).

126. CARLTON & PERLOFF, *supra* note 66, at 281 (emphasis omitted).

127. See Yoram Barzel, *The Optimal Timing of Innovations*, 50 REV. ECON. & STAT. 348, 352 (1968); Kitch, *supra* note 90, at 265-66 (suggesting that a motive for describing his prospect theory was to respond to Barzel and to show how the patent system avoids redundant expenditures on research and development); see also Mark F. Grady & Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305, 308 (1992).

Along these lines, Kenneth Dam has argued that

we do not normally consider the opening of a new gasoline station or grocery store near an existing one to be an example of waste, or at least not one with which public policy should be concerned. . . . Rather, we consider the competition induced by the new entrant to lead to a better outcome than would accrue through legal protection of the existing firm.¹²⁸

Furthermore, as research and development is so critical to economic advancement,¹²⁹ maybe increased spending on research and development is not so bad. Maybe having multiple, different researchers try to develop their own approach is not so horrible.¹³⁰

But independent of these intuitive arguments, the industrial organization literature certainly is wary of the redundant fixed costs from multiple entrants, especially when an industry is producing homogeneous products.¹³¹ In other words, “[i]t can be shown . . . that, under some plausible conditions, there are too many firms in the monopolistic competition equilibrium. That is, welfare could be increased by restricting the number of firms.”¹³² Although, ultimately, when we confine the analysis to deadweight losses alone, we cannot conclude that a free entry system is superior to the monopoly system, it is worth noting that the economics literature on redundant entry has focused on a slightly different question. There, they are showing that, *compared to some ideal system*, a free entry system is suboptimal. Though those results are informative and worth further study,¹³³ they do not directly address the current analysis here. This is a comparative analysis between two systems.¹³⁴ We are not asking if

128. Dam, *supra* note 118, at 263; *see also* Leibovitz, *supra* note 29, at 2271 (“Although rivalrous production of gasoline might result in redundant plant capacity, capitalist societies do not ordinarily discourage the construction of new plants.”).

129. *See* Peter S. Menell, *Intellectual Property: General Theories*, in 2 ENCYCLOPEDIA OF LAW & ECONOMICS: CIVIL LAW AND ECONOMICS 129, 134 (Boudewijn Bouckaert & Gerrit De Geest eds., 2000) (“Robert Solow demonstrated that technological advancement and increased human capital of the labor force accounted for most (between 80 and 90 percent) of the annual productivity increase in the US economy between 1909 and 1949, with increases in the capital/labor ratio accounting for the remainder. . . . It is now widely recognized that technological advancement and enhanced human capital are the principal engines of economic growth in the United States and other industrialized countries.”); *see also* F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 699 n.4 (2001) (highlighting the same research by Solow).

130. *See* Brett Frischmann, *Innovation and Institutions: Rethinking the Economics of U.S. Science and Technology Policy*, 24 VT. L. REV. 347, 372–75 (2000) (noting the benefits of research projects with similar goals); Merges & Nelson, *supra* note 121, at 877.

131. *See* CARLTON & PERLOFF, *supra* note 66, at 281.

132. *Id.* at 297. In particular, *see* N. Gregory Mankiw & Michael D. Whinston, *Free Entry and Social Inefficiency*, 17 RAND J. ECON. 48 (1986) (outlining conditions where free entry leads to suboptimal numbers of entrants).

133. For example, those results immediately suggest policy levers that try to limit the number of entrants for homogenous products.

134. *See* Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 J.L. & ECON. 1, 1 (1969) (criticizing the “nirvana” approach to institutional design and instead advocating for “a

there is a better system than a free entry system¹³⁵ but more simply only whether a free entry system is better than a single entrant system.¹³⁶

Furthermore, that research has highlighted that over-entry is likely to occur in markets for homogeneous products¹³⁷ while for inhomogeneous products, it is "unclear" whether a free market tends toward over- or under-entry.¹³⁸ For a free entry patent system, except in peculiar areas involving low inventorship subject matter,¹³⁹ inventors will likely develop different solutions to the same problem. Research from multiple firms is not necessarily wasteful. Despite trying to solve the same problem, different approaches and different solutions are developed. Critically, they will likely not produce the exact same product. But admittedly even with these caveats, this Article cannot conclude that a free entry system is superior to a monopoly system when considering deadweight losses alone. In fact, there exist theoretical demand curves and models of competition where a single entrant outperforms free entry when the accounting only considers research and development costs and deadweight loss.

But when the accounting includes the rent-seeking costs, then the balance starts to move definitively toward a free entry system. Because the single entrant system dangles the monopoly reward in front of a large group of inventors and because it is a winner-take-all system, those potential patentees will expend extra resources to make sure that they beat out all the others. As pointed out by George Stigler, "The prospects of monopoly pricing will lead to such a scale of investment in producing knowledge that it will return only the competitive rate of return on average."¹⁴⁰ As a result, many have argued that "[t]he total expenditure by firms to obtain the rent is equal to the amount of the rent."¹⁴¹ In other words, in a monopoly-styled patent system with its winner-take-

comparative institution approach in which the relevant choice is between alternative real institutional arrangements" (emphasis omitted)).

135. Though that is an important question, it is outside the scope of this Article.

136. The logic is similar to the joke about two hikers and a bear: when confronted by a hungry bear, one hiker starts to run and the other asks, "Can you really outrun a bear?" and the other responds, "No, but I can outrun you."

137. See Mankiw & Whinston, *supra* note 132, at 57. Again, as suggested above, it is not clear in cases where free entry creates too many entrants compared to an optimal number whether free entry is still superior to a single entrant.

138. *Id.*

139. See Liivak, *supra* note 29, at 203–07, for a discussion of low inventorship subject matter where all independent inventors are inevitably going to come up with the same actual embodiment.

140. GEORGE J. STIGLER, *THE ORGANIZATION OF INDUSTRY* 124 (University of Chicago Press 1983) (1968).

141. JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 76 (1988); see also John Duffy, *Intellectual Property Isolationism and The Average Cost Thesis*, 83 TEX. L. REV. 1077, 1078–79 (2005) (arguing that racing will always drive average costs upwards to meet price); Richard A. Posner, *The Social Costs of Monopoly and Regulation*, 83 J. POL. ECON. 807, 809 (1975) (arguing that "the cost of obtaining a monopoly is exactly equal to the expected profit of being a monopolist"); Gordon Tullock, *The Welfare Costs of Tariffs, Monopolies, and Theft*, 5 WEST. ECON. J. 224 (1967), reprinted in *TOWARD A THEORY OF THE RENT-SEEKING SOCIETY*, at 231–32 (James M. Buchanan et al. eds., Texas A&M Univ. Press 1980) (describing the costs of monopoly as the aggregate costs of compromises that "gambled resources on hopes of [obtaining a monopoly]").

all feature, inventors racing to secure the patent will expend, in total, all the private monopoly incentive in attempts to become the winner of the patent race.¹⁴² As stated by John Duffy, “Rents associated with a patent grant will, on average, be dissipated by competition.”¹⁴³

Once we take account of this cost, then a free entry system becomes clearly superior.¹⁴⁴ If, in the monopoly system, aspiring patentees, in aggregate, con-

142. Some, like Richard Posner, have argued that the monopoly incentive is wasted in racing to achieve the monopoly in all contexts. See Posner, *supra* note 136, at 812. Others have criticized that generalization:

It is true that, as Posner says, if n risk-neutral firms each have an equal chance of obtaining a monopoly with a present value of V , each of them will be willing to spend V/n in an effort to secure the monopoly. Nevertheless, it does not follow that a total of V will in fact be spent (even apart from the question whether risk neutrality is a good assumption).

Franklin M. Fisher, *The Social Costs of Monopoly and Regulation: Posner Reconsidered*, 93 J. POL. ECON. 410, 413 (1985) (citation omitted). But Franklin goes on to state that “[p]otential monopolists are somewhat more likely to be on an equal footing where barriers to entry arise simply through government action than when such barriers arise for other reasons.” *Id.* at 414. Indeed, in patent law the barrier to entry is due to government action. *But see* TIROLE, *supra* note 141, at 77–78 (“The bottom line is that rent-seeking behaviors certainly waste some of the monopoly profit. That the monopoly profit may be part of the welfare loss associated with monopoly is a well-taken point. However, we should refrain from drawing any general conclusion about which fraction of the monopoly profit should be counted as a welfare loss. Only a careful description of the rent-seeking game can allow us to give an order of magnitude for this fraction.”). In addition, note that the analysis assumes that pre-patent racing dissipates all the private surplus in the single entrant system, while in the free entry system, it is assumed that entry continues while profit is positive. In other words, though not all the private surplus may be dissipated by racing in the single entrant model, the free entry model may not encourage enough entrants to drive economic profits to zero.

143. Duffy, *supra* note 13, at 464. Furthermore, if potential patentees overestimate their chances of winning the race, then in total the resources invested into patent racing can even exceed the entire monopoly incentive. See F. M. Scherer, *The Innovation Lottery*, in EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY 3, 3 (Rochelle C. Dreyfus et al. eds., 2001) (comparing patent races to lotteries where aggregate investment in a lottery exceeds the reward). This kind of optimistic overestimation of success has been noted in a variety of places. See, e.g., Chris Guthrie et al., *Inside the Judicial Mind*, 86 CORNELL L. REV. 777, 811–12 (2001) (listing situations where overestimation of success occurs). See generally SHELLEY E. TAYLOR, *POSITIVE ILLUSIONS* (1989) (arguing that such self-deception has important mental health benefits).

144. To establish this, compare the social welfare of the two systems and include both deadweight losses and racing costs. The social welfare of the monopoly system is given by $SW_{Mono} = s_1 v T + \pi_1 v T + \int_N^{\infty} e^{-n v} dt - \sum_{i=1}^m c_i$. Assuming that the m researchers racing for the patent will expend resources equal to their expected reward then each racer will expend racing costs, $c_i = \epsilon_i \pi_i v T$ where ϵ_i is each racer’s probability of success. If racers accurately gauge their probability of success, then $\sum_{i=1}^m \epsilon_i = 1$. This means that the total resources expended on racing is $\sum_{i=1}^m c_i = \pi_1 v T$. In other words, they consume the entire private surplus in racing costs. This then can be used to simplify the expression to $SW_{Mono} = s_1 v T + \int_N^{\infty} e^{-n v} dt$.

In contrast, the social welfare of the free entry system is given by $SW_{Free} = s_n v T + \pi_n v T + \int_N^{\infty} e^{-n v} dt - n c$ where it is assumed that cost c is incurred by each of the n entrants. (Here, $s_n v$ is the aggregate consumer surplus per period during the patent term with a market with n entrants, and $\pi_n v$ is the industry revenue per period during the patent term with n entrants.) Using the free entry condition for the last entrant, $p_n q_n T \geq c > p_{n+1} q_{n+1} T$, we can see that $\pi_n v T \geq n p_n q_n T \geq n c$. (This last step requires a model of competition where the revenue for the last entrant is equal to or less than the revenue for all earlier entrants. As mentioned above, this condition holds for the major theories of competition.) This inequality can be used to simplify the social welfare of the free entry system to $SW_{Free} \geq s_n v T + \int_N^{\infty} e^{-n v} dt$. Comparing the two simplified expressions, we conclude

sume all the private reward in trying to become the actual patentee, then the total societal welfare will be the discounted value of the consumer surplus during the patent term (s_1vT)¹⁴⁵ plus the overall societal benefit v from the date of patent expiration onwards.¹⁴⁶ In contrast, in the free entry system, we expect entrants to expend the private surplus available with the equilibrium number of entrants. With that system, the total social welfare is the consumer surplus with the equilibrium number of entrants during the patent term (s_nvT)¹⁴⁷ plus the overall societal benefit v from the date of patent expiration onwards. Therefore, the difference in the social welfare of the two systems is simply the difference in the discounted present value of the consumer surpluses during the patent term. Because the free entry system will generally have an equilibrium price lower than the current system,¹⁴⁸ it will have a higher consumer surplus and it will therefore have improved societal welfare over the single entrant system.¹⁴⁹

Lastly, the accounting has not yet included the dynamic costs which generally further support the free entry system as socially superior system to the current one.¹⁵⁰ A free entry system leads to greater diversity of choice and reduces the possibility of holdout behavior, thus reducing the dynamic costs.¹⁵¹ Where there are a number of close substitutes, the injunctive threat from any one patentee has little effect on progress. If the patentee tries to hold out, people will just turn to a substitute. Furthermore, and perhaps more importantly, by having developed a diverse set of solutions to some technical problem, we enrich the domain from which improvements can begin. A diverse set of solutions will likely be

that $SW_{Free} \geq s_nvT + \int_N^{\infty} e^{-rt}v dt \geq s_1vT + \int_N^{\infty} e^{-rt}v dt = SW_{Mono}$, thus concluding that $SW_{Free} \geq SW_{Mono}$. The two systems have the same social welfare only when some project (v, c) and the model of competition admit only one entrant. Otherwise, consumer surplus under free entry exceeds consumer surplus under monopoly and therefore the free entry system is superior.

145. s_1 denotes the consumer surplus with prices and quantities set by one entrant.

146. Societal welfare includes the benefits from the producers' revenue, but these are offset by the racing costs. In particular, this leaves the consumer surplus as the only contributor to social welfare during the patent term. This result also suggests that price discrimination may not be as viable a solution in a patent system as some have suggested. See F. Scott Kieff, *Coordination, Property and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L.J. 327, 390 (2006) (arguing for price discrimination in patent law). Price discrimination surely allows for the reduction of deadweight loss, but, as it raises the private reward, it also raises the amount of patent racing. If all rents are dissipated, then during the patent term there is no net contribution to social welfare. In other words, a monopoly patent system with full price discrimination is inferior to a monopoly system without price discrimination, which this section of the Article argues is inferior to a free entry system.

147. s_n represents the consumer surplus with the equilibrium number of entrants n .

148. This is assuming that there is more than just one entrant in equilibrium. For projects where there is only one willing entrant, then the free entry system is identical to the monopoly system.

149. This result presumes that there is no social benefit from the expenditures on patent racing. See *infra* section II.C for a discussion of timing.

150. See Merges & Nelson, *supra* note 121 (focusing attention onto dynamic costs).

151. See Leibovitz, *supra* note 29, at 2272 ("The presence of multiple licensors typically increases the likelihood that the technology will be efficiently disseminated, since multiple firms are better able to uncover and exploit new markets for a new technology than is any one firm on its own."); Liivak, *supra* note 29, at 214.

produced, leading to social welfare gains from differentiated products; it no longer means that free entry will necessarily lead to over-entry. It is hard to know beforehand which detail of related yet slightly different solutions to a problem will prove the critical difference that leads to other improvements.¹⁵² By establishing a diverse (even if related) set of solutions, we develop a more robust set of technical capabilities to face new challenges.¹⁵³ Multiple diverse solutions not only discourage anticommons deadlocks but also increase our technological capabilities and diversifies our stock of technical ability.

C. RELAXING THE ASSUMPTIONS: CONSTANT FIXED COSTS, PERFECT KNOWLEDGE,
TIMING

The above analysis began with a number of important assumptions. The analysis assumed that all entrants have the same fixed costs to recoup. The analysis assumed incumbents and entrants had perfect knowledge of market conditions. The analysis also ignored temporal effects and assumed that entry and convergence to equilibrium happened instantly. With those assumptions, the above analysis reached two conclusions: first, a free entry system could support as many, if not more, inventive projects as the current system, and second, it could do so with improved social welfare. This section begins considering how robust those conclusions are when these three assumptions are relaxed.

First, the above analysis assumes that all entrants have the same fixed costs. In reality, some entrants will manage to provide some inventions at lower costs than others. If first movers incur substantial costs in unsuccessful trials and entrants can just incur the costs of developing the successful variant themselves, then indeed there is the potential of price undercutting.¹⁵⁴ A critical area in this regard is the patenting and FDA approval of drugs. Care must be taken to ensure that the entrant's costs are not too different from the incumbent's, because the entrant either has avoided drilling dry holes or can rely on the successful drug approval of the incumbent.¹⁵⁵ But if there is an inequality in fixed costs because the initial inventor picked a costly route, then this undercutting may well be a harsh but ultimately desirable result. The point is that a free entry patent system would not guarantee non-negative profits to all patent holders. A restaurant that goes out of business often reflects the poor judgment of the business rather than

152. In later sections, the Article will use as an example the basic seating device known as a stool. Considering that example, most of us would consider a four-legged and three-legged stool to be slightly different yet closely related solutions to the problem of human seating. We might think that the "diversity" of solutions between three and four legs adds little to overall seating technology. Indeed, on a flat planar surface this may be true, but on an uneven surface, a three legged stool is much sturdier and less prone to rocking than a four-legged stool.

153. See Liivak, *supra* note 29, at 214.

154. See SCOTCHMER, *supra* note 97, at 116 (discussing "dry holes" and the need to recoup costs from failed projects).

155. See Lemley, *supra* note 33, at 1530–31; see also Liivak, *supra* note 29, at 236 (discussing ways to equalize approval costs by following the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) model where generic entrants are forced to offset the incumbent's FDA approval costs).

the failure of the economic system backing that restaurant. Likewise, some pressure should be put on inventors to choose cost effective routes to solutions, and they should have to face pressure from more efficient solutions as long as those solutions were independently invented.

Second, the analysis assumes that market participants have perfect market knowledge and that they act rationally with the information. In short, the analysis presumes that market participants enter only when it is profitable. But real people do not have perfect information and, even when they do, they still make mistakes. And in the scenarios portrayed here, perfect market information is at odds with the notion of independent invention. The free entry system seemingly requires subsequent inventors to have perfect market information about demand and development costs, even though, as independent inventors, they do not know any technical details about the initial invention.

This paints an all-too-narrow picture of what constitutes an independent inventor. To maintain their status as independent inventors, inventors need not keep their heads in the sand. Copyright law already deals with a similar situation with independently created, low-authorship works. There, second-arriving authors can independently create works even though they are well aware of the existence of the initial work and in fact use that initial work. In a long line of cases dealing with factual works, the courts have generally allowed second-arriving authors to use the initial work but only to double-check the results after they have independently created them. For example, in the 1866 case of *Kelly v. Morris*, Lord Wood stated that the defendant was "not entitled to take one word of the information previously published without independently working out the matter for himself, so as to arrive at the same result from the same common sources of information, and the only use that he can legitimately make of a previous publication is to verify his own calculations and results when obtained."¹⁵⁶ Similarly, in the United States, courts would allow the use of a previous map "for comparison or checking," but not for outright copying of the facts,¹⁵⁷ and, as stated by Judge Hand, "[e]very one concedes that a second compiler may check back his independent work upon the original compilation."¹⁵⁸ Nonetheless, determining exactly how much a second-arriving author can use has always been difficult.¹⁵⁹ Likewise, independent invention in patent

156. (1866) L.R. Eq. 702.

157. *Gen. Drafting Co. v. Andrews*, 37 F.2d 54, 57 (2d Cir. 1930). Ultimately, the court in *General Drafting* found that the defendant's version of a map contained sixteen errors found in the initial map and that the errors "point[ed] in only one direction, that [defendants] used plaintiff's map, not for comparison or checking, but for substantial copying." *Id.*

158. *Jeweler's Circular Pub. Co. v. Keystone Pub. Co.*, 274 F. 932, 935 (S.D.N.Y. 1921).

159. KAPLAN, *supra* note 23, at 59 ("Take as an archetype a directory collecting humdrum information, the result of labor in physically gathering and then in presenting the facts. It is now pretty clear that a later publisher must expend some of the same kind of investigative effort to avoid infringement. But there are questions, never resolved in this country and probably beyond resolution, about just how far the first work, though unavailable as a mere template for copying, can be referred to and used as a check upon, or as an incidental aid to, the later production.").

law need not be so narrowly viewed. Inventors could realistically obtain market information without tainting their status as independent inventors. Especially if the burden is placed on the entrant to prove independence, then entrants could make special efforts, like information fire walls and clean rooms, in order to protect their independence.

But even if patent law could manage to have perfect market information spillovers without allowing technical spillovers, there may well be cases where entrants mistakenly enter.¹⁶⁰ In other words, investors need to account for the probability that they may end up sharing the market by mistake even when the fundamental economics predicts only a single entrant. For the marginal project where the cost of a project is very close to the calculated maximum private reward, this drop in expected revenue might make an ideally viable project unviable. This dynamic draws into question the conclusion that no projects will be lost in the change to a free entry system. But before concluding that a realistic assessment of a free entry system cannot support exactly the same projects as a monopoly system, it is worth noting that the monopoly system suffers from a similar mechanism. Under that system, the expected return must account for probability of errors in judging the number of and relative probabilities of success of patent racers.¹⁶¹ Although a rigorous analysis of these error terms is beyond the scope of this Article, it is worth noting that in either system realistic inventors who account for these errors will reduce their expected return.¹⁶²

Lastly, the analysis assumes that entry and convergence to equilibrium happen instantly. Once time is considered, though, a number of things change. First, timing of invention has recently been shown to be a natural by-product of patent races.¹⁶³ John Duffy has shown that racing to win the patent necessarily means racing to apply for the patent sooner.¹⁶⁴ This results in the patent expiring

160. For example, consider a project that can support one entrant ($p_1 q_1 vT > c > p_2 q_2 vT$). In the real world there is some probability φ that someone else will mistakenly enter. Accounting for such a mistake means that the expected return on the project is $(1 - \varphi)p_1 q_1 vT + \varphi p_2 q_2 vT - c$.

161. In other words with probability $(1 - \epsilon)$ the inventor predicts that there is only one entrant racing to get the monopoly reward and with probability ϵ they are racing with another. If a rational inventor thinks a project will have only one entrant but knows that with some probability ϵ there may be actually another patent racer, then the expected return on that project in a monopoly patent system (assuming a 50/50 chance of winning if another mistakenly races) is $(1 - \epsilon)p_1 q_1 vT + \epsilon p_1 q_1 vT/2 - c$. See Mark R. Patterson, *Patent Races with No Entrants* (Fordham Law & Econ. Research Paper Series, Working Paper No. 22, 2002), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=336220.

162. Assuming the error probabilities ϵ and φ are of the same magnitude, it is interesting to compare even this rudimentary analysis of the expected return. As opposed to the idealized analysis before, the comparison now becomes model-dependent. If Bertrand competition drives price to marginal cost, then the expected revenue from the free entry system is smaller than from the monopoly system. Marginal cases will not be undertaken in the free entry system. If Cournot competition prevails, then the expected revenue is again smaller than in the monopoly case but not nearly as drastically reduced as in the Bertrand case. Interestingly, if Stackelberg competition prevails, then there may be little difference between the expected revenues assuming the first inventor is the leader ($p_1 q_1 vT/2 \cong p_2 q_2 vT$).

163. See Duffy, *supra* note 13, at 445.

164. *Id.*

sooner and therefore the public getting the benefits of the patent at marginal cost sooner. In the above accounting for social welfare, the analysis notes the costs of patent racing but it does not attribute any benefits to the race. In a more sophisticated analysis, such unaccounted benefits need to be considered, which would likely increase the comparative social welfare of the monopoly system.¹⁶⁵ Timing is also important in considering lead time advantage for the first mover. Lead time advantage may be an important consideration in diffusing concerns over the reduced fixed costs of subsequent entrants. Lead time allows the initial inventor to recoup some fraction of his fixed costs without needing to share the market with others. This accumulated war chest of recovered fixed costs enables the first mover to price in ways that could make subsequent entry unfavorable if subsequent entrants have exactly the same overall fixed costs to recover. Further, it suggests that if there is a substantial lead time advantage, potential entrants with the same fixed costs as the initial inventor may pose little or no threat of actual entry. To credibly threaten entry in the face of incumbents with lead time advantage, entrants may need to have lower fixed costs than the incumbent.

Furthermore, the timing of entry decisions in conjunction with the limited patent term provides an interesting policy lever worth further study. The above analysis shows that the free entry system is superior even when it only produces the same homogeneous product redundantly. But there are numerous advantages to a system that drives inventors to pursue differing inventions, and the limited patent term enhances this pressure for entrants to seek out differing solutions. Upon patent expiration, the patented invention becomes available at marginal cost. This change in pricing has an important impact on the local market. Depending on the relevant cross-elasticities of demand, the price drop to essentially zero will then shift the demand curves for closely related substitutes. The closer the substitute, the more patent expiration will affect the substitute. Though it requires further study, this suggests that the patent term, when considered in conjunction with lead time advantage, is not just a lever that determines the patent reward. It is also a lever that can determine where and when during the patent term subsequent entrants will search for substitutes in

165. In Duffy's theory, he is correct to point out that earlier filing of patents leads to earlier expiration. *Id.* But the difficult issue comes in trying to quantify the costs and benefits. The costs are incurred early while the benefits are gained late. Once these costs and benefits are discounted for time, it is not obvious that the benefit of earlier patent expiration many years in the future is worth spending money today in the race to file the patent earlier. As I understand Duffy's argument, he is not proving that the costs outweigh the benefits. Rather, he is pointing out that once we assume that rents are dissipated, these rents do provide a benefit that we had not before recognized. *Id.* at 510.

Furthermore, once time is incorporated into the analysis, then a free entry model will also have a first-mover advantage, though it likely would be attenuated compared to the winner-take-all race. Even absent the winner-take-all nature of the monopoly system, because of the first mover advantage, there may still be a significant pressure to be the first product to the market. Where there is a pressure to patent earlier, there is the social benefit of having the patent expire sooner. In other words, the benefit of a race highlighted by Duffy likely exists in both the free entry and monopoly systems, though the pressure to be first may be weaker in a free entry system.

the vicinity of an initial invention.

Under a reasonable set of assumptions, a free entry system can provide adequate incentives so that projects that are profitable under a monopoly system are still profitable under a free entry system. A free entry system can inherently modulate the private reward in relation to the costs of developing that invention. Likewise, despite its apparent wasteful duplication of research and development costs, a free entry system, once all costs are considered, is superior to a single entrant system. Though further, more sophisticated economic analysis may provide rationales for the current system, the results here question the conventional understanding of the patent system, and they advance the free entry system as an important alternative.

III. PRACTICAL COMPARISON: SINGLE ENTRANT VERSUS FREE ENTRY

The above economic arguments suggest that the patent system might benefit by preventing copying only. Those arguments simply assumed that such a system could be perfectly administered with zero cost. Of course, in reality, administration costs do matter, and sometimes they determine institutional design. For example, real property chooses a rule of exclusion, the traditional *ad coelum* rule,¹⁶⁶ because of its superior administrative qualities even though it proscribes acts that would not be proscribed under a normative theory alone. Likewise, the modern rule protecting *the* invention has been rationalized based on its perceived administrative superiority. Already in the 19th century, patent treatise writers acknowledged the over-inclusive nature of the modern patent rule while they also defended it on grounds of administrative costs. In 1837, Willard Phillips noted:

If it be then admitted that [the inventor] is equitably entitled to the exclusive use and sale for a time, against all others who do not make use of the same invention independently of him, and without deriving any hint or facility from his prior ingenuity or experiments, we have sufficient ground for a law giving him the exclusive right against all others for a time, since it is a matter of too much difficulty and intricacy of proof, to distinguish the cases of others who have made the same invention without any assistance from his ingenuity, from those of mere imitations. The law, in order to be practicable and convenient to be administered, must give the exclusive right.¹⁶⁷

166. See MERRILL & SMITH, *supra* note 13, at 13; Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1783 (2007) ("Crossing the boundary does somewhat correlate with whether a person is imposing costs through use, but only in a very rough sense."); see also *id.* at 1745-46 ("The prototypical example is trespass to land, whereby the unauthorized crossing of a boundary serves as a (very) rough proxy for harmful use; any voluntary entry into the column of space defined by the *ad coelum* rule counts as a trespass.").

167. WILLARD PHILLIPS, *THE LAW OF PATENTS FOR INVENTIONS; INCLUDING THE REMEDIES IN LEGAL PROCEEDINGS IN RELATION TO PATENT RIGHTS* 6 (1837); see also N. Scott Pierce, *A New Day Yesterday*:

Since then many have voiced similar concerns. Some have argued that a system that protects only against copying would have difficulty differentiating between copyists and independent inventors.¹⁶⁸ Others have worried that a copyright-styled patent system would be inherently incompatible with patent law's long-standing requirement of novelty. And more recently, yet others voice concerns that a copyright-styled patent system would be unprecedented and would likely conflict with recent U.S. treaty obligations. This Part explores these concerns.

A. ADMINISTRATIVE COSTS

Administrative costs play an important role in implementing an institution of exclusion. The relevant administrative costs are the public's self-enforcement costs, an owner's monitoring costs, and a court's adjudication costs.¹⁶⁹ The traditional *ad coelum* rule from real property is often used to illustrate superior administrative costs. Self-enforcement costs are the costs that the public must bear in trying to respect a certain property rule. We can very quickly figure out the four corners of other people's property and we can relatively easily keep ourselves in the clear.¹⁷⁰ Monitoring costs are costs incurred by property owners in monitoring whether anyone has trespassed onto their property. With the *ad coelum* rule, property owners can easily see when others have entered their property.¹⁷¹ Lastly, the adjudication costs are the costs borne by the courts in trying to adjudicate a particular property rule. As with monitoring costs, the *ad coelum* rule is relatively easy to adjudicate in cases of trespassing; the court simply determines if the defendant was within the four corners of property or not. Thus, even though it may prevent certain acts that cause no harm to the property owner,¹⁷² traditional property law has nonetheless chosen the *ad coelum* rule for its administrative benefits.

With respect to adjudication and monitoring, these costs are likely higher for a system that excludes only *my* invention rather than *the* invention. When an inventor sees a competitor performing the patented process or selling the patented machine, the inventor cannot easily tell if the competitor simply copied the invention (infringed) or if the competitor independently created the inven-

Benefit as the Foundation and Limit of Exclusive Rights in Patent Law, 6 J. MARSHALL REV. INTELL. PROP. L. 373, 376–77 (2007) (citing PHILLIPS, *supra*).

168. See Duffy, *supra* note 37, at 9 (“An independent-invention defense would also present difficult administrative problems because courts would have a difficult time distinguishing between true and false claims of duplication.”).

169. See Dam, *supra* note 118, at 262–63; Lemley, *supra* note 78, at 1064 (outlining enforcement costs).

170. See Robert C. Ellickson, *Property in Land*, 102 YALE L.J. 1315, 1327–28 (1993).

171. See *id.* at 1327 (explaining that the “[g]enius of [i]ndividual [l]and [o]wnership . . . is that detecting the presence of a trespasser is much less demanding than evaluating the conduct of a person who is privileged to be where he is”).

172. *But see, e.g.*, Larissa Katz, *Exclusion and Exclusivity in Property Law*, 58 U. TOR. L. REV. 275, 298–99 (2008) (discussing customs such as the Scandinavian *Allemansratt* where harmless acts such as hiking across another's property are allowed even if they violate the strict boundaries of the property).

tion (did not infringe). For similar reasons, adjudication costs are also likely higher because courts would have to deal with the difficult evidentiary distinction between copying and independent invention.¹⁷³ In fact, both judges and scholars have worried precisely about such higher adjudication costs and have concluded that requiring proof of copying was too expensive and difficult to administer.¹⁷⁴

But other judges, like Judge Hand, were not daunted by the adjudication costs.¹⁷⁵ In recommending a copyright-like scheme for patent law, Learned Hand acknowledged the evidentiary problems and suggested solving them by placing the burden¹⁷⁶ of showing independent invention on the defendant:

You might say it would be very difficult for the patentee to ever prove that the supposed infringer had copied. Well, there are various devices that I think might be arranged to meet that. If the patentee brought the infringer to court and showed the infringer was making the same thing, you might throw the burden on the supposed infringer to show that he did not have to have recourse to the patent in order to do what he did.¹⁷⁷

This leaves the comparative analysis of adjudication and monitoring uncertain. The gathered wisdom of Judge Posner and other scholars seems to suggest that a rule protecting only *my* invention would have higher costs, but this is counterbalanced by Judge Hand's suggestions that burden shifting could ameliorate those worries.

But even if a free entry system has higher monitoring and adjudication costs on a per case basis, such a system would likely have significantly lower overall adjudication and monitoring costs. A recent article studied the empirical evidence for copying and found that if "[a] patent infringement system . . . punished only copying [then] . . . [n]inety percent of patent lawsuits would go away."¹⁷⁸ Thus, even if adjudication costs and monitoring costs were ten times higher per case with the narrower system (and Judge Hand nevertheless thinks

173. See Douglas Lichtman, *Copyright as a Rule of Evidence*, 52 DUKE L.J. 683, 705 (2003); Smith, *supra* note 166, at 1810 (citing Norman Siebrasse, *A Property Rights Theory of the Limits of Copyright*, 51 U. TORONTO L.J. 1, 22-42 (2001), for the point that "a defense of independent creation makes protection of the original more costly"). For a judicial opinion that focuses on difficulties in identifying independent creation in stuffed animals, see *Ty, Inc. v. GMA Accessories, Inc.*, 132 F.3d 1167 (7th Cir. 1997).

174. See Richard A. Posner, *Misappropriation: A Dirge*, 40 Hous. L. REV. 621, 626 (2003) ("What tips the balance against an independent-discovery defense, however, is the difficulty of determining independent discovery by the methods of litigation and the resulting likelihood that the courts would commit many errors in adjudicating patent infringement claims in cases in which independent discovery was the defense.").

175. See *Hand on Patent Reform*, *supra* note 18, at 114.

176. More recently, others have also suggested solving these evidentiary problems through burden shifting. See Leibovitz, *supra* note 29, at 2276 ("Placing the burden of proof on the defendant in an infringement action must be the bedrock of any nonexclusive patent system.").

177. *Hand on Patent Reform*, *supra* note 18, at 114.

178. Cotropia & Lemley, *supra* note 47, at 1460 (emphasis omitted).

we could fix that), society would be spending the same on either system. With a free entry system, we may well spend less overall on administering a competitive system because overall, there may be fewer patent cases.¹⁷⁹

Before concluding, we must still consider the last, and likely most important, administrative cost—the self-enforcement cost. Curiously, it is an issue that has been ignored in the previous debates over independent invention. There is good reason to think that the narrower rule could provide significant improvements in self-enforcement. Self-enforcement is critical to a well functioning property system. It is, as described by Robert Ellickson, “the cheapest method of social control.”¹⁸⁰ Property generally is not just about drawing an arbitrary line that the government will enforce.¹⁸¹ For a property system to work efficiently, the rest of us—those who will owe the property holder duties to stay off—must be willing to do our part. We must first understand the boundaries and then be willing to respect them. A property system can achieve great gains in efficiency when people generally understand and respect property boundaries themselves without the need for repeated government coercion. Therefore, the chosen property rule must be cheap and easy to understand and obey.¹⁸² We need to know whether the public can understand the rule and, just as importantly, whether we are willing to self-enforce the rule. As argued by Carol Rose, “People have to accept property for it to work in any meaningful way. And, very often, they do, relieving owners of the onerous necessity to guard their things all the time.”¹⁸³

Self-enforcement costs are important because they retain a primacy over all the other administrative costs. If the public can cheaply understand a property rule, and if they in fact abide by that rule, the other administrative costs become less relevant. If we all abide by a property rule, owners need to do less monitoring and courts need to do less adjudicating. Of course there exists a complex, dynamic relationship between enforcement and self-compliance, but high levels of self-enforcement will generally lead to lower overall administrative costs. And it is in considering self-enforcement costs that protecting *my* invention rather than *the* invention shows promise.

As opposed to other property systems, our modern patent system is particularly expensive for the public to respect. Currently, there are no clear boundaries or clear activities that indicate to the otherwise law-abiding individual that he is about to infringe a patent right. To steer clear of liability, the public must keep

179. This does not mean that patents are less important in a competitive system. Instead, there is just less fighting over patents, and the public generally knows how to behave without court intervention.

180. Ellickson, *supra* note 170, at 1327 n.38.

181. Thomas W. Merrill & Henry E. Smith, *The Morality of Property*, 48 WM. & MARY L. REV. 1849, 1853 (2007) (arguing that the “enormous information cost” created by property can be mitigated by referencing property rules with commonly held morals).

182. *Id.* at 1850 (“Because property rights need to coordinate the behavior of large numbers of unconnected people, they must be easily comprehended and must resist possible misinterpretation.”).

183. Carol M. Rose, *The Moral Subject of Property*, 48 WM. & MARY L. REV. 1897, 1925 (2007).

abreast of each and every patent claim. This puts a very costly burden on the public. Patents are complicated, and their claims are notoriously difficult to delineate with precision. Likewise, they are very numerous. In the last hour, on average, eighteen patents issued that you have not yet read.¹⁸⁴ When you wake tomorrow, 144 new patents await you.¹⁸⁵ When are you planning on reading them? You, like the rest of us, will owe these patent holders the duty to refrain from infringing their rights. Likely you can dismiss many of them quickly, but even so, how long will it take? And what do you do if a patent claim arguably looks reasonably germane? Patent attorneys charge about \$25,000 for an infringement opinion letter.¹⁸⁶ If you trespassed onto your neighbor's property this morning, likely you and your inner-civic conscience noted it. Did you drive your Toyota Prius today?¹⁸⁷ Did you use your Blackberry?¹⁸⁸ Did your civic conscience even notice these as acts that might matter? Under the current patent system, there are no cheap, easy rules that help us determine when we might be infringing someone else's patent rights.

Just as importantly, it is questionable if many feel they *should* abide by the current patent system. Observance of property has long been associated with widely held norms or morals. A property system that is aligned with some common norms will generally benefit from increased acceptance and decreased enforcement costs. As argued by Thomas Merrill and Henry Smith, this happens when "the morality upon which [property] rests [is] simple and accessible to all members of the community."¹⁸⁹ Loosely, this means that the nature and breadth of the property right must be generally acceptable to the public. On this score the current patent system fares poorly. Because patent claims reach those that have no connection to the initial inventor, it is hard to establish any direct harm caused by independent inventors—they have no connection to the initial inventor. Even taking what has been called the galloping propertization¹⁹⁰ in intellectual property and the Demsetzian trend in intellectual property as given,¹⁹¹ would Demsetz's theory of property¹⁹² view the actions of an independent

184. Between February 14, 2006 and July 15, 2008, the PTO issued 403,000 patents. See U.S. Patent No. 6,997,000 (filed Nov. 25, 2003) (issued Feb. 14, 2006); U.S. Patent No., 7,400,000 (filed Dec. 5, 2005) (issued July 15, 2008).

185. Patents do not issue from the PTO in the middle of the night. They actually only issue on Tuesdays. See *Official Gazette for Patents*, U.S. PATENT & TRADEMARK OFF., https://www.uspto.gov/news/og/patent_og/index.jsp (last visited May 21, 2010).

186. AM. INTELLECTUAL PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY 2007, at I-83.

187. *Paice L.L.C. v. Toyota Motor Corp.*, 504 F.3d 1293, 1299 (Fed. Cir. 2007).

188. *NTP, Inc. v. Research in Motion, Ltd.*, 397 F. Supp. 2d 785, 786 (E.D. Va. 2005).

189. Merrill & Smith, *supra* note 181, at 1850.

190. Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 570 (2000). See generally Robert P. Merges, *Property Rights Theory and the Commons: The Case of Scientific Research*, Soc. PHIL. & POL'Y, Summer 1996, at 145.

191. See generally Brett M. Frischmann, *Evaluating the Demsetzian Trend in Copyright Law*, 3 REV. L. & ECON. 649 (2007).

192. See generally Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. (PAPERS & PROC.) 347 (1967).

inventor as an externality that needs to be internalized? With independent inventors, where is the free riding that seems so central to intellectual property?¹⁹³

Mark Lemley recognizes the equitable disconnect in patent law, stating that “[t]hose not schooled in patent law would likely find it odd that a patent not only prevents the imitation of the patentee’s technology but also limits the ability of inventors to develop and market their own technologies.”¹⁹⁴ As quoted in the introduction, Judge Hand made exactly this same point. He argued that patents could “avoid a great deal of the animosity that has surrounded”¹⁹⁵ them by giving inventors only “what [they] contributed, . . . and unless [others] used what [they] did, [they] could not stop it.”¹⁹⁶ By choosing a broad exclusionary rule that tends to defy our expectations about property, patent law may be slowing its acceptance and making patent administration overly costly.¹⁹⁷

In contrast, if patents were only to protect *my* invention, then the costs of self-enforcement would be lower because a relatively easy-to-follow rule emerges: If you use your own, independently created work then you are safe and you need not worry about patent infringement; if you rely in part on the patented work of others, then you need to be more careful; and if you simply copy patented material, then you are infringing. Without any costly searching I would know when I can operate freely, when I need to be careful, and when the law prohibits my actions. In addition, the rule at the heart of the free entry system better aligns with the misappropriation morals that guide us. By differentiating between copied and independently created embodiments, a free entry system may provide a far superior property rule because it is easier and cheaper to follow even if it becomes more costly to monitor and adjudicate.

B. NOVELTY, COMPETITION, AND PIONEERS

Others have been concerned that a pure copyright-styled system is incompatible with patent law’s requirement of novelty.¹⁹⁸ Novelty prevents others from claiming subject matter that is already in existence.¹⁹⁹ Second-arriving independent inventors cannot patent an invention that an earlier inventor has claimed or made available to the public.²⁰⁰ This requirement, coupled with a copyright-

193. See Lemley, *supra* note 78, at 1032 (arguing that modern intellectual property is too concerned with eliminating free riding).

194. Lemley, *supra* note 33, at 1526 (arguing also that “[non-infringement for independent inventors] comports with our sense of equity”).

195. *Hand on Patent Reform*, *supra* note 18, at 115.

196. *Id.* at 117.

197. In addition, lack of acceptance leads to instability as an institution because it opens the door to “flout[ing] intellectual property.” Rose, *supra* note 183, at 1908–09.

198. There is no problem with copyright, as copyright only requires originality, whereas patent law requires both originality and novelty. I thank Rochelle Dreyfuss for pointing out that independent invention and novelty may not mix well. See Blair & Cotter, *supra* note 29, at 819.

199. See 35 U.S.C. § 102 (2006).

200. See 35 U.S.C. § 102(a), (b), (e).

styled patent system, leads to a seemingly fatal dynamic that destroys all value in the initial patent. For example, Blair and Cotter envision problems where

a [patent] system . . . recognizes the independent discovery defense, [and] A patents an invention, B independently discovers the same invention, and C then markets yet another embodiment of the same invention. If B's invention is not patentable and C is therefore free to copy from B, the value of A's patent plummets²⁰¹

The initial patent becomes nearly worthless if third parties are free to copy from the unpatentable (because it is no longer novel) invention created by an independent inventor. Interestingly, in some corners of intellectual property, once information is readily available from public sources, others can even copy from non-public sources. For example, trade secrecy is extended only to information that is not "generally known" or "readily ascertainable by proper means."²⁰² In the same way, even without permission from independent inventors, third parties could circumvent an initial patent by copying the same information from the unpatentable (because it is not novel) work of the independent inventors.

Though this dynamic has been used to argue against a free-entry-styled system, it may actually be a beneficial feature as it may help to define the level of generality at which competition will take place. The key to this potential beneficial dynamic is to realize that truly identical, independent invention is unlikely to occur. Different inventors often may well be trying to solve the same problem and they often may be drawn to similar solutions, but at some level of detail the two approaches will show some technical differences. This same dynamic is prevalent in copyright. Although independent creation is a fundamental defense in copyright, it is unnecessary in many areas.²⁰³ It is not needed because for most creative works of high authorship it is highly unlikely that two independent authors will independently create the same work. It is very unlikely that two authors will produce the exact same play or novel, word-for-word. Surely they may tackle a similar genre, like a spy novel or a detective story, but the details will always differ. Only in areas of low authorship will independent authors inevitably create nearly identical works.

In patent law it has often been assumed that this idiosyncratic effect does not exist. For example, it is common to state that the modern light bulb was invented by many people including both Thomas Edison and Joseph Swan.²⁰⁴ But a similar dynamic exists in patent law at least to some degree. In detail, Edison and Swan (even when they at times copied from each other) did not

201. Blair & Cotter, *supra* note 29, at 819 (footnote omitted).

202. See UNIFORM TRADE SECRET ACT § 1(4) (1985); see also MERGES ET AL., *supra* note 14, at 45–46.

203. The one place it is necessary is low authorship works like maps and charts. See Liivak, *supra* note 29, at 184–87.

204. See Leibovitz, *supra* note 29, at 2251–52 (describing the near simultaneous invention by Edison and Swan).

create the exact same physical thing.²⁰⁵ In the late 1870s both Swan and Edison started moving in the direction of high-resistance elements for incandescent lighting.²⁰⁶ Swan was using slender carbon rods²⁰⁷ while Edison started using a filament made from a carbonized cotton sewing thread.²⁰⁸ Even after Edison announced his success with the carbonized filament and Swan followed that lead and himself turned to carbonized filaments, the two inventors settled on different designs. Swan used carbonized cotton sewing thread that had been treated by a special parchmentizing process that Swan had discovered and patented.²⁰⁹ Meanwhile Edison ultimately chose a filament made from carbonized bamboo.²¹⁰ Thus at some level of generality, these inventors all invented the light bulb just as Tom Clancy and Ian Fleming both create espionage-laden novels. But at another level of detail there are differences. Once we note these differences, a free entry system that still mandates novelty could still work, and it could regulate the level of generality at which competition between entrants occurs.²¹¹ This dynamic of third party copying of unpatentable elements of independent invention can be viewed as a policy lever that automatically limits the effective scope of initial patents where others independently invent the same subject matter. It is similar to suggestions that independent invention be used as a secondary consideration in obviousness determinations.²¹²

To see this dynamic, consider a stylized Euler diagram that depicts the solution space for seating stools.²¹³ Imagine a first inventor (Inventor 1) creates a three-legged stool with wooden legs. He then applies for and receives a patent *that gives him exclusion only over copyists*. He is given three claims as shown in Figure 5: (1) the broadest to the concept of a stool generally, (2) a stool with three legs, and (3) (the narrowest claim to his specific embodiment) a stool with three wooden legs.

Now imagine a second inventor (Inventor 2) independently creates a four-legged stool with metal legs. Both inventors are working towards supplying the seating needs of the public, but their solutions are not exactly the same. As shown in Figure 6, the second inventor independently discloses the overall

205. See ARTHUR A. BRIGHT, JR., *THE ELECTRIC-LAMP INDUSTRY: TECHNOLOGICAL CHANGE AND ECONOMIC DEVELOPMENT FROM 1800 TO 1947*, at 54 (1949).

206. *Id.*

207. *Id.*

208. *Id.* at 64–65.

209. *Id.* at 55–56.

210. *Id.* at 66.

211. For an exploration of the level of abstraction at which patent claims should be allowed, see generally Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. Pa. L. Rev. (2009), and T.J. Chiang, *The Levels of Abstraction Problem in Patent Law* (George Mason Univ. Law & Econ. Research Paper Series, Paper No. 09-33, 2009), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1434465.

212. See Lemley, *supra* note 33, at 1534.

213. For a general discussion of Euler diagrams, see Sun-Joo Shin & Oliver Lemon, *Diagrams*, STANFORD ENCYCLOPEDIA OF PHILOSOPHY (2008), <http://plato.stanford.edu/entries/diagrams/> (last visited April 23, 2010).

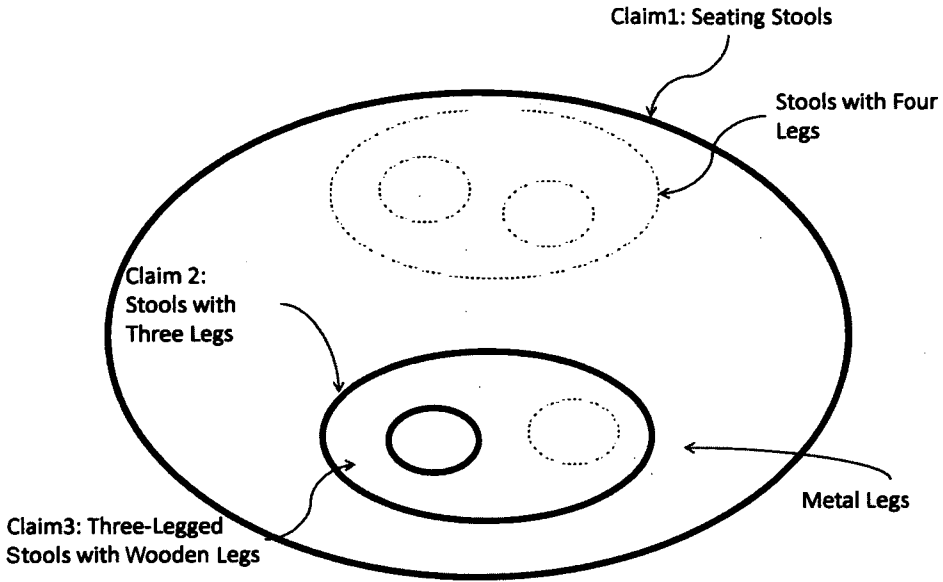


Figure 5. Inventor 1 Discloses and Claims His Invention

concept of a stool also, but, since it is not novel, she cannot claim it. She can only claim her stool with four legs, and more narrowly, claim a stool with four

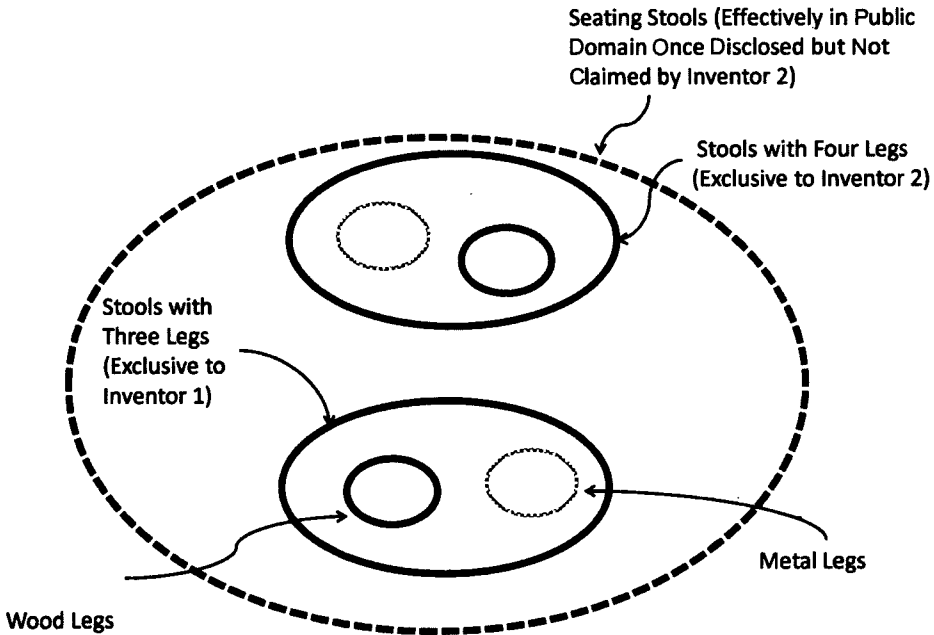


Figure 6. Resulting Regions of Public Domain, Exclusivity for the Initial Inventor and Second Arriving Independent Inventor

metal legs.²¹⁴ If the patent system limits the exclusionary reach of claims to only the copying of patented material, then third parties can simply copy the concept of a seating stool generally from the public (and unpatentable) disclosure of the general concept by Inventor 2.

This third party use of the general concept of stools does not infringe Inventor 2's patent because she could not patent it; in addition, this does not infringe Inventor 1's patent because neither the third party nor Inventor 2 copied from Inventor 1. As shown in Figure 6, as a result of novelty interacting with a copyright-styled rule, a free-entry, novelty-requiring patent system creates two separate spheres of exclusivity for Inventors 1 and 2 along with a broad effective region for the public domain.

Importantly, this result changes if Inventor 1 is truly a pioneer whose invention is instead copied by all subsequent inventors. In that case, the exclusive regions would look different. Assume Inventor 1 discloses and patents as in Figure 5. But now imagine that all new inventions in this area are the result of copying from the pioneering work of Inventor 1. In that situation, to avoid charges of inequitable conduct, Inventor 2 discloses her reliance on Inventor 1's patented work. As a result, any third party use of information in Inventor 2's disclosure could still be infringement of Inventor 1's patent. Furthermore, Inventor 1 would likely hold a blocking patent over claims made by Inventor 2. In this way, this interaction between novelty and a copyright-styled system could well help to define the level of generality at which competition will occur while preserving effective broad claim scope to pioneers that lead the way for others. In this scheme, pioneers are not just the first inventors but are also inventors that are subsequently copied by others.

The model presented here suggesting an interaction between the requirement of novelty and a free entry system shows some interesting features. It may inherently help to determine the level of generality at which patent law creates competition, and it has the potential to differentiate between pioneers that others follow and copy, and early inventors who arrive first but are soon joined by independent inventors. However, despite these interesting characteristics, as a practical matter, such a system may allow for easy manipulation whereby exclusive rights are effectively destroyed by disclosures by others and would require all-too-careful tracing of the origins of information. Part IV proposes a hybrid exclusion rule that might provide some of these same benefits, but without the difficult tracing issues.

C. COULD PATENT LAW REALLY CHANGE ITS MODE OF EXCLUSION?

Another natural question is whether patent law could ever really adopt a free entry rule. Others have argued that it would be historically unprecedented.²¹⁵

214. For this example, issues related to obviousness under 35 U.S.C. § 103 (2006) are ignored.

215. See Lemley, *supra* note 33, at 1525 (stating that ensnaring independent inventors as infringers is a power "that patentees have had, with rare exceptions, since the inception of the Republic").

Indeed, in his influential 1890 treatise on patents, Robinson made clear:

To one who has conceived and practically applied a new idea [patent law] gives the power, not only to prohibit other men from copying after him, but from inventing and applying the same idea for themselves. It recognizes no difference between the piracy of an invention by the wil[l]ful injurer and its entirely independent generation by a true inventor.²¹⁶

But influential figures remained undaunted. Judge Hand felt there would be no “constitutional difficulty . . . in limiting [patent infringement] to those who could be shown to have copied what the inventor did.”²¹⁷ The U.S. Constitution explicitly grants “inventors . . . exclusive rights” in “*their* . . . discoveries” just as “authors” are granted “exclusive rights” in “*their* . . . writings.”²¹⁸ If copyright can and did adopt a rule that requires copying, then there can be no doubt that patent law could as well.

Furthermore, many historic references to infringement incorporate copying-based language into their definitions. For example, in his influential treatise, George Ticknor Curtis stated that, “[a]n infringement takes place whenever a party avails himself of the invention of the patentee, without such variation as will constitute a new discovery, or, as it has also been stated, an infringement is a copy made after and agreeing with the principle laid down in the specification.”²¹⁹ Likewise, later in the same treatise, Curtis stated that, “in an action for an infringement . . . the question is, whether a mode subsequently invented and adopted is a substantial and independent invention, or only a colorable variation, and borrowed from the previous invention.”²²⁰ Even earlier, in 1840, Justice Story held that “if . . . [the machine] . . . has been actually pirated by the defendants, the plaintiff is entitled to maintain a suit.”²²¹ And in 1857, a court still held that “[a]n infringement is a copy made after, and agreeing with the principle laid down in, the patent.”²²² All of these general statements about infringement incorporate notions of “cop[ying],” “avail[ing],” “borrow[ing],” or “pirate[ing]” the invention from the plaintiff.²²³ Perhaps these statements were merely examples of what is sufficient for infringement rather than what is necessary, but the repeated appearance of such language suggests that preventing piracy may have been the overriding goal of patent law.

Furthermore, even after 1890, when patent infringement had clearly moved toward protecting *the* invention rather than *my* invention, the narrower protec-

216. 1 WILLIAM C. ROBINSON, *THE LAW OF PATENTS FOR USEFUL INVENTIONS* 45 (1890).

217. *Hand on Patent Reform*, *supra* note 18, at 114.

218. U.S. CONST. art 1, § 8 cl. 8 (emphasis added).

219. GEORGE TICKNOR CURTIS, *A TREATISE ON THE LAW OF PATENTS FOR USEFUL INVENTION IN THE UNITED STATES OF AMERICA* 305–06 (2d ed. 1854) (footnotes and citations omitted).

220. *Id.* at 587.

221. *Wyeth v. Stone*, 30 F. Cas. 723, 728 (D. Mass. 1840) (No. 18,107).

222. *Page v. Ferry*, 18 F. Cas. 979, 984 (E.D. Mich. 1857) (No. 10,662).

223. *Page*, 18 F. Cas. at 984; *Wyeth*, 30 F. Cas. at 728; CURTIS, *supra* note 219, at 305–06.

tion remained salient in some parts of patent law. In fact, such a narrow rule was and still is the rule used to protect unpatented inventions—what we now call trade secrets.²²⁴ In his 1890 treatise, Robinson described the rights governing *unpatented* inventions as natural rights²²⁵ where “[a]n independent exercise of inventive skill by a different inventor, though developing and embodying the same idea of means, is not a violation of [a first inventor’s] rights, but on the contrary confers on that [second] inventor the same property and privileges that [the first] enjoys.”²²⁶ These historic references all highlight that even if changing patent law to protect only *my* invention would radically affect today’s patent system,²²⁷ it may be more akin to a return to a previous state of patent law rather than an exploration of wholly uncharted waters.

Lastly, one issue deserves mention and may make future adoption of a pure free entry system untenable. Others have noted that a free entry patent system might violate U.S. treaty obligations under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs).²²⁸ For example, Article 28 requires that “where the subject matter of a patent is a product,” then at the minimum, countries confer “the . . . exclusive right . . . to prevent third parties not having the owner’s consent from . . . making [or] using . . . that product.”²²⁹ Though most would read this and conclude that a pure free entry system would not provide the minimum protections under TRIPs, it is interesting to note the language that is used to describe the exclusionary floor in copyright. There, TRIPs defers to the Berne Convention²³⁰ which requires that “[a]uthors of literary and artistic works protected by the Convention shall have the exclusive

224. The modern law surrounding unpatented inventions is trade secret law. Cotropia & Lemley, *supra* note 47, at 1426 (“Trade secret law is similar, requiring an individual to misappropriate the trade secret to be held liable.”).

225. 3 ROBINSON, *supra* note 216, at 26 (“The Right of an Inventor to Preserve the Secret of his Invention Rests on Natural Law.”).

226. *Id.* at 38.

227. See Cotropia & Lemley, *supra* note 47, at 1460 (“Finally, our data shed some light on the growing chorus of calls for an independent development defense A number of scholars have argued that patent law should exempt independent development and instead target only copying, just as copyright and trade secret law do. One of us has expressed some skepticism over that proposal. Our data demonstrates precisely how much is at stake in this debate. A patent infringement system that punished only copying would look dramatically different than current law. Ninety percent of patent lawsuits would go away, and most patent litigation would be in the chemical and pharmaceutical industries. Some will suggest this would be a good idea. We express no opinion on that issue here, other than to point out precisely how different such a patent system would be from the one we have today.” (footnotes and citations omitted)).

228. See Blair & Cotter, *supra* note 29, at 820 (“[R]ecognition of an independent discovery defense in patent law, whatever its merits may be, would probably be unlawful under article 28 of the TRIPs Agreement.” (footnote omitted)). I thank Justin Hughes for bringing the TRIPs issue to my attention.

229. Agreement on Trade-Related Aspects of Intellectual Property, art. 28, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 108 Stat. 4809, 33 I.L.M. 1125, available at www.wto.org/english/docs_e/legal_e/27-trips.pdf.

230. *Id.* art. 9.

right of authorizing the reproduction of these works, in any manner or form.”²³¹ There is no doubt that our copyright system satisfies the standard of granting exclusive rights in the author’s work. The work, it is generally agreed, does not conceptually extend to encompass things made by others. Thus, just as with the arguments relating to the U.S. Constitution, if exclusive rights over the author’s work need not reach independent authors, then without more, exclusive rights over the inventor’s product need not reach independent inventors either. In fact, just from the treaty language alone, it seems peculiar that such an important distinction in an exclusionary system is not mandated.

In addition, many other countries already have relatively strong prior user rights.²³² These exceptions are predicated on TRIPs article 30 which allows “limited exceptions to the exclusive rights conferred by a patent, provided that such exceptions do not unreasonably conflict with a normal exploitation of the patent and do not unreasonably prejudice the legitimate interests of the patent owner, taking account of the legitimate interests of third parties.”²³³ With such an exception, perhaps TRIPs could allow for a free entry system if it can be established that it does not “unreasonably prejudice the legitimate interests of the patent owner.”²³⁴ If a legitimate interest is making supernormal profits, then a free entry system might not fit the article 30 exception. But if the owner’s legitimate interest is prevention of piracy as well as prevention of the type of competition that prohibits recoupment of the owner’s costs (including opportunity costs), then a free entry system might still qualify.

* * *

This section has explored some of the practical issues associated with a free entry patent system. Administratively, there are likely increased costs for adjudication and monitoring on a per case basis, but the system’s promise in terms of self-enforcement alone makes such a system worth further consideration. Furthermore, the above discussion suggests that a pure free entry system is not inherently inconsistent with patent law’s novelty requirement and the United States’ treaty obligations.

IV. CLAIMING *THE* EMBODIMENT LITERALLY AND PREVENTING PIRACY VIA THE DOCTRINE OF EQUIVALENTS

The question arises whether something short of a purely copyright-styled patent system could achieve the economic benefits of competition while avoid-

231. Berne Convention for the Protection of Literary and Artistic Works, art. 9, Sept. 9, 1886, S. TREATY DOC. NO. 99-27, 828 U.N.T.S. 221 (as revised at Paris on July 24, 1971, and amended on Oct. 2, 1979), available at www.wipo.int/treaties/en/berne/trtdocs_wo001.html#P140_25350.

232. See Nuno Pires de Carvalho, THE TRIPs REGIME OF PATENT RIGHTS 312 (2d ed. 2005) (noting “the generalized practice by WTO Members of adopting the prior user exception”).

233. Agreement on Trade-Related Aspects of Intellectual Property, *supra* note 229, at art. 30; see also Blair & Cotter, *supra* note 29, at 820 n.65.

234. Agreement on Trade-Related Aspects of Intellectual Property, *supra* note 229, at art. 30.

ing some of the trouble spots. The economic benefits are rooted in competition from a free entry system while the administrative disadvantages are caused by the conceptual need to prove copying and patent law's foundational requirement of novelty. This section considers a hybrid patent system that captures most of the competition-based benefits while avoiding some of the pitfalls of a pure free entry system. Using the terminology developed above, this hybrid system grants exclusionary rights over *the* embodiment. This is significantly narrower than the modern rule that grants exclusion over *the* invention. But to protect against pirates that copy yet try to evade the narrow technological breadth of *the* embodiment, the hybrid rule would add broader protection in the case of copying by granting exclusion over *my* invention. This section further describes such a hybrid rule and it concludes by suggesting that despite its radical appearance, such a hybrid rule may have been in fact the standard scope of patents in the 1800s.

As suggested above in section III.B., the difference between exclusion over *my* invention versus the broader exclusion over *the* invention matters most when invention is broad. Just as in copyright, if we define the exclusionary rights very narrowly, hewing close to the particular embodiment created by the inventor, then the difference between protecting *my* invention and *the* invention becomes less relevant. In other words, a patent system that granted exclusionary rights in *the* specific machine created by an inventor would have many of the economic benefits of a system that granted exclusionary rights only in *my* invention. Though a copyright-styled system allows maximal free entry, a system that granted exclusion over *the* specific embodiment would likely not deter entry too radically. If copyright granted absolute exclusion over the verbatim text of a novel, it would still likely allow free entry by any author that chose independently to write her own novel. If the thing is defined narrowly, there is little practical difference between exclusion over *my* thing versus exclusion over *the* thing. In the former, it is conceptually impossible for an independent creator to infringe, while in the latter, it is highly (perhaps even astronomically) unlikely to infringe. There is no doubt that this idiosyncratic creation effect is more pronounced in copyright than in patent law. In copyright, there are an enormous number of relatively equal choices for expressing some idea, while in patent law, an inventor has more constrained choices as to her invention. Nonetheless, patent law may be able to capitalize on this same effect. Most entrants, at some level of detail, would have differences between their independent creations such that exclusionary rights over *the* different embodiments should not overlap often.²³⁵ Furthermore, such exclusionary rights would not have monitoring and adjudication problems because literal infringement of the claim would not require proof of copying. It would comply with our TRIPs obligations. And

235. This is a claim that would be amenable to historical verification by looking to the history of technology. That is beyond the scope of this Article, and for the current purposes, it is assumed that the effect exists.

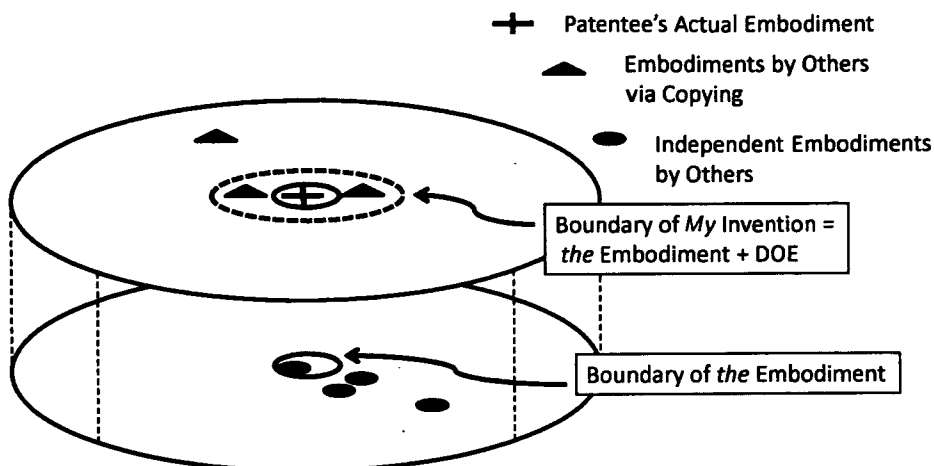


Figure 7. Exclusion in a Hybrid System: Exclusion over *the* Embodiment Augmented by a Copying-Based Doctrine of Equivalents

while it would conceptually keep the current mode of exclusion, it would likely not illicit a moral backlash, nor would it introduce undue self-enforcement costs. The same simple heuristic could apply: if you operate independently, you need not worry because you are unlikely to infringe such a narrow claim with all its limitations.

Figure 7 outlines this hybrid system in the terms developed earlier in Figures 1A and 1B. The most obvious problem with only protecting *the* embodiment is that it is too narrow to effectively police against piracy. A copyist could all-too-easily examine the specific embodiment created by an initial inventor and then slightly change the design. This avoids infringement, but sales of that close substitute could still effectively pirate the invention. For well over 150 years, patent law has already worried about this dynamic, and the judicially created doctrine of equivalents directly confronts it. It allows courts to reach beyond the literal scope of the claims to provide equitable relief for inventors. Judge Hand described the doctrine as “temper[ing] unsparing logic and prevent[ing] an infringer from stealing the benefit of the invention.”²³⁶ In its most recent discussion of the doctrine, *Festo v. Shoketsu*, the Supreme Court described the doctrine’s purpose:

If patents were always interpreted by their literal terms, their value would be greatly diminished. Unimportant and insubstantial substitutes for certain elements could defeat the patent, and its value to inventors could be destroyed by simple acts of copying. For this reason, the clearest rule of patent interpretation, literalism, may conserve judicial resources but is not necessarily the

236. *Royal Typewriter Co. v. Remington Rand, Inc.*, 168 F.2d 691, 692 (2d Cir. 1948).

most efficient rule. The scope of a patent is not limited to its literal terms but instead embraces all equivalents to the claims described.²³⁷

In recounting the history of the doctrine, the Court made clear that a major purpose of the doctrine was to prevent others from pirating the benefits of the invention by copying critical components yet changing insubstantial details. In *Winans v. Denmead*, where the Court “first adopted what has become the doctrine of equivalents, it stated that “[t]he exclusive right to the thing patented is not secured, if the public are at liberty to make substantial copies of it, varying its form or proportions.”²³⁸ The *Festo* Court then detailed the Court’s decision in *Graver Tank* where:

the Court reaffirmed the doctrine [of equivalents]. *Graver Tank* held that patent claims must protect the inventor not only from those who produce devices falling within the literal claims of the patent but also from copyists who “make unimportant and insubstantial changes and substitutions in the patent which, though adding nothing, would be enough to take the copied matter outside the claim, and hence outside the reach of law.”²³⁹

Even in recounting its 1997 decision in *Warner-Jenkinson*,²⁴⁰ the Court described that decision as having “reaffirmed that a patent protects its holder against efforts of copyists to evade liability for infringement by making only insubstantial changes to a patented invention.”²⁴¹ The doctrine of equivalents

237. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731–32 (2002) (citation omitted).

238. *Id.* at 732.

239. *Id.* at 732–33 (quoting *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 607 (1950)).

240. *Warner Jenkinson Co. v. Hilton Davis Chem.*, 520 U.S. 17 (1997). In part, the *Festo* Court’s description is so interesting because *Warner-Jenkinson* explicitly stated that the doctrine extends beyond just preventing piracy. It stated:

To be sure, *Graver Tank* refers to the prevention of copying and piracy when describing the benefits of the doctrine of equivalents. That the doctrine produces such benefits, however, does not mean that its application is limited only to cases where those particular benefits are obtained.

Elsewhere in *Graver Tank* the doctrine is described in more neutral terms. And the history of the doctrine as relied upon by *Graver Tank* reflects a basis for the doctrine not so limited as petitioner would have it.

Id. at 34. The Court further stated that:

Although *Graver Tank* certainly leaves room for petitioner’s suggested inclusion of intent-based elements in the doctrine of equivalents, we do not read it as requiring them. The better view, and the one consistent with *Graver Tank*’s predecessors and the objective approach to infringement, is that intent plays no role in the application of the doctrine of equivalents.

Id. at 36. The *Warner-Jenkinson* Court never described what other purposes the doctrine might serve, but it certainly stated that it was not limited to piracy. It is curious that the Court five years later in *Festo* seems to focus on the doctrine as preventing undue copying and piracy.

241. *Festo*, 535 U.S. at 726–27.

could be used to augment the protection of a system that granted exclusion over *the* specific embodiment.

Together, narrow protection for *the* embodiment surrounded by a broader swath that prevented piracy could have many of the benefits described above while avoiding some of the pitfalls. Interestingly, a recent proposal to return patent law to a central claiming scheme shares similar features with this proposal.²⁴² They both suggest a strong core of protection for the actual disclosed embodiments surrounded by a judicially determined periphery.²⁴³ The hybrid system could allow for a great deal of the free entry needed for the economic benefits. Furthermore, such a system would comply with TRIPs,²⁴⁴ remove most of the difficulties with the novelty requirement, and lower the monitoring and adjudication costs. Of course, for cases that needed to turn to the doctrine of equivalents, adjudication costs likely would be as high as for a pure copyright system.

CONCLUSION

A patent rule that protects *my* invention as opposed to the current rule has many benefits. It allows the patent system to take advantage of the economic benefits of free entry and competition. It lowers the patent reward where a single entrant system would over-reward yet still manages to produce at least as many inventive projects as the current system and manages to do so with improved societal welfare. Though there are administrative difficulties with it, such a system could improve the overall acceptance and self-enforcement of patent rights.

As it would be a foundational change, we should move carefully.²⁴⁵ Though he originally suggested the copyright-like scheme for patent law, when finally pressed to tell the assembled Senators “what [Congress] . . . should do,”²⁴⁶ even Judge Hand conceded that “[u]ntil we have a thoroughgoing investigation [of the patent system], it is all going to be guesswork.”²⁴⁷ With that caution, this Article submits this analysis while acknowledging that the topic deserves much more analysis.

242. See Burk & Lemley, *supra* note 211, at 1783 (arguing for the benefits of central versus peripheral claiming).

243. See *id.* at 1747.

244. In other words, it would provide exclusive rights to the patented product while it would allow the doctrine of equivalents to determine patent scope beyond the preferred embodiment.

245. Cotropia & Lemley, *supra* note 47 at 1460 (“A patent infringement system that punished only copying would look dramatically different than current law.”).

246. *Hand on Patent Reform*, *supra* note 18, at 118 (Senator O’Mahoney).

247. *Id.* at 120.

