

Commentary

“Patent Trolls” and Patent Remedies

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One would not, therefore, of all faculties, or qualities of the mind, wish, for a friend, or a child, that he should have that of invention. For his attempts to benefit mankind in that way, however well imagined, if they do not succeed, expose him, though very unjustly, to general ridicule and contempt; and, if they do succeed, to envy, robbery, and abuse.

—Benjamin Franklin¹

I. Introduction

Recently there has been much concern that the United States patent system is “out of balance.”² Although the average ratio between issued patents and real gross domestic product (GDP) is still lower than the average levels for the 1930s through the 1960s, and about the same as the average level for the 1970s,³ there is a strong perception that patents have become a

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1. Letter from Benjamin Franklin to John Lining (Mar. 18, 1755), in 5 THE PAPERS OF BENJAMIN FRANKLIN 521, 527 (Leonard W. Labaree ed., 1962).

2. Carl Shapiro, *Injunctions, Hold-Up, and Patent Royalties* 1 (Competition Policy Ctr., Working Paper No. CPC06-062, 2006), available at <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1062&context=iber/cpc>.

3. The average number of issued patents per billion dollars of real gross domestic product (measured in “chained 2000 dollars”) was about 15.7 for the years 2000 through 2005. Compare PATENT TECH. MONITORING TEAM, U.S. PATENT & TRADEMARK OFFICE, U.S. PATENT ACTIVITY CALENDAR YEARS 1790 TO THE PRESENT 4–5 (2007), http://www.uspto.gov/go/oeip/taf/h_counts.pdf [hereinafter U.S. PATENT ACTIVITY] (listing the number of patents issued from 2000 through 2005), with Bureau of Econ. Analysis, U.S. Dep’t of Commerce, *GDP and Other Major NIPA Series, 1929–2006: II*, SURV. CURRENT BUS., Aug. 2006, at 169, 175 [hereinafter *GDP*] (listing the yearly real gross domestic product from 2000 through 2005). This patent-to-real-GDP ratio is higher than the corresponding ratios (still using 2000 dollars) for the 1990s, when the ratio was about 13.8, and for the 1980s, when the ratio was about 11.9. Compare U.S. PATENT ACTIVITY, *supra*, at 4, with *GDP, supra*, at 175. On the other hand, the 2000-through-2005 ratio is about the same as for the 1970s, when the ratio was about 15.6. Compare U.S. PATENT ACTIVITY, *supra*, at 4, with *GDP, supra*, at 174. Further, the 2000-through-2005 ratio is lower than those for

substantial and growing tax on modern economic activity. Academics, policymakers, and even sitting judges⁴ have suggested that patent law may have overleaped its proper bounds, or at least become too likely to frustrate, rather than to fulfill, its constitutional purpose of “promot[ing] the Progress of Science and useful Arts.”⁵ Strong private interests, including a number of prominent information-technology companies, have echoed such suggestions.⁶ A favorite villain in such accounts is the “patent troll”—apparently one of a class of patent owners who do not provide end products or services themselves, but who do demand royalties as a price for authorizing the work of others.⁷

preceding decades: the corresponding ratio for the 1960s was about 18.3; for the 1950s and 1940s, about 20.0; and for the 1930s, about 56.1. Compare U.S. PATENT ACTIVITY, *supra*, at 3–4, with GDP, *supra*, at 174. Although I do not know that patent-per-GDP ratios are particularly meaningful signals of the extent to which patents “tax” an economy, more oft-cited numbers regarding the raw number of patents issued per year, e.g., ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS 11 (2004), may not be particularly meaningful signals either—as comparison with patent-per-GDP ratios may, if nothing else, help to suggest.

4. See, e.g., *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 126 S. Ct. 2921, 2929 (2006) (Breyer, J., dissenting) (“[A] decision from this generalist Court could contribute to the important ongoing debate . . . as to whether the patent system . . . adequately reflects the ‘careful balance’ that ‘the federal patent laws . . . embod[y].’” (quoting *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989))); *eBay*, 126 S. Ct. at 1842 (Kennedy, J., concurring) (“[T]he threat of an injunction [may be] employed simply for undue leverage in negotiations . . .”); FED. TRADE COMM’N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY 5 (2003) (“[M]any participants in and observers of the patent system expressed significant concerns that, in some ways, the patent system is out of balance with competition policy.”); JAFFE & LERNER, *supra* note 3, at 2 (“[T]he patent system . . . is generating waste and uncertainty that hinders and threatens the innovative process.”); Lori Andrews et al., *When Patents Threaten Science*, 314 SCIENCE 1395, 1395 (2006) (“The USPTO has issued various patents that could interfere with the work of basic scientists, social scientists, and engineers.”).

5. U.S. CONST. art. I, § 8, cl. 8.

6. See, e.g., Brief of American Innovators’ Alliance as Amicus Curiae in Support of Petitioners at 1, *eBay*, 126 S. Ct. 1837 (No. 05-130) (presenting arguments on behalf of “a coalition of United States high-technology companies that includes Intel Corporation, Micron Technology, Inc., Microsoft Corporation, and Oracle Corporation” (parentheticals omitted)); Brief of Business Software Alliance et al. as Amici Curiae in Support of Petitioners at 1, *eBay*, 126 S. Ct. 1837 (No. 05-130) (presenting arguments on behalf of some of “the world’s leading software and hardware technology companies,” including “three of the four largest U.S. patent recipients for 2005”—namely, Hewlett-Packard, Intel, and IBM (citing Press Release, U.S. Patent & Trademark Office, USPTO Releases Annual List of Top 10 Organizations Receiving Most U.S. Patents (Jan. 10, 2006), available at <http://www.uspto.gov/web/offices/com/speeches/06-03.htm>)).

7. The magnitude of what contemporary fashion terms the “patent-troll problem” remains substantially unknown, in part because a widely accepted definition of a patent troll has yet to be devised. See, e.g., Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEXAS L. REV. 1991, 2009 (2007) (“Defining a patent troll has proven a tricky business, but that does not mean the problem does not exist.”); Ronald J. Mann, *Do Patents Facilitate Financing in the Software Industry?*, 83 TEXAS L. REV. 961, 1023 (2005) (“[A]ny effort to design a suitable definition of the term ‘troll’ is likely to lend credence to the view that the status as a troll is in the eye of the beholder.”). Difficulty in defining a patent troll may not be an accident: the term was apparently invented after the label “patent extortionist” was found to have the unfortunate effect of inviting suit for libel. James F. McDonough III, Comment, *The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy*, 56 EMORY L.J. 189, 192 (2006). Thus, from the very start, the term patent troll has proven useful because, though

In the wake of the Supreme Court’s 2006 decision in *eBay Inc. v. MercExchange, L.L.C.*, patent remedies have become a focal point of concerns about how the patent system operates. In *eBay*, the Supreme Court rejected a “general rule that courts will issue permanent injunctions against patent infringement absent exceptional circumstances.”⁸ In a concurring opinion, Justice Kennedy and three other justices explicitly connected rejection of such a “general rule” with concern about so-called patent trolls by suggesting that the traditional practice of issuing permanent injunctions had to be reconsidered in part because “[a]n industry has developed in which firms use patents not as a basis for producing and selling goods but, instead, primarily for obtaining licensing fees.”⁹ The unanimous Court provided a counterbalancing admonition against denying injunctions because of “a plaintiff’s willingness to license its patents and its lack of commercial activity in practicing the patents.”¹⁰ Despite the unanimous Court’s warning against “certain expansive principles suggesting that injunctive relief could not issue in a broad swath of cases,”¹¹ district courts have responded in apparent lockstep to Justice Kennedy’s concerns about trolls. Since the Supreme Court issued its opinion in *eBay*, district courts appear to have consistently denied permanent injunctions in cases where an infringer has contested the patent holder’s request for such relief and the infringer and patent holder were not competitors.¹² Thus, the district courts’ post-*eBay*

disparaging, its meaning is sufficiently elusive to permit application to any of an amorphous number of entities, without real concern that such designation might be proven untrue.

8. *eBay*, 126 S. Ct. at 1839, 1839–41 (quoting *MercExchange, L.L.C. v. eBay, Inc.*, 401 F.3d 1323, 1339 (Fed. Cir. 2005), *vacated*, 126 S. Ct. 1837 (2006)).

9. *Id.* at 1842 (Kennedy, J., concurring).

10. *Id.* at 1840 (quotation marks omitted).

11. *Id.*

12. *See Sundance, Inc. v. DeMonte Fabricating Ltd.*, No. 02-73543, 2007 WL 37742, at *2 (E.D. Mich. Jan. 4, 2007) (denying a permanent injunction where the patent owner “license[d] the ’109 patent to others, and offered to license it to DeMonte prior to filing suit against it”); *Voda v. Cordis Corp.*, No. CIV-03-1512-L, 2006 WL 2570614, at *6 (W.D. Okla. Sept. 5, 2006) (denying a permanent injunction despite the patent owner’s argument that it had “granted [a third party] an exclusive license to his patented inventions and defendant’s continuing infringement will damage his relationship with [the exclusive licensee]”); *Paice LLC v. Toyota Motor Corp.*, No. 2:04-CV-211-DF, 2006 WL 2385139, at *5–6 (E.D. Tex. Aug. 16, 2006) (denying a permanent injunction where the claimed invention “form[ed] only a small aspect of the overall vehicles” and the plaintiff failed to prove that “only injunctive relief will lead to a successful licensing program”); *Finisar Corp. v. DirecTV Group, Inc.*, No. 1:05-CV-264, 2006 U.S. Dist. LEXIS 76380, at *4 (E.D. Tex. July 7, 2006) (denying a permanent injunction and “grant[ing] a compulsory license”); *z4 Techs., Inc. v. Microsoft Corp.*, 434 F. Supp. 2d 437, 440 (E.D. Tex. 2006) (denying a permanent injunction where “Microsoft only use[d] the infringing technology as a small component of its own software,” despite the patent owner’s “conten[tion] . . . that its failure to succeed [in commercializing its technology] was partly due to Microsoft’s infringement”); *see also* Complaint for Patent Infringement at ¶ 38, *Finisar Corp. v. DirecTV Group, Inc.*, 424 F. Supp. 2d 896 (E.D. Tex. 2006) (No. 1:05-CV-264) (“Although Finisar did not ultimately commercialize the technology of the [’505] patent, it did seek to license the [’505] patent to potential technology partners.”). In the only case known to me where a district court has granted a permanent injunction to a noncompeting patent holder post-*eBay*, the defendant Autodesk, Inc. had “stipulated to entry of an agreed injunction if the Court . . . affirmed that at least one of the patents [in suit] is infringed by Autodesk,

practice may be in some tension with the Supreme Court's warning against the "categorical denial of injunctive relief" to broad classes of patent holders.¹³

This Commentary provides arguments against such a categorical rule. It does so in response not only to the district courts' decisions, but also to an article by Mark Lemley and Carl Shapiro suggesting that as a matter of good economic policy, permanent injunctions should commonly be denied when they are sought by "noncompeting patent holders"—who are defined, for purposes here, to be patent holders who neither compete with an infringer nor exclusively license to someone who does.¹⁴

This Commentary does not contend that interest in reforming the patent system is fundamentally misdirected. It agrees that concerns about potential patent-law "overreach" can be welcome corrections to all-too-easy assumptions that patent law is properly tuned to favor the development and dissemination of new technology.¹⁵ In this vein, Lemley and Shapiro's article helpfully shows how more generally recognized concerns about holdout and injunction-oriented "property rules" can apply in the patent context.¹⁶ More specifically, Lemley and Shapiro successfully use a theoretical model for licensing negotiations to illustrate how a patent owner's ability to obtain a permanent injunction can produce licensing fees that are driven not by any value specifically contributed by the patented invention, but instead by the cost of implementing a noninfringing "design-around"—an alteration in, or aspect of, a product or course of conduct that is designed to place the product or conduct beyond the reach of certain patent claims.¹⁷

not invalid and enforceable." *z4 Techs., Inc. v. Microsoft Corp.*, No. 6:06-CV-258, 2006 WL 2433444, at *1 (E.D. Tex. Aug. 18, 2006).

13. *eBay*, 126 S. Ct. at 1841, 1840–41.

14. Lemley & Shapiro, *supra* note 7, at 2035–39.

15. *See generally id.* at 2017–25. James Madison himself was guilty of overstating the naturally benign nature of patent law when he said of copyright and patents that "[t]he public good fully coincides in both cases with the claims of individuals." THE FEDERALIST No. 43, at 240 (James Madison) (Clinton Rossiter ed., 1999).

16. *See* Lemley & Shapiro, *supra* note 7, at 1993 (stating that the threat of a permanent injunction can "enable a patent holder to negotiate royalties far in excess of the patent holder's true economic contribution"). For a more general discussion of such problems, see Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1106–07 (1972), which describes how owners can use property rules to demand socially undesirable rents. In Calabresi and Melamed's classic article, they used somewhat less judgmental language to describe this phenomenon—"hold-out" (which primarily suggests a demand for a better deal), rather than Lemley and Shapiro's "holdup" (which suggests both criminal conduct and a threat of immediate harm). *See id.* at 1106. Except when quoting Lemley and Shapiro, this Commentary uses the term *holdout* to describe a patent holder's legal use of "the leverage of that monopoly" "to exact royalties as high as he can negotiate," *Brulotte v. Thys Co.*, 379 U.S. 29, 33 (1965).

17. *See* Lemley & Shapiro, *supra* note 7, at 2037 (stating that where design-around costs are relatively high, "empowering the patent holder to obtain an injunction is likely to lead to royalties well in excess of the inherent value of the patented technology"). For purposes of this Commentary, the cost of implementing a design-around is understood to include indirect costs, such as lost profits that might result from the need to interrupt production while developing or implementing the

This Commentary argues, however, that Lemley and Shapiro misstep in at least two respects:

- their claim to have “*demonstrate[d]*,” both theoretically and empirically, that certain patent holders “are *systematically overcompensated*” for their inventions;¹⁸ and
- their apparent advocacy of a per se rule that would deny a presumption of injunctive relief for noncompeting patent holders while granting such a presumption for competing patent holders.¹⁹

The contents of subsequent portions of this Commentary may be described as follows.

Part II presents some history regarding concerns with patents’ capacity to impede progress, particularly where patented inventions are embedded within, or otherwise constitute “mere” improvements to, multiple-element products or methods. A substantial purpose of Part II is to suggest that because improvement and component-part patents have long had a significant role in United States patent law, and because United States science and technology have nonetheless flourished, attempts to justify significant changes to patent remedies should be supported by more than an assertion that component-part patents “are much more common now than they were in the past.”²⁰

Part III discusses considerations that patent holders or potential infringers will likely bring to any bargaining table. It suggests that concerns such as litigation costs, information asymmetries, and the typical length of patent litigation can play a substantial role in determining what licensing negotiations are likely to produce. A combination of such factors could pressure a patent holder to settle for much less than a patent could theoretically command. Further, litigation costs, not fear of an injunction, may dominate holdout concerns in situations where an infringement suit would be especially unlikely to succeed.

Part III also criticizes Lemley and Shapiro’s theoretical approach to analyzing negotiated royalties. A primary concern is Lemley and Shapiro’s lack of a well-justified baseline for determining whether royalties are “excessive.” Without such a baseline, it is difficult to see how Lemley and Shapiro’s claim to have theoretically proven systematic overcompensation can succeed. Nonetheless, Lemley and Shapiro fail to justify their assertion

design-around. The design-around cost is also understood to include expenses incurred in the development or licensing of technology that might be viewed as more tightly related to a patented invention’s more intrinsic worth.

18. *Id.* at 2044 (emphasis added).

19. *See id.* at 2036 (suggesting that injunctive relief should be granted only where the patentee “assigns or exclusively licenses its patent to someone who competes significantly against the infringing firm” or where there is otherwise no risk of holdup).

20. Lemley & Shapiro, *supra* note 7, at 1992 n.3.

that a specific royalty “benchmark,” $B \times V \times \theta$,²¹ represents the socially optimal level of patent-holder compensation. Indeed, there are fundamental flaws in Lemley and Shapiro’s use of a “benchmark royalty rate” $B \times V \times \theta$ that (1) goes to 0 as the patent holder’s relative “bargaining skill” B goes to 0 and (2) implicitly assumes that an invention’s marginal, per-unit value V is a well-defined quantity that is completely sacrificed by any potential design-around. Moreover, even if such baseline problems could be ignored, Lemley and Shapiro’s disregard of considerations relating to litigation costs, the expected length of litigation, information asymmetries, and the limited length of the patent term produces a distorted picture of patent holders’ ability to use the threat of an injunction to obtain high rewards for invention.

Part IV extends the critique of Lemley and Shapiro’s article to their empirical evidence, arguing that this data also fails to “demonstrate that under current law patentees whose inventions are only one component of a larger product are systematically overcompensated.”²² There are significant reasons to suspect that Lemley and Shapiro’s empirical data is unrepresentative. Further, such data cannot by itself indicate what the *proper* level of compensation is. Consequently, although this data may indicate that royalty rates are frequently *uneven*, it does not necessarily indicate that they are commonly *excessive*.

Part V focuses on the question of what rules or standards should govern the issuance of permanent injunctions for patent infringement. The Supreme Court’s decision in *eBay* has made this a live issue, and early returns from the district courts suggest that trial courts may be, in effect, acting as if there is a presumption against injunctive relief for noncompeting patent holders. Such an approach substantially comports with one of Lemley and Shapiro’s apparent policy proposals—retaining a “presumptive right to a permanent injunction” for patent holders who compete with their infringers or who exclusively license to someone who does, but discarding such a presumption for noncompeting patent holders.²³

Part V expresses skepticism about such a rule categorically discriminating among patent holders based on their business model. This Part suggests that determinations regarding the availability of injunctions should take into account traditional concerns about whether court-assessed damages or compulsory licensing fees are likely to do better than injunctions at producing appropriate rewards. Given courts’ difficulties with assessing reasonable royalties, there remains a strong argument for a rebuttable presumption of injunctive relief in all cases where infringement has been

21. *Id.* at 1996–99 (asserting that the royalty rate in the ideal patent system would be $\theta \times B \times V$, where θ is the probability of the patent holder winning an infringement suit, B is a value from 0 to 1 reflecting the patent holder’s relative bargaining skill, and V is the value of the patented invention to the downstream firm relative to the best alternative).

22. *Id.* at 2044.

23. *Id.* at 2036.

proven and there is a significant threat that it will continue or resume. Proper allowance for stays of injunctions and proper application of traditional grounds for denying injunctions, such as concerns that an injunction will harm the public interest or will inflict undue hardship on an infringer, may substantially mitigate risks that such a presumption will provide patent holders with excessive leverage.

Further, reliance on such traditional grounds for denying injunctions could avoid dangers that a rule such as Lemley and Shapiro’s presents. A *per se* rule of discrimination based on a patent holder’s business model could act as an undesirable drag on the efficiency and competitiveness of markets for innovation. By discouraging innovation, and the ownership of rights in innovation, by independent inventors, universities, technology start-ups, research-oriented spin-offs, and patent holding companies, a categorically discriminatory market for patent rights may slow, rather than promote, progress.

The Conclusion emphasizes this Commentary’s concern about an approach to postjudgment remedies that categorically discriminates between patent holders based on their business model. The Conclusion recognizes that Lemley and Shapiro’s article provides insights upon which ensuing work can build, but repeats that Lemley and Shapiro have not justified their claim to have proven “systemati[c] overcompensatio[n]”²⁴ of any broad category of patent holders. Moreover, the Conclusion observes that a lack of “narrow tailoring” should be expected in a patent regime that primarily operates through the provision of property-like rights. Even a well-justified belief that patent rights may, in some instances, produce excessive rewards does not necessarily justify devaluing those rights whenever they are held by a broad class of patent owners.

II. Historical Context

It has long been recognized that proper design of United States patent law is a question of balance. In general, patents are believed to serve their constitutional purpose of “promot[ing] . . . Progress”²⁵ by providing for an exchange: in exchange for public disclosure sufficient “to enable any person skilled in the art . . . to make and use”²⁶ a novel, useful, and nonobvious invention,²⁷ the public provides a limited-term “right to exclude” others from exploiting that invention.²⁸ Once the patent rights expire, the public can

24. *Id.* at 2044.

25. U.S. CONST. art. I, § 8, cl. 8.

26. 35 U.S.C. § 112 (2000).

27. *Id.* § 103; *see also* *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 151 (1989) (“In consideration of [an invention’s] disclosure and the consequent benefit to the community, the patent is granted.” (quoting *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 186 (1933))).

28. 35 U.S.C. § 154(a).

freely use the invention, and the patent's description ensures that knowledge of the invention is readily available to potential users. Given the nature of patent law's rights-for-disclosure bargain, one might follow substantially in the footsteps of Adam Smith and argue that it tends naturally to serve society's long-term interests.²⁹ If the invention is relatively worthless, delay in the ability to use it freely will not be very harmful; on the other hand, if the invention is of great value, who can begrudge the inventor a substantial reward?³⁰

It has long been appreciated, however, that such a simplistic view of patents' benefits and costs cannot be correct. Even if an invention is found to have been novel and nonobvious, the invention might have been invented, and might in fact be independently reinvented, without patent law's stimulus. Further, a patent's exclusive rights could discourage efforts by others to develop socially significant follow-on innovations.³¹

Indeed, patent law can make no claim to be narrowly tailored to serve its purpose. Substantially uniform rules regarding the scope and duration of patent rights pay relatively little heed to the worth of individual inventions or the technological and social contexts in which they are embedded. Further, patent rights are only "probabilistic."³² As was notoriously the case under the early nineteenth century's "registration system," patent law produces an indefinite number of patents issued in error, thereby generating the undesired costs associated with improperly granted rights to exclude.³³ In recognition

29. CHRISTINE MACLEOD, *INVENTING THE INDUSTRIAL REVOLUTION: THE ENGLISH PATENT SYSTEM, 1660–1800*, at 197 (1988) (“[Adam Smith argued that] it was unlikely that the legislature could give ‘pecuniary rewards . . . so precisely proportioned to the merit as [patents]. For here, if the invention be good and such as is profitable to mankind, he will probably make a fortune by it; but if it be of no value he will also reap no benefit.’”).

30. *See* *Lowell v. Lewis*, 15 F. Cas. 1018, 1019 (C.C.D. Mass. 1817) (No. 8,568) (Story, J.) (stating that whether an invention is useful “is a circumstance very material to the interests of the patentee, but of no importance to the public” because if the invention is “not extensively useful, it will silently sink into contempt and disregard”); Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 279 (1977) (arguing that “a patent system improves the structure of the returns to innovation” in part because it “provides a return based upon the economic value of the technology”).

31. *See, e.g.*, *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 126 S. Ct. 2921, 2922 (2006) (Breyer, J., dissenting) (“Sometimes [patents] can discourage research by impeding the free exchange of information”); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 882, 916 (1990) (describing the potential for patents to impede improvements to the patented inventions).

32. *See generally* Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSP., Spring 2005, at 75.

33. Under the Patent Act of 1793, patents issued without a substantive examination of applications to determine whether a qualifying invention was disclosed. MARTIN J. ADELMAN ET AL., *PATENT LAW: CASES AND MATERIALS* § 1.3[b][2], at 12 (2d ed. 2003); EDWARD C. WALTERSCHEID, *TO PROMOTE THE PROGRESS OF USEFUL ARTS: AMERICAN PATENT LAW AND ADMINISTRATION, 1798–1836*, at 15–16 (1998); *see also* Patent Act of 1793, ch. 11, § 1, 1 Stat. 318, 318–21 (repealed 1836) (including no provision for a substantive examination of patentability prior to patent issuance). It is perhaps not surprising, therefore, that “a significant number of the almost 10,000 patents issued during the era of registration were invalid and not infrequently

of this fact, Congress has, since 1790, explicitly provided that courts may declare a patent invalid, even long after its issuance.³⁴

The Jacksonian Era move to an “examination system”—in which the Patent Office addresses substantive questions of patentability before issuing a patent—failed to eliminate such concerns. The number of patents issued per year grew at unprecedented—and, to this day, unmatched—rates in the mid-nineteenth century,³⁵ and courts continued to play a significant role in checking the validity of litigated patents.³⁶ Courts mitigated the cost of such patents by recognizing a variety of potential reasons for denying preliminary injunctions, including hardship to the accused infringer and doubts as to a patent’s infringement or validity.³⁷ But after a final judgment vindicating a patent owner’s rights and holding them to be infringed, courts generally

fraudulently used.” WALTERSCHEID, *supra*, at 16. This fact helps explain “a rising chorus of complaint about fraudulent or worthless patents” during that period. *Id.* at 18; accord Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 594–96 (1999) (considering the pros and cons of a registration system).

34. See, e.g., Patent Act of 1790, ch. 7, §§ 5–6, 1 Stat. 109, 111–12 (repealed 1793) (including provisions for challenges to issued patents).

35. The number of U.S. utility patents issued in the 1850s was more than 3.5 times the number issued in the 1840s, and the number issued in the 1860s was more than 3.6 times the number issued in the 1850s. See U.S. PATENT ACTIVITY, *supra* note 3, at 2 (listing the annual number of patents issued). The only comparable decade-to-decade increase in U.S. history (where, for purposes here, decades are defined to start with a year ending in “0”) is that from the 1790s to the first decade of the 1800s, when the number of issued patents multiplied by about 3.4. See *id.* at 1. More recent decade-to-decade increases in issued patents—such as the approximate factor of 1.6 growth from the 1980s to the 1990s and as crudely projected (based on multiplying the number of patents issued from 2000 through 2005 by 5/3), the approximate factor of 1.5 growth from the 1990s to the present decade, see *id.* at 4–5—are roughly comparable to those from the 1860s to the 1870s, when the number of issued patents multiplied by more than 1.7, and from the 1870s to the 1880s, when the number of issued patents multiplied by a further factor of about 1.6. See *id.* at 2. On the other hand, the rate of increase in patenting from the 1970s to the 1980s, which produced an increase in the number of patents issued per decade of only about 3%, see *id.* at 4, was unusually low and only “bettered” in this respect by two decade-to-decade *decreases* in patenting that have occurred in U.S. history—from the 1930s to the 1940s, when the number of issued patents dropped by over 30%, see *id.* at 3–4, and from the 1830s to 1840s, when the number of issued patents dropped by about 2%, see *id.* at 1–2.

36. See, e.g., *Richards v. Chase Elevator Co.*, 158 U.S. 299, 303 (1895) (holding the “combination claimed” to be an unpatentable “pure aggregation”); *Nat’l Cash-Register Co. v. Boston Cash Indicator & Recorder Co.*, 156 U.S. 502, 515–16 (1895) (listing various Supreme Court cases in which one or more patent claims were held invalid); Edward C. Walterscheid, *The Hotchkiss Unobviousness Standard: Early Judicial Activism in the Patent Law*, 13 J. INTELL. PROP. L. 103, 104 (2005) (arguing that during this period, “the Supreme Court set forth a new condition for patentability”—unobviousness).

37. See, e.g., *Edison Elec. Light Co. v. Mt. Morris Elec. Light Co.*, 58 F. 572, 575–77 (2d Cir. 1893) (considering the likely level of “pecuniary injury” to an accused infringer in deciding whether to grant a preliminary injunction); 3 WILLIAM C. ROBINSON, *THE LAW OF PATENTS FOR USEFUL INVENTIONS* § 1170, at 557 (Boston, Little, Brown, and Company 1890) (“A preliminary injunction is not, like a perpetual injunction, a matter of course . . .”); *id.* § 1173, at 560 (stating that a preliminary injunction “will be denied if reasonable doubt exists” regarding the patent’s validity, the plaintiff’s “legal or equitable interest,” or the defendant’s imminent infringement).

issued permanent injunctions “as a matter of course.”³⁸ Although patent law was understood to be only a rough means to achieve its constitutional end, it was also believed that refusal of a permanent injunction to enforce a patent could “deaden and destroy” the inventive “energy” that patent law was meant to inspire.³⁹

Moreover, courts affirmed and reaffirmed the general availability of injunctive relief despite recognition that many patents were for relatively minor developments, including new components of, or improvements to, previously existing devices or processes.⁴⁰ Lemley and Shapiro’s suggestion that component-part patents are foreign to patent law’s traditional “paradigm”—one asserted to envision “a new device or machine covered by

38. *E.g.*, *Elec. Smelting & Aluminum Co. v. Carborundum Co.*, 189 F. 710, 711 (C.C.W.D. Pa. 1900) (“Ordinarily such decree is for an accounting, and an injunction follows as matter of course, unless there are cogent reasons for departing from such course.”); *Rumford Chem. Works v. Hecker*, 20 F. Cas. 1347, 1348 (C.C.D.N.J. 1876) (No. 12,134) (“[T]he ordinary practice is for an injunction, as a matter of course, to follow a decree in favor of the complainant”); ROBINSON, *supra* note 37, § 1220, at 653 (“A perpetual injunction issues, as a matter of course, at the conclusion of a suit in equity, whenever the plaintiff has sustained the allegations of his bill, provided the patent has not then expired.”); WILLIAM EDGAR SIMONDS, *A SUMMARY OF THE LAW OF PATENTS FOR USEFUL INVENTIONS WITH FORMS 250* (New York, L.K. Strouse & Co. 1883) (“When in the course of an equity suit, the court . . . finds that the patent is valid, and that it has been infringed, the court grants, as a matter of course, a perpetual injunction”). Issuance of permanent injunctions for patent infringement “as a matter of course” did not mean that courts believed that there were no equitable exceptions. *Rumford Chem.*, 20 F. Cas. at 1348 (“Courts have the power to withhold [an injunction], and usually will do so, in those cases where . . . there seems to be more danger of producing an irreparable injury to the defendant, than of preventing it on the part of the complainant.”); *see also* Herbert F. Schwartz, Note, *Injunctive Relief in Patent Infringement Suits*, 112 U. PA. L. REV. 1025, 1042–44 (1964) (describing circumstances in which courts refused to grant permanent injunctions).

39. *Crown Cork & Seal Co. v. Aluminum Stopper Co.*, 108 F. 845, 870 (4th Cir. 1901).

40. In 1901, the Court of Appeals for the Fourth Circuit provided something of a tempered paean to the value of patents even for supposedly “small inventions”:

Painter’s invention is not one of those great epoch-marking discoveries like that of printing, or the steam engine, or the electric telegraph, which opened to their inventors the portals of the Pantheon of the immortals. For such as these the love of fame and the glory of being benefactors of human kind served alike as motive and reward, but to the patient laborer in workshop and factory the incentive of fame and glory is absent. For them the stimulus of the rewards offered by our patent laws is needed to encourage by the hope of profit that zealous eagerness to improve processes, to remedy defects in machinery, to invent new methods and appliances for saving labor and cheapening production in the numberless articles that are in daily use. It is this stimulus that has made the American mechanic the most alert, observant, and studious of any in the world, and it is the indefinite multiplication of these small inventions and improvements that has wrought an industrial revolution and brought his country to the forefront of the world’s commerce. It was the consciousness that in the knapsack of every private soldier there might be the baton of a marshal of France that inspired her soldiers to unparalleled achievements. In our unheroic, industrial age the central processes of a nation’s life lie in production and distribution. The protection and hope of profit held out by our patent laws inspires that stimulating energy which leads to experiment, invention, and all the resulting benefits; a refusal of that protection in a proper case will deaden and destroy it.

Id.

a single patent”⁴¹—seems open to question. As John Duffy points out, approval of the application of patent law to mere “improvements” of overall devices or processes—inventions whose “point of novelty” in Lemley and Shapiro’s terms⁴² presumably involves something less than the creation of a whole new product or process—had been explicit since at least the late eighteenth century.⁴³ In 1776, Lord Mansfield recognized that patents on such inventions were not only permissible, but in fact predominant.⁴⁴ In the newly formed United States, the Patent Act of 1790 explicitly made broad provision for the patenting of “any improvement” of a “useful art, manufacture, engine, machine, or device.”⁴⁵

By the time the nineteenth century was drawing to a close and the twentieth century was beginning, the patent system had taken off. As might be expected during a time in which railroads and telegraphs crisscrossed the

41. Lemley & Shapiro, *supra* note 7, at 1992.

42. *Id.* at 2033. The categories of “improvement” inventions and “new component” inventions might be distinguished in some sense, but Lemley and Shapiro’s own description of the need to exercise “substantial judgment” in discerning the “point of novelty” of larger devices indicates that the two categories are difficult to separate by a strict principle. *See id.* Most important for purposes here, characterization of an invention as an “improvement” suggests that the invention only adds value to matter that had been separately developed, thereby implicating the basic concern to which Lemley and Shapiro’s analysis appears directed—concern that a patent can be used to stop activity that only derives a part of its value from the patented contribution itself.

43. *See* John F. Duffy, *Inventing Invention: A Case Study of Legal Innovation*, 86 TEXAS L. REV. (forthcoming 2007) (manuscript at 31, on file with the Texas Law Review) (describing the late eighteenth century as a time when British courts rejected “hostility to improvement patents”).

44. *Id.*; *see also* MACLEOD, *supra* note 29, at 54–55 (“The shift towards patenting constituent parts that made [written specifications] feasible—to have required detailed descriptions of total processes would have entailed lengthy treatises—also made them necessary . . .”).

45. Patent Act of 1790, ch. 7, § 1, 1 Stat. 109, 110 (repealed 1793); *cf.* Patent Act of 1793, ch. 11, § 1, 1 Stat. 318, 319 (repealed 1836) (authorizing the patenting of “any new and useful improvement on any art, machine, manufacture or composition of matter”). Lemley and Shapiro’s characterization of patent law as fashioned according to “a paradigm invention” consisting of “a new device or machine covered by a single patent,” Lemley & Shapiro, *supra* note 7, at 1992, appears further contradicted by the 1790 and 1793 Acts’ provision for patenting of an “art,” as well as the fact that a number of the earliest patents granted by the United States, or even earlier by the states or colonies, were *process* patents—patents, for example, for methods of heating rooms and of making salt, candles, oil, or potash and pearlsh. *See, e.g.*, U.S. Patent No. X000,001 (issued July 31, 1790) (patenting methods of making potash and pearlsh); BRUCE W. BUGBEE, GENESIS OF AMERICAN PATENT AND COPYRIGHT LAW 60, 64–65, 68, 86–88 (1967) (describing pre-1790 patents in states and colonies); WALTERSCHEID, *supra* note 33, at 176, 175–78 (describing patent applications under the 1790 Act, including various applications for patents on methods, improvements, or a part such as “a wheel for the use of grist & other mills . . . to supply the place of the running gear of gristmills”); *see also* Pennock v. Dialogue, 27 U.S. 1, 3 (1829) (involving a patent for “an improvement in the art of making tubes or hose for conveying air, water, and other fluids”). Certainly, by the end of the nineteenth century, courts and commentators were well aware that patented inventions might constitute only a small part of an overall device. *See* Egbert v. Lippmann, 104 U.S. 333, 336 (1881) (“An invention may consist of a lever or spring, hidden in the running gear of a watch, or of a ratchet, shaft, or cog-wheel covered from view in the recesses of a machine for spinning or weaving.”); *cf.* Merrill v. Yeomans, 94 U.S. 568, 570 (1876) (“When a man supposes he has made an invention or discovery useful in the arts . . . it is, nine times out of ten, an improvement of some existing article, process, or machine, and is only useful in connection with it.”).

nation, patents issued for innovations involving various aspects of multiple-element systems—systems for travel such as railroads and automobiles; systems for the generation, transmission, and use of electricity; multi-component devices such as roll-film and motion-picture cameras; and even machinery and methods for manufacturing paper bags.⁴⁶ In an age in which “independent inventors” were apparently more prevalent than they are today,⁴⁷ it was argued that court-ordered injunctions should not be available to patent holders who were “nonusers” of their patented inventions—patent holders who did not produce or practice the invention themselves—and that this rule of exclusion should apply even if the nonuser otherwise competed with the accused or adjudged infringer.⁴⁸ But the courts’ practice with respect to permanent injunctions remained essentially unaltered: after a patent’s validity had been upheld and its continued infringement had been proven, a permanent injunction would commonly issue as a matter of course.⁴⁹

46. See *Cont’l Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 406 (1908) (involving a patent for a device that would improve “paper bag machines, for making . . . self-opening square bags”); TRAVIS BROWN, *POPULAR PATENTS: AMERICA’S FIRST INVENTIONS FROM THE AIRPLANE TO THE ZIPPER* 9–11, 16–17, 114–16, 133–35, 162–64 (2000) (describing innovations involved in the commercial use of AC power, railroad braking systems, an internal combustion engine, and motion-picture and roll-film cameras).

47. Compare, e.g., James Bessen & Michael J. Meurer, *Lessons for Patent Policy from Empirical Research on Patent Litigation*, 9 LEWIS & CLARK L. REV. 1, 12 (2005) (“The role of the independent inventor is diminished in the modern economy, in which 71% of patents issue to large firms.”), and Douglas N. Modlin & Michael A. Glenn, *International Patent Strategies for Individual Inventors*, 6 J. HIGH TECH. L. 129, 131 (2006) (reporting that in 2003, “U.S. and foreign independent inventors received only 8% and 3.6%,” respectively, of total U.S. patents granted), with B. Zorina Khan & Kenneth L. Sokoloff, *Institutions and Technological Innovation During Early Economic Growth: Evidence from the Great Inventors of the United States, 1790–1930*, at 23–24, 38–39 (CESifo Venice Summer Inst., CESifo Working Paper No. 1299, 2004), available at <http://ssrn.com/abstract=614044> (finding that of 420 “great inventors” born before 1886 at least a third of the inventors in each birth cohort “frequently sold or licensed the rights to the technologies they patented,” rather than attempting to exploit their patented inventions by working for a firm that used or produced them).

48. See, e.g., *Cont’l Paper Bag*, 210 U.S. at 406–07 (reciting the defendant’s argument that the patent was “a mere paper proposition . . . and [that it was] contrary to equity to suppress a useful and established business . . . at the request of a complainant which simply own[ed] one paper bag machine patent that ha[d] never been employed by that complainant in any way in any paper bag machinery”).

49. See *supra* note 38; Schwartz, *supra* note 38, at 1042 (“Because the permanent injunction for the life of the patent was considered the only remedy adequate to protect the plaintiff’s ‘right to exclude others from making or selling his invention,’ it was often granted as a matter of course.”); Note, *The Enforcement of Rights Against Patent Infringers*, 72 HARV. L. REV. 328, 342 (1958) (“Once the issues have been fully adjudicated in the plaintiff’s favor, a permanent injunction is usually granted as a matter of course.”); see also DONALD S. CHISUM ET AL., *PRINCIPLES OF PATENT LAW: CASES AND MATERIALS* 1342 (3d ed. 2004) (“[F]or more than two hundred years, the result has almost always been that, after there has been a final determination of infringement, the prevailing patent owner will be granted [an] injunction that permanently enjoins the adjudicated infringer from infringing the patent in suit.”); WILLIAM MACOMBER, *THE FIXED LAW OF PATENTS AS ESTABLISHED BY THE SUPREME COURT OF THE UNITED STATES AND THE NINE CIRCUIT COURTS OF APPEALS* 37 (1909) (describing “a final and perpetual injunction” as “a matter of

Thus, a regime marked by a general presumption of the ultimate availability of injunctive relief—a presumption applying regardless of whether a patent holder “worked” or otherwise practiced the invention⁵⁰—was maintained despite recognition that (1) a significant percentage of patents were likely to be invalid and (2) an injunction based on a relatively minor invention could halt an enterprise that generated significant value for society.

There appears never to have been a consensus that reasonable-royalty damages were a normative ceiling for what a patent holder should receive. The current Patent Act itself decrees that a reasonable royalty is the minimum, rather than the maximum, that a patent holder should obtain through court proceedings.⁵¹ Further, it has long been recognized that in the patent context, reasonable-royalty damages might be nothing better than a poor image of a completely satisfactory remedy. As Judge Learned Hand acknowledged, “[t]he whole notion of a reasonable royalty is a device in aid of justice, by which that which is really incalculable shall be approximated, rather than that the patentee, who has suffered an indubitable wrong, shall be dismissed with empty hands.”⁵²

right”). *But see* *Fromson v. W. Litho Plate & Supply Co.*, 853 F.2d 1568, 1574 (Fed. Cir. 1988) (asserting, without citation, that “courts routinely denied injunctions to [individual, nonmanufacturing] patentees”), *overruled on other grounds*, *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337, 1341 (Fed. Cir. 2004) (overruling *Fromson* by “hold[ing] that no adverse inference that an opinion of counsel was or would have been unfavorable flows from an alleged infringer’s failure to obtain or produce an exculpatory opinion of counsel”). By way of contrast, the courts did develop rules for apportioning damages specifically to ensure that a patent holder would not generally receive damages that disgorged all profits from infringing products or processes unless “the patent-related feature was the entire basis for customer demand.” Amy L. Landers, *Let the Games Begin: Incentives to Innovation in the New Economy of Intellectual Property Law*, 46 SANTA CLARA L. REV. 307, 318, 317–20 (2006).

50. “Working” the subject matter of a patent was generally required by early British patent practice but, by the late eighteenth century, had substantially been replaced by a requirement of disclosure of the invention through a patent specification. E. Wyndham Hulme, *On the Consideration of the Patent Grant, Past and Present*, 13 L.Q. REV. 313, 315–18 (1897); *see also* ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW AND POLICY: CASES AND MATERIALS* 259 (3d ed. 2002) (noting a shift to viewing “technical disclosure” as “society’s benefit” from the patent grant); *cf.* Oren Bracha, *The Commodification of Patents 1600–1836: How Patents Became Rights and Why We Should Care*, 38 LOY. L.A. L. REV. 177, 213 (2004) (“Many colonial and state patents included working clauses . . .”). United States patent law has never required that U.S. citizens “work” a claimed invention as a condition for enforceable patent rights and has not required it of noncitizens since 1836. *See Cont’l Paper Bag*, 210 U.S. at 429 (describing the short-lived application of a working requirement to noncitizens from 1832 to 1836).

51. 35 U.S.C. § 284 (2000).

52. *Cincinnati Car Co. v. N.Y. Rapid Transit Corp.*, 66 F.2d 592, 595 (2d Cir. 1933); *accord* *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295, 300 n.5 (2d Cir. 1971) (quoting with approval Judge Hand’s statement that a court-awarded reasonable royalty amounted to an “approximat[ion]” of the “incalculable”). Under various historical approaches to relief, even patent holders who neither practiced the invention commercially nor otherwise competed with an infringer have enjoyed access to damages potentially exceeding a reasonable royalty. The Patent Act of 1793 required adjudicated infringers to pay damages “at least equal to three times the price, for which the patentee has usually sold or licensed [the invention] to other persons.” Patent Act of 1793, ch. 11, § 1, 1 Stat. 318, 322 (repealed 1836). The Patent Act of 1800 changed this to a flat

In sum, the basic problems addressed by Lemley and Shapiro—problems of how patent law should be tailored to an age of rapid, cumulative invention, and how courts and policymakers should react to concerns that individual patent holders might be overcompensated—appear to be far from foreign to the history of patent law. Although Lemley and Shapiro may be right that certain aspects of these problems are now more sharply defined and pressing than before, more than a cursory historical account and more than scattershot modern evidence are needed to prove this. Comparison of the number and significance of component or improvement patents today as opposed to a century ago may well present difficult empirical issues. Until substantial comparative evidence is assembled, however, the present situation should not be confidently characterized as “markedly”⁵³ different from the past. Although the above account of aspects of patent law’s history cannot claim to be definitive or complete, it casts doubt on suggestions that with respect to component-part inventions, current conditions are so historically unprecedented that they can easily support unprecedented alteration of patent remedies.

III. Modeling Negotiations for Patent Royalties

What courts do and what the law provides are only part of the calculus for whether patent law fulfills its purpose. As Lemley and Shapiro suggest, because the overwhelming majority of patent disputes are resolved out of court, examination of whether patent law properly balances benefits and costs requires consideration of how patent law shapes the out-of-court agreements that private parties make.⁵⁴ Is it true, as Adam Smith suggested, that patents are effective ways of proportioning awards to inventions’ worth?

requirement of treble damages. Patent Act of 1800, ch. 25, § 3, 2 Stat. 37, 38 (repealed 1836); see also Jeff A. Ronspies, Comment, *Does David Need a New Sling? Small Entities Face a Costly Barrier to Patent Protection*, 4 J. MARSHALL REV. INTELL. PROP. L. 184, 190 (2004) (describing the difference between the damages provisions of the Patent Acts of 1793 and 1800). Moreover, prior to legislative action in 1946, courts acting in equity appear to have routinely awarded patent holders the infringer’s profits from infringement. Landers, *supra* note 49, at 323. Other regimes of intellectual property, including that for design patents, still allow right holders to require disgorgement of an infringer’s profits. See 35 U.S.C. § 289 (stating that the infringer of a design patent “shall be liable to the owner to the extent of his total profit”); *Franklin Pierce Law Center’s Eighth Intellectual Property System Major Issues Conference*, 47 IDEA 1, 64 (2006) (noting that profits “appear to be explicitly recoverable for any other type of IP infringement, whether it be copyright, trademark or trade secret”); cf. *Taylor v. Meirick*, 712 F.2d 1112, 1120 (7th Cir. 1983) (Posner, J.) (defending disgorgement in the copyright context on grounds of deterrence and the prospect “that some of the ‘windfall’ may actually be profit that the owner would have obtained from licensing his copyright to the infringer had the infringer sought a license”). See generally Melvin A. Eisenberg, *The Disgorgement Interest in Contract Law*, 105 MICH. L. REV. 559, 563–64 (2006) (describing the application of disgorgement to property interests).

53. Lemley & Shapiro, *supra* note 7, at 1992.

54. *Id.* (“[S]ince far more patents are licensed or settled than litigated to judgment, the primary economic effect of rules governing patent litigation arises through the effect of those rules on the licensing terms that are negotiated in the shadow of litigation.”).

If not, can we easily tell in which direction—toward excess or insufficiency—patent awards are likely to err?

These are difficult questions to which this Commentary cannot hope to provide complete and conclusive answers. On the other hand, this Commentary can provide sketches of how licensing agreements are likely to be shaped by the concerns and expectations of both patent holders and infringers, and these sketches seem adequate to support at least three conclusions:

- First, there can be a substantial risk that some combination of uncertainty as to court-awarded damages, the threat of a permanent injunction, and the expected cost of patent litigation will cause a potential infringer to settle a patent dispute for an amount substantially greater than the value of the direct contribution that a patented invention makes to the worth of an accused device or process.
- Second, there can also be a substantial risk that uncertainty as to court-awarded damages, information asymmetries, resource constraints, and the expected cost of patent litigation will cause a patent holder to settle a patent dispute for an amount substantially less than the value of the direct contribution that a patented invention makes to the worth of an accused device or process.
- Third, litigation costs can be expected to be relatively more important to the determination of settlement amounts when the likelihood of proving liability for infringement is relatively low.

Lemley and Shapiro’s concerns with holdout are consistent with the first conclusion, which suggests that potential infringers may be willing to pay licensing fees disproportionate to an invention’s direct worth. On the other hand, in combination with various defects in Lemley and Shapiro’s analysis of whether patent awards are likely to be excessive, the second conclusion, which indicates that patent holders may be willing to settle for less than their invention’s worth, suggests substantial problems with Lemley and Shapiro’s claim to have proven “systemati[c] overcompensat[ion].”⁵⁵ Further, the third conclusion, regarding the importance of litigation costs, suggests that in proposing a new approach to the granting of permanent injunctions, Lemley and Shapiro may have selected the wrong reform target. If the primary concern is the possibility of holdout premiums for owners of “weak patents,” energy might be better directed at reducing litigation costs or developing cheaper means for dispute resolution than suits in federal courts.

A. Bargaining from the Potential Infringer’s Perspective

In considering concerns that are likely to shape private-party agreements, we start with the outlook of a potential infringer who makes and

55. *Id.* at 2044.

sells a product with a per-unit profit margin M . For the moment, we assume that the potential infringer has two options: agree to pay for a patent license or defend itself against a charge of patent infringement. Under such circumstances, the potential infringer should be willing to undertake the first option—to pay for a patent license—as long as the cost of licensing is no more than the expected cost of the second option, litigation. In other words, assuming that transaction costs associated with licensing can be treated as negligible, we can expect the potential infringer to be willing to pay a licensing fee equal to or less than the total expected cost under the litigation option.

What might the potential infringer's total expected cost look like under the litigation option? Commonly it will have three basic components: (1) the expected cost of court-awarded damages; (2) the expected cost of having to comply with a permanent injunction, whether through a design-around, licensing, or simple termination of infringing activity; and (3) the expected cost of litigation itself, including attorney fees and court costs.⁵⁶ Consequently, when the potential infringer initially considers its potential exposure from a suit for patent infringement, it might assess the expected cost as something like the following⁵⁷:

56. In reality, potential costs or enhancements of costs extend beyond those accounted for here. There are, for example, the risks of a preliminary injunction and that a court could—in a case of willful infringement, for example—as much as treble the jury's damages award and also award attorney fees. Further, there is the potential loss of business as a result of customer concern about the risk of an injunction or about the possibility of increased prices due to licensing fees. Even where such costs are significant, they should to a first approximation go to 0 as the probability θ that the patent holder will win the litigation goes to 0. Thus, to a first approximation, such costs appear unlikely to change the fundamental conclusion that litigation costs are likely to become the potential infringer's dominant concern as θ goes to 0. On the other hand, it should be recognized that such costs will tend to add to the overall expected cost of the litigation option, providing greater incentive for a design-around and greater leverage to the patent holder. On the other hand, there may also be some unaccounted-for benefits of pursuing the litigation option, such as maintaining a reputation for hard bargaining, which may help in other negotiations with patent holders.

57. I do not separately treat situations where negotiations precede the manufacturer's commitment to a potentially infringing design because I do not think θ , the likelihood of winning a patent infringement suit, generally drops out as a consideration in such situations. As Lemley and Shapiro recognize, one option for the manufacturer "if licensing negotiations break down" is to use the patented invention and then litigate whether it is valid and infringed. Lemley & Shapiro, *supra* note 7, at 2004. Portions of the expected cost of this alternative are discounted according to θ as discussed above, and the potential infringers overall θ -discounted exposure should still set a ceiling for what a rational manufacturer is willing to pay in pre-commitment negotiations, just as it more generally sets a limit for the cost of a design-around that the rational manufacturer will be willing to consider. Indeed, an uncommitted manufacturer (or even a committed manufacturer who regularly refashions its product on a time scale shorter than that expected for litigation) may even be better off than the above discussion indicates: before the manufacturer commits to a particular design, alternatives to the potentially infringing design may be more freely pursued, and the manufacturer could adopt or seek to develop an alternative design that has all the advantages of the potentially infringing one without the risk of litigation and at a time when the manufacturer is still able seamlessly, and perhaps quite cheaply, to incorporate the alternative into the planned product's original design. *Cf. id.* at 2009 (asserting that once a microprocessor design is implemented, "the patent owner can threaten to stop the sale of the entire microprocessor until it can retool its entire

Expected cost from patent infringement suit

= Expected damages award from a patent suit times the probability of losing the patent suit

+ Expected cost of complying with a permanent injunction times the probability of losing the patent suit

+ Expected litigation costs.

For simplicity, we neglect time discounting and assume that at least two things are certain: if negotiations fail, a patent suit will result, and if a court finds the potential infringer liable, a permanent injunction will follow.⁵⁸ On the other hand, because there may be doubt about whether a court will find liability, the expected costs both of damages and of compliance with an injunction are discounted by the chance that liability will not be found.

If we assume that the relevant product’s average per-unit margin M can be treated as static and is far enough above 0 that per-unit damages can be viewed as a portion of M , the elements of the potential infringer’s expected costs might look something like the following:

- Expected damages times probability of loss = $(N_{pre} \times M \times f_{pre}) \times \theta$, where N_{pre} is, roughly speaking, the number of product units expected to be sold before a final judgment adverse to the potential infringer; M is the overall per-unit margin; f_{pre} is the expected fraction of M that a court will award as the damages per unit; and θ is the probability that the potential infringer will be found liable;
- Expected cost of complying with a permanent injunction times probability of loss = $(N_{post} \times M \times f_{post}) \times \theta$, where N_{post} is, roughly speaking, the number of product units expected to be sold after a final judgment adverse to the potential infringer, and f_{post} is the expected fraction of the margin M that will have to be sacrificed either in negotiating a postjudgment license with the patent holder or in shutting down production of the infringing product and switching resources to other uses;
- Expected litigation costs = L , where the value of L tends to increase with the amount at risk (e.g., the sum of the preceding expected costs divided by θ).

As suggested above, a key point regarding these expected costs is that the two “liability costs”—associated with damages and a permanent

fab to avoid infringement”). Lemley and Shapiro might respond that if there is such an alternative design, the patented invention should be considered to be valueless, but this does not follow, as discussed *infra* note 119.

58. Particularly in the wake of the Supreme Court’s decision in *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837 (2006), the term representing the expected cost of an injunction might more properly be multiplied by the probability (from 0 to 1) that a permanent injunction would issue if liability were found. The model might then be further improved by adding a term representing the expected cost of postjudgment activity in the absence of an injunction (reflecting, for example, the risk of enhanced damages for postjudgment infringement).

injunction, respectively—are multiplied by the probability θ of the patent holder's winning the infringement suit. Therefore, the liability costs go to 0 as the probability θ goes to 0. In truth, a more precise approximation of expected litigation costs would likely break them into relatively θ -independent and θ -dependent parts. The relatively θ -independent parts would reflect the fact that certain litigation costs, such as a substantial portion of discovery costs, are likely to be relatively θ independent (presuming, perhaps, that θ matches or exceeds a threshold value and also that a substantial amount of discovery is required before even summary judgment can issue). On the other hand, other litigation costs, such as various costs for litigation after summary judgment proceedings, may be expected to vary more strongly with θ because, for example, as θ goes to either of its extreme values (0 and 1), the chances that a suit will be resolved by summary judgment increase. Nonetheless, taking expected litigation costs to be independent of θ seems reasonable for purposes of a first approximation because, at least according to the 2005 economic survey of the American Intellectual Property Law Association (AIPLA), most litigation costs are apparently incurred by the end of discovery,⁵⁹ which commonly may be expected to precede motions for summary judgment. Thus, a significant portion of litigation costs might be expected to be relatively insensitive to θ over a wide range of values.

Moreover, a party's expected litigation costs are substantial—generally at least on the order of \$1 million.⁶⁰ Hence, for a weak-patent suit for which θ is nearly 0, litigation costs are likely to dominate the potential infringer's expected costs and thus—as a number of other commentators have suggested⁶¹—to become the dominant driver for the potential infringer's

59. See LAW PRACTICE MGMT. COMM., AM. INTELLECTUAL PROP. LAW ASS'N, REPORT OF THE ECONOMIC SURVEY 2005, at 22 (2005) [hereinafter AIPLA] (listing median estimated litigation costs through the end of discovery and overall, with costs through discovery consistently being greater than half of overall costs). Moreover, the costs estimated in the AIPLA survey may understate by a wide margin such relatively θ -independent costs of discovery because the reported costs apparently do not include non-out-of-pocket costs such as the time that a potential infringer's employees have to devote to meeting with attorneys, collecting and providing requested documents, and preparing for and appearing at depositions. See Daniel A. Crane, *Exit Payments in Settlement of Patent Infringement Lawsuits: Antitrust Rules and Economic Implications*, 54 FLA. L. REV. 747, 757 (2002) (“For every hour that a lawyer spends preparing for, taking, or defending a deposition, the client often spends an hour in fact-gathering or being deposed.”).

60. According to a 2005 AIPLA survey, it typically costs \$650,000 to litigate a patent suit where less than \$1.0 million is at stake; \$2.0 million where from \$1.0 million to \$25.0 million is at stake; and \$4.5 million where more than \$25.0 million is at stake. AIPLA, *supra* note 59, at 22.

61. See Bessen & Meurer, *supra* note 47, at 16 (“[E]ven a weak lawsuit may impose significant costs on the defendant, and the defendant might settle to avoid the nuisance of mounting a defense.”); Edmund W. Kitch, *Graham v. John Deere Co.: New Standards for Patents*, 1966 SUP. CT. REV. 293, 342 (explaining that invalid patents can be “an effective threat” because “the defense of an infringement suit . . . is expensive and . . . the patentee can always offer a settlement cheaper than the litigation costs”); Edward Hsieh, Note, *Mandatory Joinder: An Indirect Method for Improving Patent Quality*, 77 S. CAL. L. REV. 683, 685 (2004) (“Companies can profit from these patents that are almost surely invalid by suing individual small companies, who will most likely settle rather than incur the costs of litigation.”); cf. *Prima Tek II, L.L.C. v. Polypap, S.A.R.L.*, 412 F.3d 1284, 1287 (Fed. Cir. 2005) (“[I]f an invalid patent is issued, competitors may be deterred

willingness to settle.⁶² In such cases, the expected cost of litigation—not the threat of an injunction—should be the most likely cause of artificially inflated settlements.⁶³

Thus, if the goal is to model how negotiated royalties can deviate from “the true economic contribution of the patent holder,”⁶⁴ it appears improper to neglect the likely influence of litigation costs.⁶⁵ This seems especially likely to be true in the context of the low- θ -value weak patents that Lemley and Shapiro indicate are of particular concern.⁶⁶

from challenging it by the substantial cost of litigation.”); Jay P. Kesan & Andres A. Gallo, *Why “Bad” Patents Survive in the Market and How Should We Change?—The Private and Social Costs of Patents*, 55 EMORY L.J. 61, 87 (2006) (“Litigation costs have an important role in determining the chances that a patent will be challenged in court.”); Randy J. Kozel & David Rosenberg, *Solving the Nuisance-Value Settlement Problem: Mandatory Summary Judgment*, 90 VA. L. REV. 1849, 1851 (2004) (stating that in “nuisance-value” suits, “paying off the proponent of the meritless claim or defense rather than incurring the greater expense of litigating to have it dismissed may well be the opponent’s rational (and expected) course of action”); Joseph Farrell & Carl Shapiro, *How Strong Are Weak Patents?* 17 (Jan. 2007) (unpublished manuscript), available at <http://faculty.haas.berkeley.edu/shapiro/weak.pdf> (“If litigation costs are unrelated to (θ , v) they may dominate the bargaining for small, weak patents . . .”). See generally ROGER M. MILGRIM, MILGRIM ON LICENSING § 2.64, at 2-104.4 (2006) (“Avoidance of the costs of patent litigation is an excellent incentive to would-be litigants to resolve their differences through a patent license agreement.”).

62. Even if a patent-infringement suit would be relatively strong, a litigation-wary patent owner may deliberately pursue a business strategy according to which it seeks to license its patent to multiple firms for significantly less than \$1 million each—in other words, for less than it would likely cost to litigate any disputes over infringement or validity. See Danielle Williams & Steven Gardner, *Basic Framework for Effective Responses to Patent Trolls*, IP LINKS, Apr. 2006, at 1, 3, available at http://intellectualproperty.ncbar.org/Newsletter/Newsletters/Downloads_GetFile.aspx?id=5956 (noting “business model[s]” according to which a patent holder “seeks licensing fees of \$30,000–\$100,000 from each of hundreds of targets” or “fees of \$200,000–\$750,000 from a smaller number of companies”). Litigation costs—or, more generally, costs of attorney services—could also be the primary drivers for settlement in such situations.

63. Indeed, if the estimated litigation costs from a 2005 AIPLA survey, *supra* note 59, at 22, are credited (and the survey’s likely understatement of such costs, see *supra* note 59, conservatively ignored), L tends to be the predominant part of the expected cost of suits where under \$1 million is at risk even for values of θ up to 65%—in other words, even in a substantial category of cases that the patent holder is substantially likely to win. Because litigation costs apparently grow less than proportionately with the amount at risk, this crossover value θ_C for litigation-cost dominance falls as the other expected costs rise, but AIPLA statistics suggest that it is still likely to be at least in the vicinity of 10% to 20% when from \$1 million to \$25 million is at stake. See AIPLA, *supra* note 59, at 22. Further, given that the AIPLA survey reported median expected litigation costs of \$4.5 million for suits involving stakes of more than \$25.0 million, there seems a reasonable likelihood that even in such high-stakes disputes, litigation costs are likely to be the potential infringer’s dominant prelawsuit concern in a large number of situations in which an infringement case has a likelihood of success of much less than 25%—i.e., a likelihood of success substantially less than that of the standard patent suit litigated to its finish (whether via summary judgment or trial). Paul M. Janicke & LiLan Ren, *Who Wins Patent Infringement Cases?*, 34 AIPLA Q.J. 1, 3 (2006) (explaining the 25% success rate by observing that “[w]hile patent owners win slightly more than half the cases that proceed to trial, they are losing more cases overall because most end in summary judgments of noninfringement”).

64. Lemley & Shapiro, *supra* note 7, at 1993.

65. See *id.* at 1999 n.16 (stating that litigation costs “are of no significance for our purposes”).

66. See *id.* at 1993 (“We also explain why the threat of an injunction is especially troublesome in the case of weak patents, i.e., patents that may well be found invalid if actually litigated.”).

Moreover, failure to account for the influence of litigation costs can have policy implications. If litigation costs, rather than damages or equitable remedies, are the primary worry, weakening equitable remedies is unlikely to be the solution. Instead, energy might be better directed to devising alternatives or improvements to today's costly court proceedings—such as better initial screening of patents by the U.S. Patent and Trademark Office, more effective reexamination proceedings, or a new brand of administrative “opposition” proceedings.⁶⁷

On the other hand, according to the model presented above, concerns about potential injunction-driven holdout or the accuracy of damages awards will become more important in situations where the case for infringement is not especially weak. In such situations, the patent holder's probability of winning may be large enough for the expected values of strongly θ -dependent liability costs to dominate the potential infringer's approach to settlement. If that is the case, then an expectation that either court-awarded damages or injunction-compliance costs will be out of proportion to an invention's more intrinsic economic value—in other words, that the value of at least one of the fractions f_{pre} or f_{post} will be disproportionately high—could cause a potential infringer to agree to pay a licensing fee that is disproportionate to the patented invention's economic worth. The holdout effect with which Lemley and Shapiro are concerned will have occurred.

How does the possibility of a design-around change the above picture? Suppose, for example, that the patent in question only covers one component of the relevant product, and that the potential infringer realizes that there is a clearly noninfringing substitute that can be put in that component's place. If the expected cost under the litigation option is greater than the cost of implementing the design-around (including any profits foregone due to either the need for a temporary shutdown for retooling or the design-around's inferiority from a consumer perspective), the possibility of a design-around improves the potential infringer's position. Such a design-around should reduce the amount for which the potential infringer is willing to settle. Will the replacement of liability costs with the design-around cost make the relative role of litigation costs qualitatively different?

My sense is that the possibility of a design-around does not change the qualitative role of litigation costs by a great deal. This is particularly easy to see in the case of a design-around that would not be implemented unless the potential infringer were found to be liable. In such a situation, the expected design-around cost substantially substitutes for the expected cost of

67. Cf. Joseph Farrell & Robert P. Merges, *Incentives to Challenge and Defend Patents: Why Litigation Won't Reliably Fix Patent Office Errors and Why Administrative Patent Review Might Help*, 19 BERKELEY TECH. L.J. 943, 961–64 (2004) (suggesting improved administrative proceedings and better incentives for disclosing prior art to the U.S. Patent and Trademark Office); Kesan & Gallo, *supra* note 61, at 122 (“[T]he patent system cannot rely on the judicial system as the only safeguard against low quality patents.”).

complying with a permanent injunction and is likewise discounted by the factor θ . Consequently, for a weak infringement case for which θ is sufficiently near 0, litigation costs can again be expected to dominate the potential infringer’s concerns.

The situation with respect to a prejudgment design-around is somewhat more complicated because the expected cost D of such a design-around cannot be straightforwardly argued to be discounted by θ . On the other hand, such a prejudgment design-around should only be adopted if its net cost is less than the sum of the expected liability and litigation costs that it replaces. The general point of a prejudgment design-around is that it replaces at least some portion of expected liability and litigation costs with a lower amount, the design-around cost D . Consequently, as θ goes to 0, what primarily drives any interest in the design-around—and therefore drives any interest in paying the patent holder to avoid the need to implement the design-around—should still ultimately be interest in reducing litigation costs, not anxiety about θ -discounted liability costs. Hence, the possibility of a design-around does not change the fact that for a weak-patent suit in which the patent holder’s chances of winning are sufficiently close to 0, the culprit for any “excessive” settlement is likely to be the exorbitant cost of patent litigation, not the possibility of an eventual permanent injunction.

On the other hand, in situations where the likelihood that the patentee will prevail is substantially higher, the threat of a permanent injunction is more likely to play the role that Lemley and Shapiro report, enabling a patentee to hold out for a disproportionate award.⁶⁸ In certain variants of such situations, a stay of a permanent injunction may, as Lemley and Shapiro suggest, substantially reduce the probability that a patent holder will obtain royalties more reflective of exogenous circumstance than the patented invention’s more intrinsic economic worth.⁶⁹

B. Bargaining from the Patent Holder’s Perspective

The above analysis models the projected costs that might concern a potential infringer. What costs and potential benefits might be weighing on the mind of a patent holder?

On the side of benefits, the patent holder is, of course, looking to see what it can obtain from the potential infringer. The patent holder presumably expects that the potential infringer will not agree to pay more than the expected cost of the least costly alternative to licensing.⁷⁰

68. Lemley & Shapiro, *supra* note 7, at 2039.

69. *Id.* at 2037–39.

70. Further, the patent holder may suspect that the potential infringer may even refuse to pay the patent holder anything other than an amount steeply discounted from such projected costs on grounds, for example, that by ruining the potential infringer’s reputation as a hard bargainer or establishing a high benchmark for royalties in the relevant technology, a generous settlement could make the potential infringer a more inviting target for demands from other patent holders.

But the patent holder will likely approach negotiations at a significant informational disadvantage with respect to the potential infringer's expected costs. At least until after a patent holder launches a lawsuit and obtains discovery, the potential infringer is likely to have significantly better information regarding the potential infringer's per-unit margin M and also the fraction of M that should be attributed to the patented invention. Further, even in situations where the potentially infringing device is publicly sold, and almost certainly in situations where possibly infringing activities occur behind closed doors, the potential infringer will likely have better information about the potentially infringing device or process.⁷¹ Information asymmetries are likely to be even worse with respect to not only the possibility and cost of a design-around, but also other aspects of the potential infringer's future plans. For example, the patent holder may have relatively little good information about the noninfringing status, commercial value, cost, or immediate availability of any potential design-arounds, or even regarding whether the potential infringer was already planning to abandon the potentially infringing device or process.⁷²

Moreover, such information asymmetries may well be worse for a nonpracticing or otherwise noncompeting patent holder than for others. A patent holder who practices the invention commercially or otherwise competes with the infringer may be able to use internal knowledge and experience, as well as greater familiarity with the nature of a business like

71. See, e.g., Mann, *supra* note 7, at 979 (reporting that interviews with software industry professionals "emphasized . . . the problem of detectability—the difficulty of being sure that a competing product infringes a patent"). The fact that "patent owners win slightly more than half the cases that proceed to trial" but win only about a quarter of suits "overall," Janicke & Ren, *supra* note 63, at 3, may be consistent with the proposition that in a prelitigation context, patent holders are generally on the short end of information asymmetries: pretrial disposition of cases with results favoring the accused infringer may be understood largely to correct for patent holder "mistakes" in bringing suit. Cf. Mark P. Gergen, *A Defense of Judicial Reconstruction of Contracts*, 71 IND. L.J. 45, 85 n.220 (1995) (noting Keith Hylton's theory that "a combination of asymmetric information about liability and strategic bargaining explains reported patterns of success and failure in contract and tort disputes," but commenting that "Hylton does not explain how such informational advantages persist through discovery").

72. Even after patent claims have been construed during litigation, the robustness of an asserted design-around and the validity of an adjudicated infringer's assertions regarding a design-around may be less than clear. During the litigation between eBay and MercExchange, eBay told the district court that it could design around a MercExchange patent for under \$10,000. Brief for Respondent at 35, *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837 (2006) (No. 05-130). Nonetheless, eBay argued against a permanent injunction in part by contending that issuance of a permanent injunction against infringement would generate a "threat of contempt proceedings" against eBay. *Id.* at 41. Given the high standard even for merely holding contempt proceedings, eBay's concern suggested uncertainty that a court would find that eBay had substantial reason to believe that its alleged design-around was noninfringing. See *Preemption Devices, Inc. v. Minn. Mining & Mfg. Co.*, 803 F.2d 1170, 1173 (Fed. Cir. 1986) ("If there is a fair ground of doubt as to the wrongfulness of the defendant's actions . . . the District Court should not entertain the civil contempt proceeding or find contempt."); *KSM Fastening Sys., Inc. v. H.A. Jones Co.*, 776 F.2d 1522, 1532 (Fed. Cir. 1985) ("If there are substantial open issues with respect to infringement to be tried, contempt proceedings are inappropriate.").

the potential infringer’s, to make more informed guesses about the potential infringer’s cost-benefit analysis.

Meanwhile, fundamental aspects of the patent holder’s position—such as the content and prosecution history of the patent that it asserts, the probable cost of litigating against the potential infringer, and in the case of a nonpracticing patent holder, the patent holder’s need to license the invention in order to make a profit—are likely to be either public knowledge or comparatively easy for the potential infringer to estimate. In sum, information asymmetries appear most likely to disfavor the patent holder in negotiations, suggesting that regardless of any inherent skill at bargaining, the patent holder will probably be substantially handicapped in its ability to achieve an especially favorable negotiated result.⁷³ If, as in Lemley and Shapiro’s model, the factor B represents the fraction of potential settlement value that a patent holder is expected to extract from negotiations with a potential infringer, then information asymmetries appear to tilt the likely result of negotiations toward an outcome corresponding to a low value for B .

Moreover, even aside from being handicapped by information asymmetries, the patent holder is likely to be burdened by the knowledge that it faces significant potential costs if negotiations fail. Such costs of negotiating failure could drive the patent holder to settle for substantially less than the patented invention’s more intrinsic economic worth.

First, if the patent must be enforced through the courts, the patent holder will face substantial litigation costs. These litigation costs might not be expected to be as great as those expected for the potential infringer.⁷⁴ For example, a nonpracticing or otherwise noncompeting patent holder who does not seek lost profits may also not be subjected to a patent-infringement countersuit and thus may not face the burden of producing significant discovery regarding its products or activities. On the other hand, such a patent holder’s resources for litigation might also be substantially less than those of the potential infringer—particularly when it is considered that the potential infringer will, if it chooses, likely be able to enjoy the benefit of the invention for years before the typically tortuous process of patent litigation can produce favorable returns for the patent holder.⁷⁵

73. See generally Williams & Gardner, *supra* note 62, at 1 (“Often, an effective response to a patent troll is one that increases its uncertainty, doubt, and fear such that the patent troll concludes that the best business decision is to end the accusation or to resolve the accusation with terms favorable to the accused company.”).

74. *But cf.* Jason Rantanen, *Slaying the Troll: Litigation as an Effective Strategy Against Patent Threats*, 23 SANTA CLARA COMPUTER & HIGH TECH. L.J. 159, 183, 190 n.134 (2006) (discussing situations in which “a patentee’s discovery costs may equal—or exceed—those of the infringer,” but acknowledging that such situations would be unlikely to occur if a patentee had already successfully defended the validity of its patent in litigation); Ronspies, *supra* note 52, at 201 (suggesting that litigation can be particularly disruptive to small companies).

75. See Leslie T. Grab, *Equitable Concerns of eBay v. MercExchange: Did the Supreme Court Successfully Balance Patent Protection Against Patent Trolls?*, 8 N.C. J.L. & TECH. 81, 113 (2006) (“For many small, independent inventors, litigation is not an option.”); Mann, *supra* note 7, at 981

Second, the patent holder can anticipate a number of additional costs from failing to negotiate a license. For a patent holder not seeking to license exclusively, such a failure may dampen the market for licensing more generally, eliminating potential revenue from market players who are less likely to be “first movers” in licensing the patented invention. Moreover, because successful licensing can serve as “secondary” evidence of nonobviousness,⁷⁶ giving up an opportunity to license a patent may sacrifice a potential boost to its likelihood of being upheld in court. Finally, suit on the patent will risk its invalidation, thereby risking general loss of the revenue that the patent could generate.⁷⁷

Thus, although the patent holder may possess the threat of an ultimate injunction, years of time and a million or so dollars of litigation costs likely stand between such a threat and its realization. The potential infringer may very well have a plausible claim that the threat of a permanent injunction is no real threat at all—that by the time a permanent injunction could issue, the accused product will have long since, and in the regular course of business, been either discontinued or substantially redesigned in a way that nullifies

(“[E]ven if an early-stage company had a patent, it is unlikely that it would have resources available to enforce the patent through litigation against a competitor.”); McDonough, *supra* note 7, at 210 (“Individual inventors and small entities rarely have the financial resources to commence and sustain a lawsuit.”); Ronspies, *supra* note 52, at 197 (“[A] small inventor may be intimidated by *any* amount of legal fees required to defend a patent.”). A study of cases involving preliminary injunctions suggests that a party’s relative size and resources can provide an advantage in negotiations even after an injunction is issued. Jean O. Lanjouw & Josh Lerner, *Tilting the Table? The Use of Preliminary Injunctions*, 44 J.L. & ECON. 573, 600 (2001) (concluding, based on a study of twelve cases in which courts issued preliminary injunctions, that larger firms “hold out longer in settlement negotiations after they have been enjoined”).

76. See *WMS Gaming, Inc. v. Int’l Gaming Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999) (“Objective evidence of non-obviousness may include commercial success, long-felt but unsolved need, and licenses showing industry respect.”). *But cf.* *SIBIA Neurosciences, Inc. v. Cadus Pharm. Corp.*, 225 F.3d 1349, 1358 (Fed. Cir. 2000) (“[T]he mere existence of . . . licenses is insufficient to overcome the conclusion of obviousness.”).

77. See William M. Landes, *An Empirical Analysis of Intellectual Property Litigation: Some Preliminary Results*, 41 HOUS. L. REV. 749, 756 (2004) (“[A] patent owner who unsuccessfully sues an alleged infringer may incur substantial losses if a court also holds that the patent is invalid.”); Rantanen, *supra* note 74, at 190 (“Through litigation, a threatened infringer can turn the tables on the patentee and threaten the patent troll’s own assets—possibly driving the value of the litigation to the infringer below zero.”); see also Williams & Gardner, *supra* note 62, at 4 (“[A] patent troll offered to settle . . . for a very, very low settlement figure The patent troll had obtained a verdict against another company and was concerned that invalidation of the patent in trial with our client would impact that verdict.”); *cf.* DOUGLAS LAYCOCK, *MODERN AMERICAN REMEDIES: CASES AND MATERIALS* 523 (3d ed. 2002) (“If the alleged infringer pays royalties or quits selling the product, the patent holder gets the benefit of a successful lawsuit without the risk of losing the lawsuit.”); Lemley & Shapiro, *supra* note 32, at 75 (“When a patent holder asserts its patent against an alleged infringer, the patent holder is rolling the dice. If the patent is found invalid, the property right will have evaporated.”). Although a licensing agreement may not fully protect a patent from challenge by the licensee, see, e.g., *MedImmune, Inc. v. Genentech, Inc.*, 127 S. Ct. 764, 777 (2007) (holding that Article III of the Constitution did “not requir[e] a licensee] . . . to break or terminate its 1997 license agreement before seeking a declaratory judgment . . . that the underlying patent is invalid, unenforceable, or not infringed”), such an agreement would likely reduce substantially the risk of such a challenge.

any possible claim of ongoing infringement.⁷⁸ Meanwhile, the patent holder may have little more than a guess as to what it could win through litigation and may have even less of a basis for contesting a claim by a manufacturer that it can design around the relevant patent both immediately and with ease.

In short, whatever the inherent bargaining skill of a patent holder, there is a good chance that various circumstances will cause it to feel substantial pressure to settle for significantly less than the patented invention’s true worth to a potential infringer. In particular, it seems at least plausible to suggest that under current legal and economic conditions, nonpracticing or otherwise noncompeting patent holders might be at least as likely to be undercompensated as to be overcompensated. And this is true even before considering the potentially corrosive effects on markets for patent licensing that could result from a catch-me-if-you-can approach to patent rights that the combination of a “hardball” business mentality⁷⁹ and court-awarded compulsory licenses could foster.⁸⁰ Hence, consideration of how licensing negotiations look to the patent holder provides substantial reason to suspect that contrary to Lemley and Shapiro’s conclusions, patent holders may not be “systematically overcompensated”⁸¹ even if they can use the threat of an injunction to make credible holdout threats under certain circumstances.

78. Cf. Williams & Gardner, *supra* note 62, at 4 (“Because of the changing nature of our client’s business, the damages exposure was limited to alleged past damages and the threat of a permanent injunction did not concern our client.”).

79. See *infra* note 171 and accompanying text.

80. Lemley and Shapiro suggest that courts’ consideration of negotiated royalty rates in assessing damages means that royalty rates may spiral upward over time. See Lemley & Shapiro, *supra* note 7, at 2021–22 (“[W]hen the courts base reasonable royalties on royalty rates negotiated by private parties . . . [the court-awarded damages] reflect a premium based on holdup . . . [a]nd this in turn gives patent holders more negotiating power in a self-reinforcing manner.”). In fact, the feedback effect between court awards and negotiated royalties that Lemley and Shapiro suggest might also plausibly run in the opposite direction, particularly if permanent injunctions become substantially scarce. This follows because according to Lemley and Shapiro’s definition of the maximum reasonable royalty, courts should discount the amounts that they award according to the patent holder’s relative bargaining skill B , awarding an amount $B \times A$ where the court would have awarded A if it did not discount damages according to the patent holder’s lack of a perfect value of 1 for B . But if parties know in advance that a court will only award $B \times A$ upon a holding of infringement, they may then, in prelitigation licensing negotiations, bargain not over how much of A the patent holder should receive, but instead over how much of $B \times A$ the patent holder should receive—with the result, according to Lemley and Shapiro’s reasoning, being that the patent holder receives $B \times (B \times A)$ or $B^2 \times A$. But if $B^2 \times A$ is what the parties would negotiate as a price for licensing, Lemley and Shapiro’s analysis would tell us that courts should award that market rate— $B^2 \times A$, instead of $B \times A$ —and so on and so forth until the supposedly ideal court award is found to be $B^n \times A$ with n heading to infinity, and because B is less than 1, $B^n \times A$ approaching 0. Although precedent suggests that courts would, in fact, abandon reliance on negotiated royalties substantially before such negative feedback could reduce the worth of patent rights to 0, see *infra* notes 105–12 and accompanying text, the possibility that a pure damages regime could lead to relatively unchecked erosion of patents’ worth might partly account for the historical intuition behind a strongly injunction-oriented patent regime.

81. Lemley & Shapiro, *supra* note 7, at 2044 (“[U]nder current law patentees whose inventions are only one component of a larger product are systematically overcompensated.”).

C. *Flaws in Lemley and Shapiro's Theoretical Approach*

The analysis in the two immediately preceding subparts of this Commentary indicates that although the holdout effect that troubles Lemley and Shapiro can occur, patent holders might nonetheless tend to be undercompensated, rather than overcompensated, in a wide run of cases. Further, the holdout premiums of most concern—those occurring in situations where the case for a potential infringer's liability is weak—may more strongly reflect the baneful influence of high litigation costs than the threat of a permanent injunction.

The present subpart critiques Lemley and Shapiro's approach to analyzing prelitigation negotiations more directly, pointing out specific defects that make their approach incapable of proving what they say it proves—namely, “that under current law patentees whose inventions are only one component of a larger product are systematically overcompensated.”⁸² Such defects in Lemley and Shapiro's approach include:

- (1) their choice of a ceiling for theoretically “appropriate” royalties that is proportional to the patent holder's “bargaining skill” B —a figure that apparently has nothing to do with the patented invention's actual worth;⁸³
- (2) their implicit assumption that a patented invention's marginal per-unit value V is a well-defined quantity that is completely sacrificed by any potential design-around;⁸⁴
- (3) their neglect to take account of the limited nature of the patent term;
- (4) their treatment of litigation costs as “of no significance” to patent holdout concerns;⁸⁵
- (5) their failure to acknowledge the likely significance of information asymmetries in bargaining, particularly with respect to subjects about which a potential patent infringer is likely to have much better knowledge—for example, the cost and effectiveness of an as-yet-unimplemented design-around, the importance of various

82. *Id.* at 2044.

83. *See id.* at 1997 (defining the patent holder's “bargaining skill” B as the “fraction of the combined gains from settling, rather than litigating, that are captured by the patent holder”); *see also id.* at 1999 (including “bargaining skill” B as a factor in the formula for a “benchmark royalty rate for an ironclad patent”).

84. *Id.* at 2001.

85. *Id.* at 1999 n.16. It may be worth noting in passing that, despite Lemley and Shapiro's apparent claim that, according to Carl Shapiro's model, “litigation costs are relevant in both the benchmark and the holdup royalty calculations,” and therefore “drop out of the comparison of the two,” *id.*, Shapiro's related paper states that “[t]he benchmark royalty rate is equal to $\theta\beta v$ ” and thus “reflects the value of the patented feature, v , the patent strength, θ , and the underlying bargaining power of the patent holder, β .” Shapiro, *supra* note 2, at 9. Shapiro's paper does not appear to describe litigation costs as playing a role in determining $\theta\beta v$. In any event, it is unclear to me why a normative ceiling for what a patent holder should receive, such as Lemley and Shapiro's benchmark, should be a function of litigation costs.

features of the invention to the potential infringer’s customers, and the profit margin for a particular device or process;⁸⁶ and

- (6) their failure to acknowledge how the likely length of patent enforcement proceedings can affect both the feasibility of a nondisruptive and relatively cheap design-around and the amount for which a patent holder will settle.

The importance of the last three defects has been indicated by the preceding two subparts. The first three defects reflect flaws either in Lemley and Shapiro’s assumption of a specific ceiling for what a patent holder should receive or in their assumptions about the patented invention’s per-unit value V . These flaws are discussed in what follows.

1. *Lemley and Shapiro’s Flawed $B \times V \times \theta$ Baseline.*—Lemley and Shapiro assume that the ceiling for proper per-unit royalties equals $B \times V \times \theta$, where B is a number between 0 and 1 reflecting what they call bargaining skill,⁸⁷ V is the per-unit value of the claimed invention, and θ is a number between 0 and 1 equaling the probability that the patent holder will win an infringement case. Because Lemley and Shapiro use the figure $B \times V \times \theta$ as the reference point for whether there is a patent “overcharge,” their claim to have “demonstrate[d] that . . . [certain] patentees . . . are systematically overcompensated”⁸⁸ hinges on the validity of using $B \times V \times \theta$ as a normative baseline.⁸⁹ Nonetheless, they do remarkably little to justify this use. How could they?

Consider the following:

- The factor B discounts the patent holder’s reward on a basis that apparently has nothing to do with the patented invention’s worth: the value of a patented invention does not become 0 simply because its owner lacks the skill or leverage to strike a revenue-

86. The theoretical analysis that lies behind Lemley and Shapiro’s article assumes “symmetric information.” Shapiro, *supra* note 2, at 8; *see also* Lemley & Shapiro, *supra* note 7, at 1995 n.7 (referring the reader to Carl Shapiro’s paper *Injunctions, Hold-Up, and Patent Licensing*, *supra* note 2, for “deriv[ations of] the equations and relationships asserted here”).

87. In a related work, Carl Shapiro describes this factor as measuring “underlying bargaining power.” Shapiro, *supra* note 2, at 9.

88. Lemley & Shapiro, *supra* note 7, at 2044.

89. The fact that according to Lemley and Shapiro’s approach, “the percentage royalty ‘overcharges’ . . . are independent of B ,” *id.* at 1999 n.13, does not eliminate the need to justify the $B \times V \times \theta$ baseline. Their “percentage royalty ‘overcharges’ . . . are independent of B ” only because they have (1) posited that what a patent holder gets through negotiation is proportional to B and (2) chosen a reasonable-royalty baseline that is likewise proportional to B . If, for example, Lemley and Shapiro followed other pairs of commentators, *see infra* note 97, and instead chose $V \times \theta$ as their baseline, a “percentage royalty ‘overcharge’” of δ calculated under their assumption of a $B \times V \times \theta$ baseline would become an “overcharge”—perhaps in reality an “undercharge”—of $B \times \delta - (1 - B)$ under the assumption of a $V \times \theta$ baseline. As B went to 0, the so-called overcharge would become -1 , meaning that, under the assumption of a $V \times \theta$ baseline, it would correspond to a 100% “undercharge.”

producing bargain. Lemley and Shapiro's benchmark seems to suggest that patent law would ideally ensure that a B -equals-0 patent holder receives nothing for a valuable invention. One might think, however, that patent law should seek to encourage invention by whatever potential patent holder is best positioned to bring it about, regardless of bargaining power or skill.⁹⁰

- Per-unit royalties such as $B \times V \times \theta$ will likely not be paid after a patent expires. Consequently, the length of time between the onset of the invention's potential infringing use and the patent's expiration—or, roughly speaking, the number N of potentially infringing products sold during that time⁹¹—will have a significant, direct effect on both the total value $N \times B \times V \times \theta$ of any such royalty and the relation between this total value and society's total gain from the invention.
- The marginal value V of an invention is notoriously difficult to determine even if a potential infringer's activity level is taken as given, and this value is even harder to determine once it is recognized that infringing activity may have “artificially” depressed any such price by leading to the offering of the invention in a different volume, at a different price, and in a different form from those that the patent holder, in exercising its right to exclude, would have chosen.⁹²

90. United States patent law apparently seeks to promote invention regardless of “the manner in which the invention was made,” 35 U.S.C. § 103(a) (2000)—including, one might think, whether it was made by a strong bargainer or by a weak bargainer.

91. For purposes of linguistic simplicity, the claimed invention will often be assumed to be a product invention rather than a process invention.

92. See *Fromson v. W. Litho Plate & Supply Co.*, 853 F.2d 1568, 1577 n.15 (Fed. Cir. 1988) (“In determining the true measure of a reasonable royalty, a court should not select a ‘diminished royalty rate’ a patentee may have been forced to accept ‘by the disrepute of his patent and the open defiance of his rights.’” (quoting *Gen. Motors Corp. v. Dailey*, 93 F.2d 938, 941–42 (6th Cir. 1937))), *overruled on other grounds*, *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337, 1341 (Fed. Cir. 2004); DONALD S. CHISUM, CHISUM ON PATENTS § 20.03[2] (2005) (“[A]n established royalty does not preclude the patent owner from recovering a greater sum under a reasonable royalty theory where the established rate was unfairly depressed because the patent had not yet gained recognition or because of widespread infringing activity.”); *id.* § 20.03[2][d] (“[A] number of decisions state that a reasonable royalty may be higher than an established royalty, particularly when the established royalty was depressed because the patent had not yet gained public recognition or acceptance or because of widespread infringing activity.”). Courts have developed specialized criteria for whether negotiated royalties should be considered to set an “established” royalty rate. In *Mobil Oil Corp. v. Amoco Chemicals Corp.*, 915 F. Supp. 1333 (D. Del. 1995), the court listed five requirements for royalties to set an “established” rate:

(1) they must be paid or secured before the infringement began; (2) they must be paid by a sufficient number of persons to indicate the reasonableness of the rate; (3) they must be uniform in amount; (4) they must not have been paid under threat of suit or in settlement of litigation; and (5) they must be for comparable rights or activity under the patent.

Id. at 1342.

What defense for their per-unit measure of a proper reward do Lemley and Shapiro provide? Although they assert that “the threat [of injunctive relief] causes the negotiated royalty rate to exceed the true economic contribution of the patent holder,”⁹³ they make no real effort to show that $N \times B \times V \times \theta$ represents that “true economic” value of the invention or “the expected value of social surplus . . . from [the] innovation,”⁹⁴ or any other measure of whether the grant of a patent “distort[s] the market allocation of resources”⁹⁵ in just the right way to produce socially optimal rewards. Indeed, at least for reasons indicated above, an effort to make such a showing would be futile.⁹⁶

Instead of justifying their baseline on the ground that it represents the patented invention’s true economic value, what Lemley and Shapiro in fact do is claim that it represents “the royalty rate that would be reasonable and expected in the *ideal* patent system without any element of holdup.”⁹⁷ In other words, what they do is assume that the “ideal patent system” is one that lacks “any element of holdup”—i.e., any remedy beyond their conception of reasonable-royalty damages.

This assumption makes Lemley and Shapiro’s argument fundamentally circular. They beg the essential question by assuming that a patent holder

93. Lemley & Shapiro, *supra* note 7, at 1993.

94. Steven Shavell & Tanguy van Ypersele, *Rewards Versus Intellectual Property Rights*, 44 J.L. & ECON. 525, 535 (2001) (“Under [a] reward system, the optimal reward r^* equals the expected value of social surplus, $E(s^*)$, from an innovation.”); *cf.* W. KIP VISCUSI ET AL., ECONOMICS OF REGULATION AND ANTITRUST 92 (1992) (“If the inventor cannot expect to appropriate all of the economic value of his invention, he will underinvest in inventive activity.”).

95. Lemley & Shapiro, *supra* note 7, at 2000.

96. Indeed, critique of Lemley and Shapiro’s benchmark could go even further. For example, Lemley and Shapiro’s use of the factor θ in their $B \times V \times \theta$ benchmark appears to reflect an assumption that the courts can be expected, at least on average, to get “right” the questions of whether a patent should have been awarded and whether the accused product or process should be understood to infringe the patent.

97. Lemley & Shapiro, *supra* note 7, at 1999 (emphasis altered). By way of contrast, Joseph Farrell and Robert Merges arguably have viewed an amount apparently akin to $V \times \theta$ as forming a kind of ceiling for a reasonable royalty. *See* Farrell & Merges, *supra* note 67, at 958 (asserting that where “all would be prepared to pay royalties of r^* ” if a “patent were certainly valid” and where “the probability of its being upheld in a well argued symmetric trial is q . . . [a] reasonable outcome would be that negotiation . . . would enable the patentee to collect royalties of up to qr^* ”). Use of $V \times \theta$, rather than $B \times V \times \theta$, as a benchmark also seems to have been suggested by Farrell and Shapiro. *See* Farrell & Shapiro, *supra* note 61, at 4, 9 (characterizing “ θv ” as “an intuitive benchmark,” with θ being the probability that the patent “would be found valid and infringed” and v being the value added by the patented invention). *But see* Lemley & Shapiro, *supra* note 7, at 2002 n.17 (asserting that Farrell and Shapiro’s article “provide[s] a formal welfare foundation for the benchmark $\theta \times B \times V$ ”). Moreover, given the limited nature of the patent term, it might be argued that even a royalty rate of $V \times \theta$ may fall short of the socially optimal level of compensation for invention, which a number of commentators have suggested amounts to the full economic surplus expected from the invention. *See supra* note 94. Given the normal expectation that a demand curve for a product or feature will fall with sales volume, such a shortfall may be particularly likely to occur where overall production levels are determined not by the patentee but instead by infringers who lack any proprietary rights in the invention and thus may tend to charge prices for the patented feature that are closer to its marginal cost of production.

should receive no more than it would receive in the absence of a credible holdout threat—in the absence of any threat of injunctive relief, enhanced damages, litigation costs, or any other plausible deterrent to “taking” the patent holder’s property without a serious effort at licensing. A more satisfactory analysis would at least acknowledge long-recognized benefits of injunctions against infringement and would engage in some substantial analysis of whether their costs nonetheless outweigh their benefits.

It is not hard to imagine what some of the benefits of permanent injunctions might be. For example, they could help correct for undercompensation that might occur under a reasonable-royalty system.⁹⁸ Further, as Joseph Story indicated long ago, injunctions—and, it might be added, the threat of injunctions—can have the social benefit of moving disputes out of the courts by motivating settlement without (further) costly litigation and without the need for courts to engage in a task for which they have long been viewed as ill suited—attempting to provide accurate assessments of patent-infringement damages.⁹⁹

Given that Lemley and Shapiro not only substantially ignore such potential benefits of injunctions but also assume that their conception of a reasonable royalty is the ceiling for a proper patent reward, it is unsurprising that they conclude that giving a patent holder the additional chit of injunctive relief produces “excessive” rewards. In essence, Lemley and Shapiro’s entire article goes in circles around their initial, undefended assumption that a patent holder should obtain no more than it would receive if an injunction were unavailable.

While permitting their argument to spin in normative circles, Lemley and Shapiro apparently do try to justify their benchmark royalty rate as a matter of positive law. According to them, $B \times V \times \theta$ is the correct per-unit

98. *See supra* subpart III(B).

99. Story explained the need for injunctions in patent and copyright cases as follows:

§ 930. It is upon similar principles, to prevent irreparable mischiefs or to suppress multiplicity of suits and vexatious litigation, that Courts of Equity interfere in cases of patents for inventions, and in cases of copyrights

§ 931. It is quite plain that if no other remedy could be given in cases of patents and copyrights, than an action at law for damages, the inventor or author might be ruined by the necessity of perpetual litigation, without ever being able to have a final establishment of his rights.

§ 932. Indeed in cases of this nature, it is almost impossible to know the extent of the injury done to the party without a discovery from the party guilty of the infringement of the patent or copyright; and if it were otherwise, mere damages would give no adequate relief. For example, in the case of a copyright the sale of copies by the defendant is not only in each instance taking from the author the profit upon the individual book which he might otherwise have sold, but it may also be injuring him to an incalculable extent in regard to the value and disposition of his copyright, which no inquiry for the purpose of damages could fully ascertain.

2 JOSEPH STORY, COMMENTARIES ON EQUITY JURISPRUDENCE AS ADMINISTERED IN ENGLAND AND AMERICA 236–37 (Melville M. Bigelow ed., 13th ed., Fred B. Rothman & Co. 1988) (1886) (citations omitted).

patent reward because it corresponds to the $B \times V$ per-unit royalty that courts should award as damages under current law.¹⁰⁰

This is a misrepresentation of the state of the law. The Patent Act does not suggest that a patent holder should receive no more than an amount discounted by the patent holder’s bargaining skill or power. Further, although the Act does invoke the concept of a reasonable royalty, it does not say that a reasonable royalty—never mind Lemley and Shapiro’s benchmark—is the upper bound for what a patent holder should receive.¹⁰¹ In fact, what the Patent Act explicitly says is that a reasonable royalty is the lower bound, not the upper bound, for what a patent holder should receive: the Act says that “the court shall award the claimant damages adequate to compensate for the infringement, but *in no event less than a reasonable royalty*.”¹⁰² Moreover, in provisions that have been found to apply to instances of willful infringement, the Act further states that a court “may increase the damages up to three times the amount found or assessed”¹⁰³ and “may award reasonable attorney fees to the prevailing party.”¹⁰⁴

It is nevertheless true that courts commonly refer to a “hypothetical negotiation” heuristic in assessing damages—asking what royalty rate the parties “would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement”¹⁰⁵ and had “known to a certainty that the patent was valid and infringed.”¹⁰⁶ Does this mean that courts have understood a patent holder’s per-unit damages as being restricted to $B \times V$, a quantity limited by the patent holder’s bargaining skill? This seems unlikely. The canonical fifteen-factor *Georgia-Pacific* test for reasonable-royalty damages does not appear to suggest discounting according to the actual patent holder’s relative bargaining skill: instead, its hypothetical negotiation factor speaks of the amount to which more generic entities—“a prudent licensee” and “a prudent patentee”—would have agreed.¹⁰⁷ Further, Lemley and Shapiro cite no cases, and I am aware of none, where a court has openly held that damages should be discounted because of a patent holder’s perceived lack of bargaining skill or power. The Court of Appeals for the Federal Circuit has effectively warned against such a result by cautioning that:

100. Lemley & Shapiro, *supra* note 7, at 1999–2000.

101. *See* 35 U.S.C. § 284 (2000).

102. *Id.* (emphasis added); *see also* Lemley & Shapiro, *supra* note 7, at 2017 (“The patent statute provides that a patentee can recover its lost profits from infringement, if it can prove them, but is always entitled to no less than a reasonable royalty.”).

103. 35 U.S.C. § 284.

104. *Id.* § 285.

105. *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified sub nom. Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295 (2d Cir. 1971).

106. Lemley & Shapiro, *supra* note 7, at 2018.

107. *Georgia-Pacific*, 318 F. Supp. at 1120.

[although] the judge-created methodology described as “hypothetical negotiations between willing licensor and willing licensee” . . . must on occasion be used for want of a better [approach], it must be carefully applied to achieve a truly reasonable royalty, for the methodology risks creation of the perception that blatant, blind appropriation of inventions patented by individual, nonmanufacturing inventors is the profitable, can’t-lose course.¹⁰⁸

True, discounting according to something like bargaining skill *B* might result, roughly and indirectly, when courts seek to gain a sense of what a reasonable royalty might be by considering prior licensing agreements involving similarly situated parties.¹⁰⁹ But courts do not in general rely blindly on such prior agreements: in a number of cases, they have found them to be unhelpful—for example, because the agreements in question reflected “a diminished royalty rate [the] patentee may have been forced to accept.”¹¹⁰ Further, any indirect incorporation of bargaining-skill discounting in court-awarded damages may simply reflect the courts’ need to rely on values that are nonspeculative,¹¹¹ not a belief that damages *ideally* are discounted in proportion to a fact finder’s estimate of the parties’ relative bargaining skill. Indeed, when confronted with an apparent proposal for such discounting, the Federal Circuit reacted with sharp hostility, rejecting the “‘survival of the fittest’ jungle mentality” that would “distinguish the respect due the patent rights of impecunious individual inventors from that due the patent rights of well-funded, well-lawyered, large manufacturing corporations.”¹¹²

In short, there seems no way around the fact that Lemley and Shapiro have failed to justify their benchmark. Moreover, this benchmark undergirds any claim that their theoretical model proves the existence of systematic

108. *Fromson v. W. Litho Plate & Supply Co.*, 853 F.2d 1568, 1574–75 (Fed. Cir. 1988), *overruled on other grounds*, *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337, 1341 (Fed. Cir. 2004).

109. *See Landers*, *supra* note 49, at 327 (stating that “courts appear to favor basing a reasonable royalty on an established royalty for the patent” and “giv[e] considerable weight” to “[t]he patentee’s past licensing practices”).

110. *CHISUM*, *supra* note 92, § 20.03[3][b][i] (internal quotation marks omitted); *see also, e.g.*, *Utah Med. Prods., Inc. v. Graphic Controls Corp.*, 350 F.3d 1376, 1385–86 (Fed. Cir. 2003) (affirming the lower court’s exclusion of expert testimony regarding the reasonableness of the royalty rate based on other license agreements because those agreements were not comparable to the present situation); *Gen. Motors Corp. v. Dailey*, 93 F.2d 938, 941–42 (6th Cir. 1937) (“[This court’s] previous holding . . . that the diminished royalty rate to which the patentee may have been driven in individual cases by the disrepute of his patent and the open defiance of his rights should not be taken as the true measure of reasonable royalty . . .”); Susan Perng Pan, *Patent Damage Assessments After Rite-Hite and Grain Processing*, 42 *IDEA* 481, 485 (2002) (“[P]roof of pre-existing licenses for the patent-in-suit or comparable patents is commonly vulnerable to attack based on the unique characteristics of the dispute.”).

111. *Cf. Cincinnati Car Co. v. N.Y. Rapid Transit Corp.*, 66 F.2d 592, 595 (2d Cir. 1933) (L. Hand, J.) (“[A] royalty of \$100 for each articulation is the utmost that we can fix upon this record . . .”).

112. *Fromson*, 853 F.2d at 1575.

overcharges. If, as might be plausibly argued, Lemley and Shapiro’s benchmark royalty rate of $B \times V \times \theta$ would, in practice, systematically undercompensate nonpracticing or otherwise noncompeting patent holders,¹¹³ the fact that some of those patent holders may get more than $N \times B \times V \times \theta$ might be cause for celebration rather than condemnation. Of course, what constitutes overcompensation or undercompensation depends on normative questions and economic realities that Lemley and Shapiro do not address. Lemley and Shapiro have provided no real reason to believe that $B \times V \times \theta$ is a correct “magic number.” And in the absence of any good justification for this baseline—or any specific baseline whatsoever—their claim to have “demonstrate[d]” a pattern of “systemati[c] overcompensat[ion]”¹¹⁴ necessarily fails.

2. *Problems with Lemley and Shapiro’s Assumptions Regarding the Patented Invention’s Per-Unit Value V.*—As subparts III(A) and III(B) of this Commentary have indicated, even if Lemley and Shapiro’s analysis did not suffer from a fundamental baseline problem, it would still suffer from a number of defects that tend artificially to inflate the significance of the threat of a permanent injunction. Moreover, Lemley and Shapiro’s article would also suffer from a failure fully to grapple with the difficulty of defining a patented invention’s per-unit value V , particularly when there are design-around options that may retain at least some of the advantages of the patented invention.

First, Lemley and Shapiro’s consistent invocation of the patented invention’s marginal per-unit value V can generate a misleading sense that this quantity is well defined and clearly distinguishable from other values, such as the overall product’s marginal per-unit value M —a value that is itself frequently difficult to specify. Even if the per-unit margin M is known, the fraction of that margin that should be attributed to the patented invention is likely to be both difficult to measure and the subject of legitimate and heated dispute. As Lemley and Shapiro recognize,¹¹⁵ the patent holder may have a plausible argument that the patented invention’s per-unit value V effectively equals the entire margin M . On the other hand, the potential infringer may believe that V is really only a small fraction of M .¹¹⁶ In situations involving multiple innovative features, disparities in such estimates of value are likely to be compounded.¹¹⁷

113. See *supra* subpart III(B).

114. Lemley & Shapiro, *supra* note 7, at 2044.

115. See *id.* at 2023 (asserting that “permit[ting] patentees to recover not just the value of the patented component but also other unpatented components” “makes sense” if the patented component really drives consumer demand for the overall product).

116. Cf. *infra* text accompanying notes 145–50.

117. Cf. Lemley & Shapiro, *supra* note 7, at 2024 (asserting that where “the value of the patent [is] only a small part of the larger product,” “a court will have to determine what else is in the product . . . and how much those elements contribute to the value of the entire product”).

In general, the concept of a per-unit value V for the invention may be little more than a theoretical heuristic. Both in court and at the bargaining table, the more pertinent question is likely to be what fraction of the overall per-unit margin M the patent holder will receive. Indeed, in response to the difficulties of determining reasonable royalties, some courts have gone so far as to adopt a “so-called ‘rule of thumb’” that the patent holder should receive “25% of the infringer’s pre-tax profits . . . subject to upward or downward departures based on the *Georgia-Pacific* factors.”¹¹⁸ In light of such realities, subpart III(A) of this Commentary has presented the potential infringer’s calculus in “fraction of profit” terms. Such terminology seems better to reflect the high degree of uncertainty about the worth of a patented invention that is likely to prevail—and, by prevailing, to suggest that courts may not be so well positioned, in the face of such uncertainty, to provide an adequate remedy without issuing an injunction.

There is an additional way in which Lemley and Shapiro appear to underestimate the potential benefits of a design-around. Lemley and Shapiro apparently assume that a design-around will forfeit all value that the patented invention added to the original product.¹¹⁹ But a potential infringer might in fact have access to, or may believe that it can develop, a design-around that will act as an essentially perfect substitute for the patented invention. In

118. Landers, *supra* note 49, at 333.

119. Lemley and Shapiro’s omission here may reflect an implicit assumption that if there is a noninfringing design-around that can *substitute* for the patented invention, thereby retaining the patented invention’s value V as part of the final product, the value V of the patented invention must be 0. See Lemley & Shapiro, *supra* note 7, at 2039 (arguing that “reasonable royalties” should be based on the relative values of the patented component and “the next best, noninfringing alternative” (emphasis omitted)). This assumption is untrue. The value of a patented invention is not necessarily merely its worth relative to that of an alternative. This can be appreciated by recognizing, for example, that my ability to purchase a bottle of Soda 2 for \$1.00, rather than a bottle of Soda 1 for \$1.25, does not mean that Soda 1 is worth only \$0.25—the difference between the values of the two choices. Likewise, the fact that company A can replace company B’s patented invention with company C’s patented invention does not mean that company B’s invention is worth no more than its value relative to company C’s. A more proper measure of worth would seem to be the value of company B’s invention relative to Company C’s plus the cost of licensing company C’s. It has long been appreciated that patents can provide “an incentive to invent substitute technologies,” *e.g.*, Kitch, *supra* note 30, at 278, but the fact that a patent has inspired the discovery of a substitute does not mean that the patented contribution should be considered to be devoid of value. In any event, even if Lemley and Shapiro mean to use a consistent assumption that for any patented invention with associated marginal value V , any design-around forfeits the entirety of that value in the finished product (rather than, for example, finding some substitute for it), and if, at the same time, Lemley and Shapiro do not want to include this forfeited value as part of their term for the design-around cost, it seems that Lemley and Shapiro should, for purposes of consistency, increase their calculated “percentage gap” under the “Redesign and Litigate Strategy,” Lemley & Shapiro, *supra* note 7, at 2002, by adding to it a term proportional to $(N_{\text{post-DA}}/N) \times (1-\theta)/\theta$, where $N_{\text{post-DA}}$ is the number of potentially infringing products that would otherwise have been sold after the time of the design-around but before the patent expired. Adding this correction term would make their result for “overcharge” under the “Redesign and Litigate Strategy” consistent with their result for “overcharge” in conjunction with predesign negotiations for which $N_{\text{post-DA}}$ effectively equals N . See *id.*

accordance with Lemley and Shapiro’s approach to modeling negotiated royalties, the availability of such a design-around would appear to mean that the parties would settle on a licensing fee totaling to $N_{pre-DA} \times B \times V \times \theta + B \times D + \lambda$, where N_{pre-DA} is the number of potentially infringing products made or sold before implementation of the design-around, B reflects the patent holder’s relative bargaining skill, D is the expected cost of the design-around (including, in this formulation, any cost from, for example, a halt to production while the design-around is implemented), and λ is a function of the parties’ expected litigation costs and the patent holder’s relative bargaining skill.¹²⁰ This licensing fee could be less than Lemley and Shapiro’s benchmark figure, $N \times B \times V \times \theta$.¹²¹ In other words, according to Lemley and Shapiro’s model, the availability of such a design-around could cause the patent holder to receive less than Lemley and Shapiro’s benchmark—a result further suggesting that comparison to this benchmark in fact tells us little about the extent to which a problem of systematic overcompensation exists.

IV. Inadequacy of Lemley and Shapiro’s Empirical Evidence

Lemley and Shapiro’s empirical evidence similarly fails to justify their claim to have “demonstrate[d] that under current law patentees whose inventions are only one component of a larger product are systematically overcompensated.”¹²² In large part, this conclusion follows from Lemley and Shapiro’s failure to provide any well-justified measure of whether overcompensation has occurred. But even if Lemley and Shapiro had identified and justified a meaningful measure of excessive compensation, it is difficult to see how their scattering of data could prove systematic overcompensation. For the most part, Lemley and Shapiro appear instead to present evidence of *sporadic* instances of *sizeable*, but not necessarily normatively *excessive*, patent rewards.

Lemley and Shapiro’s evidence for excessive rewards appears to consist substantially of the following: (1) “one patent owner charges a 0.75% royalty for patents that do not cover industry standards and 3.50% for patents that do cover industry standards”;¹²³ (2) the manufacturer of the BlackBerry device settled a patent infringement suit for \$612.5 million after the jury awarded damages of only \$33.5 million;¹²⁴ (3) patent holders in approximately fifty cases spread over more than two decades have won court-assessed damages equivalent to average royalties of 13%, patent holders in a subset of eleven

120. See Shapiro, *supra* note 2, at 13–15.

121. See Lemley & Shapiro, *supra* note 7, at 1997 (positing a value for N of “10 million” in an example used to explain the meaning of their term C).

122. *Id.* at 2044.

123. *Id.* at 2009.

124. *Id.* at 2009 & n.36.

cases involving “component” inventions won damages at royalty rates at levels about two-thirds of those in cases involving “integrated product” inventions,¹²⁵ and “the average profit margin across all industries for the past twenty-five years is 8.3%.”¹²⁶

Lemley and Shapiro’s data set is concededly small. Moreover, in large part for reasons Lemley and Shapiro themselves identify—the extraordinary nature of a patent suit that survives to the point where a reasonable royalty is calculated by a court and the similarly unusual status of publicly reported negotiated royalty rates¹²⁷—their data seems likely to be unrepresentative of the vast universe of licensing agreements, or lack thereof, that appears most likely to determine whether patent holders are, in general, rewarded adequately, excessively, or insufficiently. Even if it is true that some patent holders receive very large rewards, these patent owners may not be representative of the whole. Further, patents that become the basis for court-awarded damages may be exceptionally likely to involve inventions to which an unusually high proportion of overall profits might be attributed: disagreement over whether the patented invention was responsible for such a high percentage of profits may have helped prevent settlement. By way of contrast, the great mass of patents, even those for socially valuable inventions, may produce either no revenue at all or, at least, very little in comparison to the social value of the patented contributions.¹²⁸ Large rewards for patent law’s “winners” might help to counterbalance such general “undercompensation.” At the very least, large rewards for a few might not mean that there is a general problem with overcompensation—or more specifically, a problem general enough to justify altering patent remedies in a broad category of cases.

Moreover, Lemley and Shapiro’s data set is not only sparse and likely unrepresentative; it is also, to a substantial degree, fundamentally ambiguous. None of this data involves a comparison with even an estimated value for Lemley and Shapiro’s posited royalty benchmark—never mind a normatively justified measure for a proper patent reward. Consequently, even when pairs

125. *Id.* at 2032–33, 2032 tbl.1.

126. *Id.* at 2035.

127. *See id.* at 1992 (“[F]ar more patents are licensed or settled than litigated to judgment.”); *id.* at 2022 (“[T]he royalties that are reported tend to be higher than the average royalty.”); *id.* at 2030 (noting the “surprisingly small” number of reported cases “that actually awarded reasonable royalties”); *see also* Shapiro, *supra* note 2, at 8 n.12 (observing that “about 97% of all filed patent cases settle” and estimating that there may be “more than one hundred patent licenses for every patent litigation that results in a final judgment”); *cf.* John R. Allison et al., *Valuable Patents*, 92 GEO. L.J. 435, 435 (2004) (“Ninety-nine percent of patent owners never even bother to file suit to enforce their rights.”); Bessen & Meurer, *supra* note 47, at 20 (“Research shows that litigated patents differ significantly from non-litigated patents.”).

128. *See, e.g.*, Bessen & Meurer, *supra* note 47, at 8 (noting that “[p]atent values are highly skewed,” with one study showing “that often the top 10% of patents (or innovations) account for 80–90% of the total returns”). It might, on the other hand, be possible to predict that certain patents are likely to be significantly more valuable than others. *See* Allison et al., *supra* note 127, at 462 (critiquing comparison of patents to “lottery tickets”).

of figures are contrasted, such as 3.50% and 0.75% royalty rates that a single patent owner offers for different inventions,¹²⁹ it seems impossible to tell whether one member of the pair is “depressed” compared to its proper value, or whether the other is “inflated,” or whether the comparison between the two figures is really meaningful at all. Likewise, comparison to general profit margins is, by itself, substantially unhelpful because such margins presumably reflect profits *after* most firms have in fact paid for the technology that they use. For example, a law-abiding firm with a profit margin of 8% presumably has paid for its technology from the 92% of its revenue that is absorbed by costs. The amount that a firm pays for technology thus might well be comparable to, or even significantly higher than, the ultimate profit margin.¹³⁰

This is not to say that Lemley and Shapiro’s efforts to gather data should go unappreciated, or that their data is uninteresting. The evidence of large numbers of patents overlapping with technology standards seems sufficiently alarming to demand further investigation, and the assembled data on court-awarded reasonable royalties provides a reference point for further discussion and research. But although some of Lemley and Shapiro’s data suffices to flag concerns, it does not justify declaring an epidemic. It does not “demonstrate” the existence of “systemati[c] overcompensat[ion]” when permanent injunctions are generally available.¹³¹

V. The Prospect of Discriminatory Access to Permanent Injunctions

The debate about whether and when permanent injunctions are contrary to either equity or the aims of the patent system is far from merely academic. The Supreme Court’s decision in *eBay* has encouraged lower courts to reexamine such issues, and since *eBay* the district courts have repeatedly denied permanent injunctions sought by noncompeting patent holders.¹³²

In this context, it is important to respond to Lemley and Shapiro’s apparent advocacy of rules for the denial of permanent injunctions that would categorically discriminate among patent holders based on their business models. Lemley and Shapiro endorse a “presumptive right to injunctive

129. Lemley & Shapiro, *supra* note 7, at 2009.

130. To put this another way, consider a situation where a company has a profit margin of 20% if it sells a product without paying at all for patented technology. If through negotiations or court order, the company ends up paying 12% of its revenue to a patent holder, it will still have a profit margin of 8%. *Georgia-Pacific*’s hypothetical-negotiation factor for determining a reasonable royalty incorporates understanding of the nature of residual profit margins by instructing that a court consider “the amount which a prudent licensee . . . would have been willing to pay as a royalty and *yet be able to make a reasonable profit.*” *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970) (emphasis added), *modified sub nom.* *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295 (1971). As noted earlier, various courts have in practice adopted a “so-called ‘rule of thumb’” that the patent holder should presumptively receive “25% of the infringer’s pre-tax profits.” Landers, *supra* note 49, at 333.

131. Lemley & Shapiro, *supra* note 7, at 2044.

132. See *supra* note 12 and accompanying text.

relief” for patent holders who compete with the infringer or who have provided an exclusive license to an entity that does.¹³³ Patent holders not meeting these criteria—including patent holders who have chosen to license nonexclusively, rather than exclusively—would not be so fortunate: Lemley and Shapiro would apparently deny them such a presumption and would have a court deny them a permanent injunction whenever the court finds that the cost of an infringer’s proposed design-around “is high relative to the value that the patented technology has added to the infringing firm’s product.”¹³⁴ According to Lemley and Shapiro, instead of awarding such a patent holder an injunction, courts should instead effectively award the adjudged infringer a compulsory license for a duration that Lemley and Shapiro do not specify, with the cost of the license determined not in accordance with any estimate of future market conditions but rather in accordance with the royalty rate determined for retrospective damages.¹³⁵

To the extent Lemley and Shapiro propose the application of different presumptions—and thus, in effect, different burdens of proof—based on the business model of the patent holder, their recommendation promises to make a patent’s worth depend significantly and as a matter of law on who owns it. A patent holder who competes with the infringer or licenses exclusively to someone who does would obtain all the benefits of a presumption of injunctive relief, but a patent holder whose business model does not fit these criteria would not.

Such a categorically discriminatory rule is not needed to ensure that courts have flexibility to deny requests for permanent injunctions. Courts could apply a rebuttable presumption of injunctive relief to all patent holders and still either stay an injunction where appropriate¹³⁶ or otherwise deny an

133. Lemley & Shapiro, *supra* note 7, at 2035. There may be substantial questions about the extent to which any general presumptions relating to the issuance or denial of permanent injunctions are compatible with portions of the Supreme Court’s opinion in *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837 (2006). See *Sanofi-Synthelabo v. Apotex, Inc.*, 470 F.3d 1368, 1381, 1383 n.9 (Fed. Cir. 2006) (finding that affirmative evidence of irreparable harm meant that the court did not have to resolve a contention, in the preliminary injunction context, “that the district court erred by applying a presumption of irreparable harm because Sanofi established a likelihood of success on the merits”). See *generally eBay*, 126 S. Ct. at 1841 (“We hold only that the decision whether to grant or deny injunctive relief rests within the equitable discretion of the district courts, and that such discretion must be exercised consistent with traditional principles of equity . . .”). Because this Commentary’s focus is on concerns of policy, it leaves the task of closely parsing the *eBay* opinion to others and assumes the permissibility of presumptions to guide the issuance or denial of injunctions. Cf. *Martin v. Franklin Capital Corp.*, 546 U.S. 132, 139 (2005) (“We have it on good authority that ‘a motion to [a court’s] discretion is a motion, not to its inclination, but to its judgment; and its judgment is to be guided by sound legal principles.’” (quoting *United States v. Burr*, 25 F. Cas. 30, 35 (C.C.D. Va. 1807) (No. 14,692d) (Marshall, C.J.))).

134. Lemley & Shapiro, *supra* note 7, at 2037.

135. *Id.* at 2037–39, 2038 n.151.

136. What might be viewed as Lemley and Shapiro’s principal proposal—that courts stay permanent injunctions to permit “redesign . . . in an efficient and timely manner,” Lemley & Shapiro, *supra* note 7, at 2038—seems facially reasonable, at least where a court can efficiently and competently delineate what an “efficient and timely manner” is, and perhaps particularly where a

injunction when, for example, it would inflict “undue hardship”¹³⁷ on the adjudged infringer or implicate special concerns of the public interest.¹³⁸ Like traditional approaches to issuing preliminary injunctions,¹³⁹ such an approach to issuing permanent injunctions could produce de facto discrimination against nonpracticing or otherwise noncompeting patent holders: if, for example, an infringer shows that a permanent injunction will cause severe business harm to the infringer, a nonpracticing or otherwise noncompeting patent holder may be unable to argue that such hardship is “due” because continued infringement will inflict comparable business harm on the patent holder. But such differential outcomes need only result from contingent fact, rather than a per se rule denying noncompeting patent holders a presumption of injunctive relief because of their business model.

Lemley and Shapiro nonetheless advocate such categorically different treatment as a matter of law. Their position may reflect a failure fully to grapple with the intrinsic difficulty of determining even a retrospective reasonable royalty—never mind the difficulty of assigning a prospective

stay would be relatively short compared to the commonly years-long length of an overall litigation. Of course, Lemley and Shapiro’s proposal for stays might require qualification, or even abandonment, in various situations—for example, where a court cannot efficiently and competently assign or enforce a time limit for a stay, where the adjudged infringer has “unclean hands,” or where the adjudged infringer has failed to exploit reasonable opportunities to prepare, or perhaps even to implement, a design-around after liability has been established. It may bear noting that courts have sometimes found it difficult to monitor, and to ensure the appropriate speed of, remedial actions in the administrative-agency context. See Peter L. Strauss et al., GELLHORN AND BYSE’S ADMINISTRATIVE LAW: CASES AND COMMENTS 602–03 (rev. 10th ed. 2003) (describing repeated delays in the issuance of a workplace safety standard, despite court-imposed deadlines).

137. Undue hardship is a traditional reason “for denying specific relief.” LAYCOCK, *supra* note 77, at 398; see also Douglas Laycock, Remedies in the Legal System and in the Curriculum 25, <http://www.aals.org/am2007/wednesday/remedies/laycockoutline.pdf> (discussing the defense offered by undue hardship in the context of *eBay*).

138. See Schwartz, *supra* note 38, at 1045, 1045–47 (advocating that courts should retain “limited discretion to deny some injunctions that [would] impose severe hardship on the infringer” or would threaten the public interest). Courts could choose to deny injunctions when, for example, an adjudged infringer shows that (1) an injunction will harm the public interest to such a degree that the presumed public interest in protecting congressionally sanctioned patent rights is outweighed or (2) an injunction will cause undue harm to the infringer in circumstances where the costs of halting infringement greatly exceed both (a) reasonable estimates of the positive value of the infringement and (b) any harm to the right holder other than its failure to recover from the infringer the positive value of infringement or the negative value associated with the cost of terminating infringement. Lemley and Shapiro’s theoretical model might then provide a framework through which at least certain aspects of a situation alleged to involve “undue harm” might be assessed. In Lemley and Shapiro’s terms, the “positive value” of infringement described by the text might correspond to the invention’s marginal value V multiplied by the anticipated number of infringing products to be produced. The cost of terminating infringement might correspond to the lower of (1) the overall per-unit product margin M multiplied by the anticipated number of postjudgment products and (2) the lowest design-around cost, where the design-around cost is here understood to include portions of product margins that would be lost if a design-around were implemented. Thus, just as Lemley and Shapiro *do* show how a patent holder can obtain negotiated royalties tied to values having little to do with the invention’s worth, they *do* provide a potential approach to analyzing when undue harm from an injunction might occur.

139. See *infra* note 166.

value to patent rights or of assessing the likely cost or noninfringing status of an as-yet-unimplemented design-around. Although Lemley and Shapiro apparently understand that determining reasonable-royalty damages is hard,¹⁴⁰ they seem blind both to the full extent of the difficulty and to the implications for the adequacy of legal remedies.¹⁴¹ Somewhat oddly, they even seek to defend judicial assignment of a static future royalty rate based on a retrospective damages award by reasoning, in essence, that it is simply too hard to provide an adequate measure of future monetary compensation.¹⁴²

In fact, monetary compensation for patent rights is problematic even when the outlook is not prospective. The difficulty of assessing *even a retrospective* reasonable royalty is notorious.¹⁴³ Cognizant of the by-now canonical fifteen-factor *Georgia-Pacific* “test” for assessing such royalties,¹⁴⁴ both courts and commentators have remarked that the determination of a reasonable royalty “seem[s] often to involve more the talents of a conjurer

140. See Lemley & Shapiro, *supra* note 7, at 2019–20 (acknowledging “counterfactual” aspects of a hypothetical negotiation inquiry to calculate reasonable-royalty damages).

141. In response to a legislative proposal to require courts to “exclude from the [reasonable-royalty] analysis the economic value properly attributable to the prior art, and other features or improvements . . . that contribute economic value to the infringing product or process,” S. 1145, 110th Cong. § 5 (2007), the Chief Judge for the Court of Appeals for the Federal Circuit recently wrote a letter to two Senators stating, “Such an exercise might be successfully executed by an economic institution with massive resources and unlimited time, but hardly seems within the capability of already overburdened district courts.” Letter from Paul R. Michel, C.J., Court of Appeals for the Fed. Circuit, to Sens. Patrick Leahy and Orrin G. Hatch 2 (May 3, 2007), available at <http://www.patentlyo.com/patent/files/MichelLetter.pdf>.

142. See Lemley & Shapiro, *supra* note 7, at 2038 n.151 (“Only in exceptional circumstances would it be possible to accurately award future lost profits without some mechanism for evaluating market conditions as they change over time.”). Lemley and Shapiro seek to defend their proposal to have courts provide fixed-rate compulsory licenses in part by observing that “patent licenses commonly specify a royalty rate that does not change based on evolving market conditions.” *Id.* But private parties presumably set royalty rates with a view to some estimate of future market conditions. Although they may often conclude that “historical information” is the best indicator of future worth, they may not always do so. If the parties anticipate changed market conditions, they can limit the duration of a license or agree to a formula or process for adjusting the royalty rate accordingly. In any event, it is difficult to believe that the process of providing “damages adequate to compensate,” 35 U.S.C. § 284 (2000), is improved by completely failing to consider whether a court-imposed compulsory license will fairly compensate for court-authorized future use.

143. See, e.g., 3 PHILIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION § 707i, at 209 (2d ed. 2002) (describing “a ‘reasonable’ royalty rate” as theoretically tied to patent value, which is “almost impossible to determine, apart from such an obvious case as an improved process that reduces everyone’s production costs by, say, 10 percent”); F. Russell Denton & Paul J. Heald, *Random Walks, Non-Cooperative Games, and the Complex Mathematics of Patent Pricing*, 55 RUTGERS L. REV. 1175, 1178–79 (2003) (“A patent is the paradigmatic example of a business asset that is difficult to value. . . . Current patent valuation methods have been described charitably as ‘inappropriate,’ ‘crude,’ ‘inherently unreliable,’ and a ‘guesstimate.’” (footnotes omitted)).

144. *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970) (enumerating the fifteen factors), *modified sub nom. Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295 (1971).

than those of a judge.”¹⁴⁵ Expert witnesses from opposing sides of a patent case frequently differ hugely in their estimates of reasonable royalties. In *Norian Corp. v. Stryker Corp.*,¹⁴⁶ experts’ estimates of damages differed by a factor of five.¹⁴⁷ In another recent case, *Micro Chemical, Inc. v. Lextron, Inc.*,¹⁴⁸ experts’ estimates differed even more dramatically—by a factor of about 120 with respect to the damages from one infringer, and by a factor of about 200 with respect to those from another.¹⁴⁹ The case that produced *Georgia-Pacific*’s fifteen-factor test itself included estimates of a reasonable royalty that differed by more than a factor of sixteen.¹⁵⁰

Wide differences in experts’ reasonable-royalty estimates provide only one indication of the difficulty of assessing such damages. An infringer’s unauthorized use of a patent can distort or destroy the market for licensing an invention, just as it can distort or destroy the price of an end product. Consequently, any effort to determine what would have been a reasonable price in the absence of infringement may often amount to no more than an educated guess, based in part on either unstated assumptions or open speculation about the level and nature of use to which the patent holder might have agreed.¹⁵¹ In general, the assessment of reasonable-royalty damages remains,

145. *Fromson v. W. Litho Plate & Supply Co.*, 853 F.2d 1568, 1574 (Fed. Cir. 1988), *overruled on other grounds*, *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337, 1341 (Fed. Cir. 2004); *accord* *Trell v. Marlee Elecs. Corp.*, 912 F.2d 1443, 1447 (Fed. Cir. 1990) (quoting *Fromson*); Roger D. Blair & Thomas F. Cotter, *Rethinking Patent Damages*, 10 TEX. INTELL. PROP. L.J. 1, 37–38 (2001) (quoting *Trell*); Landers, *supra* note 49, at 328 (quoting *Fromson*); *see also* *Denton & Heald*, *supra* note 143, at 1253 (“Commentators agree that the determination of a reasonable royalty rate for a licensing agreement that does not exist—and never existed—is a formidable task for licensing experts and triers of fact.”).

146. 363 F.3d 1321 (Fed. Cir. 2004).

147. *See id.* at 1333 (“*Norian*’s expert testified that a reasonable royalty would have been 15%, while *Stryker*’s expert testified to a reasonable royalty of 3%.”).

148. 317 F.3d 1387 (Fed. Cir. 2003).

149. *See id.* at 1390 (reporting competing royalty estimates of \$1,539,600 and \$12,717 for one infringer, and of about \$145,600 and \$735 for another infringer).

150. *See Georgia-Pacific Corp.*, 318 F. Supp. at 1141–42 (reporting that an expert for the adjudged infringer estimated a fair-value royalty of about \$3 per thousand square feet of plywood, but that witnesses for the patent holder said that it would have sought no less than \$50 per thousand square feet).

151. Patent licenses commonly include more than provisions requiring payment of a flat, per-unit royalty rate. For example, a patent license may also include provisions that require minimum payments or that are otherwise designed to influence or to govern how and where the patented invention is exploited, as well as who has rights in improvements to the patented technology. *See, e.g.*, *Gen. Motors Corp. v. Dailey*, 93 F.2d 938, 941 (6th Cir. 1937) (reporting that licensing negotiations between the patent owner’s agent and General Motors “did not result in a contract because General Motors refused to guarantee a minimum production”); MARK S. HOLMES, PATENT LICENSING: STRATEGY, NEGOTIATION, FORMS § 1:3.2, at 1-8 to 1-10 (2006) (discussing best-efforts, minimum-expenditure, and minimum-royalties provisions); *id.* § 2:10, at 2-26 (discussing provisions “to restrict how a licensee may use the patented rights”); *id.* §§ 4:2–5, at 4-2 to 4-8 (describing various potential arrangements for compensation, including upfront royalties and milestone payments); Ethan Horwitz, *Patent & High Technology Licensing*, in PATENT & HIGH TECHNOLOGY LICENSING 2005, at 57, 66–68 (Ethan Horwitz & Mark S. Holmes eds., 2005) (discussing potential licensing provisions regarding “patentable improvements” and territory, field-

as Judge Learned Hand indicated, an art of approximating “that which is really incalculable.”¹⁵²

The difficulty of assessing a reasonable royalty has in fact been one of the principal rationales for granting permanent injunctions. Commentators as well as courts have tended to conclude that property rules enforced by permanent injunctions generally make sense where a unique set of rights that are difficult to value is threatened with continued infringement.¹⁵³ Because the courts are unlikely to do a good job at determining damages in such a context, conventional analysis has suggested that absent special circumstances, private parties should be left to assign the value of such rights through contract.¹⁵⁴ Because patent holders often can do little to prevent infringement short of suing, and because potential infringers often have better information regarding both their plans and the costs and benefits of using or not using the patented invention, it has made further sense to provide a patent holder with a presumption of injunctive relief that can help ensure that a potential or adjudged infringer has sufficient incentive to seek to resolve differences,¹⁵⁵ including by bringing adequate and credible information to the bargaining table.¹⁵⁶

of-use, and duration restrictions); *id.* at 82 (discussing “up-front fees, milestone payments, and minimum royalties”).

152. *Cincinnati Car Co. v. N.Y. Rapid Transit Corp.*, 66 F.2d 592, 595 (2d Cir. 1933).

153. *See, e.g.*, MERGES & DUFFY, *supra* note 50, at 1067 (indicating that it makes sense for “[t]he basic remedy in a patent infringement case [to be] the injunction,” in part because “judicial valuation of patent rights after an infringement is very difficult and inaccurate”); Robert P. Merges, *Of Property Rules, Coase, and Intellectual Property*, 94 COLUM. L. REV. 2655, 2664 (1994) (noting that enforcement of “property rule[s]” for intellectual property rights is supported by their “unique[ness]” and the “difficult valuation problems” that they present); *cf.* *Phillips v. Crown Cent. Petroleum Corp.*, 602 F.2d 616, 630 (4th Cir. 1979) (“A future injury of uncertain date and incalculable magnitude is irreparable harm, and protection from such an injury is a legitimate end of injunctive relief.”); 2 DAN B. DOBBS, *LAW OF REMEDIES* § 6.2(5), at 43 (“[T]rademarks, copyrights and patents all involve items unique in at least some respect; they deserve protection of the right to exclusive use.”); LAYCOCK, *supra* note 77, at 398 (“One of the commonest reasons for holding legal remedies inadequate is that damages are difficult to measure . . .”).

154. *See, e.g.*, AREEDA & HOVENKAMP, *supra* note 143, § 705c (“[C]ompulsory licensing may be the only remedy for some antitrust violations involving patents, but even then it must be used sparingly. Except in the case of royalty-free licensing, compulsory licensing places the court in the position of price regulator—a task for which it is poorly suited.”); MERGES & DUFFY, *supra* note 50, at 1067 (“[S]ophisticated parties with knowledge of an industry are usually in a better position than courts to determine the value of the rights . . .”); *cf. In re Rambus, Inc.*, No. 9302, Opinion of the Commission on Remedy, at 16–17 (F.T.C. Feb. 5, 2007) (“Royalty rates unquestionably are better set in the marketplace, but Rambus’s deceptive conduct has made that impossible. Although we do not relish imposing a compulsory licensing remedy, the facts presented make that relief appropriate and indeed necessary to restore competition.”). *See generally* Henry E. Smith, *Property and Property Rules*, 79 N.Y.U. L. REV. 1719, 1754 (2004) (“[I]t is property rules rather than liability rules that truly decentralize decisionmaking.”).

155. *See* MERGES & DUFFY, *supra* note 50, at 1067 (stating that where the “basic remedy . . . is the injunction,” infringers “must bargain with the right holder”); *cf.* *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 1841 (2006) (Roberts, C.J., concurring) (“This ‘long tradition of equity practice’ is not surprising, given the difficulty of protecting a right to *exclude* through monetary remedies that allow an infringer to *use* an invention against the patentee’s wishes . . .”). Professor

This conventional analysis seems plausible.¹⁵⁷ Indeed, Lemley and Shapiro appear to agree with it when they say that “the grave difficulties associated with calculating and awarding lost profits”¹⁵⁸ generally justify granting permanent injunctions. What Lemley and Shapiro do not explain is why “the grave difficulties associated with calculating and awarding” reasonable royalties do not generally justify the same result.

One explanation could be that although Lemley and Shapiro artificially limit their study to noncompeting patent holders, their analysis really suggests that injunctive relief can be problematic regardless of the patent holder’s identity. Various factors that drive Lemley and Shapiro’s concerns apply regardless of whether the patent holder is nonpracticing or otherwise noncompeting: for example, (1) a patent holder’s rational interest in seeking

Landes and Judge Posner have advised that in the intellectual property context, injunctions may promote efficiency by “coerc[ing]” negotiation:

When market transaction costs are low, as is generally the case when one person thinks he can use another’s property more efficiently . . . efficiency requires remedies that coerce the would-be user into negotiating with the owner rather than just taking the owner’s property subject to a court’s determining what price (damages) he shall be forced to pay for it

WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 8 (2003). Because of a lack of preexisting relationships with industry “incumbents,” independent inventors may derive special benefit from an injunction threat’s capacity to bring an incumbent to the bargaining table. See John R. Allison, Abe Dunn & Ronald J. Mann, *Software Patents, Incumbents, and Entry*, 85 *TEXAS L. REV.* 1579, 1615 n.126 (2007) (“[T]he availability of injunctive relief . . . is crucially important to the intermediaries in [the independent inventor] channel.”); see also Jean O. Lanjouw & Mark Schankerman, *Protecting Intellectual Property Rights: Are Small Firms Handicapped?*, 47 *J.L. & ECON.* 45, 47 (2004) (reporting findings that “support the hypothesis that both trading patents and repeated interaction are important for patent dispute resolution and that as a consequence, small firms are at a disadvantage in terms of their ability to protect their patent rights”).

156. Information provided by a potential or adjudged infringer may have the added social benefit of permitting the patent holder to coordinate exploitation of, and the exchange of information regarding, the patented information. See Kitch, *supra* note 30, at 276 (“[T]he patent owner [is] in a position to coordinate the search for technological and market enhancement of the patent’s value so that duplicative investments are not made and . . . information is exchanged among the searchers.”).

157. As Henry Smith has noted, it might be argued that a court system’s relative incompetence in assessing damages is effectively harmless as long as courts award damages in accordance with an estimate of average harm that “is not systematically biased.” Smith, *supra* note 154, at 1742. But as Smith also observes, the proposition that average-harm damages will generally be efficient has been found to “break down in the face of common or correlated values.” *Id.* at 1744. More generally, injunction-oriented “property rules” are still likely to enjoy an “information-cost advantage.” *Id.* at 1748; see also *id.* at 1760 (“The exclusion strategy is low cost at low levels of precision because it can give rough protection to a wide range of uses about which officials need know little.”). Liability rules are more susceptible to manipulation by “takers” who, for example, selectively take assets “hav[ing] an average value that is higher” than the value likely to be assigned by a court. *Id.* at 1780; see also *id.* at 1747 n.110 (stating that patent-prize proposals are “vulnerable . . . to actors’ abilities to anticipate and manipulate the criteria used by officials to value inventions”). Indeed, a taker may not be satisfied with merely choosing assets for taking based on whether they are especially likely to be undervalued by a court. A sophisticated taker might well work actively to develop a paper trail designed to lead a court to undervalue the asset in question.

158. Lemley & Shapiro, *supra* note 7, at 2036.

to use the threat of an injunction to obtain as much as it can for its patented invention; (2) difficulties in determining whether patent claims are valid and infringed; and (3) dangers that a commercial actor will be locked into use of a patented technology before the scope and validity of patent claims can be clearly established. If the availability of injunctive relief can allow a non-competing patent holder to overcharge for an invention, it seems that it can do the same for a patent holder who competes directly with an accused or adjudged infringer.

As an empirical matter, however, noncompeting and particularly nonpracticing patent holders might be more likely to use patents to command overcharges. Private markets may be better equipped to mitigate potential holdout problems when the patent holder competes in the relevant market for end products or services. In particular, a potential infringer may be better able to deter suit by such a patent holder, or otherwise to exert pressure for settlement on relatively modest terms, by threatening countersuit based on one of the potential infringer's own patents.¹⁵⁹ The basis for such a patent détente through competing "patent portfolios" generally cannot occur where a patent holder essentially has no activities against which the potential infringer could direct a patent countersuit.¹⁶⁰

But the fact that the market may be better able to defuse holdout threats where a patent holder produces enjoined products or services does not mean that tighter tailoring of equitable remedies should be limited to noncompeting patent holders.¹⁶¹ Patent portfolios can be expensive to develop, and patent détente is neither costless nor uninterrupted.¹⁶² Further, patents that industry incumbents cross license in the spirit of détente may simultaneously be used to create barriers to new entrants.¹⁶³

159. See, e.g., Allison et al., *supra* note 127, at 468–69 (explaining how the threat of “mutually assured destruction” can produce a situation “in which very few companies actually sue for patent infringement because they know that, if they do, their opponents will also be able to sue them for patent infringement”); McDonough, *supra* note 7, at 203 (“Patent portfolios are being used defensively in efforts to . . . create leverage in infringement lawsuits.”).

160. See, e.g., Allison et al., *supra* note 127, at 469 (“[N]onmanufacturing plaintiffs, or ‘licensing shops,’ need not fear that defendants will assert patents against them.”); McDonough, *supra* note 7, at 203 (“Patent dealers are generally immune from the effects of defensive patenting because they do not manufacture products, and therefore there is no basis for a potential countersuit.” (footnote omitted)).

161. Further, to the extent the patent-troll problem is of relatively recent significance, it might be argued that markets in innovation should be allowed time to develop institutions or arrangements to deal with it. Cf. Merges, *supra* note 153, at 2663 (“[I]n the early twentieth century . . . institutions, such as ASCAP and patent pools, emerged *over time* to facilitate many different combinations of separate IPRs. Until we know for sure that software and biotechnology are exceptions, we should . . . give these industries a chance to evolve similar institutional arrangements.”).

162. See Bessen & Meurer, *supra* note 47, at 15–16 (“[A]lthough defensive patenting may lessen a firm’s litigation risk, all else equal, when all firms in an industry build defensive portfolios the net result appears to be greater litigation hazard.”).

163. See *id.* at 17 (“Lanjouw and Lerner show that preliminary injunctions in patent cases tend to be used by large firms hoping to impose financial distress on smaller rivals.” (citing Lanjouw &

Perhaps Lemley and Shapiro should advocate eliminating injunctive remedies altogether, or even replacing the costly process of patent litigation with an administrative-agency-centered process of compulsory licensing. Once it is recognized that reasonable royalties for patent infringement are not substantially more determinate than lost profits, Lemley and Shapiro need to explain why they favor imposing a kind of “working requirement” for presumptive access to permanent injunctions.¹⁶⁴ Why not simply curtail injunctive relief for all patent holders?¹⁶⁵

Moreover, the halfway-house solution that Lemley and Shapiro propose—restricting permanent injunctions for noncompeting patent holders—seems at least as likely to cause mischief as good. Such categorical discrimination against patent holders based on their lack of current or imminent manufacturing capacity, or their desire to license nonexclusively instead of exclusively, threatens to distort the market for invention by explicitly favoring invention and patent-rights ownership by established

Lerner, *supra* note 75, at 575–76); Kal Raustiala & Christopher Sprigman, *The Piracy Paradox: Innovation and Intellectual Property in Fashion Design*, 92 VA. L. REV. 1687, 1771, 1771–72 (2006) (characterizing the microprocessor industry as one where patents lead to cross-licensing arrangements “within the ‘charmed circle’ of the industry’s small number of dominant firms” but to higher entry barriers for “would-be upstarts”); *cf.* Kitch, *supra* note 61, at 343 (expressing concern that “[i]nvalid patents, in the hands of unscrupulous and powerful men” can act as “vehicles for suppression of competition”).

164. The working requirement for a presumption of injunctive relief that Lemley and Shapiro suggest apparently demands only that the patent holder or its exclusive licensee suffer “significant lost profits” from infringement, not necessarily that one or the other produce, use, or perform the patented invention itself. *See* Lemley & Shapiro, *supra* note 7, at 2036. Such a requirement is therefore distinct from working requirements that commonly existed in English law before the requirement of a written description substantially took its place. *See supra* note 50. Since the 1790 Patent Act, United States patent law has generally eschewed such working requirements and has instead viewed disclosure of a patentable invention as essentially full compensation for a right to exclude enforceable through court action. *See* *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 151 (1989) (“‘In consideration of [an invention’s] disclosure and the consequent benefit to the community, the patent is granted.’” (quoting *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 186 (1933))); *Cont’l Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 429 (1908) (describing Congress’ short-lived experiment with a working requirement for noncitizens from 1832 to 1836). Further, Congress has included language in the Patent Act that makes clear that neither nonuse nor refusal to license is to be a basis for finding a patent unenforceable. Act of Nov. 19, 1988, Pub. L. No. 100-703, § 201, 102 Stat. 4674 (codified as amended at 35 U.S.C. § 271(d) (2000)). The requirement of periodic maintenance-fee payments may be viewed as the closest modern analog to the working requirements imposed in the distant past. *See* Kitch, *supra* note 30, at 274 (noting that “requirements for maintenance payments,” like requirements for work on a mineral claim, help “to eliminate claims that prove unpromising and return them to the public domain”).

165. At least one district court may be moving in this direction. *See Praxair, Inc. v. ATMI, Inc.*, Civ. No. 03-1158-SLR, 2007 WL 906704, at *3, *2–3 (D. Del. Mar. 27, 2007) (denying a permanent injunction, despite direct competition between the patent owner and the infringer, where the patent owner had “not explained why it may have ‘difficulties calculating damages going forward,’ nor how money damages could not adequately compensate for ‘lost market share’ or any ‘lost research opportunities’”); *cf.* *IMX, Inc. v. LendingTree, LLC*, 469 F. Supp. 2d 203, 225, 225–26, 228 (D. Del. 2007) (provisionally denying a permanent injunction despite the patent owner’s commercial use of its claimed invention and this invention’s status as more than “a minor component” of the infringing system).

manufacturers and service providers. Such discrimination could favor monopolists and incumbents over competitive firms and new entrants;¹⁶⁶ could discourage innovation, patenting, or patent ownership by economically efficient inventors;¹⁶⁷ could impede efficient specialization of industry functions and encourage inefficient vertical integration;¹⁶⁸ and could prevent patent holders from choosing the most economically efficient, and socially

166. LANDES & POSNER, *supra* note 155, at 330 (“Without patents a boost might be given to the organization of markets along monopolistic rather than competitive lines.”); Ronald J. Mann, *Commercializing Open Source Software: Do Property Rights Still Matter?*, 20 HARV. J.L. & TECH. 1, 36 (2006) (“[A] property rights system favors new entrants because large firms can use other tools related to their market power to continue to grow . . .”). The rules for issuing preliminary injunctions may already tilt patent law’s balance in favor of competing patent holders. An empirical study by Jean Lanjouw and Josh Lerner found that plaintiffs who requested preliminary injunctions were “significantly more likely to be bigger than the defendant.” Lanjouw & Lerner, *supra* note 75, at 575. The study also “suggest[ed] that [preliminary injunctions] may be available only to financially stronger plaintiffs.” *Id.* Although a credible threat of a preliminary injunction might be thought to lead to the sharpest of holdout concerns, preliminary injunctions are not of concern to Lemley and Shapiro. See Lemley & Shapiro, *supra* note 7, at 2036–39 (suggesting criteria for issuing permanent injunctions without discussing preliminary injunctions). This is apparently because “such injunctions are rare,” Shapiro, *supra* note 2, at 8 n.11, and perhaps particularly so in cases involving noncompeting patent holders who can only claim reasonable-royalty damages. See Lemley & Shapiro, *supra* note 7, at 2036 (“[W]e stress that . . . [o]ur policy recommendations here pertain only to [situations] where the patent holder can claim reasonable royalties but not lost profits . . .”).

167. It is possible that a substantial percentage of the United States’ most productive inventors have neither practiced their inventions commercially nor otherwise competed with potential infringers. See, e.g., Bessen & Meurer, *supra* note 47, at 12 (“Academic and independent inventions possibly have disproportionately greater social value . . .”); cf. PANEL ON INVENTION AND INNOVATION, U.S. DEP’T OF COMMERCE, TECHNOLOGICAL INNOVATION: ITS ENVIRONMENT AND MANAGEMENT 16 (1967) (“[Several] studies were unusually consistent in indicating that independent inventors (including inventor-entrepreneurs) and small technologically-based companies are responsible for a remarkable percentage of the important inventions and innovations of [the twentieth] century—a much larger percentage than their relative investment in these activities would suggest.”); Mann, *supra* note 7, at 973 (“[M]any of the most important innovations in the software industry come from relatively small firms.”). A categorical rule reducing the value of patents issued to such inventors by substantially taking away their ability, or that of a patent holding company who purchases their patent rights, to obtain a permanent injunction would effectively favor invention and ownership of invention by entities who are not so encumbered, even when the latter are not the most efficient inventors or disseminators of invention. Cf. AREEDA & HOVENKAMP, *supra* note 143, § 707i, at 210 (“The likelihood of transfer to one who would best utilize the patent and the value of the patent to the inventor would be substantially impaired, were the statutory exclusion power lost after a lawful conveyance to a developer or investor.”). Further, a decentralized market for innovation may itself help to promote progress. See Mann, *supra* note 166, at 32 (“[A] fragmented structure can provide multiple opportunities for solutions to difficult technological problems.”). See generally B. ZORINA KHAN, THE DEMOCRATIZATION OF INVENTION: PATENTS AND COPYRIGHT IN AMERICAN ECONOMIC DEVELOPMENT, 1790–1920, at 10 (2005) (“The ability to transform their human inventive capital into tradeable assets disproportionately helped inventors from disadvantaged backgrounds who lacked the financial resources or contacts that would have allowed them to extract returns by commercializing their inventions on their own.”).

168. A number of analysts have recently suggested that pharmaceutical companies should tend toward more specialization of functions, not less. *Billion Dollar Pills*, ECONOMIST, Jan. 27, 2007, at 69, 70. But if patent value would be destroyed by spinning off a research arm holding patent rights but not engaged in manufacturing, such devolution would presumably be less likely to occur.

beneficial, ways of exploiting their inventions—for example, by licensing them nonexclusively.¹⁶⁹

Effects on noncompeting patent holders could extend significantly beyond a mere devaluation of their patent rights. Small firms looking to establish themselves in the marketplace frequently use patents as levers for obtaining investment and carving out their own protected industry niche.¹⁷⁰ For such companies, the actual provision of end products or services is often beyond the visible horizon, if even within contemplation at all. For the immediate future, their revenues must come from licensing, and their fundraising is often based on a sense that they have laid exclusive claim to a potentially valuable commercial technology. In an age in which authors in the *Harvard Business Review* advise businesses to play “hardball” and to “[p]lagiarize with pride,”¹⁷¹ and in which, instead of simply seeking to avoid infringement, “many firms in the information technology sector” seek instead to protect themselves from charges of *willful* infringement by “instruct[ing] their engineers *not* to read the patents coming out of the PTO,”¹⁷² a presumption of injunctive relief for patent infringement may be necessary to help a small firm secure a commercial foothold.¹⁷³ Lemley and Shapiro’s proposals thus threaten to undermine the bases for such noncompeting firms’ capitalization, while reserving strong patent rights for companies who, due to market power, economies of scale, or other established commercial advantages, may be likely to need them least.¹⁷⁴

169. Cf. Kitch, *supra* note 30, at 287 (arguing that “[a]ny form of compulsory licensing destroys the prospect function” of patents, according to which patent rights encourage the efficient development of technology); Modlin & Glenn, *supra* note 47, at 136 (“[W]hile the highest percentage of independent inventors reported starting their own companies to commercialize their inventions, nearly as many independent inventors commercialized their inventions through licensing agreements or outright sale to others.” (citing Cynthia Wagner Weick & Cynthia F. Eakin, *Independent Inventors & Innovation: An Empirical Study*, 6 INT’L J. ENTREPRENEURSHIP & INNOVATION 1, 5 (2005))).

170. See, e.g., John M. Golden, *Biotechnology, Technology Policy, and Patentability: Natural Products and Invention in the American System*, 50 EMORY L.J. 101, 168–70 (2001) (describing how patents can help to attract investment in small biotechnology companies); Ronald J. Mann & Thomas W. Sager, *Patents, Venture Capital, and Software Start-ups*, 36 RES. POL’Y 193, 206 (2007) (“[T]here are strongly significant correlations between variables of patenting, on the one hand, and . . . rounds of financing, total investment, exit status, reaching a late stage of financing, and longevity.”). *But cf.* Mann, *supra* note 7, at 974 (indicating that patents are of doubtful value to start-up software firms until the firms “mov[e] beyond infancy—to a stage with revenues or a product”).

171. George Stalk, Jr. & Rob Lachenauer, *Hardball: Five Killer Strategies for Trouncing the Competition*, HARV. BUS. REV., Apr. 2004, at 62, 68 (“[H]ardball players [are] willing to steal any good idea they see—as long as it isn’t nailed down by a robust patent . . .”).

172. Shapiro, *supra* note 2, at 22.

173. Cf. Eric C. Wrzesinski, Comment, *Breaking the Law to Break into the Black: Patent Infringement as a Business Strategy*, 11 MARQ. INTELL. PROP. L. REV. 193, 206 (2007) (concluding that “current U.S. patent laws afford inadequate protections” against willful infringement).

174. See, e.g., Allison et al., *supra* note 127, at 468 (“Small inventors are the ones least likely to be able to commercialize their inventions, and therefore the ones most dependent on patent law to create a market for licensing.”); Bessen & Meurer, *supra* note 47, at 13 (“[I]ndependent inventors

Hence, if one believes that legal rules should tend to err in favor of procompetitive rather than anticompetitive effects,¹⁷⁵ Lemley and Shapiro's proposal for a discriminatory rule regarding permanent injunctions seems backward: (1) the situations where Lemley and Shapiro most favor permanent injunctions—situations where patent rights are held by competitors or exclusive licensors—may be those in which patent holders are most likely to use patents to suppress competition;¹⁷⁶ and (2) the situations where Lemley and Shapiro disfavor injunctions—situations where the patent holder's only profit comes by authorizing others to use the invention—may be those in which (a) it is most likely that the rational patent holder will want to license rather than to suppress, and (b) the ability to protect inventive ideas through injunctions may be most critical to attract investment. In accordance with such a viewpoint, when in 1908 the Supreme Court considered whether the nonuser owner of a patented invention could obtain an injunction in *Continental Paper Bag*, concern with permitting an injunction was argued to be particularly sharp *because of, not in spite of*, the nonuser's status as a competitor.¹⁷⁷

In a variety of situations, of course, comparative lack of anxiety regarding the granting of permanent injunctions to licensors may prove misguided. Lemley and Shapiro's analysis rightly suggests at least one possible reason why such conventional wisdom might fail. Even though a nonpracticing or otherwise noncompeting patent holder may *ultimately* want to license, that patent holder may also have reason to hold out for an exorbitant reward—one inflated to an economically wasteful level by the threat of an eventual permanent injunction.

But Lemley and Shapiro have not provided evidence “demonstrating” that the threat of injunctions “systematically” produces such excessive rewards. Nor have they shown that excessive rewards are particularly likely to be associated with noncompeting patent holders. Even if such patent

and small firms are probably more dependent on the patent premium than other patent holders. Large firms have a wider variety of methods for extracting value from their inventions”); Mann, *supra* note 7, at 967–68 (“[In the software industry, the] effects of patents are much more likely to benefit small firms and contribute to industry fragmentation than to benefit large firms and contribute to industry concentration.”).

175. See, e.g., Merges & Nelson, *supra* note 31, at 908 (“Public policy, including patent law, ought to encourage inventive rivalry, and not hinder it.”).

176. See *supra* note 163 and accompanying text; see also Lanjouw & Lerner, *supra* note 75, at 573 (“[P]ractitioner accounts suggest that . . . many firms request preliminary injunctions not just to avoid ‘irreparable harm’ but also to impose financial stress on their rivals.”).

177. See *Cont'l Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 429 (1908) (“As to the suggestion that competitors were excluded from the use of the new patent, we answer that such exclusion may be said to have been of the very essence of the right conferred by the patent”); see also *Cont'l Paper Bag Co. v. E. Paper Bag Co.*, 150 F. 741, 746, 745–46 (1st Cir. 1906) (Aldrich, J., dissenting) (stating that while a patent owner may choose not to use an invention for many reasons, equity should not “help a monopolistic exclusion of a beneficial right from public use, when the purpose is to force another and a different thing upon the public”), *aff'd*, 210 U.S. 405 (1908).

holders benefit disproportionately from the ability to threaten an injunction, this “equitable gain” may not suffice to overcome severe handicaps that they may face at the bargaining table: for example, (1) the potential infringer’s knowledge that the patent holder ultimately needs to license the invention if it is to profit from its use in the relevant market; (2) information asymmetries that likely favor the potential infringer; and (3) the patent holder’s potential lack of a substantial revenue stream, independent of licensing, with which to fund years of litigation.

Indeed, in the face of an obstinate adversary who asserts that the patent holder’s claims are both invalid and in the alternative, not infringed, and who also promises to defend these assertions in litigation likely to last years and to cost millions in attorney fees,¹⁷⁸ a noncompeting patent holder may be especially likely to cave and to accept substantially less than a patented invention’s more intrinsic worth. Despite any threat of countersuit, a patent-holding competitor might have reason to be more resolute. To the extent litigation puts a cloud over the potential infringer’s business, the competing patent holder could benefit from a suit long before obtaining any court-issued remedies. If the aim is to shut down the competitor’s business, then an injunction, not damages or negotiated royalties, is the desired goal. Moreover, a competing patent holder may have the sort of “domestic industry” that will provide access to proceedings before the International Trade Commission (ITC)¹⁷⁹—an expedited path to stopping the importation of infringing products or services.¹⁸⁰

178. In an infringement suit brought in the district courts, summary judgment on the merits may not be available until more than a year after suit is filed—after months of discovery and a claim-construction hearing and order; a decision from a trial on the merits will typically not be forthcoming for nearly two years. See Steve Seidenberg, *Patent Rocket Docket: Patent Holders Choose the International Trade Commission for Fast, Powerful Results*, A.B.A. J., Jan. 2007, at 38, 38 (reporting that the ITC “acts more quickly than other so-called rocket dockets, experts say”; whereas the ITC will “issue a decision . . . usually within 14 months” of a complaint, “[i]t takes at least 22 months for an infringement case to go to trial in most district courts”); see also Landes, *supra* note 77, at 770 & n.51 (reporting that “[t]he mean time from filing [of a patent suit] to termination by trial” was “658 days in 1997,” but higher than this from 1998 to 2000). Consideration of damages may be delayed until after a trial on liability, and injunctive relief may be stayed for additional months pending appeal. See, e.g., *Nichols Inst. Diagnostics, Inc. v. Scantibodies Clinical Lab., Inc.*, 166 F. App’x 487, 488–90 (Fed. Cir. 2006) (granting a stay of a permanent injunction pending appeal); *PIN/NIP, Inc. v. Platte Chem. Co.*, 304 F.3d 1235, 1240–41 (Fed. Cir. 2002) (noting bifurcation of the case into separate liability and damages trials). Further, a defendant may instigate further delay by triggering reexamination proceedings before the Patent and Trademark Office, for which district courts often stay court proceedings. See, e.g., *Animatics Corp. v. Quicksilver Controls, Inc.*, 102 F. App’x 659, 663 (Fed. Cir. 2004) (noting that the district court “stayed proceedings in the infringement case” after the alleged infringer “filed two separate reexamination requests with the United States Patent and Trademark Office”). During the several years that it can take to obtain a permanent injunction, the defendant may redesign its accused product or process multiple times, or perhaps stop manufacturing or using it simply because it has become obsolete.

179. 19 U.S.C. § 1337(a)(2) (2000); see also *Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003) (“A requirement of a patent-based section 337 action is that a domestic

Where does this leave us? Even if there is a problem with the access to permanent injunctions that courts have traditionally accorded, we have significant cause for concern that Lemley and Shapiro's proposal for categorical discrimination against noncompeting patent holders is a suspect response. Systematically curtailing injunctive relief for such patent holders may inflict injury on patent trolls, but it may also victimize those classes of inventors whom patent law should be most careful to protect.¹⁸¹

VI. Conclusion

The Supreme Court's decision in *eBay* has generated debate about when district courts should issue permanent injunctions against patent infringement. A number of district courts have responded to suggestions in Justice Kennedy's concurring opinion that injunctions may not be appropriate in cases involving plaintiffs who are mere patent holding companies.¹⁸² Since *eBay*, when infringers have contested noncompeting patent holders' requests for injunctions, the district courts have repeatedly denied such relief.¹⁸³

This Commentary questions the wisdom of an approach to permanent injunctions that categorically discriminates against nonpracticing or otherwise noncompeting patent holders. Along with history, policy may support a rebuttable presumption that after infringement has been proven and patent claims' validity has been upheld, a patent holder, no matter its identity, should obtain a permanent injunction where there is a substantial threat of continued infringement. Concerns about the effects of such a rebuttable presumption might be effectively accommodated by proper provision for stays of injunctions or by reference to traditional grounds for denying injunctive relief—such as a substantial threat of undue hardship to the infringer or of harm to the public interest. Moreover, even if other policy solutions should be considered, additional concerns argue against a per se rule that discriminates directly between patent holders based on their

industry 'relating to the articles protected by the patent . . . exist[] or [be] in the process of being established.'" (quoting 19 U.S.C. § 1337(a)(2)).

180. See Seidenberg, *supra* note 178, at 38.

181. Whether "patent trolls"—whatever their definition—are a category of being that deserves special injury rather than tolerance or perhaps even encouragement, itself appears unanswered. See, e.g., Mann, *supra* note 7, at 1024 ("Essentially, trolls are serving a function as intermediaries that specialize in litigation to exploit the value of patents that cannot be exploited effectively by those that have originally obtained them."); McDonough, *supra* note 7, at 223 (arguing that despite often being described derogatorily as "trolls," "patent dealers" serve the public interest "by increasing patent liquidity and decreasing risk, . . . serv[ing] as a focal point for the patent market[, and] encourag[ing] people to invent around patents"). By only requiring reduced patenting fees from small entities, Congress has signaled that it wishes to use the patent system to encourage the patenting of inventions by them. Ronspies, *supra* note 52, at 193–94.

182. See *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 1842 (2006) (Kennedy, J., concurring).

183. See *supra* note 12 and accompanying text.

business model. Lemley and Shapiro’s article has attracted this Commentary’s attention because it advocates such a rule—one that discriminates between competing and noncompeting patent holders in the application of a presumption of injunctive relief.

By showing how design-around costs can come to dominate a potential infringer’s cost-benefit analysis and how the embedding of patented inventions within larger systems or processes can make disproportionate rewards especially likely, Lemley and Shapiro have performed useful tasks.

But they overreach when they assert that they have proven that “patentees whose inventions are only one component of a larger product are systematically overcompensated.”¹⁸⁴ Lemley and Shapiro’s theoretical analysis is undercut by their failure to develop a normatively justified baseline against which the excessiveness of patent rewards can be measured. Further, their theoretical model for negotiated royalties neglects much that is significant in determining the amount of compensation that patent holders actually receive—including considerations relating to the cost and length of litigation, information asymmetries, uncertainty about the value of patented inventions, and even the limited nature of the patent term. Lemley and Shapiro’s empirical evidence is too scattered and incomplete to make up for the deficiencies in their theoretical model. Consequently, although Lemley and Shapiro do show a mechanism through which a patent holder *might* be overcompensated, they have not proven that such an event has actually occurred and certainly have not proven that it occurs systematically.

It is undoubtedly true that under various circumstances, patents can produce rewards for patent holders that are disproportionate to the patented inventions’ social worth. Some rewards may be disproportionately high, others disproportionately low. This is a relatively predictable aspect of a legal regime providing substantially uniform, property-like rights in exchange for the public disclosure of any of a number of kinds of invention. By itself, arguments that such a regime is not narrowly tailored to its purpose point out one drawback of such a regime but do not necessarily provide a clarion call for reform. In the absence of greater theoretical or empirical support for the proposition that the patent system generally overcompensates broad categories of patent holders, adoption of a discriminatory system of remedies—one that could substantially close the doors of equity to independent inventors, research-oriented start-ups and spin-offs, universities, and patent holding companies—threatens not only to mock true “equity” but also to discourage efficient markets in innovation and patent-rights ownership.

184. Lemley & Shapiro, *supra* note 7, at 2044.